

NUMBER 514
6 JULY 2007

CONTRIBUTIONS IN SCIENCE

REVISION OF THE NEOTROPICAL CLICK
BEETLE GENUS *SEMIOTUS* ESCHSCHOLTZ
(COLEOPTERA: ELATERIDAE)

SAMUEL A. WELLS

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NATURAL HISTORY MUSEUM
OF LOS ANGELES COUNTY
900 EXPOSITION BOULEVARD
LOS ANGELES, CALIFORNIA 90007

Printed at Allen Press, Inc., Lawrence, Kansas
ISSN 0459-8113

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SAMUEL A. WELLS¹

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DEDICATION

This revision is dedicated to Jacques Chassain, a longtime student of *Semiotus* and an invaluable resource in this study.

ABSTRACT. The Neotropical click beetle genus *Semiotus* is defined by the connate meso- and metasterna, presence of 3 membranous tarsal pads, and either sulcate, undulate, tuberculate, rounded, or incrassate pronotal margins. Eighty-two species are recognized in this revision. Twenty-one are described as new: *Semiotus aliciae*, *S. angustus*, *S. catei*, *S. chassaini*, *S. clarki*, *S. colombianus*, *S. cyrtomaris*, *S. gibbosus*, *S. kathleenae*, *S. kondratieffi*, *S. lacrimiformis*, *S. melleus*, *S. pallicornus*, *S. perangustus*, *S. pilosus*, *S. rileyi*, *S. rubricollis*, *S. spinosus*, *S. trinitensis*, *S. triplehorni*, and *S. woodi*. *Semiotus superbus reductus* Chassain is designated as a synonym of *S. acutus* Candèze; *S. candezei* Kirsch is designated as a synonym of *S. affinis* Guérin; *S. multifidus* Candèze is designated as a synonym of *S. fascicularis* Candèze; *S. bifasciatus* Schwarz is designated as a synonym of *S. fulvicollis* Blanchard; *S. melanocephalus* Schwarz is designated as a synonym of *S. antennalis* Candèze; *S. dohrni* Candèze is designated as a synonym of *S. badeni* Steinheil; *S. illigerii bifidus* Schwarz is designated as a synonym of *S. illigeri* Candèze; *S. imperialis subtilis* Szombathy and *S. i. schenklingi* Szombathy are designated as synonyms of *S. imperialis* Guérin; *S. borvathi* Szombathy is designated as a synonym of *S. limatus* Candèze; *S. nigrolineatus* Schwarz is designated as a synonym of *S. nigriceps* Candèze; *S. distinctus* Herbst is designated as a synonym of *S. serraticornis* Drury; *S. superbus championi* Chassain is designated as a synonym of *S. exsolutus* Candèze; *S. punctatus* Candèze is designated as a synonym of *S. germari* Guérin; *S. nigrolineatus* Schwarz is designated as a synonym of *S. nigriceps* Candèze; *S. hispidus lamotei* Chassain is designated as a synonym of *S. hispidus* Candèze; *S. langei* Schwarz is designated as a synonym of *S. schaumii* Guérin; *S. jansonii* Candèze and *S. jansonii bipunctatus* Schwarz are designated as synonyms of *S. taeniatus* Erichson; *S. splendidus* Candèze is designated as a subspecies of *S. cuspidatus* Chevrolat; and *S. sanguinolentus* Candèze is designated as a synonym of *S. virgatus* Erichson. *Semiotus superbus kirschi* Chassain is designated as a valid species, and *S. exsolutus panamensis* Chassain is recognized as a valid subspecies. A key to the known *Semiotus* is provided.

INTRODUCTION

The click beetle genus *Semiotus* Eschscholtz 1829 is one of the most striking groups of beetles in the Americas. The relatively large size and bright colors of many species have made them popular with collectors for over a hundred years. Specimens have been collected, named, and cataloged from the time of Linnaeus, and examples exist in European and American collections that now span almost 4 centuries. Yet, remarkably, the genus has received only 3 treatments that have provided any significant comparative information. Two of these treatments were produced by Candèze (1857, 1874) and 1 by Champion (1894). Since Candèze's *Révision de la Monographie des Elatérides* (1874), there have been 42 names proposed. These names have been both specific and subspecific and have been published in a variety of languages and with differing quality, making specific determinations difficult. A revision of the group is needed to establish or verify synonymies, delimit poorly known species, clarify distributions, and describe unnamed species.

This study brings together all available information on the genus *Semiotus*. Very little is known of the biology and immature stages of this group outside the few reports from Brazil and Chile (Costa, 1972; Costa et al., 1988; Orellana, 1938).

HISTORY

Eschscholtz (1829) described the genus *Semiotus* in order to distinguish those *Elater* Linnaeus (1767) with frontal tubercles or spines and that bear tarsal pads on tarsomeres 1, 2, and 3. He included the species *E. lignarius* Fabricius (1792),

E. distinctus Herbst (1806), *E. intermedius* Herbst (1806), and *E. furcatus* Fabricius (1792) in the genus. Candèze (1857) established the tribe Chalcolepidiides and included the genera *Semiotus*, *Campsosternus* Latreille (1834), *Chalcolepidus* Eschscholtz (1829), and his new genus *Oistus* Candèze (1857). The tribe was established to include those species of click beetles having the mesosternum and metasternum fused, without a defining sulcus. Within the tribe, the genus *Semiotus* was distinguished from the other genera by the presence of lobes on the first 3 tarsomeres. Later authors would place the genus *Oistus* next to *Semiotus* based on this same character. Candèze (1857) considered the tarsal pads of the genus *Oistus* to be different than those of *Semiotus*, which he called lamellae. Candèze's work was also the first general treatment of the species including a key to the recognized species.

Fleutiaux (1927) erected the subfamily Campsosterninae, which excluded *Semiotus*. The genus was considered sufficiently distinct from *Campsosternus* to merit placement in a separate subfamily. The characters used to justify this separation included the narrow elytra and the frontal spines. Quelle (1929) and Laurent (1961) confirmed the separate status of these 2 genera and included the presence of tarsal lobes in defining the genus *Semiotus* (and their absence in the genus *Campsosternus*) on tarsomeres 1, 2, and 3 as further evidence for separating the genera.

Golbach (1970) established the subfamily Semiotinae to recognize the genera excluded from Fleutiaux's Campsosterninae. The genera in the new subfamily included *Semiotus*, *Oistus*, and *Semiotinus* Pjatakova. The primary characters of the subfamily were the fused meso- and metasterna and the presence of tarsal lobes or pads on

segments 1, 2, and 3. Gurjeva (1974), overlooking Golbach's work, established the tribe Semiotini to include the same genera.

Stibick (1976) moved *Campso sternus* into Golbach's Semiotinae and recognized Campso sterninae as the senior name. He was unaware of Gurjeva's tribal designation of *Semiotus* and allied genera until after publication. Calder (1976) included the New Zealand genus *Metablax* in the subfamily Campso sterninae and separated it from the genus *Semiotus* by having a distinct fourth tarsomere (as compared to the partially concealed fourth tarsomere of *Semiotus*) as well as its lack of abdominal foveae on sternite 5 (often present in *Semiotus*). In 1979, Stibick established the tribe Campso sternini to coincide with Gurjeva's Semiotini with the addition of the genus *Campso sternus*. Wells (2002), following Lawrence and Newton (1995), recognized the subfamily Semiotinae to include the genera *Semiotus*, *Semiotinus*, and *Oistus*.

MATERIALS AND METHODS

The following collections provided material for this study. Specimens belong to the following institutions (codens from Arnett et al., 1993) or private collections. These are the same codens used as institutional designators in the individual species treatments.

BMNH	United Kingdom, London, The Natural History Museum
BWPC	USA, North Carolina, Cary, Bonta/Wells Personal Collection
BYUC	USA, Utah, Provo, Brigham Young University
CASC	USA, California, San Francisco, California Academy of Sciences
CMNC	Canada, Ontario, Ottawa, Canadian Museum of Nature
CNCI	Canada, Ontario, Ottawa, Canadian National Collection of Insects
CMNH	USA, Pennsylvania, Pittsburg, Carnegie Museum of Natural History
CSUC	USA, Colorado, Fort Collins, Colorado State University
CUIC	USA, New York, Ithaca, Cornell University
DEIC	Germany, Eberswalde Finow, Institut für Pflanzenschutz-forschung
EAPZ	Honduras, Tegucigalpa, Escuela Agrícola Panamericana
EGRC	Edward G. Riley
EMEC	USA, California, Berkeley, Essig Museum
FMNH	USA, Illinois, Chicago, Field Museum of Natural History
FSCA	USA, Florida, Gainesville Florida State Collection of Arthropods
HNHH	Hungary, Budapest, Hungarian Natural History Museum
INBC	Costa Rica, Santo Domingo, Instituto Nacional de Biodiversidad
ISNB	Belgium, Brussels, Institut Royal des Sciences Naturelles de Belgique
JEWC	James E. Wappes
LACM	USA, California, Los Angeles, Los Angeles County Museum of Natural History
MNFD	Germany, Breisgau, Museum für Naturkunde

MNHN	France, Paris, Museum National d'Histoire Naturelle
MTEC	USA, Montana, Bozeman, Montana State University
NHMW	Austria, Vienna, Naturhistorisches Museum
OSUC	USA, Ohio, Columbus, Ohio State University Collection
OXUM	United Kingdom, Oxford, University Museum
PCCV	Austria, Vienna, Peter Cate Collection
SEMC	USA, Kansas, Lawrence, University of Kansas
SMTD	Germany, Dresden, Staatliches Museum für Tier-kunde
TAMU	USA, Texas, College Station, Texas A&M University
USNM	USA, D.C., Washington, Smithsonian Institution
ZMUC	Denmark, Copenhagen, Zoologisk Museum, Copenhagen University

Color terminology was standardized by using the color charts in *A Dictionary of Color* (Maerz and Paul, 1950) and then correlated with color descriptions found in W.T. Stern's *Botanical Latin* (1983). These sources should be consulted for precise identification of the colors in this study. A general description of the main colors referred to herein include aeruginosus: verdigris; aurantiacus: apricot orange; badius: dull chocolate brown; fulvus: dull yellow with a mixture of gray and brown; luteus: buttercup yellow; piceus: black as pitch; rufopiceus: reddish black (in this study more black than reddish); sanguineus: blood red; testaceus: brick red to brownish yellow (of unglazed earthenware); and viridis: untinted green. These color names are herein considered anglicized and will not be italicized. Spelling corresponds with Stern (1983).

Measurements of body length were made from the anterior margin of the frons (including frontal spines when present) to the tip of the elytra (including spines, when present). Abdomena extending beyond the elytra were not measured, as this is not the normal state of any known species. Measurements of body width were made at the widest part of the body—generally on the basal third of the elytra. Pronotal length was measured along the centerline of the pronotum. Pronotal width was measured at the widest part of the hind angles. Elytral length was measured along the suture. Elytral width was measured at the widest point—generally on the basal third. The relative width of the eyes was determined using the ocular index (Campbell and Marshall, 1964). This is determined by measuring the narrowest distance between the eyes divided by the width of the head measured across the eyes. This quotient is then multiplied by 100.

Male and female internal genitalia were examined after dissection and cleared in a 1.0 molar solution of KOH at room temperature. Dissections were made from nontype material, except where available material was limited. Fragile type material was not dissected.

Location information in the Material Examined sections are taken verbatim from the specimen labels. Dates recorded on the labels have been standardized so as to be read month (in roman numerals)–day–year. In cases where these periods are uncertain, the data have remained exactly as indicated on the labels. Larger political divisions have also been added in cases where they have not appeared on labels and where they could be determined. Duplicate specimens of the same species bearing identical labels are only listed once. Specimens bearing labels with country data only were not listed if

these countries were already represented by specimens containing a more complete label. Labels that were nearly identical except for minor difference (such as a different collection date) were listed together with the second label indicated with "ibid." followed by a comma and the differing information. Label data are listed alphabetically first by country and then by the political subdivision of each country. Countries are indicated in all capital bold letters. Political subdivisions are underlined.

Older literature and specimen labels often have a collection locality of New (or Nouvelle) Granada. This area is now part of the countries of Colombia, Ecuador, and Panama (occasionally even outlying areas). This name is used in individual species treatments only in cases where the current country names are unknown from other specimens.

All available or extant type specimens were examined. The Pjatakowa types were destroyed (Dolin, personal communication). Types of the species described prior to Blanchard (1843) were not located. In the cases where adequate descriptions and/or illustrations of these species were made (e.g., *Semiotus serraticornis* Drury [1782] and *S. angulatus* Drury [1782]), correct designations were made, otherwise, the designations made by Candèze (the earliest reviser) have been followed. More than 3,000 specimens of *Semiotus* were examined.

SYSTEMATICS

TAXONOMIC CONCEPTS

Many authors have recognized that the subgeneric groups established by Candèze are often more confusing than helpful. These were based primarily on frontal spines and elytral color patterns and do not represent true relationships. The color patterns of the head, thorax, and abdomen, though they are often useful in delimiting species, are of little use in delimiting groups. The taxonomic section of this study, accordingly, does not recognize Candèze's groups. Five monophyletic groups established by Wells (2002) within *Semiotus* are noted parenthetically in the key for ease in identification. These same groupings are used in the individual species treatments. Color illustrations are provided throughout the work to aid in identification.

In this study, approximately one-third of the 82 recognized *Semiotus* are represented by only a few (or even unique) individual specimens. Approximately one-third are represented by only a dozen or so individuals. The remaining one-third are more commonly encountered in collections. Intraspecific variability in poorly represented *Semiotus* is not well understood. The best approach under these circumstances is to be conservative in delimiting species.

Subspecies are recognized (for previously recognized species or varieties) only in cases where differences in color patterns have been geographically correlated and where existing names are available, thus maintaining taxonomic stability.

DIAGNOSTIC CHARACTERS OF ADULTS

Historically, the principal characters used to define species of *Semiotus* were color patterns, frontal spines, pronotal shape, and elytral spines. Standardizing these characters has therefore been an important part of this study. Additionally, other characters not used in the past have proven helpful for determining relationships.

The anterolateral frontal spines are nearly always clearly defined (see Figs. 135–154). In a few cases where spines are absent, there is a fairly sharp angle. Illustrations have been included in this study to obviate any possible confusion. The medial frontal spine is different. Authors in the past have referred to sharp angles as spines. This can be confusing, as there are several lengths and widths of the medial frontal spine. In cases where this might be unclear, illustrations have been prepared (Figs. 135–154).

Antennae are moderately to strongly serrate except in the *S. angulatus* group, where they are pectinate to subpectinate. In few other cases can the antennae be used to differentiate groups, except where differences exist in antennal length. Males generally have longer antennae than females. The difference can be as much as the length of 1.5 segments or completely negligible.

The size of the eyes also differs interspecifically, ranging from large (covering about half the head width) to small (covering less than a fourth the head width). Measurements have been made using the ocular index (see above).

Differences in pronotal shape show the most significant and easily recognized characters defining species groups and individual species. These characters tend to be consistent between groups with little if any overlap. The presence or absence of the marginal sulcus, the length of this sulcus, the presence or absence of lateral tubercles, the size of these tubercles, and the presence or absence of sublateral depressions are all defining characters. On the other hand, pronotal coloration is significantly less diagnostic. The presence and absence of piceus to sanguineus vittae have been used extensively in the past for defining species. This is unfortunate, as these vittae vary intraspecifically to a great extent. In this study, several specimens have been evaluated with obscure vittae, clearly intermediate in color between 2 previously described species. These have been synonymized in sympatric groups where no other diagnostic characters have been found.

Important thoracic characters also occur ventrally. The apical portion of the prosternal process is partially divided dorsoventrally in a few species; otherwise, it is evenly rounded at the tip. The posterior border of the hypomeron is more variable interspecifically. Species in the *S. imperialis* group have the median half of the posterior border evenly concave with a small dentition near

the distal third (Fig. 180). In the *S. furcatus* group, species bear 2 dentitions near the middle of the posterior border (Fig. 182), and in most other groups, a single dentition is present near the mesial third to half of the posterior border (Figs. 178, 179, 181). The size of the dentitions is also important for separating some species.

The scutellum varies diagnostically in shape, being often nearly chordate, elongate oval, obovate, or quadrate. In some species the anterior margin dips anteriorly. The color of the scutellum ranges from completely piceus to luteus.

Elytral coloration is useful in separating many species—more useful than pronotal coloration. The major patterns include alternating light and dark vittae, contrasting basal and apical coloration, and luteus basal coloration with contrasting dark sutural and marginal vittae. The body profile is also diagnostically important. Typically, the dorsal and ventral surfaces are parallel, at least on the basal half or third. Some species, though, are more gibbous, with the dorsal surface raised basally relative to the ventral surface. Elytral characters of importance include the striae and stria punctures, which often vary from completely obsolete to deep and well defined. The shape of the elytral apices are also diagnostically important, ranging in shape from sharply spined to rounded. The sutural side of the apices also varies, ranging in shape from straight, to sinuous, to sharply angled or even spined.

Male and female genital characters are also important. The male parameres range from narrow (as in Fig. 111) to broad (as in Fig. 106) and always bear an apical blade. This blade varies significantly in size and shape ranging from triangular with sharp angles to sinuous with rounded extremities. The anterior sclerite of the female bursa copulatrix also differs significantly between species. The typical pattern includes a median piece, or spine, flanked by 2 lateral arms, or spines. These spines vary in relative length and can be either completely covered by smaller dentitions (as in Fig. 43) or smooth (as in Fig. 51). In some species, the lateral arms all project posteriorly (as in Figs. 72–90); in others, they project laterally (as in Figs. 43, 45). A few species have a vestigial sclerite (as in Figs. 57, 60, 67); in a few others, the sclerite is absent.

SPECIES RELATIONSHIPS

Semiotus is most closely allied to the genera *Semiotinus* and *Oistus* (Golbach, 1970; Gurjeva, 1974). Wells (2002) established the monophyly of these groups as well as several other species groupings that can be easily identified using morphological characters. Species that do not form natural groupings have been left ungrouped in this revision. These species groupings are indicated below.

The *S. angulatus* group is recognized by the subpectinate to pectinate antennae (Figs. 166, 167) and the divided lateral arms of the anterior sclerite of the female bursa copulatrix (Figs. 41, 43–45). The species include *S. angulatus* (Drury), *S. angusticollis* Blanchard (1843), *S. convexicollis* Blanchard (1843), and *S. insignis* Candèze (1857). This species group occurs throughout Central America and into South America to southern Brazil.

The *S. caracasanus* group is recognized by the evenly convex pronotum and the lack of any undulations, sulci, or protuberances on the pronotum or pronotal margins (Figs. 195–206). Species in this group are small to medium-sized (generally less than 20 mm long) *Semiotus*. The species include *S. antennalis* Candèze (1895), *S. caracasanus* de Rojas (1855), *S. carus* Janson (1882), *S. chortalenus* Candèze (1874), *S. cyrtomaris* n. sp., *S. lacrimiformis* n. sp., *S. matilei* Chassain (2001), *S. nigriceps* Candèze (1857), *S. pallicornus* n. sp., *S. rileyi* n. sp., *S. spinosus* n. sp., *S. triplehorni* n. sp., *S. woodi* n. sp., and *S. zonatus* Candèze (1874). This species group occurs from Nicaragua to Bolivia and east to Brazil.

The *S. furcatus* group is recognized by the double dentitions along the posterior border of the hypomera (Fig. 182). The species include *S. antennatus* Schwarz (1900), *S. bilineatus* Candèze (1857), and *S. furcatus* (1792) Fabricius. This species group occurs in South America from near the Tropic of Capricorn north.

The *S. imperialis* group is recognized by the single ventrally projecting frontal spine (Fig. 140) and small female foveae on sternite 5, which occupies only the apical fourth of the sternite. The species in this group are the largest in the genus and include *S. cuspidatus* Chevrolat (1834) and *S. imperialis* Guérin (1844). This species group occurs throughout Central America and into South America east to Guyana and south to northern Argentina.

The *S. ligneus* group is recognized by the lack of frontal spines (Figs. 193, 194), lack of anterior sclerites (within the bursa copulatrix), and large ocular index. The species include *S. ligneus* Linnaeus (1767) and *S. serraticornis* Drury. This species group occurs from Mexico to southern Brazil and Paraguay.

Semiotus can be separated from *Oistus* by having the tarsal pads membranous. Tarsal pads in *Oistus* are composed of tightly compacted setae. *Semiotus* can be separated from *Semiotinus* by having a pronotum with marginal striae or by having an evenly arcuate pronotal margin. In *Semiotinus* the pronotal margin is without sulci and comes to a sharp angle that separates the disk from the hypomera (Wells, 2003). Several species of *Semiotus* in the *S. caracasanus* group are superficially similar to the species of *Semiotinus* that bear frontal spines (*S. macer* (Candèze) and *S. aeneovittatus* (Kirsch)). Both groups lack

marginal sulci. In these cases, species of *Semiotus* can be recognized by the broader pronotal border (joining the hypomera in an even curvature and not acutely as in *Semiotinus*) and by the very finely punctate pronotum and elytra having faint striae. The pronotal punctures in *Semiotinus* are deeper, and the striae and strial punctures are clearly defined.

Other important diagnostic characters have much less phylogenetic information. Examples of these characters include the condition of the lateral margin of the pronotum, pronotal shape (including tubercles and callosities), elytral coloration, and shape of male genitalia and female foveae (or lack of foveae) on sternite 5.

The anterior sclerite of the bursa copulatrix is partially informative. The *S. angulatus* group is partially defined by the divided lateral arms of the anterior sclerite. This condition is not evident in any other known species. Otherwise, the shape of the lateral and central arms of the anterior sclerite and the presence or absence of sharp dentitions do not provide useful phylogenetic information. A few unrelated species have reduced anterior sclerites (*S. rileyi*, *S. luteipennis*, *S. hispidus* (Candèze, 1889), *S. pallicornus*, and *S. angustus*). *Semiotus ligneus* and *S. serraticornis* lack anterior sclerites.

The short (3 to 4 segments short of the hind angles of the pronotum) subpectinate to pectinate antennae are unique to the *S. angulatus* group. Other species have antennae of varying lengths with serrate antennal segments ranging from subquadrate to elongate, rectangular. The *S. ligneus* group has serrate and rectangular antennal segments. The *S. furcatus* group has short (3 to 5 segments short of the hind angles of the pronotum) serrate antennal segments.

Geographically, *Semiotus* occurs from Mexico south to central Chile and east to Eastern Brazil. The genus is most species rich in Colombia, Ecuador, and Venezuela.

A few species (e.g., *S. linnei* (Guérin-Méneville (1844), *S. hispidus*, *S. illustris* (Dejean, 1836), and *S. sommeri* (Candèze, 1857)) occur uniquely from northern South America. Two distinct species are herein described from this area (*S. kondratieffi* and *S. kathleenae*). *Semiotus kondratieffi* was collected from Venezuela from a pass near a wind current that was likely carrying canopy-inhabiting insects.

Most of the species of *Semiotus* that are well represented in collections do not have restricted ranges. A large number of species are known from very few individual specimens. About a fourth of the species (21) are known from less than 3 or 4 specimens, making an accurate assessment of distribution difficult.

FOSSIL SEMIOTUS

Birket-Smith (1977) assigned *Elater ebrensværdis* Heer to *Semiotus*. The species was described from

an Eocene *Taxodium* layer from Cap Staratschin, Spitsbergen, Norway (78°7'N, 13°50'E). The generic placement was made based on the long tapering elytra, 9 visible elytral striae, and apical elytral spines. This designation is speculative and lacks the critical defining information of tarsal and sternal characters. Spitsbergen is far removed from the present locality of all species of *Semiotus* or any related genus.

Genus *Semiotus* Eschscholtz

Semiotus Eschscholtz 1829 (type species: *S. furcatus* Fabricius (*Elater*), designation Hyslop, 1921:668), Candèze 1857, Candèze 1874, Champion 1894.

Eucamptus Chevrolat 1834 (type species: *E. cuspidatus* Chevrolat).

Pericallus Lepeletier and Serville 1825:594 (type species: *S. ligneus* Fabricius (*Elater*), designation Hyslop, 1921:663).

DESCRIPTION. Length 7 to 50 mm, variously colored with combinations of red, orange, yellow, green, brown, and black. Head often spinose, bearing 0, 1, 2, or 3 anterior spines. Antennae serrate to pectinate, generally 1 to 4 segments short of hind angles, occasionally extending beyond hind angles; first 2 segments testaceous to piceus, remaining segments fulvus to piceus, last 3 to 4 segments occasionally lighter in color than medial segments. Pronotum longer than wide (occasionally as wide as long), evenly convex or with sublateral concavities; with or without setae, often glabrous, nitidus; punctation evenly scattered throughout or becoming denser and umbilicate anterolaterally; anterolateral margin with or without elevated callosities; margins convergent anteriorly, with or without defining sulcus, hind angles generally divergent. Epimeron elongate, posterior border sinuous and often dentate, partially enclosing procoxae. Prosternum lobed to subtruncate anteriorly, prosternal process straight or curved in profile, extending between procoxae to mesosternal fossa. Scutellum flat, convex laterally, or declivous anteriorly. Legs fulvus to piceus, tarsal segments 1, 2, and 3 lobed beneath; tarsal claws broad, without basal setae. Elytron widest anteriorly then narrowing to apex. Interstriae flat or convex, occasionally unequally elevated; elytral base on same plane as pronotum, occasionally gibbous, rising above level of pronotum; color various, often with alternating light and dark vittae; texture glabrous or covered with thin setae; abdomen fulvus to piceus, sternite 5 of females often with 2 foveae or densely setose areas. Bursa copulatrix in most species with 2 posterior plate-like sclerites and 1 spinose anterior sclerite. Male with parameres generally bearing a lateral blade apically.

Larva (full grown larvae) flattened dorsoventrally, sclerotized and often pilose, mandibles dark, situated on anterior region of head capsule.

Antennae 3-segmented, often bearing small apical sensorial appendages; prothorax trapezoidal, longer than mesothorax; prosternum triangular; legs short, 5-segmented, coxa wide and short, trochanter triangular, femur longer than tibia; abdominal segments variously pilose. Abdomen 9-segmented, often bearing tufts of setae laterally, segment 9 with projections distally.

Pupa aedeiticous, exarate, wing pads extending beneath body; prothorax with a pair of small projections; spiracles annular; last abdominal segment with a pair of small bifid spiniform projections distally.

REMARKS. Larvae of *S. ligneus* have been found in semirotten wood feeding on fly larvae (Costa et al., 1988).

KEY TO THE SPECIES OF SEMIOTUS

- 1 Head and pronotum entirely black . . . 2
- Head and pronotum not entirely black 4
- 2(1) Elytra blood red
 S. capucinus Candèze
- Elytra light brown, black, or black with pale vittae 3
- 3(2) Elytra either entirely black or black with pale vittae (Figs. 254, 255)
 S. hispidus Candèze (in part)
- Elytra light brown . . . *S. carimicollis* Kirsch
- 4(1) Head, pronotum, and entire venter of body unicolorous orange to light brown, elytra unicolorous black (Fig. 259) . . .
 S. aliciae n. sp.
- Head, pronotum, venter, and elytra variously colored, often with maculae or vittae, not fitting above description . . . 5
- 5(4) Pronotum not evenly convex, either with anterolateral foveae (as in Fig. 147), tubercles (Figs. 136, 143-145, 148, 154), longitudinal concavities or sublateral depressions; pronotal margin various, often separated from hypomeron by an acute margin or sulcus over anterior third or more (as in Figs. 30, 31, 33) 6
- Pronotum evenly convex across entire width (Fig. 32, best viewed from anterior aspect), without foveae, tubercles, longitudinal concavities or sublateral depressions; pronotum, on anterior 2/3 merging into hypomeron without acute margin or sulcus, or if faint sulcus present, then restricted to anterior seventh or less of lateral margin (*S. caracasanus* group) 25
- 6(5) Anterior margin of frons with 0, 1, 2, or 3 spines (as in Figs. 135-139, 141-154), single spine or point, if present, small and projecting forward, on same plane as frons (as in Fig. 139) 7
- Anterior margin of frons with a single long spine or point at center curving down toward mandibles (Fig. 140), end-

- ing below level of anterolateral frontal margins, (viewed laterally), anterolateral frontal margin rounded or angled, without spines 16
- 7(6) Antennae serrate (Figs. 261, 163-165), length various, if strongly serrate (appearing subpectinate), then antennae reach to or beyond hind angles; anterior sclerite of bursa copulatrix without lateral arms divided distally, or with sclerite vestigial or absent (Figs. 34-40, 42, 46-90) . . . 8
- Antennae subpectinate to pectinate and short, 3 or more segment-lengths from reaching hind angles (Figs. 166, 167, 260); anterior sclerite of bursa copulatrix with lateral arms divided distally (Figs. 41, 43-45 (*S. angulatus* group)) 18
- 8(7) Elytra without green or yellowish green coloration or patterns 9
- Elytra green or yellowish green throughout 24
- 9(8) Head lobed or angled along anterior margin, without spines (Figs. 136, 139, 149, 150) 10
- Head with frontal spines (Figs. 135, 137, 138, 141-148, 151-153) 11
- 10(9) Hypomera with outer fifth of posterior border pointed and extending well beyond level of the inner border (Fig. 179) 21
- Hypomera with outer fifth of posterior border not pointed or extending beyond level of the inner border (Fig. 178) . . . 78
- 11(9) Hypomeron without 2 teeth along mesial half of posterior border (as in Figs. 178, 181), a single tooth may be present on inner third; antennae various 12
- Hypomeron with 2 teeth along mesial half of posterior border (Fig. 182); antennae short, 3 or more segment-lengths from hind angles (*S. furcatus* group) 14
- 12(11) Head with 3 frontal spines, or with 2 spines and area between spines strongly angled (Figs. 142-148), in questionable cases, length of lateral spines will be 1/4 or less the distance between eyes (as in Fig. 143) 13
- Head with 2 frontal spines (viewed directly from above with body held level), area between spines without angle, or with very faint angle (Fig. 138), in questionable cases, length of lateral spines will be 1/3 or more than the distance between eyes (as in Figs. 141, 151) 65
- 13(12) Elytra yellow to light brown; each elytron with 2 dark red to black vittae, 1 sutural and 1 marginal, confluent apically, often forming a V-shaped pattern (Figs. 219-221, 223, 224) 38
- Elytra either unicolorous, mostly blood red, without dark vittae, or with alter-

	nating light and dark vittae (not restricted to suture and margin) across each elytron	42
14(11)	Antennal segments 1 and 2 light brown, middle segments nearly black, apical 3 or 4 segments pale yellow (Fig. 252)	
- <i>S. antennatus</i> Schwarz	
-	Antennae orange or yellow throughout	15
15(14)	Each elytron with 2 dark vittae (Fig. 250)	<i>S. bilineatus</i> Candèze
-	Each elytron with 3 dark vittae (Fig. 251)	<i>S. furcatus</i> (Fabricius)
16(6)	Posterior border of hypomeron with tooth or angle on medial third, lateral half convex (as in Fig. 178); female with foveae larger, covering over half of sternite 5 and shallow; each elytron bearing a single spine apically (Fig. 238)	<i>S. chassaini</i> n. sp.
-	Posterior border of hypomeron with tooth or angle on lateral third, concave on inner half (Fig. 180); female with foveae on sternite 5 small and restricted to apical fourth only; each elytron with 2 spines apically (<i>S. imperialis</i> group)	17
17(16)	Pronotum with 2 dark marginal maculae in addition to discal vittae (Fig. 187)	<i>S. imperialis</i> Guérin-Ménéville
-	Pronotum with discal vitta, without marginal maculae (Figs. 185, 186)	<i>S. cuspidatus</i> (Chevrolat)
18(7)	Pronotal tubercles each covered with a black macula in addition to discal vittae or maculae (Fig. 191)	<i>S. angusticollis</i> Blanchard
-	Pronotum variously patterned but tubercles same color as pronotal margin	19
19(18)	Pronotum with single (often cruciform) dark vitta on disk (Figs. 188–190)	<i>S. angulatus</i> (Drury)
-	Pronotum either with several small maculae, without vittae or with 2 sublateral dark vittae	20
20(19)	Antennae pectinate (Fig. 26); scutellum longer than wide (Fig. 161)	<i>S. convexicollis</i> Blanchard
-	Antennae subpectinate (Fig. 166); scutellum as wide as or wider than long (Fig. 160)	<i>S. insignis</i> Candèze
21(10)	Pronotum black with orange (or orange brown) to blood red vitta along each lateral margin (Fig. 248); elytral apices each bearing 2 small spines or dentitions (as in Fig. 168)	<i>S. luteipennis</i> Guérin-Ménéville
-	Pronotum variously colored, 1 or 2 dark vittae may be present on disk, but these are broken up with dull yellow to light brown areas between; elytral apices each bearing a single spine (as in Fig. 168)	22
22(21)	Pronotum with 2 black vittae (Fig. 249); frontal margin angled and jutting well beyond anterior margin of eyes (Fig. 136)	<i>S. kondratieffi</i> n. sp.
-	Pronotum with 1 or more light to dark brown vittae, without black vittae; frontal margin lobed anteriorly (Fig. 149, <i>S. ligneus</i> group)	23
23(22)	Pronotum with a single dark vitta on center of disk, distinctly darker than lateral areas or vittae; elytra with alternating light and dark vittae, interval 4 pale (Fig. 194)	<i>S. serraticornis</i> (Drury)
-	Pronotum with pale infusate vittae on pronotum, middle vitta or vittae not distinctly darker than lateral infusate areas; elytra with alternating light and dark vittae, interval 4 dark (Fig. 193)	<i>S. ligneus</i> (Linnaeus)
24(8)	Black pronotal vittae narrow, area between vittae as wide as or wider than vittae, color between vittae green (Fig. 257); each elytron bearing a short spine apically (Fig. 176)	<i>S. ligatus</i> Candèze
-	Black pronotal vittae wide, area between vittae narrower than vittae, color between vittae yellow to brownish orange to black (Fig. 256); each elytron rounded or angled at apex, without spines (Fig. 177)	<i>S. seladonius</i> Guérin-Ménéville
25(5)	Basal half of elytra yellow to orange, apical half black (Figs. 195–200), narrow black vitta may or may not be present along suture on basal half	26
-	Elytra with sutural and marginal vittae brown to black, otherwise bright yellow between vittae from base to near apex (Figs. 201–206)	33
26(25)	Pronotum unicolorous orange to blood red, hind angles may be paler (Fig. 200)	<i>S. rileyi</i> n. sp.
-	Pronotum bright yellow laterally, with median vitta dark (Figs. 195–199)	27
27(26)	Yellow marginal vitta of pronotum narrow, 2/3 width of scutellum or less	<i>S. zonatus</i> Candèze
-	Yellow marginal vitta of pronotum wide (at least near center), as wide as or wider than scutellum	28
28(27)	Last 4 segments of antennae pale yellow	29
-	Last 1, 2, or 3 segments of antennae pale yellow, or antennae entirely black	30
29(28)	Elytral suture with black vitta on basal half (Fig. 197) in addition to entire apical half of elytra	<i>S. woodi</i> n. sp.
-	Elytral suture without black vitta on basal half	<i>S. chontalenus</i> Candèze
30(28)	Antennae with segments 4 to 11 dark red brown to black	31

- Antennae with segments 4 to 11 not entirely dark, at least 1 apical segment pale yellow 32
- 31(30) Parameres with apical blades 1/5 length of parameres (Fig. 114); Venezuela *S. caracasanus* Rojas
- Parameres with apical blades more than 1/4 length of parameres (Fig. 113); Costa Rica, Panama, Colombia, Ecuador *S. spinosus* n. sp.
- 32(30) Black pronotal vitta nearly 2 times wider at base than near anterior margin (Fig. 198); apical black portion of elytra not extending onto basal half along margin, line between elytral colors nearly straight; lateral area of pronotum orange anteriorly, dull to bright yellow basally *S. triplehorni* n. sp.
- Black pronotal vitta less than 1.6 times wider at base than on anterior margin (Fig. 199); apical black portion of elytra extending onto basal half along margin, line between elytral colors deeply concave on apical half; lateral area of pronotum uniformly dull to bright yellow *S. lacrimiformis* n. sp.
- 33(25) Antennae pale yellow throughout *S. pallicornus* n. sp.
- Antennae with at least middle segments reddish black to black 34
- 34(33) Scutellum subquadrate, anterior margin wider than 1/2 greatest width (Fig. 158) *S. matilei* Chassain
- Scutellum subtriangular, anterior margin 1/2 or less greatest width (Fig. 156) 35
- 35(34) Male with aedeagus strongly arched dorsoventrally (Fig. 105); elytra with dark marginal vitta extending entire length of elytra (though thin on anterior fourth) when viewed from above (Fig. 201) *S. cyrtomaris* n. sp.
- Male with aedeagus not strongly arched dorsoventrally; elytra with dark marginal vitta on posterior 3/4 of lateral margin only, not reaching humeral angles (Figs. 202, 203, 206) 36
- 36(35) Pronotum with median dark vitta (Fig. 203) *S. nigriceps* Candèze
- Pronotum without median dark vitta 37
- 37(36) Marginal elytral vitta 2 to 3 intervals wide near mid-section (Fig. 202) *S. carus* Janson
- Marginal elytral vitta 4 to 6 intervals wide near midsection (Fig. 206) *S. antemalis* Candèze
- 38(13) Venter unicolorous yellow to light brown (except for possible dark macula on hypomeron) 39
- Venter yellow to light brown with at least abdominal vittae, metepisternum, and part of prosternal suture dark brown to black 40
- 39(38) Pronotum with 2 dark vittae (Fig. 221); antennae yellow to orange throughout *S. illustris* Candèze
- Pronotum with 1 median dark vitta (Fig. 224); antennal segments 1 and 2 light brown, segments 3 to 11 black *S. decoratus* Candèze
- 40(38) Scutellum vitreous, light brown, less than 1.2 times wider than long, anterior margin slightly recurved (Figs. 157, 223) *S. intermedius* (Herbst)
- Scutellum opaque, black, or with hind angles only light brown, more than 1.3 times wider than long, anterior margin incised (Fig. 159) 41
- 41(40) Elytra with dark vitta along suture short, not reaching scutellum (at least 1 mm short of scutellum (Fig. 219); lateral pronotal margin without sulcus on anterior fourth *S. lafertei* Candèze
- Elytra with piceus vitta along suture long, reaching scutellum (Fig. 220); lateral pronotal margin with sulcus on anterior fourth *S. affinis* Guérin-Méneville
- 42(13) Pronotum strongly arched forward (in lateral view (Fig. 30); elytral intervals convex, intervals 3, 5, and 7 more so, and rising above level of other intervals, intervals 3 and 5 joining near apex *S. fryi* Candèze
- Pronotum not strongly arched forward (as in Figs. 28, 29, 33); elytral intervals various but intervals 3, 5, and 7 not as above 43
- 43(42) Each elytron with 3 black to red black vittae: 1 marginal, 1 sutural, and 1 between (though vittae might not always extend from base (Fig. 226); tooth on posterior border of hypomeron very large (Fig. 181) *S. taeniatus* Erichson
- Each elytron either unicolorous, blood red with 2 pale vittae, or with less than 3 or more than 3 black vittae; tooth on posterior border of hypomeron smaller (as in Fig. 178) 44
- 44(43) Elytral coloration changing from pale brown to yellow basally to black apically, lacking longitudinal vittae or maculae *S. singularis* Kirsch
- Elytra without a yellow to black gradient from base to apex, longitudinal vittae or maculae present 45
- 45(44) Elytral intervals 1–7 similarly colored, contrasting with darker, infuscate to black striae or strial vittae (Figs. 231–234, 236, 237); darker vittae may not all be of equal width 46
- Elytral intervals various: either same color as striae; alternating in color with other intervals and not with striae; or base and apex of elytra of different colors 56

- 46(45) Pronotum glabrous throughout 47
 – Pronotum covered with decumbent setae, if setae not over entire surface, then at least on sublateral vittae 49
- 47(46) Pronotal margin sulcate anteriorly; elytral striae black (Fig. 230)
 *S. buckleyi* Candèze
 – Pronotal margin without sulcus; elytral striae light brown 48
- 48(47) Pronotum with medial dark vitta (occasionally with red vitta between) and reddish black maculae near anterolateral angles; punctures on pronotal disk denser and larger than those on head
 *S. reaumuri* Candèze
 – Pronotum with medial dark vittae (red and/or black) only, without anterolateral maculae; punctures on pronotal disk less dense and smaller than those on head
 *S. glabricollis* Candèze
- 49(46) Lateral margin of pronotum not sulcate on anterior third, or sulcus very faint . . . 50
 – Lateral margin of pronotum sulcate, at least on anterior third (Fig. 33) 51
- 50(49) Pronotum with brown to reddish brown disk appearing as a single broad vitta (margins yellowish (Fig. 245))
 *S. pilosus* n. sp.
 – Pronotum bright yellow with 2 black vittae on disk *S. vicinus* Fleutiaux
- 51(49) Lateral frontal spines short and wide, not longer than medial frontal spine (Figs. 144, 231) . . . *S. cristatus* Candèze
 – Lateral frontal spines longer, extending anteriorly as far as or beyond medial spine (as in Figs. 233, 234, 236) . . . 52
- 52(49) Interstriae convex (subhemispherical when viewed from posterior aspect), striae deeply impressed
 *S. auripilis* Candèze
 – Interstriae flat or nearly so (clearly not subhemispherical when viewed from posterior aspect), striae often faint or absent, or only punctures evident 53
- 53(52) Hypomeron without dark vitta along suture, or if present, less than 1/7 width of hypomeron
 *S. linnei* Guérin-Méneville
 – Hypomeron with dark vitta along suture wide, width of vitta more than 1/5 width of hypomeron 54
- 54(53) Anterolateral frontal spines long, at least 1.5 times longer than width of eye (viewed from above (Fig. 233) in questionable cases body length less than 22 mm) *S. perangustus* n. sp.
 – Anterolateral frontal spines shorter, less than 1.2 times longer than width of eye (in questionable cases body length more than 22 mm) 55
- 55(54) Antennae 1 segment short of hind angles in females, extending up to 1 segment beyond hind angles in males; female with 2 large foveae on sternite 5; length over 22 mm (Fig. 232) *S. colombianus* n. sp.
 – Antennae extending at least 1 segment beyond hind angles in females, extending 1 to 2 segments beyond hind angles in males; female without foveae on sternite 5; length less than 22 mm (Fig. 234)
 *S. angustus* n. sp.
- 56(45) Elytral intervals 1 and 2 unicolorous, either red or black 57
 – Elytral intervals 1 and 2 of 2 contrasting colors, generally black and yellow or orange 58
- 57(56) Black pronotal vittae wide, each much wider than area between vittae (or vittae confluent medially); elytral intervals 1 and 2 black (Fig. 222)
 *S. regalis* Guérin-Méneville (in part)
 – Black pronotal vittae narrow, area between vittae wider than vittae; elytra, including intervals 1 and 2 dark red (Fig. 225) *S. rubricollis* n. sp.
- 58(56) Lateral margin of pronotum sulcate nearly entire length (always more than half the pronotal length) 59
 – Lateral margin if sulcate at all, sulcate on anterior half only 60
- 59(58) Elytral intervals 8 and 9 unicolorous black (Fig. 244) . . . *S. kirschi* Chassain
 – Elytral interval 8 black, interval 9 yellow to orange (Fig. 242) . . *S. virgatus* Erichson
- 60(58) Lateral margin of pronotum without sulcus, or with sulcus very fine and never explanate 61
 – Lateral margin of pronotum sulcate on anterior third to anterior half, sulcate margin becoming explanate, at least on anterior fifth (as in Fig. 33) 62
- 61(60) Pronotum with 2 broad black vittae, each at least 2 times wider than area between vittae (Fig. 243) . . . *S. acutus* Candèze
 – Pronotum either with a single wide vitta or with 2 narrow black vittae interrupted by a red vitta, if with 2 black vittae then area between vittae as wide as or wider than each vitta (Figs. 239, 240)
 *S. exsolutus* Candèze
- 62(60) Elytral intervals 8 and 9 unicolorous
 *S. superbus* Kirsch
 – Elytral interval 8 black, 9 yellow to orange 63
- 63(62) Pronotum with 2 broad black vittae surrounded by yellow to orange border, pale margin narrow, less than half the width of each black vitta, black vittae subparallel (Fig. 235)
 *S. germari* Guérin-Méneville
 – Pronotum with 1 or 2 black vittae, if 2, then pale margin (at least on posterior half) as wide as or wider than each black

- vitta, black vittae may be very irregular 64
- 64(63) Pronotum with 2 black vittae that are each narrow and sinuate, not cruciform (Figs. 241, 261) . . . *S. sommeri* Candèze
- Pronotum with 1 or 2 black vittae, if 2, then vittae appearing cruciform (Figs. 227–229) *S. illigeri* Guérin-Méneville
- 65(12) Each elytron with 2 dark vittae only, 1 sutural and 1 marginal (dark vittae may or may not extend basally to humeri) 66
- Color of each elytron various either unicolorous (or nearly so), with more than 2 dark vittae, or with elytra blood red with pale vittae 67
- 66(65) Pronotum orange to light brown, with a single dark macula or vitta medially (often faint (Fig. 208)) *S. limatus* Candèze
- Pronotum dull yellow to light brown laterally, orange medially, with 2 dark vittae separating colors (Fig. 212) *S. trinitensis* n. sp.
- 67(65) Elytra blood red basally, reddish black apically, with intervals 3 and 7 pale (Fig. 211) . . . *S. fleutiauxi* Szombathy
- Elytra dull yellow to light brown with contrasting dark vittae 68
- 68(67) Elytra gibbous basally, body widest (dorsoventrally) at anterior fifth (Fig. 29) 69
- Elytra not gibbous basally, body widest across anterior third or beyond (Fig. 28) 72
- 69(68) Pronotum covered with distinct pale setae (at least several dozen), at least on dark lateral areas 70
- Pronotum glabrous, entirely without setae or with few (less than 10 scattered setae throughout) very fine and inconspicuous setae 71
- 70(69) Pronotal margin evenly convex to anterolateral angles (viewed from above; Fig. 151); head with black macula (Fig. 237) . . *S. punctatostriatus* Candèze
- Pronotal margin constricted just before anterolateral angles (Fig. 140); head without black macula *S. girardi* Chassain
- 71(69) Scutellum and legs black (with occasional reddish maculae); dark pronotal vittae irregular, with arm or extension near center projecting laterally or as an outlying macula (Fig. 216) . . *S. catei* n. sp.
- Scutellum and legs orange to light brown; dark pronotal vittae straight to slightly sinuate, without lateral extension near center (Fig. 246) . . . *S. gibbosus* n. sp.
- 72(68) Pronotum with a dark macula along each lateral margin (near center) in addition to dark vittae ((Figs. 215, 218) lateral macula may extend medially to dark vittae) 73
- Pronotum without dark maculae along lateral margin of pronotum; dark pronotal vittae various 74
- 73(72) Elytral disk with contrasting pale and dark colors, intervals of different colors (Fig. 215) *S. clarki* n. sp.
- Elytral intervals (at least on disk) pale, contrasting in color with darker striae (Fig. 218) *S. flavangulus* Candèze
- 74(72) Elytral intervals 4 and 6 dark on apical half (margins and suture also dark), confluent (or nearly so) on apical third, forming a V-shaped pattern; elytral vittae becoming obscure on basal half (Fig. 214) *S. fascicularis* Candèze
- Elytra with or without discal vittae, if vittae present, intervals 4 and 6 not forming a V-shaped pattern; elytral vittae if obscure, obscure only on basal fourth or less 75
- 75(74) Pronotal margin not sulcate on anterior third (Fig. 213) *S. melleus* n. sp.
- Pronotal margin sulcate, and often explanate, on anterior third (as in Fig. 33) 76
- 76(75) Prosternum without a black macula or vitta along suture (though suture may be dark red in places (Fig. 210)) *S. fulvicollis* Blanchard
- Prosternum with black macula or vitta along suture 77
- 77(76) Elytral intervals 2, 4, 6, and 8 slightly infusate to completely black on disc (though dark vittae may be obscure basally (Fig. 209)) *S. bispinus* Candèze
- Elytral intervals 1, 4, 6, and 9 infusate to black (Fig. 207) . . . *S. badeni* Steinheil
- 78(10) Pronotum blood red throughout, with black discal vitta(e) or macula(e), yellow coloration, if present, restricted to hind angles (Figs. 217, 258) 79
- Pronotum with yellow to orange markings, without blood red coloration (or if present, restricted to discal vitta or macula) 81
- 79(78) Elytral interval 3 wider and rising above level of other intervals; hind angles of pronotum yellow (Fig. 258) *S. kathleenae* n. sp.
- Elytral interval 3 not wider and rising above level of other intervals; hind angles of pronotum variously colored 80
- 80(79) Pronotum with 2 black vittae or maculae on disk; elytral intervals strongly convex (Fig. 217) *S. pectitus* Candèze
- Pronotum with a single black vitta on disk (often faint); elytral intervals flat or nearly so *S. schaumii* Guérin-Méneville

- 81(78) Apex of each elytron ending in a sharp spine, angle or dentition (as sharp as in Fig. 169 or sharper) 82
 – Apex of each elytron rounded (Fig. 173) 83
 82(81) Elytra unicolorous yellow to light brown, intervals often darker (Fig. 247)
 *S. striatus* Guérin-Ménéville
 – Elytral base mostly yellow, apex black (Fig. 253) *S. formosus* Janson
 83(81) Prosternum and abdomen with contrasting red and black coloration
 . . . *S. regalis* Guérin-Ménéville (in part)
 – Prosternum and abdomen black throughout *S. hispidus* Candèze (in part)

Semiotus angulatus Group

The *S. angulatus* species group is comprised of 4 known species that have short pectinate to subpectinate antennae. The pronotum bears a tubercle or strong convexity on the anterior third of the lateral margin. Additionally, the anterior sclerite within the bursa copulatrix is covered with small spines, and the lateral arms are divided (Figs. 41, 43–45).

Semiotus angulatus (Drury)

- (Figs. 5, 41, 122, 154, 160, 167, 179, 188–190)
Elater angulatus Drury 1782:69, Fleutiaux 1925:109 (Type(s) not located; type locality: Brazil).
Elater suturalis Fabricius 1792:224, Herbst 1806:334, Chassain 2002a (Type(s) not located; type locality: unknown).
Pericallus suturalis Dejean 1836:96.
Pericalle suturalis, Latreille 1834:141.
Semiotus sanguinicollis Blanchard 1843:128, Candèze 1857:304, Candèze 1874:173. Chassain 2002a (Lectotype, male: MNHN; type locality: Santa Cruz de la Sierra).
Semiotus speciosus Erichson 1847:75, Candèze 1857:337 (Holotype: MNFD; type locality: Peru, Mt. Phillippi).
Semiotus suturalis, Candèze 1857:303, Candèze 1874:173, Szombathy 1909b:121, Fleutiaux 1925:109.
Semiotus cardinalis Belval 1861:101 (Type(s) not located; type locality: unknown).

DESCRIPTION. Length 31 to 38 mm (length/width ratio 4.9 to 5.2). Head piceus, bearing 2 spines apically, venter strongly concave between spines; frontal texture glabrous with moderately deep punctures throughout; ocular index 57.0 to 59.0. Antennae pectinate to subpectinate, with segments 1 and 2 badius to piceus, segments 3 to 11 piceus; length 4 or more segments short of hind angles. Pronotum 8 to 11 mm (length/width ratio 1.3 to 1.5), narrowly sinuate with pronounced tubercle anterolaterally on anterior third of each

margin, margin sulcate except on hind angles, anterior third explanate; color fulvus to sanguineus with large piceus macula extending from base to anterior border (this macula may be only a narrow vitta or extended laterally nearly to margin, appearing cruciform in most specimens); texture glabrous with moderately deep punctures scattered throughout. Scutellum piceus, broadly ovate. Prosternum strongly concave in profile; texture glabrous with erect setae on anterior fourth, punctation fine medially becoming thick and umbilicate laterally; color testaceous to sanguineus, lobe often piceus anteriorly. Hypomeron fulvus to sanguineus, with or without elongate piceus macula along suture; texture glabrous with fine punctures throughout. Mesosternum and mesepisternum fulvus to aurantiacus with or without obscure maculae. Metasternum fulvus to aurantiacus with piceus lateral vittae; texture glabrous with fine punctation throughout. Metepimeron piceus. Femora testaceous to aurantiacus. Elytra 20 to 26 mm (length/width ratio 3.1 to 3.3), subparallel on basal third, then narrowing evenly to tip; striae intervals 1 and 2 (on apical 2/3) and various portions of intervals 4 through 9 piceus, base color fulvus to testaceous (often luteus) forming a cuneiform extension on interval 3 to near apex; texture glabrous with striae and striae punctures fine to obsolete; apices each bearing 1 spine. Abdomen fulvus to aurantiacus with 2 piceus vittae sublaterally; texture glabrous with fine scattered setae on sternite 1, punctation fine throughout; female foveae absent; anterior sclerite wider than long, multiramose, lateral arms divided, 1 arm extending apically nearly as far as median piece, 1 extending laterally.

Male not seen.

MATERIAL EXAMINED. BOLIVIA: Cochabamba, Chaparé, (X-XII) (LACM); Villa Tunari, Parque Machias, 300 m, 16°58'20"S, 65°24'42"W, II-12-1999, R. Anderson, lowland rain forest (CMNC); P. Germain, 1883 (MNHN); Santa Cruz, Prov. Sara, Santa Cruz de la Sierra, 500 m, (I-IV)-1904, J. Steinbach (MNFD); **BRAZIL:** Amazonas, Manaus, Boa Vista Rd, 110 km, (IX-X)-1989, P. Hrabovský (PCCV); Rio Madeira, Mann & Baker (USNM); Minas Gerais, Passa Quatro, Faz. Dos Campos, J.F. Zikan (FMNH); Rio Grande do Sul, P. Bruck (LACM); Rondonia, 62 km SW Ariquemes, nr Fzda Rancho Grande, XI-(4-16)-1997, J.E. Eger (FSCA); Santa Catarina, Joinville, Steind. (NHMW); **COLOMBIA:** Amazonas, Amacayacu, 3.82°S, 70.26°W, III-(8-12)-2000, B. Brown, G. Kung, M. Sharkey (LACM); Caquetá, Morelia, Rio Bodoquero, 430 m, I-(19-20)-1969, Duckworth and Dietz (USNM); Putumayo, Florida, Sup., G. Klug, 1931 (MNHN); Department unknown, Guines Fluss, Umbria (USNM); *ibid.* (CUIC); **ECUADOR:** Los Ríos, Río Palenque, XI-15-1972 (FSCA); Napo, 24 km E Atahualpa, 450 m, X-(1-13)-1996, E. Giesbert (FSCA); Limoncocha, VI-15-1977, W.E. Steiner

(USNM); Limoncocha, VI-10-1977, P.J. Spangler & D.R. Givens (USNM); Limoncocha, VI-10-1977, P.J. Spangler & D.R. Givens (USNM); Río Pacuyaco, V-8-1937, Schultz-Rhonhof S.G. (MNHN); Pastaza, Cusuimi, Río Cusuimi, 150 km SE Puyo, 300 m, VII-(18-23)-1971, B. Malkin (FMNH); *ibid.* V-(15-31)-1971; **FRENCH GUIANA:** Guliana PK 72, Rte. à Régina, (I-23)-(II-1)-1995, E. Giesbert & F. Hovore (FSCA); La Mana, Melinon, 1864 (MNHN); **NICARAGUA:** Managua, VII-1958, M. Smith (CASC); **PARAGUAY:** (USNM); **PERU:** Cuzco, Río Paucartambo, X-26-1932, Quiroz (LACM); Huánuco, Huallaga Dist., Tingo María, 680 m (MNFD); Leonpampa, XII-1937, Woytkowski (FSCA); Tingo María, (XI-XII)-1963, W. Rosenberg (FSCA); Junín, Chanchamayo, II-1933, E.G. Smyth (SEMC); La Mercéd, 1922 (USNM); Río Oxobamba, La Mercéd, Chanchamayo (MNFD); Satipo, IX-3-1989, (HNHM); Soudoveni Ridges, 900 m, Soudoveni / Huantadriri Vall., ca. 100 km N Satipo (PCCV); Loreto, Madre de Dios, Río Tambopata Res., 30 km (air) SW Puerto Maldonado, 290 m, 12°50'S, 69°20'W (BMNH); Madre de Dios, Río Tambopata Res., 30 km (air) SW Puerto Maldonado, 290 m, X-(20-31)-1982, R. Wilkerson (FSCA); Pucallpa, II-9-1971, J. Schunke (CNCI); Requena, 150 m, III-91 (PCCV); nr junction Río Marañón and Ucayali, 73.5°W, 4.8°S, VIII-(6-20)-1994, P.E. Skelley (FSCA); Yagua Indian Villiage, headwaters of Loreto-Yacu, IV-(24-26)-1970, B. Malkin (FMNH); Río Toro (MNFD); Pebas, de Mathan, 1907 (MNHN).

DIAGNOSIS. *Semiotus angulatus* is most closely allied to *S. insignis*, *S. angusticollis*, and *S. convexicollis*. *Semiotus angulatus* is the most variable of the 4 species within the species group. Specimens range from dark red to light orange with the black sutural strip on the elytra varying in length. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle (Fig. 191), *S. angulatus* does not (Figs. 188–190). *Semiotus convexicollis* bears either 2 linear vittae, or no vittae at all, on the pronotum; *S. angulatus* bears a single vitta that is usually cruciform. *Semiotus insignis* differs from the other 3 species in having the antennae less pectinate (Fig. 166), though still having the outer angles of each segment longer than other species of *Semiotus* that are not included in the *S. angulatus* group. The anterior sclerite of the bursa copulatrix is much less dentate in *S. angulatus* (Fig. 41) than in the other 3 species (Figs. 43–45), and the division of the lateral arms is much more arched and separate from the posterior piece.

REMARKS. The differing color patterns evident in *S. angulatus* are not consistent enough geographically to justify subspecific status. Specimens manifesting yellow to dark red elytra have been collected from the same area. The extent of

the dark vittae on the elytra also varies within specimens collected in the same geographic area. This was the only difference between *S. angulatus* and *S. suturalis*.

Semiotus angusticollis (Blanchard)
(Figs. 6, 44, 107, 191)

Semiotus angusticollis Blanchard 1843:127, Candèze 1857:317, Candèze 1874:178 (Lectotype, female: MNHN (Chassain 2001c); type locality: Río de Janeiro).

DESCRIPTION. Length 25 to 29 mm (length/width ratio 4.3 to 5.0). Head sanguineous on spines and laterally, piceus medially; bearing 2 spines apically, area between strongly concave; frontal texture glabrous, spines nearly impunctate, base of head moderately punctate; ocular index 62.0 to 65.0; frontal spines approximately 0.33 length of frons. Antennae pectinate, piceus, 3 to 4 segments short of hind angles. Pronotum 7 to 9 mm (length/width ratio 1.3 to 1.4), testaceous to badius laterally, darker anteriorly, with 2 piceus vittae on disk (often joined apically), sanguineous vitta medially, anterolateral tubercles piceus; shape parallel-sided with angles gradually expanding on anterior sixth, anterolateral angles tuberculate; texture glabrous with punctures on anterior third up to 10 times the size of punctures on posterior third; margin sulcate medially and preapically, thickly rounded from hind angles to tubercles. Scutellum widely ovate. Prosternum fulvus to aurantiacus with piceus macula extending from hypomeron along suture; concave in profile; texture with fine scattered setae, nearly impunctate medially, with large punctures laterally. Hypomeron fulvus to testaceous with piceus maculae along suture extending onto prosternum; texture glabrous with fine punctures throughout. Mesosternum fulvus to aurantiacus medially with piceus lateral maculae; texture glabrous and impunctate medially with fine setae and dense punctation laterally. Mesepisternum fulvus to aurantiacus. Metasternum fulvus to testaceous with piceus lateral vittae; texture glabrous with fine punctation throughout. Femora testaceous to aurantiacus throughout. Elytra 16 to 19 mm (length/width ratio 2.9 to 3.2), widest on anterior fourth then evenly tapering to tip; color fulvus to testaceous with piceus lateral and sutural vitta extending from apex to anterior fifth; interstriae nearly flat, with very fine punctures; apices each bearing 1 spine. Abdomen fulvus to testaceous with 2 piceus vittae sublaterally; texture glabrous with fine punctation throughout; female foveae absent; anterior sclerite covered with dense dentitions, lateral arms divided distally, at nearly right angles to median piece (Fig. 44). Male with parameres narrowing to near apex, lateral blades small, subtriangular, approximately 0.17 to 0.19 length of parameres (Fig. 107).

MATERIAL EXAMINED. BRAZIL: Rio de Janeiro, Corcovado, XI-1968, S.A. Fragoso (EMEC); Guanabara, X-1961, Alvarenga Seabra (BMNH); 1935, P. Sandig (USNM); São Paulo, Cantareira, II-13-1962, Halik (USNM); Ilha Santa Amaro, nr Santos, IV-1-1912, G.E. Bryant (BMNH); *ibid.* III-28-1912; *ibid.* III-29-1912.

DIAGNOSIS. *Semiotus angusticollis* is most closely related to *S. insignis*, *S. convexicollis*, and *S. angulatus*. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle, the other 2 species do not. *Semiotus convexicollis* bears either 2 linear vittae, or no vittae at all, on the pronotum; *S. angulatus* bears a single vitta that is usually cruciform. The anterior sclerite of the bursa copulatrix in *S. angusticollis* (Fig. 44) is somewhat T-shaped, similar to that of *S. convexicollis* (Fig. 45) but with the lateral arms deflexed distally.

Semiotus convexicollis Blanchard
(Figs. 20, 45, 161, 192, 260)

Semiotus convexicollis Blanchard 1843:128, Candèze 1857:318, Candèze 1874:178, Szombathy 1909b:121 (Lectotype, female: MNHN; type locality: Guarayos).

Semiotus convexicollis signatus Schwarz 1902b: 208 (Holotype, female: DEIC; type locality: Paraguay, Villa Rica). New synonymy.

DESCRIPTION. Length 21 to 26 mm (length/width ratio 4.3 to 4.6). Head piceus, with or without pale spines, bearing 2 spines apically; frontal texture glabrous, nitidus, punctation moderately deep. Antennae subpectinate, with segments 1 and 2 testaceous, segments 3 through 11 piceus; length up to 4 segments short of hind angles (in females); ocular index 66.0 to 69.0. Pronotum 6 to 8 mm (length/width ratio 1.2 to 1.5), elongate, cylindrical, hind angles diverging, with 2 anterolateral tubercles, margin sulcate near middle only; color fulvus to aurantiacus with 2 piceus vittae conjoined along anterior border, or vittae faint to absent; texture glabrous, nitidus, punctation fine basally becoming thicker and umbilicate anteriorly. Scutellum piceus, subtrapezoidal. Prosternum concave in profile; color testaceous to aurantiacus with suture piceus; texture glabrous with few erect setae on anterior fourth, punctation fine medially becoming thick and umbilicate laterally. Hypomeron fulvus to testaceous with piceus maculae along suture; texture glabrous, nitidus, with very fine punctures throughout. Mesosternum fulvus to aurantiacus; texture glabrous and impunctate medially on fossa, with fine setae and dense punctation laterally. Mesepisternum fulvus to aurantiacus. Metasternum luteus to aurantiacus with 2 lateral piceus vittae; texture glabrous, nitidus with fine punctation throughout. Metepimeron fulvus to

aurantiacus. Femora testaceous to aurantiacus. Elytra 13 to 17 mm (length/width ratio 2.7 to 2.9), widest on anterior fourth then evenly tapering to tip; color luteus with posterior 3/4 of suture and lateral margin piceus; texture glabrous, nitidus, with striae (except stria 1) fine to obsolete, stria punctures fine to very fine; apices each bearing 1 spine. Abdomen luteus to aurantiacus with 2 sublateral piceus vittae; texture glabrous, nitidus with fine punctation throughout; female foveae absent; anterior sclerite wider than long, covered with sharp denticulations throughout, lateral arms at right angles to median piece, partially divided at tips (Fig. 45).

Male not seen.

MATERIAL EXAMINED. BOLIVIA: La Paz, Tumupasa, XII, Lopez (USNM); **BRAZIL:** Amazonas, Santarem (CMNH); Rondonia, 62 km SW Ariquemes, nr Fzda. Rancho Grande, XII-(3-15)-1996, J.E. Eger (FSCA); 9 km NE Cacauplandia, (XII-1996)-(I-1997), K. Vulinec & D. Mellow (FSCA); 7 km NE Cacauplandia, Faz. Rancho Grande, XII-(6-15)-1990, rain forest, UV/Hg, G.B. Edwards (FSCA); **COLOMBIA:** Capital District, Bogotá (BMNH); Candèze (ISNB); **ECUADOR:** Morona—Santiago, Chigüinda, Buckley (BMNH); Napo, 10 km SW Mishanalli, 600 m, 1°5'3"S, 77°42'9"W, L. Nádai (HNHM); Pastaza, Santa Clara, VII-4-1976, P.M. Turner (USNM); **GUYANA:** Mazaruni—Potaro, Bartica District, Kartabo, VIII-28-1920 (CASC); **PARAGUAY:** Villa Rica (MNFD); **PERU:** Huánuco, Tingo María, Monson Valley, XII-18-1954 (CASC); Loreto, 80 km NE Iquitos, Explorama Lodge, on Amazon River, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Explorama Lodge, 80 km NE Iquitos on Amazon River, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Paleazu (ISNB).

DIAGNOSIS. *Semiotus convexicollis* is most closely allied to *S. insignis*, *S. angusticollis*, and *S. angulatus*. *Semiotus angusticollis* and *S. convexicollis* can be distinguished from *S. angulatus* by the pronotal maculae. *Semiotus angusticollis* bears black maculae on the pronotal tubercle, *S. angulatus* does not. *Semiotus convexicollis* bears either 2 linear vittae, or no vittae at all, on the pronotum, *S. angulatus* bears a single vitta that is usually cruciform. The anterior sclerite of the bursa copulatrix is more narrowly sinuate in *S. convexicollis* than in the other species (Fig. 45). The lateral arms extend nearly at right angles to the medial piece with a sinuate anterior margin. In *S. insignis*, the anterior margin lacks situations (Fig. 43), in *S. angusticollis* the anterior margin is curved distally on the lateral half (Fig. 44), and in *S. angulatus* the anterior margin is much more strongly convex (Fig. 41).

REMARKS. *Semiotus c. signatus* was described as a subspecies of *S. c. convexicollis* based on the absence of piceus pronotal vittae. This form appears to be the most common form in the

southern part of its range. The subspecies is not here recognized as vague vittae are evident on occasional specimens clearly intermediate between the 2 forms.

Semiotus insignis Candèze
(Figs. 24, 43, 166, 183, 184)

Semiotus insignis Candèze 1857:311. Steinheil 1875:111, Candèze 1874:176, Champion 1894:289 (Holotype: BMNH; type locality: Mexico).

Semiotus longus Candèze 1857:315, Candèze 1874:178 (Holotype: BMNH; type locality: Mexico). New synonym.

Semiotus insignis longus, Champion 1894:289.

DESCRIPTION. Length 32 to 44 mm (length/width ratio 4.5 to 5.0). Head aurantiacus to sanguineus, with piceus macula on basal half medially; anterior margin of frons bearing 2 spines; texture glabrous with moderately sized punctures evenly spaced throughout; ocular index 59.0 to 61.0; frontal spines approximately 0.16 length of frons. Antennae strongly serrate to subpectinate, extending 3 or 4 segments short of hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 8 to 12 mm (length/width ratio 1.2 to 1.4), fulvus to luteus basally, becoming aurantiacus medially; 5 piceus maculae situated from base to apex (1 medially near anterior margin, 2 on disk, and 2 near base), occasionally 4 maculae (at base and on disk) partially confluent forming 2 arcuate piceus lines; lateral margin sulcate for entire length of pronotum, visible (when viewed dorsally) only on anterior third, hidden on posterior 2/3 by thickly rounded supramarginal convexity, ending in a tubercle near anterior third; shape gradually widening posteriorly; texture glabrous with fine punctures scattered throughout, becoming larger on anterior third. Prosternum evenly concave on anterior 2/3, lobe subtruncate anteriorly then tapering to margin; color aurantiacus to sanguineus with or without elongate piceus maculae near suture medially; texture glabrous with a few fine setae on lobe, punctation very fine medially becoming larger and often contiguous laterally. Hypomeron and mesosternum fulvus to aurantiacus, glabrous, with fine punctation scattered throughout. Mesepisternum fulvus to aurantiacus. Metasternum testaceous with piceus lateral maculae (sometimes absent); texture glabrous with very fine punctures scattered throughout. Femora testaceous. Elytra 21 to 29 mm (length/width ratio 2.9 to 3.4), fulvus to testaceous, with margin and suture piceus (sometimes badius) on posterior half; parallel-sided on anterior half before tapering to apex; texture glabrous with setae and striae very fine to absent; apices each bearing 1 spine. Abdomen fulvus to testaceous with 2 piceus (sometimes badius) maculae on each segment sublaterally; texture glabrous or with very fine

setae on anterior margin of some sternites, punctures very fine and scattered throughout; female foveae absent; anterior sclerite covered with dense dentitions, lateral arms partially divided distally, nearly at right angles to short median piece.

Male not seen.

