

THREE NEW SPECIES OF THE GENERA *ASPILOTA* FOERSTER AND *SYNALDIS* FOERSTER FROM NORTH EUROPE (HYMENOPTERA: BRACONIDAE: ALYSIINAE)

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Abstract.— Illustrated descriptions are given for three new North European species of the genera *Aspilota* and *Synaldis*: *Aspilota spiracula* **sp. nov.** from Denmark, *Synaldis agaricae* **sp. nov.** from Denmark, Finland and the Netherlands, and *Synaldis machairum* **sp. nov.** from Denmark.



Key words.— Parasitoids, Braconidae, Alysiinae, *Synaldis*, *Aspilota*, new species, North Europe.

INTRODUCTION

The taxa of the *Aspilota* genus-group are the most taxonomically complicate group of Alysiinae over their mainly small body size and the reduced number of diagnostic characters used for distinguishing these species (Belokobylskij 2005). Part of the genera of this group are easily recognizable by the size of the anterior tentorial pits and by the presence or absence of the first radiomedial vein (2RS). On the other hand, the size of the paraclypeal area used for the separation of several Alysiini genera (*Dinotrema* Foerster, 1862 and *Aspilota* Foerster, 1862, *Synaldis* Foerster, 1862 and *Adelphenaldis* Fischer 2003) vary and in some cases it is not easy to understand the real generic position of a few of their species (Belokobylskij 2002, Peris-Felipo *et al.* 2012). However, basically this metrical feature is effectively used for separating the great majority of species in the listed taxa.

Status of the Alysiinae genus *Synaldis* Foerster, 1862 was stable a long-term period until van Achter-

berg (1988) in his revision of the *Aspilota*-group synonymized this genus with re-established *Dinotrema* Foerster, 1862. Former species of *Synaldis* were distributed by him among genera *Aspilota* Foerster, 1862 and *Dinotrema* due to using of the new diagnosis feature (only size of the paraclypeal areas). However, synonymization of *Synaldis* was not support by other experts working with alysiine taxa (Fischer 1993a, 1993b, Papp 2000, Belokobylskij 2002). It is necessary to underline that complete reduction of the first radiomedial vein (2RS) is appreciable evolutionary event which was also attended with disappearing of the break (angle) between first (r) and second (3RSa) radial abscissae and this part of the vein connection is only gently curved. Such state of the wing venation is valuable qualitative transformation and can reliable support the generic status of *Synaldis* (Belokobylskij 2002). Only difference between *Synaldis* and *Dinotrema* (complete absence or presence of 2RS) is very rarely gradual one: see for example member of subgenus *Synaldotrema* Belokobylskij *et* Tobias,

2002, with a few specimens of *Dinotrema* (*S.*) *speciosum* Belokobylskij et Tobias, 2002 having 2RS descleotised (Belokobylskij and Tobias 2002). Such intermediate forms are present as exception in this group of genera and final decision about generic status can be resolved after their comprehensive phylogenetic analysis including morphological and especially biochemical data.

In this paper, we describe three new species from North Europe: *Aspilota spiracula* sp. nov., *Synaldis agaricae* sp. nov., and *S. machairum* sp. nov. These species were previously separated by the late T. Munk, who is a co-author of these new taxa.

For the terminology of morphological features and sculpture, measurements and wing venation nomenclature codes see Sharkey and Wharton (1997); for measurements of the length and width of mandibles and abbreviations for ocellar proportions see Peris-Felipo *et al.* (2013). The keys by Fischer (2003), Belokobylskij (2004a, 2004b, 2005) and Papp (2008) were used for the identification of new *Aspilota* and *Synaldis* species. The types of described species are deposited in the:

ENV – Entomological Collection at the University of Valencia, Valencia, Spain;

NMA – Naturhistorisk Museum, Arhus, Denmark;

NHMW – Naturhistorisches Museum, Wien, Austria;

RMNH – Naturalis Biodiversity Center, Leiden, Netherlands;

ZISP – Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia.

TAXONOMY

Genus *Aspilota* Foerster 1862

Aspilota spiracula Munk et Peris-Felipo, sp. nov.
(Figs 1–12)

Etymology. The name refers to the enlarged propodeal spiracles.

Diagnosis. This new species is similar to *A. impar* Papp 2008 (Papp 2008) from Hungary, but differs in having the first flagellar segment 2.5 times as long as its maximum width (2.0 times in *A. impar*), middle flagellar segments 1.05–1.10 times as long as their maximum width (1.6 times in *A. impar*), hind femur 3.9 times as long as its maximum width (3.0 times in *A. impar*), and the first metasomal tergite 2.3 times as long as its apical width (1.5 times in *A. impar*). According to Belokobylskij (2005), the new species is similar to the Eastern Palaearctic *A. tshandolaz* Belokobylskij 2005. *A. spiracula* sp. nov. differs from *A. tshandolaz* in its large propodeal spiracles (small in *A. tshandolaz*), the first flagellar segment 2.5 times as long as its maximum width (3.5–4.3 times in

A. tshandolaz), and the middle flagellar segments 1.05–1.10 times as long as their maximum width (1.6–1.8 times in *A. tshandolaz*).

Description. Female (holotype). Head. In dorsal view 1.7 times as wide as its median length, 1.4 times as wide as mesoscutum, with rounded temples behind eye. Eye in lateral view 1.5 times as high as wide and 0.95 times as wide as temple medially. POL 1.1 times OD; OOL 3.1 times OD. Face 1.65 times as wide as high; inner margins of eyes subparallel. Clypeus slightly curved ventrally, 2.3 times as wide as high. Mandible widened towards apex, 1.5 times as long as maximum width. Upper tooth of mandible distinctly shorter than middle tooth; middle tooth subrounded apically; lower tooth longer than upper tooth, rounded apically. Antenna thick, 18-segmented. Scape 2.25 times as long as pedicel. First flagellar segment 2.5 times as long as its apical width, 1.3 times as long as second segment; second segment 1.8 times as long as its maximum width. Third to fifteenth flagellar segments 1.05–1.10 times, sixteenth segment 1.7 times as long as maximum width.

Mesosoma in lateral view, 1.1 times as long as high. Mesoscutum 0.95 times as long as maximum width. Notauli mainly absent in their posterior parts. Mesoscutal pit present, very small, rounded. Prescutellar depression smooth, with lateral carinae. Precoxal suture present, not reaching anterior or posterior margins of mesopleuron. Posterior mesopleural furrow crenulate. Propodeum sculptured, with large areola. Propodeal spiracle enlarged, 0.25 times as wide as distance between spiracle and apical margin of propodeum.

Legs. Hind femur 3.9 times as long as its maximum width. Hind tibia weakly widened towards apex, about 9.75 times as long as its maximum subapical width, 1.05 times as long as hind tarsus. First segment of hind tarsus 2.15 times as long as second segment.

Wings. Length of fore wing 2.8 times its maximum width. Marginal cell reaching apex of wing, 4.0 times as long as its maximum width. Vein 3RSa 2.6 times as long as 2RS, 5.5 times as long as r, 0.4 times as long as 3RSb. Second submarginal cell distinctly narrowed distally, 3.1 times as long as maximum width. 1 cu-a distinctly postfurcal. First subdiscal cell closed, widened apically, 2.85 times as long as its maximum width. Hind wing 4.9 times as long as its maximum width.

Metasoma. Distinctly compressed. First tergite striate, but almost smooth medially, weakly widened towards apex, 2.3 times as long as its apical width. Ovipositor 1.15 times as long as first tergite, distinctly shorter than metasoma, 0.85 times as long as hind femur.

Colour. Body and legs brown to dark brown. Wings hyaline. Pterostigma brown.

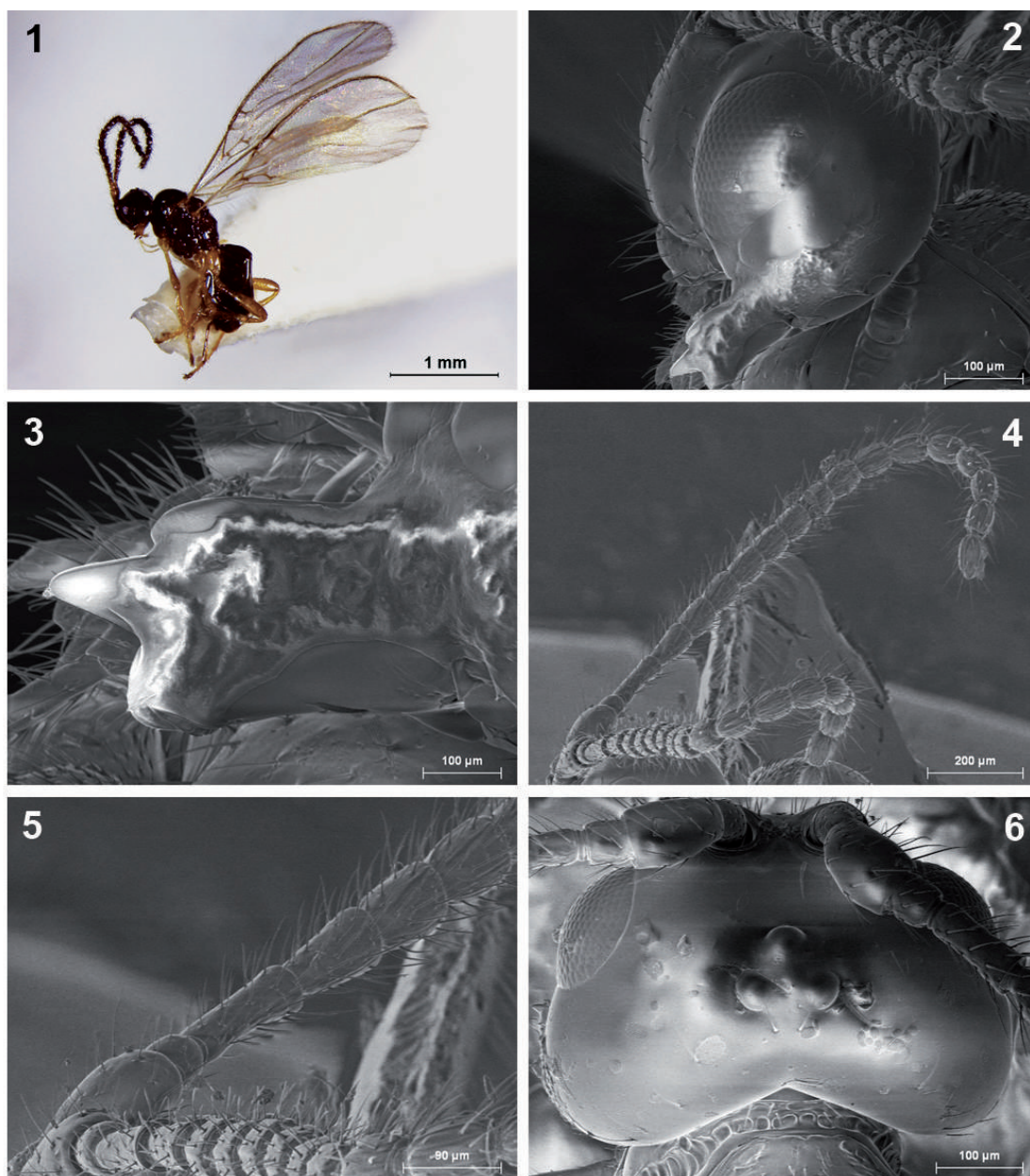
Length. Body 1.85 mm; fore wing 2.3 mm; hind wing 1.8 mm.