MATERIAL EXAMINED. BELIZE: Toledo, Columbia Forest, 5 km N. San Antonio, VI-24-1981, W.E. Steiner (USNM); COLOMBIA: Valle del Cauca, Anchicaya Dam, 70 km E Buenaventura, 1200 ft, VII-22-1970, H. & A. Howden (CNCI); Anchicaya, 1000 ft, VII-27-1970, J.M. Campbell (CNCI); Darien, 1909, H. Hodge, (BMNH); W Cordillera, IX-1988, Lake Colima nr Buga, Río Bravo Valley, 1180–1200 m (PCCV); *ibid.*, 700–1100 m; Bogotá (CMNH); COSTA RICA: Alajuela, Río San Lorencito, 900 m, R.F. San Ramón, 5 km N Colonia, VI-1993 (INBC); San Coplos, VII-12-1964, R. Canet (INBC); San Ramón de Dos Ríos, 620 m, (IV-27)-(V-11)-1995, C. Cano (INBC); Guanacaste, Est. Cacao, lado SO Volcán Cacao, P.N. Guanacaste, 800–1600 m, VII-1993, J.F. Quesada (INBC); Est. Pitilla, 9 km S Santa Cecilia, P.N. Guanacaste, 700 m, VII-1994, P. Ríos (INBC); Heredia, Finca La Selva, 1.5 mi. S Puerto Viejo, IX-(17-22)-1966, D.R. & M.L. Paulson (FSCA); La Selva, 50–150 m, VIII-1992 (BYUC); Limón, Amubri, Talamanca, A.C. Amistad, 70 m, VI-(6-28)-1994, G. Gallardo (INBC); Hamburg farm, Reventazon, V-8-25, im gebüsch, F. Nevermann (USNM); *ibid.* IX-27-24; R.B. Hitoy Cerere, Valle La Estrella, 100–200 m, IV-(4-20)-1994, G. Carballo (INBC); Ramal, Río Parismina, Santa Clara, VI-2-25, auf trockenen Holz (USNM); Ramal, Río, Parismina, Santa Clara, IX-26 (USNM); *ibid.* V-8-28, auf Frischgefallenem Holz; Puntarenas, Est. Biol. Las Alturas, 1500 m, Coto Brus., Aguilar, Greeney, Zumbado (INBC); Finca Cafrossa, 1300 m, Est. Las Mellizas, P. Internacional La Amistad, V-1991, A.M. Ramirez (INBC); Rancho Quemado, 200 m, Peninsula der Osa, IV-1992, K. Flores (INBC); ECUADOR: Los Ríos, Río Palenque, XI-15-1972, T. Dodson (FSCA); GUATEMALA: Petén, Suyaaxche, El Petén, XII-21-1963, E.C. Welling (CNCI); Suyaaxche, X-8-1963, E.C. Welling (FMNH); HONDURAS: Altrántida, P. N. Pico Bonito, El Manchón, 350 m, 15°29'18"N, 87°07'39"W, X-12-2000, A. Lopez (EAPZ); MEXICO: Chiapas, San Quintín, VI-28-1977, P. Hubbell (FSCA); Oaxaca, Tehuantepec (USNM); Puebla, Xicotepic de Juarez, 1200 m, IX-1987, T. Porion (PCCV); Veracruz, Catemaco, VII-13-1992, S. Bily (PCCV); Jalapa (FMNH); Presidio, R. Müller (USNM); NICARAGUA: (BMNH); PANAMA: Canal Zone, Barro Colorado Island, 9°10'N, 79°50'W, V-(15-27)-1972, T.L. & L.J. Erwin (USNM); Barro Colorado Island, 9°10'N, 79°50'W, VII-(2-7)-1973, Erwin & Hevel Central American Expedition (USNM); Barro Colo-

rado Island, 23-VIII-1978, E.M. Fisher (CASC); Barro Colorado Island, VII-24-1963, D.Q. Cavanaugh & M.E. Erwin (CASC); Cano Saddle, Cloe's Plantation, M. Close (USNM); Chiriquí, Potrerillos, V-25-1935 (CASC); (NHMW); Vulcan de Chiriquí 25-4000 m, Champion (NHMW); (OXUM); (USNM); Panama, 10 km N El Llano, V-(16-22)-1987, E. Giesbert (FSCA); VENEZUELA: Aragua, Parque Nacional Henri Pittier, 4 km N El Limon, 700 m, VI-19-1987, M.A. Ivie, on dead tree (MTEC); Zulia, Maracaibo (ZMUC).

DIAGNOSIS. *Semiotus insignis* is most closely allied to *S. angusticollis*, *S. convexicollis*, and *S. angulatus*. *Semiotus insignis* is readily separated from the other species in the species group by the pattern of pronotal maculae, by the shape of the antennae and female genitalia, and in distribution. The pronotum normally bears 5 maculae including 4 discal maculae (2 anterior and 2 posterior) and an anterior macula positioned medially along the anterior margin (Fig. 184). Occasionally the anterior discal maculae are confused with the posterior maculae forming 2 longitudinal vittae (Fig. 183). In these cases there is still an anterior macula (separate from the discal vittae), which is absent in specimens of *S. convexicollis* (Fig. 192) and *S. angusticollis* (Fig. 191) that also bear 2 pronotal maculae. The tubercles (or strong convexities) in *S. insignis* bear no maculae. *Semiotus insignis* differs from the other 3 species in having the antennae less pectinate (Fig. 166). The anterior sclerite of the bursa copulatrix in *S. insignis* (Fig. 44) is unique of the 4 species in that the anterior margin is nearly straight (Fig. 43). In the other species it is more sinuate (Figs. 41, 44, 45). The distribution of *S. insignis* overlaps very little with the other 4 species, occurring primarily in Central America, although its range does extend into northern South America where it overlaps somewhat with the other species (all of which are restricted to South America).

REMARKS. Champion (1894) recognized *S. insignis longus* Candèze as a subspecies where the 4 discal maculae of the pronotum became confluent into 2 parallel vittae. Specimens with this pattern are not geographically limited and the form is not recognized.

Semiotus caracasanus Group

The *S. caracasanus* species group is defined by the evenly convex and elongate dorsal surface of the pronotum. Dorsal concavities or tubercles are absent on the pronotum, and the disk joins the hypomera without sulci. These species also all bear 2 well-defined frontal spines. Species in the *S. caracasanus* group have the elytra colored 1 of 2 general ways. The pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal vitta (Figs. 201-206),

or the pale basal color does not extend onto the apical third of the elytra (Figs. 195-200).

Semiotus antennalis Candèze

(Figs. 8, 83, 115, 206)

Semiotus antennalis Candèze 1895:16 (Type: not found; type locality: Véragua)

Semiotus melanocephalus Schwarz 1902a:131-132 (Syntypes: DEIC; type locality: Peru, Huanuco and Ecuador, Napo, Archidona). New synonym.

DESCRIPTION. Length 11 to 20 mm (length/width ratio 4.7 to 4.8). Head piceus, front with 2 spines anterolaterally; texture glabrous with few erect setae over eyes, punctation moderately deep; ocular index 69.0 to 72.0. Antennae serrate, 2 to 3 segments short of hind angles; segments 1 through 3 testaceous, segments 4 to 7 piceus, segment 8 badius, and segments 9 to 11 fulvus to stramineous. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus to sanguineus, hind angles lighter; texture nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum testaceous to rufopiceus, broadly ovate, as wide as long. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceous to sanguineus throughout; texture glabrous with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus, lighter posteriorly; texture glabrous with fine punctation throughout. Mesosternum aurantiacus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum aurantiacus to testaceous. Metasternum aurantiacus to testaceous; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora aurantiacus to testaceous. Elytra 12 to 13 mm (length/width ratio 3.1 to 3.2), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1 (and part of interval 2 posteriorly) and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria punctures fine, interstriae wrinkled and lightly punctate; apices each ending in a single spine. Abdomen fulvus to luteus with medial cuneiform vitta extending length of abdomen piceus; texture glabrous, nitidus, punctation fine and scattered throughout; female with 2 nearly contiguous elongate elliptical foveae on posterior 3/5 of sternite 5; lateral arms of anterior sclerite extending distally 1/2 length of median piece, each bearing 3 to 4 dentitions (Fig. 83). Male with parameres narrow, lateral blade about 1/5 length of parameres (Fig. 115).

MATERIAL EXAMINED. BOLIVIA: Cochabamba, 1 km E Villa Tunari, X-(8-12)-1992, E. Giesbert (FSCA); La Paz, Tumupasa, IX-1925, G. Harrington (USNM); Santa Cruz, Buena Vista,

Ichilo, (XI-XII)-1948, L. Peña (CASC); BRAZIL: Goiás, Jatahay, (IX-XI)-1897 (DEIC); ECUADOR: Napo, Archidona, R. Haensch (DEIC); Limoncocha, VI-9-1977, W.E. Steiner (USNM); Tena vicinity, 500 m, VII-(5-10)-1976, S & J Peck (CNCL); Sucumbíos, Sacha Lodge, 0.5°S, 76.5°W, IX-(10-20)-1994, 290 m, P. Hibbs (LACM); *ibid.*, V-(14-24)-1994, 260 m; PERU: Huánuco, D. Speyer (DEIC); Madre de Dios, Manú, confluence of Río Alto Madre de Dios & Río Ganitana, XI-1980, N. Zakharoff (CASC); Manu, Erika (near Salvacion), 550 m, IX-(4-6)-1988, O. Flint & N. Adams (USNM); Political division unknown, Marcapata (DEIC).

DIAGNOSIS. *Semiotus antennalis* is most closely related to *S. carus*, *S. spinosus*, and *S. rileyi*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 206). The last 3 antennal segments are pale yellow in *S. antennalis*, which is also the case for most of the species in the *S. caracasanus* group. Only *S. spinosus*, *S. nigriceps*, and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last 4 segments of the antennae are pale yellow in *S. woodi*, *S. chontalensis*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus antennalis* can also be separated from *S. nigriceps* by the lack of a pronotal vitta (present in *S. nigriceps* and *S. matilei*; see Figs. 203, 204). It can be separated from *S. cyrtomaris* by the shorter dark vitta along the elytral margin and by the laterally straight aedeagus. In *S. cyrtomaris*, the dark elytral vitta extends marginally to the humeri and the aedeagus is strongly arched dorsoventrally (Fig. 105). *Semiotus antennalis* can be separated from *S. carus* by the reduced number of spines (approximately 4) on the anterior sclerite of the bursa copulatrix (Fig. 83). *Semiotus carus* bears roughly 9 such spines (Fig. 61). The piceus marginal elytral vitta in *S. carus* extends medially across 2 or 3 intervals only. In *S. antennalis* it extends medially 4 to 6 intervals.

REMARKS. The type of *S. antennalis* has not been found. A specimen identified by Candèze (ISNB) is similar to the original description of *S. antennalis* and is conspecific with *S. melanocephalus*.

Semiotus caracasanus Rojas
(Figs. 10, 53, 114, 137, 195)

Semiotus caracasanus Rojas 1855:160, Candèze 1857:311, Steinheil 1875:111, Candèze 1874:176, Fleutiaux 1891:275 (Lectotype (Chassain 2001c): MNHN; type locality: Venezuela, Caracas).

Semiotus caracasanus Fleutiaux 1925:109. Unjustified emendation.

DESCRIPTION. Length 12 to 19 mm (length/width ratio 3.9 to 4.6). Head piceus, front with 2 spines anterolaterally; texture glabrous with few

setae above eyes and spines, punctation moderately deep and scattered throughout; ocular index 70.0 to 73.0. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 3.0 to 5.0 mm (length/width ratio 1.1 to 1.3), narrowly sinuate, lateral margin rounded; color fulvus with broad piceus vitta extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceous. Elytra 7 to 12 mm (length/width ratio 2.5 to 3.0), glabrous and subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing 1 spine with sutural side angled and often minutely dentate subapically. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite longer than wide, lateral arms short, 1/3 length of median piece (Fig. 53). Male with parameres narrow, lateral blades pointed, less than 1/5 length of parameres (Fig. 114).

MATERIAL EXAMINED. GUYANA: Landsberg (ZMUC); VENEZUELA: Aragua, Portachuelo Pass, 20 km N Maracay, 1160 m, VI-18-1972, C.R. Collins (CASC); *ibid.*, 1100 m; Rancho Grande Biol. Stn., Portachuelo Pass, 10°21'0"N, 67°41'0"W, 1100 m, VI-4-1998, J. Ashe, R. Brooks, R. Hanley, insects moving through pass against wind-migration (SEMC); Federal District, Caracas (ZMUC); State unknown, Caracas Valley, VII-1897 (CASC).

DIAGNOSIS. *Semiotus caracasanus* is most closely allied to *S. nigriceps*. The dark elytral markings, however, readily separate the 2 species. In *S. caracasanus*, they are restricted to the apical half (Fig. 195). In *S. nigriceps*, they extend along the suture and lateral margins nearly to the elytral apices (Fig. 203). *Semiotus caracasanus* can be readily separated from *S. rileyi* by the presence of a pronotal vitta. *Semiotus rileyi* lacks a pronotal vitta (Fig. 200). The pronotal vitta in *S. caracasanus* is broad and approximately as wide

anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow vittae. This is also the condition in *S. spinosus*, and *S. woodi*. In *S. triplehorni*, the pronotal vitta is strongly constricted toward the anterior margin (Fig. 198). In *S. zonatus*, the pronotal vitta is much wider, occupying roughly 0.75 or more of the dorsal pronotal area. *Semiotus caracasanus* can be separated from *S. woodi* by the entirely pale basal color of the elytra. In *S. woodi*, a dark vitta extends from the black apical color to the scutellum (Fig. 197). *Semiotus lacrimiformis* is distinguished from *S. caracasanus* by the tear-shaped extension of the basal elytral color onto the black apical color (Fig. 199). In *S. caracasanus* the juncture of the 2 colors is only slightly sinuate. Nearly all the species in the *S. caracasanus* group have at least the apical segment of the antennae pale yellow. Only *S. spinosus*, *S. nigriceps*, and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. *Semiotus caracasanus* can be separated from *S. spinosus* by the length of the lateral blades of the parameres. In *S. spinosus* the lateral blades are longer, more than 1/4 length of the parameres (Fig. 113). In *S. caracasanus* the lateral blades are less than 1/5 length of the parameres (Fig. 114). *Semiotus spinosus* has been collected in Ecuador and Peru. *Semiotus caracasanus* is known only from Venezuela.

Semiotus carus Janson
(Figs. 10, 61, 112, 202)

Semiotus carus Janson 1882:34, Champion 1894:553 (Syntypes (7): BMNH; type locality: Ecuador, Chigiunda)

DESCRIPTION. Length 15 to 20 mm (length/width ratio 4.5 to 5.2). Head piceus, front with 2 spines anterolaterally; texture glabrous with moderately deep punctation. Antennae 2 to 3 segments short of hind angles; segments 1 through 3 testaceous, segments 4 to 8 (and sometimes 9) testaceous to badius, segments (9), 10, and 11 fulvus. Pronotum 3 to 6 mm (length/width ratio 1.1 to 1.5), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus; texture nitidus, finely punctate throughout with punctures becoming thicker and umbilicate anteromedially. Scutellum testaceous to rufopiceus, broadly ovate, wider than long. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceous to sanguineus, lobe piceus to testaceous; texture glabrous with erect setae on anterior fourth, punctation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus; texture glabrous with fine punctation throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum testaceous to aurantiacus; texture nearly glabrous with few

scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceous. Elytra 10 to 13 mm (length/width ratio 3.0 to 3.4), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1 and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria punctures fine, interstriae wrinkled and lightly punctate; apices each ending in poorly defined spines. Abdomen fulvus to luteus with medial piceus cuneiform vitta extending length of abdomen; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctation fine, becoming denser on sternite 1; female with 2 nearly contiguous elongate elliptical foveae on posterior 2/3 of sternite 5, anterior sclerite with approximately 4 to 8 dentitions, arms extending distally approximately 4/5 length of median piece (Fig. 61). Male with narrow parameres, lateral blades approximately 1/5 length of parameres, acute apically (Fig. 112).

MATERIAL EXAMINED. ECUADOR: Morona—Santiago, Chigiunda, Buckley (BMNH); **PERU:** Huánuco, Tingo María, Monson Valley, XII-11-1954, E.I. Schlinger and E.S. Ross (CASC); *ibid.* XII-2-1954; *ibid.* XI-10-1954; *ibid.* X-12-1954; 20 km SW Tingo María, VI-20-1982, E. & I. Munroe (CMNC); Madre de Dios, Manú, confluence of Río Alto de Madre de Dios and Río Ganitano, XI-1980, N. Zakharoff (CASC).

DIAGNOSIS. *Semiotus carus* is most closely related to *S. antennalis*, *S. spinosus*, and *S. rileyi*. The last 3 antennal segments are pale yellow in *S. carus*. This is also the case for most of the species in the *S. caracasanus* group. Only *S. spinosus*, *S. nigriceps* and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last 4 segments of the antennae are pale yellow in *S. woodi*, *S. chontalenus*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus carus* can also be separated from *S. nigriceps* by the lack of a pronotal vitta (present in *S. nigriceps* and *S. matilei*; see Figs. 203, 204). It can be separated from *S. cyrtomaris* by the shorter and narrower dark vitta along the elytral margin and by the laterally straight aedeagus. In *S. cyrtomaris* (and in *S. antennalis*) the dark elytral vitta extends marginally to the humeri and medially across 4 to 6 elytral intervals (in *S. carus* it extends medially only across 2 or 3 intervals), and the aedeagus is strongly arched dorsoventrally (Fig. 105). *Semiotus carus* can be separated from *S. antennalis* by the extra number of spines (roughly 9) on the anterior sclerite of the bursa copulatrix (Fig. 61). *Semiotus antennalis* bears approximately 4 such spines (Fig. 83).

Semiotus chontalenus Candèze
(Fig. 9)

Semiotus chontalenus Candèze 1874:177, Champion 1896:291 (Holotype, female: BMNH; type locality: Nicaragua, Chontales).

DESCRIPTION. Length 15 to 16 mm (length/width ratio 4.6 to 4.7). Head piceus, front with 2 spines anterolaterally; texture glabrous except for a few setae above eyes and at base of spines, punctuation moderately deep and scattered throughout; ocular index 64.0 to 66.0; frontal spines approximately 0.28 length of frons. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 7 piceus to rufopiceus, segments 8 to 11 fulvus to stramineous. Pronotum 4 to 5 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulci; color fulvus with broad piceus vitta extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile; color piceus; texture with long fine setae scattered anterolaterally, punctuation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctuation very fine throughout. Femora fulvus. Elytra 10 to 11 mm (length/width ratio 2.9 to 3.0), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half, contrasting colors separate along sinuous line; stria punctures fine, striae (except stria 1, which is variously impressed) very fine to obsolete, interstriae flat; apices each bearing 1 spine with sutural side angled and often minutely dentate. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctuation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically.

MATERIAL EXAMINED. NICARAGUA: Chontales, Chontales gold mines (OXUM); Chontales (NHMW); *ibid.* (BMNH).

DIAGNOSIS. *Semiotus chontalenus* belongs to those species of the *S. caracasanus* group where the pale basal color of the elytra does not extend onto the apical third (Figs. 195–200), as opposed to those species where the pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal vitta (Figs. 201–206). The pronotal vitta in *S. chontalenus* is broad and roughly as wide anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow vittae. This is also the condition in *S. spinosus*, *S. woodi*, and *S. caracasanus*. In *S. triplehorni*, the pronotal vitta is strongly constricted toward the anterior margin (Fig. 198). In *S. zonatus*, the pronotal vitta is

much wider, occupying roughly 0.75 or more of the dorsal pronotal area. *Semiotus chontalenus* can be separated from *S. woodi* by the entirely pale basal color of the elytra. In *S. woodi*, a dark vitta extends from the black apical color to the scutellum (Fig. 197). *Semiotus lacrimiformis* is different from *S. chontalenus* in the tear-shaped extension of the basal elytral color onto the black apical color (Fig. 199). In *S. chontalenus* the juncture of the 2 colors is only slightly sinuate. *Semiotus chontalenus* occurs in Nicaragua (Fig. 9) and perhaps into Costa Rica as well (although no material from there has been seen), where several other species in the *S. caracasanus* group occur. These species include *S. woodi*, *S. spinosus*, *S. triplehorni*, *S. pallicornus*, and *S. lacrimiformis*. The antennae in *S. lacrimiformis* and *S. triplehorni* terminate with 3 pale yellow to orange segments. *Semiotus woodi* and *S. chontalenus* have 4 pale yellow to straw-colored distal antennal segments. The antennae in *S. pallicornus* are completely yellow to orange, and the antennae of *S. spinosus* are entirely black.

Semiotus cyrtomaris n. sp.

(Figs. 8, 59, 104, 105, 201)

DESCRIPTION. Length 14 to 17 mm (length/width ratio 4.4 to 4.9). Head piceus, front with 2 spines anterolaterally; texture glabrous with moderately deep punctuation. Antennae 2 to 3 segments short of hind angles; segments 1 through 3 testaceous, segments 4 to 8 (or 9) testaceous to badius, segments (9), 10, and 11 fulvus. Pronotum 3 to 5 mm (length/width ratio 1.1 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus with or without piceus vitta anteromedially; texture nitidus, finely punctate throughout with punctures becoming thicker and umbilicate anteromedially. Scutellum testaceous to rufopiceus, ovate, longer than wide. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceous to sanguineus, lobe piceus or not different in color from rest of prosternum; texture glabrous with erect setae on anterior fourth, punctuation fine medially, contiguous and umbilicate laterally. Hypomeron aurantiacus; texture glabrous with fine punctuation throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum testaceous to aurantiacus; texture nearly glabrous with or without few scattered setae anterolaterally, punctuation very fine throughout. Femora fulvus to testaceous. Elytra 9 to 12 mm (length/width ratio 2.7 to 3.3), subparallel on anterior fourth then narrowing to tip; color luteus with interval 1, posterior half of interval 2, and lateral margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, stria punctures fine, interstriae wrinkled and lightly punctate;

apices each ending in a single spine. Abdomen fulvus to luteus with medial piceus cuneiform vitta extending length of abdomen; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctation fine, becoming denser on sternite 1; female with 2 nearly contiguous elongate elliptical foveae on posterior half of sternite 5; anterior sclerite with lateral arms long, as long as median piece, and bearing roughly 4 dentitions apically (Fig. 59). Male with median lobe and parameres strongly arcuate, lateral blades short, roughly 1/8 length of parameres (Figs. 104, 105).

MATERIAL EXAMINED. Holotype, male: PERU: Huánuco, Tingo María, Monson Valley, XII-11-1954, E.I. Schlinger and E.S. Ross (CASC); Paratypes: PERU: Huánuco, Tingo María, Monson Valley, XI-1-1954, E.I. Schlinger and E.S. Ross (1, CASC); Tingo María, Monson Valley, IX-23-1954, E.I. Schlinger and E.S. Ross (1, CASC); Junín, 900 m, Soudoveni Ridges, Soudoveni/Huantadriri Vall., 1987, ca. 100 km NO Satipo (1, PCCV).

DIAGNOSIS. The elytral markings of *S. cyrtomaris* are restricted to the suture and lateral margin (Fig. 201). The last 3 antennal segments are pale yellow. This is also the case for most of the species in the *S. caracasanus* group. Only *S. spinosus*, *S. nigriceps*, and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. The last 4 segments of the antennae are pale yellow in *S. woodi*, *S. chontalenus*, and *S. matilei*. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus cyrtomaris* can also be separated from *S. nigriceps* by the lack of a pronotal vitta (present in *S. nigriceps* and *S. matilei*; see Figs. 203, 204). *Semiotus cyrtomaris* can be separated from *S. carus* by having the scutellum longer than wide. It can be separated from *S. antennalis* and *S. nigriceps* by the piceus elytral marginal vitta extending anteriorly past the posterior border of the scutellum (often to the anterior humeral angles). The male parameres of *S. cyrtomaris* are strongly arcuate, nearly hemispherical, in profile (Fig. 105). This is a unique characteristic, not found in other *Semiotus*.

ETYMOLOGY. The name is a combination of Greek *kyrtos* (curved) and *maris* (maleness), referring to the arched aedeagus and parameres.

Semiotus lacrimiformis n. sp.

(Figs. 12, 69, 111, 199)

DESCRIPTION. Length 11 to 19 mm (length/width ratio 4.0 to 5.1). Head piceus, front with 2 spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate, 1 to 2 segments short of hind angles; segments 1 and 2 badius, segments 3 to 7 piceus, segment 8 badius to testaceus, segments 9 to 11 stramineous. Pronotum 2 to 5 mm (length/width ratio 1.1 to 1.5), narrowly

sinuate, margin broadly rounded without sulcus; color fulvus to luteus, with broad piceus vitta extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate, broader than long. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceus, tarsi piceus. Elytra 7 to 12 mm (length/width ratio 2.5 to 3.4), glabrous and subparallel on anterior half then narrowing to tip; color piceus apically, luteus basal coloration projecting on each elytron in broad hemispherical extensions onto apical third; texture glabrous, nitidus, stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with 2 points extending apically at different lengths, difference in length (or apical extension) of both points less than lateral distance between points. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 to 3/4 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than 1/2 length of median piece (Fig. 69). Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 0.35 to 0.40 length of parameres (Fig. 111).

MATERIAL EXAMINED. Holotype, male: COSTA RICA: Puntarenas, Buen Amigo, San Luis Monteverde, 1000–1300 m, III-1995, Z. Fuentes (INBC); Paratypes: COSTA RICA: Guanacaste, Estación Mengo, SW side Volcán Cacao, 1100 m, II-1989 (1, INBC); Est. Cacao, 1000–1400 m, S Vol. Cacao P.N., V-(21-29)-1992, A. Gutierrez (1, INBC); Est. Cacao, 1000–1400 m, SW Vol. Cacao, III-1990 (1, INBC); Est. Cacao, 800–1600 m, S Vol. Cacao P.N., VII-1993, J.F. Quesada (1, INBC); Estac. Cacao, SE side Volcan Cacao, 1000–1400 m, V-VI-1990 (1, INBC); *ibid.*, B. Guadamuz y familia (1, INBC); Estación Cacao, SW side Volcán Cacao, 1000–1400 m, VI-1990 (2, INBC); Río San Lorenzo, Tierras Morenas, Z.P. Tenorio, 1050 m, IV-1992, C. Alvarado (1, INBC); Puntarenas, Buen Amigo, San Luis Monteverde, A.C. Arenal, 1000–1350 m, V-1994, Z. Fuentes (6, INBC); Buen Amigo, Monteverde 4 km S de la reserva, 1000–1350 m, V-1997, Z. Fuentes (2, INBC); Est. G Brenes, Reserva Biológica Monteverde, 1300 m, VI-1991, E. Bello (1, INBC);

Monte Verde, IV-(19-26)-1988, E. Giesbert (2, FSCA); Monte Verde, Pension Quetzal, 1380 m, V-28-1992, M. Jameson and B. Ratcliffe (1, SEMC); San Luis, Fca. Buen Amigo Monteverde, 4 km S de la Reserva, 1350 m, VII-1997, Z. Fuentes (1, INBC); *ibid.*, III-1997 (1, INBC); San Luis Monteverde, 1000–1350 m, IV-1995, Z. Fuentes (2, INBC); *ibid.*, III-1995 (1, INBC); San Luis Monteverde, 1000–1350 m, IV-1994, Z. Fuentes (1, INBC); *ibid.*, III-1994 (6, INBC); *ibid.*, II-1994 (2, INBC); San Luis Monteverde, 1040 m, IX-1992, Z. Fuentes (2, INBC); *ibid.*, (VIII-24)-(IX-15)-1992, F.A. Quesada (2, INBC).

DIAGNOSIS. The color pattern of the elytra is different in *S. lacrimiformis* than in related species. The pale basal color extends as a tear-shaped extension onto the black apical color (Fig. 199). In related species, the pale basal color (extending nearly to the elytral apices) is separated by a dark sutural and a dark marginal vitta (Figs. 201–206), or the pale basal color does not extend onto the apical third of the elytra (Figs. 195–198, 200). The basal pale elytral coloration of *S. woodi*, though not lacrimiform, is sinuate. It can be separated from *S. lacrimiformis* by the dark sutural vitta that extends to the scutellum (Fig. 197). In *S. lacrimiformis* the suture is pale on the basal half of the elytra. Both *S. triplehorni* and *S. woodi* have the lateral paramere blades 0.30 to 0.35 of the overall paramere length. In *S. lacrimiformis* the blades are longer, 0.35 to 0.40 the overall paramere length.

ETYMOLOGY. The name refers to the tear-shaped markings on the elytra.

Semiotus matilei Chassain
(Figs. 10, 158, 204)

Semiotus matilei Chassain 2001a:31 (Holotype, male: MNHN; type locality: Ecuador, Paramba, 3500 ft).

DESCRIPTION. Length 13 to 14 mm (length/width ratio 4.3 to 4.4). Head piceus, front with 2 spines anterolaterally; texture glabrous with moderately deep punctation. Antennae serrate, 2 to 3 segments short of hind angles; segments 1 through 3 testaceous, segments 4 to 7 (or 8) piceus, segments 8 to 11 fulvus to stramineous. Pronotum 3 to 4 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus, hind angles lighter, disc with median piceus vitta sinuous, extending from posterior border to anterior border; texture nitidus, finely punctate throughout with punctation becoming thicker anteromedially. Scutellum subtrapezoidal, small, separated from anterior elytral margin by own length; color testaceous to rufopiceus. Prosternum evenly concave in profile, tip of prosternal process not divided; color fulvus to aurantiacus, lobe piceus; texture glabrous with erect setae on anterior fourth, punctation fine medially, denser and deeper laterally. Hypomeron fulvus to aurantiacus; texture glabrous, nitidus with fine

punctation throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum testaceous to aurantiacus; texture nearly glabrous with few scattered setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceous. Elytra 8 to 9 mm (length/width ratio 2.8 to 2.9), widest on anterior fourth then narrowing to anterior border and to posterior tip; color fulvus to luteus with interval 1 and broad lateral vitta (covering intervals 5 to 9) extending to humeral angles testaceous to badius; texture glabrous, nitidus, striae (except stria 1) and stria punctures fine to obsolete; apices each ending in a single spine. Abdomen fulvus to testaceous; texture glabrous with few scattered decumbent setae anterolaterally and few erect setae posteriorly. Male with parameres narrow medially, lateral blades rounded on lateral margin apically, sharply angled anteriorly, approximately 1/4 length of parameres.

Female not seen.

MATERIAL EXAMINED. ECUADOR: Pichincha, 500 m, 16 km SE Santo Domingo, VI-(4-14)-1976, S. & J. Peck (CNCI); Province unknown, Cachabé, low ca. XI-'96, Rosenberg (MNHN); Paramba, 3500 ft, III-'97, Rosenberg (MNHN).

DIAGNOSIS. *Semiotus matilei* is unique among all the species in the *S. caracasanus* group in having a small subquadrate scutellum. In the other species the scutellum is subobovate to triangular. *Semiotus matilei* is most closely related to *S. pallicornus*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 204). The last 4 antennal segments are pale yellow in *S. matilei*, *S. woodi* (see Fig. 197), and *S. chontalenus*. Only the last 3 segments are pale in most species in the *S. caracasanus* group. In *S. spinosus*, *S. nigriceps*, and *S. caracasanus* the last 8 or 9 antennal segments are entirely black. In *S. pallicornus* and *S. rileyi*, all the segments are pale.

REMARKS. The last 2 localities indicated are assumed to be in Ecuador (Chassain, 2001a) though not found in available atlases.

Semiotus nigriceps Candèze
(Figs. 13, 55, 156, 203)

Semiotus nigriceps Candèze 1857:310, Candèze 1874:175, Fleutiaux 1925:109 (Syntypes (4): BMNH; type locality: Brazil).

Semiotus nigrolineatus Schwarz 1900:306 (Syn-types: DEIC; type locality: Brazil, Goyas, Jatahy). New synonym.

DESCRIPTION. Length 20 to 21 mm (length/width ratio 4.8 to 4.9) Head piceus, front with 2 spines anterolaterally with sharply angled area between; texture glabrous with or without few erect supraorbital setae, with small deep punctures scattered throughout; ocular index 71.0 to 73.0; frontal spines approximately 0.38 length of

frons. Antennae serrate, 4 segments short of hind angles in females; segments 1 and 2 (and sometimes 3) testaceous, segments 3 (or 4) to 11 rufopiceus. Pronotum 5 to 6 mm (length/width ratio 1.3 to 1.5), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to testaceous with broad median vitta piceus, angles often paler; texture glabrous with fine deep punctures scattered throughout. Scutellum piceus, broadly ovate. Prosternum slightly and evenly concave in profile; color testaceous to sanguineus; texture glabrous with few decumbent setae laterally, punctuation fine and shallow medially becoming dense and umbilicate laterally. Hypomeron fulvus to testaceous with fine punctures scattered throughout. Mesosternum fulvus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to aurantiacus. Metasternum testaceous to aurantiacus medially with badius to rufopiceus lateral areas; texture glabrous with very fine scattered punctures scattered throughout. Femora fulvus to testaceous. Elytra 12 to 14 mm (length/width ratio 3.1 to 3.2), subparallel on anterior third then narrowing to tip; interval 1 (and posterior half of interval 2) and posterior half (to 3/4) of intervals 5 to 9 piceus, remainder of elytra forming a wedge-shaped fulvus basal extension to near tip; texture glabrous, stria 1 well defined, remaining striae and strial punctures shallow to obsolete; apices each bearing 1 spine. Abdomen fulvus to luteus laterally with broad medial piceus vitta extending from sternite 1 to sternite 5; texture with very fine decumbent setae scattered throughout, punctuation fine and scattered throughout; female with 2 elongate foveae on posterior 3/4 of sternite 5; anterior sclerite with lateral arms covered with several dentitions extending posteriorly 2/3 length of median piece (Fig. 55).

Male not seen.

MATERIAL EXAMINED. BRAZIL: Goiás, Jatahy (DEIC); Rio de Janeiro (ZMUC); Rio de Janeiro, I-1977, M. Alvarenga (CNCI); ECUADOR: Napo, Res. Ethnica Waorani, 1 km S Onkone Gare Camp, Trans. Ent., 220 m, 0°39'10"S, 76°26'W, VI-30-1995, T.L. Erwin et al., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, at Trans. 8, sta. 4 Project MAXUS, lot 1074 (USNM); PARAGUAY: Itapúa, San Pedro Mi., San Rafael Reserve, 26°31'24"S, 55°48'18"W, 90 m, XI-27-2000, Z.H. Falin, PAR1FOO, ex: on vegetation near fruitfall (SEMC); PERU: Cuzco, Río Paucartambo, Quiroz (LACM); (DEIC).

DIAGNOSIS. *Semiotus nigriceps* is most closely related to *S. caracasanus*, *S. antennalis*, and *S. spinosus*. The dark elytral markings are restricted to the suture and lateral margin (Fig. 203). Among these species within the *S. caracasanus* group, only *S. nigriceps* and *S. matilei* have a dark

pronotal vitta. The pronota are immaculate in the other species. *Semiotus nigriceps* can be separated from *S. matilei* by the completely dark antennae. In *S. matilei* the last 4 segments are pale yellow.

REMARKS. The pattern of the elytral and pronotal vittae do not differ in the type series of *S. nigrolineatus* and *S. nigriceps*. Because other characters are likewise the same, these 2 names are considered synonyms.

Semiotus pallicornus n. sp.

(Figs. 11, 60, 103, 205)

DESCRIPTION. Length 14 to 19 mm (length/width ratio 4.6 to 5.4). Head piceus, front with 2 spines anterolaterally; texture glabrous with moderately deep punctuation. Antennae serrate, 1 to 2 segments short of hind angles; color fulvus to testaceous throughout. Pronotum 3 to 5 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus; texture nitidus, finely punctate throughout becoming thicker and umbilicate anteromedially. Scutellum piceus, subtrapezoidal. Prosternum evenly concave in profile, tip of prosternal process not divided; color testaceous to sanguineus medially, lobe and prosternal process piceus; texture glabrous with erect setae on anterior fourth, punctuation fine medially, contiguous and umbilicate laterally. Hypomeron fulvus to aurantiacus with posterior border piceus; texture glabrous with fine punctuation throughout. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with few scattered setae anterolaterally, punctuation very fine throughout. Femora fulvus to testaceous. Elytra 9 to 12 mm (length/width ratio 2.9 to 3.4), subparallel on anterior fourth then narrowing to tip; color luteus with apical 3/4 of interval 1 and posterior 2/3 of margin piceus; texture glabrous, nitidus, striae (except stria 1) fine to obsolete, strial punctures fine, interstriae wrinkled and lightly punctate; apices each ending in a point or poorly defined spine. Abdomen fulvus to luteus with piceus medial cuneiform vitta extending length of abdomen; texture mostly glabrous with few scattered setae on sternites 1 and 5, punctuation fine, becoming denser on sternite 1; female with 2 nearly contiguous elongate elliptical foveae on posterior 3/4 of sternite 5; anterior sclerite vestigial, lateral arms small, subtriangular (Fig. 60). Male with parameres narrow, lateral blades subtriangular, 1/3 length of parameres (Fig. 103).

MATERIAL EXAMINED. Holotype, male: COSTA RICA: Guancaste, Río San Lorenzo, 1050 m, Tierras Morenas, Z.P. Tenorio, IV-1993, G. Rodríguez (INBC); Paratypes: COSTA RICA: Alajuela, Peñas Blancas, II-2-1987, E. Cruz (1, CMNC); Peñas Blancas, XII-1986, E. Cruz

M.T. (1, CMNC); Cartago, Quebrada Segunda, Tapantí, 1150 m, XI-1994, R. Delgado (1, INBC); Ref. Nac. Fauna Silv., Tapantí, 1250 m, VIII-1991, F.A. Quesada (1, INBC); Suiza Tur'iba, P. Schild (1, USNM).

DIAGNOSIS. In *S. pallicornus*, the dark elytral markings are restricted to the suture and lateral margin (Fig. 205). In the *S. caracasanus* group, only *S. pallicornus* and *S. rileyi* have entirely pale antennae. *Semiotus pallicornus* has a reduced anterior sclerite of the bursa copulatrix (Fig. 60) that appears subtriangular. This sclerite is even more reduced in *S. rileyi* (Fig. 67), where it is subelliptical. *Semiotus pallicornus* is known only from Costa Rica, *S. rileyi* is only known from Panama.

ETYMOLOGY. *Semiotus pallicornus* is named for the pale antennae.

Semiotus rileyi n. sp.

(Figs. 8, 67, 200)

DESCRIPTION. Length 16 to 18 mm (length/width ratio 4.6 to 5.7). Head piceus, front with 2 spines anterolaterally; texture glabrous with few erect setae over eyes, punctuation fine and scattered throughout. Antennae serrate, 2 to 3 segments short of hind angles; fulvus throughout. Pronotum 4 to 5 mm (length/width ratio 1.2 to 1.5), elongate, cylindrical, hind angles diverging; margin incassate, without sulcus; color aurantiacus, without maculae; texture glabrous, nitidus, with fine punctures throughout. Scutellum piceus, ovate to subtriangular. Prosternum evenly concave in profile; color aurantiacus medially, lobe and prosternal process piceus; texture glabrous medially with decumbent setae laterally and few erect setae on lobe, punctuation fine medially, denser and umbilicate laterally and on lobe. Hypomeron aurantiacus, posterior border piceus, angles fulvus; texture glabrous, nitidus with or without fine punctuation throughout. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture glabrous, nitidus with fine punctures throughout. Femora fulvus to aurantiacus. Elytra 9 to 10 mm (length/width ratio 2.7 to 3.2), subparallel on anterior third then narrowing to tip; color luteus to aurantiacus on basal half, piceus on apical half; texture glabrous, nitidus, strial punctures fine, striae fine to obsolete; apices each ending in a spine and with sutural margin sinuous to slightly angled subapically. Abdomen piceus medially, fulvus to luteus laterally; texture glabrous, nitidus with fine punctures throughout; female with 2 elongate obovate foveae on posterior 4/5 of sternite 5; anterior sclerite vestigial, reduced to small sclerite 1/3 size of antennomere 2 (Fig. 67).

Male unknown.

MATERIAL EXAMINED. Holotype, female: PANAMA: Chiriquí, Reserva la Fortuna, Divide Trail, V-26-1993, E.G. Riley (EGRC/TAMU); Paratype: PANAMA: Cerro Jefe, VI-(1-2)-1985, E.G. & M.A. Riley (1, EGRC/TAMU); Panamá, Cerro Azul, 2600 ft, VI-3-1992, E. Giesbert (1, FSCA).

DIAGNOSIS. *Semiotus rileyi* is most closely allied to *S. carus*, *S. spinosus*, and *S. antennalis*. In *S. rileyi* the dark elytral markings are restricted to the apical half (Fig. 200). Among other species in the *S. caracasanus* group with this elytral pattern, it is unique in having an immaculate pronotum. The pronotal color is a deeper tan to orange than the pale color of the other species that ranges from pale to dark yellow. The anterior sclerite of the bursa copulatrix is very reduced in *S. rileyi* (Fig. 67), being not more than an elliptical piece less than a fifth the size of related species (as in Figs. 68, 69). Geographically, *S. rileyi* is known only from Panama. Of the species in the *S. caracasanus* group, only *S. spinosus* is known to also occur in Panama.

ETYMOLOGY. *Semiotus rileyi* is named in honor of Edward G. Riley, Texas A&M University.

Semiotus spinosus n. sp.

(Figs. 10, 52, 113, 196)

DESCRIPTION. Length 14 to 17 mm (length/width ratio 4.2 to 4.5). Head piceus, front with 2 spines anterolaterally; texture glabrous with few setae above eyes and spines, punctuation moderately deep and scattered throughout; ocular index 72.0 to 75.0. Antennae serrate, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 3 to 4 mm (length/width ratio 1.0 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to luteus, with broad piceus vitta extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctuation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctuation very fine throughout. Femora fulvus to testaceous. Elytra 9 to 11 mm (length/width ratio 2.8 to 2.9), glabrous, subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; strial punctures fine, striae (except

stria 1) very fine to obsolete, interstriae flat; apices each bearing 1 spine with sutural side angled to dentate subapically. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite longer than wide, lateral arms short, 1/3 length of median piece (Fig. 52). Male with parameres narrow, lateral blades pointed, length more than 1/4 the length of parameres (Fig. 113).

MATERIAL EXAMINED. Holotype, male: **COSTA RICA:** Puntarenas, Estación Biológica Las Alturas, 1500 m, Coto Bruns., IX-1991, M. Ramirez, L-S-822500,591800 (INBC); Paratypes: **COSTA RICA:** Puntarenas, Avenida El Pizote, 1.4 km NE de la Tigra, 1300 m, VI-(10-29)-1996, E. Navarro (1, INBC); **ECUADOR:** Galápagos, Galápagos Islands, Charles Island, VI-1929, Pinchot Exp. (1, USNM); **PANAMA:** Canal Zone, Barro Colorado Island, VII-9-1961, J.M. Campbell, at light (2, CNCI); Barro Colorado Island, VI-(11-13)-1976, E.M. Fisher (1, CASC); Barro Colorado Island, VI-(17-20)-1976, E.M. Fisher (1, CASC); Barro Colorado Island, V-1-1980, R. Silberg, A. Aiello, Snyder, Molino (1, USNM); Barro Colorado Island, II-1-45, J. Zetek (1, USNM); Barro Colorado Island, VIII-7-1933, J.D. Hood (1, USNM); Fort Sherman, IV-26-1980, D. Engleman (1, EGRC); Fort Sherman, IV-26-1980, D. Engleman (1, EGRC); Fort Sherman, 9°20'N, 79°58'W, VII-31-1974, D. Engleman (1, CNCI); vic. Gamboa, V-8-1981, E. Giesbert (1, FSCA); Summit Gardens, V-27-1969, E.G. Riley (1, EGRC); Panama, Cerro Campana, 850 m, 8°40'N, 79°56'W, VI-3-1972, Stockwell (1, CNCI); Cerro Campana, III-18-1973, Stanch (1, BWPC); Pan American Highway, 30 km E Cañita, VI-(15-29)-1992. J. & K. Ribardo (1, CASC); South America (1, LACM).

DIAGNOSIS. *Semiotus spinosus* is most closely allied to *S. carus*, *S. rileyi*, and *S. antennalis*. In *S. spinosus* the dark elytral markings are restricted to the apical half (Fig. 196). It can be readily separated from *S. rileyi* by the presence of a pronotal vitta. *Semiotus rileyi* lacks a pronotal vitta (Fig. 200). The pronotal vitta in *S. spinosus* is broad and roughly as wide anteriorly as posteriorly and occupies roughly as much area as the lateral pale yellow vittae. This is also the condition in *S. caracasanus*, *S. chontalenus*, *S. woodi*, and *S. caracasanus*. *Semiotus caracasanus* but can be separated from *S. spinosus* by the length of the lateral blades of the parameres. In *S. spinosus* the lateral blades are longer, more than 1/4 length of the parameres (Fig. 113). In *S. caracasanus* the lateral blades are less than 1/5 the length of the parameres (Fig. 114). *Semiotus spinosus* is known from Ecuador and Peru north to Costa Rica. *Semiotus caracasanus* is only known from Venezuela.

ETYMOLOGY. *Semiotus spinosus* is named for the spinose frons.

Semiotus triplehorni n. sp.

(Figs. 12, 68, 110, 198)

DESCRIPTION. Length 13 to 18 mm (length/width ratio 4.1 to 4.5). Head piceus, front with 2 spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate, 1 to 3 segments short of hind angles; segments 1 and 2 badius, segments 3 to 7 piceus, segment 8 badius to testaceous, segments 9 to 11 stramineous. Pronotum 3 to 5 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, margin broadly rounded without sulcus; color aurantiacus with hind angles fulvus to luteus, piceus vitta constricted anteriorly, width of constricted area half or less width of vitta at pronotal base (Fig. 198); texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus to aurantiacus, posterior border piceus; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus to testaceous, tarsi piceus. Elytra 8 to 12 mm (length/width ratio 2.5 to 2.9), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half, colors clearly separated by narrow transverse sinuation (Fig. 198); stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with 2 points extending apically at different lengths, difference in length (or apical extension) of both points greater than lateral distance between points. Abdomen pale fulvus to luteus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 to 3/4 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than 1/2 length of median piece (Fig. 68). Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 0.30 to 0.35 length of parameres (Fig. 110).

MATERIAL EXAMINED. Holotype, male: **COSTA RICA:** Puntarenas, Est. Sirena, 0-100 m, P.N. Corcovado, (III-21)-(IV-21)-1992, Z. Fuentes (INBC); Paratypes: **COSTA RICA:** (1, MNHN); Alajuela, San Mateo, 400 ft, A. Heyne, Berlin-Wilm. (3, MNHN); San Mateo, 300 ft, A. Heyne,

Berlin-Wilm. (1, MNHN); Puntarenas, Monteverde, V-(23-27)-1987, E. Giesbert (1, FSCA); Est. Quebrada Bonita, 50 m, IX-1993, J. Saborio (1, INBC); Est. Quebrada Bonita, Res. Biol. Carara, 50 m, X-1994, J.C. Sabario (1, INBC); Est. Quebrada Bonita, 50 m, XI-1994, R. Guzman (1, INBC); Est. Quebrada Bonita, Res. Biol. Carara, 50 m, VIII-(10-28)-1992, R. Guzman (1, INBC); *ibid.* VIII-11-1991, A. Solis (1, INBC); Rancho Quemado, Peninsula de Osa, IV-1992, D. Brenes (1, INBC); Est. Sirena, 0–100 m, P.N. Corcovado, VI-1992, G. Fonseca (1, INBC); *ibid.* IV-1992 G. Rodríguez (1, INBC); *ibid.* VI-1990, F. Quesada (1, INBC); *ibid.*, N. Obando (1, INBC); San José, Alto Tigra, 750 m, V-15-1997, F.A. Quesada (1, INBC); Mora, Hacienda el Rodeo, 800 m, V-10-1997, I.A. Chacon (1, INBC); PANAMA: Chiriquí (4, MNHN); (1, CUIIC); Coclé, rd. N Cerro Gaital, V-15-1980, E.G. Riley & D. LeDoux (1, EGRC).

DIAGNOSIS. In *S. triplehorni* the dark elytral markings are restricted to the apical half (Fig. 198). It can be readily separated from *S. rileyi* by the presence of a pronotal vitta. *Semiotus rileyi* lacks a pronotal vitta (Fig. 200). The pronotal vitta in *S. spinosus*, *S. lacrimiformis*, *S. woodi*, *S. caracasanus*, and *S. zonatus* is broad and roughly as wide anteriorly as posteriorly. In *S. triplehorni* the pronotal vitta is strongly constricted towards the anterior margin (Fig. 198). The last 3 to 4 segments of the antennae are pale in *S. triplehorni*. This is the typical condition in the *S. caracasanus* group. Exceptions are *S. rileyi* and *S. pallicornus*, where all the terminal segments are pale, and *S. spinosus*, *S. caracasanus*, and *S. zonatus*, where they are completely black.

ETYMOLOGY. *Semiotus triplehorni* is named in honor of Charles A. Triplehorn, The Ohio State University.

Semiotus woodi n. sp.

(Figs. 11, 32, 66, 109, 197)

DESCRIPTION. Length 12 to 16 mm (length/width ratio 4.2 to 4.7). Head piceus, front with 2 spines anterolaterally; texture glabrous with few supraorbital setae, punctation moderately deep and scattered throughout. Antennae serrate, just short of hind angles in females, reaching hind angles in males; segments 1 and 2 testaceous, segments 3 to 7 piceus, segments 8 to 11 stramineous. Pronotum 3 to 4 mm (length/width ratio 1.1 to 1.3), narrowly sinuate, margin broadly rounded without sulcus; color fulvus to luteus with broad piceus vitta extending from base to anterior margin; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomeron fulvus laterally, piceus along suture; texture glabrous and

nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora fulvus, tarsi piceus. Elytra 8 to 11 mm (length/width ratio 2.6 to 3.1), glabrous and subparallel on anterior half then narrowing to tip; color fulvus on basal half, piceus on apical half, with intervals 1 and part of 2 piceus anteriorly to scutellum; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each with 2 points extending apically at different lengths, difference in length (or apical extension) of both points less than lateral distance between points. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically; anterior sclerite with numerous spinose dentitions, lateral arms short, extending apically less than 1/2 length of median piece (Fig. 66). Male with parameres narrow, lateral blades narrow, flexed and subtriangular, approximately 0.30 to 0.35 length of parameres (Fig. 109).

MATERIAL EXAMINED. Holotype, male: COSTA RICA: Alajuela, Est. San Ramón Oeste, 620 m, IV-(3-19)-1994, F. Quesada (INBC); Paratypes: COSTA RICA: Alajuela, San Cristobal, 600–620 m, (VI-16)-(VII-1)-1997, F.A. Quesada (1, INBC); Sect. San Ramón de Dos Ríos, 620 m, (I-16)-(II-3)-1995, C. Cano (1, INBC).

DIAGNOSIS. In *S. woodi* the dark elytral markings are primarily restricted to the apical half (Fig. 197). It is unique in having a dark sutural vitta on the anterior half of the elytra extending to the scutellum (Fig. 197). The last 4 segments of the antennae of *S. woodi* are pale yellow (as they are in *S. matilei*, and *S. chontalenus*). In the majority of species in the *S. caracasanus* group, only the last 3 segments of antennae are pale yellow. Only *S. spinosus*, *S. nigriceps*, and *S. caracasanus* have the last 8 or 9 antennal segments entirely black. In *S. pallicornus* and *S. rileyi*, all the segments are pale. *Semiotus woodi* is apparently endemic to the northern Guanacaste Cordillera.

ETYMOLOGY. *Semiotus woodi* is named in honor of Stephen L. Wood, Brigham Young University.

Semiotus zonatus Candèze

(Fig. 9)

Semiotus zonatus Candèze 1874:176 (Syntypes (2): BMNH; type locality: Ecuador).

DESCRIPTION. Length 13 to 14 mm (length/width ratio 4.3 to 4.6). Head piceus, front with 2 spines anterolaterally; texture glabrous with few

setae above eyes and spines, punctation moderately deep and scattered throughout. Antennae serrate, reaching hind angles in males; segments 1 and 2 piceus or with pale patterns, segments 3 to 8 piceus, segments 9 to 11 straminious. Pronotum 3 to 4 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, margin broadly rounded without definition; color piceus with narrow fulvus margin, broad piceus vitta occupying 0.90 width of pronotum; texture glabrous with very fine punctures on lateral fulvus areas, deeper punctures on median piceus vitta. Scutellum piceus, broadly ovate. Prosternum evenly concave in profile on anterior half; color piceus; texture with long fine setae scattered anterolaterally, punctation fine medially, becoming denser and umbilicate laterally. Hypomerone piceus with very narrow luteus vitta along lateral border; texture glabrous and nearly impunctate on lateral fulvus area, finely punctate on piceus medial area. Mesosternum piceus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum piceus. Metasternum piceus; texture nearly glabrous with clump of fine decumbent setae anterolaterally, punctation very fine throughout. Femora piceus. Elytra 8 to 10 mm (length/width ratio 3.0 to 3.1), glabrous and subparallel on anterior half then narrowing to tip; color fulvus to luteus on basal half, piceus on apical half; stria punctures fine, striae (except stria 1) very fine to obsolete, interstriae flat; apices each bearing 1 spine with sutural side angled and often minutely dentate subapically. Abdomen pale fulvus laterally with broad medial piceus vitta; texture with fine suberect setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 elliptical foveae on posterior 2/3 of sternite 5 confluent apically. Male with parameres narrow, lateral blades pointed, less than 1/5 length of parameres.

MATERIAL EXAMINED. ECUADOR: (BMNH); Zamora Chinchipe, 8 km NW Zamora, mouth of Río Sabanilla, 1420 m, XI-1-1987, C. Young, wet forest (CMNH).

DIAGNOSIS. In *S. zonatus* the dark elytral markings are restricted to the apical half (as in Figs. 195–200). The dark pronotal vitta extending from the anterior margin of the pronotum to the posterior margin in *S. zonatus* is much broader than in other species of the *S. caracsanus* group. In *S. zonatus* the yellow marginal vittae of the pronotum occupies less than 2/3 the width of the scutellum. In the other species, the yellow vitta is much wider, nearly always wider than the width of the scutellum. The last 3 segments of the antennae are pale yellow in *S. zonatus*. *Semiotus zonatus* is known only from Ecuador.

Semiotus furcatus Species Group

All 3 species in the *S. furcatus* species group bear 2 well-defined anterolateral frontal spines

with an angled area between (that is occasionally subspinose). They are distinct from all other *Semiotus* in having double dentitions on the posterior border of the hypomerone (Fig. 182).

Semiotus antennatus Schwarz (Figs. 18, 58, 101, 252)

Semiotus antennatus Schwarz 1900:306 (Syn-types: DEIC; type locality: Colombia, Río Dágua).

DESCRIPTION. Length 25 to 26 mm (length/width ratio 4.2 to 4.4). Head piceus, front with 2 spines anterolaterally; texture glabrous, nitidus with or without erect supraorbital setae, punctation deep and scattered throughout, subumbilicate basally; ocular index 67.0 to 70.0. Antennae serrate, more than 3 segments short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 7 piceus, segments 8 to 11 straminious. Pronotum 6 to 8 mm (length/width ratio 1.2 to 1.3), subtrapezoidal, hind angles only slightly diverging; color piceus medially, fulvus to aurantiacus laterally; lateral margin sulcate along entire length, explanate anteriorly; texture glabrous, nitidus with punctures becoming larger and often umbilicate anteriorly. Scutellum piceus, wider than long, incised on anterior border. Prosternum concave in profile, prosternal process not divided apically; color piceus with prosternal process sanguineus in most specimens; texture glabrous with few scattered setae laterally and on lobe, punctation very fine to obsolete medially, deep and umbilicate laterally. Hypomerone piceus along suture, fulvus to aurantiacus laterally; texture glabrous, nitidus with scattered punctures becoming denser medially. Mesosternum testaceus to aurantiacus medially, piceus laterally, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum testaceus to piceus. Metasternum fulvus to aurantiacus medially, piceus laterally; texture glabrous, nitidus with fine punctures throughout becoming umbilicate anteriorly. Femora testaceus to aurantiacus. Elytra 16 to 17 mm (length/width ratio 2.7 to 2.9), subparallel on anterior third then narrowing to tip; color piceus with anterior lateral margin of elytra and cuneiform vitta extending from base and tapering to near apex fulvus to luteus; texture glabrous, nitidus with striae and stria punctures fine to obsolete; apices each ending in a point with or without a small dentition subapically. Abdomen piceus medially, fulvus to luteus laterally often with testaceus to sanguineus macula near metacoxa; texture glabrous, nitidus with fine punctation becoming denser and lacrimiform laterally; female with 2 large obovate foveae extending from near apex to near anterior border of sternite 5; anterior sclerite with median piece and lateral arms subequal in length, arms and base covered with sharp serrations (Fig. 58). Male with parameres narrow

medially, lateral blades subtriangular, approximately 0.30 length of parameres (Fig. 101).

MATERIAL EXAMINED. COLOMBIA: Bolívar, Buena Vista, Rosenberg (BMNH); Valle del Cauca, Río Dagua (DEIC); W-Cordillera, Lake Calima, Río Bravo Valley near Buga, 1180–1200 m, (VIII-IX)-1988 (PCCV); 1898 (MNHN); ECUADOR: Province unknown, Lila, 1906, Fry Coll. (BMNH).

DIAGNOSIS. *Semiotus antennatus* is the only species in the *S. furcatus* species group with dark antennal segments 3 to 7 (segments 8 to 11 being pale). In *S. furcatus* and *S. bilineatus*, all antennal segments are pale (generally aurantiacus). *Semiotus furcatus* bears 3 elytral vittae (per elytron), whereas *S. antennatus* and *S. bilineatus* have only 2. The male and female genitalia are diagnostic in the 3 species. In *S. bilineatus* and *S. furcatus*, the anterior sclerite of the bursa copulatrix is less curled than in *S. antennatus* (Fig. 58), which also bears several dentitions near the base. These dentitions are absent in *S. bilineatus* and *S. furcatus*, and the lateral arms are more strongly curled forward (Figs. 39, 84). The apical blades of the male parameres are more strongly triangulate in *S. antennatus* (Fig. 101) than in the other 2 species (Figs. 92, 97).

Semiotus bilineatus Candèze
(Figs. 18, 39, 97, 155, 174, 250)

Semiotus bilineatus Candèze 1857:308, Candèze 1874:175 (Holotype, female: BMNH; type locality: Colombia).

DESCRIPTION. Length 18 to 24 mm (length/width ratio 4.5 to 4.8). Head fulvus to aurantiacus with piceus median macula basally, front with 2 spines anterolaterally with angled area between; texture glabrous with or without supraorbital setae, punctation deep and evenly scattered throughout; ocular index 6.7 to 7.0. Antennae serrate, 1 to 2 segments short of hind angles in males, 4 segments short of hind angles in females; color fulvus throughout. Pronotum 4 to 6 mm (length/width ratio 1.2 to 1.4), narrowly expanding posteriorly with anterior half convergent and hind angles divergent, margin sulcate except for area just behind middle, explanate on anterior third; color fulvus to testaceus with elongate (often elliptical) piceus vitta extending from base to (or just short of) anterior border; texture glabrous, punctation deep and mostly separated, becoming smaller and denser along posterior border. Scutellum piceus, wider than long, anterior margin recurved medially. Prosternum strongly concave in profile; color fulvus to aurantiacus; texture with scattered erect setae on anterior third, decumbent setae on posterior half, punctation fine medially becoming deep and umbilicate laterally. Hypomeron fulvus, glabrous with fine punctures scattered throughout. Meso-

sternum fulvus to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus. Metasternum fulvus to aurantiacus with fine setae mostly restricted to posterolateral area, fine shallow punctures scattered throughout. Femora fulvus. Elytra 11 to 16 mm (length/width ratio 2.8 to 3.1), subparallel on anterior fourth then narrowing to tip; intervals 1, 2, posterior half to 3/4 of 5, 6 through 9, and lateral margin piceus, intervals 3, 4, and anterior half to 1/4 of 5 fulvus; texture glabrous, striae (except stria 1) and strial punctures shallow to obsolete; apices each bearing 1 spine with apical sutural border angled and often faintly dentate. Abdomen fulvus with fine scattered decumbent setae scattered throughout, punctation fine and evenly scattered throughout; female with 2 large suboval foveae on posterior 3/4 of sternite 5; anterior sclerite with lateral arms 2 times length of median piece and with several large serrations along inner margin (Fig. 39). Males with parameres narrow medially, not sinuate, lateral blades subtriangular, approximately 0.77 to 0.79 length of parameres (Fig. 97).

MATERIAL EXAMINED. COLOMBIA: Amazonas, Amacayacu, 3.82°S, 70.26°W, III-12-2000, B. Brown, G. Kung, M. Sharkey, MT (LACM); Putumayo, Mocoa, II-1921, W. Hopp (USNM); Mocoa, 530 m, Putumayogebiet, II-1921, W. Hopp (USNM); Department unknown, Umbria, Guines Fluss (CUIC); ECUADOR: Los Ríos, Río Palenque, XI-15-1972, D. Dodson (FSCA); Napo, 20 km E Atahualpa, 480 m, X-(15-24)-1995, E. & V. Giesbert (FSCA); Coca, XI-1982, G. Onore (PCCV); Limoncocha, 250 m, VI-(15-28)-1976, S. & J. Peck (CNCI); Limoncocha, VI-9-1977, Spangler & Givens (USNM); *ibid.*, VI-14-1977; Limoncocha, VI-15-1977, W.E. Steiner (USNM); Limoncocha, 00°24'S, 76°36'W, VII-12-1972, P.L. Kazan (FSCA); Limoncocha, 100 m, V-(18-25)-1976, flight trap, D.G. Young (FSCA); Limoncocha, III-30-1934, D. Engleman (CNCI); 2 km N Limoncocha, VI-14-1977, P.J. Spangler & D.R. Givens (USNM); Puerto Misahualli (vic.), 1650–1900 ft, IX-(6-19)-1998, J.E. Eger (FSCA); 25 km E Puerto Napo, Selva Aliñahú, 450 m, XII-1992, E.S. Ross (CASC); 20 km E Puerto Napo, Aliñahú, 450 m, 1°0'S, 77°25'W, XI-XII-1995, E.S. Ross (CASC); *ibid.*, VI-6-1977; Res. Ethnica Waorani, 1 km S. Onkone gare Camp, Trans. Ent., 0°39'10"S, 76°26', VI-30-1995, W, T.L. Erwin et al., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, at Trans. 8, Sta. 10 project MAXUS lot 1080 (USNM); Sucumbíos, Sacha Lodge, 0.5°S, 76.5°W, VIII-(16-27)-1994, 270 m, P. Hibbs, MT (LACM); *ibid.*, (II-22)-(III-4)-1994; *ibid.*, (III-24)-(IV-3)-1994; *ibid.*, IX-(10-20)-1994; PERU: Loreto, Explorama Inn, 25 mi. NE Iquitos, VII-(19-21)-1989, Amazon rain forest, G.B. Edwards (FSCA); Explorama Lodge, VIII-(13-31)-1989, S. Dunkle

(FSCA); Explorama Lodge, 80 km NE Iquitos, on Amazon River, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Explornapo Camp on Río Sucusari, 2 km upstream from Río Napo, 160 km NE Iquitos, (VI-24)-(VII-20)-1990, Menke & Awertschenko (USNM); cmp. Manco Capac, 74°18'W, 4°43'S, VI-24-1990, palm swamp/Agual insecticidal fog, dry hanging leaves *Maurita flexuosa*, Erwin et al. (USNM); Napo River, 80 mi. NE Iquitos, XII-11-1980, T. King (FMNH); jct. Río Marañoñ & Río Ucayali, 73.5°W, 4.8°S, VIII-(6-20)-1994, P. Skelley, at light (FSCA); Río Napo, Explornapo Camp, Cocha Shimagai, 100 m, 3°15'S, 72°55'W, VI-5-1992, W, T.L. Erwin, E & F Pfuno S (USNM); Río Amazonas, 200 m, Explorama Inn, 25 mi. E Iquitos, IX-(9-12)-1990, B.P. Harris (LACM).

DIAGNOSIS. *Semiotus bilineatus* and *S. furcatus* both have completely pale (yellow to orange) antennae. *Semiotus antennatus* has segments 3 to 7 dark (segments 8 to 11 being pale). *Semiotus furcatus* bears 3 vittae on each elytron, whereas *S. antennatus* and *S. bilineatus* have only 2. The male and female genitalia are distinct in the 3 species. The anterior sclerite of the bursa copulatrix is less curled in *S. antennatus* (Fig. 58), and the medial arm bears several dentitions near the base. These dentitions are absent in *S. bilineatus* and *S. furcatus*, and the lateral arms are more strongly curled forward (Figs. 39, 84). The apical blades of the parameres are triangulate but less elongate in *S. bilineatus* (Fig. 97) than in *S. antennatus* (Fig. 101). In *S. furcatus* the apical blades are pointed (Fig. 92). *Semiotus bilineatus* has been collected from Colombia, Ecuador, and Peru (Fig. 18). *Semiotus antennatus* is known only from Colombia (Fig. 18). *Semiotus furcatus* occurs in South America from Bolivia and Brazil to Colombia and Surinam (Fig. 23).

Semiotus furcatus (Fabricius)

(Figs. 23, 84, 92, 164, 172, 182, 251)

Elater furcatus Fabricius 1792:224, Herbst 1806:335 (Type: not found; type locality: unknown).

Pericalle furcatus, Latreille 1834:141.

Pericallus furcatus, Dejean 1836:96.

Semiotus furcatus, Candèze 1874:174, Szombathy 1909b:121, Fleutiaux 1925:109.

Semiotus fuscatus, Candèze 1874:171. Unjustified emendation.

DESCRIPTION. Length 17 to 25 mm (length/width ratio 4.2 to 4.5). Head testaceous to aurantiacus, front with 2 spines anterolaterally with angled area between; texture with a few erect supraorbital setae, punctation moderately deep and scattered throughout; ocular index 6.7 to 7.0. Antennae 3 or more segments short of hind angles in both sexes; color fulvus to testaceous throughout. Pronotum 5 to 7 mm (length/width

ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging, margin sulcate and explanate on anterior third to half, without sulcus posteriorly; color fulvus to testaceous with thin piceus vitta extending from base to near anterior border; texture glabrous with moderate punctures becoming thicker and umbilicate anterolaterally. Scutellum sanguineus to rufopiceus, greater than 1.3 times wider than long, posterior border rounded, anterior border incised. Prosternum evenly concave in profile; color testaceous to aurantiacus; texture glabrous with few erect setae on lobe, punctures fine medially becoming umbilicate and nearly contiguous laterally, prosternal process not divided at tip. Hypomeron fulvus to testaceous; texture glabrous with few fine punctures scattered throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous, glabrous, with fine punctation becoming thicker anteriorly. Femora fulvus to testaceous. Elytra 11 to 16 mm (length/width ratio 2.6 to 3.1), subparallel on anterior third then narrowing to tip; color luteus to testaceous basally with posterior intervals 1, 2, 5, 6, posterior third of intervals 7 and 8, and 9 piceus, intervals 3, 4, and narrowing wedge along 7 and 8 fulvus; texture glabrous with striae (except stria 1) faint to obsolete, stria punctures moderately deep to obsolete; apices each bearing 1 spine. Abdomen fulvus to testaceous; texture glabrous or with few scattered setae, punctation fine and dense and evenly scattered throughout; female with 2 shallow obovate foveae on posterior 2/3 of sternite 5; anterior sclerite with lateral arms long, approximately 1.3 times as long as middle piece, mesial side covered with approximately 10 to 15 sharp serrations (Fig. 84). Male with parameres narrow medially, lateral blades acute apically, approximately 0.20 to 0.25 length of parameres (Fig. 92).