Variations. Body length 1.85–1.90 mm. Antenna 18–20-segmented. Head in dorsal view 1.4–1.5 times as wide as median length. Hind femur 3.85–3.90 times as long as its maximum width.

Male. Length of body 1.5 mm. Antenna 22–24-segmented. First flagellar segment 4.0 times and second segment 3.0 times as long as maximum width; middle segments 2.3 times as long as width. Otherwise similar to female.

Type material. Holotype: female, Denmark, E-Jutland, Mols, Strandkær, 56°14'N 10°25'E, 30.IX.1982 (Munk leg.) (NMA).

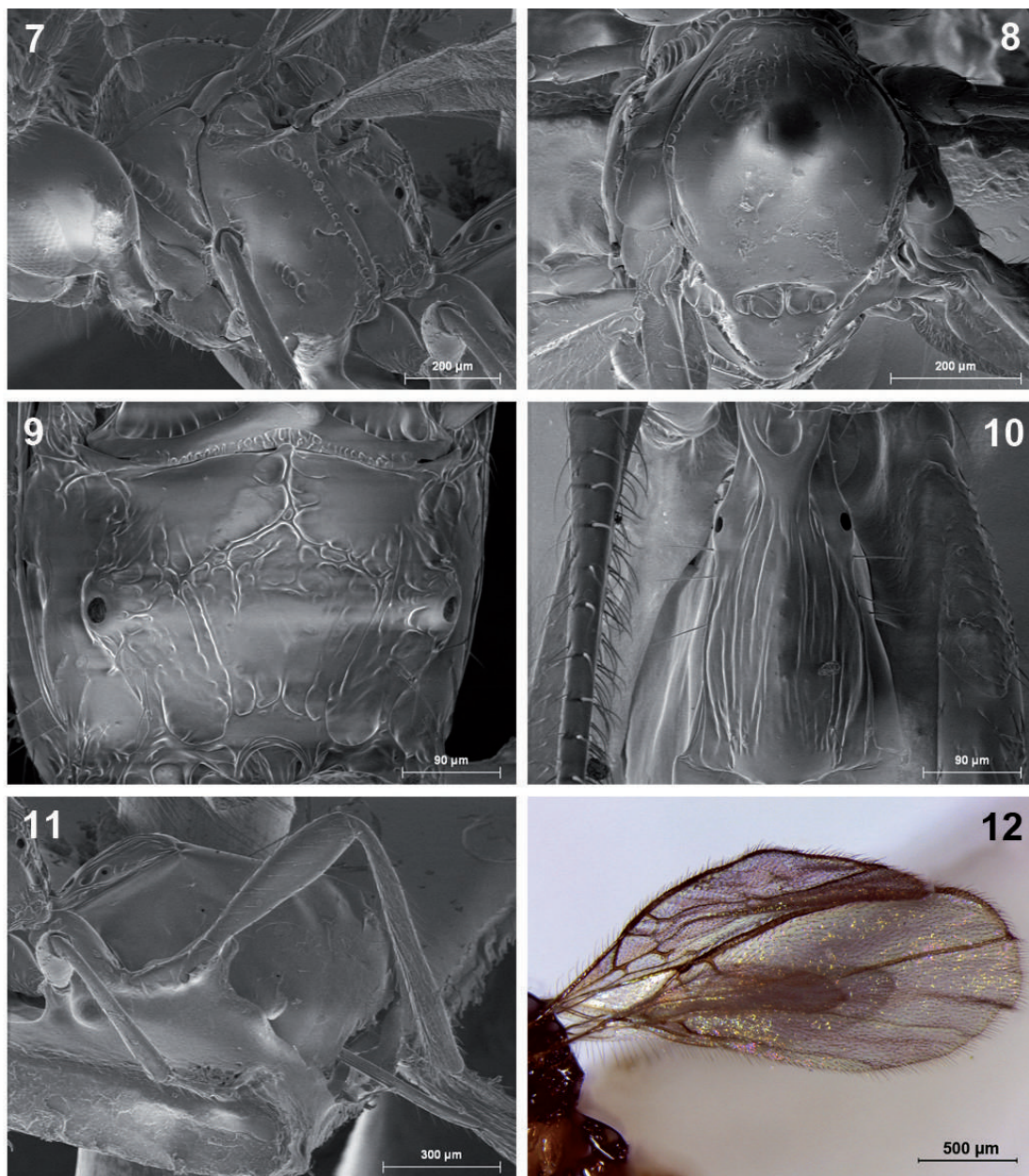
Paratypes. 10 ♀♀, 2 ♂♂, same locality and date as holotype (Munk leg.) (ENV, NMA, ZISP); 3 ♀♀, same locality but, 29.IX.1986, 2 & 3.X.1991 (Munk leg.) (ENV, ZISP); 3 ♀♀, 1 ♂, Denmark, E-Jutland, Højkol Skov., 56°05'N 9°38'E, 28.IX.1987 (Munk leg.) (NMA); 13 ♀♀, 3 ♂♂, Denmark, E-Jutland, Palsgård Skov.,



Figures 1–6. *Aspilota spiracula* sp. nov. (female). (1) Habitus, lateral view; (2) head, lateral view; (3) mandible; (4) antenna; (5) basal segments of antenna; (6) head, dorsal view.

56°01'N 9°25'E, 28.IX.1987 (Munk leg.) (NMA, RMNH, ZISP); 1 ♀, 1 ♂, Denmark, E-Jutland, Fuglslev, 56°16'N 10°43'E, 9.IX.1988 (Munk leg.) (NMA); 3 ♀ ♀, 4 ♂ ♂, same locality but 2.X.1988 (Munk leg.) (NMA); 4 ♀ ♀, 3 ♂ ♂, Denmark, S-Jutland, Stensbæk Plant., 55°17'N 8°56'E, 1.X.1983 (Munk leg.) (NMA); 1 ♀, Denmark, S-Jutland, Draved Skov., 1.X.1983 (Munk leg.) (NMA); 3 ♀ ♀, 2 ♂ ♂, Denmark, SW-Jutland, Skallingen, near the field laboratory, 2.X.1983 (Munk leg.) (NMA).

Remarks. The specimens from Fuglslev, Højkol, Mols and Skallingen were swept in *Pinus* plantations with a thick cover of moss and scattered *Deschampsia flexuosa* (L.) Trin. In Stensbæk all specimens were collected on the same kind of undergrowth in a *Picea* plantation; the specimens from Palsgård were also from a *Picea* plantation, most of them swept on *Oxalis*.



Figures 7–12. *Aspilota spiracula* sp. nov. (female). (7) Mesosoma, lateral view; (8) mesonotum; (9) propodeum; (10) first metasomal tergite; (11) hind leg, metasoma and ovipositor, lateral view; (12) fore and hind wings.

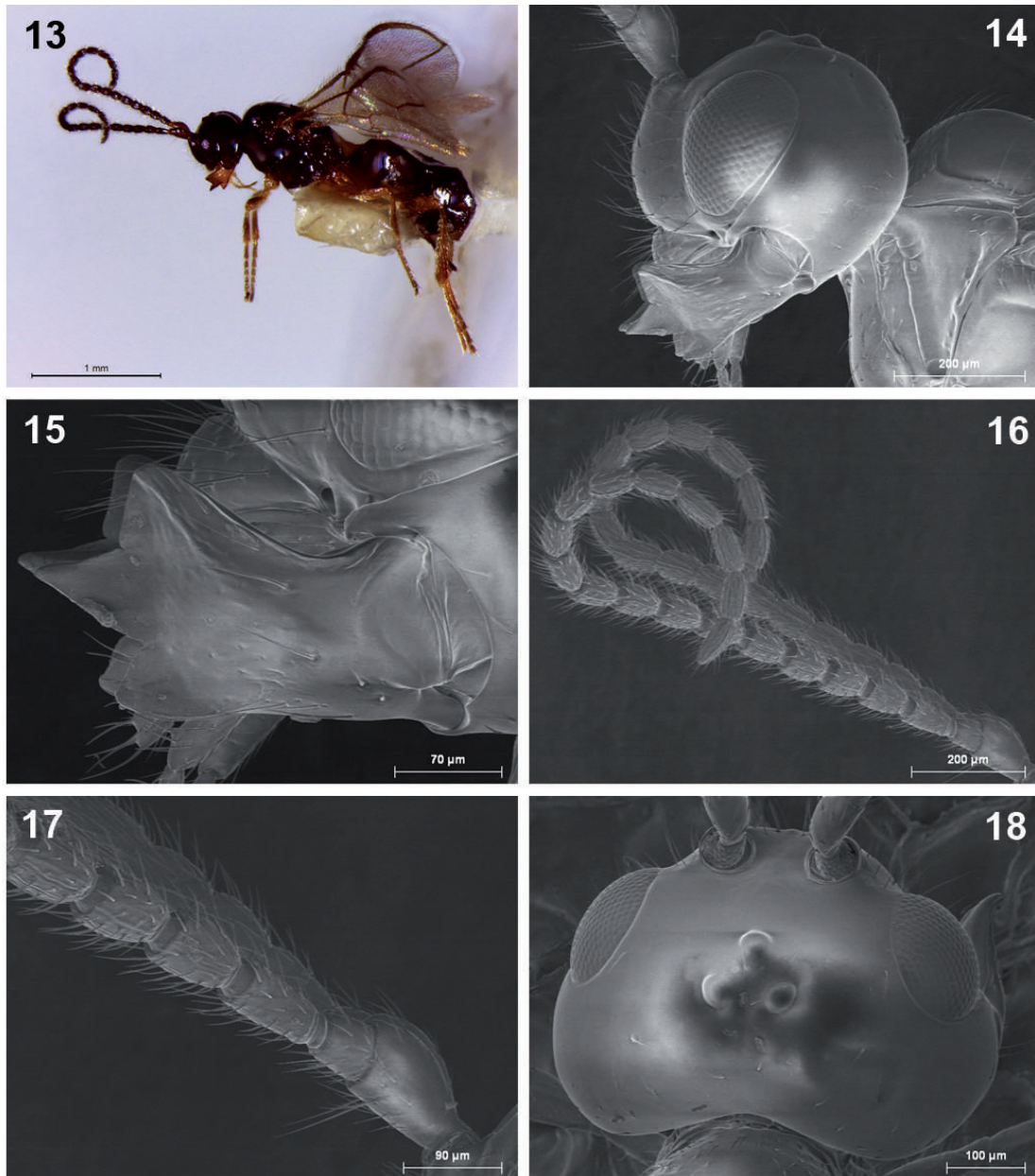
Genus *Synaldis* Foerster 1862

Synaldis agaricae Munk et Peris-Felipo, sp. nov.
(Figs 13–24)

Etymology. The name is derived from *Agaricus* (Agaricales), the name of the mushroom from which most of the type material was collected.