MATERIAL EXAMINED. BOLIVIA: Beni, Ivoa, II, W.M. Mann (USNM); La Paz, Tumpasa, XII, W.M. Mann (USNM); **BRAZIL:** Amapá, Serra de Navio, XII-60, R. Bicelli (CASC); Amazonas, Estirao do Ecuador, Río Jaurai, X-1979, M. Alvarenga (CNCI); Manaus, X-1936, Worontzow (USNM); Tefé, I-2-1920, Parisli (CASC); Río Madeira, Abuna, Mann & Baker (USNM); Taperinha b. Santarem, VII-(11-20)-1927, Zerny (NHMW); Tefé, XII-23-19, H. Parish (FMNH); Tefé, III-20-32, W. Hopp (USNM); 15 km E Manaus, VIII-4-1993, A.M. & N.D. Penny, primary forest (CASC); Espírito Santo, J.F. Zikan (FMNH); Mato Grosso, Sinop., X-1975, M. Alvarenga (CNCI); 12°31'S, 55°37'W, X-1974, M. Alvarenga (CNCI); Pará, Obidos (FMNH); IX-1967, J.K. (FMNH); (CUIC); Obidos, 1953 (CNCI); 1905, W. Hoffmann (BMNH); Tucuruí, I-1979, M. Alvarenga (CNCI); Uriximcha, nr Obidos, VIII-1935, G.V. Vredenburg (BMNH); Rondônia, 62 km S Ar-

iquemas, Fazenda Rancho Grande, 165 m, 10-32'S, 62-48'W, (X-29)-(XI-10)-1991, B.P. Harris (LACM); 60 km SW Ariquemas, VII-20-1993, N. Penny, secondary forest (CASC); 62 km S Ariquemas, nr Fazenda Rancho Grande, XI-(4-16)-1997, J.E. Eger, fish carion pitfall (FSCA); *ibid.*, XII-(3-15)-1996; 62 km S Ariquemas, Fazenda Rancho Grande, (XI-X)-1992, D.G. Marqua (TAMU); *ibid.* XI-(13-26)-1993; **COLOMBIA:** Amazonas, Leticia, 700 ft, VII-10-1970, H. & A. Howden (CNCI); *ibid.*, (19-25)-1972; Leticia, 10 km N in jungle, III-30-1975, on tree stripped of bark, D. Summers (FMNH); **FRENCH GUIANA:** Cayenne (USNM); Cayenne (OXUM); SE Cayenne, Montagne de Kaw, Km 41, 175 m, 4.58°N, 54.1°W, II-(7-9)-1994, J. Beierl, MV light (LACM); Gulana PK, 37-40, Rte. À Kaw, (I-25)-(II-1)-1995, E. Giesbert & F. Hovore (FSCA); Kaw Rd., PK 38, VIII-26-1995, J.E. Wappes (JEWG); Maroni River (USNM); St. Jean de Maroni (USNM); **GUYANA:** Mazaruni—Potaro, Bartica, Katabo, IV-21-1919 (CASC); *ibid.* III-28-1922; Bartica (CASC); Bartica, Demerara (USNM); Political division unknown, Essequibo River, Moraballi Creek, VIII-27-1929, Oxford Un. Exp. (BMNH); Rupununi, Upper Corentyne River, King Frederick William IV Falls, XI-1935, G.A. Hudson (BMNH); Rupununi, Upper Kutari River, (XI-XII)-1935, G.A. Hudson (BMNH); **PANAMA:** Canal Zone, Madden Dam, IV-3-1939, E.N. Kjellesvig-Waering (FSCA); **PERU:** Huánuco / Pasco, Pachitea (CUIC); Río Pachitea, elev. 300 m, X-15-1964, J.S. (MTEC); Madre de Dios, Pebas (USNM); Río Tambopata res., 30 km (air) Maldonado, 290 m, 12°50'S, 69°20'W (BMNH); Río Tambopata res., 30 air km SW Puerto Maldonado, 290 m, XI-(21-25)-1979, J.B. Heppner, subtropical moist forest (USNM); Río Tambopata Reserve, 30 air km SW Puerto Maldonado, 290 m, XI-(1-26)-1982, E.S. Rosa (CASC); Río Tambopata Res., 30 air km SW Pto. Maldonado, 290 m, XI-(11-15)-1979, J.B. Heppner, subtropical moist forest (USNM); Tambopata, 15 km NE Puerto Maldonado Reserva, Cuzco Amazónico, 12°33'S, 69°03'W, 200 m, VI-24-1989, J.S. Ashe, R.A. Leschen, D. Silva, on molasses traps (SEMC); Tambopata Res. Zone, Explorer's Inn, 290 m, XI-(10-11)-1982, 12°50'S, 69°17'W, T.L. Erwin, On fallen tree along Río la Torre trail (USNM); Ucayali, Pucallpa, X-2-1954 (CASC); Ucayali, Neshuya, I-18-1974, J. Schunke (CNCI); **SURINAM:** Tibiti River, R.S.M. Camp, I-(21-24)-1972, F. Scott (CNCI).

DIAGNOSIS. *Semiotus bilineatus* and *S. furcatus* both have completely pale (yellow to orange) antennae. *Semiotus antennatus* has segments 3 to 7 dark (segments 8 to 11 being pale). *Semiotus furcatus* bears 3 elytral vittae (per elytron), whereas *S. antennatus* and *S. bilineatus* have only 2. Superficially, *S. furcatus* resembles *S. fulvicollis* but can be easily separated by the antennal color (in *S. fulvicollis* segments 3 to 11 are piceus) and

length (which in *S. fulvicollis* nearly reach the hind angles). The male and female genitalia are also distinct. The anterior sclerite of the bursa copulatrix is angulate near the anterolateral angles in *S. fulvicollis*, and the lateral arms are less curled (Fig. 50). In *S. furcatus* the anterior margin is evenly curved and curled forward (Fig. 84). The apical blades of the male parameres are short and convex laterally in *S. furcatus* (Fig. 92). In *S. fulvicollis* they are larger and concave in outline (Fig. 93). *Semiotus furcatus* occurs from Bolivia and Brazil to Panama, Colombia, and Surinam, overlapping in range with nearly all related species.

Semiotus imperialis Group

The 2 species in the *S. imperialis* species group are distinguished by having a single long frontal spine that curves ventrally toward the mandibles. Additionally, the elytral apices each bear 2 spines. Both species are among the largest *Semiotus*, often exceeding 40 mm in length.

Semiotus cuspidatus (Chevrolat)

(Figs. 21, 46, 121, 140, 185, 186)

Eucamptus cuspidatus Chevrolat 1834:35, Guérin-Méneville 1855:579, Germar 1839 (Lectotype, male: MNHN; type locality: unknown).

Pericallus dupontii Dejean 1836:96, Candèze 1857:299.

Semiotus cuspidatus, Candèze 1857:299, Candèze 1874:173, Champion 1896:288, Fleutiaux 1925:109.

Semiotus splendidus Candèze 1881:23, Champion 1896:289 (Type: not found; type locality: Ecuador). New synonymy.

DESCRIPTION. Length 32 to 45 mm (length/width ratio 3.7 to 4.0). Head aurantiacus to testaceous with basal (and occasionally anterior) macula piceus; bearing 1 medial frontal spine; ocular index 73.0 to 75.0. Antennae serrate, 3 to 4 segments short of hind angles; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Front glabrous with few erect setae above eyes and anterior margin, punctures moderately deep throughout. Pronotum 7 to 13 mm (length/width ratio 1.0 to 1.2); subtrapezoidal, hind angles hardly diverging, margin incrassate without sulcus; texture glabrous with dense moderately deep punctures scattered throughout. Scutellum piceus, broadly ovate; prosternum evenly concave in profile, prosternal process undivided; color aurantiacus to sanguineus with piceus vitta along suture; texture glabrous or with few scattered setae, punctures fine medially becoming thick, umbilicate, and often contiguous laterally. Hypomeron fulvus to testaceous laterally, piceus medially; texture glabrous with dense contiguous

punctures on piceus area, less dense laterally. Mesosternum curving ventrally, on different plane than metasternum (as in Fig. 29), finely punctate with fine setae laterally, fossa glabrous and impunctate; fossa sanguineus, piceus laterally. Mesepisternum piceus. Metasternum sanguineus medially, piceus laterally; glabrous with fine decumbent setae anterolaterally; femora rufopiceus to piceus. Elytra 21 to 32 mm (length/width ratio 2.6 to 3.0) gibbous, subparallel on anterior third then narrowing to tip; color fulvus to testaceous with infusate tessellated pattern along striae, cuneiform macula around scutellum piceus; texture glabrous, striae distinct posteriorly, fine to obscure anteriorly, striae punctures very fine to obsolete, intervals with faint wrinkles; apices each bearing 2 subequal spines. Abdomen sanguineus medially, fulvus to luteus laterally with piceus vitta sublaterally, in some specimens piceus vitta reduced to triangular maculae on each segment; surface glabrous except for fine setae over most of first segment and in lateral areas on other segments (and with a few scattered setae on sternite 5), punctation fine and scattered throughout becoming denser on sternite 1; female foveae elliptical to subobovate on apical fourth of sternite 5, conjoined apically forming a chordiform fovea in some specimens.

DIAGNOSIS. *Semiotus cuspidatus* is most closely allied to *S. imperialis* but differs in having the lateral pronotal margin completely yellow (Figs. 185, 186). The pronotum bears a black macula on each side (in addition to the medial vittae) in *S. imperialis* (Fig. 187). The anterior sclerite of the bursa copulatrix is not as heavily armed near the base of the medial and lateral arms in *S. cuspidatus* (Fig. 46) as it is in *S. imperialis* (Fig. 48). Geographically *S. cuspidatus* and *S. imperialis* overlap only in Colombia and Peru. *Semiotus cuspidatus* occurs throughout Central America, with few specimens collected as far south as Peru. *Semiotus imperialis* occurs in South America from Argentina and Brazil north to Venezuela and Colombia. Two subspecies of *S. cuspidatus* are recognized.

REMARKS. The type of *Pericallus dupontii* Dejean has not been located. The synonymy of Candèze (1857) is here accepted.

Semiotus cuspidatus cuspidatus
(Fig. 185)

MATERIAL EXAMINED. COSTA RICA: F. Neverman (USNM); GUATEMALA: Alta Verapaz, Panzós (NHMW); Baha Verapaz, Purulhá, Champion (BMNH); 6 km E Purulhá, 5100 ft, V-(26-31)-1989, E. Giesbert (FSCA); 7 km E Purulhá, VI-6-1991, J.E. Wappes (JEWG); Izabal, SE Capatillo, Rodríguez (BMNH); Morales, nr Negro Norte, 1000 m, 15°22'67"N, 88°41'68"W, X-20-1998, Col. A.C. Bailey, J. Monzon; 25 km SE Morales, 2800 ft, V-(21-24)-1996, E. Giesbert &

J. Monzon (FSCA); Jutiapa, Zapote, Champion (BMNH); HONDURAS: Cortés, Lago Yojoa, A.J. Flores (USNM); MEXICO: Chiapas, Finca "La Isla" (FMNH); Finca Refugio, 3000–10000 ft (CASC); Ocosingo, 1200 m, primitive forest VI-IX-1913 (CNCI); Rancho Santa Rosa, nr Las Delicias, IX-3-1972, R. Wind (CASC); Río Santa Rosa, IV-1975, P. Hubbell (USNM); San Quintin, VII-23-1979 (FSCA); Topachula (CASC); T. Mabre, 1913 (MNHN); Jalisco (OXUM); Veracruz, Catemaco, VIII-1990 (PCCV); Coatepec, Hodge (BMNH); Atoyac, A. Dugos (BMNH); Catemaco, La Victoria, VIII-1-1971 (USNM); Cordoba, VII-21-1936, on tree (FMNH); Dos Amates, I-15-1972, Jubbell (USNM); Jalapa (FMNH); Lake Catemaco, V-(24-25)-1969, J.E.H. Martin (CNCI); Motzorongro (CASC); Orizaba, A. Genin, 1921 (MNHN); Volcán San Martín Tuxtla (east slope), VII-5-1994, E. Giesbert (FSCA); State unknown, Milemek, 1871, Mirada (NHMW).

DIAGNOSIS. This subspecies is readily recognized by the uninterrupted piceus vitta on the prothorax.

Semiotus cuspidatus splendidus
(Fig. 186)

MATERIAL EXAMINED. BRAZIL: São Paulo, Piracicaba, C.E. Tottenham (BMNH) [dubious locality]; COSTA RICA: Alajuela, Cariblanco, XII-18-1983, 750 m, R. Canet (INBC); Estacion Biologica Elberto Brenes, 10°13'02"N, 84°35'51"W, (VI-VII)-1999, M.A. Ivie (MTEC); Río San Lorenzo, 900 m, Res. For. San Ramón, 5 km N Col. Palmarena, III-1996 (INBC); Zapote Upala, nr Bijagua, X-20-1973, F. Cordera (EMEC); Cartago, Aserradero el Seis, Grano de Oro, Turrialba, I-(18-24)-1993, P. Campos (INBC); Chitaria, XII-20-1928, M. Valerio, alt. 700 m (USNM); Grano de Oro, Chirripó, 1120 m, IX-1993, P. Campos (INBC); Suiza Tur'iba, P. Schild (USNM); Guanacaste, Est. Pitilla, 700 m, 9 km S Santa Cecilia, XI-1988, C. Chaves & M. Espinoza (INBC); Limón, Blanca, 8 km SE, 8-V-1987, D.F. Corrales (INBC); Puntarenas, Buen Amigo, San Luis, Monteverde, 1000–1350 m, III-1995, Z. Fuentes (INBC); Cotoncito, 3.5 km N Lucha, 1600 m, V-(13-16)-1997, A. Picado & A. Solis (INBC); Est. Pitier, Sendero Altamira, 1740 m, VII-2-1995, M. Madrigal (INBC); Finca Cafrosa, Est. Las Mellizas, P.N. Amistad, 1300 m, XI-1989, M. Ramírez & G. Mora (INBC); La Amistad Nat. Park, Fila Cedro, 1800 m, II-25-1991, M. Halterman (CASC); Monteverde, 1500 m, V-4-1972, C. Guindon (CASC); *ibid.*, VI-3-1972; Navarro, V-24-36, F. Neverman (USNM); San Luis, Monteverde, A.C. Arenal, 1040–1350 m, VII-1993, Z. Fuentes (INBC); 4 mi. S San Vito, 4000 ft, IV-(26-28)-1967, D.R. & M.L. Paulson (FSCA); Send. El Ripario, 3 km NE Progreso, 1300 m, XI-6-1997,

A. Picado (INBC); 6 km S San Vito, 08°42'N, 83°00'W, III-(19-21)-1967, D.M. Janzen (USNM); San José, Cerro Nara, 17 km N mouth Rio Savegre, II-17-1967, Wille-Fernandez (FSCA); P.B. Carrillo, Est. La Montura, V-22-1981, 1100 m, R. Canet (INBC); **HONDURAS**: Yoro, Linda Vista, 1,000 m, 15°09'59"N, 87°38'18"W, IX-10-1999, R. Cave, J. Torres, R. Diaz (EAPZ); Parque Nacional Pico Pijol, V-25-1998, R.D. Cave (EAPZ); Parque Nacional Pico Pijol, Linda Vista, 1,450 m, 15°09'N, 87°37'W, V-7-2000, R.D. Cave (EAPZ); **PANAMA**: Bocas del Toro, 10 km NE Fortuna Dam, 3400 ft, V-(23-26)-1984, E. Giesbert (FSCA); Chiriquí, Cerro Colorado cmp., VI-13-1980, J. Wagner (FMNH); Hartmanns Finca, VII-(4-7)-1997, Wappes & Morris (JEWG); Petrerillos, I-1934 (CASC); *ibid.*, III-8-1934; *ibid.*, I-25-1935; Volcán de Chiriquí, 25–4000 ft, Champion (NHMW); Volcán de Chiriquí, Champion (BMNH); Volcán Lagunas, V-(13-14)-1981, E. Giesbert (FSCA); Cocle, El Valle, V-29-1982, 1,000 m, S. Knapp (CUIC); Darién, Río Tacarcuna, 1900 ft, VI-1963, M.P. Murdoch (USNM); Panama, Cerro Campana, 820 m, 8°40'N, 79°56'W, VIII-12-1977, T.J. Riley (EGRC); **PERU**: Junín, I-46, P.P. Satipo (FMNH).

DIAGNOSIS. *Semiotus c. splendidus* is readily recognized by the piceus pronotal vitta being interrupted medially by a sanguineus vitta. Several specimens have only a vague indication of the lighter medial vitta, and a clear distinction between the 2 forms is not always possible.

REMARKS. The only apparent difference between *S. c. cuspidatus* and *S. c. splendidus* is the presence or absence of the sanguineus pronotal vitta. No differences are evident in the male or female genitalia. This character state is geographically limited, with only little overlap, justifying subspecific status only (Fig. 21). One specimen of *S. c. cuspidatus* has been taken from Costa Rica, within the range of *S. c. splendidus*; otherwise, the area of overlap between the 2 subspecies is in Honduras.

Semiotus imperialis (Guérin-Méneville)

(Figs. 6, 48, 127, 171, 180, 187)

Eucamptus imperialis Guérin-Méneville 1844:15, Guérin-Méneville 1855:579 (Type: not found; type locality: New Granada).

Semiotus imperialis, Candèze 1857:298, Steinheil 1875:111, Candèze 1874:173, Szombathy 1909b:121, Fleutiaux 1891:275.

Semiotus imperialis subtilis Szombathy 1909a:23 (Type: not found (not in HNHM); type locality: unknown) New synonym.

Semiotus imperialis schenklingi Szombathy 1909a:23 (Holotype, not found; type locality: Peru, Patria). New synonym.

DESCRIPTION. Length 28 to 44 mm (length/width ratio 3.8 to 4.1). Head aurantiacus to

sanguineus with 1 piceus macula in center of posterior border, a second macula often present in center of anterior border (in some specimens the 2 maculae are connected to form a continuous stripe); with 1 medial frontal spine curved ventrally; ocular index 71.0 to 74.0. Antennae serrate, 3 to 4 segments short of hind angles; segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Front glabrous, punctures becoming larger posteriorly, separated by more than own width, concave on anterior 2/3. Pronotum 7 to 11 mm (length/width ratio 1.0 to 1.1); with median longitudinal stripe sanguineus, bordered by 2 irregular piceus longitudinal vittae, which are expanded at base, lateral margin fulvus with 1 piceus macula on each side medially, which is often expanded laterally to near margin on many specimens (on a few specimens the median vittae extend to the lateral margin or are interrupted forming small maculae), pronotum glabrous with fine row of setae on anterior border extending onto head; margins nearly straight, expanding gradually posteriorly; hind angles expanded only slightly; anterolateral angles foveate; margins thickly rounded without sulci. Scutellum sanguineus to testaceous, nearly flat to slightly concave, widely ovate. Prosternum sanguineus, piceus along suture; glabrous and impunctate medially with fine setae and deep punctures laterally; evenly concave over entire length, lobe hemispherical. Hypomeron fulvus with piceus dorsal maculae extending ventrally at middle, piceus along suture; glabrous with very fine shallow umbilicate punctures. Mesosternum finely punctate with fine setae; fossa sanguineus, piceus laterally. Mesepisternum piceus. Metasternum sanguineus medially, piceus laterally; glabrous and nearly impunctate medially with fine setae and fine punctation laterally; femora fuscus, tibiae and tarsi rufopiceus. Elytra 19 to 30 mm (length/width ratio 2.6 to 2.8), gibbous; color fulvus to luteus with each stria shaded by broken infusate vitta; area around scutellum piceus; widest on anterior third, then narrowing to tip; surface glabrous with very fine interstitial punctures, except on apical half; each elytron ending in 2 spines. Abdomen aurantiacus to sanguineus medially, fulvus laterally with piceus vitta separating colors (piceus vittae may be reduced in some specimens to triangular maculae on each segment), surface glabrous except for fine setae over most of first segment and in lateral areas on other segments, punctation shallow except on segments 1 and 5; female foveae elliptical to subobovate on apical fourth of segment 5; anterior sclerite covered with dense dentitions, lateral arms extending distally 1/2 length of median piece. Male with parameres wide basally, narrow apically, lateral blades small, less than 1/10 length of parameres.

MATERIAL EXAMINED. ARGENTINA: Jujuy, El Quemado, IV-1926, G.L. Harrington

(USNM); **BOLIVIA:** Beni, VI-3-1947, A.P. Reed (CASC); Cochabamba, Yanachi so, Yungas, M. Cardenas (USNM); Yungas Coroico, Fassl, 1908 (NHMW); 124 km E Yungas, Cochabamba-Villa Tuneri Rd., 730 m, 17°3'54"S, 63°38'43"W, II-(8-12)-1999, R. Hanley (SEMC); La Paz, Nord-Yungas, 400–1800 m, Region um Caranavi, ca. 50 km N Coroica, Tello (PCCV); Santa Cruz, Buenavista, Ichila, 400 m, E.N. Kjellesvig-Waering (FSCA); Department unknown, Tacaurandi, to BuenaVista, W. Rand (USNM); **BRAZIL:** (CUIC); **COLOMBIA:** Antioquia, Medellín (NHMW); Capital District, Bogotá (USNM); Cundinamarca, Finca Bella Vista, nr Sasaima, V-25-1965, P.R. Craig (CASC); *ibid.*, VI-1-1965; *ibid.*, IV-13-1965, P.R. & D.L. Craig; Guaduas, XII-17-38, F.L. Gallego, on Coffee (USNM); Magdalena, Minca, 2000 ft, (CMNH); Nariño, Pasto, Götz. (NHMW); Valle del Cauca (ZMUC); Summit west of Cali, 2,000 m, II-6-1977, M. Breed & C.D. Michener (SEMC); Colima Valley, Buga, V-1989 (PCCV); Department unknown, Aguatal (CUIC); **ECUADOR:** Bolívar, Balzapamba, 650 m, F. Campos (USNM); Balzapamba, VI-21-1960, C. Garcia (USNM); Cotopaxi, 5 km WNW San Fransisco de las Pampas, Otonga Reserve, V-15-1994, J. Rawlins, cloud forest (CMNH); Las Pampas, IV-1983, Onore (OSUC); Guayas, Guayaquil (CASC); Los Ríos, Santo Domingo, Allurigami, I-7-1997 (HNHM); Santo Domingo, XII-1982, G. Onore (PCCV); Santo Domingo, X-1983, Onore (OSUC); Santo Domingo, XII-1982, G. Onore (ZMUC); Morona-Santiago, Macas, 1050 m, F. Campos (USNM); Macas, IV-5-1957 (EMEC); Río Cuangos, nr Cuevas de los Tayos, VII-(7-21)-1976, A.M. Hutson, (BMNH); Napo, 7 km E Atahualpa, 490 m, X-(2-13)-1996, E. Giesbert (FSCA); Napo-Galeras Rd., 1000 m, X-(4-5)-1996, E. Giesbert (FSCA); Oriente, Río Napo—Pinto, II-1956 (CNCI); Puerto Misahualli Jungle Hotel, IX-(6-18)-1998, D.G. Marqua (TAMU); Pastaza, Llandia, 1000 m, 17 km N Puyo, VII-16-1994, F. Genier, remnant rain forest (CMNC); Napo, 2–8 mi. N Puyo, 953 m, II-9-1955 (CASC); Santa Clara, VII-4-1976, P.M. Turner (USNM); Tarqui, II-10-1976, Spangler et al. (USNM); Puyo, 900 m, VII-(13-17)-1976, S. & J. Peck (CNCI); Pichincha, Tandapi, 1460 m, VII-(14-28)-1967, J.D. Lynch (SEMC); Tinalandia, E Alluriquin, V-(26-28)-1976, 700 m, T.E. Rogers (FSCA); Tinalandia, 4 km SE Santo Domingo, VI-(4-14)-1976, S. & J. Peck (CNCI); Tinalandia grounds, trails 10 mi. E Santo Domingo de los Colovados, IV-(16-21)-1984, B. Harris (LACM); Province unknown, Gualea, IX-1928 (LACM); Naranjapata, F. Campos (USNM); Normandia (CUIC); El Partidero, X-8-1935, W. Macintyre (USNM); *ibid.* XI-27-1935; Zulay, 1000 m, VII-1936, W. Macintyre (USNM); XI-1966, (BYUC); **GUYANA:** Landsberg (ZMUC); **PERU:** Arequipa, Mollendo coast XI-1935 (CASC); Cajamarca, Río

Charape, IX-15-11, C.H.T. Townsend (USNM); Cuzco, Cosnipata River, Hacienda María, Saucacambo Cusco, III-3-1952, F. Woytowski (CNCI); Machu Picchu, IV-18-1971, J. Schuster, on log surface (FSCA); Río Paucartambo, Quiroz (LACM); Huánuco, Huallaga, 750 m, III-1960 (CNCI); Tingo María, Monson Valley, XII-23-1954 (CASC); *ibid.*, XI-2-1954; Tingo María, M.R. Villegas (LACM); Junín, Chanchamayo (ZMUC); Chanchamayo, III-1933, E.G. Smyth (SEMC); La Mercéd, 1922 (USNM); Political subdivision unknown, Río Inambari, II-7-10, elev. 1800 ft, C.H. Townsend (USNM); Sinchona, II-25-44, J.G. Sander (USNM); 2000–3000 ft, Piches & Perene Vs. (USNM); Ehrbacher, 1905 (NHMW); **VENEZUELA:** Aragua, Portachuelo Pass, 20 km N. Maracay, 1160 m, VI-27-1972, C.R. Collins (CASC); Rancho Grande, 1100 m, XI-(26-30)-1981, J. Heppner, cloud forest (FSCA); Rancho Grande Biol. Stn., Portachuelo Pass, 10°21'0"N, 67°41'0"W, 1100 m, VI-4-1998, J. Ashe, R. Brooks, R. Hanley (SEMC); *ibid.*, V-13-1998; Rancho Grande, 1100 m, IV-9-1970, S.L. Wood (BYUC); Rancho Grande Biol. Stn., Portachuelo Pass, 1100–1300 m, 10°20'32"N, 67°41'46"W, 1100 m, V-13-1998, J. Ashe, R. Brooks, R. Hanley (SEMC); Rancho Grande, VIII-5-1968, J. Maldonado (USNM); Rancho Grande, 800 m, II-(24-25)-1971, H. & A. Howden (CNCI); Rancho Grande, V-7-1973, 1100 m, Ginter Ekis (USNM); Rancho Grande, (VII-VIII)-1976, A. Watson, (BMNH); Rancho Grande, VI-(8-14)-1967, 1100 m, R.W. Poole (USNM); Rancho Grande, II-(10-21)-69, Duckworth & Dietz (USNM); Rancho Grande, 1100 m, V-1988, UV light, M. Epstein (USNM); Federal District, Caracas (ZMUC); Caracas, 1921 (USNM); Mérida, S. Briceno (USNM); Zulia, Maracaibo (USNM); Maracaibo, Witzke (ZMUC); State unknown, D. Moritz, 1858 (NHMW).

DIAGNOSIS. *Semiotus imperialis* is most closely allied to *S. cuspidatus* with similarities to *S. gibbosus*, *S. chassaini*, *S. fryi*, *S. girardi*, and *S. punctatostriatius*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus*, and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. The other gibbous species (*S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatius*) bear 2 spines along the anterolateral margin of the frons and lack a medial frontal spine. Of these 3 species bearing a single frontal spine, only *S. chassaini* bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear 2 small spines apically on each elytron. The female foveae of *S. chassaini* occupy over half of sternite 5, the other 2 species have the foveae restricted to the apical fourth. *Semiotus chassaini* has 3 elytral intervals raised above the level of the other intervals; this is not the case in *S. imperialis* and

S. cuspidatus. The posterior border of the hypomerion bears a single tooth along the inner half in *S. chassaini*. In *S. imperialis* and *S. cuspidatus* a single tooth is present along the outer half. *Semiotus cuspidatus* can be readily separated from *S. imperialis* by the lateral pronotal margin, which is completely yellow. The pronotum bears a black macula on each side (in addition to the medial vittae) in *S. imperialis*. The anterior sclerite of the bursa copulatrix is not as heavily armed near the base of the medial and lateral arms in *S. cuspidatus* (Fig. 46) as it is in *S. imperialis* (Fig. 48). Geographically *S. cuspidatus* and *S. imperialis* overlap in Colombia and Peru. *Semiotus cuspidatus* occurs throughout Central America, with only a few records of specimens being taken as far south as Peru. *Semiotus imperialis* occurs in South America from Argentina and Brazil north to Venezuela and Colombia. The combination of a single frontal spine, gibbous profile, and double spines at the apex of each elytron distinguishes *S. imperialis* from all other *Semiotus*.

REMARKS. The subspecies of Szombathy were based on variation in the pronotal vittae. This variability is not geographically limited.

Semiotus ligneus Group

The *S. ligneus* species group is comprised of 2 fairly common species that have a strongly concave frons without spines. The eyes are also quite large, together exceeding half the width of the head. The females in both species lack an anterior sclerite within the bursa copulatrix.

Semiotus ligneus (Linnaeus) (Figs. 1, 124, 149, 163, 193)

Elater ligneus Linnaeus 1767:652, Drury 1782:82, Fabricius 1801:224 (Type: not found; type locality: Surinam).

Elater conicus Voet 1806:83 (Type: not found; type locality: unknown)

Pericalle ligneus, Latreille 1834:141.

Pericallus ligneus, Dejean 1836:96.

Semiotus ligneus, Guérin-Ménéville 1855:578, Candèze 1857:302, Steinheil 1875:111, Candèze 1874:185, Champion 1896:291, Fleutiaux 1925:109, Costa et al. 1988.

DESCRIPTION. Length 19 to 34 mm (length/width ratio 3.7 to 4.2). Head fulvus to badius without frontal spines; ocular index 50.0 to 52.0. Antennae serrate, reaching beyond hind angles by 1 or more segments in males, just reaching hind angles in females; segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Front deeply (though poorly defined) impressed with V-shaped depression on vertex extending length of head; texture glabrous or with few scattered setae above eyes and along anterior margin; punctures separated by space greater than own width on

posterior half, punctures on anterior half often separated by less than own width. Pronotum 5 to 9 mm (length/width ratio 1.0 to 1.2), with 3 longitudinal vittae, ranging in color from badius to ferruginous, running entire length (the middle vitta often divided longitudinally into smaller halves) and surrounded by paler base color, ranging from stramineous to aurantiacus; texture glabrous with longitudinal impression distinct medially, outer vittae strongly umbilicately punctured, scattered punctures on middle vitta not umbilicate and often separated by less than width of punctures; lateral margins gradually diverging on posterior 2/3 (being most pronounced on apical fourth), anterior third either parallel-sided or expanded and rounded, margination absent on thickly rounded anterior third, present on posterior 2/3 but not reaching tip of hind angles. Scutellum fulvus to badius, strongly declivous anteriorly with declining concavity extending to anterior edge, lateral margin convex; scattered setigerous punctures throughout. Prosternum either unicolorous or fulvus to aurantiacus, evenly arcuate over length; lobe hemispherical with anterior margin less rounded; setigerous punctures much larger on lateral areas of mesial third. Hypomerion same color to slightly paler than prosternum, glabrous, with umbilicate punctures throughout; margin impunctate in most specimens. Mesosternum same color as prosternum with fine setae and scattered fine punctation. Mesepisternum fulvus to aurantiacus. Metasternum fulvus to aurantiacus; texture glabrous or with fine scattered setae, punctation fine and most punctures separated by less than own width medially, becoming more distant laterally. Femora fulvus to aurantiacus. Elytra 13 to 23 mm (length/width ratio 2.5 to 2.8), generally badius to ferruginous with interstria 3 and lateral margin paler (in some specimens intervals 3, 4, 5 and 7, 8, 9 are also pale), apical eighth entirely pale; width greatest on anterior fourth then narrowing evenly to tip; texture glabrous, stria punctures distinct, each with a row of finer punctures on each side, interstriae variously textured from smooth to subrugose, interstriae 1 with scattered setae; apices each bearing 1 spine. Abdomen same color as prosternum with very fine scattered setae, punctures fine and generally separated by greater than own width medially, becoming denser laterally; first visible segment with punctures larger than remaining segments; female foveae on segment 5 round and restricted to apical 3/5; anterior sclerite absent. Male with parameres sinuate laterally, lateral blades subtriangular, approximately 1/5 length of parameres.

Larvae (summarized from Costa et al., 1988) 27 mm long, elateriform, flattened dorsoventrally, sclerotized, brownish red dorsally with dark brown mandibles; body lighter ventrally; lightly pilose; head prognathus, heavily sclerotized and pigmented. Antennae 3-segmented, segments 1

and 2 glabrous, with segment 2 bearing small apical sensorial appendages, segment 3 smaller and bearing small sensorial appendages; prothorax subtrapezoidal, longer than mesothorax, with 8 pairs of lateral setae inserted in 4 points; prosternum triangular; legs short, 5-segmented, coxa wide and short, trochanter triangular; abdominal segments 1 to 8 with a bundle of lateral setae and a pair of dorsal setae at base; abdominal segment 9 subquadrangular, covered with dense punctation, apex with 2 pairs of semiconvergent tubercles.

MATERIAL EXAMINED. BOLIVIA: Beni, VI-3-1947, A.P. Reed (CASC); Rurrenabaque, Río Beni, XI-1921, W.M. Mann (USNM); 40 km E San Borja, Estac. Biol. Beni, Palm Camp, IX-13-1987, W.E. Steiner (USNM); Cochabamba, Villa Tunari, Parque Machias, 300 m, 16°58'20"S, 65°24'42"W, II-12-1999, R. Anderson, lowland rain forest (CMNC); Yungas, Coroico, Fassl, 1908 (NHMW); Cristal Mayu, VIII-15-1949, L. Peña (FMNH); *ibid.* IX-7-1949; La Paz, Isiamas, XII-1921, W.M. Mann (USNM); Santa Cruz, 4–6 km SSE Buena Vista, F&F Hotel, XI-(1-8)-2002, J.E. Wappes (JEW); Saavedra Exp. St., 6-I-1960, R. Cumming (OSUC); II-1956, G. Pinckert (USNM); **BRAZIL:** Amazonas, Benjamin Constant, XI-1962, A. Silva (CASC); Est. do Equador, Río Javari, X-1979, M. Alvarenga (CNCI); Porto Velho, Río Madeira (USNM); Res. Ducke, 26 km. E. Manaus, II-1-1979, O.S. Flint Jr.; Río Madeira, Madeira mamore, R.R. Co. Camp 39, Mann & Baker (USNM); Río Topajos, VI-1962 (BYUC); Taperinha, b. Santarem, (II-20)-(VIII-27), Zerny (NHMW); Upper Amazon, V-1904 (CASC); Minas Gerais, Passo Quatro, Faz. Dos Campos (CASC); Passo Quatro, Faz. Dos campos (FMNH); Pará, Belem, (II-27)-(V-27), Zerny (NHMW); Rondônia, 62 km S Ariquemias Fazenda Rancho Grande, 165 m, 10–32'S, 62–48'W, (X-29)-(XI-10)-1991, B.P. Harris (LACM); Cachoera Nazare Río Jiperana, (X-XI)-1966 (FMNH); 62 km S Ariquemias, Fazenda Rancho Grande, XI-(13-26)-1993 D.G. Marqua (TAMU); *ibid.* (VIII-IX)-1994; São Paulo, Capital, XII-2-1962, F. Halik (USNM); Est. Biol. Boracela, 850 m, nr Salespolis, X-20-1971, E.G., I., E.A. Munroe (CNCI); **COLOMBIA:** Bolívar, Buena Vista, S.C. Patchett (USNM); Capital District, Bogotá (ZMUC); César, El Roncón, 10–12 km E Becerril, foothills of Sierra de Perija, elev. 220–260 m, IX-18-1969, B. Malkin (FMNH); Meta, Villavicencio, VII-18-1938 (FMNH); Villavicencio, 1927 (USNM); Putumayo, Santa Rosa, Kofan Indian villiage, headwaters of Río San Miguel, X-(4-6)-1970, B. Malkin & P. Burchard (FMNH); **COSTA RICA:** Cartago, Catie, 3 km SE Turrialba, 600 m, VI-(9-10)-1988, Brown & Powell (EMEC); Turrialba, 2000 ft, III-9-1964, S.L. Wood (BYUC); Turrialba, 600 m, VI-9-1972, P.A. Opler (EMEC); Turrialba, VI-(24-25)-1965, R.H. McPeak (LACM); Turrialba, II-(22-28)-

1965, S.S. & W.D. Duckworth (USNM); *ibid.* III-(13-17)-1965; *ibid.* III-(1-6)-1965; Guanacaste, Agua Buena, P.N. Guanacaste, 200 m, II-(7-12)-1994, E. López (INBC); 2 mi. NW Canas, V-(18-21)-1974, E. Giesbert (LACM); Dos de Tilaran, San Ramón, 1100 m, VII-1995, G. Rodríguez (INBC); Estación Experimental Enrique Jimenez Nuñez, 20 km SW Cañas, XI-(5-17)-1991, A.S. Menke (USNM); Est. Las Pailas, P.N. Rincón de la Vieja, A.C. Guanacaste, 800 m, V-(8-26)-1994, K.E. Taylor (INBC); Estación las Pailas, P.N. Rincón de la Vieja, 800 m, V-(8-26)-1994, K.E. Taylor (INBC); Est. Lomas Barbudal, 30 m, A.C.T., VII-1991, D. Acevado (INBC); Est. Palo Verde, 10 m, Ref. Nac. Fauna Silva, VI-1991, D. Acevado (INBC); Finca Jenny, 30 km N de Liberia, 240 m, (IV-30)-(V-11)-1995, E. Araya, at light (INBC); Los Almendros, P.N. Guanacaste, V-(12-31)-1993, E. Lopez (INBC); Los Mesones, P.N. Barra Honda, 100 m, V-1995, M. Reyes (INBC); Palo Verde OTS, Comelco, Bagaces, VII-(5-20)-1971, D.H. Janzen (USNM); P.N. Barra Honda, 100 m, VII-1994, M. Reyes (INBC); Río Gongora, 600 m, P.N. Guanacaste, VI-1992 (INBC); Santa Rosa N.P., V-2-1985, Doyen & Powell (EMEC); Santa Rosa N.P., X-(16-31)-1983, G.C. Stevens, at light (INBC); Sector El Hacha, P.N. Guanacaste, (XI-XII)-1991, E. Lopez (INBC); 3 km N Nacaome, 100 m, P.N. Barra Honda, V-(3-30)-1993, M. Reyes (INBC); 3 km E Caujiniquil, 300 m, VI-25-1992 (INBC); 6 km NE Quebrada Grande de Liberia, 700 m, II-1992, R. Gongora (INBC); 21 km south Canas, VII-27-90, at light (TAMU); Heredia, Est. Biol. La Selva, VII-(1-5)-1994, at light (EMEC); Finca Naranja Valenciana, 2 km S Pueblo Nuevo, Sarapiquí, 90 m, I-(4-31)-1993, M. Ortíz (INBC); La Selva ca. 100 m, VIII-(14-15)-1991, M.A. Ivie (MTEC); La Selva Field St. nr Puerto Viejo, III-(21-28)-1988, Steiner et al. (USNM); Limón, Amubri, A.C. Amistád, 70 m, I-(2-26)-1994, G.M. Gallardo (INBC); Bananito, X-24, F. Neverman (USNM); Estación Aguas Frías, 10–20 m, VIII-1997, E. Rojas, at light (INBC); Est. Quatro Esquinas, P.N. Tortuguero, 0 m, XII-1990, R. Delgado (INBC); 35 km N Guapiles, II-(7-8)-1978, E. Giesbert (LACM); Hacienda la Suerte/Tampezcó, 29 air km W Tortuguero, 40 m, 10°27'–30'N, 83°47'W, VIII-(13-31)-1979, J.P. Donahue, C.C. Hair, N.K. Moore, M.A. Hopkins (LACM); Hamburg Farm, Reventazon, Meginiss, VII-2-29, F. Neverman (USNM); Hamburg Farm, Reventazon, Anglebeisch, III-15-24, F. Neverman (USNM); *ibid.* III-11-26; Hamburg Farm, Reventazon, on Frisch gefolle, Ficus sp., VIII-12-25 (USNM); Hitoy Cerere, A.C. Amistád, 100–200 m, (V-20)-(VI-6)-1993, G. Carballo (INBC); La Florida, 500 ft C.H. Lankester (USNM); Lalola, III-(14-16)-1983, UV Light, M.H. Evans, W. Warfield (CUIC); Lomas de Sierpe, Orillas del Río Tortuguero, 10 m, VI-9-1997, E. Rojas, at light (INBC); Manzanillo, 0–100 m, RNFS Gan-

doca y Manzanillo, XI-(20-30)-1992, F. Quesada (INBC); Puerto Viejo, 39 km S Limón, VI-14-1985, C.D. Nagano (LACM); Río Banano, Asunción, 240 m, VIII-21-1995, A. Solis (INBC); Río Sardinas, R.N.F.S. Barro del Colorado, 10 m, IX-(12-20)-1993, F. Araya (INBC); Sector Cerro Cocori, Finca de E. Rojas, 150 m, (VI-26)-(VII-16)-1992, E. Rojas (INBC); Valle le Estrella, R.B. Hitoy Cerere, A.C.A.C. Amistad, 100 m, VII-1994, G. Carballo (INBC); Puntarenas, Alberque Cerro de Oro, 150 m, (V-27)-(VI-1)-1995, E. Fletes (INBC); *ibid.*, VIII-30-1995; *ibid.* IV-(10-16)-1996, at light; Rancho Quemado, Peninsula Osa, 200 m, VI-(4-28)-1994, A. Marín (INBC); Est. Agujas, Send. Purruja, 300 m, XI-(1-4)-1997, A. Azofeifa, at light (INBC); Est. Esquinas, 0 m, Peninsula de Osa, I-1993, M. Segura (INBC); Osa Peninsula, 1.8 mi. W Rincon, II-11-1971, J.F. Donahue, C.L. Hogue (LACM); Est. Quebrada Bonita, 50 m, Res. Biol. Carara, V-1992, J.C. Saborio (INBC); Sirena, Corcovado N.P., Osa Peninsula, I-(5-11)-1981, Janzen & Hallwachs (INBC); Vuelta Campana, R. Térraba, 100–500 m, Rey Curré, III-1993, S. Rojas (INBC); Manuel Antonio, III-(13-23)-1996, D. Dauber (PCCV); 3 km NE Golfito, 100 m, V-(22-23)-1987, D. Ubick & B. Hiler, tropical wet forest, UV light (CASC); San José, Braulio-Carillo N. P., V-24-1991, Brenes (CASC); Est. Bijagual, 500 m, Reserva Biológica Carara, IX-1990, G. Varela (INBC); Guapiles, Sta. Clara, 250–300 m, X-6-25, F. Neverman, at light (USNM); Province unknown, San Carlos (USNM); V. Central, Ciudad Colon El Rodeo, Finca Hamadryas, III-1998, D. Dauber (PCCV); **ECUADOR**: Napo, Garzacochoa, 68 air km E Coca, 210 m, III-16-1986, McKamey (EMEC); Lago Agrio, 2 km N, IX-26-1975, A. Langley (USNM); Limoncocha, VI-15-1977, W.E. Steiner (USNM); *ibid.*, VI-10-1977; Limoncocha, VI-15-1977, D.L. Vincent (USNM); Limoncocha, VI-13-1977, P.J. Spangler, D.R. Givens (USNM); Loreto, (II-17)-(III-14)-1996, J. Strnad (PCCV); Napo and Aquarico Rivers, alt. 250 m, *lett.*, X-20-42, K.A. Rijeterborgh (USNM); Puerto Misahualli Jungle Hotel, IX-(6-18)-1998, D.G. Marqua (TAMU); Río Napo, Biol. St. Jatun Satcha, 380–400 m, 1°03'S, 77°35'09" W, IV-(12-16)-1990, S.J. Weller (USNM); Santa Cecilia, 340 m, (VI-8)-(VIII-1)-1968, W.G. Saul (SEMC); Tena, V-24-1977, P.J. Spangler & D.R. Givens #72 (USNM); Tena, 400 m, VII-(6-13)-1994, E. Genier, pastureland, light trap (CMNC); 25 km E Puerto Napo, Selva Aliñahuí, 450 m, XII-1992, E. Ross (CASC); 400 m, Jatun Sacha, Biol. St., 21 km E Puerto Napo, VII-(8-11)-1994, F. Genier, virgin rain forest, hand collected (CMNC); Pastaza, Ashuara, Río Macuma, 10 km from Río Morona, 300 m, VII-(7-16)-1971, B. Malkin (FMNH); Cusuimi, Río Cusuimi, 150 km SE Puyo, V-(15-31)-1971, B. Malkin (FMNH); *ibid.* VII-(18-29)-1971; Tzapino, 400 m, V-22-1976, J. Cohen, black light (USNM); Pichincha, Quito,

K.A. Rijeterborgh (USNM); Sucumbíos, Sacha Lodge, 0.5°S, 76.5°W, VII-1994, 290 m, P. Hibbs (LACM); Sacha lodge, 270 m, 0°28'14"S, 76°27'35"W, III-23-1999, R. Brooks (SEMC); **FRENCH GUIANA**: SE Cayenne, Montagne de Kaw., km 47, 250 m, 4.58°N, 54.1°W, II-18-1994, J. Beierl, UV light (LACM); S Cayenne, Rd to Belezón, 10 km W Hwy N2, 100 m, 4.58°N, 54.1°W, II-(10-15)-1994, J. Beierl, MV light (LACM); Esseq., 6 mi. SW Wineperu Picrewana Is., III-(8-16)-69, Duckworth & Dietz (USNM); Esseq. Wineperu, III-(18-24)-69, Duckworth & Dietz (USNM); Hwy D6 to Kaw, 34 km SE Roura, VI-(5-6)-1986, E.G. Riley & D.A. Rider (EGRC); Regina Rd. PK-73, VIII-16-1995, J.E. Wappes (JEW); Saut Athanase at Rapids, III-8-1995, J.A. Lewis (USNM); St. Jean (USNM); **GUATEMALA**: Petén, Ruinas Tikal, 245 m, VII-(7-10)-1977, E.M. & J.L. Fisher (CASC); 1915 (USNM); Department unknown, Cayuga, VIII (USNM); **GUYANA**: Mazaruni—Potaro, Bartica, Kartabo, IX-2-1922 (CASC); Landsberg (ZMUC); **HONDURAS**: Al-tántida, P. N. Pico Bonito, Cerro Miramar, 650 m, 15°34'01"N, 87°03'57"W, VIII-(14-15)-2001, A. Lopez (EAPZ); Lancetilla, IV-17-1980, M.J. Marcus (CUIC); *ibid.*, III-22-1980; Cortés, Lago Yojoa, XII-6-81 (USNM); El Paraíso, 8.3 km SE Capire 675 m, 13°58'54"N, 85°49'25"W, VIII-13-1999, J. Torres & R. Diaz (EAPZ); Yoro, Cuevitas, 15°11'14"N, 87°38'53"W, VI-17-1999, R.D. Cave & J. Torres (EAPZ); Department unknown, Middlesex, Stann Creek Dist., V-7-1963, E.C. Welling (CNCL); **MEXICO**: Chiapas, Aguacera, 16 km W Ocoz. VII-(1-7)-1986, J.E. Wappes, 2500 ft (TAMU); Aguacera, 16 km W Ocoz., VII-(1-7)-1986, 2500 ft, J.E. Wappes (JEW); Aguaceros 40 km W Tuxcla Gutierrez, VI-21-1987, W.F. Chamberlain, at light (TAMU); Bonampak, ca. 12 km W ruins, VIII-(21-22)-1990, M.H. Evans, UV & MV light (CUIC); Cerro Tres Picos, 1500–1800 m alt., III-30-1973, D.E. Bred-dlove (CASC); Chorrodero, 8 km E Chiapa de Corzo, VI-17-1989, H. Howden (CMNC); Cinco Cerros, 860 m, V-31-1990, H. & A. Howden (CMNC); El Aguacero, 16 km W Ocozocoautla, VI-5-1990, B. Gill (CMNC); Pq. El Aguacero, 16 km W Ocozocoautla, 9-VI-1989, H. Howden (CMNC); 30 km W Tuxcla, Gutierrez, VI-4-1990, B. Gill (CMNC); 7 km S Chicoasen, VI-10-1989, H. Howden (CMNC); 4 mi. E Cintalapa, VII-11-1991, W. Jones, at light (TAMU); Colima, Comala, X-25-1967, R. Wind (USNM); Wind, VII-19-1968 (USNM); 14 km E Miniatiatlan, VII-17-1990, J.E. Wappes (JEW); Guerrero, 3.7 mi. E Marquelia, VII-10-1974, Clark, Murray, Ashe, Schaffner, taken at light (TAMU); Jalisco, Champela, vic. UNAM, VII-(9-11)-1983, J.E. Wappes (TAMU); Est. Biol. Chamela, VII-(13-22)-1992, J. Chemsak, at light (EMEC); Mpio. La Huerta, Chamela Biological Station, VII-27-1996, W.M. Godwin, UV light (TAMU); nr. Puerto Vallarta, II-28-1966, J.M. Spencer (CASC); 21 km N Mela-

- que, Fiesta Americana sign, VII-13-1987, E.G. & J.M. Linsey, at light (EMEC); Morelos, 4.4 mi. E Cuernavaca, VI-(6-7)-1974, Clark, Murray, Ashe, Schaffner, taken at light (TAMU); Nayarit, 21 km N Puerto Vallarta Airport, VII-4-1972, R.H. McPeak (LACM); San Blas, VII-14-1960, R.B. Loomis & J. Maris (CASC); Tepic, VII-20-1955, R.B. & J.M. Selander, at light (FMNH); 8.7 mi. E San Blas, Sleeper (CASC); 20.3 mi. W Compostela, VI-19-1967, A.R. Hardy (CASC); 18 km SW Compostela, VII-20-1974, M.E. & P.D. Perkins, black light (USNM); Oaxaca, 17.5 km ENE Magdalena Tequisistlan, 1600 m, VII-1979, tropical deciduous forest, E.L. & K.W. Sleeper, at light (CASC); 72 mi. E La Ventosa, VII-21-1963 J. Doyen (EMEC); Sinaloa, Mazatlán, VII-7-1962, Sleeper (CASC); Venedio, VI-10-1918 (CASC); 5 mi. N Mazatlán, VII-27-1973, E. Giesbert (LACM); *ibid.*, VII-30-1973; 5 mi. N Mazatlán, VII-28-1973, J. Chemsak, at light (EMEC); 5 mi. N Mazatlán, VIII-4-1983, E. Giesbert (LACM); 26 mi. NE Villa Unión, 1000 ft, Sleeper (CASC); Veracruz, Catemaco, P. Hubbell, VI-1975; Cordoba, 2700 ft, VI-20-1963, A.B. Lau (USNM); Dos Amates, VIII-15-1971 (USNM); Playa Escondida, P. Hubbell, VI-1975 (USNM); Dos Amates, (IV-V)-1969, A. Ramirez (CNCI); Estacion Biologica, Los Tuxtlas, ca. 15 km N Catemaco, IX-(15-17)-1987, A.L. Norrbom (USNM); Lake Catemaco, V-24-1969, H.F. Howden (CNCI); State unknown, Zacazonapan, VI-1992, F. Pokorny (PCCV); **NICARAGUA**: Masaya, VII-14-72, J.V. Mankins (USNM); **PANAMA**: Canal Zone, Barro Colorado Island, VII-24-1963, D.Q. Cavagnaro & M.E. Irwin (CASC); Barro Colorado Island, VII-2-1967, UV Light, R.G. Beard (CUIC); Barro Colorado Island, VII-9-1978, E.M. Fisher (CASC); Barro Colorado Island II-12-64 (TAMU); Barro Colorado Island I-(7-9)-41 (USNM); Barro Colorado Island, VII-15-1933, J.D. & H. Hood (USNM); Barro Colorado Island, V-(1-9)-1964, W.D. & S.S. Duckworth (USNM); *ibid.* IV-(10-20)-1965; *ibid.* V-(10-17)-1964; *ibid.* IV-(28-30)-1964; *ibid.* IV-(18-28)-1964 *ibid.*; *ibid.* V-(10-17)-1964; *ibid.* V-(1-9)-1964; III-(25-28)-1965; *ibid.* V-(10-17)-1964; *ibid.* IV-(10-20)-1965; Barro Colorado Island XII-25-1941, K.W. Cooper (USNM); *ibid.* I-(19-22)-1941; Barro Colorado Island, 9°10'N, 79°50'W, VII-9-1974, Whitehead (USNM); Barro Colorado Island (IX-X)-1940, Jas Zetek, at light (USNM); Barro Colorado Island III-1983, J.H. Martin (BMNH); Barro Colorado Island, V-19-1967, Delong & Triplehorn (OSUC); Barro Colorado Island, IV-22 to V-4-1961, S.D. Warren (BWPC); Barro Colorado Island, IX-X-1940, Jas Zetek, at light (USNM); Barro Colorado Island, Nov. 1941 (USNM); Barro Colorado Island, VII-1944, Jas Zetek (USNM); Barro Colorado Island, Curundu, VII-5-1972, Stanch (BWPC); Barro Colorado Isl., IV-(7-13)-1959, R. Barth (FMNH); Canno Saddle, Gatun lake, V-12-23, R.C. Shannon (USNM); Close's Cano, Saddle, VII-1923, M.F. Close (USNM); Fort Clayton, F.S. Blanton (USNM); Fort Clayton, VII-4-1957, P.W. Johnson (CASC); Fort Gulick, Qtrs. 40-A, (V-VII)-1981, H.J. Harian, at light (MTEC); Gamboa, NW VIII-(10-12)-1975, E.M. & J.L. Fisher (CASC); Gatun lake, Cano Saddle, V-3-1923, R.C. Shannon (USNM); Madden Dam, X-3-1972, Stanch (USNM); Madden Dam, XII-22-1972, Stanch (BWPC); Madden Dam, VIII-13-1969, E.G. Riley (EGRC); *ibid.* VI-12-1969; *ibid.* VI-16-1976; Madden Dam, VI-19-1965, H.G. Real (CASC); Pan American Highway, 30 km E Cañita, VI-(15-29)-1992, J. & K. Ribardo (CASC); Río India, VIII-6-1933, L. Cook (CASC); 9 km NW Gamboa, VIII-(10-12)-1975, E.M. & J.L. Fisher (CASC); 5 mi. W Balboa, VI-17-1972, Stanch (BWPC); Chiriquí (USNM); Coclé, Aguadulce, II-17-1912 (USNM); Colón, 6 km SE Colón, VI-(13-15)-1980, E. Giesbert (LACM); Ft. Sherman area, V-8-1999, Wappes & Morris (JEWG); Darién, Estación Ambiental Cana, 7°45'32"N, 77°41'07"W, VI-(3-10)-1996, R.S. Anderson (CMNC); Santa Fé, VI-2-1967, DeLong & Triplehorn (OSUC); Panama, Cerro Campana, V-(11-15)-1980, E.G. Riley & D. LeDoux (EGRC); E Chepo, V-20-1981, E. Giesbert (LACM); **PARAGUAY**: Colonia Sudetia, Anders, C. Pfanni (PCCV); **PERU**: Ayacucho, La Mar, Santa Rosa, 640 m, IX-(8-15)-1976, R. Gordon (USNM); Cuzco, Cosnipata River, Hacienda María, Saucetambo Cusco, II-26-1952, F. Woytkowski (CNCI); Rio Paucartambo, IX-28-1932, Quiroz (LACM); Huánuco, Tingo María, H.A. Allard (USNM); *ibid.* (XII-II)-(1949-1950); *ibid.* (XI-XII)-1950; Tingo María, IV-23-1983, F.W. Fisk, at light (MTEC); Tingo María, III-10-1967, Light Trap, W.L. Brown (CUIC); Tingo María, XI-1946, W.K. Wegrauch, WKW-481, 670 m, at light (USNM); Tingo María, Monson Valley, XI-2-1954 (CASC); *ibid.*, 16-XI-1954; Tingo María, XI-6-1979 (FMNH); nr Afilador, V-15-1937, F. Woytkowski (CASC); Tingo María, VIII-(21-24)-1971, C. & M. Vardy, (BMNH); Tingo María, Monson Valley, X-27-1954, E.I. Schlinger & E.S. Ross (CASC); *ibid.* XI-2-1954; *ibid.* XI-16-1954; Yurac, 67 mi. E Tingo María, XI-16-1954, E.I. Schlinger & E.S. Ross (CASC); Yurac, 67 mi. E Tingo María, XI-16-1954, Schlinger & Ross (CASC); Junín, Satipo, XI-1948, P. Paprzycki (CASC); Chanchamayo, II-1933 (SEMC); Loreto, Rio Amazonas, 200 m, Explorama Lodge, 50 mi. E Iquitos, IX-(12-16)-1990, B.P. Harris, MV (LACM); Estiron, Río Ampiyacu, (III-IV)-1970, B. Malkin (FMNH); Explorama Inn, 40 km NE Iquitos on Amazon River, (IV-24)-(VII-20)-1990, Menke & Awertschenko (USNM); Ucayali R., Yarina Cocha, XII-23-1953, P. Hocking (FMNH); Mishuyacu, III-18-30, O. Klug (USNM); Yagua Indian Village, headwaters of Loreto-Yacu, B. Malkin (FMNH); Madre de Dios, Río Tambopata Res., 30 air km SW Puerto Maldonado, 290 m, XI-(6-10)-1979, J.B. Heppner, subtropical moist forest (USNM);

Río Tambopata, 30 km SW Puerto Maldonado, 290 m, 12°50'S, 69°20'W, III-9-1984, Smithsonian canopy fogging project, T.L. Erwin (USNM); Río Tambopata Res., 30 air km SW Puerto Maldonado, 290 m, XI-(6-10)-1979, J.B. Heppner, subtropical moist forest (USNM); Pasco, Pan de Azucar, VII-14-1961, F.S. Truxal (LACM); Political subdivision unknown, Avispas, X-1962, L.E. Pena (CNCI); Huallaga, Aquaytin, 400 m, IX-1961 (CNCI); Sanj Beni, Yunin, VI-5-1935, Woytkowski (CUIC); *ibid.* XI-23-1935; Yahuar-mayo, II-12-10, Tanopoto (CUIC); **SURINAM:** Kartabo, Bartica, X-1920 (CUIC); **TRINIDAD:** Arima Valley, IX-4-1971, L.A. Mound (BMNH); Arima Valley, Simla Res. Station, (VI-25)-(VII-19)-1982, J.M. Carpenter, J.S. Ederly (CUIC); Balandra Bay, W.I. VIII-(12-17)-1969, F. Bennett (CNCI); Maraval, BWI, W. Buth N (USNM); St Augustine, W.I., VII-(1-15)-1964, J.M. Capriles (USNM); Port of Spain, IX-25-1901, H. Currurola (USNM); Simla, II-(5-10)-1966 (USNM); Simla res. Station, 3.6 km N Arima, (III-30)-(IV-3)-1987, 200 m, at light, M.E. Carter, E.R. Hoebeke, J.K. Liebherr (CUIC); Simla, N Arima, W.I., VIII-10-1969, H. & A. Howden (CNCI); Simla, II-(24-28)-66 (USNM); Tunapuna, Mt. St. Benedict, VI-(4-30)-1995, 200-250 m, forest, S. & J. Peck (CMNC); 8 km N Arima, Simla Res. St., 250 m, lower montane rain forest, VI-14-1993, UV light, S. & J. Peck (CMNC); 7 mi. N Arima, W.I. Morne Bleu St., I-8-1979, 2300 ft (MTEC); X-22-1932 (LACM); **VENEZUELA:** Amazonas, Cerro de la Neblina Basecamp, 140 m, 0°50'N, 66°10'W, II-1-1985, W.E. Steiner et al., black light (USNM); *ibid.*, II-24-1985; *ibid.*, II-5-1985; Cerro de la Neblina, Base Camp, 0°50'N, 66°9'44" W, 140 m, II-4-12-1984, D. Davis and T. McCabe (USNM); *ibid.* III-1-10-1984; *ibid.* II-21-29-1984; Aragua, Maracay, X-11-1933, L.F. Martofell (USNM); P.N. Henri Pittier, 4 km N El Limón, 700 m, VI-19-1987, M.A. Ivie, on dead tree (MTEC); Rancho Grande, (VII-VIII)-1976, A. Watson (BMNH); Barinas, Barinitas, II-(22-26)-1969, Duckworth & Dietz (USNM); Pte. Parangula, 8 km S Barinitas, II-18-1976, C.M. & O.S. Flint (USNM); Bolívar, 10 km E Icabaru, VII-(4-7)-1987, 700 m, humid forest, UV light, S. & J. Peck (CMNC); Mt. Juaqual, Suapure, Caura River, IV-25-1900, E.A. Klages (CUIC); *ibid.*, IV-30-1900; Carabobo, San Esteban nr Puerto Cabello, XI-1939, P.J. Anduze (USNM); Valencia, Schibbye (ZMUC); Federal District, Caracas, 1921, A.J.C. Rojas (USNM); Caracas, Styrup (ZMUC); Las Trincheras, VI-21-22, L.R. Reynold (FMNH); Miranda, Santa Lucía, V-1922, L.R. Reynold (FMNH); Monagas, 42 km SE Maturín, VII-14-1958, A. Menke (LACM); Trujillo, Valera, 1800 ft, E.P. de Bellard (USNM); Zulia, El Tucuco, 45 km SW Machiques, VI-(5-6)-1976, A.S. Menke & D. Vincent (USNM); El Tucuco, Sierra de Perija, I-(28-29)-1978, J.B. Heppner, montane forest, (USNM); State unknown, Caracas Valley, III-24-22, L.R. Reynold

(FMNH); Chacon, V-22, L.R. Reynold (FMNH); Cumaragua (USNM); El Valle, XI-13-39, C.H. Ballou (USNM); Las Quiguas, Esteban Valley, XI-III (USNM); Las Quiguas, Esteban Valley, N. Venvola, (XI-III).

DIAGNOSIS. *Semiotus ligneus* is most closely allied to *S. serraticornis* but differs in having 2 or 3 dark pronotal vittae and having elytral interval 4 infusate. *Semiotus serraticornis* bears only a single dark pronotal vitta, and the fourth elytral interval is pale. In *S. ligneus* the elytral apex is fulvous for more than 1/8 the total length of the elytra and forms a nearly straight border with the darker anterior vitta. The pronotal vittae in *S. ligneus* are nearly the same color. The fulvous elytral tip in *S. serraticornis* is only an extension of the fulvous elytral margin and occupies less than 1/10 the total length of the elytra. The pronotal vittae in *S. serraticornis* consist of 1 very dark median vitta and 2 pale lateral vittae. The declivous scutellum with convex sides, large ocular index, absence of anterior sclerites of the bursa copulatrix, broad infusate elytral vittae, lack of frontal spines, and the extended postero-lateral angles of the hypomeron separate both of these species from other *Semiotus*. Geographically, *S. ligneus* and *S. serraticornis* overlap throughout much of their range, though *S. ligneus* extends into Central America, whereas *S. serraticornis* occurs no farther north than Colombia. In the south, *S. ligneus* occurs through southern Brazil and Paraguay. *Semiotus serraticornis* also occurs in these countries but also extends into Argentina.

DISCUSSION. *Semiotus ligneus* is the most commonly collected species of *Semiotus*. It is present in long series from many collections and is often collected at lights. In the north of its range (in Mexico) it is darker and smaller with relatively smaller elytral spines. Toward the south of its range it is generally larger and paler and bears longer elytral spines. Larvae have been collected from semirotten cassava together with large numbers of stratiomyid flies that they were feeding on. The pupal period is around 21 days. The larvae are similar to that of *S. intermedius*, differing primarily by the pilose tubercles at the apex of the ninth abdominal segment (Costa et al., 1988).

Semiotus serraticornis (Drury)

(Figs. 6, 128, 169, 194)

Elater serraticornis Drury 1782:69 (Type: not found (illustrated, Drury, 1782); type locality: Brazil, Río de Janeiro).

Elater distinctus Herbst 1806:5-8 (Type: not found; type locality: Brazil). New synonym.

Elater inermis Kirby 1818:383 (Holotype: BMNH; type locality: Brazil).

Pericalle inermis, Latreille 1834:141.

Pericallus acuminatus Dejean 1836:96 (Type: not found; type locality: unknown).

Pericallus aestimatus Dejean 1836:96 (Type: not found; type locality: unknown).

Semiotus distinctus, Germar 1839:210, Candèze 1857:301, Candèze 1874:185, Steinheil 1875:112.

DESCRIPTION. Length 23 to 42 mm (length/width ratio 4.0 to 4.3). Head aurantiacus to testaceus without frontal spines; ocular index 52.0 to 55.0. Antennae reaching less than 1 segment beyond hind angles in females, reaching 1 to 2 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 testaceous to badius. Front deeply (though poorly defined) impressed with V-shaped depression on vertex extending length of head; texture of few erect peripheral setae, deep scattered punctures throughout. Pronotum length 6.0 to 11.5 mm (length/width ratio 1.1 to 1.2). Lateral margins evenly concave except for anterolateral angles, hind angles divergent, margin clearly defined medially becoming less defined anteriorly and posteriorly, area along margin thickly rounded dorsally; color fulvus to testaceus with badius medial vitta extending from near base to near border, with 2 paler infuscate vittae laterally; texture glabrous with deep punctures scattered throughout becoming contiguous and umbilicate laterally. Scutellum fulvus to testaceus, declivous anteriorly, rounded except for straight anterior margin, lateral margin convex. Prosternum slightly and evenly concave in profile, prosternal process subdivided apically into ventral and dorsal points; color testaceous to aurantiacus with or without sanguineous to badius median vitta; texture glabrous with scattered erect setae on or near lobe, punctation fine medially becoming larger and umbilicate laterally. Hypomeron fulvus to testaceous; texture glabrous with punctation becoming thicker, deeper and contiguous medially. Mesosternum fulvus to testaceous; fossa glabrous with lateral areas finely and densely punctate. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with fine punctures becoming thicker and deeper anterolaterally. Femora fulvus to testaceous. Elytra 16.0 to 29.0 mm long (length/width ratio 2.8 to 3.0); sides subparallel on anterior fourth then narrowing to tip; intervals 1, 2, part of 5 and 7, and 6 testaceous (interval 2 often becoming badius), intervals 3, 4, 5, 8, and 9 mostly fulvus; texture glabrous, striae poorly impressed to obsolete, striae punctures fine to moderately impressed; apices each bearing 1 spine. Abdomen fulvus to testaceous with few scattered setae and fine punctures scattered throughout; female with 2 obovate foveae on posterior half of sternite 5; anterior sclerite absent. Male with parameres sinuate, lateral blades subtriangular approximately 1/5 length of parameres.

MATERIAL EXAMINED. ARGENTINA: Buenos Aires, Buenos Aires, XII-1983, A. Hansen, *Eumolpus olivieri* (JEW/C); Córdoba, Stempelm.

(NHMW); Misiones, Campo Grande, I-1973, R. Foerster (CNCI); Iguazú, (XI-20)-(XII-5)-1987, R. Forster (PCCV); Panamb, XII-1957 (CNCI); Puerto Bemberg, II-1942 (CASC); P.N. Iguazú, Empalme 101, (VII-8-1990)-(I-6-1991), palm forest FIT, 206 m, S. & J. Peck (CMNC); **BRAZIL:** Bahia, D. Davis (CASC); Espírito Santo, Linhares Reserve, nr Entrance, MV light, 19°04'58"S, 39°52'57"W, II-3-1998, M.E. Epstein, sta. 26 (USNM); Municipio Lunares, Lagoa do Macucu, X-26-1972, J.P. Abravaya (LACM); Municipio Conceição da Barra, 12 km E Pedro Canario, Fazenda Klabin, XII-1972, J.P. Abravaya (LACM); Northeast, J.P. Abravaya (LACM); Porto Alegri (NHMW); (USNM); Conceicao de Barra, X-1972, M. Alvarenga (CNCI); Río Itabapoana, J.F. Zikan (FMNH); Federal District, Estacao Florestal, Cabeca do Veado, 1100 m, XI-(1-2)-1971, E.G., I., E.A. Munroe (CNCI); Mato Grosso, Maracaju, VII-1937, Servicio Fobre, Amarela (USNM); Minas Gerais, Passa Quatro, Faz. Dos Campos (FMNH); Río de Janeiro, Corcovado, XI-1968, S.A. Fragozo (EMEC); Guanabara, X-1963 (USNM); (3-4)-1935, P. Saudig (USNM); Municipio Majé nr Guapimirim (Caneca Fina-Rio Sucavão), 100-160 m, X-13-1985, H.R. Pearson (LACM); Río Grande do Sul, X-13-1933 (EMEC); IV-1951, P. Buck (LACM); Santa Catarina, Anilopolis (NHMW); Blumenau (CUIC); Corupa, X-1965 (FMNH); Hansa Humbolt, X-1932, A. Maller (USNM); *ibid.* I-1934; *ibid.* IV-1933; *ibid.* XI-1933; I-1978 (PCCV); Joinville, Steind. don. (NHMW); Nova Teutonia, XI-8-34 (CASC); *ibid.* XI-5-48; *ibid.* X-13-48; F. Plaumann (CASC); Nova Teutonia, 27°11'S, 52°23'W, 300-500 m, I-2-1954, F. Pigumann (CNCI); Santa Catarina Isl., Massarandula, Blumenau, 1934, A. Muller (CASC); X-13-'66 (FSCA); São Paulo, Casa Grande, I-1936, Guer. (USNM); Est. Biol. Boracelia, Salesopolis, IV-(13-18)-1961 (CASC); Pae Mathias, II-1936, (USNM); *ibid.* II-1936; Pae Mathias, I-1936, J. Halik (USNM); *ibid.* V-3-1935; Sampaio, XI-1977, M. Alvarenga (CNCI); XI-1977, M. Alvarenga (CNCI); Santos (ZMUC); State unknown, E. Alto de Serra, Stanzel-lachnit (FMNH); Corupa, S.C., II-1988 (PCCV); Guapi, III-3-1936, P. Saudig (USNM); VIII-3-65, G. Crow (USNM); **COLOMBIA:** Caquetá, Yari (PCCV); **PARAGUAY:** Central, Asunción (CUIC); Itapúa, Encarnación (CUIC); Karonay, 17 km W San Rafael Reserve, 26°45'53"S, 55°50'37"W, 90-110 m, XI-17-2000, Z.H. Falin, ex: UV Light (SEMC); Paraguari Cerro Acahay, 25°53'S, 57°08'W, III-(13-14)-1986, M. Pogue & M. Solis (USNM); 25km SE Ybycui, in Ybycui Nat. Pk., IV-(19-24)-1980, P.J. Spangler et al. (USNM); 26.2 km SE Ybycui, P.N. Ybycui, 26°7'S, 56°47'W, III-(15-18)-1986, M. Pogue & M. Solis (USNM); Department unknown, Caaguazu, XI-1957 (CNCI); Río del Plata, X-5-63 (FMNH); S. Bernardino, K. Fiebrig (USNM); Villarica, 1932 (FMNH); I-10-1966 (FMNH).