Diagnosis. According to the keys by Fischer (2003) and Belokobylskij (2004a), this new species is similar

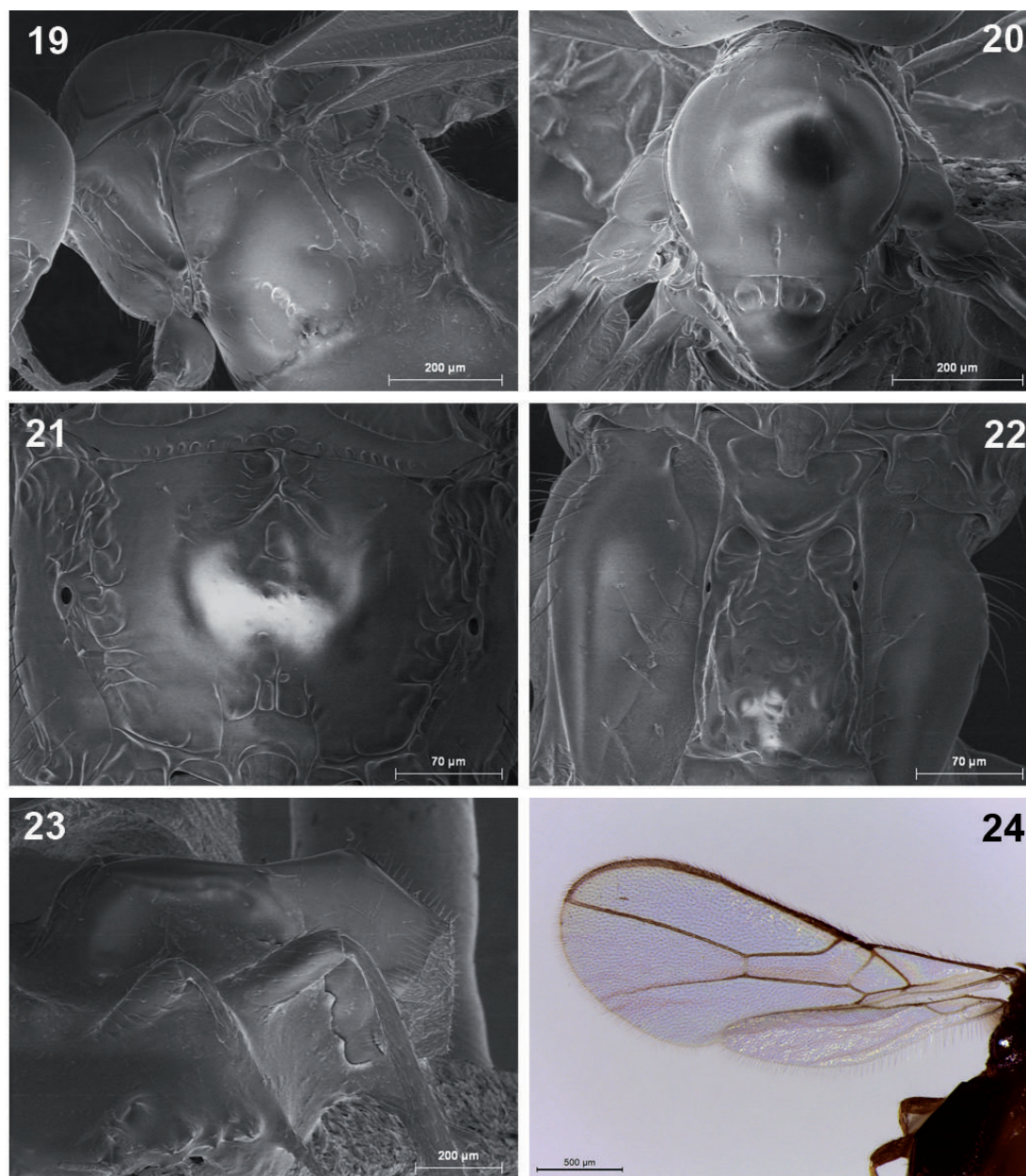
to *S. israelica* Fischer 1993 and *S. jordonica* Fischer 1993. *S. agaricae* sp. nov. differs from *S. israelica* in having the propodeum with short median carinae divergent in basal 0.2, its branches short and distant from propodeal spiracles (with complete longitudinal median carinae running from anterior to posterior margins of propodeum in *S. israelica*), the first metasomal tergite 2.1 times as long as its apical width (1.5 times in *S. israelica*), and mesosoma in lateral view 1.15 times as long as high (1.5 times in *S. israelica*).



Figures 13–18. *Synaldis agaricae* sp. nov. (female). (13) Habitus, lateral view; (14) head, lateral view; (15) mandible; (16) antenna; (17) basal segments of antenna; (18) head, dorsal view.

On the other hand, *S. agaricae* sp. nov. differs from *S. jordani* in having the propodeum with short median carinae divergent in basal 0.2, its branches short and distant from propodeal spiracles (with complete longitudinal median carinae running from anterior to posterior margins of propodeum in *S. jordani*), the first metasomal tergite 2.1 times as long as its apical width (1.8 times in *S. jordani*), the first flagellar segment 3.0 times as long as its maximum width (2.0 times in *S. jordani*), and mandible 1.3 times as long as wide (as long as wide in *S. jordani*).

Description. Female (holotype). Head. In dorsal view 1.5 times as wide as median length, 1.4 times as wide as mesoscutum; head behind eyes rounded. Eye in lateral view 1.65 times as high as wide and 0.7 times as wide as temple medially. POL 1.25 times OD; OOL 2.85 times OD. Face 1.4 times as wide as high; inner margins of eyes subparallel. Clypeus weakly convex ventrally, 2.9 times as wide as high. Anterior tentorial pits not reaching half distance between clypeus and eye. Mandible strongly widened towards apex, 1.3 times as long as its maximum width. Upper tooth of mandible



Figures 19–24. *Synaldis agaricae* sp. nov. (female). (19) Mesosoma, lateral view; (20) mesonotum; (21) propodeum; (22) first metasomal tergite; (23) hind leg, metasoma and ovipositor, lateral view; (24) fore and hind wings.

longer than lower tooth; middle tooth not long, pointed apically; lower tooth slightly shorter than upper tooth, rounded apically. Antennae thickened, 20-segmented. Scape twice as long as pedicel. First flagellar segment 1.5 times as long as its apical width, 1.2 times as long as second segment; second segment 1.2 times as long as its maximum width. Third to fifth flagellar segments 1.2–1.3 times, fourth to twelfth segments 1.4–1.5 times, and thirteenth to eighteenth segments 1.9–2.1 times as long as their width.