DIAGNOSIS. *Semiotus serraticornis* is most closely allied to *S. ligneus* but differs in having a single dark pronotal vitta and having the fourth elytral interval pale. *Semiotus ligneus* bears 2 or 3 dark pronotal vittae, and the fourth elytral interval is infusate. In *S. ligneus* the elytral apex is fulvus for more than 1/8 the total length of the elytra and forms a nearly straight border with the darker anterior vitta. The pronotal vittae in *S. ligneus* are nearly the same color. The fulvus elytral tip in *S. serraticornis* is only an extension of the fulvus elytral margin and occupies less than 1/10 the total length of the elytra. The pronotal vittae in *S. serraticornis* consist of 1 very dark median vitta and 2 pale lateral vittae. The declivous scutellum with convex sides, large ocular index, absence of anterior sclerites (of the bursa copulatrix), broad infusate elytral vittae, lack of frontal spines, and the extended posterolateral angles of the hypomeron separate both of these species from other *Semiotus*. Geographically, *S. ligneus* and *S. serraticornis* overlap throughout much of their range, though *S. ligneus* extends into Central America, whereas *S. serraticornis* occurs north no farther than Colombia. In the south, *S. ligneus* occurs through southern Brazil and Paraguay. *Semiotus serraticornis* also occurs in these countries but also extends into Argentina.

REMARKS. The description of *S. serraticornis* by Drury (1782) is clearly that of the commonly collected species from Brazil (that also occurs in Argentina and Colombia (Fig. 6)) previously considered *S. distinctus*. Unfortunately, Drury's illustration is not definitive (and may not have been readily available to previous authors). The name *serraticornis* has been ignored since its publication. The illustration is clear, however, in lacking frontal spines and in the pattern of the elytral and pronotal vittae. These combined characters could not refer to any other species that occupy the same area. The lack of definite lateral pronotal vittae in the illustration may be the reason for previous confusion, as most specimens do have light lateral vittae. Many light forms, however, are known that do not demonstrate clearly defined lateral vittae. Drury's illustration and accompanying description could not refer to any other species.

Ungrouped *Semiotus* Species

Semiotus acutus Candèze

(Figs. 2, 70, 168, 243)

Semiotus acutus Candèze 1874:180, Szombathy 1909b:121 (Syntype, female: BMNH (1); type locality: Ecuador, Macas).

Semiotus superbus reductus Chassain 1998:77 (Holotype, female: MNHN; type locality: Bolivia, Riv. Songo). New synonymy.

DESCRIPTION. Length 24 to 29 mm (length/width ratio 4.3 to 4.7). Head piceus to sanguineus

with anterolateral areas fulvus to testaceous; bearing 3 spines anteriorly; texture glabrous with few erect setae over eyes and anterolateral spines, punctation moderately deep and scattered throughout. Antennae serrate, 0 to 1 segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Pronotum 6 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging; margin narrowly incrassate with or without faint sulcus on anterior third to half; texture glabrous, nitidus, with fine to moderately deep punctures scattered throughout. Scutellum subquadrate, wider than long, posterior border rounded, anterior border recurved. Prosternum concave in profile, prosternal process not divided apically; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron glabrous, nitidus, with fine dense punctures throughout becoming more dense medially. Mesosternum with fossa glabrous and impunctate, lateral areas densely setose and punctate. Metasternum with few scattered setae and punctures throughout. Elytra 16 to 19 mm (length/width ratio 2.8 to 3.2), narrowing nearly from base with alternating luteus and piceus or sanguineus vittae; texture glabrous, nitidus, striae and strial punctures obsolete; apices of each elytron bearing a single spine. Abdomen with fine scattered setae and punctures throughout becoming denser on sternite 1; female with 2 elliptical to subovate foveae on apical half of sternite 5; anterior sclerite with lateral arms densely dentate, extending posteriorly nearly half length of median piece.

MATERIAL EXAMINED. BOLIVIA: Cochabamba, Cristal Mayu, IV-1873 (MNHN); 1889, P. Germain (MNHN); Department unknown, Acabamba, Garlepp (MNHN); River Songo, A.H. Fassl (MNHN); **COLOMBIA:** Antioquia, Medellín VII-1874 (NHMW); Capital District, Santa Fé de Bogotá (MNHN); **ECUADOR:** Napo, vic. Cosanga, 2050 m, IX-(17-30)-1996, E. Giesbert (FSCA); Vía Santa Barbara—La Bonita, IV-(7-9)-1986, S. McKamey (EMEC); 2000 m, 7 km S Baeza, II-(20-28)-1979, H. & A. Howden (CNCI); Moronas—Santiago, Macas, Región oriental, de Baños a Canelos, (IX-X)-1894, M. de Mathan (MNHN); **PERU:** Cuzco, 30 km SW Pilcopata, I-20-1979, W. E. Steiner (USNM); Junín, Tarma, Huscapistana, 1800 m, II-12-1940, F. Woytkowski (SEMC); Loreto, Iquitos, Samlet auf Indianere, Birthe Thau, III-22-1961 (ZMUC); Political subdivision unknown, Region Centrale, Perene, 1923, Vergne (MNHN); 2000 to 3000 ft, Piches & Perone (USNM).

DIAGNOSIS. *Semiotus acutus* is most closely allied to *S. taeniatus*, *S. kirschi*, and *S. germari*. It can be separated from these species by the lack of sulci along the lateral margin of the pronotum. In *S. kirschi* the sulci extend nearly the entire length of the pronotum. In *S. germari* and *S. taeniatus*

the sulci are reduced to the anterior third to half only (as in Fig. 33). Several species have alternating light and dark elytral vittae and glabrous pronota similar to *S. acutus*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. acutus*, the elytral vittae cover alternating intervals with intervals 1 and 2 being of 2 contrasting colors. This same pattern is evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. kirschi*, and *S. illigeri*. *Semiotus acutus* and *S. exsolutus* are most easily separated from these by the absence of lateral pronotal sulci. *Semiotus superbus*, *S. sommeri*, *S. germari*, and *S. illigeri* all have a short marginal sulcus (not extending onto the posterior half). *Semiotus exsolutus* can be separated from *S. acutus* by the presence of stria punctures (which are nearly obsolete in *S. acutus*) and by the thinner (occasionally single) pronotal vittae (Fig. 240). In *S. acutus*, the pronotal vittae are wider (Fig. 243). The anterior sclerite of the bursa copulatrix differ in these species. In *S. acutus*, the series of dentitions along the posterior border extend nearly to the tip of the lateral arms (Fig. 70). In *S. exsolutus*, the dentitions are clustered around the median piece (Fig. 89).

REMARKS. A specimen (USNM) from "Colombia" bears a sanguineous color for areas otherwise predominantly piceus.

Chassain recognized this species as *S. superbus reductus*. In the first couplet of Chassain's (1998) key to subspecies of *S. superbus*, he uses the character of the marginal sulcus of the pronotum to separate *S. s. superbus* and *S. s. kirschi* from *S. s. panamensis*, *S. s. reductus*, and *S. s. championi*. The current study recognizes the marginal sulcus as delimiting species. *Semiotus s. reductus* is the same as the type of *S. acutus*.

Semiotus affinis (Guérin-Méneville)
(Figs. 3, 220)

Semiotus affinis Guérin-Méneville 1855:578, Candèze 1857:316, Candèze 1874:178, Dohrn 1875 (Type: not found; type locality: Napo, Ecuador).

Semiotus candezei Kirsch 1866:180, Steinheil 1875:111, Candèze 1874:178 (Lectotype: SMTD; type locality: Bogotá, Colombia). New synonym.

DESCRIPTION. Length 25 to 35 mm (length/width ratio 4.0 to 4.7). Head testaceous to sanguineous with piceus maculae basally; texture glabrous with occasional setae above eyes and frontal spines, punctation deep and scattered evenly throughout; front with 2 spines anterolaterally, with area between sharply angled. Antennae 3 segments short of hind angles (in both sexes), with segments 1 and 2 testaceous, segments 3 to 11 rufopiceous to piceus. Pronotum 6 to 9 mm (length/width ratio 1.1 to 1.2), gradually expanding posteriorly; margin broadly rounded with

sulcus on anterior fourth; color fulvus to testaceous laterally, testaceous to aurantiacus medially with 2 arcuate vittae on disk piceus; texture glabrous with punctation fine and evenly scattered throughout, often with a few fine umbilicate punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvus to testaceous with long piceus vitta along suture and small piceus macula on lateral border; texture glabrous (or with few erect setae laterally) with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvus to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with very fine punctures scattered throughout; metepimeron piceus. Femora testaceous to aurantiacus. Elytra 17 to 23 mm (length/width ratio 2.6 to 3.2), subparallel on anterior fourth, then narrowing to apex; color fulvus with badius to piceus markings along suture and lateral margin becoming wider apically, sutural vitta reaching scutellum anteriorly; striae and stria punctures finely impressed, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceous laterally testaceous medially with sublateral piceus vitta on each sternite; texture glabrous or with fine setae scattered throughout, punctation dense, fine and scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with 2 oblong foveae on posterior 2/3 of sternite 5, lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades, lateral blades approximately 1/4 length of parameres, penis extending beyond tip of parameres.

MATERIAL EXAMINED. BOLIVIA: Cochabamba, Cristal Mayu, X-7-1949, L.E. Peña (FMNH); Chaparé (IACM); La Paz, Isiamas, XII-1921, O.J. Costello (USNM); Tumupasa, XII-1921, W.M. Mann (USNM); **BRAZIL:** Mato Grosso, 12°31'S, 55°37'W, X-1974, M. Alvarenga (CNCI); Rondonia, 62 km SW Ariquemes, nr Fzda. Rancho Grande, XI-(4-16)-1997, J.E. Eger (FSCA); **COLOMBIA:** Caqueta, Yari (PCCV); Putumayo, Santa Rosa, Kofan indian village, headwaters of Río San Miguel, X-(10-23)-1970, B. Malkin & P. Burchard (FMNH); Valle del Cauca, Lower Auchicayá. 400 m, tropical wet forest, netted, IV-2-1976, R. Wilkerson (FSCA); W-Cordillera, Lake Colima, Río Bravo Valley, nr Buga, 1180–1200 m, (VIII-IX)-1988 (PCCV); Department unknown, Umbria,

Guines Fluss (CUIC); Landazuri, I-8-38, F.J. Otoyá (USNM); ECUADOR: Cañar, Herrera Ranch, 40–70 m, Sona Cochancay, 1979 (LACM); Esmeraldas, Bilsa, 500 m, 0.34°N, 79.71°W, (VI-5)-(VII-7)-1996, P. Hibbs, MT (LACM); Guayas, Guayaquil (LACM); Los Ríos, Río Palenque, 47 km S Santo Domingo, II-27-1976, H. & A. Howden (CNCI); Napo, 24 km E Atahualpa, 480 m, X-(16-23)-1995, E. & V. Giesbert (FSCA); *ibid.*, X-(1-3)-1996; Limoncoche, Oriente, 00°24'S, 76°36'W, (VI-29)-(VI-5)-1970, P. L. Kazan (FSCA); Laguna Tarocoa, Río Napo, 800 m, VI-25-1980, C.M. Stevens (FSCA); Limoncocha, VI-10-1977, W.E. Steiner (USNM); 25 km E Puerto Napo, Selva Aliñahuí, 450 m, XII-1992, E.S. Ross (CASC); 10 km SW Mishanalli, 600 m, 1°5'3"S, 77°42'9"W, I-26-1998, L. Náday (HNHM); Pastaza, Ashuara, Río macuma, 10 km from Río Morona, 300 m, VII-(7-16)-1971, B. Malkin (FMNH); Cusuimi, Río Cusuimi, 150 km. SE Puyo, V-(15-31)-1971, B. Malkin (FMNH); Pichincha, Santo Domingo, Allurigami, I-7-1997 (HNHM); 10 km SE Santo Domingo de los Colorados, V-2-1978, O'Brien & Marshall (USNM); Sucumbíos, Sacha Lodge, 270 m, 0°28'14"S, 76°27'35"W, III-24-1999, R. Brooks, on fungus covered log (SEMC); PERU: Arequipa, Mollendo Coast, XI-1935 (CASC); Cuzco, Hacienda María, Cosnipata River, Saucetimbo Cuzco, III-3-1952, F. Woytowski (CNCI); Río Paucartambo, VI-30-1932, Quiroz (LACM); Huánuco, Río Monzón, 798 m, nr Tingo María, III-17-1964, J. Schunke (CASC); Tingo María, (XI-XII)-1963, W. Rosenberg (FSCA); Tingo María, Monson Valley, X-15-1954, (CASC); *ibid.*, IX-29-1954; *ibid.*, XI-10-1954; *ibid.*, X-26-1954; *ibid.*, XI-1-1954; *ibid.*, XII-11-1954; Junín, Chachamayo, II-1933 (SEMC); Satipo, XI-1948, P. Paprzycki (CASC); Junín, Satipo, IV-15-1941, P. Paprzycki (CASC); Soudoveni Ridges, 900 m, Soudoveni / Huantadriiri Vall., 1987, ca. 100 km N Satipo (PCCV); Loreto, Estiron., Río Amlyacu, (X-XI)-1961, B. Malkin (FMNH); Explorama Lodge, 50 mi. NE Iquitos, VII-19-1990, S. Dunkle (FSCA); Madre de Dios, Cocha Otorongo, Reserved Zone, Manu Natl. Park, 310 m, 12°2'1"S, 71°11'58"W, X-21-2000, R. Brooks (SEMC); Madre de Dios / Puno, Río Inambari, II-7-10, alt. 1800 ft, C.H. Townsend (USNM); Madre de Dios, 30 km SW Pto. Maldonado, P.J. Anderson (USNM); Madre de Dios, Res. Zone, Explorer's Inn, 290 m, 12°50'S, 69°17'W, II-25-1982, T.L. Erwin, on vegetation along trail (USNM); Madre de Dios, Río Tambopata Reserve, 30 air km SW Puerto Maldonado, 290 m, XI-(1-26)-1982, E.S. Ross (CASC); Yagua Indian Village, headwaters of Loreto-Yacu, IV-29-1970, B. Malkin (FMNH); Pasco, Pan de Azúcar, VII-(8-9)-1961, F.S. Truxal (LACM); Political subdivision unknown, Huallaga, Aquaytin, 400 m, IX-1961 (CNCI); Río Huallagas, II-1986, L.E. Peña (PCCV).

DIAGNOSIS. *Semiotus affinis* is most closely allied to *S. lafertei*, *S. intermedius*, and *S. decoratus*. *Semiotus illustris*, though not closely related, is superficially similar. All of these species have 2 dark vittae on the elytra (1 sutural and 1 marginal) that converge near the apex (as in Figs. 219–221, 223, 224). These species also have 2 stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with 2 frontal spines and those with 3. *Semiotus decoratus* is readily distinguished from *S. affinis* by the single pronotal vitta and black lateral pronotal maculae (Fig. 224). *Semiotus affinis*, *S. lafertei*, *S. intermedius*, and *S. illustris* all have 2 pronotal vittae (Figs. 219–221, 223). *Semiotus affinis* can be separated from *S. intermedius* by the darker patterns and shape of the scutellum. The dark elytral and pronotal patterns in *S. affinis* are black, whereas in *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is approximately as wide as long (Fig. 157). It is much wider than long in *S. affinis* (as in Fig. 159). *Semiotus affinis* differs from *S. lafertei* in the piceus sutural stripe that reaches the scutellum and in the sulcus on the anterior third of the lateral pronotal margin. In *S. lafertei* the elytral suture is not piceus all the way to the scutellum, and the anterior third of the lateral pronotal margin is not sulcate. *Semiotus affinis* is superficially similar to *S. illustris* but can be separated by the dark vittae on the abdomen and metasternum. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. *Semiotus affinis* can be separated from all other *Semiotus* by the 2 converging piceus vittae on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

REMARKS. The type of *S. affinis* is lost. A specimen similar to the original description and labeled by Candèze as "*Semiotus affinis*" is deposited in the MNHN (on loan from the BMNH) with a Candèze identification label. This specimen is conspecific with *S. candezei*.

Semiotus aliciae n. sp.

(Figs. 4, 259)

DESCRIPTION. Length 20 to 26 mm (length/width ratio 4.6 to 4.7). Head aurantiacus to testaceous throughout; anterolateral area of frons protuberant and angled, without spines; texture glabrous, nitidus, with few erect setae over eyes, punctation shallow, becoming umbilicate basally; ocular index 68.0 to 70.0. Antennae 1 to 2 segments short of hind angles; segments 1, 2, and

part of 3 aurantiacus, segments 4 to 11 rufopiceus to piceus. Pronotum 4 to 8 mm (length/width ratio 1.1 to 1.3); widest on anterior 2/5, then converging anteriorly and posteriorly to divergent hind angles, anterior 2/5 narrowing and declivous to anterior angles, margin moderately incrassate without sulcus; color aurantiacus to testaceus; texture glabrous, nitidus, with fine punctures throughout becoming thicker anteriorly. Scutellum testaceus medially, piceus peripherally, subchordate, anterior margin declivous. Prosternum concave in profile, prosternal process not divided; color aurantiacus to testaceus; texture glabrous medially, with large umbilicate punctures and erect setae along suture. Hypomeron aurantiacus to testaceus; texture glabrous, nitidus, punctation very fine to obsolete. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus to testaceus. Mesepisternum aurantiacus to testaceus. Metasternum fulvus to testaceus; texture glabrous, nitidus, with punctation fine to obsolete; femora aurantiacus to testaceus. Elytra 12 to 16 mm (length/width ratio 2.8 to 3.0) narrowing from near base to apex; color piceus throughout; texture glabrous, nitidus, without striae (except stria 1) or stria punctures; apices of each elytron bearing 1 spine. Abdomen fulvus to testaceus; texture glabrous, nitidus, with punctation fine to obsolete. Female without foveae on sternite 5.

MATERIAL EXAMINED. Holotype: PANAMA: Chiriquí (BMNH); Paratypes: PANAMA: Panama, 10 km N El Llano, 1400 ft, VI-(3-8)-1986, E. Giesbert (1, FSCA); Cerro Campana, 2700 ft, VI-(3-5)-1981, E. Giesbert (1, FSCA); Cerro Campana, 2700 ft, V-(17-19)-1987, E. Giesbert (3, FSCA).

DIAGNOSIS. *Semiotus aliciae* is a unique species with an angled frontal margin. Phylogenetically it is placed between those species with distinct frontal spines and those lacking spines (Wells, 2002). Among the species with spines, it is most closely allied to *S. catei*, from which it is easily separated. *Semiotus catei* bears several pronotal and elytral markings (Fig. 216), whereas, the orange pronotum and black elytra of *S. aliciae* are unicolorous respectively (Fig. 259). Among the species lacking frontal spines, *S. aliciae* is most closely allied to *S. luteipennis*, *S. serraticornis*, and *S. ligneus*. Each one of these species has a bicolored pronotum. Geographically, *S. aliciae* occurs in Panama, separated from most related species (Fig. 4). *Semiotus luteipennis* occurs much farther south in Argentina and Chile, *S. serraticornis* occurs from Colombia to Argentina, and *S. catei* occurs in Colombia. The unicolorous orange body with contrasting black elytra, along with the absence of elytral striae (except stria 1) readily distinguish this species from all other *Semiotus*.

ETYMOLOGY. *Semiotus aliciae* is named in honor of Alicia Wells.

Semiotus angustus n. sp.

(Figs. 7, 71, 99, 234)

DESCRIPTION. Length 18 to 21 mm (length/width ratio 4.2 to 4.7). Head testaceus to aurantiacus with piceus median macula; with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae on frons, punctation deep and scattered throughout; ocular index 74.0 to 77.0. Antennae serrate, reaching beyond hind angles by 1 to 2 segments in females, 2 or more segments in males; segments 1 to 11 testaceus. Pronotum 4 to 5 mm (length/width ratio 1.1 to 1.3), sinuate, hind angles divergent; margin incrassate becoming explanate on anterior fifth, clearly defined only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median vitta aurantiacus to sanguineus, hind angles and anterior border paler, with 2 broad sublateral piceus vittae extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally; scutellum subquadrate, posterior border rounded, fulvus with obscure borders. Prosternum slightly concave in profile, prosternal process not divided at tip; color testaceus to aurantiacus medially, piceus along suture; texture of long erect setae scattered throughout with fine dense decumbent setae laterally, punctation fine medially, dense laterally. Hypomeron testaceus to aurantiacus, fulvus basally, with piceus vitta along suture; texture of fine decumbent setae and fine punctation becoming denser along suture. Mesosternum fulvus to testaceus with piceus macula, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum fulvus to testaceus with piceus macula. Metasternum glabrous with fine punctation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceus medially, piceus anterolaterally. Femora testaceus to badius. Elytra 13 to 14 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third to half before narrowing to tip; color fulvus with badius to piceus irregular vittae along each stria; texture glabrous, nitidus, striae faint, stria punctures moderately deep; apices each bearing 1 spine. Abdomen aurantiacus to testaceus with sanguineus to badius sublateral coloration; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female without foveae; anterior sclerite vestigial, lacking lateral arms, median piece pointed apically. Male with parameres subparallel basally and apically, lateral blades narrow, 0.33 to 0.35 length of parameres (Fig. 99).

MATERIAL EXAMINED. Holotype, female: BOLIVIA: La Paz, 7 mi. SE Unduavi, IV-7-1978, C.W. & L.B. O'Brien (CNCL); Paratypes: BOLIVIA: Santa Cruz, Br. Ichilo R. Rain Forest,

X-(15-16)-1966, B. & K. Burks (1, USNM); PERU: Cuzco, Lucma, 7000 m, VIII-25-1911 (1, USNM); Junín, Prov. Tarma, Huacapistana, S.A., 1940, F. Woytkowski (1, SEMC).

DIAGNOSIS. *Semiotus angustus* is most closely allied to *S. perangustus* and other species with 3 frontal spines, dense pronotal setae, and pale elytra with infusate striae (*S. cristatus*, *S. linnei*, *S. colombianus*, and *S. auripilis*). *Semiotus auripilis* is distinct from *S. angustus* by the strongly convex elytral intervals. The intervals in *S. angustus* are flat or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of *S. perangustus* and *S. angustus*, not extending forward beyond the length of the medial spine. In *S. angustus* the lateral spines are much longer than the medial spine. The pronotal vittae in *S. linnei* are arcuate (especially along the medial side), those of *S. angustus* are subparallel. *Semiotus colombianus* is larger (over 22 mm long) than *S. angustus* (less than 22 mm long). *Semiotus perangustus* and *S. angustus* can be distinguished from these related species by their narrow body and smaller size. These 2 species are similar, but can be separated by several characters. *Semiotus perangustus* has darker antennae (segments 3 to 11 are nearly piceus). In *S. angustus* segments 3 to 11 are only slightly darker than segments 1 and 2. The female of *S. perangustus* bears 2 deep foveae on sternite 5. The female of *S. angustus* lacks foveae. The anterior sclerite of the bursa copulatrix is much larger in *S. perangustus*, and lateral arms are present (Fig. 72). In *S. angustus*, lateral arms are lacking (Fig. 71).

ETYMOLOGY. The name refers to the narrow dorsal profile of this species.

Semiotus auripilis Candèze
(Fig. 2)

Semiotus auripilis Candèze 1874:184 (Holotype: BMNH; type locality: Bolivia).

DESCRIPTION. Length 22 to 24 mm (length/width ratio 4.3 to 4.5). Head piceus with piceus to aurantiacus spines; with 3 frontal spines medial spine not as long as lateral spines; texture of fine pale decumbent setae and long erect setae over eyes and spines, punctation deep with punctures separated by about width of punctures. Antennae serrate, reaching beyond hind angles by 0 to 1 segments; segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Pronotum 5 to 6 mm (length/width ratio 1.1 to 1.2), narrowly sinuate; lateral margin sulcate on anterior third to half, thickly rounded posteriorly, with elevated thickening above margin on anterior half; disk with 2 large arcuate piceus maculae, interrupted medially by sanguineous longitudinal vitta, anterior border and lateral margins aurantiacus to sanguineous; texture of dense pile laterally, becoming

thicker and aureus on piceus vittae, median area between vittae with fewer setae, punctation fine and moderately dense medially, deep and often contiguous laterally; scutellum testaceous, subrectangular to subchordate, and glabrous or with few scattered punctures. Prosternum nearly straight in profile with lobe descending anteroventrally; color sanguineous to piceus medially, lobe aurantiacus, with or without lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron piceus, with lateral margin aurantiacus to badius, posterior border fulvus to testaceous; texture of dense decumbent and golden setae throughout becoming less dense in peripheral areas. Mesosternum piceus laterally, fossa sanguineous; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum testaceous to piceus. Metasternum sanguineous to badius with anterolateral areas piceus, glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora testaceous to aurantiacus. Elytra 15 to 17 mm (length/width ratio 2.9 to 3.1), nearly parallel-sided on anterior 2/3 then narrowing evenly to apex; striae and stria punctures well defined, intervals strongly convex; color fulvus with infusate striae (also surrounding scutellum); apices subspinose. Abdomen sanguineous to badius medially, becoming rufopiceus, margin lighter; setae scattered throughout except median area, punctation fine medially, deeper laterally.

MATERIAL EXAMINED. BOLIVIA: (BMNH). *Semiotus auripilis* is known only from the holotype.

DIAGNOSIS. *Semiotus auripilis* is most closely allied to *S. hispidus*, *S. seladonius*, and *S. pectitus*. *Semiotus auripilis* and *S. pectitus* both have strongly convex (nearly hemispherical when viewed from behind) elytral interstriae. The interstriae of *S. seladonius* are more nearly flat or only slightly convex. The elytral color of *S. pectitus* is deep red. The elytral color of *S. hispidus* is completely black, or black with pale vittae. The elytral color of *S. seladonius* is green. The elytra of *S. auripilis* is pale yellow with infusate striae, similar to *S. linnei*, *S. cristatus*, and *S. colombianus*. These last 3 species can be easily distinguished from *S. auripilis* by the flat or slightly convex interstriae. Also, the pronotal setae of these species are thin. In *S. auripilis* the pronotal setae is thick golden brown. Geographically, *S. auripilis* seems to be separated from most related species (Fig. 2). The single specimen known is from Bolivia. *Semiotus hispidus*, *S. linnei* and *S. cristatus* occur in Venezuela. *Semiotus pectitus* and *S. colombianus* occur in Colombia. *Semiotus seladonius* occurs in Colombia and Bolivia. The dense golden pronotal setae, 3 frontal spines, sulcate pronotal margin, and unicolorous strongly convex elytral intervals with dark striae separate *S. auripilis* from all other *Semiotus*.

Semiotus badeni Steinheil
(Figs. 9, 75, 94, 138, 207)

Semiotus badeni Steinheil 1875:111 (Lectotype, male: MNHN; type locality: Colombia).

Semiotus dohrni Candèze 1889:80, Champion 1896:290 (Lectotype, female: BMNH; type locality: Cerro Zunil, 4000 ft). New synonymy.

DESCRIPTION. Length 18 to 26 mm. (length/width ratio 4.6 to 4.9). Head aurantiacus to sanguineus with or without piceus basal macula, front with 2 spines anterolaterally; texture with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout. Antennae serrate, 0 to 1 segments short of hind angles in females, 0 to 1 segments beyond hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate with margins converging on anterior fourth, hind angles divergent, disk convex with depressions sublaterally on posterior 2/3 to 3/4, margin sulcate and explanate on anterior third to fourth, broadly rounded without definition on posterior half; color fulvus to aurantiacus becoming darker anteriorly with irregular piceus vitta extending from base almost to anterior border, or in some specimens extending onto head; texture glabrous with moderately deep punctures scattered throughout. Scutellum testaceous to piceus, subquadrate with anterior margin incised or recurved medially. Prosternum concave in profile, prosternal process not divided at apex; color aurantiacus to sanguineus with piceus vitta along suture; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker and umbilicate laterally. Hypomeron fulvus to luteus with piceus vitta along suture; texture glabrous with very fine punctures scattered throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous with or without piceus vitta along lateral margin; texture glabrous, with very fine punctation throughout. Metepimeron piceus. Femora fulvus to testaceous. Elytra 12 to 17 mm (length/width ratio 2.8 to 3.1), subparallel on anterior third then narrowing to tip; color fulvus to luteus with intervals 1, 4, 6, and 9 mostly piceus (Fig. 207). (Specimens from the Province of Puntarenas, Costa Rica, have the discal vittae very pale); texture glabrous with striae (except stria 1) faint to obsolete, stria punctures fine to obsolete; apices each bearing 1 spine. Abdomen fulvus laterally, testaceous to aurantiacus medially, with 2 sublateral obscure vittae extending from sternite 2 (sometimes also on sternite 1) to sternite 4; texture glabrous or with few scattered setae basally and apically, moderately deep punctures scattered throughout; female with 2 very fine, small, shallow ill-defined

foveae on anterior third of sternite 5, or with foveae absent; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

MATERIAL EXAMINED. COLOMBIA: (MNHN); COSTA RICA: Alajuela, Est. San Ramón Oeste, 620 m, IV-(3-19)-1994, C. Cano (INBC); Río San Lorencito, 900 m, 5 km N Col. Palmarena, III-1990 (INBC); Cartago, Grano de Oro, Chirripó, Turrialba, 1120 m, IX-1993, P. Campos (INBC); Grano de Oro, Turrialba, I-(18-24)-1993, P. Campos (INBC); Monumento Nacional Guayabo, 1100 m, VII-1994, G. Fonseca (INBC); *ibid.* (IX-1994); Suiza Turrialba, P. Schild (USNM); Turrialba, VII-19-1965, Ötvöa (HNHM); Turrialba, VI-26-1965, C. Slobodchikoff (EMEC); Guanacaste, Estación Pitilla, 9 km S Santa Cecilia, 700 m, IV-1994, C. Moraga (INBC); *ibid.*, V-1992, Z. Fuentes; Est. Mengo, IV-15-1988, M. Espinoza (INBC); Heredia, Estación Magasay, P.N. Braulio Carrillo, 200 m, IV-1991, R. Aguilar (INBC); Limón, Cerro Tortuguero, 1–120 m, VII-1993, R. Delgado (INBC); *ibid.* (IV-1989); *ibid.* (VIII-1992); Estación Miramar, 500 m, Reserva Biológica Hitoy Cerere, VIII-(21-30)-1992, G. Carballo (INBC); Hamburg Farm, Reventazon, III-1-1924, F. Neverman (USNM); *ibid.* VIII-1-1924; *ibid.* VIII-21-1936; *ibid.* II-27-1933; *ibid.* X-14-1927; *ibid.* II-27-1925, an Gebüsch (USNM); Sector Cerro Cocori, Finca de E. Rojas, 150 m, (I-31)-(II-21)-1992, E. Rojas (INBC); 100 m, Hitoy Cerere, (IV-24)-(V-5)-1998, E. Rojas (INBC); Sector Coccori, 30 km N Cariari, 100 m, II-1994, E. Rojas & A.A. Solis (INBC); Sector Cocori, Finca de E. Rojas, 150 m, IX-1993, E. Rojas (INBC); Puntarenas, Cerro Anguciana, Llano Bonito, Piedras Blancas, Península Osa, 100–110 m, V-1994, J.F. Quesada (INBC); Estación La Casona, 1520 m, Reserva Biológica Monteverde, X-1991, N. Obando (INBC); San José, Las Mercedes, Santa Clara, 200–300 m, V-11-1922 (USNM); Parque B. Carrillo, Estación la Montuqa, 1–100 m, V-22-1981, R. Canet (INBC); GUATEMALA: Santa María, XI, W. Schauss (USNM); PANAMA: Canal Zone, Escobal Road, VII-30-1974, D. Engleman (CNCI); Fort Davis, VII-1980, H.J. Harlan (OSUC); Chiriquí, Fortuna, V-17-1978, O'Brien & Marshall (CNCI); Fortuna Dam, V-16-1993, E. Giesbert (FSCA); vic. Fortuna Dam, IV-(15-18)-1993, E. Giesbert (FSCA); Panama, Cerro Campana, 850 m, VIII-21-1971, W. Bivia (USNM).

DIAGNOSIS. *Semiotus badeni* is most closely allied to *S. fleutiauxi*, *S. fulvicollis*, and *S. clarki*. It is also similar to *S. fascicularis* and the other species with 2 frontal spines and 4 or 5 dark elytral vittae (*S. bispinus* and *S. melleus*). *Semiotus fleutiauxi* is unique among these species by the orange to deep red elytra with a pale yellow

vitta on the disk (Fig. 211). The elytra in the other species are pale brown to yellow with dark vittae. *Semiotus badeni* and *S. fascicularis* each bear a sutural, a marginal, and 2 discal vittae per elytron. The discal vittae occupy intervals 4 and 6. Interval 2 is pale. These discal vittae occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* each elytron bears a marginal, a sutural, and a single discal dark vitta extending from the humeral angles to near the elytral apices. The anterior sclerite of the bursa copulatrix in *S. badeni* is convex along the anterior border and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). In *S. flautiaxi* (Fig. 77), *S. fulvicollis* (Fig. 50), and *S. melleus* (Fig. 73), the anterior margin is angled at the point where the lateral arms are directed posteriorly. *Semiotus badeni* is known primarily from Central America (Fig. 9). The other related species, as far as is known, occur in South America.

REMARKS. The intensity of the elytral vittae varies among individuals and between populations. The colors contrast from deep reddish brown to black. These differences are minor and blend in to each other in larger series. The differences in the type of *S. dohrni* and *S. badeni* are only of this nature and do not merit separate specific recognition.

Semiotus bispinus Candèze
(Figs. 7, 54, 96, 209)

Semiotus bispinus Candèze 1874:180 (Holotype: BMNH; type locality: Ecuador).

DESCRIPTION. Length 24 to 25 mm (length/width ratio 4.6 to 4.7). Head aurantiacus to testaceous with basal and antepical maculae piceus; bearing 2 spines anterolaterally; texture glabrous, nitidus with few scattered setae above eyes, punctation fine and scattered throughout; ocular index 73.0 to 75.0; frontal spines 0.45 to 0.47 length of head. Antennae serrate, 3 or more segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length/width ratio 1.2), subparallel medially, converging on anterior fourth, hind angles diverging; margin incrassate with anterior fourth only clearly defined; color fulvus to luteus with broad piceus vitta extending from base to near anterior margin (sometimes with sanguineus vitta within piceus vitta); texture glabrous, nitidus, with fine punctation throughout, appearing impunctate laterally. Scutellum piceus, suborbicular, anterior margin recurved. Prosternum concave in profile; color sanguineus to testaceous with thin piceus vitta along suture; texture glabrous with long erect setae on lobe,

punctation very fine medially, thicker and umbilicate laterally. Hypomeron fulvus to luteus; texture glabrous, nitidus with very fine punctation scattered throughout. Mesosternum testaceous to badius; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum testaceous to badius. Metasternum testaceous to badius; texture glabrous, nitidus with very fine punctures scattered throughout. Femora testaceous to badius. Elytra 15 to 16 mm (length/width ratio 3.0), subparallel on anterior third to half, then narrowing to tip; color fulvus to luteus with alternating intervals lightly infuscate; texture glabrous, nitidus, striae and strial punctures fine to obsolete; apices each bearing 1 spine. Abdomen Sanguineus to badius medially, fulvus to testaceous laterally; texture glabrous except for fine decumbent setae on sternite 1, punctation fine throughout; female with 2 shallow to obscure foveae along lateral margin of sternite 5; anterior sclerite wider than long, lateral arms extending 2/3 length of median piece, median piece subtriangular basally, with several dentitions along lateral margin on basal half. Male with lateral blades of parameres wide, with acute apices and lateral spines, approximately 0.25 to 0.28 length of parameres.

MATERIAL EXAMINED. ECUADOR: Bolívar, Balzapamba, F. Campos (USNM); Los Ríos, Río Palenque, 47 km S Santo Domingo, 700 ft, II-(22-27)-1976, H. & A. Howden (CNCI); Río Palenque Biol. St., 47 km S Santo Domingo, II-(22-28)-1976, J.D. Glaser (CMNH); PERU: Junín, 900 m, Soudoveni Ridges, Soudoveni/Huantadriiri Vall., ca. 100 km N Satipo, 1987 (PCCV).

DIAGNOSIS. *Semiotus bispinus* is most closely allied to *S. flavangulus*. It is also similar to the species with 2 frontal spines and 4 or 5 dark elytral vittae, *S. badeni*, *S. melleus*, *S. fascicularis*, and *S. clarki*. *Semiotus flavangulus* bears 8 to 9 dark elytral vittae. Each vitta occupies a stria (Fig. 218). The intervals are pale. In *S. bispinus* (and other related species), alternating elytral intervals are dark. *Semiotus badeni* and *S. fascicularis* each bear a sutural, a marginal, and 2 discal vittae per elytron. The discal vittae occupy intervals 4 and 6. Interval 2 is pale. In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). *Semiotus bispinus* bears a single pronotal vitta and the anterior third of the lateral pronotal margin is sulcate. In *S. melleus* and *S. clarki* the pronotum bears 2 discal vittae and the lateral pronotal margin lacks sulci. The anterior sclerite of the bursa copulatrix in *S. badeni* is convex along the anterior border and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). In *S. melleus* (Fig. 73) the anterior margin is angled at the point where the lateral arms are directed posteriorly. The anterior sclerite in *S. bispinus* is

subangulate along the anterior border, and the median piece is thick and covered with several dentitions (Fig. 54).

Semiotus buckleyi Candèze
(Figs. 19, 35, 116, 230)

Semiotus buckleyi Candèze 1874:183 (Holotype: BMNH; type locality: Ecuador).

DESCRIPTION. Length 25 to 27 mm (length/width ratio 4.2 to 4.4). Head with 3 frontal spines (2 long anterolateral spines and 1 smaller median spine); color piceus basally, testaceous to sanguineus around spines; texture glabrous, punctures moderately deep and separated by distance greater than own width, becoming fainter and farther apart apically; ocular index 70.0 to 72.0; frontal spines approximately 0.29 length of frons. Antennae serrate, short of hind angles by 1 segment in females, reaching to hind angles in males; segments 1 and 2 testaceous to badius, segments 3 to 11 piceus to rufopiceus. Pronotum 6 to 8 mm (length/width ratio 1.2 to 1.3), slightly converging on anterior half, hind angles diverging on posterior fourth, margin sulcate on anterior third to half, thickly rounded posteriorly, forming an elevated thickening above margin; disk piceus, anterior and lateral margins fulvus to sanguineus; texture glabrous with punctation moderately deep and separate throughout. Scutellum subchordate, testaceous medially with piceus border. Prosternum slightly concave in profile, medially glabrous with fine punctation becoming larger and deeper laterally with fine setae; lobe testaceous to sanguineus, remainder of prosternum sanguineus to piceus or with spine sanguineus (in some specimens most of prosternum is sanguineus). Hypomeron piceus along suture, testaceous to sanguineus laterally; texture glabrous with fine punctures laterally with thick fulvus setae, denser punctation medially. Mesosternum testaceous to piceus; texture glabrous medially with fine punctation and light setae laterally. Mesepisternum testaceous to piceus. Metasternum testaceous to piceus; texture glabrous medially with fulvus setae laterally, fine punctures throughout becoming thicker laterally. Femora testaceous to badius. Elytra 16 to 18 mm (length/width ratio 2.7 to 2.8), subparallel on anterior third then narrowing to tip, color fulvus with piceus vittae along striae converging on humeri and near apices in many specimens; texture glabrous, strial punctures lightly impressed apically, obscure to obsolete basally; apices each bearing 1 spine. Abdomen ranging from rufopiceus throughout to sanguineus with pale margins; texture glabrous medially with thick setae laterally, punctures fine, becoming thicker laterally; female with 2 elliptical foveae in center of sternite 5; anterior sclerite with lateral arms long, multiserrate, projecting apical-

ly 3/4 length of median piece. Male with parameres wide basally, wider than lateral spine; lateral blades long, 0.32 to 0.35 length of parameres.

MATERIAL EXAMINED. ECUADOR: Bolívar, Balzapamba, 650 m, F. Campos (USNM); Pichincha, Mindo, ca. 75 km NW Quito, X-30-2002, T.O. Holtzer (CSUC); Nanegalito, 7 km S on Nono Rd., 1540 m, 0°0'23"N, 78°40'36"W, X-30-1999, Z.H. Falin, ECU1F99, ex: pyrethrum fogging fallen tree trunk (SEM); S. Domingo, XII-1982, G. Onore (PCCV).

DIAGNOSIS. *Semiotus buckleyi* is most closely allied to *S. illustris*, *S. kathleenae*, *S. virgatus*, and *S. sommeri* with similarities to *S. reaumuri*, *S. glabricollis*, and other species with infusate striae. The elytra in *S. buckleyi* are pale brown to yellow with each stria dark brown to black, the striae themselves being very faintly, if at all, impressed. In *S. kathleenae*, the striae are impressed, and the elytra are deep red, lacking dark vittae. In *S. illustris* the elytra are pale brown to yellow but only have 2 dark vittae per elytron—1 sutural and 1 marginal. *Semiotus virgatus* and *S. sommeri* have alternating elytral intervals with contrasting light and dark vittae (Figs. 241, 242). In *S. buckleyi*, the elytral vittae are restricted to the striae, the intervals are all pale (Fig. 230). Several other species have pale elytra with infusate striae and a dense covering of setae on the pronotum (*S. pilosus*, *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, *S. colombianus*, *S. vicinus*, and *S. angustus*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similar elytra but lack setae on the pronotum (or have very faint and inconspicuous setae). These species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark strial vittae are black and extend out from the striae onto the elytral intervals (Fig. 230), and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the strial vittae are light brown, and the pronotum lacks sulci. The anterior sclerite of the bursa copulatrix in *S. buckleyi* bears an anterior convexity (Fig. 35) similar to that of *S. virgatus* (Fig. 76) and *S. sommeri* (Fig. 87), though the lateral arms are longer, extending nearly as far posteriorly as the median piece. In *S. virgatus* and *S. sommeri* the lateral arms are shorter, extending approximately 1/2 and 1/4 the length of the median piece, respectively. *Semiotus buckleyi* is known from Ecuador (Fig. 19), whereas *S. reaumuri* and *S. glabricollis* are known, although from few specimens, from Colombia. The combination of dark vittae along each elytral stria, glabrous pronotum, pronotal sulcus along the anterolateral margin, 3 frontal spines, along with the absence of a marginal macula on the pronotum, readily separate *S. buckleyi* from all other known *Semiotus*.

Semiotus capucinus Candèze

Semiotus capucinus Candèze 1857:334, Candèze 1874:188, Kirsch 1884:45 (Holotype: BMNH; type locality: New Granada).

DESCRIPTION. Length 16 mm (length/width ratio 3.0 to 3.1). Head completely piceus; frons with anterolateral areas angled without spines; texture glabrous with few scattered setae above eyes, punctation fine throughout; ocular index 75.0 to 77.0. Antennae serrate, reaching 1 to 2 segments beyond hind angles; color piceus throughout. Pronotum 3 to 4 mm (length/width ratio 0.7 to 0.8), subcomplanate, much wider than long, hind angles diverging, disk strongly convex; margin thin, without sulcus; color completely piceus; texture glabrous, nitidus with fine punctation on disk becoming much denser laterally. Scutellum completely piceus, subquadrate, hind border rounded, anterior border recurved. Prosternum strongly convex in profile; color piceus; texture nitidus with long erect setae and fine punctation throughout. Hypomeron completely piceus; texture nitidus with long erect setae and fine punctation throughout. Mesosternum piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum piceus; texture nitidus with long erect setae and fine punctation throughout. Femora piceus. Elytra 13 mm (length/width ratio 2.5), strongly gibbous; color sanguineus throughout, without markings; texture nitidus with very few scattered setae, intervals convex, striae and strial punctures distinct; elytral apices angled, without spines. Abdomen piceus; texture nitidus with long erect setae and fine punctation throughout.

MATERIAL EXAMINED. New Granada: (BMNH). This could be anywhere within the present boundaries of Panama, Colombia, Venezuela, and Ecuador. *Semiotus capucinus* is known only from the holotype.

DIAGNOSIS. *Semiotus capucinus* is most closely allied to *S. ligatus* and *S. striatus*. It can be easily distinguished from these species by the blood red elytra. *Semiotus ligatus* has green elytra, and *S. striatus* has pale elytra with infuscate striae. In general habitus and phylogenetic placement, *S. capucinus* is similar to the genera *Oistus* and *Semiotinus* by having a wide and gibbous body; however, *S. capucinus* is considered part of the genus *Semiotus* by having membranous tarsal pads and lacking patterned tufts of setae. In the genus *Oistus*, the tarsal pads are comprised of stout setae and the elytra often bear colored patterns of setae. The strongly convex outline of the pronotum separates *S. capucinus* from species of *Semiotinus*, which have either recurved or straight lateral pronotal margins. The strongly gibbous elytra, very broad and convex pronotum, and completely piceus body color (with sanguineus elytra) readily distinguish

S. capucinus from all other *Semiotus*. Superficial similarities (in color) exist between *S. capucinus* and *S. carinicollis*; however, the later has a much narrower pronotum (being about as long as wide) and lighter elytral coloration (more testaceous than sanguineus).

Semiotus carinicollis Kirsch
(Fig. 3)

Semiotus carinicollis Kirsch 1884:46 (Lectotype (male): SMTD; type locality: Colombia, Paramo de Huila, 3500–4000 m.). Note that the lectotype is a photograph only.

DESCRIPTION. Head completely piceus; frons with anterolateral areas rounded to angled, without spines; texture of scattered setae throughout. Antennae serrate, reaching 2 to 3 segments beyond hind angles; color piceus throughout. Pronotum as wide as long, narrowly sinuate, converging on anterior third; color completely piceus; texture with scattered setae throughout. Femora piceus. Elytra subparallel on anterior 2/3 then narrowing to tip; color testaceous to aurantiacus, piceus at base; texture glabrous, nitidus, intervals convex, striae and strial punctures distinct; elytral apices without spines.

MATERIAL EXAMINED. COLOMBIA: Huila/Tolima, Paramo de Huila, 3500–4000 m, D. Stubel (SMTD). *Semiotus carinicollis* is known only from the lectotype.

DIAGNOSIS. The piceus head and pronotum with testaceous elytra and lack of frontal and elytral spines distinguish *S. carinicollis* from all other *Semiotus*. Superficial similarities (in color) exist between *S. capucinus* and *S. carinicollis*; however, the latter has a much narrower pronotum (being about as long as wide) and lighter elytra, being more testaceous than sanguineus.

Semiotus catei n. sp.
(Figs. 19, 134, 216)

DESCRIPTION. Length 25 to 31 mm (length/width ratio 4.1 to 4.6). Head testaceous to aurantiacus with piceus maculae basally; texture glabrous with few erect setae above eyes and spines, punctation fine and scattered throughout; front with 2 spines anterolaterally. Antennae serrate, 2 to 3 segments short of hind angles (in males), segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 to 8 mm (length/width ratio 0.9 to 1.2), with sides subarcuate, hind angles diverging; incressate without sulcus; color fulvus to testaceous with median vitta aurantiacus to sanguineus, with 2 irregular sublateral vittae piceus with lateral extension medially; texture glabrous, nitidus with fine shallow punctures scattered throughout. Scutellum piceus, broadly subchordate, convex laterally. Prosternum very slightly concave in profile on anterior 2/3; color aurantiacus to sanguineus, piceus along suture;

texture glabrous, nitidus with few scattered setae throughout becoming denser on lobe, punctuation very fine medially, denser and deeper laterally. Hypomeron fulvus to aurantiacus, suture piceus; texture glabrous, punctuation fine to obsolete. Mesosternum sanguineus medially, piceus laterally, texture glabrous medially with fine dense setae laterally, fossa nearly impunctate, lateral areas containing fine setigerous punctures. Mesepisternum piceus. Metasternum sanguineus medially, piceus laterally; texture glabrous with fine decumbent setae anterolaterally, punctuation fine throughout. Femora rufopiceus to piceus. Elytra 17 to 21 mm (length/width ratio 2.7 to 3.1), subparallel on basal half then narrowing to tip; color fulvus to luteus, intervals 2, 4, 6, and 8 infuscate; texture glabrous, nitidus, intervals convex, striae clearly defined, punctures obsolete; apices each bearing 1 spine. Abdomen aurantiacus to sanguineus medially, fulvus to luteus laterally with sublateral piceus vittae; texture glabrous, nitidus with fine decumbent setae sublaterally on sternite 1, punctuation fine throughout. Male with parameres short, approximately 1.5 times length of basal piece, lateral blades subtriangular, 0.25 to 0.30 length of parameres.

MATERIAL EXAMINED. Holotype, male: **COLOMBIA:** Valle del Cauca, W. Cordillera, Lake Colima, Río Bravo Valley nr Buga, 1180–2000 m, IX-1988 (PCCV); Paratypes: **COLOMBIA:** Valle del Cauca, Colima Valley, Buga, IV-1989 (2, PCCV).

DIAGNOSIS. *Semiotus catei* is most closely allied to *S. aliciae* and *S. trinitensis*. It is most notably different from these species in having a gibbous profile. It is also similar to the generally gibbous *S. gibbosus*. *Semiotus catei* can be readily distinguished from *S. aliciae* by the patterned pronotum and elytra (with contrasting light and dark vittae). In *S. aliciae* the pronotum and elytra are unicolorous orange and black, respectively (Fig. 259). Additionally, the frontal spines in *S. catei* are stout and well defined. In *S. aliciae*, the frontal margin is angled only, without spines. *Semiotus trinitensis* has a procurved (rounded anteriorly) scutellum. The scutellum in *S. catei* is broad and flat throughout. This is similar to the scutella of *S. imperialis* and *S. cuspidatus*. *Semiotus trinitensis* can also be distinguished from *S. catei* by the presence of 2 dark vittae per elytron. *Semiotus catei* bears dark vittae over each stria. This pattern is similar to that evident in *S. gibbosus*. These 2 species can be separated by the color of the scutella and legs. In *S. catei* they are black (with occasional light areas). In *S. gibbosus* they are orange to light brown. Also, the lateral margins of the pronotum are more strongly divergent in *S. gibbosus* (Fig. 246) than in *S. catei* (Fig. 216).

ETYMOLOGY. *Semiotus catei* is named in honor of Peter Cate of Vienna, who has assisted me in this research.

Semiotus chassaini n. sp.

(Figs. 19, 65, 238)

DESCRIPTION. Length 22 to 23 mm (length/width ratio 4.0 to 4.1). Head testaceous to aurantiacus with basal macula piceus; anterolateral areas rounded to slightly angled without spines, median anterior margin angled to slightly spinose; texture with fine setae and deep punctuation scattered throughout. Antennae approximately 1 segment short of hind angles in females, with segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 to 6 mm (length/width ratio 1.0 to 1.1), widest at base becoming evenly narrower anteriorly, hind angles gradually enlarged, hardly divergent; margin incressate, without distinct definition; color testaceous to aurantiacus medially, fulvus to luteus laterally, with 2 piceus vittae between colors; texture glabrous with scattered setae, piceus vittae with dense decumbent setae. Scutellum suborbicular, fulvus to testaceous. Hypomeron fulvus to luteus laterally, piceus along suture; texture glabrous with fine punctures laterally, fine setae and dense punctuation medially. Prosternum slightly concave in profile, prosternal process not divided apically; color sanguineus to aurantiacus with suture piceus; texture glabrous with fine punctures medially, fine setae and dense punctuation laterally. Mesosternum declivous, color testaceous medially, piceus laterally with fossa glabrous and impunctate, lateral areas with dense setae and punctuation. Mesepisternum piceus. Metasternum piceus with medial macula testaceous; texture glabrous with fine punctures medially, fine setae and dense punctuation laterally. Femora testaceous to aurantiacus. Elytra 16 to 17 mm (length/width ratio 2.8 to 2.9), subparallel on anterior third, then narrowing gradually to tip; color fulvus to testaceous with infuscate striae; texture glabrous, nitidus, striae and strial punctures shallow, intervals convex, intervals 3 (more than others), 5, and 7 more strongly convex and elevated; apices each bearing 1 spine. Abdomen testaceous to aurantiacus with sublateral piceus vittae; texture glabrous with fine punctures medially, fine setae and dense punctuation laterally. Female with 2 narrowly obovate foveae on posterior 2/3 of segment 5, anterior sclerite unarmed, lateral arms of anterior sclerite extending apically very little, median piece subequal in length to width of base.

Male not seen.

MATERIAL EXAMINED. Holotype, female: **COLOMBIA:** Magdalena, San Lorenzo, 41 km S Santa Marta, 700 ft, V-10-1973, Campbell & Howden (CNCI).

DIAGNOSIS. *Semiotus chassaini* is allied to *S. imperialis*, *S. cuspidatus*, *S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatius*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus*, and *S. chassaini* all bear a single spine at the center of the

frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. Of these 3 species, only *S. chassaini* bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear 2 small spines apically per elytron. The female foveae of *S. chassaini* occupy over half of sternite 5, the other 2 species have the foveae restricted to the apical fourth. *Semiotus chassaini* has 3 elytral intervals raised above the level of the other intervals; this is not the case in *S. imperialis* and *S. cuspidatus*. The other gibbous species (*S. gibbosus*, *S. fryi*, *S. girardi*, and *S. punctatostriatus*) all bear 2 spines along the anterolateral margin of the frons and lack a medial frontal spine. The anterior sclerite of the bursa copulatrix is unarmed in *S. chassaini* (Fig. 65) as it is in *S. gibbosus*, though the later species has longer lateral arms that curve further posteriorly (Fig. 62). The anterior sclerite in *S. punctatostriatus*, *S. imperialis*, and *S. cuspidatus* are all armed with several small dentitions (Figs. 38, 46, 48). *Semiotus chassaini* is presently known only from Colombia (Fig. 19). Of the related species, only *S. imperialis* and *S. punctatostriatus* are also known from Colombia (Figs. 6, 15). The combination of raised elytral interval 3, gibbous profile, and a single frontal spine distinguish *Semiotus chassaini* from all other *Semiotus*.

ETYMOLOGY. *Semiotus chassaini* is named in honor of Jacques Chassain.

Semiotus clarki n. sp.

(Figs. 2, 64, 215)

DESCRIPTION. Length 27 to 28 mm (length/width ratio 4.5 to 4.6). Head testaceous to aurantiacus with piceus maculae basally; texture glabrous with few long setae above eyes and spines, punctation scattered throughout becoming subumbilicate basally; front with 2 spines anterolaterally. Antennae serrate, 1 to 2 segments short of hind angles in females, segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, narrowing on anterior fifth, hind angles diverging; margin incressate without sulcus, anterior fifth very faintly explanate; color fulvus to luteus laterally, aurantiacus to testaceous medially, with 2 piceus sublateral vittae connected to margin by irregular piceus maculae near center of lateral margin; texture glabrous, nitidus with fine medium punctures scattered throughout becoming umbilicate anteriorly. Scutellum rufopiceus, subquadrate, anterior margin recurved. Prosternum very slightly concave in profile, prosternal process not divided at tip; color aurantiacus to sanguineus, piceus along suture; texture glabrous, nitidus medially with fine setae laterally and on lobe, punctation fine medially, much larger and umbilicate laterally. Hypomeron piceus along suture, luteus laterally; texture glabrous, nitidus

with fine punctation becoming obsolete laterally. Mesosternum aurantiacus to sanguineus medially, piceus laterally; texture glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum piceus. Metasternum aurantiacus to testaceous medially, piceus laterally; texture glabrous, nitidus with fine decumbent setae anterolaterally, punctation fine throughout. Femora testaceous to badius. Elytra 17 to 18 mm (length/width ratio 2.9 to 3.0), subparallel on basal half, then narrowing to tip; color luteus with intervals 1 (only along suture), 2, 4, 6, 8, and part of lateral margin piceus; texture glabrous, nitidus, striae, and strial punctures moderately to well defined; apices each bearing 1 spine. Abdomen testaceous to aurantiacus medially, fulvus to luteus laterally with sublateral vittae badius; texture glabrous, nitidus with fine decumbent setae on sternite 1, punctation dense and scattered throughout; female without foveae on sternite 5; anterior sclerite with lateral arms recurved apically, 2/3 length of median piece, serrate dentitions throughout.

Male not seen.

MATERIAL EXAMINED. Holotype, female: COLOMBIA: Valle del Cauca, W. Cordillera, Lake Colima, Río Bravo Valley nr Buga, 1180–2000 m, XII-1988 (PCCV).

DIAGNOSIS. *Semiotus clarki* is most closely allied to *S. limatus*, *S. badeni*, and the species in the *S. angulatus* group. It can be separated from these species by the pattern of the elytral vittae and by the shape of the antennae. *Semiotus limatus* bears 2 dark vittae per elytron (1 sutural and 1 marginal). *Semiotus badeni* bears 4 dark vittae, 1 sutural, 1 marginal, and 1 each on intervals 4 and 6 (Fig. 207). *Semiotus clarki* bears dark vittae on intervals 2, 4, 6, 8, and part of the lateral margin (Fig. 215). The antennae in *S. clarki* are serrate (as in Fig. 165). In the *S. angulatus* group they are pectinate to subpectinate (Figs. 166, 167). The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus*, and the lateral arms are undivided and curve posteriorly nearly as far as the median piece (Fig. 78). In *S. clarki*, the median piece bears only a pair of dentitions (Fig. 64). In *S. badeni* the median piece is unarmed apically, and the lateral arms extend posteriorly less than half the length of the median piece (Fig. 75). The lateral arms of the anterior sclerite in the *S. angulatus* group are divided distally (Figs. 41, 43–45). Similarity occurs between *S. clarki*, *S. melleus*, and *S. bispinus*, which also have 2 frontal spines and 4 or 5 dark elytral vittae. These species lack the dark lateral pronotal macula of *S. clarki* that extends from the discal vittae (Fig. 215). *Semiotus bispinus* is presently known from Ecuador, whereas *S. melleus* is known from Venezuela.

Semiotus clarki is known only from Colombia (Fig. 2).

ETYMOLOGY. *Semiotus clarki* is named in honor of Shawn M. Clark, Brigham Young University.

Semiotus colombianus n. sp.
(Figs. 7, 81, 232)

DESCRIPTION. Length 23 to 26 mm (length/width ratio 4.3 to 4.6). Head piceus basally, spines luteus to aurantiacus; with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae on frons, punctation deep and scattered throughout; ocular index 71.0 to 74.0. Antennae serrate, reaching hind angles in females; segments 1 to 2 fulvus, segments 3 to 11 piceus. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.3), sinuate, hind angles moderately divergent; margin incrassate becoming explanate on anterior fifth, sulcate only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median vitta aurantiacus to sanguineus, with 2 broad sublateral piceus vittae extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally. Scutellum suborbicular, anterior margin recurved, fulvus with obscure borders. Prosternum slightly concave in profile, prosternal process not divided at tip; color fulvus to testaceus medially with piceus vitta along suture; texture with few long erect setae scattered throughout with fine dense decumbent setae laterally, punctation fine medially, dense laterally. Hypomeron fulvus with piceus vitta along suture; texture of fine decumbent setae and fine punctation becoming denser along suture. Mesosternum fulvus to testaceus, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum fulvus to testaceus. Metasternum glabrous with fine punctation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceus medially, with piceus medial stripe and anterolateral areas. Femora fulvus to testaceus. Elytra 16 to 18 mm (length/width ratio 3.0 to 3.2), subparallel on anterior third to half before narrowing to tip; color fulvus to luteus with badius to piceus irregular vittae along each stria; texture glabrous, nitidus, striae and stria punctures obscure to obsolete; apices each bearing 1 spine. Abdomen aurantiacus to testaceus with sanguineus to badius sublateral vittae; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female with 2 elliptical foveae on posterior 3/5 of sternite 5; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece, and bearing several dentitions along inner surface.

Male unknown.

MATERIAL EXAMINED. Holotype, female: COLOMBIA: Cundinamarca, Choachi, 1943, F.R. Fosberg (USNM); Paratypes: COLOMBIA: Antioquia, Medellín, VII-1879 (1, NHMW); Capital District: Bogotá (CMNH); Cundinamarca, Fusagasuga, alt. 1746, II-18-40, F. Jotoya (1, USNM); illegible label (1, CNCI); No Data (1, OXUM); ECUADOR: Napo, vic. Cosanga, 2050 m, IX-(17-30)-1996, E. Giesbert (1, FSCA); 2 km S Oritoyacu, 20 km S Baeza, 1500 m, III-(4-5)-1976, J.M. Campbell (1, NHMW).

DIAGNOSIS. *Semiotus colombianus* is most closely allied to *S. angustus* and *S. perangustus* and the other species with 3 frontal spines, pale elytra, and infuscate striae (including *S. cristatus*, *S. auripilis*, and *S. linnei*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* similarly have pale elytra with infuscate striae but have glabrous pronota. The pronota in the other species are covered with dense setae. *Semiotus auripilis* is unique among these species in having strongly convex elytral intervals. The intervals are flat or nearly flat in the other related species. *Semiotus cristatus* and *S. linnei* are similar to *S. colombianus* but can be separated by the relatively darker striae and by the smaller female foveae. In *S. cristatus* and *S. linnei* the striae generally range in color from sanguineus to badius and contrast somewhat with testaceus to aurantiacus interstriae. In *S. colombianus* the striae are generally piceus and contrast strongly with the fulvus to luteus interstriae. The female foveae are restricted to the apical half of sternite 5 in *S. cristatus* and *S. linnei*. In *S. colombianus* they extend anteriorly onto the basal half. *Semiotus colombianus* is larger (apparently over 22 mm long) than *S. angustus* and *S. perangustus* (both less than 21 mm). The anterior sclerite of the bursa copulatrix bears a convex extension along the anterior margin in *S. colombianus* (Fig. 81). In *S. angustus* and *S. perangustus* the anterior margin is evenly convex (Figs. 71, 72). The median arm of the anterior sclerite is shorter in *S. colombianus* (less than 2 times the length of the lateral arms) than in *S. cristatus* and *S. linnei* (both over 2 times longer than the lateral arms). *Semiotus colombianus* is known only from Colombia. *Semiotus angustus* is known from Bolivia and Peru. *Semiotus perangustus* is known from Ecuador.

ETYMOLOGY. *Semiotus colombianus* is named after Colombia, the country of primary provenance.

Semiotus cristatus Candèze
(Figs. 3, 80, 129, 144, 231)

Semiotus cristatus Candèze 1874:182, Szombathy 1909b:121, Fleutiaux 1891:275 (Holotype: BMNH; type locality: Venezuela (an invalid "Lectotype" exists in the MNHN on loan from the BMNH from Colombia)).

DESCRIPTION. Length 22 to 31 mm (length/width ratio 4.0 to 4.5). Head piceus; with 3

testaceus to aurantiacus frontal spines subequal in length; texture of fine pale decumbent setae and long erect setae over eyes and spines, punctation deep with punctures separated by about width of punctures; ocular index 70.0 to 73.0. Antennae serrate, reaching beyond hind angles by 0 to 1 segments; segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 8 mm (length/width ratio 1.0 to 1.2), narrowly sinuate; margin sulcate on anterior third to half, thickly rounded posteriorly, with elevated thickening above margin on anterior half; disk with 2 large piceus subrectangular maculae, interrupted medially by sanguineus longitudinal vitta, anterior border, and margins aurantiacus to sanguineus; texture glabrous medially with thick pile laterally, punctation fine and moderately dense medially, deep and often contiguous laterally. Scutellum testaceus, chordate, and glabrous or with few scattered punctures. Prosternum nearly straight with lobe descending ventrally; color sanguineus to piceus medially, lobe aurantiacus, with or without lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron aurantiacus, lateral areas glabrous with moderately dense pile along suture. Mesosternum piceus laterally, fossa sanguineus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum testaceus. Metasternum piceus with or without badius vittae on each side of median piceus area, glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora testaceus to aurantiacus. Elytra 15 to 22 mm (length/width ratio 2.7 to 3.1), nearly parallel-sided on anterior 2/3 then narrowing evenly to apex; color fulvus with striae surrounding scutellum infuscate; apices subspinose. Abdomen sanguineus to badius medially, becoming rufopiceus, margin lighter; setae scattered throughout except median area, punctation fine medially, deeper laterally; female foveae on segment 5 elliptical on apical half; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece and bearing several dentitions along inner surface. Male with parameres broad, 2.5 times longer than wide, lateral blades 0.35 to 0.38 length of parameres.

MATERIAL EXAMINED. COLOMBIA: (MNHN); VENEZUELA: Federal District, Las Trincheras, VI-6-22, L.R. Reynold (FMNH); Mérida, Anden, Umg. Hotel de los Frailes, 2600 m, Franz (PCCV); La Culeta, Valle Grande, 2800 m, VI-30-1991, L. Stange & C. Porter (FSCA); Mérida, S. Briceno (USNM); Mérida, 18.5 km NE Páramo la Culata, 2950 m, V-25-1998, J. Ashe, R. Brooks, R. Hanley (SEM); Mucubajá, 2400 m, VII-23-1988, C. Porter & L. Stange (FSCA); P.N. Sierra Nevada, trail between L. Mucubajá & L. Negra, 3500 m. VI-4-1988, A.L. Norrbom & G.J. Steck (USNM); Nueva

Esparta, La Asunción (USNM); Zulia, Maracaibo (ZMUC); State unknown, Caracas Valley, V-6-22, L.R. Reynold (FMNH).

DIAGNOSIS. *Semiotus cristatus* is most closely allied to *S. perangustus*, *S. linnei*, *S. colombianus*, and *S. angustus*. Overall similarities also exist with *S. auripilis*. These species have 3 frontal spines and pale elytra with infuscate striae. *Semiotus auripilis* is readily separated from *S. cristatus* by the strongly convex elytral intervals. The intervals in *S. cristatus* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of the other related species, not extending forward beyond the length of the medial spine (Fig. 144). The lateral spines in the other species are much longer than the medial spine (as in Fig. 142). The 2 piceus pronotal vittae in *S. cristatus* are nearly linear and approximate, the area between being narrow and parallel-sided. In *S. linnei* and *S. colombianus*, these vittae are arcuate medially. The anterior sclerite of the bursa copulatrix is more heavily armed in *S. cristatus* than in *S. linnei* and *S. colombianus*. *Semiotus cristatus* has dentitions all along the posterior margin of the lateral arms extending onto the median piece (Fig. 80). In *S. colombianus* the dentitions do not extend to the apex of the lateral arms (Fig. 81). In *S. linnei* the median piece is without dentitions (Fig. 82). The aedeagus is narrow in *S. linnei* (Fig. 130) with the base of the parameres approximately as wide as the parameres across the apical blades. In *S. cristatus* the base of the parameres is wider than the aedeagus at the widest point of the apical blades (Fig. 129).

Semiotus decoratus (Dejean)

(Figs. 13, 74, 143, 175, 224)

Pericallus decoratus Dejean 1836:96. (Type: not found; type locality: ?).

Semiotus decoratus, Candèze 1857:306, Candèze 1874:174 (3 specimens labeled "Syntypes" exist in the BMNH from Cayenne; types invalid).

Semiotus approximatus Candèze 1857:305, Candèze 1874:174, Chassain 2002b (Holotype, male: BMNH; type locality: Cayenne).

DESCRIPTION. Length 25 to 27 mm (length/width ratio 5.0 to 5.2). Head testaceus to aurantiacus with piceus maculae basally; texture glabrous with a few setae above eyes and spines, punctation fine and scattered throughout becoming umbilicate basally; front with 2 spines anterolaterally, with area between sharply angled. Antennae serrate, 3 segments short of hind angles (in females), with segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 6 to 7 mm (length/width ratio 1.5 to 1.6), narrowly sinuate, narrowing anteriorly, hind angles divergent; margin incassate on posterior 2/3, declivous, sulcate and explanate on anterior third; color fulvus to testaceus with median vitta and lateral

maculae piceus; texture glabrous with punctation fine and evenly scattered throughout except for a few fine, often umbilicate punctures along anterior margin. Scutellum piceus, broadly subchordate. Prosternum concave in profile; color fulvus to testaceus; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvus to testaceus with small piceus macula on lateral border extending from dorsum; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvus to testaceus and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum fulvus to testaceus. Metasternum fulvus to testaceus; texture glabrous with very fine punctures scattered throughout; metepimeron fulvus to piceus. Femora fulvus to testaceus throughout. Elytra 16 to 18 mm (length/width ratio 3.3 to 3.4), subparallel on anterior third, evenly narrowing to tip; color fulvus to testaceus with badius to piceus markings along suture and lateral margin becoming wider apically; texture glabrous with striae and stria punctures fine to obsolete, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceus; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with 2 obovate foveae on posterior 2/3 of sternite 5; anterior sclerite with lateral arms curved mesially, bearing fine dentitions apically, extending distally approximately 3/4 length of median piece.

Male not seen.

MATERIAL EXAMINED. BRAZIL: Amazonas, Santarem (CMNH); Estirao do Ecuador, Río Jaurai, X-1979, M. Alvarenga (CNCI); COLOMBIA: Department unknown, Umbria, Guines Fluss (CUIC); FRENCH GUIANA: Bas Maroni, Le Moul (MNHN); Maroni (MNHN); St. Laurent, Maroni, Audouit, 1862 (MNHN); GUYANA: Mazaruni-Potaro, Takutu Mountains, 6°15'N, 58°55'W, XII-8-1983, W.E. Steiner (USNM); SURINAM: District Brokopondo, Brownsberg Nature Reserve, Mazaruni plateau, 500 m, III-4-1986 (CASC); VENEZUELA: Orinoco River, LeMoult (MNHN).

DIAGNOSIS. *Semiotus decoratus* is most closely allied to *S. affinis*, *S. intermedius*, and *S. lafertei*. *Semiotus illustris*, though not phylogenetically related, is superficially similar. All of these species have 2 dark vittae on the elytra (1 sutural and 1 marginal) that converge near the apex. These species also have 2 stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with 2 frontal spines and those with 3. *Semiotus decoratus* is readily distinguished from the other related species by the single pronotal vitta (Fig. 224). The other related species have 2 pronotal vittae (Figs. 219–221, 223). In *S. decoratus* (and *S.*

illustris) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. The other related species have pronounced black vittae on the abdomen and metepimera. In addition to the pronotal vitta, *S. decoratus* can be separated from *S. illustris* by the darker antennae and the shape of the anterior sclerite of the bursa copulatrix. In *S. illustris* the antennae are all testaceus to aurantiacus. (In *S. decoratus*, segments 4 to 11 are dark brown to black.) The anterior sclerite in *S. decoratus* bears 2 stout dentitions near the base of the lateral arms, the lateral arms themselves bearing sharp dentitions only near the apex (Fig. 74). In *S. illustris*, the lateral arms do not bear dentitions apically, but rather medially, and the base is unarmed (Fig. 85). *Semiotus decoratus* can be separated from all other *Semiotus* by the 2 converging piceus vittae on each elytron, the stout frontal angles with the broadly angulate median area between, and the completely pale venter.

REMARKS. The holotype of *S. approximatus* is the same species as the types of *S. decoratus*. This synonymy has been recognized by Chassain (2002b).

Semiotus exsolutus Candèze

(Figs. 4, 89, 131, 178, 239, 240)

Semiotus exsolutus Candèze 1900:82 (Holotype: ISNB; type locality: Colombia).

Semiotus superbus championi Chassain 1998:77 (Holotype: MNHN; type locality: Panama). New synonym.

Semiotus superbus panamensis Chassain 1998:77 (Holotype: MNHN; type locality: Panama). New synonym.

DESCRIPTION. Length 19 to 26 mm (length/width ratio 4.4 to 4.9). Head testaceus to aurantiacus with triangular piceus macula narrowing anteriorly; bearing 3 spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally; ocular index 73.0 to 75.0; spines 0.30 length of frons. Antennae serrate, reaching hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 4 to 7 mm (length/width ratio 1.2 to 1.4), with sides arched, hind angles divergent, anterolateral angles impressed, margin thinly rounded, without sulcus; color fulvus laterally with broad piceus vitta extending from base to apex (or with 2 narrower vittae sublaterally or with sanguineous vitta separating 2 piceus vittae); texture glabrous with fine punctures scattered throughout. Scutellum rufopiceus to piceus, subchordate. Prosternum slightly concave in profile; color aurantiacus to sanguineus with lobe and lateral area testaceus to aurantiacus, suture with piceus vitta; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypo-

meron fulvus with suture piceus; texture glabrous with fine punctation scattered throughout, becoming denser toward suture. Mesosternum fulvus to testaceous with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum fulvus to testaceous with obscure margins. Metasternum testaceous to aurantiacus with piceus line medially and along lateral margin; texture with very fine setae scattered medially, becoming denser laterally, punctation very fine medially, denser laterally; metepimeron piceus. Femora testaceous to badius. Elytra 13 to 18 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus with 5 (including sutural vitta) piceus vittae; striae fine to obsolete, stria punctures shallow to barely impressed, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceous laterally, testaceous to aurantiacus medially with piceus sublateral vittae laterally; texture with few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with 2 elliptical foveae on apical half of sternite 5; anterior sclerite strongly convex across lateral arms, median piece 2 times as long as lateral arms. Male with parameres narrow medially, lateral blades narrow, 0.32 to 0.34 length of parameres.

DIAGNOSIS. *Semiotus exsolutus* is most closely allied to *S. superbus*, *S. taeniatus*, and *S. intermedius*. It can be separated from these species by the lack of sulci along the lateral margin of the pronotum and by the elytral color patterns. *Semiotus exsolutus* lacks lateral pronotal sulci, the other 3 species have short sulci in the anterior third of the lateral pronotal margin. *Semiotus intermedius* has 2 dark vittae per elytron (1 marginal and 1 sutural), and *S. taeniatus* has 3 vittae per elytron. Both *S. exsolutus* and *S. superbus* have at least 4 dark vittae per elytron. Several species have alternating light and dark elytral vittae and glabrous pronota similar to *S. exsolutus* and *S. superbus*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. exsolutus*, the elytral vittae cover alternating intervals with intervals 1 and 2 being of 2 contrasting colors. This same pattern is evident in *S. acutus*, *S. germari*, *S. kirschi*, and *S. illigeri*. The last 3 of these species have a short marginal sulcus (not extending onto the posterior half). *Semiotus exsolutus* can be separated from *S. acutus* (both lacking pronotal sulci) by the presence of stria punctures (which are nearly obsolete in *S. acutus*) and by the thinner (occasionally single) pronotal vittae (Fig. 240). In *S. acutus*, the pronotal vittae are wider (Fig. 243). The anterior sclerite of the bursa copulatrix differ in these species. In *S. acutus*, the series of dentitions along the posterior border extend nearly to the tip of the lateral arms

(Fig. 70). In *S. exsolutus*, the dentitions are clustered around the median piece (Fig. 89).

MATERIAL EXAMINED. COSTA RICA: Alajuela, Poás, Vara Blanca 1700, III-15-1932, H. Schmidt, F. Neverman (USNM); Cartago, Chitaria, VI-19-1967, Flint & Ortiz (USNM); Grano de Oro, Chirripó, 1120 m, IX-1993, P. Campos (INBC); Guayabillos, SW Aohang, Vulkan Irazu, 1500–2000 m (USNM); Q. Segunda, P.N. Tapantí, 1300 m, X-1993, G. Mora (INBC); Río Aiquares nr Santa Cruz, 1500 m, 9 km NW Turrialba, V-15-1985 (EMEC); Río Dos Amigos, P.N. Tapantí, 1500 m, XI-1994, R. Delgado (INBC); Río Navarro, V-1937 (USNM); Sector La Represa beginning of Sendero to Rancho Negro, 1700 m, III-1997, R. Delgado (INBC); Vulcan Turrialba, 3000 m, A. Smith, XI-32, on tree stump, F. Neverman (USNM); Westabhang, Vulkan Irazu, 1800–2000 m, IV-30-26, T. Assmann, F. Neverman (USNM); ibid. III-11-28; ibid. (I-III)-35; ibid. V-9-26; Chiriquí, Hartman Café Finca, Ojo de Agua, 4650 ft, VI-14-1993, S. Lingafelter, at light (SEMC); Guanacaste, Derrumbe, Est. Mengo, 1400 m, W side Volcán Cacao, VII-11-1988, Janzen & Hallwachs (INBC); Río San Lorenzo, 1050 m, Tierras Morenas, Z.P. Tenorio, (III-23)-(IV-21)-1992, A. Marin (INBC); Heredia, Braulio Carrillo, San Rafael, VIII-12-1984 (INBC); Limón, Valle del Silencio, 2200 m, IX-10-1984, A. Solis (INBC); Puntarenas, Buen Amigo, San Luís, Monteverde, 1000–1350 m, III-1995, Z. Fuentes (INBC); Buenos Aires, La Amistád, Sector Altamira, XI-1993, R. Delgado (INBC); Catarata, 4.5 km NE Cerro Pittier, 1300–1360 m, VII-13-1996, M. Moraga (INBC); Cerro Amigos, 1820 m, III-23-1998, Z. Fuentes & F. Alvarado (INBC); Cerro Biolley, Buenos Aires, 1766 m, III-(5-9)-1996, R. Villalobos (INBC); Cerro Frantzus, 2134 m, (IV-24)-(VI-8)-1997, R. Villalobos, Malaise trap (INBC); Cloud Forest Reserve Monteverde, 1450 m, V-(18-19)-1985, J. Doyen (EMEC); Cotoncito, 3.5 km N Lucha, 1600 m, V-(13-16)-1997, A. Picado & A. Solis (INBC); Est. Biol. Las Alturas, 1500 m, Coto Brus. (III-23)-(V-2)-1992, F. Araya (INBC); Est. La Casona, R.B. Monteverde, 1500 m, VI-1991, N. Obando (INBC); Est. Pittier, Sendero a Río Canasta, 1750–1850 m, IV-(5-10)-1997, M. Moraga, beating sheet (INBC); Fila Cruces, Laguna Gamboa, 1400 m, V-20-1996, I.A. Chacón (INBC); Finca Cafrosa, Est. Las Mellizas, P.N. Amistád, 1300 m, (VI-19)-(VII-26)-1990, R. Delgado (INBC); Las Alturas (San Vito), 1500 m, V-9-1996, E. Giesbert & H. Lezama (FSCA); Monteverde, 35 km N Puntarenas, VII-22-1987, J. Brambila (FSCA); Monteverde, II-26-19987, E. Giesbert (FSCA); ibid., IV-(19-26)-1988; Monteverde, 1500 m, V-(11-13)-1996, E. Giesbert (FSCA); Monteverde area, VI-(4-6)-1980, J.E. Wappes (JEWG); Monteverde, Camino a San Luís, 900 m, VI-1991, M.A. Zumbado (INBC); Monteverde, 1500 m, VI-3-

1972, C. Guindon (CASC); Monteverde Res., 1500 m, VIII-(17-18)-1987, H&A Howden (CMNC); Monteverde Res., 1400 m, VIII-21-1987, H&A Howden (CMNC); Monteverde area, VI-6-1973, 1400–1700 m, Erwin & Hevel Central American Expedition, 1973 (USNM); Monteverde, 1600 m, V-2-1974, P. Opler (EMEC); Monteverde Reserve 1500 m, V-29-1979, H. & A. Howden (CNCI); Monte Verde de Guanacaste, Powell's Place, 1560-m elev., IV-16-76, A.H. Powell (MTEC); San Luís, Monteverde, 1000–1350 m, I-1995, Z. Fuentes (INBC); Sitio Coto Brus, 2.6 km ENE Cerro Bellavista, 1800–1900 m, III-22-1996, E. Navarro (INBC); Las Alturas, 1500 m, 8.95°N, 82.83°W, VI-(9-10)-1998, B. Brown & V. Berzovsky (LACM); Monteverde, IV-23-1991, E. Giesbert (LACM); San Vito de Java (6 mi. S), VIII-14-1967, R.W. McDiarmid (LACM); San José, Est. Cueici, Sendero al Mirador, 4.6 km E Villa Mills, 2640 m, III-(17-22)-1996, B. Gamboa, at light (INBC); Est. Las Nubes de Santa Elena, Sendero el Llano, 1900 m, X-2-1995, E. Alfaro (INBC); F. Cementario de la Máquina, 2100–2500 m, P.N. Chirripó, III-2-1993, M. Zumbado (INBC); Finca Zacatales, 2100 m, VIII-(8-10)-1995, M.A. Zumbado (INBC); Pico Blanco, 1500 m, III-6-1991, H&A Howden (CMNC); 3 km S San Antonio de Escazú, 1700 m, VI-26-1988, W.T. Wcislo (SEMC); San Gerardo de Dota, 2000–2500 m, II-(22-26)-1992 (INBC); San Isidro, 9.37°N, 83.70°W, VI-(20-23)-1974, J.P. Donahue, malaise (LACM); 15 km N San Ysidro, V-24-1985 (EMEC); Province unknown, Coronado, 1400–1500 m, X-15-23, F. Neverman (USNM); La Palma, 1500 m, II-7-24, F. Neverman (USNM); La Palma, 4800 ft, E. Fernandez (USNM); Matina, Waldeck Farm (NHMW); PANAMA: Chiriquí, Cerro Punta, IV-1940 (OSUC); Cerro Punta, 8000 ft, VII-(18-24)-1961, J.W. Campbell (CNCI); Cerro Punta, 5300 ft, V-1961, C.E. Yunker (CNCI); Cerro Rando, 1535 m, V-24-1973, G. Ekis (USNM); Fortuna, 82°15'W, 8°44'N, V-18-1978, O'Brien & Marshall (CNCI); Hartmanns Finca, V-(18-20)-1996, Wappes, Huether, Morris (JEWG); Hartmanns Finca, VII-(4-7)-1997, Wappes & Morris (JEWG); Las Lagunas, 1360 m, 4 km W Hato del Volcán, V-(22-23)-1977, H. & A. Howden (CNCI); Potrerillos, (IV-28)-(V-8)-1933 (CASC); *ibid.*, I-25-1935; Volcán Baru, VII-11-1981, B.K. Dozier (FSCA); Volcán de Chiriquí (NHMW); 2.5 km W Cerro Punta, 8°51'N, 82°36'W, 1720 m, III-28-1975, H. Stockwell (CNCI); 2 km W Cerro Punta, 1700 m, (V-19)-(VI-8)-1977, S. & J. Peck & H. Howden (CNCI); 12 km NE Santa Clara, Cerro Pando, 8°54'73"N, 82°43'29"W, 1850 m, VI-18-1996, R. Anderson, oak forest (CMNC); (CUIC).

REMARKS. *Semiotus s. panamensis* and *S. s. championi* are here regarded as synonyms of *S. exsolutus*. Chassain (1998) recognized *S. s.*

panamensis and *S. s. championi* as subspecies of *S. superbus*. (Chassain refers to these forms as "varieties," although he uses this term to imply taxonomic validity in the sense of subspecies.) In the first couplet of Chassain's (1998) key to subspecies of *S. superbus*, he uses the character of the marginal sulcus of the pronotum to separate *S. s. superbus* and *S. s. kirschi* from *S. s. panamensis*, *S. s. reductus*, and *S. s. championi*. This study recognizes the importance of the marginal sulcus as delimiting these species. The 2 subspecies of Chassain were based on color patterns on the pronotum. *Semiotus s. panamensis* was characterized by a pronotum with 2 black vittae separated by a red to yellow pattern. *Semiotus s. championi* was characterized by a single broad black vitta on the pronotum. Of the several dozens of specimens evaluated in this study, no defining geographical boundaries could be determined to separate these 2 forms. Both could be found in the same or proximate localities.

Semiotus fascicularis Candèze

(Figs. 22, 214)

Semiotus fascicularis Candèze 1857:309, Candèze 1874:175 (Type: not found; type locality: Colombia).

Semiotus multifidus Candèze 1874:181–182, Steinheil 1875:112 (Syntype (1): BMNH; type locality: Colombia). New synonym.

DESCRIPTION. Length 19 mm (length/width ratio 4.5). Head aurantiacus to testaceous, front with 2 spines anterolaterally; texture mostly glabrous with a few erect setae above eyes and spines, punctation broad, shallow, and often umbilicate; ocular index 72.0 to 74.0; frontal spines approximately 0.39 length of frons. Antennae serrate, extending to or just short of (less than 1 segment) hind angles; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Pronotum 5 mm (length/width ratio 1.2), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles diverging, disk concave with lateral depressions sublaterally on posterior 2/3 to 3/4, margin becoming increasingly incrassate posteriorly, without sulcus; color aurantiacus to testaceous (becoming lighter near hind angles); texture glabrous, nitidus, with few shallow punctures throughout, becoming umbilicate anteriorly. Scutellum subquadrate with rounded posterior border, anterior border incised; color testaceous to piceus. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to testaceous; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker laterally. Hypomeron fulvus to testaceous; texture glabrous with very fine punctures scattered throughout, or punctures obsolete. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense

setae and fine punctures. Mesepisternum fulvus to testaceus. Metasternum fulvus to testaceus, glabrous, with very fine punctation throughout. Femora testaceus to aurantiacus. Elytra 12 mm (length/width ratio 2.9), subparallel on anterior fourth then narrowing to tip; base color fulvus to luteus with intervals (on posterior half to 2/3) 1, 2, 4 (and 5 posteriorly), 6, 8, and 9 piceus; texture glabrous, nitidus with striae and strial punctures faint to obsolete, intervals 4 and 6 confluent apically forming a V-shaped pattern; apices each bearing 1 spine. Abdomen fulvus laterally, testaceus to aurantiacus medially, with 2 sublateral obscure vittae; texture glabrous or with few scattered setae basally and apically, sternite 1 with or without patch of fine decumbent setae anteriorly, punctation very fine and scattered throughout; female without foveae or with 2 very fine, small, and shallowly ill-defined foveae restricted to anterior third of sternite 5; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

MATERIAL EXAMINED. BOLIVIA: La Paz (BMNH); COLOMBIA: Capital District, Bogotá (ISNB); Valle del Cauca, Darien, H. Hodge, 1909 (BMNH); VENEZUELA: Miranda, Panaguire, IV-23-1981, C.L. Hogue (LACM); Los Camales, G. Vivas (USNM).

DIAGNOSIS. *Semiotus fascicularis* is most closely allied to *S. melleus*, *S. trinitensis*, and *S. kondratieffi*. It is also similar to *S. badeni*, *S. bispinus*, and *S. clarki*. The elytra of *S. badeni* and *S. fascicularis* each bear a sutural, a marginal, and 2 discal vittae per elytron. The discal vittae occupy intervals 4 and 6. Interval 2 is pale. These discal vittae occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* and *S. kondratieffi* each elytron bears a marginal, a sutural, and a single dark discal vitta extending from the humeral angles to near the elytral apices. *Semiotus trinitensis* bears only 2 dark vittae per elytron (1 sutural and 1 marginal). The frontal margin in *S. kondratieffi* bears 2 angles anterolaterally. Spines are absent. The frontal margin in *S. fascicularis* is bispinose.

REMARKS. The type of *S. fascicularis* has not been found, but Candèze's description is clear on important characteristics including 2 frontal spines, the bifid (divided) discal vitta of the elytra, and the absence of female foveae. Candèze later described *S. multifidus* and distinguished it from *S. fascicularis*, and other species, by the larger division of the discal vitta (appearing as 2 vittae instead of the single Y-shaped vitta of *S. fascicularis*). This distinction is not consistent.

Several intermediate forms of these patterns were examined.

Semiotus flavangulus Candèze
(Figs. 22, 218)

Semiotus flavangulus Candèze 1900:82 (Holotype: ISNB; type locality: Colombia).

DESCRIPTION. Length 24 to 26 mm (length/width ratio 4.5 to 4.6). Head aurantiacus to sanguineus apically, piceus basally; texture glabrous, nitidus with few setae over eyes and spines, punctation scattered throughout, larger basally; front with 2 spines anterolaterally; ocular index 62.0 to 64.0. Antennae serrate, 0 to 1 segments short of hind angles, segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 5 to 6 mm (length/width ratio 1.0 to 1.2), narrowly sinuate, hind angles diverging; margin narrowly incrassate, faintly sulcate on anterior third; color sanguineus, front angles testaceus to aurantiacus, hind angles luteus, with 2 median vittae and medial area of lateral margin piceus; texture glabrous, nitidus with fine medium punctures scattered throughout. Scutellum piceus, anterior margin recurved and dropping below level of scutellar disk. Prosternum very slightly concave in profile, prosternal process not divided at tip; color sanguineus, testaceus to aurantiacus anteriorly, suture piceus; texture with scattered setae and punctures becoming denser laterally. Hypomeron fulvus to testaceus laterally, piceus along suture, with piceus dorsal maculae extending onto hypomeron from above; texture glabrous, nitidus laterally with fine setae and punctation along suture. Mesosternum badius to sanguineus medially, piceus laterally; texture glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum piceus. Metasternum piceus with paler maculae in some specimens; texture glabrous, nitidus medially, with long setae and very fine punctation laterally. Femora testaceus to aurantiacus. Elytra 16 to 18 mm (length/width ratio 3.0 to 3.2), subparallel on basal third, then narrowing to tip; color fulvus to luteus with striae and lateral margin piceus; texture glabrous, nitidus; apices each bearing 1 spine. Abdomen piceus medially, luteus laterally; texture glabrous, nitidus medially with long setae and very fine punctation laterally. Male with parameres thickened on basal half, blades small, approximately 0.20 length of parameres.

MATERIAL EXAMINED. COLOMBIA: (ISNB). *Semiotus flavangulus* is known only from the type.

DIAGNOSIS. *Semiotus flavangulus* is most closely allied to *S. bispinus*. It is also similar to the species with pale elytra and infuscate striae. *Semiotus flavangulus* bears 8 to 9 dark elytral vittae. Each vitta occupies a stria (Fig. 218). The intervals are pale. In *S. bispinus*, alternating

elytral intervals are dark (Fig. 219). Several species have pale elytra and infusate striae similar to *S. flavangulus*, including *S. linnei*, *S. cristatus*, *S. buckleyi*, *S. reaumuri*, *S. glabricollis*, *S. angustus*, *S. colombianus*, *S. perangustus*, *S. punctatostriatus*, and *S. girardi*. All but the last 2 of these similar species have 3 frontal spines. *Semiotus flavangulus*, *S. punctatostriatus*, and *S. girardi* all have 2. The profile of *S. flavangulus* is linear, with the widest portion of the body occurring across (or at) the anterior third of the elytra (as in Fig. 28). In *S. punctatostriatus* and *S. girardi*, the profile is gibbous, with the widest portion on the body occupying the anterior fifth of the elytra (as in Fig. 29).

Semiotus fleutiauxi Szombathy

(Figs. 22, 77, 211)

Semiotus fleutiauxi Szombathy 1909a:24 (Holotype, female: HNHM; type locality: Peru, Marcapata).

DESCRIPTION. Length 18 to 22 mm (length/width ratio 4.8 to 4.9). Head aurantiacus, front with 2 spines anterolaterally; texture mostly glabrous with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 69.0 to 72.0. Antennae serrate, roughly 1 segment short of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.2), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles expanding, disk concave with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth, becoming explanate, broadly rounded without sulcus on posterior half; color aurantiacus to sanguineus, with narrow piceus vitta extending from base to near anterior border; texture glabrous, nitidus with moderately deep punctures scattered throughout becoming deeper anteriorly. Scutellum aurantiacus to piceus, wider than long, curved ventrally on anterior fourth, anterior margin recurved medially. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to sanguineus; texture glabrous, nitidus with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker and umbilicate laterally. Hypomeron aurantiacus; texture glabrous, nitidus with very fine punctures or with punctures obsolete. Mesosternum aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum badius to piceus. Metasternum aurantiacus medially, testaceus to badius laterally; texture glabrous, nitidus with very fine punctation throughout. Metepimeron testaceus to badius. Femora testaceus to aurantiacus. Elytra 12 to 15 mm (length/width ratio 3.3 to 3.4), subparallel on anterior third then narrowing

to tip; color aurantiacus to sanguineus basally, apical half of interval 7 and all of interval 3 luteus to aurantiacus, intervals 1, 2, 4, 5, 6, 8, and 9 sanguineus to rufopiceus on apical half, blending into aurantiacus coloration of basal half; texture glabrous, nitidus with striae and strial punctures fine to obsolete; apices each with 1 point. Abdomen aurantiacus medially, fulvus laterally, with 2 sublateral obscure vittae; texture glabrous, nitidus with very fine punctures throughout, sternite 1 with fine setae and dense punctation; female without foveae on sternite 5; anterior sclerite with lateral arms angled basally, extending apically 3/4 as far as median piece, bearing 3 to 4 dentitions along inner surface of each arm.

Male not seen.

MATERIAL EXAMINED. PERU: Cuzco, Marcapata (HMNH); Junín, Chanchamaya, 1-2-1969, J. Schunke (CNCI).

DIAGNOSIS. *Semiotus fleutiauxi* is most closely allied to *S. badeni*, *S. fulvicollis*, *S. bispinus*, and *S. flavangulus*. It is distinguished from these species by the orange to deep red elytra with a pale yellow vitta on the disk (Fig. 211). The elytra in the other species are pale brown to yellow with dark vittae. The anterior sclerite of the bursa copulatrix in *S. fleutiauxi* (Fig. 77) is similar to that of *S. fulvicollis* (Fig. 50) and *S. melleus* (Fig. 73). In all of these species, the anterior margin is angled at the point where the lateral arms are directed posteriorly. In *S. fleutiauxi* the median piece is unarmed and only slightly longer than the lateral arms. In *S. melleus*, the median piece is likewise unarmed but is nearly twice as long as the lateral arms. The anterior sclerite in *S. fulvicollis* has the median piece strongly dentate to spinose. *Semiotus schaumii* and *S. pectitus* have deep red elytra similar to those of *S. fleutiauxi* but lack frontal spines. Also, the elytral intervals in *S. pectitus* are strongly convex. In *S. fleutiauxi* and *S. schaumii*, the intervals are flat, or nearly so.

Semiotus formosus Janson

(Figs. 22, 51, 95, 150, 165, 170, 253)

Semiotus formosus Janson 1882:34, Fleutiaux 1925:109 (Syntypes (2): BMNH; type locality: Ecuador, Chiguinda).

DESCRIPTION. Length 25 mm (length/width ratio 4.1 to 4.2). Head piceus with sanguineus macula on anterior border; anterolateral areas angled, without spines; texture with few scattered setae, punctures fine becoming larger and denser basally. Antennae serrate, piceus, just short of hind angles in females, extending to or just beyond hind angles in males. Pronotum 6 mm (length/width ratio 1.0), with lateral margin rounded, hind angles diverging on basal sixth, disk convex, merging into lateral foveae mesad of lateral margin; margin thickly rounded without sulcus; color piceus with aurantiacus maculae on anterior angles and on basal half of margin, disk

with sanguineus fusiform macula; texture with fine scattered setae throughout with fine punctures evenly spaced throughout. Scutellum subchordate, piceus with scattered punctures on anterior half. Prosternum evenly concave in profile, lobe hemispherical; color piceus, lobe with sanguineus macula; texture glabrous medially with long scattered setae laterally, punctures fine and widely scattered medially becoming much larger and denser laterally. Hypomeron piceus with aurantiacus maculae of pronotum extending ventrally; texture with fine punctures scattered throughout, fine setae mostly restricted to lateral margin. Mesosternum piceus with long thin setae and scattered punctures on lateral area. Mesepisternum piceus. Metasternum piceus and glabrous with fine punctures medially, with scattered setae and punctures becoming denser anterolaterally. Legs rufopiceus to piceus. Elytra 17 mm (length/width ratio 2.8 to 2.9), subparallel on basal half, curving evenly to apex; color fulvus on anterior half (except for piceus base) extending to apices on margin, basal half piceus with dark coloration extending to anterior third laterally; texture glabrous throughout with interstriae slightly wrinkled, striae punctures clearly defined on disk, becoming obscure laterally and apically; apices ending in a sharp angle, spine absent or poorly defined. Abdomen piceus with a sanguineus macula on sternites 2, 3, and 4; texture with fine setae and punctures throughout, lateral areas wrinkled; female with 2 long elliptical foveae on apical 2/3 of segment 5; anterior sclerite with lateral arms short, half as long as median piece, without sharp dentitions except on median piece.

MATERIAL EXAMINED. ECUADOR: Loja, 3000 m, S. Ohaus (USNM); Abbe Gaujon (BMNH); Morona—Santiago, Chigüinda (BMNH); O.F. Baron (CASC).

DIAGNOSIS. *Semiotus formosus* is a morphologically unique species with affinities to *S. schaumii*, *S. pectitus*, *S. luteipennis*, *S. ligneus*, and *S. serraticornis* though differing significantly from them. The elytra in *S. schaumii*, *S. pectitus*, and *S. luteipennis* are deep red. In *S. ligneus* and *S. serraticornis* they are pale brown to yellow with dark vittae. In *S. formosus* the elytra are pale brown to yellow basally and black apically (with a pale margin apically as well). Additionally, the pronotum of related species bear 1 or more dark vittae. In *S. formosus*, the pronotum is black with yellow areas on or near the anterior and posterior angles (Fig. 253). This pattern is unique in *Semiotus*.

Semiotus fryi Candèze
(Figs. 13, 30, 135)

Semiotus fryi Candèze 1874:175 (Holotype, female: BMNH; type locality: Ecuador).

DESCRIPTION. Length 27 to 29 mm (length/width ratio 3.9 to 4.0). Head testaceous to

aurantiacus with piceus macula at base; bearing 2 mammiform spines anterolaterally; texture glabrous with few setae over eyes and frontal margin between spines, punctation scattered throughout; ocular index 70.0 to 72.0. Antennae 3 to 4 segments short of hind angles; segments 1 and 2 testaceous to aurantiacus, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length/width ratio 1.0 to 1.2), subcomplanate, blunt ridge extending along lateral margin entire length of pronotum, margin sulcate on anterior 3/4, disk strongly arched, anterior portion of pronotum and head projecting nearly ventrally (Fig. 30); color fulvus to testaceous laterally, aurantiacus to sanguineus near anterior border, with broad piceus macula medially extending from base to near anterior margin; texture glabrous, nitidus, punctures very fine on disk becoming umbilicate anteriorly. Scutellum piceus, subquadrate, small sulcus medially, anterior margin below plane of disk. Prosternum strongly arched in profile; color sanguineus to aurantiacus with piceus vitta along suture; texture glabrous, nitidus with setae along lateral margin and on lobe. Hypomeron fulvus to aurantiacus with broad piceus vitta along suture; texture glabrous, nitidus, punctation fine to obsolete. Mesosternum sanguineus with piceus maculae; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum aurantiacus to sanguineus medially, piceus laterally; texture glabrous, nitidus with setae anterolaterally. Femora aurantiacus to testaceous, tarsi badius. Elytra 19 to 21 mm (length/width ratio 2.7 to 2.9), subparallel on anterior half then narrowing to tip, intervals strongly convex, interval 3 and intervals 5 and 7 to a lesser degree rising above level of other intervals; intervals 1, 2, 4, 5, 6, and 8 piceus, intervals 3, 7, and 9, and base of 4 and 5 fulvus to luteus; texture glabrous, nitidus; apices each angled with sutural margin, without spines. Abdomen aurantiacus to sanguineus medially, luteus laterally with dark vittae and maculae between; texture glabrous, nitidus with fine setae on sternum 1, punctures fine and scattered throughout; female with 2 shallow oval foveae on apical half of sternite 5.

Male not seen.

MATERIAL EXAMINED. ECUADOR: (BMNH). *Semiotus fryi* is known only from the holotype.

DIAGNOSIS. *Semiotus fryi* is allied to *S. imperialis*, *S. cuspidatus*, *S. gibbosus*, *S. chassaini*, *S. girardi*, and *S. punctatostriatus*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus*, and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The other gibbous species (*S. gibbosus*, *S. girardi*, and *S. punctatostriatus*) all bear 2 spines along the anterolateral margin of the frons and lack a medial frontal spine. These spines tend to be acute (as in Fig. 141) in all of these species

except *S. fryi*, where they are more mammiform (Fig. 135). *Semiotus fryi* is known only from Ecuador (Fig. 13). Of the related species, only *S. imperialis* and *S. punctatostriatus* are known from the same area (Figs. 6, 15). The strongly procurved pronotum, gibbous profile, and mammiform frontal spines distinguish *S. fryi* from all other *Semiotus*.

Semiotus fulvicollis Blanchard
(Figs. 14, 50, 93, 210)

Semiotus fulvicollis Blanchard 1843:129, Kirsch 1866:179, Candèze 1874:174, Szombathy 1909b:121 (Lectotype: MNHN; type locality: unknown).

Semiotus bifasciatus Schwarz 1902a:129–130 (Syntype (1 located), male: DEIC; type locality: S. Catarina). New synonymy.

DESCRIPTION. Length 17 to 21 mm (length/width ratio 4.3 to 4.9). Head aurantiacus to sanguineus with or without piceus basal macula, front with 2 spines anterolaterally; texture with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 74.0 to 77.0. Antennae serrate, 1 to 2 segments short of hind angles; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.4), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles diverging, disk convex with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth moderately explanate; color fulvus to aurantiacus (becoming darker anteriorly) with irregular piceus vitta extending from base to before anterior border (or in some specimens extending onto head); texture glabrous with moderately deep punctures scattered throughout. Scutellum testaceous to piceus with anterior margin incised medially. Prosternum concave in profile, prosternal process rounded at apex; color aurantiacus to testaceous; texture glabrous with few erect setae on lobe, impunctate or with very fine punctures medially becoming thicker laterally. Hypomeron fulvus to testaceous; texture glabrous with very fine punctures scattered throughout. Mesosternum fulvus to testaceous, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous, glabrous, with very fine punctation throughout, becoming obsolete anterolaterally. Metepimeron piceus. Femora fulvus to testaceous. Elytra 12 to 14 mm (length/width ratio 2.7 to 3.3), subparallel on anterior half then narrowing to tip; color fulvus with intervals 1 (and posterior half of 2), 5 (on posterior half), 6, 8 (on posterior third) and 9 piceus; texture glabrous with striae (except stria 1) faint to obsolete, strial punctures fine to

obsolete, intervals flat and slightly wrinkled; apices each bearing 1 spine. Abdomen fulvus laterally, testaceous to aurantiacus medially, with 2 sublateral obscure vittae extending from sternite 1 or 2 to sternite 4; texture glabrous or with few scattered setae basally and apically, moderately deep punctures scattered throughout; female with 2 very fine, small, and shallowly ill-defined foveae restricted to anterior third of sternite 5 or foveae absent; anterior sclerite with lateral arms subangulate extending apically 2/3 length of median piece, with few dentitions basally. Male with parameres narrowing medially, lateral blades approximately 1/4 length of parameres.

MATERIAL EXAMINED. **BOLIVIA:** Beni, Rurrenabaque, Río Beni, XI-1921, W.M. Mann (USNM); *ibid.* XII-1922; La Paz, Tumupasa, IX-5-1925, G.L. Harrington (USNM); Sara, 450 m, XI-1909, J. Steinbach (CMNH); **BRAZIL:** São Paulo (FMNH); Cantareira, F. Halik (USNM); Barbiellini (USNM); (FMNH); **ECUADOR:** Morona—Santiago, Chigüinda, Buckley (BMNH); **FRENCH GUIANA:** Hwy D6 to Kaw, 15 km SE Roura, VI-6-1986, E.G. Riley & D.A. Rider (EGRC); **PANAMA:** Panama, 10–12 km N El Llano, VI-(3-8)-1986, E. Giesbert (FSCA); **PERU:** Huánuco, Madre de Dios, Tambopata Res. Zone, Explorer's Inn, 290 m, 12°50'S, 69°17'W, XI-(10-11)-1982, T.L. Erwin, On fallen tree along Río la Torre trail (USNM); Tingo María region, V-(11-20)-1937, F. Woytkowski (SEMC); *ibid.*, (V-27)-(VI-5)-1937; Tingo María, Monson Valley, XII-23-1954 (CASC); *ibid.*, X-12-1954; Loreto, Iquitos, 100 mi. NE Napo River, III-20-1969, B.K. Dozier (FSCA).

DIAGNOSIS. *Semiotus fulvicollis* (Fig. 210) is most closely allied to *S. fleutiauxi*, *S. badeni*, *S. bispinus*, and *S. flavangulus*. It is also similar to *S. fascicularis* and *S. melleus*. The elytra of *S. badeni* and *S. fascicularis* each bear a sutural, a marginal, and 2 discal vittae per elytron. The discal vittae occupy intervals 4 and 6. Interval 2 is pale. These discal vittae occupy nearly the entire length of the elytra in *S. badeni* (Fig. 207). They are abbreviated anteriorly in *S. fascicularis* (Fig. 214). In *S. clarki* (Fig. 215), *S. melleus* (Fig. 213), and *S. bispinus* (Fig. 209), the second interval is dark (as are intervals 4 and 6). In *S. fulvicollis* each elytron bears a marginal, a sutural, and a single dark discal vitta (extending from the humeral angles to near the elytral apices). The anterior sclerite of the bursa copulatrix in *S. fleutiauxi* (Fig. 77), *S. fulvicollis* (Fig. 50), and *S. melleus* (Fig. 73) is angled at the point where the lateral arms are directed posteriorly. In *S. badeni* the anterior sclerite is convex along the anterior border, and the lateral arms are short, extending less than half as far distally as the median piece (Fig. 75). The anterior sclerite in *S. bispinus* is subangulate along the anterior border (Fig. 54), and the median piece is thicker and bears several dentitions.

REMARKS. The color of the elytral vittae in *S. fulvicollis* varies, ranging from dark reddish brown to black. Also, the width of the middle elytral vitta varies in width on intervals 5 and 6. These varied characters that have been used to distinguish *S. fulvicollis* from *S. bifasciatus* do not justify specific status. A type in BMNH is marked with a “?” without further data and is dubious. The lectotype designated by Chassain in MNHN is herein accepted. No geographical information is given for this specimen.

Semiotus germari Guérin-Méneville

(Figs. 14, 49, 91, 235)

Semiotus germarii Guérin-Méneville 1844:17, Candèze 1857:322 (Type: not found; type locality: New Granada).

Semiotus punctatus Candèze 1857:322–323, Candèze 1874:179 (Holotype: BMNH; type locality: Venezuela). New synonym.

Semiotus germari, Candèze 1874:179, Steinheil 1875:111.

DESCRIPTION. Length 21 to 28 mm (length/width ratio 4.3 to 5.0). Head sanguineus to piceus on basal half, fulvus apically, basal color often extending apically in center; ocular index 68.0 to 70.0; lateral frontal spines approximately 0.17 length of frons. Front with 3 spines, vertex impressed on anterior third. Antennae serrate, with segments 1 and 2, and with center of remaining segments, badius, outer portion of segments 3 to 11 luridus; in males, last segment extending beyond hind angles, female antennae vary from 1 segment short of hind angles to extending 1 segment beyond. Texture glabrous or with few scattered setae above eyes and along anterior margin; punctures becoming larger posteriorly, nearly contiguous at base. Pronotum 5 to 8 mm (length/width ratio 1.3 to 1.4), with long clearly defined rectangular piceus macula on each side of disc, often with sanguineus mesial coloration, maculae bordered on all sides by fulvus to aurantiacus basal color, also separating maculae medially; margin sinuate, sulcate anteriorly, rounded posteriorly, widest at middle, then narrowing apically and basally before diverging at hind angles, disc convex with lateral areas concave from base to apex, anterior fifth declining to level below eyes; texture glabrous with scattered setae along margin, punctation fine medially becoming course and contiguous laterally. Scutellum subchordate, sides rounded. Prosternum evenly concave in profile, lobe rectangular; color sanguineus medially, lobe becoming aurantiacus, lateral areas piceus; texture glabrous and finely punctate medially, sides heavily punctate and covered with dense setae. Hypomeron fulvus with punctation and pubescence fine. Mesosternum fulvus to badius with scattered punctures and setae. Mesepisternum badius to piceus. Metasternum aurantiacus medially, piceus laterally, often with piceus

median line; texture glabrous medially with scattered setae laterally. Femora unicolorous fulvus to badius. Elytra 15 to 19 mm (length/width ratio 3.0 to 3.3), with interstriae 1, 3, 5, 7, and 9 fulvus, interstriae 2, 4, 6, and 8 badius; widest on anterior third then narrowing to tip; texture glabrous, reticulate with fine punctation; apices each bearing 1 spine. Abdomen badius with lateral margin fulvus; texture glabrous medially with fine scattered setae laterally; fine dense punctures throughout becoming nearly contiguous laterally; female foveae on segment 5 elliptical on apical half; anterior sclerite broad basally, lateral arms short, extending distally approximately 1/3 length of median piece. Male with parameres narrowing from base to lateral blades, lateral blades long, approximately 0.35 to 0.37 length of parameres.

MATERIAL EXAMINED. COLOMBIA: (BMNH); VENEZUELA: Mérida, 1929, M. Robinson (USNM); 1864 (NHMW); (BMNH).

DIAGNOSIS. *Semiotus germari* is most closely allied to *S. illigeri*, *S. acutus*, and *S. kirschi*, with similarities to other species with 4 or more vittae per elytron (including *S. virgatus*, *S. regalis*, *S. exsolutus*, *S. superbus*, and *S. sommeri*). *Semiotus regalis* is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with 4 or more dark elytral vittae have the first 2 intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus germari* (and *S. superbus*, *S. sommeri*, and *S. illigeri*) have abbreviated sulci evident only on the anterior third to half of the pronotal margin. These last species are best separated by the pattern of elytral and pronotal vittae as follows. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of 2 different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal vitta in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. sommeri* (Fig. 241) and *S. illigeri* (Figs. 227–229). The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. germari* (Fig. 49) and *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79) the lateral arms are longer, extending more than 1/3 the length of the median piece.

REMARKS. Candèze (1857) distinguished *S. punctatus* from *S. germari* based on the heavier pronotal punctation in *S. punctatus*. This condition is variable as indicated in a series in the USNM.

Semiotus gibbosus n. sp.

(Figs. 14, 62, 246)

DESCRIPTION. Length 30 to 31 mm (length/width ratio 4.4 to 4.5). Head aurantiacus to

sanguineus with basal piceus macula; anterior border of frons bearing 2 spines; texture glabrous with few erect setae over eyes and spines, punctation fine becoming thicker and umbilicate basally. Antennae 1 to 2 segment short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 6 to 8 mm (length/width ratio 1.0 to 1.1); subtrapezoidal, hind angles diverging; margin incrassate, not clearly defined; color aurantiacus to testaceus laterally with broad sanguineus vitta medially and 2 narrow sublateral piceus vittae; texture glabrous, nitidus with fine punctation throughout becoming thicker and umbilicate anteriorly. Scutellum sanguineus, widely obovate, anterior margin slightly incised. Prosternum slightly concave in profile; color sanguineus with piceus vitta along suture; texture with few erect setae throughout becoming more dense on lobe, punctation fine medially, thicker and umbilicate laterally. Hypomeron fulvus to testaceus with piceus vitta along suture; texture glabrous, nitidus with fine shallow punctures throughout. Mesosternum finely punctate with fine setae, fossa glabrous with fine punctures; color sanguineus to testaceus. Mesepisternum testaceus with badius to piceus maculae. Metasternum testaceus to sanguineus with piceus vitta laterally; texture glabrous, nitidus with fine punctation medially, decumbent setae and denser punctation anterolaterally; metepimeron piceus; femora sanguineus to testaceus. Elytra 20 to 22 mm (length/width ratio 3.0 to 3.1) gibbous, subparallel on anterior third, then narrowing to tip; color varying with intervals ranging from aurantiacus to badius, striae infuscate; texture glabrous, nitidus, intervals convex, striae well defined, stria punctures fine to obsolete; apices of each elytron terminating in a point. Abdomen sanguineus to testaceus medially, fulvus to luteus laterally with 2 sublateral vittae piceus; texture glabrous, nitidus with fine punctures throughout, sternite 1 with fine decumbent setae and denser punctures; female with 2 foveae on apical 3/5 of sternite 5 well defined anteriorly, becoming obscure apically; lateral arms of anterior sclerite short, approximately 1/2 length of median piece.

Male unknown.

MATERIAL EXAMINED. Holotype, female: PERU: Amazonas, 5 km N Pomacocha on road to Rioja, 2000 m, X-(7-8)-1964, P.C. Hutchison & J.K. Wright (CASC).

DIAGNOSIS. *Semiotus gibbosus* is most closely allied to *S. fryi*, *S. chassaini*, *S. cuspidatus*, and *S. imperialis*. It is also similar to *S. catei*, *S. punctatostriatus*, and *S. girardi*. All of these species have a gibbous profile. *Semiotus imperialis*, *S. cuspidatus*, and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. *Semiotus gibbosus* bears 2 anterolateral spines along the anterior margin of the frons. *Semiotus gibbosus* (and *S.*

punctatostriatus, *S. girardi*, *S. catei*, and *S. chassaini*) bears a single spine at the end of each elytron. Both *S. imperialis* and *S. cuspidatus* bear 2 small spines apically per elytron. The anterior sclerite of the bursa copulatrix is unarmed in *S. chassaini* (Fig. 65) as it is in *S. gibbosus*, though the later species has longer lateral arms that curve further posteriorly (Fig. 62). The anterior sclerite in *S. punctatostriatus*, *S. cuspidatus*, and *S. imperialis* are all armed with several small dentitions (Figs. 38, 46, 48). *Semiotus fryi* and *S. chassaini* have the third elytral interval raised above the level of the other intervals. In *S. gibbosus* (and *S. punctatostriatus*, *S. girardi*, and *S. catei*) the third interval is not raised above the level of the other intervals. *Semiotus punctatostriatus* and *S. girardi* have strongly setose pronota. *Semiotus gibbosus* (and *S. catei*) have glabrous pronota. *Semiotus gibbosus* has narrower piceus vittae on the pronotum (each vitta less than 1/6 width of pronotum) than *S. punctatostriatus* and *S. girardi*. In *S. punctatostriatus* and *S. girardi* the piceus vittae are wider (each over 1/3 width of pronotum). *Semiotus catei* and *S. gibbosus* can be separated by the color of the scutellum and legs. In *S. catei* they are black (with occasional light areas), in *S. gibbosus* they are orange to light brown. Also, the lateral margins of the pronotum are more strongly divergent posteriorly in *S. gibbosus* (Fig. 246) than in *S. catei* (Fig. 216).

ETYMOLOGY. The name refers to the gibbous lateral profile.

Semiotus girardi Chassain
(Figs. 14, 133, 141)

Semiotus girardi Chassain 2002a (Holotype, male: MNHN; type locality: Ecuador, Napo, Cordillera Huacamayo, 1800 m, Rta. Baiz a Tena).

DESCRIPTION. Length 27 to 29 mm. (length/width ratio 4.4 to 5.0). Head sanguineus; bearing 2 anterolateral spines, with area between spines distinctly angled; frons with fine setae scattered throughout becoming denser and thicker in median depression. Antennae approximately 1 segment short to 1 segment beyond hind angles, with segments 1 and 2 sanguineus, segments 3 to 11 piceus. Pronotum 6 to 8 mm (length/width ratio 1.1 to 1.3), widest at base becoming evenly narrower anteriorly then curving laterally to anterior angles, hind angles gradually enlarged; margin broadly rounded, without sulcus; color aurantiacus to sanguineus with 2 piceus vittae extending from base to just before anterior margin, hind angles fulvus; texture glabrous medially with fine dense setae laterally, punctation fine and distinctly separated on disk, becoming approximate, dense, and umbilicate anterolaterally. Scutellum subrectangular, anterior margin wider, posterior margin rounded. Hypomeron piceus medially becoming sanguineus

along outer margin, basal area fulvus; texture glabrous laterally with fine dense setae medially along suture, punctures small and contiguous medially becoming larger and often not contiguous laterally. Prosternum slightly concave in profile; color testaceus to aurantiacus, lobe becoming testaceous, suture piceus; texture nearly glabrous medially with fine dense setae laterally, punctation very fine medially becoming larger and denser laterally. Mesosternum sanguineus with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum piceus, with or without infusate margins. Metasternum sanguineus with piceus triangular macula along lateral margin extending nearly to mesocoxae anteriorly; texture glabrous medially with dense setae anterolaterally, punctation fine and moderately dense throughout. Femora testaceus to aurantiacus. Elytra 17 to 20 mm (length/width ratio 2.8 to 3.1), subparallel on anterior half then narrowing gradually to tip; color testaceus with infusate striae, or alternating intervals infusate; texture glabrous, nitidus, interstriae impunctate and convex, striae evident with broad punctures; apices each bearing 1 obtuse spine. Abdomen testaceus to aurantiacus; texture mostly glabrous with clumps of setae sublaterally, especially on segment 1 and around foveae, punctation fine medially becoming denser and contiguous laterally.

Female unknown.

MATERIAL EXAMINED. ECUADOR: Napo, Route de Baeza a Tena, Cordillera Huacamayo, 1800 m, XI-20-1978, T. Porion (Holotype and 5 paratypes, MNHN).

DIAGNOSIS. *Semiotus girardi* is most closely allied to *S. punctatostriatus* and related to *S. imperialis*, *S. cuspidatus*, *S. chassaini*, *S. gibbosus*, and *S. fryi*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus* (Fig. 140), and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. Other related gibbous species (*S. punctatostriatus*, *S. gibbosus*, *S. fryi*, *S. girardi*, and *S. chassaini*) all bear 2 spines along the anterolateral margin of the frons and lack a medial frontal spine. The pronotum of *S. gibbosus*, *S. fryi*, and *S. chassaini* are glabrous or bear only fine and inconspicuous setae. The pronotum of *S. punctatostriatus* and *S. girardi* are covered with thick pale to golden setae. *Semiotus punctatostriatus* can be separated from *S. girardi* by the shape of the pronotum. In *S. girardi* the lateral margin is constricted just posterior to the anterolateral angles. In *S. punctatostriatus* the lateral margin is evenly convex all the way to the anterolateral angles. Superficial similarities exist between specimens of *S. girardi* and many of the species with pale elytra and infusate striae (such as *S. linnei*, *S. cristatus*, and *S. colombianus*). These species have 3 frontal

spines and lack a gibbous profile. The combination of dense pronotal setae, gibbous profile and 2 frontal spines distinguish *Semiotus girardi* from all other *Semiotus*.

Semiotus glabricollis Candèze
(Fig. 16)

Semiotus glabricollis Candèze 1857:326, Candèze 1874:182 (Holotype: BMNH; type locality: Colombia).

DESCRIPTION. Length 23 to 24 mm (length/width ratio 4.5 to 4.8). Head fulvus to luteus with median piceus macula extending anteriorly to near anterior margin; bearing 3 frontal spines; texture glabrous, with few erect setae above eyes and over spines, punctation becoming umbilicate and larger basally; ocular index 75.0 to 76.0. Antennae serrate, 0 to 1 segments short of hind angles; segments 1 and 2 fulvus to testaceous, segments 3 to 11 testaceous to badius. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, anterior lateral margins converging and declining, anterior angles foveate; margin incrasate, with an elevated thickening above margin, without sulcus; color luteus with broad piceus vitta medially, often with sanguineus coloration between piceus vittae; texture glabrous, nitidus, with fine punctation throughout becoming larger and subumbilicate near anterior margin. Scutellum testaceous, broadly subchordate. Prosternum concave in profile; color aurantiacus to testaceous medially, with piceus vitta along suture; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron fulvus to luteus; texture glabrous, nitidus with thin row of setae near suture. Mesosternum aurantiacus to testaceous; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum aurantiacus to testaceous. Metasternum aurantiacus to testaceous medially, badius to piceus laterally; texture glabrous medially with dense setae anterolaterally, punctation fine throughout. Femora aurantiacus to testaceous. Elytra 15 to 17 mm (length/width ratio 3.0 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus to luteus, striae aurantiacus to testaceous; texture glabrous, nitidus, intervals flat, striae faint to obsolete, striae punctures clearly defined and infusate; apices each bearing 1 broad spine or dentition. Abdomen aurantiacus medially, fulvus laterally with badius vitta between; texture glabrous, with fine punctation medially, fine setae and dense punctation laterally; female with 2 elliptical foveae on posterior half of sternite 5.

MATERIAL EXAMINED. COLOMBIA: (BMNH). *Semiotus glabricollis* is known only from the type.

DIAGNOSIS. *Semiotus glabricollis* is most closely allied to *S. reaumuri* with similarities to *S. buckleyi* and other species with 3 frontal spines

and infusate striae. These 3 species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark striae are black and extend out from the striae onto the elytral intervals, and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the striae are light brown, and the pronotum lacks sulci. The pronotal punctation in *S. reaumuri* is dense, subumbilicate, and often contiguous. In *S. glabricollis*, the punctation is finer and less dense. *Semiotus reaumuri* has 2 anterolateral black maculae on the pronotum in addition to the discal vitta(e). *Semiotus glabricollis* lacks anterolateral black maculae. *Semiotus buckleyi* is known from Ecuador, *S. reaumuri* and *S. glabricollis* are known from Colombia. The combination of dark vittae along each elytral stria, glabrous pronotum, lack of a pronotal sulcus along the anterolateral margin, along with 3 frontal spines separate *S. glabricollis* from all other *Semiotus*.

Semiotus hispidus Candèze

(Figs. 15, 57, 100, 139, 173, 254, 255)

Semiotus hispidus Candèze 1889:81, Fleutiaux 1891:275, Chassain 1991:132 (Holotype: ISNB; type locality: Venezuela).

Semiotus alternatus Schwarz 1904:50, Chassain 1991:133 (Holotype, male: DEIC; type locality: Venezuela).

Semiotus anthracinus Szombathy 1909a:25, Chassain 1991:133 (Holotype, male: HNHM; type locality: Venezuela, Navedad, Briceño).

Semiotus anthracinus lamotei Chassain 1991:135. New synonym.

DESCRIPTION. Length 16 to 22 mm (length/width ratio 3.7 to 4.1). Head completely piceus, or with anterolateral areas aurantiacus to luteus; frons with 3 angled projections on anterior border, not spinose; texture glabrous with deep umbilicate punctures throughout; ocular index 69.0 to 72.0. Antennae serrate, reaching hind angles in females, extending 1 to 2 segments beyond hind angles in males; segment 1 testaceous to sanguineus, segments 2 to 11 piceus. Pronotum 3 to 5 mm (length/width ratio 0.9 to 1.1), broadly sinuate, hind angles diverging; margin incrassate without sulcus; color completely piceus or with narrow lateral vittae along margins and medially aurantiacus to testaceous; texture with dense decumbent setae laterally and dense deep punctation becoming umbilicate anterolaterally. Scutellum completely piceus, or with testaceous macula, subchordate. Prosternum concave in profile; color piceus; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron completely piceus or with lateral border aurantiacus; texture of fine setae throughout, punctures scattered throughout becoming deeper laterally. Mesoster-

num piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum piceus; texture of fine decumbent setae and deep punctures (often nearly contiguous) throughout. Femora testaceous to sanguineus with tarsi and joints piceus. Elytra 10 to 15 mm (length/width ratio 2.5 to 2.8), subparallel on anterior half then narrowing to tip; color completely piceus or with parts of intervals 1, 3, 5, 7, 9, and lateral border luteus; texture glabrous, nitidus, striae and striae punctures clearly defined; apices rounded without spines. Abdomen piceus; texture of fine scattered setae and double punctation throughout; female with 2 oblique elliptical foveae on apical 2/3 of sternite 5; anterior sclerite reduced, without projecting lateral arms, basal piece subtriangular, with projecting median piece. Male with parameres sinuous medially, lateral blades subacute apically, spinose laterally, 0.25 to 0.30 length of parameres.

MATERIAL EXAMINED. VENEZUELA: Mérida, Anderr, Umg. Hotel de los Frailes, 2600 m, Franz (PCCV); Mucubaji, VI-1973, on *Eschecholtzia* (USNM); Mucubaji, VI-2-1973, D.H. Janzen, commonly found feeding on damaged *Eschecholtzia* buds (CNCI); ibid. V-26-1998; Mucubaji, VI-1973, on *Eschecholtzia* (USNM); Paso Pico Aguila, Paramo de Mucuchies, 3710 m, 8°51'5"N, 70°48'34"W, V-21-1998, Ashe, Brooks, Hanley (SEMC); ibid. V-26-1998; Paso Pico Aguila, Paramo de Mucuchies, 3710 m, 8°51'5"N, 70°48'34"W, V-21-1998, Ashe, Brooks, Hanley (SEMC); S. Bricenol (USNM); S. Bricenol (USNM); State unknown, Navedad, Briceño (HNHM); Sierra Nevada de Merida, 4000 m, Franz (PCCV).

DIAGNOSIS. *Semiotus hispidus* is most closely allied to *S. auripilis*, *S. seladonius*, and *S. pectitus*. It can be easily distinguished from these species by the completely black elytra, or with the black elytra interrupted by pale vittae. The elytra of *S. auripilis* and *S. pectitus* are dark red to reddish brown, those of *S. seladonius* are green. *Semiotus hispidus* is similar to *S. regalis* in general shape but differs in having a less developed frontal margin. In *S. regalis* sharp angles becoming subspinose are present along the anterior border, these are only angled in *S. hispidus*. The paramere blades of *S. hispidus* are 1/4 the length of the parameres, whereas in *S. regalis* they are 1/3 the length. The parameres are sinuate basally in *S. hispidus* (Fig. 100) and more nearly straight in *S. regalis* (Fig. 117). The rounded elytral apices, long setae on the head and pronotum, and lack of definite frontal spines distinguish *S. hispidus* from other *Semiotus*. *Semiotus hispidus* occurs in Venezuela and is isolated from related species. *Semiotus auripilis* occurs in Bolivia, *S. pectitus* and *S. regalis* occur in Colombia, and *S. seladonius* occurs in Bolivia and Colombia.

REMARKS. *Semiotus hispidus* is comprised of several different color morphs that differ in the

number and extent of the luteus elytral vittae. The color patterns range from the paler *S. alternatus* form with several luteus elytral vittae and bicolored pronotum to the completely piceus form. Chassain (1991) correctly recognized the conspecific nature of these forms in his synonymies of the 3 species under *S. hispidus*. Chassain's *S. hispidus lamotei* should only be recognized as a color morph (as he specifies) and not as a valid subspecies, as it is not geographically isolated from the other forms.

Semiotus illigeri Guérin-Ménéville
(Figs. 16, 79, 147, 227–229)

Semiotus illigerii Guérin-Ménéville 1844:16, Candèze 1857:321, Steinheil 1875:111 (Type: not found; type locality: unknown).

Semiotus illigeri, Candèze 1874:179.

Semiotus illigerii bifidus Schwarz 1902b:209 (Syntype (1), female: DEIC; type locality: Venezuela). New synonym.

DESCRIPTION. Length 26 to 32 mm (length/width ratio 4.3 to 4.9). Head luteus to aurantiacus with basal macula piceus; bearing 3 spines anteriorly; texture glabrous, nitidus with few scattered setae above eyes, punctation fine anteriorly, shallow and umbilicate basally; ocular index 71.0 to 74.0. Antennae serrate, 1 to 2 segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 7 to 8 mm (length/width ratio 1.2 to 1.3), sinuate with hind angles diverging, margin incrassate sulcate, becoming explanate, on anterior third, anterolateral angles declivous and foveate; color luteus to testaceous with elongate piceus vitta extending from base to (or nearly to) anterior margin; in some specimens the piceus vitta is interrupted medially with a sanguineus vitta, piceus vitta elliptical on posterior half, with or without lateral extension on anterior third appearing cruciform; texture glabrous, nitidus, with fine punctation throughout. Scutellum testaceous to piceus, suborbicular laterally and posteriorly with anterior margin recurved. Prosternum concave in profile, prosternal process not divided apically; color sanguineus to aurantiacus with or without piceus lateral vittae; texture with few erect setae anteriorly, few decumbent setae laterally, punctation fine to obsolete medially becoming denser and umbilicate posterolaterally. Hypomeron luteus to testaceous laterally with piceus vitta along suture; texture glabrous, nitidus, punctation fine and shallow laterally, thicker and subrugose medially. Mesosternum sanguineus to piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum sanguineus to testaceous medially, piceus laterally; texture glabrous, nitidus with few decumbent setae anterolaterally. Femora aurantiacus to piceus. Elytra 18 to 22 mm (length/width ratio 3.0 to 3.2), subparallel on anterior fourth, then narrowing to tip; color luteus to

testaceous with mesial portion of interval 1, intervals 2, 4, 6, 8, (and sometimes outer portion of 9) testaceous to piceus; texture glabrous, nitidus, striae and stria punctures very fine to obsolete; apices each bearing 1 spine. Abdomen aurantiacus to sanguineus medially, luteus to testaceous laterally with piceus sublateral maculae or vittae; texture glabrous with few scattered erect setae, nitidus, with decumbent setae on sternite 1, punctation fine and scattered throughout; female with 2 elliptical piliferous foveae on apical half of sternite 5; anterior sclerite with lateral arms extending posteriorly 1/2 length of median piece, each bearing several serrations.

Male not seen.

MATERIAL EXAMINED. COLOMBIA: Antioquia, Medellín, 1939, H. Daniel (USNM); Valle del Cauca, Cali Valley, IV-27-39, B. Losada (USNM); Lago Calima, 1250 m, 5 mi. below dam, tropical moist forest, netted, VII-17-1975, R. Wilkerson (FSCA); Río Colima, VI-13-1989 (HNHM); W. Cordillera, IX-1988, Lake Colima, nr Buga, Río Bravo Valley, 1180–1200 m (PCCV); COSTA RICA: Alajuela, Río San Lorencito, 900 m, R.F. San Ramón, 5 km N Colonia, VI-(13-18)-1993 (INBC); Río San Lorencito, 800 m, V-31-1997, I.A. Chacón (INBC); Cartago, La Suiza de Turrialba, 1923, P. Schlid (CMNH); M.N. Guayabo, Turrialba, 100 m, VI-21-1994, J.F. Corrales (INBC); Heredia, Transecto Braulio Carrillo, N.P., X-1989, 1100–1500 m, R. Aguilar & M. Zumbado (INBC); ECUADOR: Bolívar, Balzapamba, 650 m, F. Campos (USNM); Carachi, Chical 1250 m, VII-3-1983, J.E. Rawlins (CMNH); Cotopaxi, Los Pampas, 20 km S La Union de Toachi, 1400 m, I-12-1992, C. Carlton & R. Leschen (SEMCC); Los Ríos, Santo Domingo, XII-1982, G. Onore (PCCV); Province unknown, Lita (BMNH); PANAMA: Bocas del Toro, 10 km NE Fortuna Dam, 3400 ft, V-(23-26)-1984, E. Giesbert (FSCA); Darién, Cerro Mali, Tacarcuna Range, 4800 ft, VII-1963, W.P. Murdoch (USNM).

DIAGNOSIS. *Semiotus illigeri* is most closely allied to *S. germari* with similarities to other species with 4 or 5 vittae per elytron (including *S. virgatus*, *S. regalis*, *S. exsolutus*, *S. kirschi*, *S. superbus*, and *S. sommeri*). *Semiotus regalis* is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with 4 or 5 dark elytral vittae have the first 2 intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus illigeri* (and *S. superbus*, *S. sommeri*, and *S. germari*) has an abbreviated sulcus evident only on the anterior third to half of the pronotal margin. These last species are best separated by the pattern of elytral and pronotal vittae. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of 2 different

colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal vitta in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. illigeri*, where the vittae range from being single (Fig. 229) on individuals from Costa Rica to double and slightly (Fig. 227) to strongly (Fig. 228) cruciform. The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. germari* (Fig. 49) and *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79) the lateral arms are longer, extending more than 1/3 the length of the median piece.

REMARKS. The pronotal markings of *S. illigeri* exhibit much variability ranging from the extension of the lateral arms to the lateral pronotal margins as in *S. i. bifidus* to the even elliptical vitta apparent in Central American populations. Intermediate forms of varying degree also differ in the amount of sanguineous coloration on the disk between piceus vittae.

Semiotus illustris (Dejean)
(Figs. 15, 85, 145, 221)

Pericallus illustris Dejean 1836:96 (Type: not found; type locality: unknown).

Semiotus illustris, Candèze 1857:313, Candèze 1874:177 (Syntypes (3), female: BMNH; type locality: Cayenne; types invalid).

DESCRIPTION. Length 26 to 28 mm (length/width ratio 4.3 to 4.5). Head testaceous to aurantiacus with piceus maculae basally; texture glabrous, nitidus with few setae above eyes and spines, punctation fine apically becoming umbilicate basally; ocular index 71.0 to 73.0. Antennae serrate, 2 to 3 segments short of hind angles (in females), with all segments testaceous to aurantiacus. Pronotum 6 to 7 mm (length/width ratio 1.1 to 1.2), with sides subparallel on posterior 2/3, converging anteriorly, hind angles divergent; margin incrassate on posterior 2/3, narrow, declivous, sulcate and explanate on anterior third; color aurantiacus to testaceous with 2 medial vittae piceus, with or without marginal piceus maculae; texture glabrous with punctation fine and evenly scattered throughout, bearing long setae basally. Scutellum piceus, broadly chordate. Prosternum very slightly concave on anterior 2/3; color testaceous to aurantiacus; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron testaceous to aurantiacus; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum testaceous to aurantiacus, glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum testaceous to aurantiacus. Metaste-

rum testaceous to aurantiacus; texture glabrous with very fine punctures scattered throughout. Femora testaceous to aurantiacus throughout. Elytra 17 to 19 mm (length/width ratio 2.8 to 3.1), subparallel on anterior third, then evenly narrowing to tip; color fulvus to luteus with suture and lateral margin piceus nearly to base; texture glabrous, nitidus, striae and striae punctures fine to obsolete; apices each bearing 1 spine. Abdomen testaceous to aurantiacus; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with 2 oblong foveae on posterior half; anterior sclerite with lateral arms curved mesially, extending nearly as far distally as median piece.

Male not seen.

MATERIAL EXAMINED. VENEZUELA: Bolívar, 10 km N Luepa Gransabana, (VI-25)-(VIII-11)-1987, S. & J. Peck, cloud forest malaise FIT, 1500 m (CMNC); Surukum Basin, Upper Caroni, XII-1941, P. Anduze (USNM).

DIAGNOSIS. *Semiotus illustris* is most closely allied phylogenetically to *S. kathleenae* (Wells, 2002). It is superficially similar to *S. affinis*, *S. intermedius*, *S. decoratus*, and *S. lafertei*. All of these species, except *S. kathleenae*, have 2 dark vittae on the elytra (1 sutural and 1 marginal) that converge near the apex. These species also have 2 stout lateral frontal spines and an angled area between. *Semiotus illustris* is readily distinguished from these species, except *S. decoratus*, by the entirely pale venter that is yellowish brown to orange with black markings on the hypomera in some specimens. The other similar species have pronounced black vittae on the abdomen and metepimera. *Semiotus decoratus* can be separated from *S. illustris* by the darker antennae and the shape of the anterior sclerite of the bursa copulatrix. In *S. illustris* all antennal segments are testaceous to aurantiacus, while segments 3 or 4 to 11 are dark brown to black in *S. decoratus*. The anterior sclerite in *S. decoratus* bears 2 stout dentitions near the base of the lateral arms, the lateral arms themselves bearing sharp dentitions only near the apex (Fig. 74). In *S. illustris*, the lateral arms do not bear dentitions apically, but rather medially, and the base is unarmed (Fig. 85). *Semiotus kathleenae*, though a related species, is quite distinct from *S. illustris*. It is a dark red and black and is covered with long golden setae. *Semiotus illustris* is pale yellowish brown to orange and is nearly glabrous. *Semiotus illustris* can be separated from all other *Semiotus* by the 2 converging piceus vittae on each elytron, the stout frontal angles with the broadly angulate median area between, and the completely pale venter.

REMARKS. None of the Dejean types have been found. Candèze appears to have designated his own types while recognizing Dejean's name.

Semiotus intermedius (Herbst)

(Figs. 40, 146, 157, 223)

Elater intermedius Herbst 1806:8 (Type: not found; type locality: Brazil).*Elater cornutus* Kirby 1818:383 (Type: not found; type locality: Brazil).*Pericalle cornutus*, Latreille 1834:141.*Semiotus intermedius*, Guérin-Méneville 1855:578, Candèze 1857:314, Candèze 1874:178, Steinheil 1875:112a, Costa et al. 1988.*Semiotus intermedius delineatus* Candèze 1900: 82 (Holotype: ISNB; type locality: Brazil, Rio de Janeiro). New synonym.

DESCRIPTION. Length 23 to 29 mm (length/width ratio 4.1 to 4.3). Head testaceous to sanguineous, with piceous maculae basally; texture glabrous with occasional setae above eyes and spines, punctation fine and scattered evenly throughout; front with 2 spines anterolaterally, with area between sharply angled; ocular index 73.0 to 75.0; frontal spines approximately 0.25 length of frons. Antennae serrate, 3 segments short of hind angles in females, with segments 1 and 2 testaceous, segments 3 to 11 rufopiceous to piceous. Pronotum 6 to 8 mm (length/width ratio 1.0 to 1.3), gradually expanding posteriorly; margin broadly rounded without sulcus except for explanate area on anterior fourth; color fulvus to testaceous, testaceous to sanguineous medially, with 6 piceous maculae (2 basally, 2 arcuate lines on disk, and 2 laterally just anterior to middle) or with discal maculae confluent forming 2 irregular vittae on disk; texture glabrous with punctation fine and evenly scattered throughout except for a few fine, often umbilicate, punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvus to testaceous with long piceous macula along suture and small piceous macula on lateral border; texture glabrous with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvus to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with very fine punctures scattered throughout; metepimeron piceous. Femora testaceous throughout. Elytra 16 to 20 mm (length/width ratio 2.6 to 2.9), subparallel on anterior fourth, evenly narrowing to apex; color fulvus with badius to sanguineous markings along suture and lateral margin becoming wider apically (markings occasionally piceous); striae and strial punctures finely impressed, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceous laterally testaceous to badius medially with sublateral

piceous vitta on each sternite; texture glabrous with dense fine punctures scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with 2 oblong foveae on posterior 2/3; lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades; lateral blades approximately 1/4 length of parameres.

Larva (summarized from Costa et al., 1988) 26 mm long, elateriform, flattened dorsoventrally, sclerotized and pilose, brownish red dorsally with dark brown mandibles on anterior region of head capsule; head, prothorax, meso and metanotum brownish red, darker than remainder of body; meso- and metasterna and sternites 1 to 8 yellow with reddish brown spots, sternites 9 and 10 completely reddish brown. Antennae 3-segmented, segments 1 and 2 glabrous, with segment 2 bearing small apical sensorial appendages, segment 3 smaller and bearing small sensorial appendages; prothorax trapezoidal, slightly larger than head, longer than mesothorax, with 2 dorsal depressions and 2 groups of lateral setae; prosternum triangular; mesothorax with a pair of large bifid spiracles laterally; legs short, 5-segmented, coxa wide and short, trochanter triangular, femur longer than tibia; abdominal segments 1 to 8 with round lateral margins and with bundle of setae and 1 to 2 pair of dorsal setae near base, each segment bearing a pair of bifid spiracles on anterior lateral margin, segments 2 to 8 sculptured, segment 9 with thick punctation.

Pupa (summarized from Costa et al., 1988) adectitious, exarate, yellowish and glabrous; prothorax with a pair of small projections angled posteriorly; spiracles annular; last abdominal segment with a pair of small bifid spiniform projections distally.