Mesosoma in lateral view, 1.15 times as long as high. Mesoscutum as long as maximum width. Notauli mainly absent in their posterior parts. Mesoscutal pit distinct, elongate. Prescutellar depression smooth, with lateral carinae. Precoxal suture present, not reaching anterior or posterior margins of mesopleuron. Posterior mesopleural furrow smooth. Propodeum mainly smooth, with short median carinae divergent in basal 0.2, its branches short and distant from propodeal spiracles. Propodeal spiracle small, 0.15 times distance between spiracle and apical margin of propodeum.

Legs. Hind femur 3.6 times as long as its maximum width. Hind tibia weakly widened towards apex, about 8.5 times as long as its maximum subapical width, 0.95 times as long as hind tarsus. First segment of hind tarsus 1.8 times as long as second segment.

Wings. Length of fore wing 2.55 times its maximum width. Marginal cell reaching apex of wing, 4.85 times as long as its maximum width. Vein 3RSa 3.6 times as long as r, 0.4 times as long as 3RSb. Vein 3RSb 1.9 times as long as 3RSa+r. Vein 1 cu-a postfurcal. First subdiscal cell closed, short, widened apically, 3.0 times as long as its maximum width. Hind wing 5.0 times as long as its maximum width.

Metasoma. Distinctly compressed. First tergite finely rugulose-coriaceous, almost smooth apically, weakly widened towards apex, 2.1 times as long as its apical width. Ovipositor 1.2 times as long as first tergite, distinctly shorter than metasoma, 0.85 times as long as hind femur.

Colour. Body and legs brown to dark brown. Wings hyaline. Pterostigma brown.

Length. Body 2.25 mm; fore wing 2.7 mm; hind wing 1.7 mm.

Variation. Body length 2.2–2.3 mm; fore wing length 2.7–2.8 mm. First flagellar segment 1.5–1.6 times as long as its width.

Male. Antenna 22–26-segmented; segments more slender than in female. Otherwise similar to female.

Type material. Holotype: female, Netherlands, “Oude Mirdum, em. 19.IX.1980 no. 36, L. Vet,” coll. 17.VIII.1980 in *Agaricus nivescens* (RMNH).

Paratypes. 6♀♀, 16♂♂; same label as holotype but, “Oude Mirdum, larvae collected with *Agaricus nivescens* 17.8.1980, adults emerged 15–23.9.1980” (RMNH, ZISP); 2♂♂, same labels, but adults emerged

2.12.1980 (RMNH); 1♀, Netherlands, Gaasterland, Flarich, 18.VIII.1982, on *Agaricus* sp. in pasture (L. Vet) (RMNH); 9♀♀, Denmark, N-Jutland, Slotved Skov., 20.IX.1982 (Munk leg.) (NHMW, NMA, ZISP); 1♀, 1♂, Denmark, Bøgsted Plantage, 16.IX.1982 (Munk leg.) (NMA); 1♀, Denmark, W-Jutland, Høgild, 24.VIII.1985 (Munk leg.) (NMA); 8♀♀, 1♂, Denmark, E-Jutland, Mols, Strandkær, 4.X.1983 (Munk leg.) (ENV, NMA); 1♀, same label but 3.X.1984 (Munk leg.) (ENV, NMA); 4♀♀, Denmark, Nørreris Skov. 10 km NW of Århus. 18.IX.1988, on *Lepiotarha codes* (V. Mahler) (NHMW, NMA); 4♀♀, Denmark, Højen Bæk, 27.IX.1982 (Munk leg.) (NHMW, NMA); 1♀, Finland, “Suomi, ES. Mikkelinmlk, 6830:501, 3.IX.1974 (Koponen leg.) (NMA).

Synaldis machairum Munk et Peris-Felipo, sp. nov.
(Figs 25–36)

Etymology. The name is derived from the Gaelic “machair”, which means “low-lying fertile plain”, referring to the place where the holotype was collected.

Diagnosis. According to the keys by Fischer (2003) and Belokobylskij (2004a), this new species is similar to *S. distracta* (Nees 1934). *S. machairum* sp. nov. differs from *S. distracta* in having the head in dorsal view 1.65 times as wide as its median length (2.0 times in *S. distracta*), the first flagellar segment 4.5 times as long as its maximum width (3.0 times in *S. distracta*), and mesosoma 1.05 times as long as high (1.3 times in *S. distracta*).

Description. Female (holotype). Head. In dorsal view 1.65 times as wide as median length, 1.5 times as wide as mesoscutum: head behind eyes rounded. Eye in lateral view 1.6 times as high as wide and 0.9 times as wide as temple medially. POL 1.65 times OD; OOL 3.25 times OD. Face 1.5 times as wide as high; inner margins of eyes subparallel. Clypeus weakly convex ventrally, 2.75 times as wide as high. Anterior tentorial pits reaching halfway between clypeus and eye. Mandible weakly widened towards apex, 1.4 times as long as its maximum width. Upper tooth of mandible as long as lower tooth; middle tooth rather short, subrounded apically; lower tooth rounded apically. Antennae thick, 21-segmented. Scape 2.3 times as long as pedicel. First flagellar segment 4.5 times as long as its apical width, 1.2 times as long as second segment; second segment 2.3 times as long as its maximum width. Third to eighteenth flagellar segments 1.9–2.0 times as long as their width; nineteenth segment 2.3 times as long as its width.

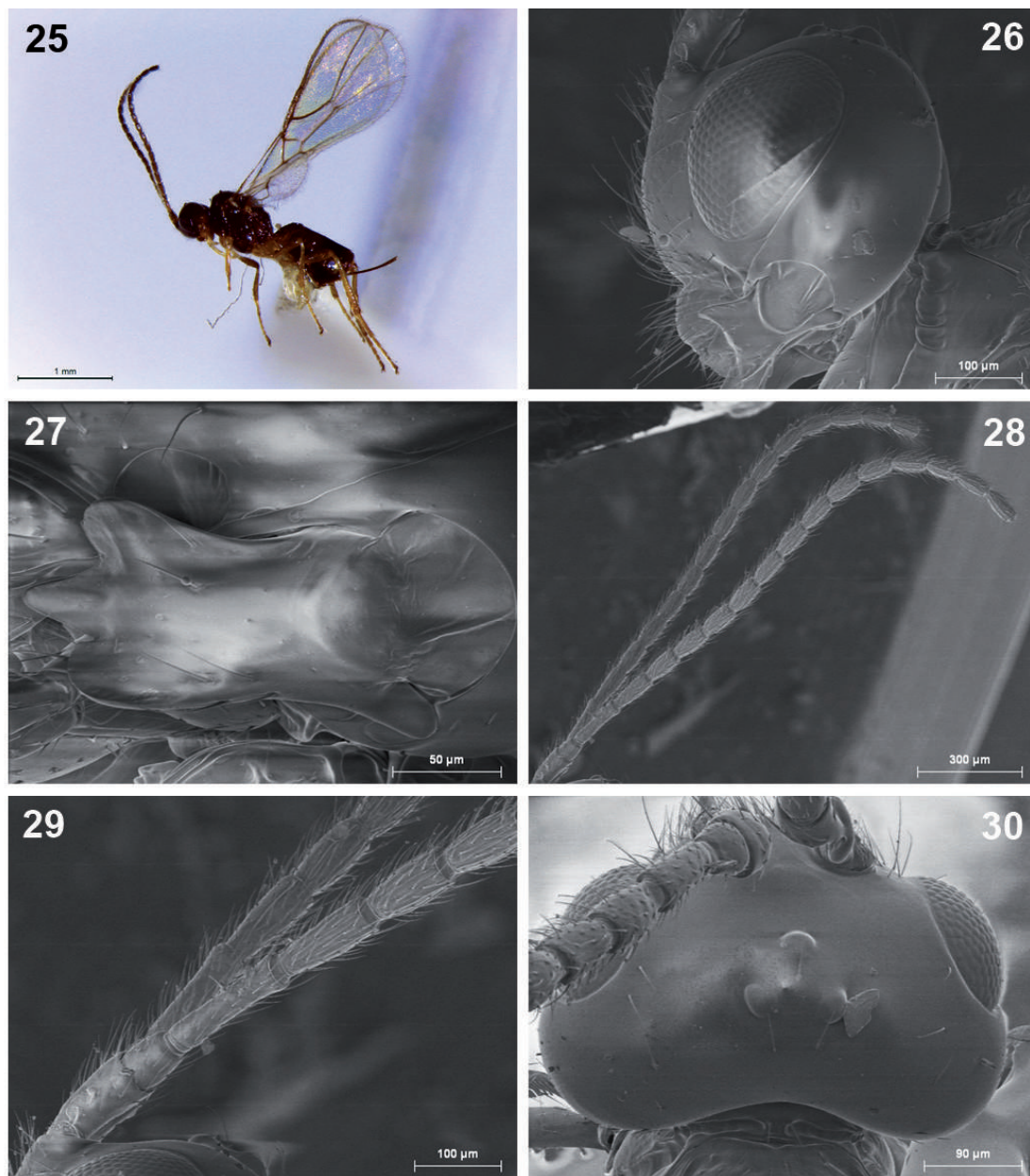
Mesosoma in lateral view, 1.05 times as long as high. Mesoscutum 0.95 times as long as maximum width. Notauli mainly absent in their posterior parts. Mesoscutal pit distinct, wide, oval. Prescutellar

depression smooth, without lateral carinae. Precoxal suture present, reaching anterior but not posterior margins of mesopleuron. Posterior mesopleural furrow almost smooth in lower half. Propodeum sculptured, with median longitudinal carina running from anterior to posterior margins of propodeum, with emerging carinae reaching sides of propodeum. Propodeal spiracle small, 0.15 times distance between spiracle and apical margin of propodeum.

Legs. Hind femur 3.8 times as long as its maximum

width. Hind tibia weakly widened towards apex, about 9.0 times as long as its maximum subapical width, as long as hind tarsus. First segment of hind tarsus 2.0 times as long as second segment.

Wings. Length of fore wing 2.35 times its maximum width. Marginal cell reaching apex of wing, 3.65 times as long as its maximum width. Vein 3RSa about 4.7 times as long as r (distinction almost imperceptible), 0.45 times as long as 3RSb. Vein 3RSb 1.75 times as long as 3RSa + r. Vein 1 cu-a postfurcal. First subdiscal



Figures 25–30. *Synaldis machairum* sp. nov. (female). (25) Habitus, lateral view; (26) head, lateral view; (27) mandible; (28) antenna; (29) basal segments of antenna; (30) head, dorsal view.

cell closed, short, widened apically, 3.4 times as long as its maximum width. Hind wing 5.7 times as long as its maximum width.

Metasoma. Distinctly compressed. First tergite striated in apical half, weakly widened towards apex, 2.0 times as long as its apical width. Ovipositor 1.55 times as long as first tergite, distinctly shorter than metasoma, 1.4 times as long as hind femur.