MATERIAL EXAMINED. ARGENTINA: Misiones, Camp Grande, I-1973, R. Föerster (CNCI); Dos de Mayo, X-15-1969, J. Föerster (CNCI); Iguazu, XI-12-1987 (PCCV); Province unknown, Puerto Bemberg, Alto Parana, XII-1933 (BMNH); **BRAZIL:** Espírito Santo, Alegre, A. Huacke (FMNH); Castelo, XI-1976, M. Alvarenga (CNCI); Faz. Jerusalem, XI-23-1913, J.F. Zikan (FMNH); *ibid.* I-16-1914; XII-13-1915, J.F. Zikan (FMNH); (CASC); Porto Alegri (ZMUC); Porto Alegri (NHMW); Villa de Alegri, XII-16-12 (FMNH); XII-13-1915 (CASC); Goiás, Jatahy, Ch. Pujal, 1895-1896 (MNHN); Minas Gerais, Passa Quatro, I-31-1916 (FMNH); Passa Quatro, Faz. Dos Campos, J.F. Zikan (FMNH); Passa Quatro, Faz. Dos Campos (CASC); Poços de Caldas, I-1968, O. Leoncini (CNCI); Vila Monte Verde, III-13-1966 (USNM); Vila Monte Verde, III-(12-18)-1966 (USNM); Paran, Castro, E. D. Jones, 1919 (BMNH); Posto Alpino, 65 km NE Curitiba, IV-14-1964, C.E. & E.S. Ross (CASC);

Río de Janeiro, Itatiaya, 850 m, E. Gounelle, II-'99 (MNHN); Organ Mountain MG, IV-35 (USNM); Parton, 1883 (MNHN); San Fidelis, Santo Antonio dos Bratos, 1876–1882, A.V. de Lyon (MNHN); II-3-1963 (USNM); XI (USNM); 1938 (USNM); XI (USNM); XII-3-1919, E.G. Holt (USNM), (CMNH); Río Grande do Sul, XII-2-1932 (EMEC); C. 1880 Dimes, 1966 (BMNH); III-1949, P. Buck (LACM); *ibid.*, II-1951; 1927 (USNM); Santa Catarina, Hansa Humbolt, Ant. Maller, 1933 (MNHN); Hansa Humbolt, XI-1933, A. Maller (USNM); *ibid.* X-1932; Hansa Humbolt, XII-1933, A. Maller (USNM); Joinville, Steind. (NHMW); Lages, J. Michaelis, 1887 (MNHN); Mafra, III-1933, A. Maller (USNM); Nova Teutonia, 52°23'W, 27°11'S, I-11-1957, 300–500 m, F. Plaumann (LACM); Nova Teutonia, XI-8-1934 (CASC); *ibid.* IV-1966; Nova Teutonia, 27°11'S, 52°23'W, 300–500 m, XII-27-1954, F. Plaumann (CNCI); Nova Teutonia, V-5-1948, F.S. Pereira (CASC); Salto do Pirahy, Pres. Jaragua, E. Gounelle, 1915 (MNHN); São Bosto, IV-1936 (PCCV); I-1959, R. Varmellio (FMNH); São Paulo, Campos de Jordao, II-1958, K. Lenko (CNCI); Cantareira, III-1-1936, F. Halik (USNM); Cantareira, XI-2-1935 (USNM); Val. De Río Pardo, E. Gounelle, XII-'98 (MNHN); I-18-1940 (USNM); (USNM); State unknown, Alto de Serra, Stanzel-Lachnit (FMNH); Caraça, P. Germain, last half of 1884 (MNHN); Cipo, S.P., XII-18-1966, V.N. Alin (CNCI); *ibid.* II-2-1935; *ibid.* I-1936; Corupas C., IX-1961 (USNM); Est. Biol. Boraceia, Salesopolis S.P., IV-(16-18)-1962, Reichardt (CASC); PARAGUAY: Hohenau, Alto Parana, H. Jacob, 1954 (BMNH); Colonia Sudetia, Anders, C. Pfanni (PCCV); Sapugay, XII-19-1902 (MNHN).

DIAGNOSIS. *Semiotus intermedius* is most closely allied to *S. affinis*, *S. lafertei*, and *S. decoratus*. *Semiotus illustris*, though not phylogenetically related, is superficially similar. All of these species have 2 dark vittae on the elytra (1 sutural and 1 marginal) that converge near the apex. These species also have 2 stout lateral frontal spines and an angled area between, forming a position phylogenetically roughly between those species with 2 frontal spines and those with 3 (Wells, 2002). *Semiotus decoratus* is readily distinguished from *S. intermedius* by the single pronotal vitta and black lateral pronotal maculae (Fig. 224). The other related species have 2 pronotal vittae (Figs. 219–221, 223). *Semiotus intermedius* can be separated from *S. lafertei* and *S. affinis* by the lighter patterns and shape of the scutellum. The elytral and pronotal vittae in *S. lafertei* (and *S. affinis*) are black, whereas in *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. lafertei* and *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is roughly as wide as long (Fig. 157). It is much

wider than long in *S. lafertei* (Fig. 159) and *S. affinis*. *Semiotus intermedius* is superficially similar to *S. illustris* but can be separated by the dark vittae on the abdomen and metepimera. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with black markings on the hypomera in some specimens. *Semiotus intermedius* can be separated from all other *Semiotus* by the 2 converging piceus vittae on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

REMARKS. Larvae have been collected from underneath semirotten tree trunks. They have been reared in the laboratory on termite workers. The pupal period is around 13 days (Costa et al., 1988). The type of *Elater cornutus* Kirby was not found. The synonymy of Candèze is herein accepted.

Semiotus kathleenae n. sp.

(Figs. 24, 106, 258)

DESCRIPTION. Length 23 mm (length/width ratio 3.0 to 4.0). Head piceus basally and medially, sanguineus anterolaterally; anterior border of frons subangulate medially, without spines; texture of long erect setae and shorter decumbent setae throughout, punctation moderately deep and scattered throughout. Antennae 1 segment short of hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 mm (length/width ratio 1.0 to 1.1); slightly sinuate, companulate, hind angles divergent; margin defined only on anterior third to half, incrassate posteriorly, with thickening above marginal line on portion of anterior half; color sanguineus, hind angles becoming fulvus, disk with 2 wide piceus vittae extending from base to near anterior border; texture of dense aureus setae and dense punctation throughout becoming denser laterally. Scutellum sanguineus to aurantiacus suborbicular with anterior margin slightly recurved. Prosternum slightly concave in profile, prosternal process not divided apically; color sanguineus to aurantiacus medially with faint fulvus coloring on dorsum of prosternal process, piceus laterally; texture nearly glabrous with very fine punctures medially, with deep punctures and double aureus vestiture (of long erect and shorter decumbent setae) laterally. Hypomeron piceus with lateral margin sanguineus and posterior border fulvus to luteus; texture of dense punctures throughout with double aureus vestiture of long erect and shorter decumbent setae throughout. Mesosternum finely punctate with fine setae, fossa nearly glabrous and impunctate; color sanguineus to testaceous medially, piceus laterally. Mesepisternum piceus. Metasternum piceus with patches of sanguineus to testaceous patterns; texture with double vestiture of long erect and

shorter decumbent setae becoming denser anterolaterally, punctation fine medially, deeper and denser anterolaterally; femora sanguineus to testaceus. Elytra 16 to 17 mm (length/width ratio 2.7 to 2.8) gibbous, subparallel on anterior half then narrowing to tip; color sanguineus throughout; texture of dense aureus setae scattered throughout, striae and strial punctures shallow, intervals 3 (more so than others), 5, and 7 convex, rising above other intervals; apices of each elytron bearing 1 small spine. Abdomen sanguineus medially, fulvus to testaceus laterally with piceus cuneiform macula sublaterally on anterior sternites; texture with double vestiture of long erect and shorter decumbent setae becoming denser laterally, punctation fine medially, deeper and denser anterolaterally. Male with basal piece large, 3/4 length of parameres, parameres sinuate laterally, apical blades (including lateral spines) 0.30 length of parameres, bearing several setae laterally, penis narrow, barely extending beyond tips of parameres.

Female not seen.

MATERIAL EXAMINED. Holotype, male: VENEZUELA: Mérida, La Grita, 46.2 km NE Paramo La Negra, 8°14'54"N, 71°52'31"W, 2900 m, V-27-1998, Ashe, Brooks, Hanley (SEMC).

DIAGNOSIS. *Semiotus kathleenae* is a unique species of *Semiotus* most closely allied phylogenetically to *S. illustris* and *S. buckleyi* but differing significantly morphologically. It bears some similarities to *S. schaumii* and *S. pectitus*. The elytra in *S. kathleenae*, *S. schaumii*, and *S. pectitus* are deep red (sometimes changing to black). The elytra in *S. illustris* and *S. buckleyi* are pale brown to yellow with 2 or several dark vittae, respectively. *Semiotus kathleenae* is covered by dense golden setae. *Semiotus pectitus* and *S. schaumii* are glabrous, or nearly so. The pronotum in *S. schaumii* bears a single black vitta (often faint), those of *S. pectitus* and *S. kathleenae* bear 2 black vittae. The elytral intervals in *S. schaumii* are nearly flat. In *S. pectitus* they are strongly convex but roughly equal in size. In *S. kathleenae* the intervals are also convex but the third interval is raised above the level of the others.

ETYMOLOGY. *Semiotus kathleenae* is named in honor of Kathleen Wells.

***Semiotus kirschi* Chassain new status**

(Figs. 23, 90, 244)

Semiotus superbus kirschi Chassain 1998:77 (Holotype: MNHN; type locality: Santa Fé de Bogotá). New status.

DESCRIPTION. Length 25 mm (length/width ratio 4.5 to 5.5). Head testaceus to aurantiacus with or without piceus macula; bearing 3 spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally; ocular index

65.0 to 68.0. Antennae serrate, reaching hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 6 mm (length/width ratio 1.4 to 1.5), with sides narrowly sinuate, hind angles divergent, anterolateral angles impressed, margin thinly rounded, sulcate through most of length; color aurantiacus to testaceus with 2 longitudinal piceus vittae on disk; texture glabrous with fine punctures scattered throughout. Scutellum testaceus (often infuscate) suborbicular with anterior margin incised. Prosternum slightly concave in profile; color sanguineus to testaceus; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypomerion aurantiacus to testaceus with infuscation along posterior border; texture glabrous with fine punctation scattered throughout, becoming denser along suture. Mesosternum aurantiacus to testaceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum aurantiacus to testaceus. Metasternum aurantiacus to testaceus; texture glabrous medially becoming denser laterally, punctation very fine medially, denser laterally; metepimeron piceus. Femora aurantiacus to testaceus. Elytra 16 to 17 mm (length/width ratio 3.2 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus to luteus with intervals 2, 4, 6, 8, and 9 piceus; striae fine to obsolete, strial punctures shallow to poorly defined; apices each bearing 1 spine. Abdomen fulvus to testaceus laterally, testaceus to aurantiacus medially with piceus sublateral vittae extending from sternite 1 to sternite 2 to 5; texture with or without few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with 2 elliptical foveae on apical half of sternite 5; anterior sclerite with lateral arms broad, with several serrations along inner margin, median piece short and acute.

Male not seen.

MATERIAL EXAMINED. BOLIVIA: La Paz, Carinavi, 1500 m, N Yungas, XI-1992, P. Bleuzen (MNHN); Cristal Mayu, IV-1979 (MNHN); P. Germain, 1889 (MNHN); Department unknown, River Songo, A.H. Fassel (MNHN); COLOMBIA: Capital District, Bogotá (MNHN); Bogotá (SMTD); PERU: Junín, Chanchamayo, Dr. Bäessler (SMTD); Tarma, Huacapistrana, 1800 m, III-24-1940, F. Woytkowski (SEMC); Lima (MNHN); Political subdivision unknown, Région Centrale, Péréné, Dr. Vergne (MNHN).

DIAGNOSIS. *Semiotus kirschi* is most closely allied to *S. acutus* and *S. germari*. It can be separated from these species by the sulcus along the lateral margin of the pronotum. In *S. kirschi*, the sulcus extends nearly the entire length of the pronotum. In *S. germari*, the sulcus is reduced to the anterior third to half only, and in *S. acutus* it is entirely lacking. Several species have alternating

light and dark elytral vittae and glabrous pronota similar to *S. kirschi*. Of these, *S. regalis* is readily separated by having intervals 1 and 2 black (Fig. 222). In *S. kirschi*, the elytral vittae cover alternating intervals with intervals 1 and 2 being of 2 contrasting colors. This same pattern is evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. acutus*, and *S. illigeri*. *Semiotus kirschi* is most easily separated from these by the long lateral pronotal sulci. *Semiotus exsolutus* and *S. acutus* have no pronotal sulci. *Semiotus superbus*, *S. sommeri*, *S. germari*, and *S. illigeri* all have a short marginal sulcus that does not extend onto the posterior half. *Semiotus virgatus* has a single narrow pronotal vitta (Fig. 242). *Semiotus kirschi* has 2 pronotal vittae (Fig. 244). The lateral arms of the anterior sclerite of the bursa copulatrix extend posteriorly at least half the length of the median piece in *S. virgatus* (Fig. 76). In *S. kirschi* (Fig. 90) the lateral arms do not extend posteriorly.

REMARKS. *Semiotus kirschi* was recognized by Chassain (1998) as a subspecies of *S. superbus* based primarily on the color pattern of the pronotum. No specific significance was placed by Chassain on the lateral margin, which in *S. kirschi* extends nearly the entire length of the pronotum; it is here recognized as a specific difference.

Semiotus kondratieffi n. sp.
(Figs. 23, 86, 136, 249)

DESCRIPTION. Length 27 to 28 mm (length/width ratio 4.0 to 4.1). Head aurantiacus to sanguineus; anterolateral area of frons protuberant and angled, without spines; texture with few erect setae over eyes and anterior margin, punctures moderately deep and evenly scattered throughout, becoming umbilicate basally. Antennae 0 to 1 segments short of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 rufopiceus to piceus. Pronotum 7 to 8 mm (length/width ratio 1.0 to 1.1); widest on anterior fourth then converging anteriorly and posteriorly to hind angles that strongly diverge, margin incassate (less so on anterior fourth) without clear definition; color fulvus to aurantiacus laterally, sanguineus medially with 2 lateral piceus vittae extending from base to anterior fourth; texture glabrous with fine punctation throughout, becoming thicker and subumbilicate anteriorly. Scutellum piceus, anterior half declivous and excavate, anterior border incised. Prosternum concave in profile with base of lobe incassate, prosternal process not divided; color aurantiacus to sanguineus with piceus vitta along suture; texture glabrous with fine erect setae on lobe, punctation fine medially becoming thickened and umbilicate laterally. Hypomeron luteus to aurantiacus laterally with piceus vitta along

suture; texture glabrous with fine punctures scattered throughout. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color luteus to aurantiacus with piceus lateral border. Mesepisternum testaceus to piceus. Metasternum aurantiacus to sanguineus with piceus vitta laterally; texture glabrous with scattered setae anteriorly, punctation very fine throughout; metepimeron piceus; femora fulvus to testaceus. Elytra 18 to 19 mm (length/width ratio 2.6 to 2.7) narrowing from near base to apex; color luteus to testaceus with intervals 1, 5, 6, and parts of 8 and 9 piceus; texture glabrous, striae (except stria 1) fine to obsolete, stria punctures fine to obsolete; apices of each elytron bearing 1 spine. Abdomen testaceus medially, fulvus laterally with piceus vitta sublaterally; texture glabrous or with few erect setae, fine decumbent setae on sternite 1, punctation fine and scattered throughout becoming denser on sternite 1; female with dense decumbent and erect setae on sternite 5, without foveae; lateral arms of anterior sclerite short, approximately 1/2 length of median piece, lateral arms bearing scattered dentitions, median piece wide in profile on basal 2/3, narrowing apically.

Male unknown.

MATERIAL EXAMINED. Holotype, female: VENEZUELA: Aragua, Rancho Grande Biological Station, Portachuelo Pass, 10°21'0"N, 67°41'0"W, 1100 m, VI-4-1998, Ashe, Brooks, Harley, VEN1ABH98, moving through pass against wind (SEMC).

DIAGNOSIS. *Semiotus kondratieffi* is a unique species quite distinct from any other *Semiotus*. It is allied to *S. fascicularis* and *S. clarki* and other species with 2 prominent frontal spines. It can be readily separated from these species by lacking frontal spines, the anterolateral portion of the frons being strongly angled only. The anterior sclerite of the bursa copulatrix and the hind angles of the pronotum of *S. kondratieffi* are distinct from other known species of *Semiotus*. The anterior sclerite lacks spines on the medial or lateral arms, bearing spines or dentitions only near the base of the lateral arms (Fig. 86). The hind angles of the pronotum are much more strongly diverging in *S. kondratieffi* than in any other *Semiotus* (Fig. 136). The declivous and concave scutellum is similar to that of *S. trinitensis*; however, this species bears 2 prominent frontal spines.

ETYMOLOGY. *Semiotus kondratieffi* is named in honor of Boris C. Kondratieff, Colorado State University.

Semiotus lafertei Candèze
(Figs. 25, 120, 159, 219)

Semiotus lafertei Candèze 1857:313, Candèze 1874:177, Champion 1896:290 (Syntypes (2), female: BMNH; type locality: Mexico).

DESCRIPTION. Length 25 to 35 mm (length/width ratio 4.0 to 4.7). Head testaceous to sanguineous with piceus maculae basally; texture glabrous with occasional setae above eyes and frontal spines, punctation deep and scattered evenly throughout; front with 2 spines anterolaterally, with area between sharply angled. Antennae 3 segments short of hind angles (in both sexes), with segments 1 and 2 testaceous, segments 3 to 11 rufopiceous to piceus. Pronotum 6 to 9 mm (length/width ratio 1.1 to 1.2), gradually expanding posteriorly; margin broadly rounded without sulcus except for vague concavity on anterior fourth; color fulvus to testaceous laterally, testaceous to aurantiacus medially with 2 piceus arcuate vittae on disk; texture glabrous with punctation fine and evenly scattered throughout, often with a few fine umbilicate punctures along anterior margin. Scutellum broadly ovate with indentation along anterior border. Prosternum concave in profile; color testaceous to sanguineous; texture with fine scattered setae laterally and on lobe, punctation fine medially becoming deeper and larger laterally. Hypomeron fulvus to testaceous with long piceus vitta along suture and small piceus macula on lateral border; texture glabrous (or with few erect setae laterally) with fine scattered punctures throughout, becoming denser anteriorly. Mesosternum fulvus to testaceous and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum fulvus to testaceous. Metasternum fulvus to testaceous; texture glabrous with very fine punctures scattered throughout; metepimeron piceus. Femora testaceous to aurantiacus. Elytra 17 to 23 mm (length/width ratio 2.6 to 3.2), subparallel on anterior fourth, then narrowing to apex; color fulvus with badius to piceus markings along suture and lateral margin becoming wider apically, sutural vitta not reaching scutellum anteriorly; striae and strial punctures finely impressed, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceous laterally testaceous medially with sublateral piceus vitta on each sternite; texture glabrous or with fine setae scattered throughout, punctation dense, fine and scattered throughout, becoming larger and nearly contiguous on first visible sternite; female with 2 oblong foveae on posterior 2/3, lateral arms of anterior sclerite narrow, 4/5 length of median piece, arms and median piece covered with dentitions. Male with parameres constricted near middle between angulate and subquadrate basal half and lateral blades, lateral blades approximately 1/4 length of parameres, penis extending beyond tip of parameres.

MATERIAL EXAMINED. COLOMBIA: Valle del Cauca, Cali, I-2-67 (FMNH); **COSTA RICA:** Alajuela, Alberge de Heliconias, 10.71°N, 85.04°W, VI-(16-21)-2000, B. Brown, treefall gap, MT (LACM); Est. San Ramón, P.N. Guana-

caste, 620 m, IV-(3-19)-1994, Familia H. García (INBC); Finca San Gabriel, 2 km SW Dos Ríos, 600 m, V-1989 (INBC); San Cristobal, 600–620 m, V-(9-30)-1998, F.A. Quesada (INBC); Sect. San Ramon de Dos Ríos, 620 m, (IV-V)-1995, F.A. Quesada (MTEC); Sector San Ramón de Dos Ríos, 620 m, IV-(3-24)-1995, M. Chinchilla (INBC); Zapote de Upala, VIII-2-1971, E. Sraveja (EMEC); Zapote Upala, nr Bijagua, XI-1-1972, F. Cordero (EMEC); *ibid.*, IV-(20-26)-1972; Zapote Upala, nr Bijagua, XII-8-1972, R. Ortiz (EMEC); Zapote de Upala vic. Bijagua, XI-1-1972, F. Cordero (CNCI); *ibid.*, V-19-1972; Zapote de Upala, vic. Bijagua, XII-8-1972, R. Ortiz (CNCI); 2.5 km W Dos Ríos, V-22-1985 (EMEC); Cartago, Turrialba, Schild & Burgdorf (USNM); Guanacaste, Est. Cacao, 1000–1400 m, SW side Volcán Cacao, X-1989, R. Blanco & C. Chavez (INBC); Est. Maritza, 600 m, W Volcán Orosi, V-1990, R. Blanco (INBC); Est. Pitilla, 700 m, 9 km S Santa Cecilia, P.N. Guanacaste, (V-19)-(VI-3)-1993, P. Ríos (INBC); Tilarán, 2200 ft, VII-18-1966, S.L. Wood (BYUC); Heredia, Est. El Ceibo, Braulio Carrillo, P.N. 400–600 m, IV-1990, C. Chaves (INBC); est. Magassay, 200 m, P.N. Braulio Carrillo, VII-1991, A. Fernandez (INBC); Finca la Selva, 3 km S Puerto Viejo, VII-(23-25)-1976, E.M. Fisher (CASC); Tirimbirca, ca. 200 m, V-1971, G.R. Proctor (CASC); Limón, Cerro Tortuguero, 1–120 m, VII-1993, R. Delgado (INBC); Est. Hitoy Cerere, 100 m, R. Cerere, res. Biol. Hitoy Cerere, II-(15-27)-1993, G. Carballo (INBC); *ibid.*, (VI-30)-(VII-20)-1992, F.A. Quesada; Hamburg Farm, Reventazon, VI-26-22, F. Neverman (USNM); *ibid.* VI-25-22; Hdas. La Suerte/Tapzco, 29 air km W Tortuguero, 40 m, 10°27'–30'N, 83°47'W, VIII-(13-31)-1979, Donahue, Hair, Moore, Hopkins (LACM); La Colonia, 23 km NE Guapiles, VIII-21-1966, R.D. Sope (USNM); Manzanillo, 0–100 m, RNFS, Gandoca y Manzanillo, (6-27)-1993, F.A. Quesada (INBC); Río Sardinas, RNFS Barra del Colorado, 10 m, VII-(16-24)-1993, F. Araya (INBC); Ramal, Río Parismina, Santa Clara, an Gebusch, F. Neverman (USNM); *ibid.* IV-28-25; Sector Cerro Cocori, Finca E. Rojas, 150 m, (IX-10)-(X-14)-1992, malaise trap (INBC); Tingue lot, 6 m, Río Reventazon, IV-27-37, F. Neverman (USNM); Puntarenas, Alberque Cerro de Oro, Sendero La Tarde, 5.3 km NW Cerro Rincón, 280 m, II-8-1996, L. Angulo (INBC); Avenida El Pizote, 1.4 km NE La Tigra, 1300 m, V-(1-8)-1996, E. Navarro (INBC); Cantón Coto Brus., Agua Caliente, VIII-1986, N. Zakharoff (CASC); División, VI-9-1991, Brenes (CASC); Est. Agujas, Río Agujas, 300 m, Puntarenas, Cantón Coto Brus., Agua Caliente, VIII-(11-20)-1986, N. Zakharoff (CASC); Est. Sirena, P.N. Corcovado, 0-100 m, VI-1990, F. Quesada (INBC); Fila Cruces, Finca Llama, 1200 m, V-13-1996, I.A. Chacón (INBC); Finca Cafrosa, Est. Las Mellizas,

P.N. Amistád, 1300 m, (VI-VII)-1990, J.C. Saborio (INBC); Provincia Gromaco, 34 km SE Potrero Grande, on Río Coto Brus, 1000 ft VII-21-1963, C.D. Michener and W. Kerfoot (SEMC); Jardín Botánico Wilson, 1100 m, III-29-1996, A. Chacón (INBC); Osa Peninsula, 1.8 mi. W Rincon, II-27-1971, J.P. Donahue, C.L. Hogue (LACM); Palmira, Guitierrez Bravo, Fila Tigre, 1200 m, IV-12-1996, I.A. Chacón (INBC); Rancho Quemado, Peninsula de Osa, III-1991, J.C. Saborio (INBC); San Vito de Java (5 mi. S), VIII-1967, R.W. McDairmid (LACM); San Vito, V-18-1967 (FSCA); San Vito, Las Cruces, IV-29-1988, A. Sohs (INBC); 5 mi. S San Vito, V-25-1983, D.J. Heffern (TAMU); Province unknown, San Carlos, Schild & Burgdorf (USNM); collected under wood (CMNH); GUATEMALA: Alta Verapaz, Panzós (NHMW); Izabal, 25 km SE Morales, 2800 ft, V-(21-24)-1996, E. Giesbert & J. Monzon (FSCA); San Antonio, IV-12-1990, J. Monzón (TAMU); Petén, Sayaxche, El Petén, X-18-1963, E.C. Welling (CNCI); *ibid.*, X-24-1963; *ibid.*, X-8-1963; HONDURAS: Cortés, Lago Yojoa, VII-5-77, J.V. Mankins (USNM); Estación Experimental Café ca Peñas Blancas rain forest, VIII-15-1992, L. Stange & C. Porter (FSCA); Yoro, P.N. Pico Bonito, El Portillo, 640 m, 15°26'27"N, 87°08'09"W, VIII-13-2000, R. Reyes (EAPZ); MEXICO: Chiapas, San Quintín, 1971, Wind (USNM); San Quintín, VII-23-1979 (FSCA); Veracruz, Est. Biol. Las Tuxtlas, 250 m, VII-27-1990, J. Doyen (EMEC); Lake Catemaco, V.C., VI-(16-20)-1969, D.E. Bright (CNCI); 33 km NE Catemaco, 160 m, Los Tuxtlas Biol. St., (VII-1)-(VIII-1)-1983, FIT ravine, rain forest, S. & J. Peck (CMNC); Río Atoyac, 5 mi. NW Potrero, VII-15-1973, R.R. Shelling, T.W. Taylor (LACM); 8 mi. N Santiago Tuxtla (FMNH); 14-16 km W S'ntcnpn, VI-1994, P. & A. Garcia (JEW); State unknown, Dos Anares, IX-1980, P. Bleuzen (PCCV); NICARAGUA: Chontales, Richardson (OXUM); Chontales, Richardson (NHMW); Chontales, Janson (USNM); PANAMA: Canal Zone, Barro Colorado Island, VI-21-1967, sweeping, R.C. Beard (CUIC); Barro Colorado Island, V-21-1967, R.E. Beer (SEMC); Barro Colorado Island, VI-28-1978, N. Woodley, on log (USNM); Chiriquí (ZMUC); 10 km NE Fortuna Dam, V-(26-28)-1992, E. Giesbert (FSCA); Volcan de Chiriqui, Champion, 25-1000 ft, (OXUM); (CUIC); (FMNH); Volcán de Chiriquí, 25-4000 m, Champion (NHMW); Colón, Santa Rita Ridge, 30 km SE Colón, V-13-1981, R.W. Brooks (SEMC); Darién, Estación Ambiental Cana, 7°45'32"N, 77°41'07"W, 500 m, VI-(7-10)-1996, R.S. Anderson (CMNC); Río Tacarcuna, 1900 ft, VII-1963, W.P. Murdoch (USNM); Panama, Cerro Azul, 700 m, 9°10'N, 79°25'W, VI-30-1971, Bivia (USNM); Cerro Campana, 2700 ft, VI-(3-5)-1981, E. Geisbert (LACM); Cerro Campana, VII-27-1978, E.M. Fisher (CASC); Cerro Campana, V-(11-15)-

1980, E.G. Riley & D. LeDoux (EGRC); Cerro Campana, 850 m, 8°40'N, 79°56'W, IX-2-1972, Stockwell (JEW); Cerro Campana, 820 m, 8°40'N, 79°56'W, VIII-12-1977, T.J. Riley (EGRC); 10 km NE El Llano, Carti Rd., V-10-1981, R.W. Brooks (SEMC); 10-12 km N El Llano, VI-(3-8)-1986, E. Giesbert (FSCA).

DIAGNOSIS. *Semiotus lafertei* is most closely allied to *S. affinis*, *S. intermedius*, and *S. decoratus*. *Semiotus illustris* is also superficially similar. All of these species have 2 dark vittae on the elytra (1 sutural and 1 marginal) that converge near the apex. These species also have 2 stout lateral frontal spines and an angled area between. *Semiotus decoratus* is readily distinguished from *S. lafertei* by the single pronotal vitta and black lateral pronotal maculae (Fig. 224). The other related species have 2 pronotal vittae (Figs. 219-221, 223). *Semiotus lafertei* can be separated from *S. intermedius* by the darker patterns and shape of the scutellum. The dark elytral and pronotal patterns in *S. lafertei* (and *S. affinis*) are black. In *S. intermedius* they are dark brown to red. Also, in *S. intermedius* the lateral pronotal maculae are much more evident dorsally. In *S. lafertei* and *S. affinis* they are often restricted entirely to the hypomera. The scutellum of *S. intermedius* is roughly as wide as long (Fig. 157). It is much wider than long in *S. lafertei* (Fig. 159) and *S. affinis*. *Semiotus lafertei* differs from *S. affinis* in the piceus sutural stripe that does not reach the scutellum and in the lack of a sulcus on the anterior third of the lateral pronotal margin. In *S. affinis* the elytral suture is piceus to the scutellum, and the anterior third of the lateral pronotal margin is sulcate. *Semiotus lafertei* is superficially similar to *S. illustris* but can be separated by the dark vittae on the abdomen and metepimera. In *S. illustris* (and *S. decoratus*) the venter is entirely pale yellowish brown to orange with occasional black markings on the hypomera. *Semiotus lafertei* can be separated from all other *Semiotus* by the 2 converging piceus vittae on each elytron, the stout frontal angles with the broadly angulate median area between, and the broad incised scutellum.

REMARKS. *Semiotus lafertei* and *S. affinis* are not easily separated in certain areas in Colombia where their ranges overlap. In this area individuals have the elytral sutural vitta extending to the scutellum but only narrowly. The marginal pronotal sulcus in these individuals is also lacking or very reduced.

Semiotus ligatus Candèze
(Figs. 24, 37, 118, 176, 257)

Semiotus ligatus Candèze 1889:81 (Holotype: ISNB; type locality: Colombia).

DESCRIPTION. Length 22 to 26 mm (length/width ratio 3.9 to 4.3). Head piceus with anterolateral areas testaceous to aurantiacus; ante-

rolateral margin angled, frons lacking spines; texture of dense setae and punctures throughout; ocular index 75.0 to 78.0. Antennae serrate, just reaching hind angles in females, 0 to 1 segments beyond hind angles in males; segments 1 and 2 testaceous to aurantiacus, segments 3 to 11 piceus. Pronotum 5 to 6 mm (length/width ratio 0.9 to 1.1), sinuate with hind angles diverging, margin undulate, thinly rounded without sulcus; color viridis, lateral and anterior margins fulvus to viridis with 2 piceus vittae extending from base to anterior fourth; fulvus and viridis areas glabrous, nitidus, piceus vittae with dense decumbent setae and punctation deeper than medial and lateral areas. Scutellum fulvus to testaceous, broadly rounded posteriorly, anterior margin straight. Prosternum nearly straight in profile, curving ventrally on lobe; color piceus with prosternal process sanguineus, lobe aurantiacus; texture glabrous with very fine punctation medially, deeply and densely punctate with dense decumbent setae laterally. Hypomerion fulvus to luteus, with broad piceus macula along suture; texture of dense setae and punctation on medial piceus area, lateral area glabrous, nitidus. Mesosternum testaceous to sanguineus medially, piceus laterally; texture glabrous with fine punctures medially, with denser punctures and dense setae laterally. Mesepisternum piceus. Metasternum sanguineus medially, piceus laterally; texture glabrous with fine punctation medially, with long dense setae and deep punctures laterally. Femora testaceous to aurantiacus. Elytra 16 to 19 mm (length/width ratio 2.8 to 3.2), subparallel on anterior third, then tapering to tip; color viridis to subviridis, margin and suture faintly (or not) fulvus; striae finely impressed, strial punctures shallow, interstriae nearly flat and smooth on disk, becoming more convex and wrinkled posterolaterally; apices each bearing a single spine. Abdomen sanguineus medially, fulvus to piceus laterally; texture glabrous with fine punctation medially, with long dense setae and deep punctures laterally; female without foveae on sternite 5; anterior sclerite smooth, lacking dentitions except for apex of lateral arms, lateral arms narrow, extending apically 2/3 length of median piece. Male with parameres wide basally, wider than apical half, lateral blades small, approximately 0.20 length of parameres, rounded at tip, spines acute.

MATERIAL EXAMINED. COLOMBIA: Cauca, 16 km E Silvia, 9000 ft, II-22-1970, H. Howden (CNCI); 14 km E Silvia, 12000 ft, VII-15-1970, H. & A. Howden (CNCI); ECUADOR: Napo, 5 km E Papallacta, III-24-1979, H. & A. Howden (CNCI).

DIAGNOSIS. *Semiotus ligatus* is most closely allied to *S. capucinus* and *S. striatus*, both of which share with *S. ligatus* a gibbous elytral base and lack frontal spines. The frontal spines in *S. ligatus* are very reduced. These species are readily distinguished from *S. ligatus* by the elytral color.

In *S. ligatus* the elytra are green, in *S. capucinus* they are deep red, and in *S. striatus* they are pale yellowish brown with infuscate striae. The green elytra of *S. seladonius* is similar to those of *S. ligatus*. These species can be distinguished by the prothoracic setae. In *S. seladonius* they are much longer and more erect than those of *S. ligatus*, where the setae are decumbent. The pronotal base color is fulvus around the piceus vittae in *S. seladonius*. In *S. ligatus* the base color is viridis with only the angles being fulvus. The frontal margin in *S. ligatus* is angled to subspinose. In *S. seladonius* the frontal margin is arcuate, without angles or spines. The elytral apices are pointed or spined in *S. ligatus*, whereas in *S. seladonius* they are rounded or occasionally angled. The elytral base is more gibbous in *S. seladonius* than in *S. ligatus*.

Semiotus limatus Candèze

(Figs. 18, 78, 208)

Semiotus limatus Candèze 1889:81 (Lectotype: ISNB; type locality: Brazil, Amazonas).

Semiotus borvathi Szombathy 1909a:23–24 (Holotype, female: HNHM; type locality: Peru, Chanchamayo, Briceño). New synonym.

DESCRIPTION. Length 22 to 25 mm (length/width ratio 4.9 to 5.0). Head aurantiacus to sanguineus, front with 2 spines anterolaterally; texture mostly glabrous, nitidus with a few erect setae above eyes and spines, punctation moderately deep and evenly scattered throughout; ocular index 71.0 to 74.0; frontal spines approximately 0.36 length of frons. Antennae serrate, 2 to 3 segments short of hind angles in females; segments 1 and 2 aurantiacus, segments 3 to 11 rufopiceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate with margins converging on anterior fourth to anterior third, hind angles diverging, disk convex with lateral depressions sublaterally on posterior 2/3 to 3/4, margin sulcate on anterior third to fourth explanate laterally, broadly rounded without sulcus on posterior half; color aurantiacus to sanguineus; texture glabrous, nitidus with moderately deep punctures scattered throughout becoming subumbilicate anteriorly. Scutellum aurantiacus, suborbicular, anterior margin incised medially. Prosternum concave in profile, prosternal process not divided at apex; color testaceous to aurantiacus; texture glabrous, nitidus with few erect setae on lobe, with fine punctures medially becoming thicker and umbilicate laterally. Hypomerion testaceous to aurantiacus; texture glabrous, nitidus with very fine punctures or with punctures obsolete. Mesosternum testaceous to aurantiacus, fossa glabrous and impunctate, lateral areas with dense setae and fine punctures. Mesepisternum testaceous to aurantiacus. Metasternum testaceous to aurantiacus; texture glabrous, nitidus with punctation fine to obsolete. Femora testaceous to

aurantiacus. Elytra 14 to 15 mm (length/width ratio 3.0 to 3.1), subparallel on anterior third then narrowing to tip; color aurantiacus basally, intervals 3 and 4 luteus posteriorly, intervals 1, 2, parts of 5, and 6 through 9 piceus on posterior half; texture glabrous, nitidus with striae and strial punctures fine to obsolete; apices each bearing 1 spine. Abdomen testaceus to aurantiacus medially, fulvus laterally, with sublateral piceus vittae; texture glabrous, nitidus with very fine punctures throughout, sternite 1 with fine setae and dense punctation; female with densely punctate area on basal half of sternite 5, foveae absent; anterior sclerite wide basally, lateral arms strongly convex, projecting medially, median piece subtriangular, as long as or slightly longer than lateral arms, bearing several serrations laterally.

Male not seen.

MATERIAL EXAMINED. BRAZIL: Amazonas (ISNB); PERU: Junín, Chanchamayo, Briceño (HNHM); Chanchamaya, I-2-1969, J. Schunke (CNCI); Satipo, XI-1987 (PCCV).

DIAGNOSIS. *Semiotus limatus* is most closely allied to *S. clarki*, *S. badeni*, and the species in the *S. angulatus* group. It can be separated from these species by the pattern of the elytral vittae and by the shape of the antennae. *Semiotus limatus* bears 2 dark vittae per elytron (1 sutural and 1 marginal). *Semiotus badeni* and *S. clarki* each bear 4 or 5. The antennae in *S. limatus* are serrate (as in Fig. 165). In the *S. angulatus* group they are pectinate to subpectinate (Fig. 166, 167). The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus*, and the undivided lateral arms curve posteriorly nearly as far as the median piece (Fig. 78). In *S. clarki*, the median piece bears only a pair of dentitions (Fig. 64). In *S. badeni* the median piece is unarmed apically, and the lateral arms extend posteriorly less than half the length of the median piece (Fig. 75). The lateral arms of the anterior sclerite in the *S. angulatus* group are divided distally (Figs. 41, 43–45).

REMARKS. The type of Szombathy's *S. horvathi* is clearly conspecific with *S. limatus*. It is questionable if he even saw the type of *S. limatus*.

Semiotus linnei Guérin-Méneville
(Figs. 5, 82, 130, 142, 236)

Semiotus linnei Guérin-Méneville 1844:17, Candèze 1857:325, Candèze 1874:182, Kirsch 1884:43, Steinheil 1875:112, Szombathy 1909b:121 (Type: not found; type locality: New Granada).

DESCRIPTION. Length 21 to 26 mm (length/width ratio 4.5 to 4.9). Head with anterior half fulvus to aurantiacus, posterior half (and median vitta) piceus; bearing 3 frontal spines; texture of erect setae over eyes and spines, punctation deep with punctures separated by about width of

punctures; ocular index 73.0 to 75.0. Antennae serrate, 0 to 1 segments short of hind angles; segments 1 and 2 testaceus, segments 3 to 11 testaceus to rufopiceus. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.4), narrowly sinuate; marginal sulcus obscure to well defined on anterior half, thickly rounded posteriorly, with an elevated thickening above margin; disk with 2 large piceus subrectangular maculae, interrupted medially by sanguineus longitudinal vitta, anterior border and margins fulvus to sanguineus; texture glabrous medially with thick pile laterally, punctation fine and moderately dense medially, deep and often contiguous laterally. Scutellum testaceus, suborbicular posteriorly, anterior margin recurved; texture glabrous or with few scattered punctures. Prosternum concave in profile; color aurantiacus medially, lobe fulvus to aurantiacus, lateral area piceus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron fulvus with or without narrow piceus vitta along suture, lateral areas glabrous with moderately dense pile along suture. Mesosternum fulvus to testaceus; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum fulvus to testaceus. Metasternum testaceus to aurantiacus medially, badius to piceus laterally; texture glabrous medially with dense setae anterolaterally, punctation fine medially becoming denser laterally. Femora aurantiacus to testaceus throughout. Elytra 14 to 17 mm (length/width ratio 2.9 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus, striae infuscate; texture glabrous, nitidus, striae fine to obsolete, strial punctures deep and well defined; apices each bearing 1 spine. Abdomen testaceus medially, fulvus laterally with sublateral maculae (or vittae) badius to sanguineus; setae scattered throughout except median area, punctation fine medially, deeper laterally; female with 2 elliptical foveae on posterior half of sternite 5; anterior sclerite with lateral arms convex basally extending posteriorly 1/2 to 1/3 length of median piece, and bearing several dentitions along inner surface. Male with parameres 3 times longer than wide, lateral blades 0.30 to 0.34 length of parameres.

MATERIAL EXAMINED. COLOMBIA: Capital District, Bogotá (OXUM); Bogotá (CMNH); nr Bogotá, 1848–1857, E.W. Mark. (OXUM); Nariño, Pasto, Götz (NHMW); VENEZUELA: Mérida, Tabay, 7 km E La Mucuy Station, Sierra Nevada Nt. Pk., 8°37'44"N, 71°2'26"W, 2300–2700 m, V-24-1998, J. Ashe, R. Brooks, R. Hanley (SEMC).

DIAGNOSIS. *Semiotus linnei* is most closely allied to *S. perangustus*, *S. cristatus*, *S. colombianus*, and *S. angustus*. Overall similarities also exist with *S. auripilis*. These species have 3 frontal spines and pale elytra with infuscate striae. *Semiotus auripilis* is readily separated from *S. linnei* by the strongly convex elytral intervals.

The intervals in *S. linnei* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of the other related species, not extending forward beyond the length of the medial spine (Fig. 144). The lateral spines in *S. linnei* (and the other related species) are much longer than the medial spine (as in Fig. 142). *Semiotus linnei* can be separated from *S. cristatus* and *S. colombianus* by the frontal vestiture and length of the antennae. In these species the setae are double, with decumbent setae discally and erect setae over the eyes and spines. In *S. linnei* the frontal decumbent setae are absent or very few in number. The antennae in *S. cristatus* and *S. colombianus* extend beyond the hind angles in both sexes. The antennae of *S. linnei* do not quite reach the hind angles. Also, the 2 piceus pronotal vittae in *S. cristatus* are nearly linear and approximate, the area between being narrow and parallel-sided. In *S. linnei* and *S. colombianus*, these vittae are arcuate medially. The anterior sclerite of the bursa copulatrix is more heavily armed in *S. cristatus* than in *S. linnei* and *S. colombianus*. *Semiotus cristatus* has dentitions all along the posterior margin of the lateral arms extending onto the median piece (Fig. 80). In *S. colombianus* (Fig. 81) and *S. perangustus* (Fig. 72) the dentitions do not extend the entire length of the lateral arms. In *S. linnei* the median piece is without dentitions (Fig. 82). *Semiotus angustus* lacks lateral arms entirely (Fig. 71). The aedeagus is narrow in *S. linnei* (Fig. 130) with the base of the parameres approximately as wide as the parameres across the apical blades. In *S. cristatus* the base of the parameres is wider than the aedeagus at the widest point of the apical blades (Fig. 129).

Semiotus luteipennis (Guérin-Méneville)
(Figs. 1, 47, 123, 248)

Elater luteipennis Guérin-Méneville 1839:20
(Type: not found; type locality: Chile).

Eucamptus luteipennis, Solier 1851:9.

Chalcolepidius luteipennis, F. Philippi 1887:84.

Semiotus luteipennis, Candèze 1857:300, Candèze 1874:186, Bartlet-Calvert 1898:798, Fleutiaux 1907:173, Bruch 1911:244.

DESCRIPTION. Length 21 to 35 mm (length/width ratio 3.6 to 3.9). Head piceus without frontal spines; ocular index 81.0 to 84.0. Texture with long fine brown setae throughout, punctation umbilicate and generally separated by less than own diameter except in isolated areas on disk. Antennae serrate, entirely piceus, extending 0.5 to 1.5 segments beyond hind angles. Pronotum 5 to 9 mm (length/width ratio 0.9 to 1.0), gradually expanding posteriorly with hind angles expanding only a little further laterally, margin thickly rounded with sulcus extending entire length except on posterior fifth and anterior fourth; color piceus with lateral margin sanguineus;

texture with scattered fine setae on disk becoming slightly longer and denser anterolaterally. Scutellum with anterior margin nearly straight, widest on anterior third then narrowing to rounded apex. Prosternum piceus, evenly concave in profile, lobe hemispherical; texture consisting of fine scattered setae, moderately punctate medially with punctures becoming larger laterally. Hypomeron sanguineus laterally, piceus along suture, with fine appressed setae shorter than prosternal setae, punctation becoming larger along suture, punctures generally separated by distance greater than own width. Mesosternum piceus and moderately punctate with fine setae throughout. Mesepisternum piceus. Metasternum piceus with setae and punctures well separated medially, becoming dense laterally. Femora piceus. Elytra 15 to 25 mm (length/width ratio 22.5 to 2.9), widest at middle before narrowing to tip; color aurantiacus to sanguineus; texture glabrous, interstriae wrinkled; apices each bearing 2 spines of subequal length. Abdomen piceus with fine setae and fine scattered punctures throughout, with impunctate cavities and wrinkles along lateral margin; female foveae large, shallow and elliptical, covering most of central area of sternum 5; anterior sclerite with lateral arms vestigial, median piece extending to point distally, surrounded in bursa copulatrix by numerous accessory sclerites. Male with parameres sinuous, lateral blades convex laterally, approximately 0.20 length of parameres.

Pupa "Ninfa" (translated from Bartlet-Calvert, 1898, in Orellana 1938) dirty yellowish white, with 2 spines on the anterior border of the prothorax with points directed inward, antennae free, wings and elytra folded below, completely covering the mesometasternum, abdominal segment 1 with 2 long sharp spines above, with other smaller and shorter spines below.

MATERIAL EXAMINED. ARGENTINA: Chubut, Los Alerces, II-1973, R. Förster (CNCI); P.N. Los Alerces, Lago Futalaufquen, 500 m, 14-XII-1997, forest track, C. & M. Vardy (BMNH); (FMNH); Neuquén, Junin de los Andes, Laguna Verde, 1000 m, 11-III-1979 (ZMUC); Río Bonito SE, Va. La Angostura, II-21-1978, C.M. & O.S. Flint Jr. (USNM); C. Bruch (ZMUC); Río Negro, Lago Nahuel Huapi, Puerto Blest, 770 m, XII-16-1978 (ZMUC); Puerto Blest, XII-2-1926, R.C. Shannon (USNM); Province unknown, Correntoso, L. NahHuapi, XI-20-26, R.C. Shannon (USNM); **CHILE:** Bío Bío, Araucanía, 1907, R.M. Middleton (BMNH); Arauco, Contulmo, II-10-1967, Sanfeliu (CNCI); Concepción (ZMUC); Concepción (CASC); Las Trancas, III-1977, T. Cekalovic (CNCI); Recinto, XII-1989 (PCCV); Curicó, Cord. Curicó, Palos Negros, XII-60, L.E. Peña (USNM); El Coigo, XI-1960, L.E. Peña (CNCI); *ibid.*, X-(10-20)-1960; El Coigo Cord. Curicó, XI-1961, L.E. Peña (CNCI); El Coigo, XII-1979 (CMNH); Palos Negros, XI-1960, L.E. Peña

(CNCI); La Araucanía, Cabreria 1100 m, I-1977, L.E. Peña (FMNH); Collipulli, VI-20-1964, H. Diaz (CNCI); Coral, Valdivia, X-25-1913, R.H. Beck (CASC); Cord. Las Raíces, XII-1976, L.E. Peña (FMNH); Cudico, I-1978, T. Cekalovic (CNCI); Cunco I, 1937, Dr. Reed (USNM); Pichinahuel, Cord. Nahuelbuta, XII-(23-31)-1958, L.E. Peña (USNM); Río Blanco, III-27-1951, L.E. Peña (FMNH); Temuco, 1912, A.C. Soldana (USNM); Termas de Tolguaca, 1000 m, II-(19-20)-1991, D. MacNeill (CASC); W Angol, Crest of Sierra Nahuelbuta, 1200 m, I-3-1951, Ross & Michelbacher (CASC); 22 km E Temuco, I-1951, M.G. Smith (CASC); 20 km E Temuco (USNM); Los Lagos, Ancud, IV-1941, P.A. Berry (USNM); Chiloe Island, Da'cahue, 1962, D. Usinger (EMEC); Chiloé, Chonchi, I-21-1962, L. Peña (CNCI); Chiloe Isl., ca. 100 m, 1 km E Lago Tepuhueco, ca. 40 air km SW Castro, XII-(23-25)-1981, D.R. Davis (USNM); Chiloé, San Pedro, H. Christensen, III-27-1914 (ZMUC); Enco, Valdivia, II-(20-23)-1978, T. Cekalovic (CNCI); Isla Chiloé, Dalcachue, I-(17-31)-1962, L. Peña (CNC); Llanquihue, III-84, L.E. Peña (FMNH); Osorno, Puyehue Nat. Pk., Anticura, II-4-1978, 350 m, P.J. Spangler (USNM); Osorno, 10 km E Puyehue, I-24-1951 (CASC); Palena, Río Futaleufu, 37 km SW Futaleufu, I-27-1987, C.M. & O.S. Flint Jr. (USNM); Puerto Octay, XI-30-46, P.A. Berry (USNM); Puyehue, III-1-45, E.A. Chapin (USNM); Valdivia, X-26-1980, E. Krahmer (ZMUC); 8 mi. W Puerto Varas, I-16-1951, Ross & Michelbacher (CASC); Maule, Alto de Vilches, 70 km E Talca, (XII-5-1984)-(II-20-1985), Nothophagus forest, S. & J. Peck, FIT 1300 m (CMNC); Talca, Alto Vilches, XII-1977, T. Cekalovic (CNCI); Santiago (CUIC); Melipilla (CASC); Region unknown, Cord. Parral, Fundo Malcho, I-1958, L.E. Peña (USNM); El Manso, 1960, A. Kovaks (BMNH); Fundo Malcho, Cord. Parral, X-1956, L. Peña (CNCI); Kocharno, 1960, A. Kovaks (BMNH).

DIAGNOSIS. *Semiotus luteipennis* is most closely allied to *S. ligneus* and *S. serraticornis*. It can be readily separated from these species by the deep red elytra and pronotal margins and the black head and pronotal disk. The dorsum of both *S. ligneus* and *S. serraticornis* is a pale yellowish brown interrupted by darker vittae, lacking either deep red or completely black patterns (although the medial pronotal vitta of *S. serraticornis* is often a dark brown). The apex of each elytron is doubly spined in *S. luteipennis*. In *S. ligneus* and *S. serraticornis* each elytron ends in a single spine. *Semiotus imperialis* and *S. cuspidatus* are the only other 2 species that bear these double spines (of equal length) but can be readily separated from *S. luteipennis* by the medial frontal spine. The frons in *S. luteipennis* bears no spines or angles. The anterior sclerite of the bursa copulatrix is vestigial in *S. luteipennis*, with the lateral arms not extending much at all beyond the medial arm (Fig. 47). The lateral arms in *S. imperialis*

(Fig. 48) and *S. cuspidatus* (Fig. 46) are much longer. The anterior sclerites of *S. ligneus* and *S. serraticornis* are absent entirely. The male parameres, anterior to the apical blades are evenly convex in *S. luteipennis* (Fig. 123), and the apical blades are approximately a fifth the length of the parameres. In *S. ligneus* (Fig. 124) and *S. serraticornis* (Fig. 128) the parameres are sinuate along the outer margin. In *S. cuspidatus* and *S. imperialis* the apical blades are less than an eighth the length of the parameres. Geographically *S. luteipennis* occurs farther south than any other *Semiotus*, occurring in Argentina and Chile. The piceus venter (excluding the sanguineous borders of the hypomera), the sanguineous elytra and pronotal margins, piceus head and pronotal disk and antennae, lack of frontal spines, and double apical spines of each elytron separate *S. luteipennis* from all other *Semiotus*.

REMARKS. *Semiotus luteipennis* has been collected on *Araucaria imbricata* (most likely *A. araucana*) and the larva have been found in worm-eaten wood of the same species (Bartlett-Calvert, 1898). Orellana (1938) provided additional records as follows: Isla del Huafo, Panguipulli, Temuco, Concepción, Bulnes y San Carlos, Valdivia, Calbuco, Pichibureo, Curacautín, Termas de Chillán. Specimens in this study were not seen from these localities.

Semiotus melleus n. sp.
(Figs. 20, 73, 108, 213)

DESCRIPTION. Length 20 to 24 mm (length/width ratio 4.1 to 4.6). Head luteus to testaceous with basal macula piceus; bearing 2 spines anterolaterally; texture glabrous, nitidus with few scattered setae above eyes, punctation moderately deep; ocular index 68.0 to 71.0. Antennae serrate, reaching hind angles in females, or just beyond hind angles in males; segments 1 and 2 fulvus to testaceous, segments 3 to 11 piceus. Pronotum 4 to 6 mm (length/width ratio 1.1 to 1.3), narrowly sinuate with hind angles diverging, margin incrassate without sulcus; color luteus to testaceous with 2 piceus sinuate vittae extending from base to near anterior border; texture glabrous, nitidus, with fine punctation throughout. Scutellum parallel-sided, posterior border rounded, anterior margin straight to moderately incised. Prosternum concave in profile; color testaceous to sanguineous with piceus lateral vittae; texture glabrous with very fine punctures medially, fine setae and thick and often umbilicate punctures laterally. Hypomeron fulvus to aurantiacus with piceus vittae along suture; texture glabrous with few erect setae along lateral margin, punctures fine and scattered throughout. Mesosternum fulvus to aurantiacus with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum

fulvus to testaceus with obscure margins. Metasternum testaceus with lateral vittae piceus; texture with fine decumbent setae throughout becoming denser anterolaterally, fine punctures scattered throughout. Femora testaceus to badius. Elytra 14 to 17 mm (length/width ratio 2.8 to 3.1), subparallel on anterior half, then narrowing to tip; color luteus with intervals 2, 4, 6, 8, and often outer edge of 9 testaceus to badius; texture glabrous, nitidus, striae and strial punctures fine to obsolete; apices each ending in a point. Abdomen aurantiacus to sanguineus medially, fulvus to luteus laterally with or without piceus sublateral maculae or vittae; texture of fine decumbent setae throughout, with fine punctures scattered throughout; female with fine impression (often very faint) on anterior third of sternite 5; anterior sclerite wider than long, lateral arms not extending posteriorly as far as median piece. Male with parameres narrow medially, lateral blades subtriangular, approximately 1/4 length of parameres.

MATERIAL EXAMINED. Holotype, male: VENEZUELA: Aragua, Rancho Grande Biological Station, Portachuelo Pass 10°21'00"N, 67°41'00"W, elev. 1100 m, VI-4-1998, Ashe, Brooks, Harley, insects moving through pass against wind migration; (SEMC); Paratypes: VENEZUELA: Aragua, nr Maracay, Rancho Grande, VI-(22-24)-1984, J.D. Glaser (CMNH); Alto de Rancho Grande, X-12-1927, H. Pittier (1, USNM); Portachuelo Pass, 20 km N Maracay, elev. 1160 m, IV-13-1972, C.R. Collins (1, CASC); Portachuelo Pass, 20 km N Maracay, elev. 1100 m, IV-6-1972, C.T. Collins (1, CASC); Falcón, Curimagua, 1640 m, III-22-1987, R. Miller & L. Stange, cloud forest (1, FSCA).

DIAGNOSIS. *Semiotus melleus* is most closely allied to *S. trinitensis* and *S. fascicularis* with similarities to *S. bispinus* and *S. clarki*. Of these species, *S. trinitensis* is unique in having a strongly procurved and incised (along the anterior margin) scutellum (Fig. 212) that curves evenly from the disk to the front without a dorsal angle or margin. In the other related species a frontal angle or margin is present. The elytra in *S. melleus* (Fig. 213), *S. clarki* (Fig. 215), and *S. bispinus* (Fig. 209) bear 4 to 5 dark vittae (per elytron) than extend from the elytral base to or near the apex. Each elytron bears only 2 dark vittae in *S. trinitensis*. The dark elytral vittae in *S. fascicularis* are generally restricted to the apical 2/3 of the elytra and consist of a sutural, a marginal, and 2 medial vittae (confluent distally (Fig. 214)). *Semiotus melleus* is known from Venezuela, *S. trinitensis* is known only from Trinidad. The anterior margin of the anterior sclerite of the bursa copulatrix is evenly convex in *S. trinitensis* (Fig. 42). In *S. melleus* (Fig. 73) and *S. clarki* (Fig. 64) the anterior margin is angulate at the point where the lateral arms project posteriorly.

ETYMOLOGY. Candèze recognized *S. melleus* as a distinct species, though this was never published. A specimen in the BMNH is identified with a Candèze label as *Semiotus melleus*. The name was identified by C.M.F. Von Hayek as a manuscript name. The name is here retained as originally proposed by Candèze. The name "melleus" means honey or pollen.

Semiotus pectitus Candèze
(Figs. 5, 217)

Semiotus pectitus Candèze 1889:81 (Holotype: ISNB; type locality: Colombia).

DESCRIPTION. Length 20 to 22 mm (length/width ratio 3.7 to 3.8). Head with faint angles along anterior border, without spines; color sanguineus with median basal macula piceus; ocular index 69.0 to 71.0. Antennae serrate, 0 to 2 segments short of hind angles; segments 1 and 2 sanguineus, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 0.9 to 1.1); narrowly sinuate, hind angles diverging; margin narrowly incressate, declivous on anterior third, without sulcus; color sanguineus with 2 narrow piceus vittae extending from base 2/3 distance to anterior margin; texture glabrous, nitidus with long setae in piceus vittae. Scutellum sanguineus, subchordate with anterior margin recurved; prosternum concave in profile, prosternal process not divided at tip; color aurantiacus to sanguineus, with sutural vitta piceus; texture nitidus, glabrous medially with long setae and umbilicate punctures along suture. Hypomeron aurantiacus to sanguineus, piceus along suture; texture glabrous, nitidus laterally with setae and punctation more pronounced along suture. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus to piceus. Mesepisternum aurantiacus to piceus. Metasternum sanguineus, piceus laterally; texture nearly glabrous with fine punctures medially, denser setae and punctation laterally; femora aurantiacus to sanguineus often with piceus joints. Elytra 14 to 15 mm (length/width ratio 2.5 to 2.6) subparallel on anterior third then narrowing to base; color sanguineus to piceus throughout; texture glabrous, nitidus, intervals strongly convex, striae deeply impressed, interval 3 more convex and rising above level of other intervals on apical half; each elytron bearing a single spine apically with a dentition or definite angle on sutural margin subapically. Abdomen badius to piceus, with sublateral areas darker; texture nearly glabrous with fine punctures medially, denser setae and punctation laterally; female with 2 elliptical foveae on apical 3/5 of sternite 5.

MATERIAL EXAMINED. COLOMBIA: (ISNB).

DIAGNOSIS. *Semiotus pectitus* is most closely allied to *S. auripilis*, *S. seladonius*, and *S. bispidus*. It can be readily distinguished from these species

by the deep red elytra with strongly convex interstriae (nearly hemispherical when viewed from behind). *Semiotus auripilis* also has strongly convex interstriae, but the elytral color is pale yellow to light brown. The elytral color of *S. hispidus* is black, or black with pale vittae, and that of *S. seladonius* is green. Both of these species have flat or only slightly convex interstriae. *Semiotus pectitus* is superficially similar to *S. schaumii*. Both species are deep red and lack frontal spines. The pronotum in *S. schaumii* bears a single black vitta (often faint), that of *S. pectitus* bears 2 black vittae. Also, the elytral interstriae in *S. schaumii* are flat, or nearly so. *Semiotus pectitus* occurs in Colombia. Most related species occur elsewhere. *Semiotus hispidus* occurs in Venezuela, *S. auripilis* occurs in Bolivia, *S. seladonius* occurs in Bolivia and Colombia, and *S. schaumii* occurs in Ecuador and Peru. The deep red body color, lack of frontal spines, double piceus pronotal vittae, and convex interstriae distinguish *S. pectitus* from all other *Semiotus*.

Semiotus perangustus n. sp.
(Figs. 23, 56, 98, 233)

DESCRIPTION. Length 19 to 27 mm (length/width ratio 4.8 to 5.0). Head testaceous to aurantiacus with piceus median and basal macula (or with base completely piceus); with 3 frontal spines; texture of long erect setae over eyes, finer decumbent setae throughout, punctation deep and scattered throughout; ocular index 75.0 to 78.0. Antennae serrate, reaching hind angles in females, extending 1 to 2 segments beyond hind angles in males; segments 1 to 2 testaceous, 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 1.2 to 1.4), sinuate, hind angles moderately divergent; margin incrassate becoming explanate on anterior fifth, sulcate only on anterior fourth; color fulvus to aurantiacus laterally and anteriorly with median vitta aurantiacus to sanguineus, with 2 broad sublateral piceus vittae extending from base to near anterior border; texture glabrous medially with dense luteus decumbent setae laterally, punctation fine medially becoming dense laterally. Scutellum fulvus to testaceous, suborbicular, anterior margin slightly recurved. Prosternum slightly concave in profile, prosternal process not divided at tip; color fulvus to testaceous medially with or without piceus vitta along suture; texture of long erect setae scattered throughout with fine dense decumbent setae laterally, punctation fine medially, dense laterally. Hypomeron fulvus to testaceous with piceus vitta along suture; texture of fine decumbent setae and fine punctation becoming denser medially. Mesosternum fulvus to testaceous with or without piceus macula, fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum fulvus to testaceous with piceus macula. Metasternum glabrous with

fine punctation medially and with fine dense setae and fine punctures anterolaterally; color aurantiacus to testaceous medially, badius to piceus anterolaterally. Femora testaceous to badius. Elytra 13 to 17 mm (length/width ratio 3.0 to 3.3), subparallel on anterior third then narrowing to tip; color fulvus with badius to piceus irregular vittae along each stria; texture glabrous, nitidus, striae faint, stria punctures moderately deep; apices each bearing 1 spine. Abdomen fulvus to testaceous with or without darker lateral vittae; texture glabrous, nearly impunctate medially, dense punctures and dense decumbent setae laterally; female with 2 elliptical foveae on apical half of sternite 5; anterior sclerite with lateral arms evenly convex externally, extending apically 1/3 length of median piece. Male with parameres constricted before blades, lateral blades obtuse apically, spines projecting posterolaterally, 0.28 to 0.30 length of parameres.

MATERIAL EXAMINED. Holotype, male: ECUADOR: Baños, VI-15-1936 (PCCV); Paratypes: BOLIVIA: Santa Cruz, 4–5 km N Achira, Rd. to Amboro, X-(12-13)-2000, Wappes & Dozier (1, JEW); ECUADOR: Carchi: 46 km W Tufino, west slope 2600 m, XI-19-1987, C. Young, under dead wood (1, CMNH); Morona—Santiago, Sangay, II-3-1966, R.D.L. (1, FMNH); Napo, Baeza, 2000 m, III-5-1979, S. Marshall (1, CNCI); Hac. Aragon, Sierra Azul, 2250 m, 0.67°S, 77.92°W, (II-17)-(III-8)-1996, P. Hibbs (2, LACM); Tungurahua, Runtún (above Baños), 2500 m, IX-(24-25)-1996, E. Giesbert (1, FSCA).

DIAGNOSIS. *Semiotus perangustus* is most closely allied to *S. angustus* and other species with 3 frontal spines, dense pronotal setae, and pale elytra with infusate striae (*S. cristatus*, *S. linnei*, *S. colombianus*, and *S. auripilis*). *Semiotus auripilis* is distinct from *S. perangustus* by the strongly convex elytral intervals. The intervals in *S. perangustus* are flat, or nearly so. The lateral frontal spines of *S. cristatus* are shorter than those of *S. perangustus*, not extending forward beyond the length of the medial spine. In *S. perangustus* the lateral spines are much longer than the medial spine. The pronotal vittae in *S. linnei* are arcuate (especially along the medial side), those of *S. perangustus* are subparallel. *Semiotus colombianus* is larger (over 22 mm long) than *S. perangustus* (less than 22 mm long). *Semiotus perangustus* and *S. angustus* can be distinguished from these related species by their narrow body and smaller size. These 2 species are similar but can be separated by several characters. *Semiotus perangustus* has darker antennae (segments 3 to 11 are nearly piceus). In *S. angustus* segments 3 to 11 are only slightly darker than segments 1 and 2. The female of *S. perangustus* bears 2 deep foveae on sternite 5. The female of *S. angustus* lacks foveae. The anterior sclerite of the bursa copulatrix is much larger in *S. perangustus*, where lateral arms

are present (Fig. 72), than in *S. angustus*, where lateral arms are lacking (Fig. 71).

ETYMOLOGY. The name refers to the narrow profile and aedeagus.

Semiotus pilosus n. sp.

(Figs. 25, 102, 245)

DESCRIPTION. Length 24 mm (length/width ratio 4.5 to 4.6). Head badius to piceus, fulvus to testaceus anteriorly; with 3 frontal spines; texture of fine decumbent aureus setae throughout, with long erect setae over eyes and spines, punctation deep and scattered throughout. Antennae serrate, reaching hind angles or extending beyond by less than 1 segment; segments 1 and 2 testaceous, segments 3 to 11 rufopiceus. Pronotum 5 to 6 mm (length/width ratio 1.1), narrowly sinuate, hind angles diverging, margin incassate without sulcus (or with sulcus very faint); color badius, lateral margin fulvus; texture of fine aureus setae, punctation deep and scattered throughout. Scutellum testaceous, suborbicular, anterior margin recurved. Prosternum concave in profile, not divided apically; color sanguineus, lobe aurantia-cus; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomeron badius to piceus with lateral and posterior border fulvus; texture of dense punctures and dense aureus setae. Mesosternum testaceous; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum testaceous. Metasternum testaceous; texture of dense punctures and dense aureus setae. Femora testaceous to badius. Elytra 16 to 17 mm (length/width ratio 3.1 to 3.2), nearly parallel-sided on anterior third then narrowing evenly to apex; color fulvus, striae 1, 2, 3, 7, and 8 narrowly infuscate, striae 4, 5, and 6 broadly infuscate; apices each bearing 1 spine. Abdomen badius; texture glabrous with fine punctures medially, of dense punctures and dense aureus setae laterally. Male with lateral paramere blades subparallel, 0.30 to 0.35 length of parameres, lateral spines nearly at right angles to parameres.

Female not seen.

MATERIAL EXAMINED. Holotype, male: ECUADOR: Loja, NW Panagul de Podocaspus, III-6-1987, P. Johnsen (ZMUC); paratype: ECUADOR: Loja, 10 km NW Loja, continental divide, VI-9-1983, J. Rawlins, S. Thompson (CMNH).

DIAGNOSIS. *Semiotus pilosus* is most closely allied to *S. vicinus* and other species with 3 frontal spines and infuscate striae (including *S. cristatus*, *S. linnei*, *S. perangustus*, *S. angustus*, and *S. colombianus*). Superficial similarities also exist with *S. auripilis*. All of these species have pale elytra with dark striae and a dense covering of setae on the pronotum. *Semiotus auripilis* is separated from *S. pilosus* by the strongly convex elytral intervals. The intervals are nearly flat in *S.*

pilosus. *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similarly patterned elytra but have glabrous, or nearly glabrous, pronota. Of the related species (with pronotal setae), *S. pilosus* and *S. vicinus* are unique in lacking lateral sulci on the pronotum (or it is very faint if present). The 2 species can be separated by the color of the pronotum. *Semiotus pilosus* has a completely brown to reddish brown disk, with only the peripheral areas pale. *Semiotus vicinus* bears 2 black vittae on the pronotal disk. The unicolorous elytral intervals with infuscate striae, lack of (or very faint) lateral pronotal sulci, and nearly uniform badius pronotum (with fulvus margins) with dense decumbent setae separate *S. pilosus* from all other *Semiotus*.

ETYMOLOGY. The name refers to the dense, decumbent setae on the pronotum.

Semiotus punctatostratus Candèze

(Figs. 15, 38, 132, 151, 237)

Semiotus punctatostratus Candèze 1857:328, Candèze 1874:184, Kirsch 1884:43, Steinheil 1875:113 (Lectotype, male: MNHN; type locality: New Granada).

DESCRIPTION. Length 25 to 27 mm (length/width ratio 3.8 to 4.3). Head sanguineus, with or without basal piceus macula; bearing 2 antero-lateral spines, with area between spines distinctly angled; frons with fine setae scattered throughout becoming denser and thicker in median depression. Antennae approximately 1 segment short of hind angles, with segments 1 and 2 badius, segments 3 to 11 rufopiceus to piceus. Pronotum 6 to 8 mm (length/width ratio 1.1 to 1.2), widest at base becoming evenly narrower anteriorly, hind angles gradually enlarged; margin broadly rounded, without sulcus; color sanguineus with 2 piceus vittae extending from base to just before anterior margin; texture glabrous medially with fine dense setae laterally, punctation fine and distinctly separated on disk, becoming approximate, dense, and umbilicate anterolaterally. Scutellum subrectangular, anterior margin wider, posterior margin rounded. Hypomeron piceus medially becoming sanguineus along outer margin, basal area fulvus; texture glabrous laterally with fine dense setae medially along suture, punctures small and contiguous medially becoming larger and less contiguous laterally. Prosternum slightly concave in profile; color sanguineus, lobe becoming testaceous, suture piceus; texture nearly glabrous medially with fine dense setae laterally, punctation very fine medially becoming larger and denser laterally. Mesosternum sanguineus with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum piceus, with or without infuscate margins. Metasternum sanguineus with piceus triangular macula along lateral margin extending nearly to meso-

coxae anteriorly; texture glabrous medially with dense setae anterolaterally, punctation fine and moderately dense throughout. Femora testaceous to badius. Elytra 17 to 19 mm (length/width ratio 2.6 to 2.8), subparallel only on anterior 1/4, then narrowing gradually to tip; color testaceous with infuscate striae, or with elytra badius with intervals 3 (sometimes 5) and 7 fulvus; texture glabrous, interstriae impunctate and convex, striae evident with broad punctures; apices each bearing 1 obtuse spine. Abdomen sanguineous with rufopiceous to piceus maculae on sublateral areas of first 3 to 4 segments, lateral margin with subhemispherical maculae testaceous to luteus; texture mostly glabrous with clumps of setae sublaterally, especially on segment 1 and around foveae, punctation fine medially becoming denser and contiguous laterally. Female with 2 obovate foveae on posterior half of sternite 5; lateral arms of anterior sclerite narrow, 4/5 length of median piece, median piece armed with dense subserrate dentitions. Male with parameres sinuate, blades roughly 1/4th length of parameres, penis extending beyond paramere apices.

MATERIAL EXAMINED. COLOMBIA: Cauca (CUIC); Nariño, 25 mi. SW Mocoa, 2080 m, III-3-1955, E.I. Schlinger and E.S. Ross (CASC); **ECUADOR:** (PCCV); **VENEZUELA:** Apure, San Fernando de Apure, L. Laglaize (ISNB).

DIAGNOSIS. *Semiotus punctatostratus* is most closely allied to *S. girardi* and related to *S. imperialis*, *S. cuspidatus*, *S. chassaini*, *S. gibbosus*, and *S. fryi*. All these species are gibbous in profile and have convex interstriae. *Semiotus imperialis*, *S. cuspidatus*, and *S. chassaini* all bear a single spine at the center of the frontal margin that extends forward and down. The anterolateral areas of the frons are rounded, without spines. The other gibbous species (*S. punctatostratus*, *S. gibbosus*, *S. fryi*, *S. girardi*, and *S. chassaini*) all bear 2 spines along the anterolateral margin of the frons and lack a medial frontal spine. The pronotum of *S. gibbosus*, *S. fryi*, and *S. chassaini* are glabrous or bear only fine and inconspicuous setae. The pronotum of *S. punctatostratus* and *S. girardi* are covered with thick pale to golden setae. *Semiotus punctatostratus* can be separated from *S. girardi* by the shape of the pronotum. In *S. girardi* the lateral margin is constricted just posterior to the anterolateral angles. In *S. punctatostratus* the lateral margin is evenly convex all the way to the anterolateral angles. Superficial similarities exist between specimens of *S. punctatostratus* with pale elytra and infuscate striae (which includes most of the specimens examined) and many of the species with similar elytral coloration (such as *S. linnei*, *S. cristatus*, and *S. colombianus*). These species have 3 frontal spines and lack a gibbous profile. The combination of dense pronotal setae, gibbous profile, and double frontal spines distinguish *Semiotus punctatostratus* from all other *Semiotus*.

REMARKS. Three types located in the BMNH indicate a locality "Mexico" with a line through it. No specimens have otherwise been seen from Mexico, and the locality is most likely incorrect.

Semiotus reaumuri Candèze
(Fig. 26)

Semiotus reaumurii Candèze 1857:327 (Holotype: BMNH; type locality: Colombia).

Semiotus reaumuri, Candèze 1874:182, Steinheil 1875:113.

DESCRIPTION. Length 26 to 28 mm (length/width ratio 4.6 to 4.8). Head fulvus to aurantiacus with median piceus macula extending anteriorly to near anterior margin; bearing 3 frontal spines; texture glabrous, with few erect setae above eyes and over spines, punctation becoming umbilicate and larger basally. Antennae serrate, 0 to 1 segments short of hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 6 to 7 mm (length/width ratio 1.3 to 1.4), with sides nearly straight, hind angles diverging, lateral margin broadly rounded, undulate, without sulcus, converging anteriorly to foveate angles; color fulvus to aurantiacus laterally, with broad piceus vittae separated by sanguineous coloration between, anterior angles with piceus maculae on basal third extending from near foveae; texture glabrous, nitidus, with few erect setae on lateral margin, punctation dense, subumbilicate and often contiguous. Scutellum testaceous, broadly subchordate. Prosteronum nearly straight; color testaceous to sanguineous, lobe paler, with or without dark vitta along suture; texture glabrous with fine punctation medially with thick pile and dense punctation laterally. Hypomerion fulvus to badius laterally, with broad piceus vitta medially; texture glabrous along lateral margin, with dense setae and fine punctation throughout. Mesosternum aurantiacus to testaceous; fossa texture glabrous, lateral areas covered with fine setae and punctures. Mesepisternum aurantiacus to testaceous. Metasternum aurantiacus to badius with dark vitta medially; texture glabrous with fine punctation medially with dense setae and punctation laterally. Femora aurantiacus to testaceous, joints piceus. Elytra 17 to 19 mm (length/width ratio 3.0 to 3.2), subparallel on anterior third then narrowing to tip; color fulvus to luteus, striae aurantiacus to testaceous; texture glabrous, nitidus, intervals flat, striae faint to obsolete, striae punctures clearly defined and infuscate; apices each bearing 1 spine. Abdomen badius to sanguineous medially, aurantiacus to testaceous laterally; texture glabrous, with fine punctation medially, fine setae and dense punctation laterally; female with 2 elliptical foveae on posterior half of sternite 5.

MATERIAL EXAMINED. COLOMBIA: (CMNH); Capital, Bogotá (ISNB); Tolima, Honda, Le Moul (ISNB).

DIAGNOSIS. *Semiotus reaumuri* is most closely allied to *S. glabricollis* with similarities to *S. buckleyi* and other species with 3 frontal spines and infusate striae. It is unique from these species in having anterolateral black maculae on the pronotum (in addition to the discal vitta(e)). Several species have pale elytra with infusate striae and a dense covering of setae on the pronotum (*S. pilosus*, *S. cristatus*, *S. auripilis*, *S. linnei*, *S. perangustus*, *S. colombianus*, *S. vicinus*, and *S. angustus*). *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similar elytra but lack setae on the pronotum (or have very faint and inconspicuous setae). These 3 species can be separated by the color of the elytral striae and by the pronotum. In *S. buckleyi*, the dark strial vittae are black and extend out from the striae onto the elytral intervals, and the lateral pronotal margins bear sulci on the anterior third to half. In *S. reaumuri* and *S. glabricollis*, the strial vittae are light brown, and the pronotum lacks sulci. The pronotal punctation in *S. reaumuri* is dense, subumbilicate, and often contiguous. In *S. glabricollis*, the punctation is finer and less dense. *Semiotus buckleyi* is known from Ecuador (Fig. 19), *S. reaumuri* and *S. glabricollis* are known from Colombia. The combination of dark vittae along each elytral stria, glabrous pronotum, lack of a pronotal sulcus along the anterolateral margin, 3 frontal spines, and the presence marginal maculae on the pronotum separate *S. reaumuri* from all other *Semiotus*.

Semiotus regalis Guérin-Ménéville
(Figs. 26, 36, 117, 148, 222)

Semiotus regalis Guérin-Ménéville 1844:16, Candèze 1857:319, Candèze 1874:179, Steinheil 1875:111 (Lectotype, female: MNHN; type locality: Colombia).

DESCRIPTION. Length 25 to 27 mm (length/width ratio 4.0 to 5.0). Head piceus with anterolateral areas aurantiacus to sanguineus; bearing 2 short obtuse lateral spines and angled median area between spines; texture of long erect setae over eyes, shorter fine decumbent setae throughout, punctation moderately deep and scattered throughout; ocular index 80.0 to 83.0; frontal spines (or angles) approximately 0.12 length of frons. Antennae serrate, 1 to 2 segments short of hind angles in females, reaching to or slightly beyond hind angles in males; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 to 6 mm (length/width ratio 1.0 to 1.1), broadly sinuate, hind angles diverging; margin incrassate, undulate; color testaceous to sanguineus along lateral and anterior margins, median line aurantiacus to sanguineus, with 2 broad rectangular vittae extending from base to near anterior margin; texture of fine setae scattered throughout or absent, punctation double. Scutellum testaceous to piceus, wider than

long, anterior margin recurved. Prosternum slightly concave in profile, prosternal process not divided apically; color aurantiacus to sanguineus medially, piceus along suture; texture of long erect setae and fine punctation medially, decumbent setae and thicker punctation laterally. Hypomeron piceus with lateral border aurantiacus to sanguineus; texture glabrous or with few scattered setae, punctation shallow to obsolete throughout. Mesosternum aurantiacus to sanguineus medially, piceus laterally; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum aurantiacus to sanguineus medially, piceus laterally; texture of fine setae and deep punctures (often nearly contiguous) throughout. Femora testaceous to aurantiacus with tarsi and joints piceus. Elytra 17 to 19 mm (length/width ratio 2.0 to 3.0), subparallel on anterior half to 2/3 then narrowing to tip; color piceus with intervals 3, 5, 7, and lateral border luteus and equal to or more convex than other intervals; texture glabrous, nitidus, striae shallow, strial punctures clearly defined; apices rounded without spines. Abdomen Aurantiacus to sanguineus with 2 sublateral piceus vittae; texture of fine scattered setae and punctures throughout; female with 2 broadly elliptical foveae on apical half of sternite 5; anterior sclerite with lateral arms short, nearly at right angles to median piece, with few serrations along apical surface. Male with parameres narrowing medially, lateral blades approximately 0.30 to 0.33 length of parameres.

MATERIAL EXAMINED. COLOMBIA: Boyacá, Tunja, Boy, V-30-1946, E.A. Chapin (USNM); Capital District, Bogotá (CMNH); Cundinamarca, 3400 m, III-20-1940 (CNCI); Department unknown, Páramo de Monserrate, 3200 m, IV-26-1969, on *Espeletia grandiflora* (CNCI); Páramo de Monserrate, 3250 m, IV-4-1969, on dead leaves of *Espeletia grandiflora* (CNCI).

DIAGNOSIS. *Semiotus regalis* is most closely allied to *S. sommeri*, *S. rubricollis*, *S. virgatus*, and *S. buckleyi*. It is most readily separated from these (and all other *Semiotus*) by the alternating light and dark elytral intervals, with both intervals 1 and 2 being completely black (Fig. 222). *Semiotus virgatus* and *S. buckleyi* (along with other less related species) have alternating light and dark elytral intervals, but intervals 1 and 2 consist of 2 contrasting colors. *Semiotus rubricollis* has unicolorous intervals 1 and 2, but these are deep red in color. Some specimens of *S. regalis* have reduced frontal spines. These individuals key out near *S. hispidus*, which often has alternating light and dark elytral vittae. *Semiotus hispidus* can be readily recognized by the completely black abdomen and prosternum. *Semiotus regalis* will have contrasting red and black abdominal and prosternal patterns. The lateral arms of the anterior sclerite of the bursa copulatrix are short

and do not extend posteriorly in *S. regalis* (Fig. 36) or in *S. sommeri* (Fig. 87). In *S. buckleyi* (Fig. 35) and *S. virgatus* (Fig. 76) the lateral arms extend posteriorly over half the length of the median piece.

Semiotus ruber Pjatakova

Semiotus ruber Pjatakova 1941:106 (Holotype, lost; type locality: Ecuador).

DESCRIPTION. Specimen not seen. Description taken from Pjatakova, 1941. Length 25 mm (length/width ratio 4.1 to 4.2). Head red with apical black macula, strongly punctate, bearing 2 frontal spines. Antennae short, reaching or nearly reaching half way to the pronotal angles; color black, segments 1 and 2 reddish basally. Pronotum more than 1.5 times longer than wide, nearly flat with angular widening laterally, front angles blunt with declivous pit; color half red with 2 black vittae. Scutellum subchordate, medially impressed; color red medially darker peripherally. Sternum yellow to reddish yellow. Abdominal segments 2 to 4 with dark punctures. Femora testaceus. Elytra sanguineous to dark blue red, becoming darker apically, suture darker; texture without impressions except for sutural and lateral striae; apices each bearing a spine.

MATERIAL EXAMINED. None.

REMARKS. The type and only known specimen of *S. ruber* was destroyed (V. Dolin, personal communication). No specimens fitting the specific description have been seen during the course of this study.

Semiotus rubricollis n. sp.

(Figs. 26, 63, 225)

DESCRIPTION. Length 24 to 25 mm (length/width ratio 4.1 to 4.2). Head aurantiacus to sanguineous with basal macula piceus; bearing 3 frontal spines; texture of few erect setae over eyes and spines, punctation scattered throughout. Antennae 1 to 2 segments short of hind angles in females; segments 1 and 2 testaceus, segments 3 to 11 piceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.3), narrowly sinuate with hind angles diverging, margin incrassate, with sulcus on anterior half; color aurantiacus to sanguineous with 2 sinuate piceus vittae on disk, hind angles fulvus; texture glabrous, nitidus, moderately deep punctation becoming denser and umbilicate anterolaterally. Scutellum aurantiacus, subquadrate, wider than long. Prosternum concave in profile; color sanguineous to aurantiacus with piceus vitta along suture; texture glabrous medially with erect setae laterally and on lobe, punctation fine medially thicker and umbilicate laterally. Hypomeron aurantiacus anteriorly, fulvus posteriorly with piceus vitta along suture; texture glabrous, nitidus, punctation fine laterally, dense medially. Mesosternum sanguineous to testaceus; fossa gla-

brous and impunctate, lateral areas densely setose and punctate. Mesepisternum piceus. Metasternum aurantiacus to sanguineous with median vitta piceus; texture with short erect setae and fine punctation scattered throughout. Femora aurantiacus to testaceus. Elytra 17 to 18 mm (length/width ratio 2.9 to 3.1), subparallel on anterior third to fourth, then narrowing to tip; color sanguineous with interval 3 and portion of base aurantiacus; texture glabrous, nitidus, striae and stria punctures fine to obsolete; apices each bearing 1 spine. Abdomen sanguineous to testaceus with fulvus hemispherical lateral maculae; texture glabrous, nitidus with fine setae on first visible sternite, punctures fine and scattered throughout; female with 2 elongate subelliptical foveae on apical 3/5 of sternum 5; anterior sclerite with small dentitions on lateral arms, median piece 1.2 times as long as lateral arms.

Male unknown.

MATERIAL EXAMINED. Holotype, female: ECUADOR: Dist. Churubamba, Dept. Huanuco, Hacienda Bjita, IX-36, 2000 m, V. Mexla (CASC).

DIAGNOSIS. *Semiotus rubricollis* is most closely allied to *S. sommeri*, *S. regalis*, *S. virgatus*, and *S. buckleyi*. It is most readily separated from these by the deep red elytra (with pale yellow vitta on interval 3). The above related species all have pale brown to yellow elytra with dark brown to black alternating vittae. *Semiotus schaumii* and *S. pectitus* also have deep red elytra (occasionally with yellow vittae), though darker than *S. rubricollis*. These 2 species lack frontal spines, whereas *S. rubricollis* bears 3. *Semiotus pectitus* has very convex elytral intervals. The intervals in *S. rubricollis* are flat, or nearly so.

ETYMOLOGY. *Semiotus rubricollis* is named for the reddish coloration of the elytra.

Semiotus schaumii Guérin-Ménéville

(Fig. 26)

Semiotus schaumii Guérin-Ménéville 1844:16, Candèze 1857:330 (Type: lost; type locality: New Granada).

Semiotus schaumii, Candèze 1874:185.

Semiotus langei Schwarz 1902b:132–133. (Holotype, male: DEIC; type locality: Peru, Chanchamaya). New synonym.

DESCRIPTION. Length 14 to 15 mm (length/width ratio 4.1 to 4.3). Head with faint angles along anterior border, without spines; color testaceus to sanguineous with median basal macula sanguineous to badius; texture glabrous, nitidus with few erect setae above eyes and anterior margin, punctation sparse and scattered throughout; ocular index 71.0 to 78.0. Antennae serrate, extending 1 segment short of hind angles to 1 to 2 segments beyond hind angles in males; segments 1 and 2 testaceus, segments 3 to 11 rufopiceus to piceus. Pronotum 3 to 4 mm (length/width ratio

1.1 to 1.2); narrowly sinuate, hind angles diverging, with 2 foveae anterolaterally, 1 apically and 1 on anterior third; margin narrowly incrassate without sulcus, with supermarginal thickening subcarinate on hind angles; color testaceous to sanguineous with or without thin median vitta sanguineous to badius; texture glabrous, nitidus with fine punctation scattered throughout. Scutellum testaceous to aurantiacus, subchordate. Prosternum concave in profile; color aurantiacus to sanguineous, lobe testaceous with sutural vitta piceus; texture glabrous medially with fine erect setae on lobe, punctation very fine medially, dense and deep laterally. Hypomeron testaceous to aurantiacus; texture very finely granulate. Mesosternum finely punctate with fine setae, fossa glabrous and impunctate; color aurantiacus with piceus maculae laterally. Mesepisternum aurantiacus to sanguineous, with piceus maculae. Metasternum aurantiacus to testaceous medially, badius laterally; texture glabrous medially with dense decumbent setae laterally; femora testaceous. Elytra 9 to 11 mm (length/width ratio 2.8 to 2.9) narrowing nearly from base; color testaceous to aurantiacus basally, becoming progressively darker apically, apex nearly piceus, each elytron bearing a single spine. Abdomen testaceous to sanguineous, lateral margin lighter; texture with dense aureus decumbent setae laterally, scattered erect setae medially, punctation fine medially, denser and deeper laterally; female with 2 broadly oval foveae on sternite 5.

MATERIAL EXAMINED. ECUADOR: Morona—Santiago, Chigüinda, Buckley (BMNH); PERU: Junín, Chanchamaya, D. Lange (DEIC); Chanchamayo, A. Heyne (MNHN).

DIAGNOSIS. *Semiotus schaumii* is most closely allied to *S. pectitus* and *S. formosus*. It also bears similarities to *S. fleutiauxi* and *S. kathleenae*. All of these species have deep red patterns dorsally. *Semiotus pectitus*, *S. kathleenae*, *S. formosus*, and *S. schaumii* lack frontal spines. *Semiotus fleutiauxi* bears 2 stout frontal spines. The pronotum in *S. schaumii* bears a single black vitta (often faint), that of *S. pectitus* bears 2 black vittae. The pronotum in *S. formosus* is mostly black with yellow to light brown areas on or near the anterior and posterior angles. The pronotum of *S. kathleenae* is deep red with 2 broad black vittae covered by dense setae. The pronota of *S. schaumii*, *S. pectitus*, and *S. formosus* are glabrous, or nearly so. The elytral interstriae in *S. schaumii* are flat. In *S. pectitus* they are strongly convex.

REMARKS. Specimens in the BMNH have a bright yellow vitta that occupies the apical 2/3 of interval 3. These specimens were taken from Ecuador and may represent a valid subspecies. Further material is required to verify this. The type of *Semiotus langei* is paler than that of *S. schaumii*. All other characters are similar. Intensity of color varies interspecifically in most

groups of *Semiotus* and does not justify separate specific treatment.

Semiotus seladonius Guérin-Méneville
(Figs. 27, 119, 177, 256)

Semiotus seladonius Guérin-Méneville 1844:16, Guérin-Méneville 1855:578, Candèze 1857:330, Candèze 1874:185, Steinheil 1875:113, Fleutiaux 1925:109 (Type: not found; type locality: New Granada).

DESCRIPTION. Length 21 to 22 mm (length/width ratio 3.6 to 4.0). Head piceus; anterolateral margin angled, lacking spines; texture of dense setae and punctures throughout; ocular index 75.0 to 78.0. Antennae serrate, 2 segments short of hind angles in males; segments 1 and 2 testaceous to aurantiacus, segments 3 to 11 piceus. Pronotum 4.5 to 5.5 mm. (length/width ratio 0.9 to 1.2), sinuate with hind angles diverging, subcomplanate, margin thinly rounded without sulcus; color piceus (sometimes interrupted medially by badius to sanguineous vitta extending from base to anterior border) with fulvus to testaceous anterior border and margin; texture densely setose throughout except medially, punctation deep and often contiguous, becoming finer and less dense anteromedially. Scutellum piceus throughout or with pale posterior border, widely elliptical, anterior margin straight. Prosternum nearly straight in profile, curving ventrally on lobe; color piceus or with sanguineous vitta medially; texture of dense setae throughout, punctation moderately dense medially becoming deeper and denser laterally. Hypomeron piceus with lateral margin fulvus to testaceous; texture of dense setae and punctures throughout. Mesosternum piceus or with fossa sanguineous, with dense setae and punctures laterally. Mesepisternum piceus. Metasternum piceus with long dense setae and deep punctures throughout. Femora testaceous to aurantiacus. Elytra 16 mm. (length/width ratio 2.7 to 2.9), subparallel on anterior third to half, then tapering to tip; color viridis to subviridis, margin and suture fulvus; striae finely impressed, striae punctures shallow, interstriae nearly flat and smooth on disk, becoming more convex and wrinkled posterolaterally; apices angled or rounded, without spines. Abdomen piceus with testaceous posterior border to sternites 4 and 5 (some specimens with median area sanguineous); texture of dense setae and punctures laterally becoming nearly glabrous and impunctate medially; female foveae not seen. Male with parameres narrowing medially, tips rounded, lateral blades approximately 0.30 length of parameres.

MATERIAL EXAMINED. BOLIVIA: (OXUM); COLOMBIA: Capital District, Bogotá (MNHN); Goudor (ZMUC); Cundinamarca, 3300 m, Guasca, III-10-1942, Chapin (USNM).

DIAGNOSIS. *Semiotus seladonius* is most closely allied to *S. auripilis*, *S. hispidus*, and *S.*

pectitus. It can be easily distinguished from these species by the green or greenish elytra. The elytra of *S. auripilis* and *S. pectitus* are dark red to reddish brown, those of *S. hispidus* are black, or black with pale vittae. The green elytra of *S. seladonius* is similar to those of *S. ligatus*. These species can be particularly distinguished by the setae (especially the prothoracic setae). In *S. seladonius* they are much longer and more erect than those of *S. ligatus* (where the setae are decumbent). The pronotal base color is fulvus around the piceus vittae in *S. seladonius*. In *S. ligatus* the base color is viridis with only the angles being fulvus. The frontal margin in *S. ligatus* is angled to subspinose. In *S. seladonius* the frontal margin is arcuate, without angles or spines. The elytral apices are pointed or spined in *S. ligatus*, whereas in *S. seladonius* they are rounded or occasionally angled. The elytral base is more gibbous in *S. seladonius* than in *S. ligatus*. The aedeagal plates are much shorter in *S. ligatus* (Fig. 118) than in *S. seladonius* (Fig. 119). Geographically, *S. seladonius* occurs in Bolivia and Colombia, whereas *S. hispidus* occurs in Venezuela. Its range in Colombia and Bolivia overlap the ranges of *S. pectitus* (Colombia), *S. ligatus* (Colombia and Ecuador), and *S. auripilis* (Bolivia). The green elytra, lack of frontal spines, and rounded elytral apices separate *S. seladonius* from all other *Semiotus*.

Semiotus singularis Kirsch
(Fig. 27)

Semiotus singularis Kirsch 1884:44 (Lectotype: SMTD; type locality: Ecuador).

DESCRIPTION. Length 21 mm (length/width ratio 3.8 to 3.9). Head piceus basally, fulvus to testaceous over spines; anterior border of frons with 3 angles, lateral 2 angles subspinose. Antennae serrate, reaching 0 to 1 segments beyond hind angles; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum with wide lateral convexities on anterior 1/3, then declining to anterior angles, hind angles divergent; color fulvus to testaceous with 2 sinuate piceus vittae extending from base to near apex, margin undulate; texture glabrous, nitidus. Scutellum suborbicular, piceus, anterior margin recurved. Elytra narrowing nearly from base; color fulvus to testaceous basally, becoming piceus apically; texture glabrous, nitidus, intervals flat, striae and strial punctures faint to obsolete; elytral apices each bearing a single spine.

MATERIAL EXAMINED. ECUADOR: 1500 m, D. Stubel (SMTD).

DIAGNOSIS. *Semiotus singularis* is similar to *S. taeniatus*, *S. buckleyi*, and other species with 3 frontal spines (or angles). It can be readily separated from these species by the pattern of the elytra, which is yellow to pale brown basally changing into black apically. Other species with 3

frontal spines have alternating light and dark vittae running the length of the elytra. The distinct color pattern of the elytra is similar to that of *S. schaumii*, which lacks frontal spines (although the elytra of *S. schaumii* are much more sanguineous basally). The fine lateral pronotal margin evident in *S. singularis* is entirely absent in *S. schaumii*.

Semiotus sommeri Candèze
(Figs. 27, 87, 152, 241, 261)

Semiotus sommerii Candèze 1857:323, Kirsch 1866:180 (Holotype, female: MNHN (on loan from BMNH); type locality: Venezuela).

Semiotus sommeri, Candèze 1874:179, Steinheil 1875:113, Fleutiaux 1891:275.

DESCRIPTION. Length 22 to 28 mm (length/width ratio 4.3 to 4.8). Head luteus to aurantiacus with basal macula piceus; bearing 3 spines apically; texture mostly glabrous with few scattered setae above eyes and spines, punctuation fine and well separated, becoming thicker basally; ocular index 71.0 to 74.0. Antennae serrate, at least 2 segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 5 to 7 mm (length/width ratio 1.2 to 1.4), narrowly sinuate, hind angles diverging, margin incassate, sulcate on anterior third only, with supramarginal thickening extending nearly entire length, anterolateral areas foveate; color fulvus to aurantiacus with 2 longitudinal sinuate vittae (and often sanguineous vittae medially adjacent to piceus vittae) on disk; texture glabrous, nitidus, punctuation fine, becoming umbilicate along anterior border. Scutellum fulvus to testaceous, suborbicular with anterior margin recurved. Prosternum evenly concave in profile; color sanguineus, lobe aurantiacus, with piceus vittae along suture; texture glabrous, nearly impunctate medially, with deep contiguous punctures and dense decumbent setae laterally, and with scattered erect setae laterally on lobe. Hypomeron fulvus to luteus with piceus vitta along suture; texture glabrous, nitidus with fine punctuation throughout becoming denser along suture. Mesosternum fulvus to sanguineus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum fulvus to sanguineus. Metasternum testaceous to sanguineus; texture glabrous and nearly impunctate medially with dense setae and punctures laterally. Femora aurantiacus to testaceous. Elytra 15 to 19 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third to fourth, then narrowing to tip; color fulvus to luteus with intervals 2, 4, 6, 8, and along suture aurantiacus to testaceous; texture glabrous, nitidus, with striae fine and strial punctures fine to deep; apices each bearing 1 spine. Abdomen testaceous to sanguineus medially, fulvus to aurantiacus laterally with or without 2 infusate sublateral vittae; texture glabrous with fine punctuation medially, with dense decumbent

setae and dense contiguous punctures anterolaterally; female with 2 obovate foveae on apical half to 3/5 of sternite 5; anterior sclerite with lateral arms reduced, hardly extending apically beyond basal piece, sharp dentitions along inner margin. Male with lateral blades of parameres greater than 0.25 length of parameres.

MATERIAL EXAMINED. COLOMBIA: (USNM); GUYANA: Landsberg (ZMUC); VENEZUELA: Amazonas (PCCV); Aragua, Rancho Grande, VII-(15-21)-1967, R.W. Poole, 1100 m (USNM); Rancho Grande, VII-4-1988, L. Stange & C. Porter (FSCA); Tovar, 5300 ft, I-24-1978, J.B. Heppner (USNM); Federal District, Avila, II-28-1971, H.F. Howden (CNCI); Caracas (ZMUC); Lara, Sanaré, 17.4 km SE Yacambú N.P. 1510 m, 9°42'26"N, 69°34'34"W, (V-18)-(VI-1)-1998, Ashe, Brooks, Hanley (SEMC); Táchira, San Cristóbal, 10 km SE P.N. Chorro El Indio, 1320 m, 7°44'3"N, 72°13'1"W, V-29-1998, J. Ashe, R. Brooks, R. Hanley (SEMC); Zulia, Maracaibo (USNM); State unknown, Caracas Valley, VII-1897 (CASC); D. Moritz, 1858 (NHMW); 1939 G. Vivas (USNM).

DIAGNOSIS. *Semiotus sommeri* is most closely allied to *S. virgatus*, *S. buckleyi*, *S. regalis*, and *S. rubricollis*, with similarities to other species with 4 or 5 vittae per elytron (including *S. exsolutus*, *S. kirschi*, *S. superbus*, and *S. germari*). *Semiotus regalis* and *S. rubricollis* are readily separated from these species by the unicolorous first and second elytral intervals (being black in *S. regalis* and deep red in *S. rubricollis*). The other related species with 4 or 5 dark elytral vittae have the first 2 intervals comprised of contrasting light and dark colors. *Semiotus buckleyi* is separated from *S. sommeri* by the similar colors of the elytral intervals (with the dark elytral vittae located on the striae). *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margins lack sulci entirely. *Semiotus sommeri* (and *S. superbus*, *S. germari*, and *S. illigeri*) has an abbreviated sulcus evident only on the anterior third to half of the pronotal margin. These last species are best separated by the pattern of elytral and pronotal vittae. In *S. superbus*, the eighth and ninth elytral intervals are unicolorous. They are of 2 different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*. The pronotal vitta in *S. germari* (Fig. 235) is larger and more parallel-sided than in *S. sommeri* (Fig. 241) and *S. illigeri* (Figs. 227–229). The pronotal vittae in *S. sommeri* are sinuate (never cruciform) and separated by a narrow pale vitta (Fig. 241). Some individuals of *S. illigeri* have similar pronotal vittae (Fig. 227) that are more cruciform. The lateral arms of the anterior sclerite of the bursa copulatrix are abbreviated in *S. sommeri* (Fig. 87), extending less than 1/3 the length of the median piece. In *S. illigeri* (Fig. 79)

the lateral arms are longer, extending more than 1/3 the length of the median piece.

Semiotus striatus Guérin-Ménéville
(Figs. 16, 88, 247)

Semiotus striatus Guérin-Ménéville 1855:579, Candèze 1857:337, Candèze 1874:185 (Type: lost; type locality: Ecuador, Napo).

DESCRIPTION. Length 17 to 18 mm (length/width ratio 4.2 to 4.3). Head testaceous to aurantiacus with basal macula piceus; frons without spines or angled anterolateral margins, bearing erect setae over eyes and anterior margin, smaller decumbent setae and dense punctation throughout; ocular index 72.0 to 75.0. Antennae serrate, extending to or just beyond hind angles in females, with segments 1 and 2 testaceous, segments 3 to 11 testaceous medially, rufopiceus laterally. Pronotum 3.5 to 4.5 mm (length/width ratio 0.9 to 1.0), subcomplanate, hind angles divergent; margin incrassate without sulcus; color sanguineous to aurantiacus, margin fulvus to luteus with 2 lateral piceus vittae extending from near base to anterior fourth; texture with fine setae medially with denser setae laterally, punctation moderately deep and scattered throughout. Scutellum fulvus to aurantiacus, longer than wide, expanding anteriorly, anterior margin not recurved. Prosternum fulvus to testaceous medially, piceus laterally; slightly concave in profile, prosternal process not divided apically; texture glabrous, nitidus with fine punctures medially, with dense setae and punctation laterally. Hypomeron fulvus to testaceous laterally, piceus along suture; texture glabrous, nitidus with fine punctures laterally, with dense setae and punctation medially. Mesosternum fulvus to testaceous medially piceus laterally, with fossa glabrous and impunctate, lateral areas with dense setae and punctation. Mesepisternum piceus. Metasternum fulvus to testaceous medially, piceus laterally; texture glabrous and impunctate medially, with decumbent setae and fine punctation laterally. Femora testaceous to badius throughout. Elytra 12 to 13 mm (length/width ratio 2.9 to 3.1), gibbous, subparallel on anterior half then narrowing gradually to tip; color fulvus to testaceous, darker coloring along striae; texture glabrous, nitidus, striae and strial punctures deep and well defined; apices each bearing 1 spine. Abdomen testaceous to badius medially, fulvus laterally with sublateral badius vittae; texture glabrous with fine punctation medially, decumbent setae and denser punctation laterally. Female with 2 oblique elliptical foveae on posterior half of sternite 5; anterior sclerite with basal piece strongly convex across base, bearing several serrations along median piece, and approximately 1/2 length of basal piece.

Male unknown.

MATERIAL EXAMINED. COLOMBIA: Norte de Santander, 2600 m, 30 km S Chinacota, V-14-1974, H. & A. Howden (CNCI).

DIAGNOSIS. *Semiotus striatus* is most closely allied to *S. capucinus* and *S. ligatus*, both of which have a gibbous elytral base and lack frontal spines (the frontal spines in *S. ligatus* are very reduced). These species are readily distinguished from *S. striatus* by the elytral color. In *S. ligatus* the elytra are green, in *S. capucinus* the elytra are deep red. In *S. striatus* the elytra are pale yellowish brown with infusate striae. *Semiotus striatus* superficially resembles the other *Semiotus* species with pale elytra and infusate striae, such as *S. cristatus*, *S. linnei*, *S. colombianus*, *S. angustus*, and *S. perangustus*. All of these species bear distinct frontal spines. *Semiotus striatus* bears no frontal spines. The anterior sclerite of the bursa copulatrix is also distinct from these species. In *S. striatus* the anterior margin of the sclerite is evenly convex (Fig. 88). The other species either have an anterior swelling (Figs. 80–82), a thin anterior margin (Fig. 72), or a much reduced sclerite (Fig. 71). The lack of frontal spines, gibbous elytra, and unicolorous elytral intervals (with infusate striae) separate *S. striatus* from all other *Semiotus*.

Semiotus superbus Kirsch
(Fig. 17)

Semiotus superbus Kirsch 1866:181, Candèze 1874:179, Fleutiaux 1925:109 (Type: not found; type locality: Colombia: Bogotá).

DESCRIPTION. Length 19 to 26 mm (length/width ratio 4.4 to 4.9). Head testaceous to aurantiacus with piceus macula broad at base, narrowing anteriorly; bearing 3 spines apically; texture glabrous with few scattered setae above eyes and spines, punctation fine and well separated, becoming thicker basally. Antennae serrate, reaching hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 4 to 7 mm (length/width ratio 1.2 to 1.4), with sides sinuate, hind angles divergent, anterolateral angles impressed, margin thinly rounded, sulcate on anterior third to half; color fulvus laterally with 2 broad piceus vittae extending from base to apex; texture glabrous with fine punctures scattered throughout. Scutellum rufopiceus to piceus, subchordate. Prosternum slightly concave in profile; color aurantiacus to sanguineus with lobe and lateral area testaceous to aurantiacus, suture with piceus vitta; texture glabrous medially with fine scattered setae laterally, punctation fine medially becoming denser and deeper laterally. Hypomeron fulvus with suture piceus; texture glabrous with fine punctation scattered throughout, becoming denser toward suture. Mesosternum fulvus to testaceous with obscure margins; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum fulvus to testaceous with obscure margins. Metasternum testaceous to aurantiacus with piceus line medially and along lateral margin; texture of very fine setae

scattered medially, becoming denser laterally, punctation very fine medially, denser laterally. Femora testaceous to badius. Elytra 13 to 18 mm (length/width ratio 2.9 to 3.3), subparallel on anterior third, then narrowing to tip; color fulvus with 5 (including sutural vitta) piceus vittae, striae 8 and 9 piceus; striae fine to obsolete, striae punctures shallow to poorly defined, interstriae wrinkled; apices each bearing 1 spine. Abdomen fulvus to testaceous laterally, testaceous to aurantiacus medially with piceus sublateral vittae; texture with few fine erect setae scattered medially, sternite 1 with dense decumbent setae behind metacoxae, punctation fine and scattered throughout becoming denser on sternite 1; female with 2 elliptical foveae on apical half of sternite 5; anterior sclerite strongly convex across lateral arms.

MATERIAL EXAMINED. COLOMBIA: Capital District, Bogotá; ECUADOR: Morona -Santiago, Macas, Région Oriental (MNHN); Napo, Río Hollin, XII-(3-5)-1999, Dauber (PCCV); Pastaza, Puyo, 3000 m, VI-28-1980, C.W. Stevens (FSCA); 11 km NE Puyo, IV-28-1978, C.W. & L.B. O'Brien & Marshall (CNCI); 1000 m, Llandia, 17 km N Puyo, VII-16-1994, F. Genier, remnant rain forest (CMNC); Province unknown, Gualaquiza (MNHN); de Baños à Canelos, région orientale, IX-X-1894 (MNHN); route de Cosanga à Vena, 2000 m, VIII-1990 (MNHN); PERU: Junín, La Mercéd (USNM); Political subdivision unknown, Jarugui (NHMW); Mayabamba, M. de Mathan, 1888 (MNHN); Mera (NHMW).

DIAGNOSIS. *Semiotus superbus* is most closely allied to *S. exsolutus*, *S. intermedius*, and *S. taeniatus*, with similarities to other species with 4 or 5 vittae per elytron (including *S. virgatus*, *S. kirschi*, *S. acutus*, *S. illigeri*, *S. regalis*, *S. exsolutus*, and *S. sommeri*). *Semiotus intermedius* is separated from *S. superbus* by the lack of dark vittae on the elytral disk (the vittae being restricted to the elytral suture and margin). In *S. superbus*, each elytron bears 4 to 5 dark vittae. *Semiotus taeniatus* bears only 3 dark vittae per elytron and has an enlarged angle along the posterior border of the hypomera (Fig. 181). This angle is much smaller in *S. superbus* (as in Fig. 178). *Semiotus regalis* is readily separated from these species by the black first and second elytral intervals (Fig. 222). The other species with 4 or more dark elytral vittae have the first 2 intervals comprised of contrasting light and dark colors. *Semiotus kirschi* and *S. virgatus* are distinct in having the lateral pronotal margin sulcate nearly the entire length. In *S. exsolutus* and *S. acutus*, the lateral margin lacks sulci entirely. *Semiotus superbus* (and *S. germari*, *S. sommeri*, and *S. illigeri*) has an abbreviated sulcus evident only on the anterior third to half of the pronotal margin. *Semiotus superbus* can be separated from these species by the eighth and ninth elytral intervals being unicolorous. They are

of 2 different colors (interval 8 black and interval 9 yellow to orange) in *S. germari*, *S. sommeri*, and *S. illigeri*.

Semiotus taeniatus Erichson
(Figs. 17, 34, 125, 181, 226)

Semiotus taeniatus Erichson 1847:73, Candèze 1857:312, Candèze 1874:177 (Holotype: MNFD; type locality: Peru).

Semiotus jansonii Candèze 1874:174–175 (Lectotype: MNHN (on loan from BMNH); type locality: Ecuador). New synonym.

Semiotus jansonii bipunctatus Schwarz 1902b: 130–131 (Type: not found; type locality: Peru, Marcapata). New synonym.

DESCRIPTION. Length 21 to 26 mm (length/width ratio 4.2 to 5.2). Head fulvus to aurantiacus, with central macula piceus; bearing 3 spines apically; texture glabrous medially with long setae above eyes and spines, punctation fine and scattered anteriorly, larger and umbilicate basally; ocular index 72.0 to 74.0 (lateral frontal spines approximately 0.31 length of frons). Antennae serrate, 1 to 2 segments short of hind angles in females; segments 1 and 2 badius, segments 3 to 11 rufopiceus. Pronotum 5 to 6 mm (length/width ratio 1.2 to 1.5), fulvus to aurantiacus, with sanguineus medial vitta flanked by piceus vittae, margin with small piceus maculae (sanguineus vitta and marginal maculae absent in many specimens); shape sinuate, widest at hind angles, then at middle, anterior margin dropping to lower plane; margin sulcate on anterior half becoming thicker and less defined posteriorly, a thick carina also present from posterior margin to just before anterior angle; texture glabrous with fine scattered punctures throughout, with lateral areas becoming nearly impunctate. Scutellum subchordate, testaceous to badius. Prosternum evenly concave in profile, aurantiacus to testaceous, with elongate badius to piceus maculae laterally; texture with few fine setae scattered throughout, punctures very fine medially, becoming larger and courser laterally. Hypomerion fulvus to testaceous, piceus along suture, with or without piceus macula on lateral margin; texture glabrous with very fine punctures scattered throughout. Mesosternum testaceous with venter of fossa glabrous and impunctate, lateral areas with fine and dense setae and punctation. Mesepisternum testaceous to piceus. Metasternum fulvus to aurantiacus with piceus line medially (and sometimes laterally); texture nearly glabrous with very few scattered setae, punctation very fine and scattered throughout. Metepimeron badius. Elytra 14 to 17 mm (length/width ratio 2.8 to 3.4), widest on anterior fourth then gradually tapering posteriorly; interval 1, 2, 4 (except at base), 5, 6, 8, and 9 badius to rufopiceus, interval 3 and 7 fulvus; texture glabrous, striae 1 definitely impressed, other striae faintly punctate striate, interval 3 and 7 more convex than other intervals; apices each

bearing 1 spine. Abdomen fulvus to testaceous, with sublateral line testaceous to badius extending length of abdomen; texture with short dense setae scattered throughout, punctation fine and dense throughout; female with 2 elliptical foveae on apical half of sternite 5 conjoined apically; anterior sclerite mostly unarmed, laterally arms smooth, extending distally approximately 1/2 length of median piece. Male with parameres wide at base, narrowing to blades; lateral blades approximately 0.35 to 0.40 length of parameres.

MATERIAL EXAMINED. BOLIVIA: Cochabamba, 117 km E Yungas, Cochabamba-Villa Tunari Rd., 1040 m, 17°6'32"S, 65°41'12"W, II-(1-6)-1999, R. Hanley, flight intercept trap (SEMC); La Paz, Nord-Yungas, 400–1800 m, Region um Caranavi, ca. 50 km N Coroico, Tello (PCCV); Yungas, Coroico, Fassl, 1908 (NHMW); Yungas de la Paz, Heyne V. (MNFD); Santa Cruz, Buenavista, Ichila, 400 m (FSCA); **ECUADOR:** Morona—Santiago, Chigüinda, Buckley, 1903 (BMNH); Pastaza, Río Puyo, Cotococha, 1000 m, 1°32'4"S, 77°53'6"W, I-24-1998, L. Nádai (HNHM); Pichincha, Quito (ZMUC); District unknown, Mangosisa R., 650 m, L. Gomez, B.M., 1940 (BMNH); **PARAGUAY:** Colonia Sudetia, Anders, C. Pfanni (PCCV); **PERU:** Cuzco, Paucartambo, Kosnipata, Bosque Nublada res., Coll. MVL Barclay, Cock-of-the-Rock, montane wet forest, 1400 m, in flight during day, 13°03'21"S, 71°31'44"W, IV-1999 (BMNH); Río Paucartambo, XI-26-1933, Quiroz (LACM); *ibid.*, XI-6-1935; Santa Isabel, Cosnipata Valley, XII-6-1951, F. Woytkowski (USNM); Santa Isabel, Cosnipata Valley, XI-27-1951, F. Woytkowski (CNCI); *ibid.*, XI-15-1951; *ibid.*, XI-30-1951; Santa Isabel, Cosnipata Valley, XII-6-1951, F. Woytkowski (FMNH); km 165 on Cosnipata Hwy., elev. 1200 m, Cosnipata Valley (X-XI)-1981, tropical forest, J.F. Fitzpatrick & D. Willard (FMNH); km 165, on Cosnipata Hwy., elev. 1200 m, Cosnipata Valley, (X-XI)-1981, J. Fitzpatrick & D. Willard, tropical forest (USNM); Huánuco, Tambillo Chico Canyon, 13 km S Tingo María, 2800 ft, IV-(11-17)-1987, J.E. Eger (FSCA); Tingo María, Monson Valley, X-27-1954 (CASC); Tingo María, Monson Valley, X-12-1954 (CASC); Junín, Chanchamayo (USNM); Chanchamayo, M. Freyman G. (MNFD); Chanchamayo, II-1933, E.G. Smythe (SEMC); Quiroz, Río Paucartambo (CNCI); Quiroz, Río Paucartambo, I-1934, Bot. G. Nelson (SEMC); Río Oxobamba, La Mercéd, Chanchamayo (MNFD); Political subdivision unknown, Río Huallagas. II-1986, L. Peña (PCCV); Río Toro (MNFD).

DIAGNOSIS. *Semiotus taeniatus* is most closely allied to *S. acutus*, *S. kirschi*, *S. superbus*, *S. exsolutus*, and *S. intermedius*. All of these species have 3 frontal spines (although the medial spine in *S. intermedius* is subspinose to angulate). *Semiotus taeniatus* is unique from these (and all other known *Semiotus*) by the large subquadrate angle

or point near the center of the posterior border of the hypomerion (Fig. 181). This angle is much more reduced in other *Semiotus* (Figs. 178–180). In addition, *S. taeniatus* can be separated from the above related species by the color pattern of the elytra. In *S. taeniatus*, each elytron bears 3 dark vittae. In the other species, each elytron bears 4 or more dark vittae (except *S. intermedius* which has only 2—1 sutural and 1 marginal). The anterior sclerite of the bursa copulatrix is unarmed in *S. taeniatus* (Fig. 34). In *S. exsolutus* and *S. kirschi*, the posterior portion of the lateral arms bear several dentitions (Figs. 89, 90). *Semiotus taeniatus* bears some similarities to *S. singularis* but can be readily separated by the elytral color, which in the latter species is yellow to pale brown basally turning gradually to black apically.

REMARKS. The pronotal markings are quite varied, ranging from a single wide piceus vitta to double piceus vittae interrupted by a sanguineus vitta. Both varieties exist with or without lateral piceus maculae. These forms overlap geographically and are otherwise the same, obviating the specific or subspecific status of *S. jansoni* and *S. j. bipunctatus*.

Semiotus trinitensis n. sp.

(Figs. 15, 42, 126, 162, 212)

DESCRIPTION. Length 19 to 22 mm (length/width ratio 4.4 to 4.8). Head aurantiacus to testaceus with basal macula piceus; texture glabrous with occasional setae above eyes and spines, punctation fine and scattered evenly throughout; front with 2 spines anterolaterally, without medial angulation; frontal spines approximately 0.28 length of frons; ocular index 73.0 to 75.0. Antennae serrate, 1 segment short of hind angles, segments 1 and 2 testaceous, segments 3 to 11 rufopiceus to piceus. Pronotum 4 to 6 mm (length/width ratio 1.2 to 1.3), narrowly sinuate, hind angles diverging; margin incassate, sulcate on anterior third only; color fulvus to luteus with median sanguineus vitta flanked by 2 long piceus vittae; texture glabrous, nitidus with fine punctures, becoming thicker and umbilicate anteriorly. Scutellum piceus, moderately declivous and incised anteriorly with median sulcus. Prosternum concave in profile; color sanguineus to aurantiacus with piceus vitta along suture; texture glabrous with erect setae on lobe, punctation fine medially, thicker and umbilicate laterally. Hypomerion luteus with or without sanguineus vitta along suture; texture glabrous, nitidus with fine punctures throughout. Mesosternum testaceous to badius and glabrous medially with fine dense setae laterally, fossa nearly impunctate with lateral areas containing fine setigerous punctures. Mesepisternum testaceous to piceus. Metasternum testaceous with lateral vittae badius to piceus; texture glabrous, nitidus with very fine punctures throughout. Femora fulvus to testaceous. Elytra 12

to 15 mm (length/width ratio 2.9 to 3.2), narrowing nearly from base, becoming thicker posteriorly; color luteus with interval 1, part of 2, and lateral margin piceus; texture glabrous, nitidus with striae and stria punctures fine to obsolete; apices each bearing 1 spine. Abdomen aurantiacus to testaceous medially, fulvus to luteus laterally, with 2 sublateral badius to piceus vittae; texture glabrous with fine decumbent setae on sternite 1, punctation fine throughout; female with 2 shallow elliptical foveae in center of sternite 5; anterior sclerite wider than long, lateral arms strongly convex, approximately 2/3 length of median piece, bearing 2 to 4 serrations apically. Male with parameres subparallel basally, lateral blades approximately 0.30 length of parameres.

MATERIAL EXAMINED. Holotype, male: TRINIDAD: Morne Bleu, 2700 ft, W.I., VIII-8-1969, H. & A. Howden (CNCI); Paratypes: TRINIDAD: Aripo, BWI, VII-2-1944, F. Fernandez (1, USNM); Morne Bleu, IV-26-1969, J. Boas (2, CMNH); *ibid.*; IV-27, 1969 (2, CMNH); Morne Bleu, 2700 ft, W.I., VIII-4-1969, H. & A. Howden (1, CNCI); 1 mi. W Morne Bleu, V-16-1969, J. Boas (1, FSCA); Mt. Tamana, S Coryal, W.I., VIII-16-1969, H. & A. Howden (1, CNCI); Port of Spain, W.I., VI-5-1967, R.E. Beer (1, SEMC).

DIAGNOSIS. *Semiotus trinitensis* is most closely allied to *S. melleus*, *S. fascicularis*, and the species in the *S. caracasanus* group. It is also similar to *S. bispinus* and *S. clarki*. *Semiotus trinitensis* is unique from all these species by the strongly procurved and incised (along the anterior margin) scutellum (Fig. 212) that curves evenly from the disk to the front without a dorsal angle or margin. In the other related species a frontal angle or margin is present. The *S. caracasanus* group is distinct from *S. trinitensis* in the doubly spined frons and a completely convex pronotum that lacks lateral sulci. *Semiotus trinitensis* bears 2 frontal spines as well but has sublateral depressions on the pronotum (Fig. 213), and the lateral margin is sulcate anteriorly. The elytra in *S. melleus* (Fig. 212), *S. clarki* (Fig. 215), and *S. bispinus* (Fig. 209) bear 4 to 5 dark vittae (per elytron). Each elytron bears only 2 dark vittae in *S. trinitensis*. The dark vittae in *S. fascicularis* are generally restricted to the apical 2/3 of the elytra and consist of a sutural, a marginal, and 2 medial vittae (confluent distally (Fig. 214)). *Semiotus limatus* also bears 2 dark vittae per elytron, similar to *S. trinitensis*. These species can be separated by the pronotal vittae and by geography. *Semiotus trinitensis* bears 2 pronotal vittae, *S. limatus* bears only a single vitta (Fig. 208). *Semiotus limatus* is known from Brazil and Peru, *S. trinitensis* is known only from Trinidad. The median piece of the anterior sclerite of the bursa copulatrix is thick and completely covered by dentitions in *S. limatus* (Fig. 78). In *S. trinitensis*, the median piece is unarmed (Fig. 42).

ETYMOLOGY. *Semiotus trinitensis* is named after Trinidad, the only place where it is known to occur.

Semiotus vicinus Fleutiaux

Semiotus vicinus Fleutiaux 1920:300 (Lectotype, female; MNHN; type locality: Ecuador, Montagne du Nanegal, Río Guallabamba).

DESCRIPTION. Length 24 to 27 mm (length/width ratio 4.8 to 5.2). Head with 3 frontal spines (2 long anterolateral spines and 1 smaller median spine); color piceus basally, testaceous to luteus around spines; texture nitidus with few erect setae and mixed punctures throughout, less so medially. Antennae serrate, short of hind angles by 1 to 3 segments; segments 1 and 2 testaceous to badius, segments 3 to 11 piceus to rufopiceus. Pronotum 5 to 7 mm (length/width ratio 1.3 to 1.5), slightly converging on anterior half, hind angles diverging on posterior fourth, margin without sulcus, thickly rounded posteriorly, forming an elevated thickening above margin; color luteus with 2 broad piceus vittae extending from base to near apex; texture of golden setae and well defined punctures, especially on black vittae. Scutellum subtriangular, fulvus to testaceous medially with obscure border. Prosternum nearly straight in profile, medially glabrous with fine punctation becoming larger and deeper laterally with fine setae; color sanguineus medially, piceus laterally, lobe fulvus to luteus. Hypomeron piceus along suture, fulvus to luteus laterally; texture glabrous with fine punctures and fine golden setae laterally. Mesosternum piceus; texture glabrous medially with fine punctation and golden setae laterally. Mesepisternum piceus. Metasternum piceus; texture glabrous medially with fine punctation and golden setae laterally. Femora fulvus to testaceous. Elytra 16 to 18 mm (length/width ratio 3.2 to 3.6), subparallel on basal half then narrowing to tip, color fulvus to luteus with piceus vittae along striae; texture glabrous, striae punctures lightly impressed apically, obscure to obsolete basally; apices each bearing 1 spine. Abdomen aurantiacus to badius medially, fulvus laterally with dark sublateral areas; texture glabrous medially with fine punctation and golden setae laterally; female with 2 elliptical foveae on apical half of sternite 5.

MATERIAL EXAMINED. ECUADOR: Montagne du Nanegal, Río Guallabamba, P. Rivet (MNHN). *Semiotus vicinus* is known from a single specimen.

DIAGNOSIS. *Semiotus vicinus* is most closely allied to *S. pilosus* and other species with 3 frontal spines and infusate striae (including *S. cristatus*, *S. linnei*, *S. perangustus*, *S. angustus*, and *S. colombianus*). Superficial similarities also exist with *S. auripilis*. All of these species have pale elytra with dark striae and a dense covering of setae on the pronotum. *Semiotus auripilis* is separated from *S. vicinus* by the strongly convex

elytral intervals. The intervals are nearly flat in *S. vicinus*. *Semiotus buckleyi*, *S. reaumuri*, and *S. glabricollis* have similarly patterned elytra but have glabrous, or nearly glabrous, pronota. Of the related species with pronotal setae, *S. pilosus* and *S. vicinus* are unique in lacking lateral sulci on the pronotum (or it is very faint if present). The 2 species can be separated from each other by the color of the pronotum. *Semiotus pilosus* has a completely brown to reddish brown disk, with only the peripheral areas pale. *Semiotus vicinus* bears 2 black vittae on the pronotal disk. The unicolorous elytral intervals with infusate striae, lack of (or very faint) lateral pronotal sulci, and nearly uniform badius pronotum (with fulvus margins) with dense decumbent setae separate *S. vicinus* from all other *Semiotus*.

Semiotus virgatus Erichson

(Figs. 16, 76, 153, 242)

Semiotus virgatus Erichson 1847:76, Candèze 1857:320, Candèze 1874:179 (Holotype: MNFD; type locality: Peru).

Semiotus sanguinolentus Candèze 1900:82, Szombathy 1909b:121 (Holotype: ISNB; type locality: Bolivia). New synonym.

DESCRIPTION. Length 28 to 29 mm (length/width ratio 4.1 to 4.7). Head luteus to aurantiacus with basal macula piceus; bearing 3 spines anteriorly; texture glabrous, nitidus with few scattered setae above eyes and spines, punctation fine anteriorly, shallow and umbilicate basally; ocular index 76.0 to 79.0. Antennae serrate, 1 to 2 segments short of hind angles in females; segments 1 and 2 testaceous, segments 3 to 11 piceus. Pronotum 7 to 8 mm (length/width ratio 1.1 to 1.3), sinuate with hind angles diverging, margin sulcate, extending nearly entire length of pronotum, with supramarginal ridge extending from hind angles to near anterolateral foveae; color testaceous to sanguineus with elongate elliptical piceus vitta medially extending from base (or near base) to (or nearly to) anterior margin; texture glabrous, nitidus, with fine punctation throughout becoming thicker anteriorly and along supramarginal ridge. Scutellum fulvus to sanguineus, suborbicular laterally and posteriorly with anterior margin recurved. Prosternum concave in profile, prosternal process not divided apically; color sanguineus to testaceous; texture with few erect setae anteriorly, few decumbent setae laterally, punctation fine to obsolete medially becoming denser and umbilicate posterolaterally. Hypomeron sanguineus to testaceous; texture glabrous, nitidus, punctation fine and shallow laterally, thicker and subrugose medially. Mesosternum sanguineus to piceus; fossa glabrous and impunctate, lateral areas densely setose and punctate. Mesepisternum testaceous to piceus. Metasternum sanguineus to testaceous medially (often with piceus medial

vitta), with or without piceus areas laterally; texture glabrous, nitidus with decumbent setae anterolaterally. Femora aurantiacus to testaceus. Elytra 18 to 20 mm (length/width ratio 2.8 to 3.0), subparallel on anterior third, then narrowing to tip; color luteus to testaceus with mesial portion of interval 1 along with intervals 2, 4, 6, 8, and outer portion of 9 in some specimens piceus; texture glabrous, nitidus, striae and stria punctures very fine to obsolete; apices each bearing 1 spine. Abdomen sanguineus to testaceus throughout; texture glabrous with few scattered erect setae, nitidus, with decumbent setae on sternite 1, punctation fine and scattered throughout with fewer deeper setigerous punctures scattered throughout; female with 2 elliptical piliferous foveae on apical half of sternite 5; anterior sclerite with anterior arms curved mesially, extending posteriorly 1/2 length of median piece, each bearing 5 to 10 sharp dentitions.

Male not seen.

MATERIAL EXAMINED. ECUADOR: Morona—Santiago, Macas, alt. 1050 m, F. Campos (USNM); Pastaza, Puyo, 900 m, VII-(13-17)-1976, S. & J. Peck (CNCI); Province unknown, Mero Pastase, II-1982 (PCCV); PERU: Cuzco, Río Paucartambo, IX-24-1932, Quiroz (LACM); Junín, Chanchomayo, M. Freyman G. (MNFD); Chanchomayo (CUIC); La Mercéd, 1921 (USNM); Political subdivision unknown, Gozoro (MNFD).

DIAGNOSIS. *Semiotus virgatus* is most closely allied to *S. sommeri*, *S. rubricollis*, *S. regalis*, and *S. buckleyi*. *Semiotus regalis* and *S. rubricollis* have unicolorous elytral intervals 1 and 2 (these are black in *S. regalis* (Fig. 222) and deep red in *S. rubricollis* (Fig. 225)). In *S. buckleyi* the elytral vittae all overlap the elytral striae (with the elytral intervals being unicolorous). In *S. virgatus* and *S. sommeri*, the elytral vittae cover alternating intervals with intervals 1 and 2 being of 2 contrasting colors. This same pattern is evident in *S. exsolutus*, *S. superbus*, *S. germari*, *S. kirschi*, *S. acutus*, and *S. illigeri*. *Semiotus virgatus* is most readily separated from these species by the narrow pronotal vitta (Fig. 242) and long lateral pronotal sulci that extend nearly the entire length of the pronotum. *Semiotus exsolutus* and *S. acutus* have no pronotal sulci and 2 pronotal vittae (*S. exsolutus championi* (Fig. 239) has only a single pronotal vitta but this is twice as wide as that of *S. virgatus*). *Semiotus superbus* (with 2 pronotal vittae), *S. sommeri* (with 2 pronotal vittae), *S. germari* (with 2 pronotal vittae), and *S. illigeri* all have a short marginal sulcus (not extending onto the posterior half). Most individuals of *S. illigeri* have 2 pronotal vittae, although the population in Central America (with a single vitta) has the vitta larger than the pale lateral areas (Fig. 229). In *S. virgatus* the pronotal vitta is much narrower. *Semiotus kirschi* has 2 pronotal vittae. The lateral arms of the anterior sclerite of the bursa

copulatrix extend posteriorly at least half the length of the median piece in *S. virgatus* (Fig. 76). In *S. kirschi* (Fig. 90), *S. regalis* (Fig. 36), and *S. sommeri* (Fig. 87) the lateral arms do not extend posteriorly.

REMARKS. The color of the pronotum is a deeper yellow in the type of *S. sanguinolentus*. Most specimens of *S. virgatus* (including the type) are paler yellow. This, however, is not justification for specific recognition.

ACKNOWLEDGMENTS

Specific appreciation is extended to Boris C. Kondratieff for encouragement, suggestions, and support (both financial and otherwise) throughout the course of this project. Paul A. Opler provided helpful taxonomic insights and comments and helped acquire research material. Ed Fuller carefully edited the manuscript and provided helpful comments. Acknowledgment is also made of the many lending individuals and institutions that provided material. Michael Kippenhan provided the 2 habitus drawings. Joe Mendoza made the digital images. Charles A. Triplehorn and Kathy Wells have offered encouragement toward this effort.