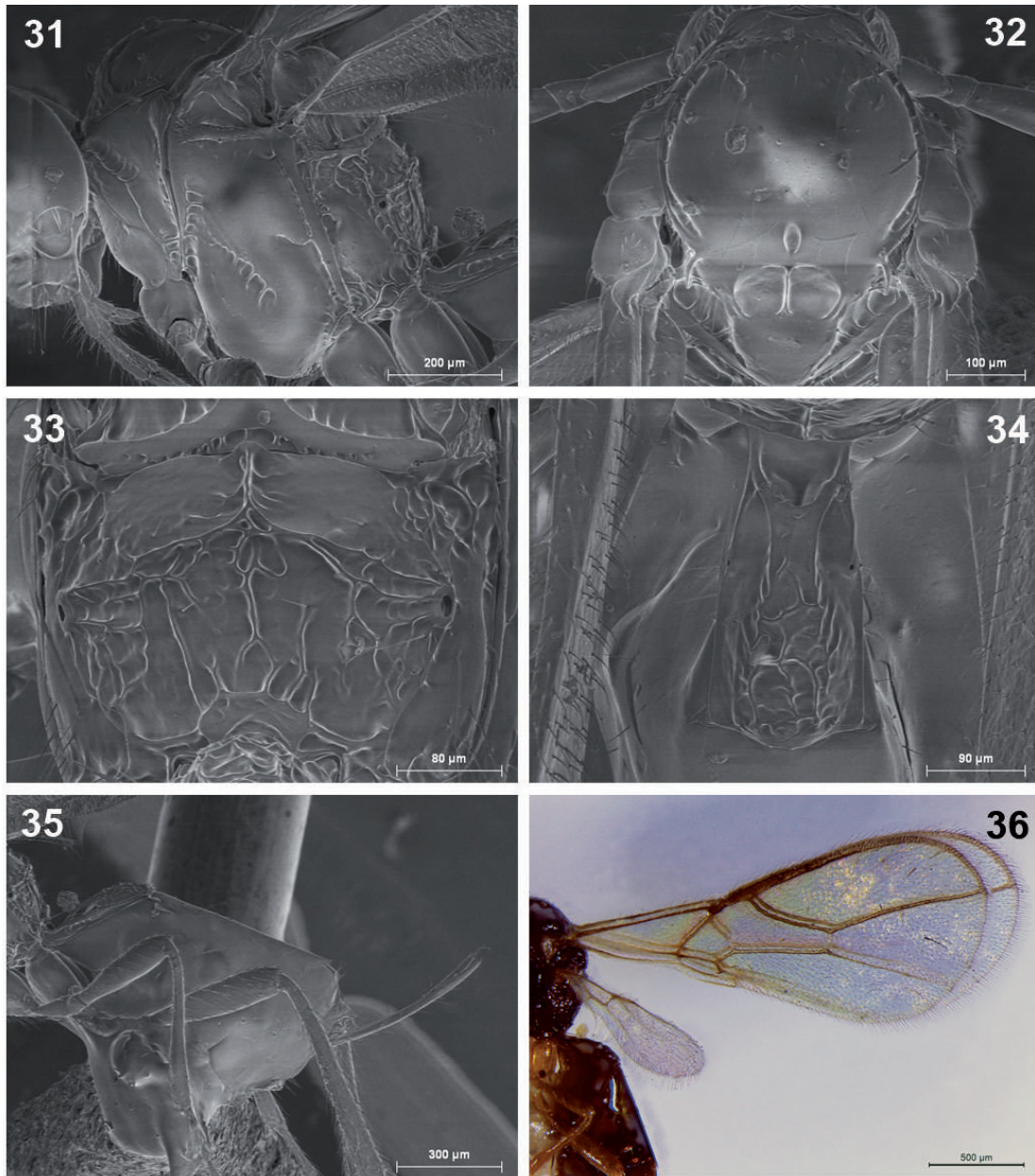
Colour. Body and legs brown to dark brown. Wings hyaline. Pterostigma brown.

Length. Body 1.9 mm; fore wing 2.45 mm; hind wing 1.7 mm.

Variation. Body length 1.8–1.9 mm; fore wing length 2.4–2.5 mm; hind wing 1.6–1.7 mm. First flagellar segment 4.4–4.5 times as long as its width. Mandible 1.35–1.40 times as long as wide.

Male unknown.

Type material. Holotype: female, Denmark, E-Jutland, Højen Bæk, 5 km S of Vejle, 30.VII.1984 (Munk leg.) (NMA).



Figures 31–36. *Synaldis machairum* sp. nov. (female). (31) Mesosoma, lateral view; (32) mesonotum; (33) propodeum; (34) first metasomal tergite; (35) hind leg, metasoma, ovipositor, lateral view; (36) fore and hind wings.

Paratypes. 5 ♀ ♀, same label as holotype, but 17.VII.1983, 21, 05 & 06.VII, 18.VIII.1984 (Munk leg.) (ENV, NMA, ZISP); 1 ♀, Denmark, E-Jutland, Vingsted, 10 km W-SW of Vejle, 8.VI.1983 (Munk leg.) (NMA); 1 ♀, Denmark, E-Jutland, Tirsbæk, 5 km E of Vejle, 18.VIII.1984 (Munk leg.) (NMA); 1 ♀, Denmark, N-Jutland, Børglumkloster Skov., 57°24'N 10°13'E, 1984 (Munk leg.) (NMA).

Remarks. The specimens from Højen Bæk were collected in the shady *Alnus-Fraxinus-Fagus* wood with spring-character, the following low plants dominating or important here: *Circaea lutetiana* L., *Clematis montana* Buch.-Ham. ex DC., *Galium odoratum* (L.) Scop., and *Lamium galeobdolon* (L.) Crantz; the other localities concern similar deciduous woods on wet clay.

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