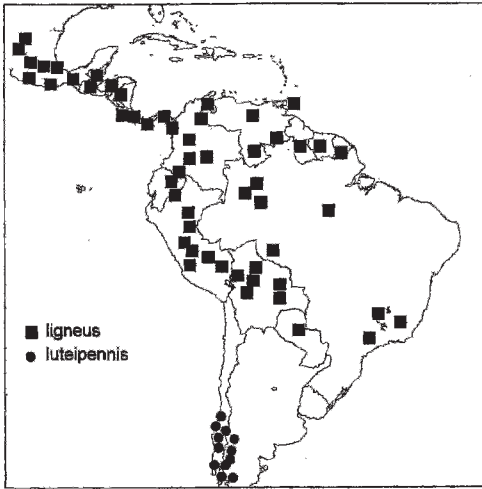
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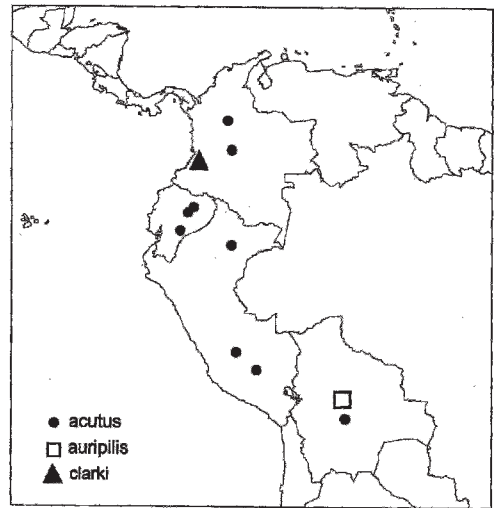
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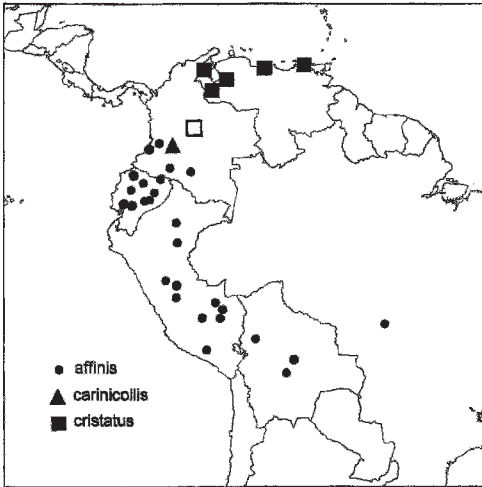
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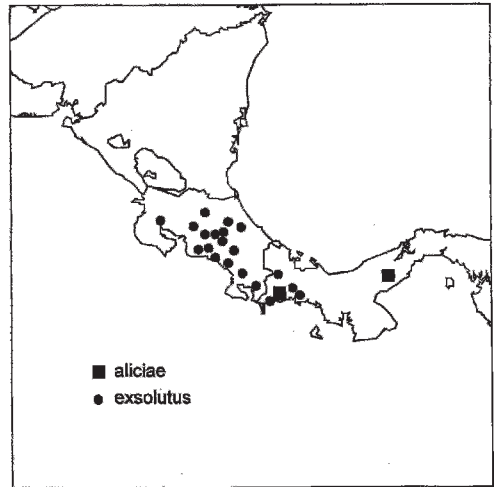
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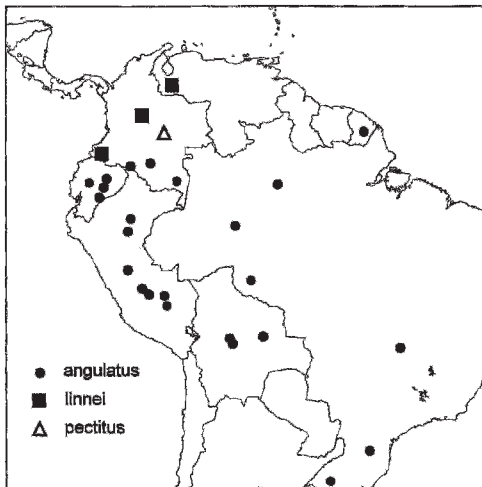
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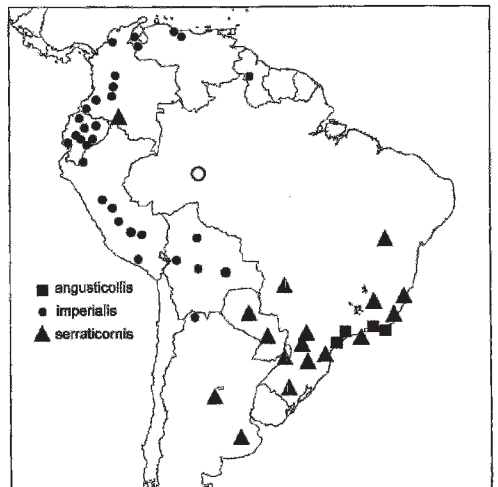
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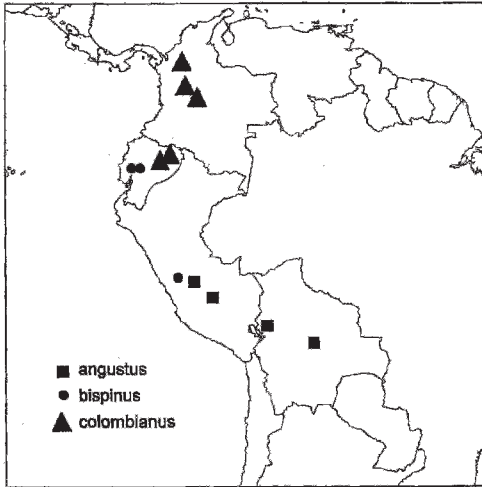
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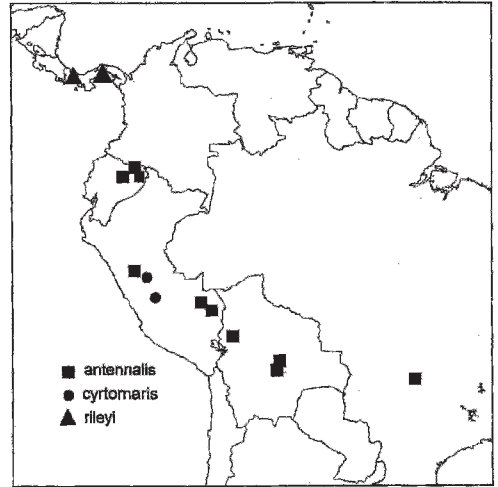
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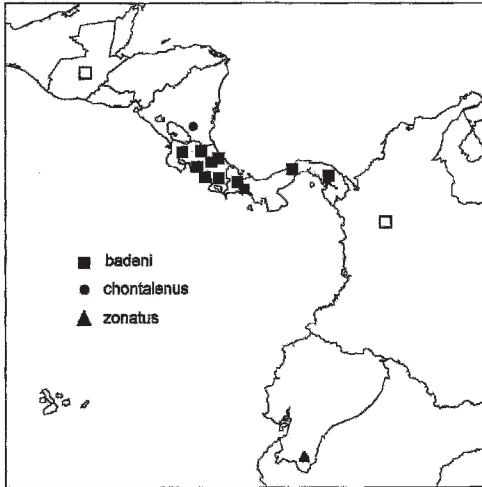
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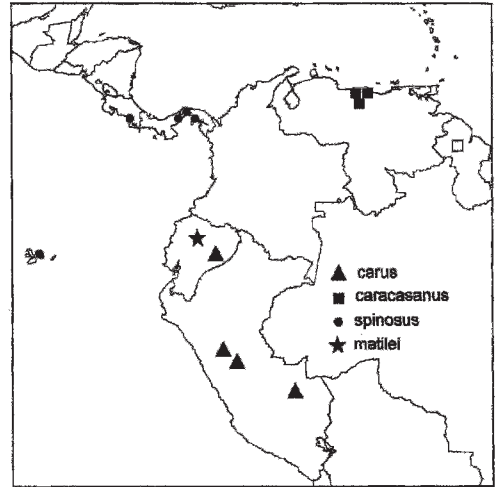
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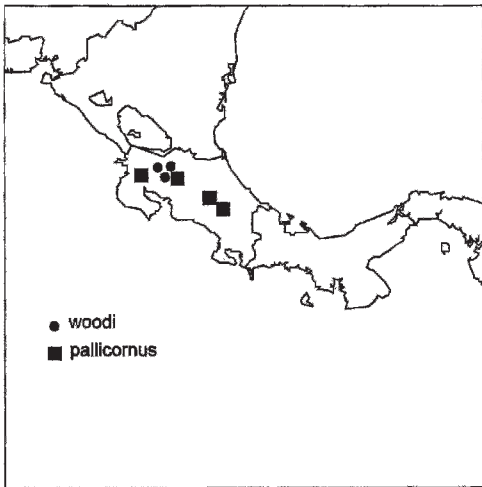
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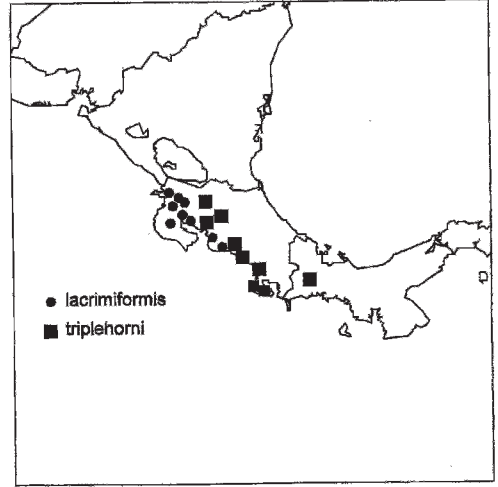
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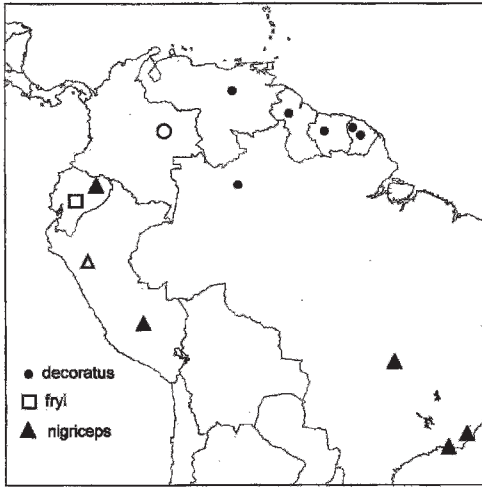
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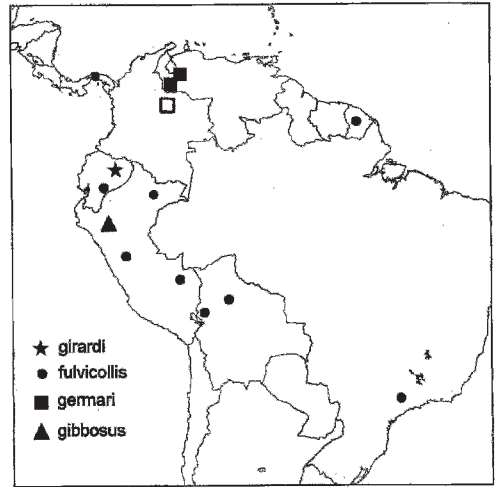
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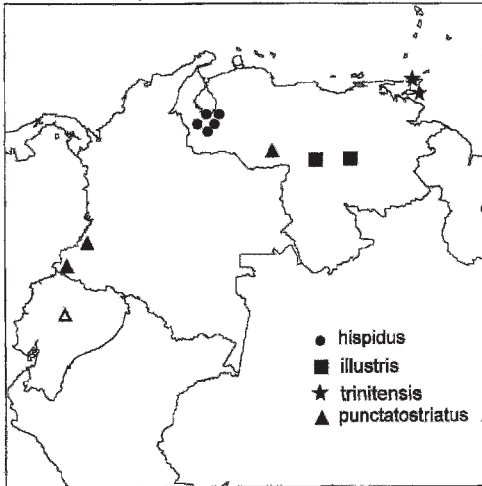
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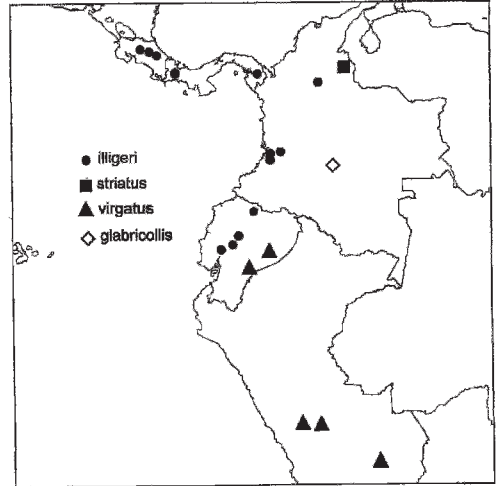
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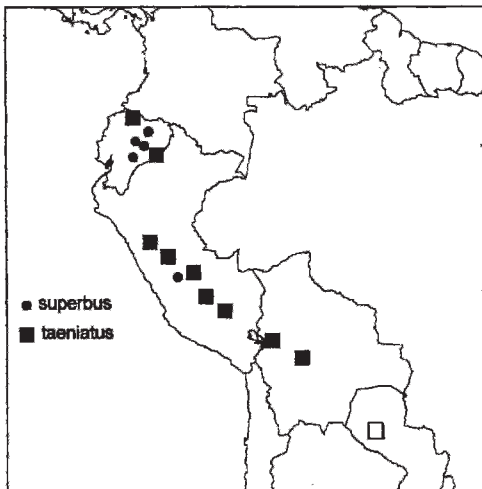
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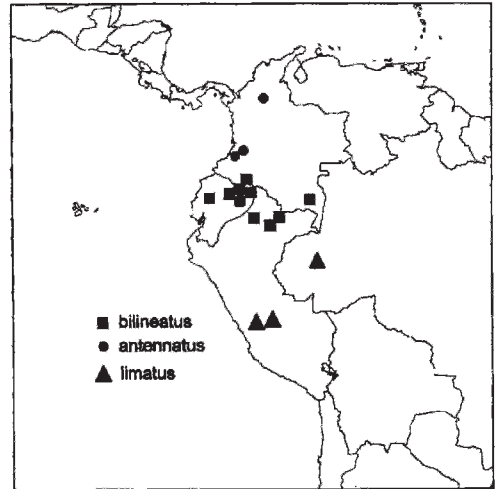
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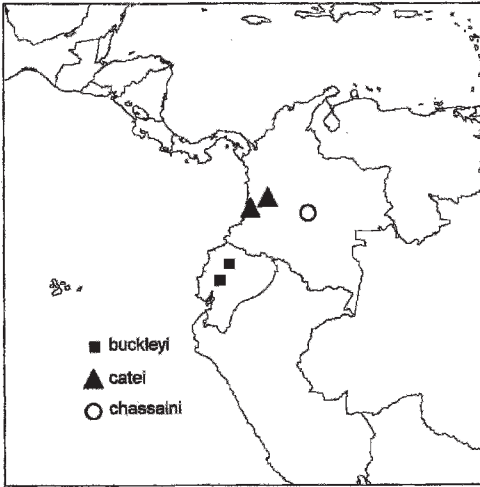
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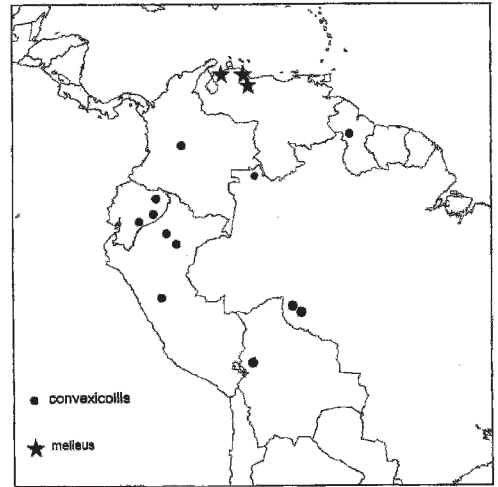
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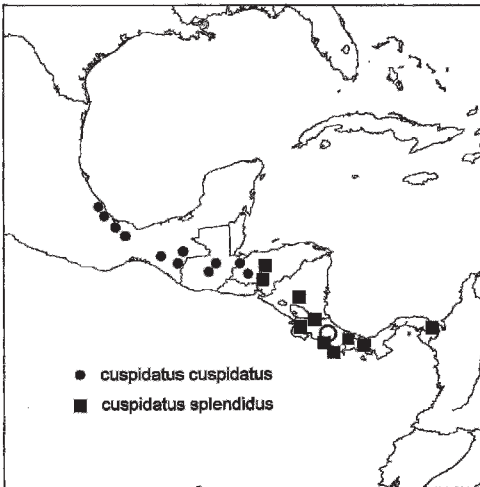
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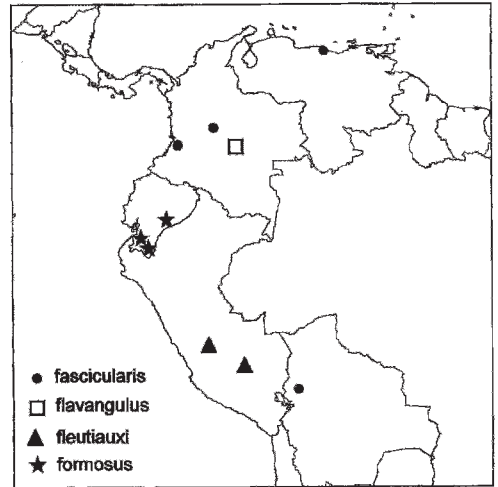
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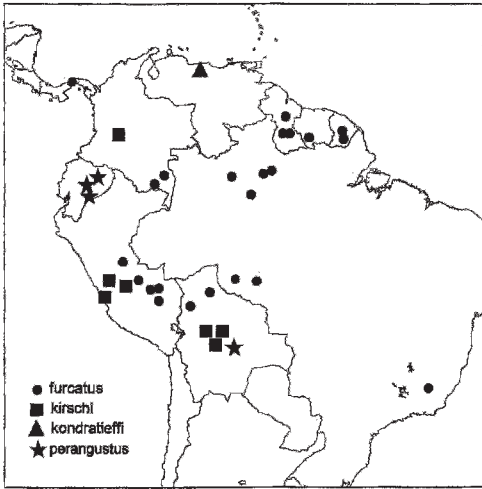
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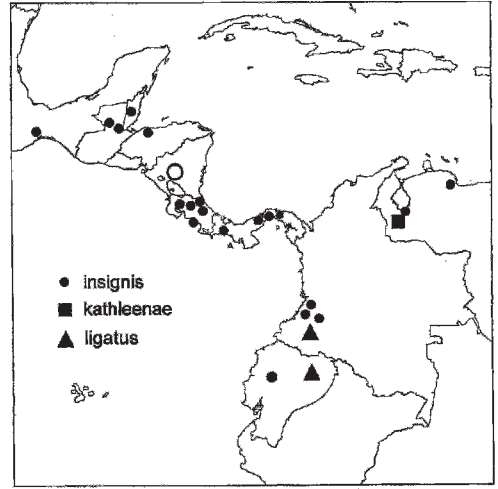
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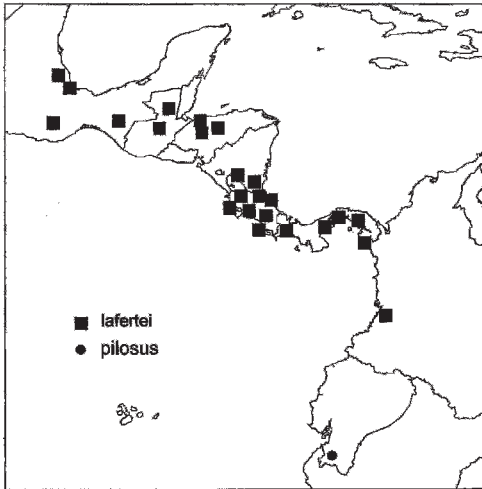
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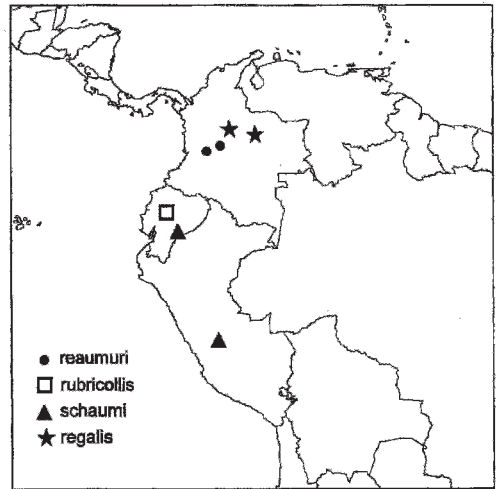
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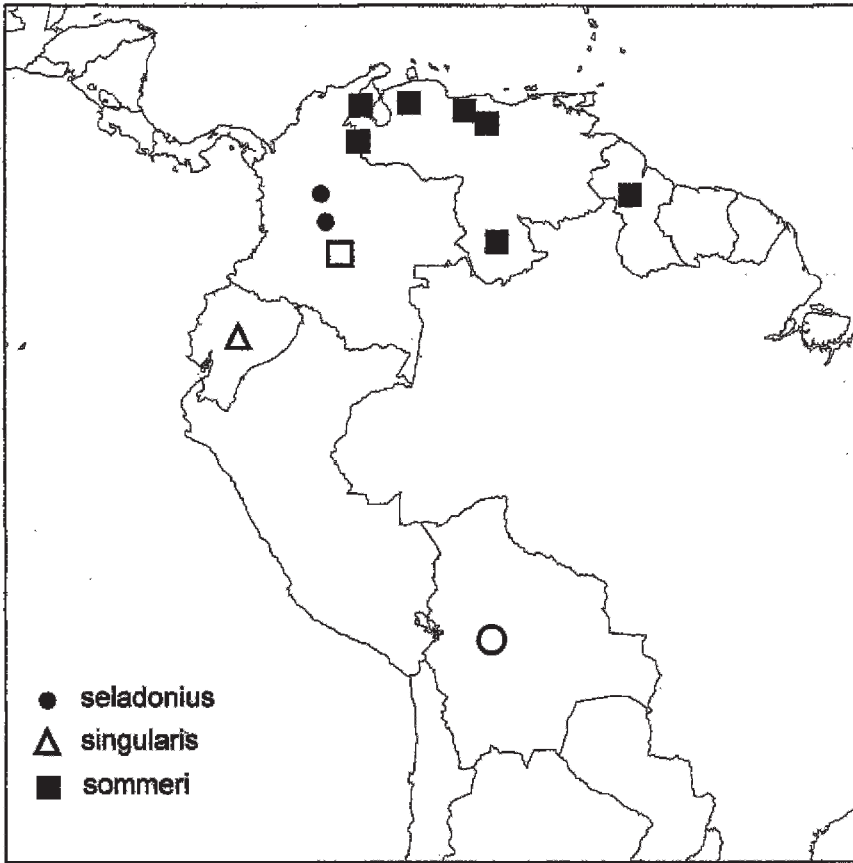
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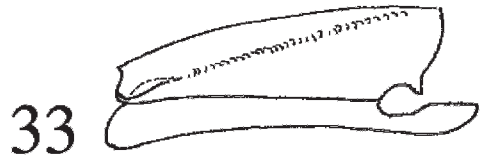
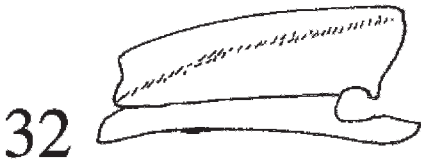
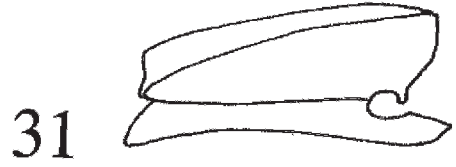
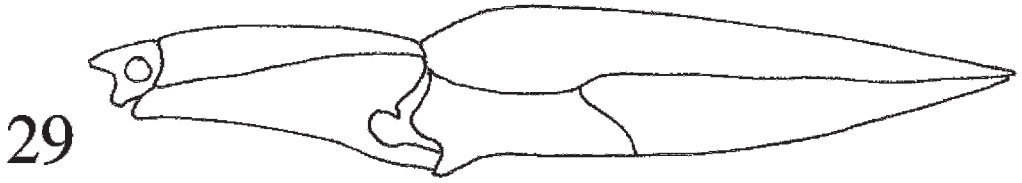
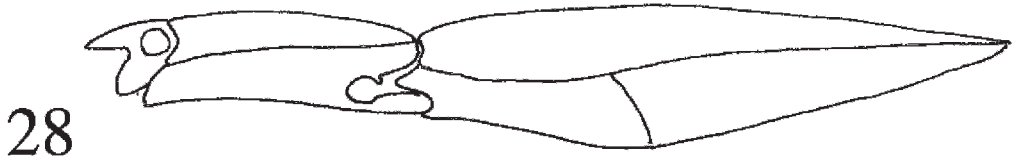


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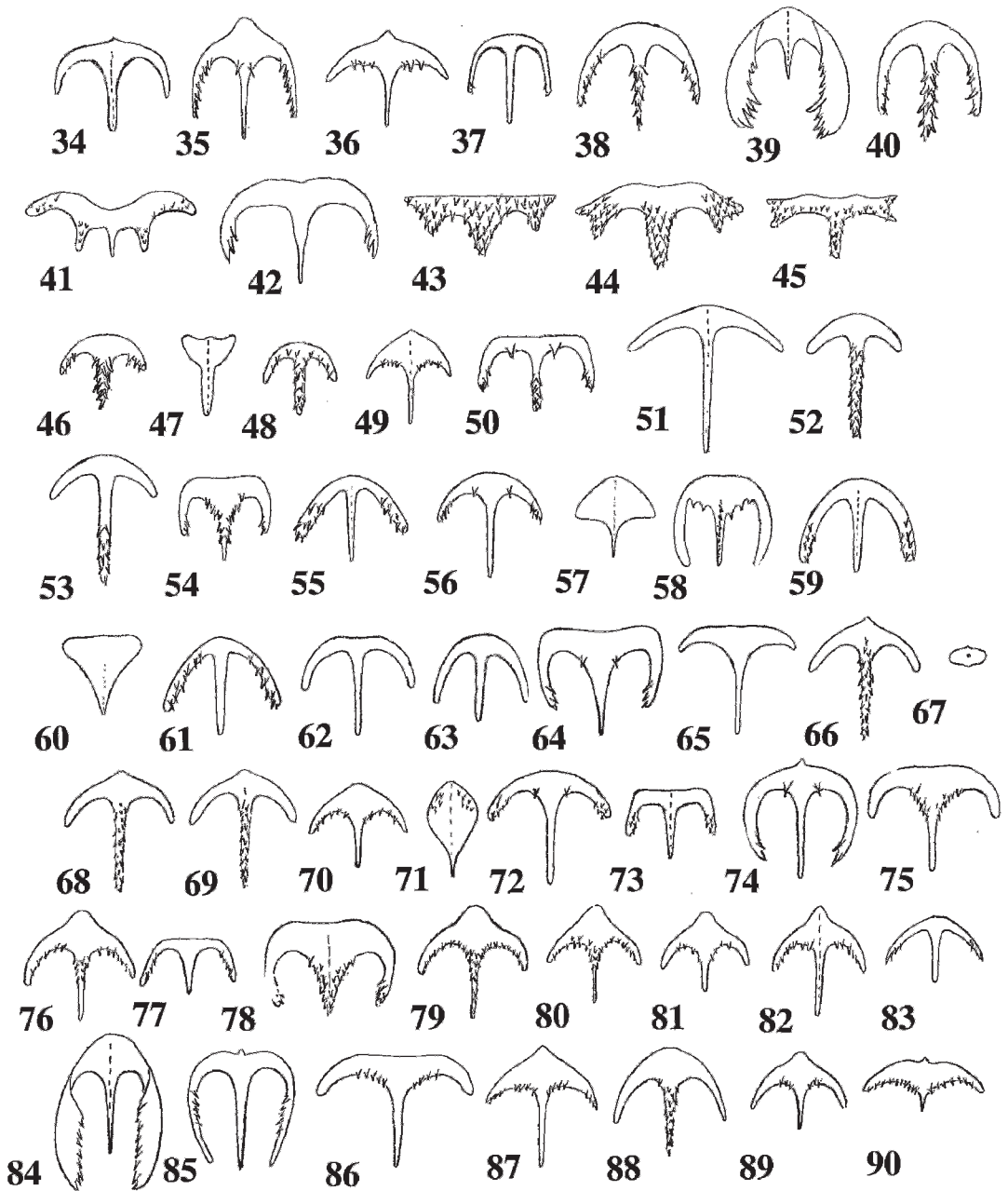


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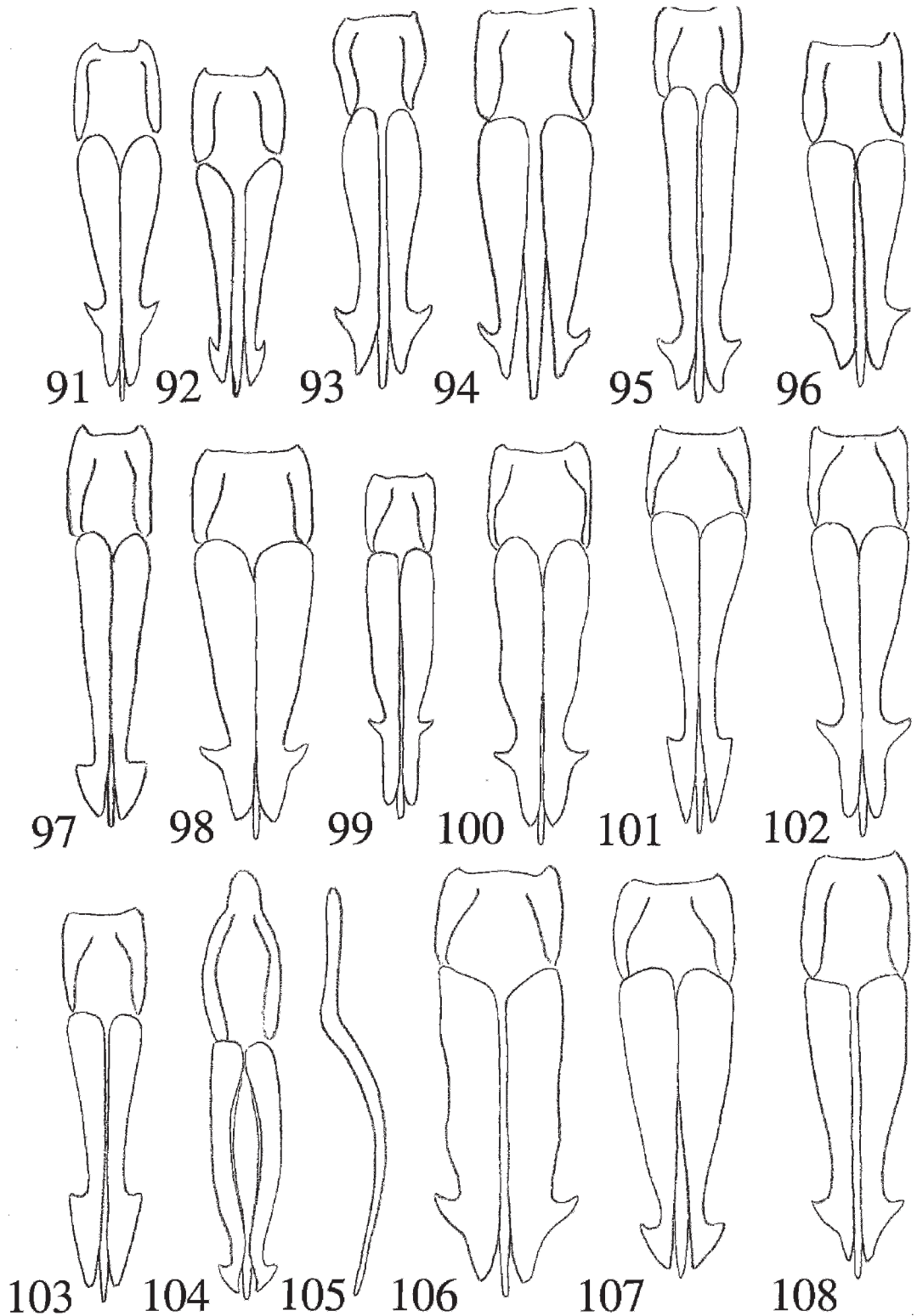
Figures 1–27 Distribution of *Semiotus* species; solid shapes represent specific localities, open shapes represent localities where only countries are known (see individual species treatments for complete data). 1. *Semiotus ligneus*, *S. luteipennis*. 2. *S. acutus*, *S. auripilis*, *S. clarki*. 3. *Semiotus affinis*, *S. carinicolis*, *S. cristatus*. 4. *S. aliciae*, *S. exolutus*. 5. *S. angulatus*, *S. linnei*, *S. pectitus*. 6. *S. angusticollis*, *S. imperialis*, *S. serraticornis*. 7. *S. angustus*, *S. bispinus*, *S. colombianus*. 8. *S. antennalis*, *S. cyrtomaris*, *S. rileyi*. 9. *S. badeni*, *S. chontalensis*, *S. zonatus*. 10. *S. carus*, *S. caracasanus*, *S. spinosus*, *S. matilei*. 11. *S. woodi*, *S. pallicornus*. 12. *S. lacrimiformis*, *S. triplehorni*. 13. *S. decoratus*, *S. fryi*, *S. nigriceps*. 14. *S. girardi*, *S. fulvicollis*, *S. germari*, *S. gibbosus*. 15. *S. hispidus*, *S. illustris*, *S. trinitensis*, *S. punctatostriatus*. 16. *S. illigeri*, *S. striatus*, *S. virgatus*, *S. glabricollis*. 17. *S. superbus*, *S. taeniatus*. 18. *S. bilineatus*, *S. antennatus*, *S. limatus*. 19. *S. buckleyi*, *S. catei*, *S. chassaini*. 20. *S. convexicollis*, *S. melleus*. 21. *S. cuspidatus cuspidatus*, *S. cuspidatus splendidus*. 22. *S. fascicularis*, *S. flavangulus*, *S. fleutiauxi*, *S. formosus*. 23. *S. furcatus*, *S. kirschi*, *S. kondratieffi*, *S. perangustus*. 24. *S. insignis*, *S. kathleenae*, *S. ligatus*. 25. *S. lafertei*, *S. pilosus*. 26. *S. reaumuri*, *S. rubricollis*, *S. schaumii*, *S. regalis*. 27. *S. seladonius*, *S. singularis*, *S. sommeri*.



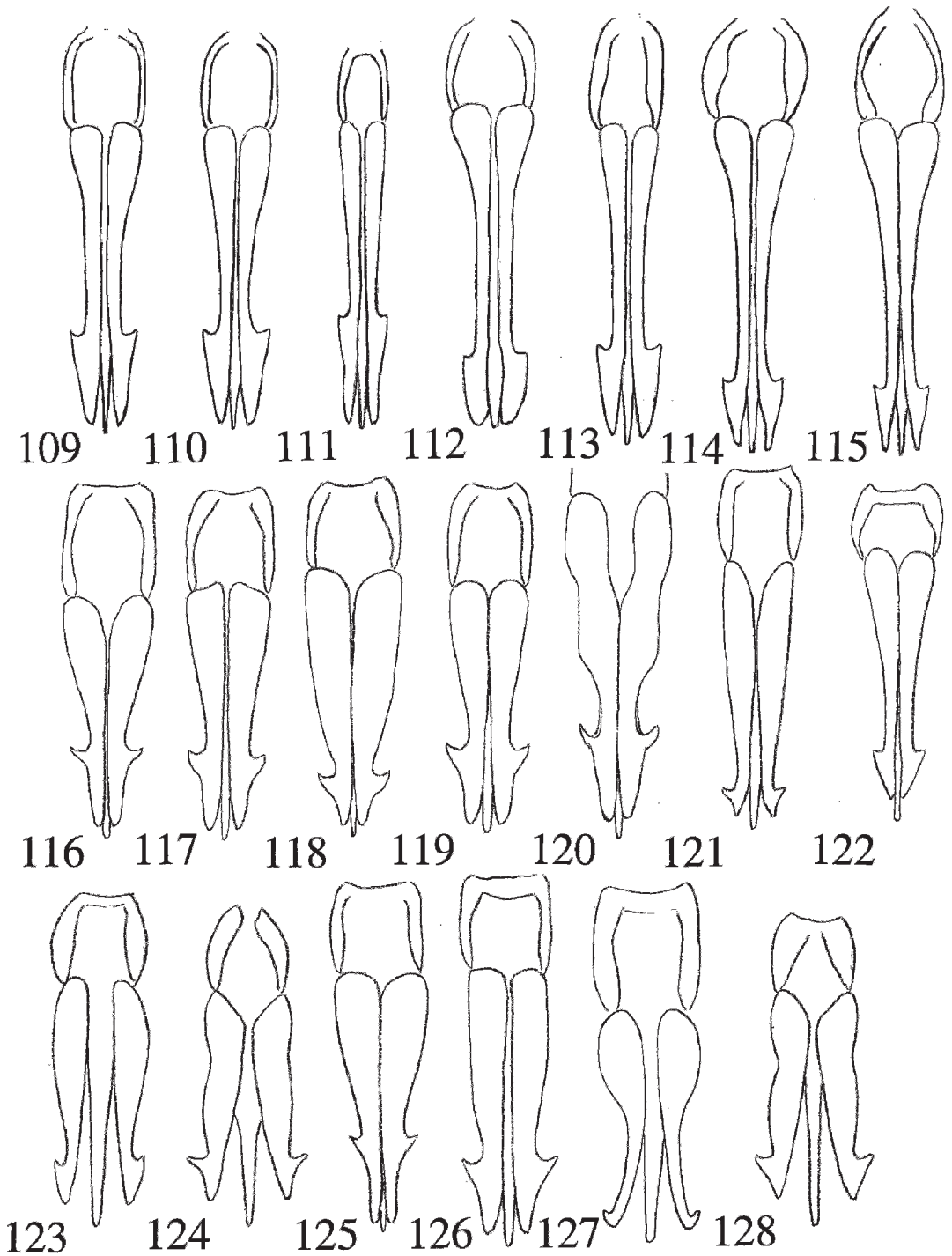
Figures 28–33 *Semiotinus* and *Semiotus* species. 28. nongibbous profile. 29. gibbous profile. 30–33. pronotal profiles. 30. *Semiotus fryi*. 31. *Semiotinus sp.* 32. *Semiotus woodi*. 33. *Semiotus superbus*.



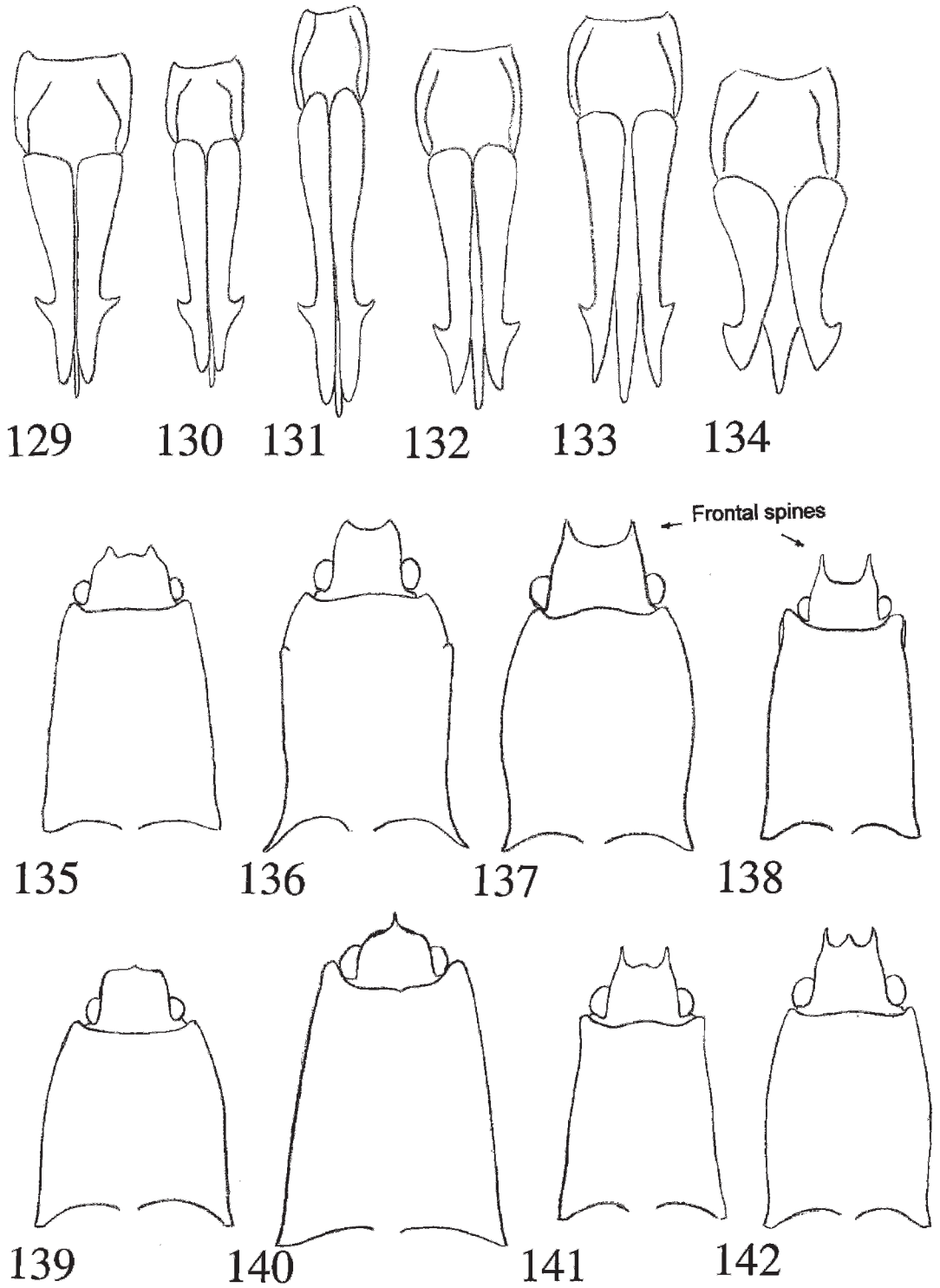
Figures 34–90 Anterior sclerites (of bursa copulatrix) of *Semiotus* species. 34. *S. taeniatus*. 35. *S. buckleyi*. 36. *S. regalis*. 37. *S. ligatus*. 38. *S. punctatostriatus*. 39. *S. bilineatus*. 40. *S. intermedius*. 41. *S. angulatus*. 42. *S. trinitensis*. 43. *S. insignis*. 44. *S. angusticollis*. 45. *S. convexicollis*. 46. *S. cuspidatus*. 47. *S. luteipennis*. 48. *S. imperialis*. 49. *S. germari*. 50. *S. fulvicollis*. 51. *S. formosus*. 52. *S. spinosus*. 53. *S. caracasanus*. 54. *S. bispinus*. 55. *S. nigriceps*. 56. *S. perangustus*. 57. *S. hispidus*. 58. *S. antennatus*. 59. *S. cyrtomaris*. 60. *S. pallicornus*. 61. *S. carus*. 62. *S. gibbosus*. 63. *S. rubricollis*. 64. *S. clarki*. 65. *S. chassaini*. 66. *S. woodi*. 67. *S. rileyi*. 68. *S. tripleborni*. 69. *S. lacrimiformis*. 70. *S. acutus*. 71. *S. angustus*. 72. *S. perangustus*. 73. *S. melleus*. 74. *S. decoratus*. 75. *S. badeni*. 76. *S. virgatus*. 77. *S. fleutiauxi*. 78. *S. limatus*. 79. *S. illigerii*. 80. *S. cristatus*. 81. *S. colombianus*. 82. *S. limiei*. 83. *S. antennalis*. 84. *S. furcatus*. 85. *S. illustris*. 86. *S. kondratieffi*. 87. *S. sommeri*. 88. *S. striatus*. 89. *S. exsolutus*. 90. *S. kirschi*.



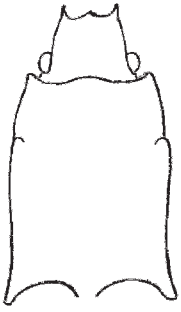
Figures 91–108 Male genitalia of *Semiotus* species. 91. *S. germari*. 92. *S. furcatus*. 93. *S. fulvicollis*. 94. *S. badeni*. 95. *S. formosus*. 96. *S. bispinus*. 97. *S. bilineatus*. 98. *S. perangustus*. 99. *S. angustus*. 100. *S. hispidus*. 101. *S. antennatus*. 102. *S. pilosus*. 103. *S. pallicornus*. 104. *S. cyrtomaris*. 105. *S. cyrtomaris* (lateral view). 106. *S. kathleenae*. 107. *S. angusticollis*. 108. *S. melleus*.



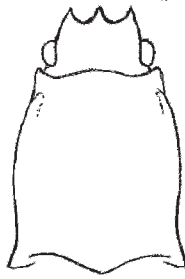
Figures 109–128 Male genitalia of *Semiotus* species. 109. *S. woodi*. 110. *S. triplehorni*. 111. *S. lacrimiformis*. 112. *S. carus*. 113. *S. spinosus*. 114. *S. caracasanus*. 115. *S. antennalis*. 116. *S. buckleyi*. 117. *S. regalis*. 118. *S. ligatus*. 119. *S. seladonius*. 120. *S. lafertei*. 121. *S. cuspidatus*. 122. *S. angulatus*. 123. *S. luteipennis*. 124. *S. ligneus*. 125. *S. taeniatus*. 126. *S. trinitensis*. 127. *S. imperialis*. 128. *S. serraticornis*.



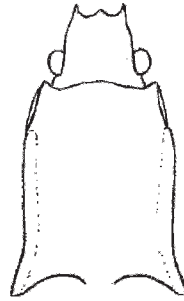
Figures 129-142 *Semiotus* species. 129-134 male genitalia. 129. *S. cristatus*. 130. *S. linnei*. 131. *S. exsolutus*. 132. *S. punctatostriatus*. 133. *S. girardi*. 134. *S. catei*. 135-142. Head and pronotum. 135. *S. fryi*. 136. *S. kondratieffi*. 137. *S. caracasanus*. 138. *S. badeni*. 139. *S. hispidus*. 140. *S. cuspidatus*. 141. *S. girardi*. 142. *S. linnei*.



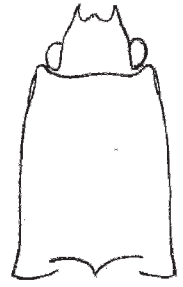
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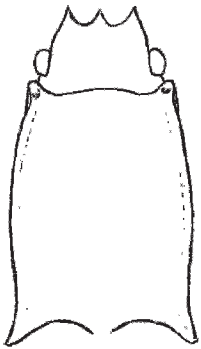
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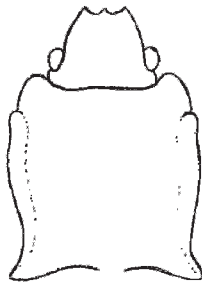
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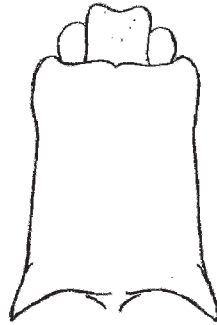
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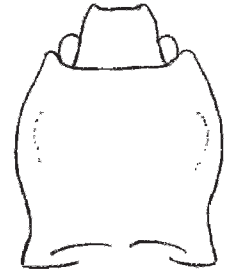
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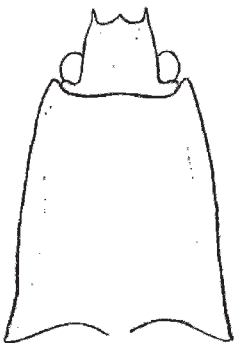
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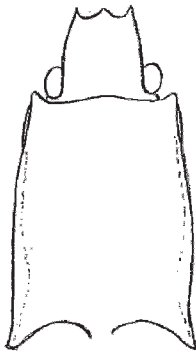
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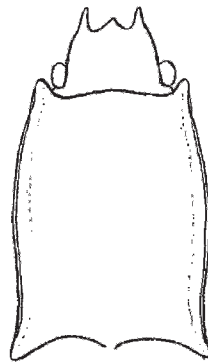
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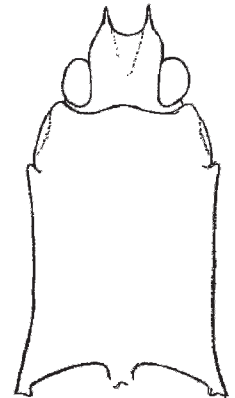
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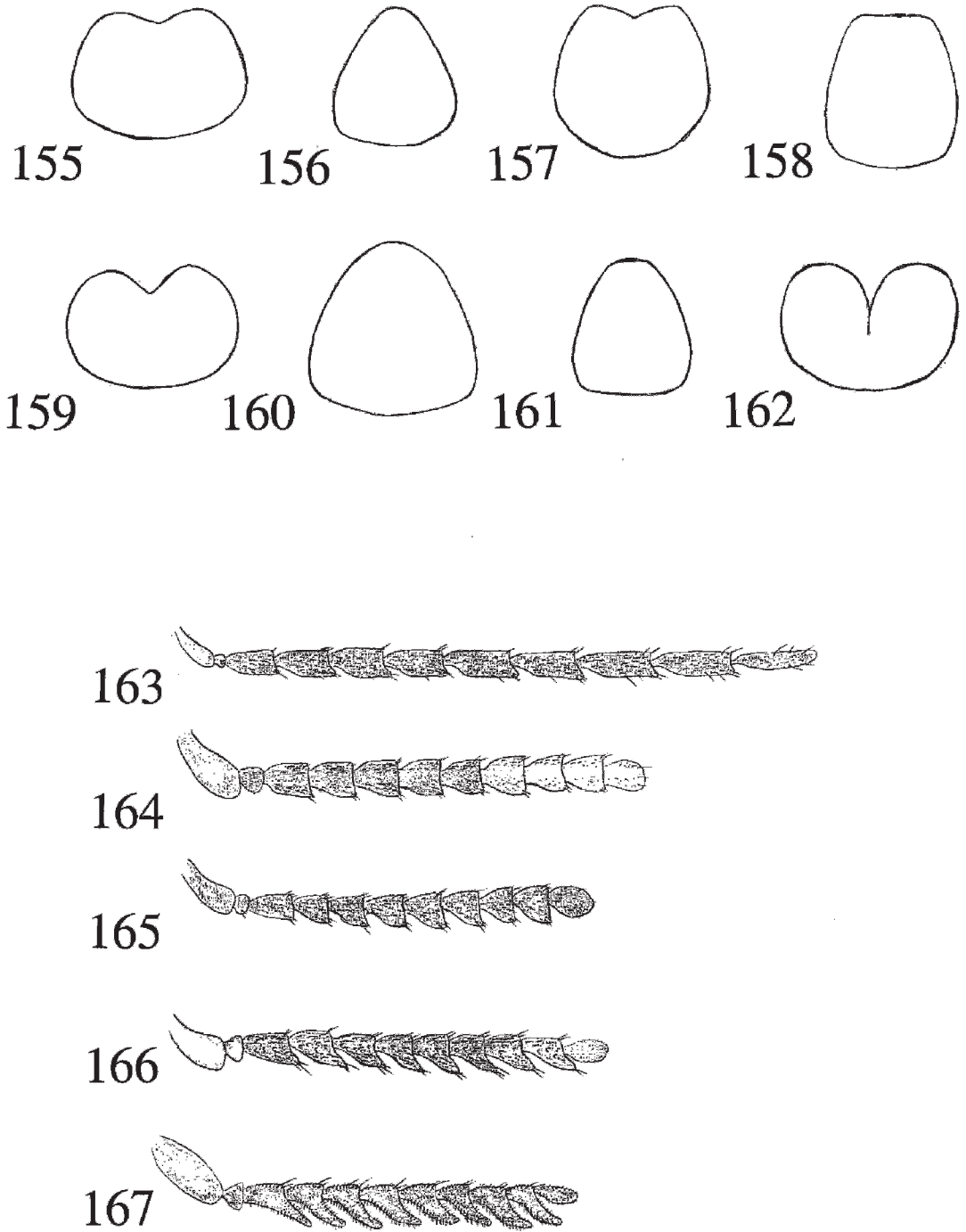


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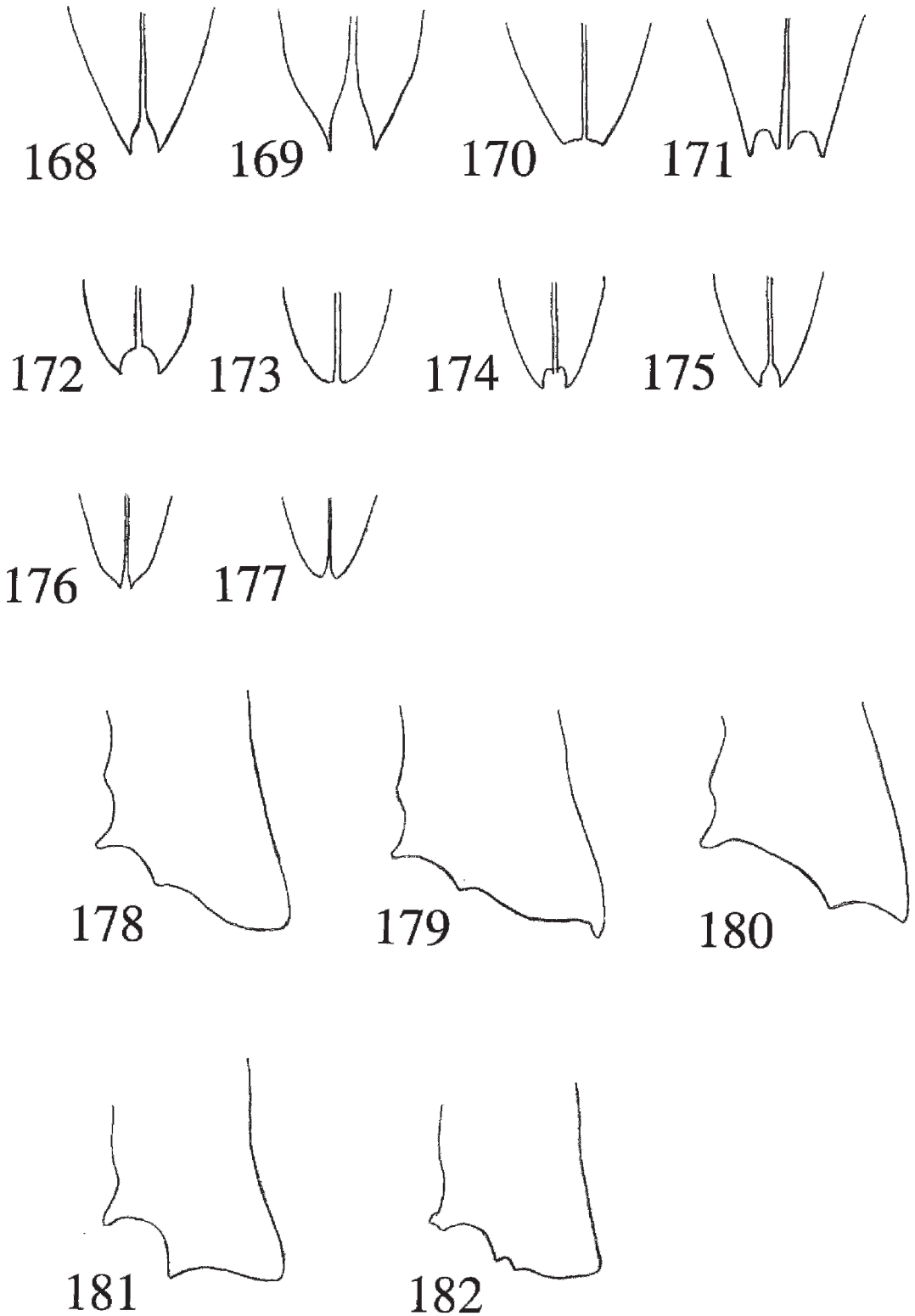


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Figures 143–154 Head and pronotum of *Semiotus* species. 143. *S. decoratus*. 144. *S. cristatus*. 145. *S. illustris*. 146. *S. intermedius*. 147. *S. illigeri*. 148. *S. regalis*. 149. *S. ligneus*. 150. *S. formosus*. 151. *S. punctatostratus*. 152. *S. sommeri*. 153. *S. virgatus*. 154. *S. angulatus*.



Figures 155–167 *Semiotus* species. 155–162. scutella. 155. *S. bilineatus*. 156. *S. nigriceps*. 157. *S. intermedius*. 158. *S. matilei*. 159. *S. lafertei*. 160. *S. angulatus*. 161. *S. convexicollis*. 162. *S. trinitensis*. 163–167. antennae. 163. *S. ligneus*. 164. *S. furcatus*. 165. *S. formosus*. 166. *S. insignis*. 167. *S. angulatus*.



Figures 168–182 *Semiotus* species. 168–177, elytral apices. 168. *S. acutus*. 169. *S. serraticornis*. 170. *S. formosus*. 171. *S. imperialis*. 172. *S. furcatus*. 173. *S. hispidus*. 174. *S. bilineatus*. 175. *S. decoratus*. 176. *S. ligatus*. 177. *S. seladonius*. 178–182. Hypomera. 178. *S. exsolutus*. 179. *S. angulatus*. 180. *S. imperialis*. 181. *S. taeniatus*. 182. *S. furcatus*.



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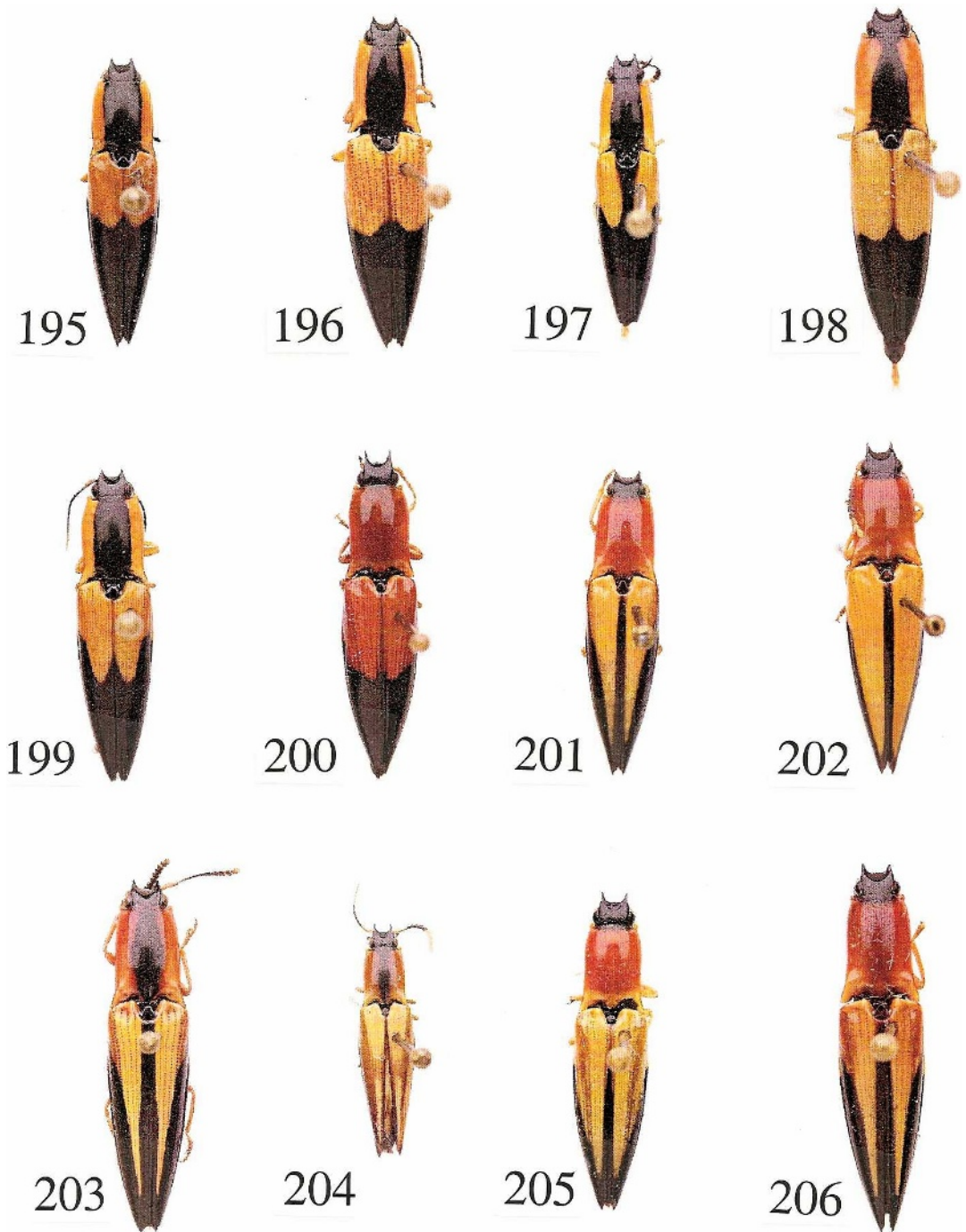


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Figures 183–194 *Semiotus* species. 183. *S. insignis*. 184. *S. insignis*. 185. *S. cuspidatus cuspidatus*. 186. *S. cuspidatus splendidus*. 187. *S. imperialis*. 188. *S. angulatus*. 189. *S. angulatus*. 190. *S. angulatus*. 191. *S. angusticollis*. 192. *S. convexicollis*. 193. *S. ligneus*. 194. *S. serraticornis*.



Figures 195–206 *Semiotus* species. 195. *S. caracasanus*. 196. *S. spinosus*. 197. *S. woodi*. 198. *S. tripleborni*. 199. *S. lacrimiformis*. 200. *S. rileyi*. 201. *S. cyrtomaris*. 202. *S. carus*. 203. *S. nigriceps*. 204. *S. matilei*. 205. *S. pallicornus*. 206. *S. antennalis*.



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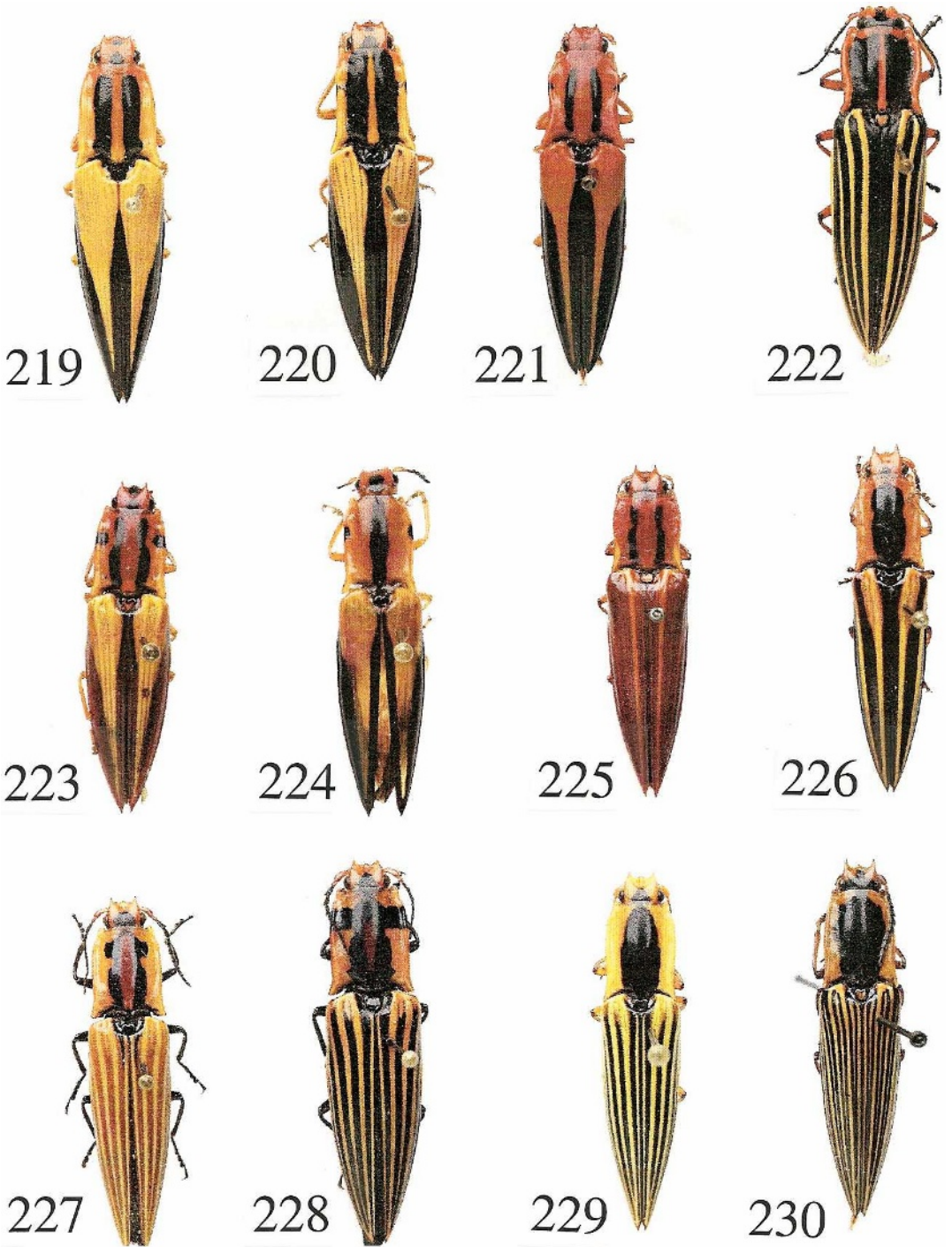


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Figures 207–218 *Semiotus* species. 207. *S. badeni*. 208. *S. limatus*. 209. *S. bispinus*. 210. *S. fulvicollis*. 211. *S. fleutiauxi*. 212. *S. trinitensis*. 213. *S. melleus*. 214. *S. fascicularis*. 215. *S. clarki*. 216. *S. catei*. 217. *S. pectitus*. 218. *S. flavangulus*.



Figures 219–230 *Semiotus* species. 219. *S. lafertei*. 220. *S. affinis*. 221. *S. illustris*. 222. *S. regalis*. 223. *S. intermedius*. 224. *S. decoratus*. 225. *S. rubricollis*. 226. *S. taeniatus*. 227. *S. illigeri*. 228. *S. illigeri*. 229. *S. illigeri*. 230. *S. buckleyi*.



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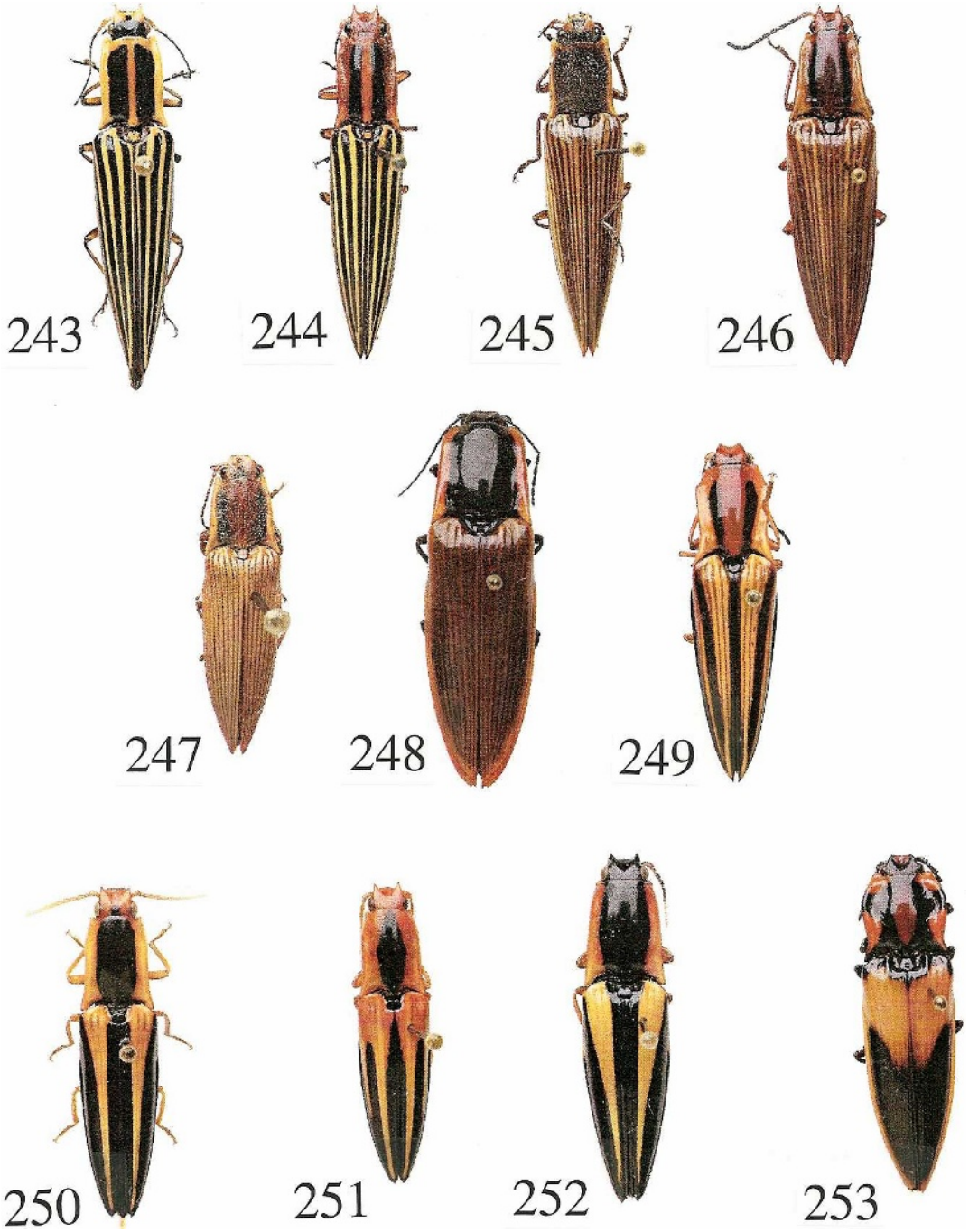


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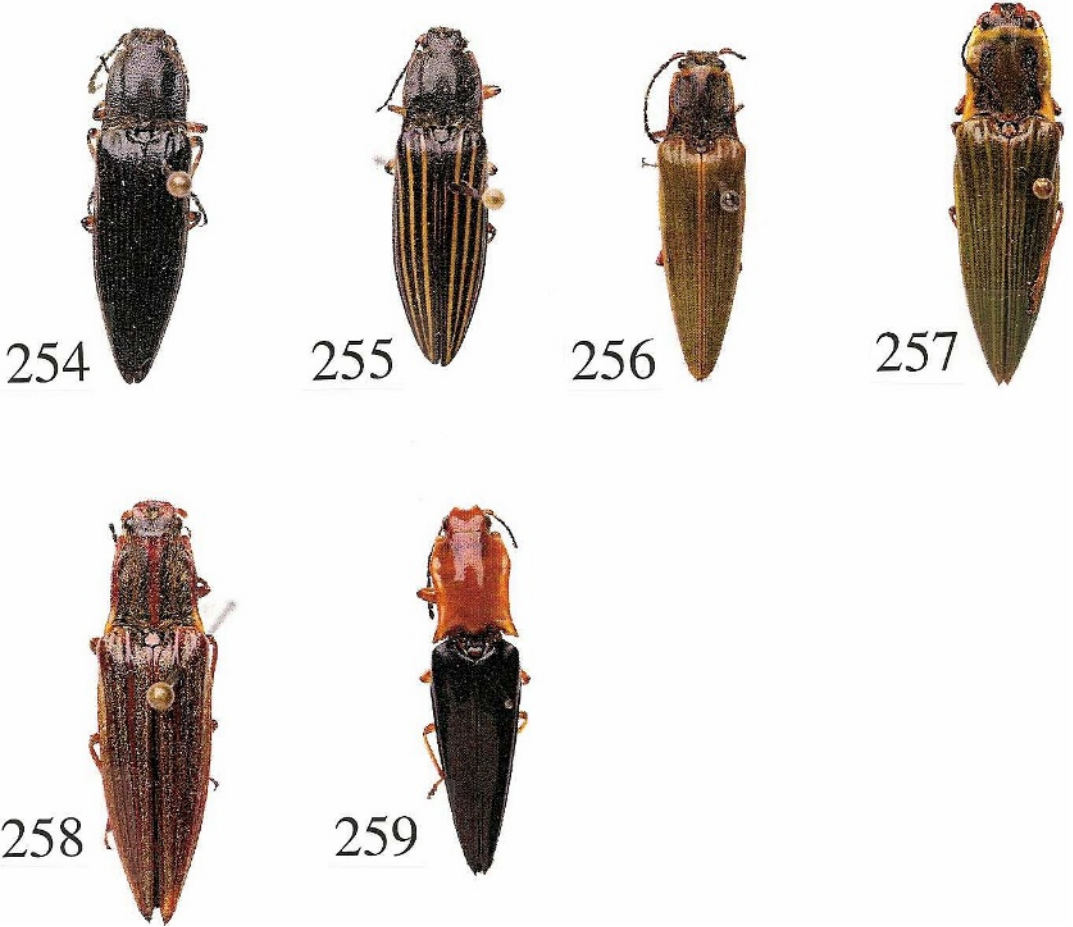


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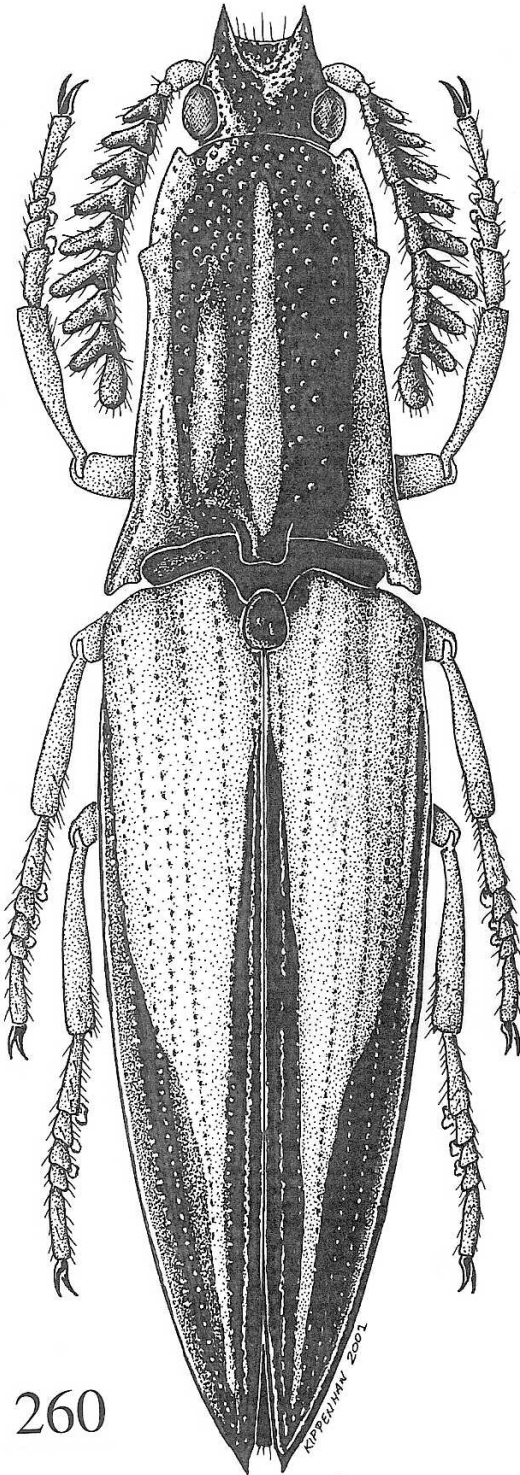
Figures 231–242 *Semiotus* species. 231. *S. cristatus*. 232. *S. colombianus*. 233. *S. perangustus*. 234. *S. angustus*. 235. *S. germari*. 236. *S. linnei*. 237. *S. punctatostriatus*. 238. *S. chassaini*. 239. *S. exsolutus*. 240. *S. exsolutus*. 241. *S. sommeri*. 242. *S. virgatus*.



Figures 243–253 *Semiotus* species. 243. *S. acutus*. 244. *S. kirschi*. 245. *S. pilosus*. 246. *S. gibbosus*. 247. *S. striatus*. 248. *S. luteipennis*. 249. *S. kondratieffi*. 250. *S. bilineatus*. 251. *S. furcatus*. 252. *S. antennatus*. 253. *S. formosus*.

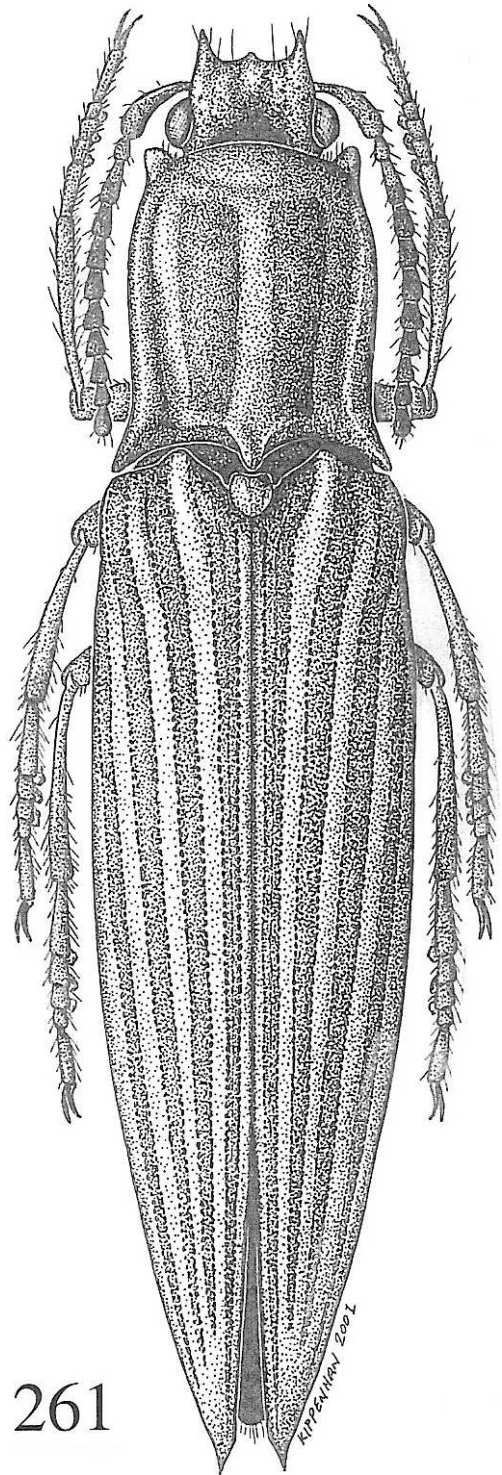


Figures 254–259 *Semiotus* species. 254. *S. hispidus*. 255. *S. hispidus*. 256. *S. seladonius*. 257. *S. ligatus*. 258. *S. kathleenae*. 259. *S. aliciae*.



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Figure 260 *Semiotus convexicollis*.



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Figure 261 *Semiotus sommeri*.

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