Naturalness and the genetic modification of animals

Henk Verhoog

Louis Bolk Institute, Hoofdstraat 24, NL-3872 LA Driebergen, The Netherlands

In the past few years it has been recognised that so-called intrinsic concerns about genetic modification (GM) of plants and animals, for food in particular, have an important role in the public perception of GM. One of these concerns is the view that GM is 'unnatural'. This article gives an overview of the often conflicting views on the argument of unnaturalness in books and reports. The author gives a new direction to this discussion, by contrasting the common sense view of nature and animals, with the scientific concept of nature and what is natural. The view of nature and what is natural is always normative. This is illustrated by making explicit the concept of nature in organic farming, which explains why GM is rejected.

The discussion about the 'unnaturalness' of genetic modification (GM) is important because it is one of the so-called intrinsic ethical concerns in debates about genetic engineering, directed at the technique itself, rather than at the consequences of applying the technique (extrinsic concerns). However, the critique that GM is unnatural, and therefore wrong, is highly controversial. The classical reaction of most biotechnologists would be that there is not a fundamental (qualitative) difference between traditional and modern breeding of animals for food or for animal experiments. In both cases the animals produced are not natural, in the sense of pristine nature. They get support from a widely applied utilitarian theory of animal ethics [1,2], which says that what we do to animals is only morally relevant when the individual animal consequently suffers. But we can only find out whether the animal suffers after the transgenic animal has been made. In theory, a utilitarian approach could even be used to justify changing the characteristic nature of an animal by means of GM, for instance in the case that the welfare of the animal is increased. An example would be the removal, through GM, of a chicken's need for dustbathing in intensive husbandry. For many people this is counterintuitive and such an argument was rejected in the 1995 Banner report [3].

In a recent AEBC report on 'Animals and Biotechnology' [4], a literature survey and qualitative research on UK public attitudes towards GM animals shows that the unnaturalness of GM remains an important moral criterium for many lay people. The arguments used by biotechnologists and utilitarian ethicists against the idea that GM is unnatural are obviously not convincing many lay people and also several bioethicists (including myself). The controversy continues. In this article, I want to show how this issue is dealt with in several recent reports and books. The AECB [4] has indicated that the role of the argument of unnaturalness with respect to GM animals 'bears comparison with attitudes to applying genetic biotechnology to crops'. For that reason some reports mentioned deal with crops and not with animals. Another reason for taking crops into account is that the argument of the unnaturalness of GM is widely used in the field of organic farming, in connection with both crops and animals.

Intrinsic and extrinsic moral concerns

Reiss and Straughan make a helpful distinction between extrinsic and intrinsic moral concerns in connection with GM [5]. We speak of intrinsic concerns when genetic engineering is thought to be intrinsically wrong in itself. It may be said to be extrinsically wrong when, for instance, the risks for human health, animal welfare, or the environment are too great. Typical examples of intrinsic arguments against genetic engineering are:

- it is playing God (it is blasphemous, human hubris)
- it violates the integrity of living organisms. In Dutch policy, violation of the integrity of animals is used as an explicit criterion in the ethical evaluation of experiments with GM animals, besides animal health and animal welfare [6]. Similarly in the Danish action plan for biotechnology 'BioTIK' [7], it is said that 'Uses of genetic engineering must take into consideration …the integrity and vulnerability of man, animals and nature'.
- it is unnatural. In this argument the crossing of natural species boundaries generally is one of the main isssues of concern. This human intervention in nature distinguishes GM from traditional breeding, which generally is not seen as going against nature.

Let us look at some recent books and reports to see how they deal with the argument of unnaturalness. When applied to GM crops, Reiss and Straughan [5] are very critical. They conclude that such arguments 'do not have much ethical significance, resting as they do upon unclear language and unsound reasoning'. They argue that species change over time, and that exchange of genetic material between populations of different organisms occurs in nature. Furthermore, even if it would be unnatural,

Corresponding author: Henk Verhoog (h.verhoog@louisbolk.nl).

http://tibtec.trends.com 0167-7799/03/$ - see front matter doi:10.1016/S0167-7799(03)00142-2

so-called natural events are not automatically good. With respect to animals they consider the issue of changing the 'essence' or 'telos' of an animal through GM, but they conclude that conventional breeding can also change the essence of an animal. Here the authors refer to the Banner Report [3]. The Banner Committee concluded that some genetic modifications are 'morally objectionable in treating the animals as raw materials upon which our ends and purposes can be imposed, regardless of the ends and purposes which are natural to them'. In such a case animals are treated as if they only have an instrumental value and not an intrinsic value. The authors wonder whether this is not already the case in traditional breeding (a conclusion already reached by the Banner Committee itself).

In a report by the Nuffield Council on Bioethics [8] that considers crops only, it is said that, in many ways, traditional farming is already a very unnatural activity. It is stated in the report that 'The 'natural/unnatural' distinction is one of which few practising scientists can make much sense. Whatever occurs, whether in the field or in the test tube, occurs as a result of natural processes, and can, in principle, be explained in terms of natural science'. Intrinsic concerns are feelings less of moral concern than of disgust and revulsion.

The book 'Engineering genesis' [9] shows a more positive attitude towards intrinsic concerns – the reductionistic aspects of GM are contrasted with the idea of the relatedness of all life (ecological holism). Those who say that genetic engineering is unnatural may fear that intricate organismic and ecological balances could be upset. The authors conclude that 'The idea of the natural (or divine) wisdom of the natural order is an important principle'. Also in the report 'Ethical aspects of agricultural biotechnology' [10] it is said that intrinsic concerns, such as tampering with nature and breaching natural species boundaries, are believed to be of considerable importance. The report adds that 'conceptions of Nature and what counts as 'natural' and 'unnatural' are never merely descriptive; they always have a normative component, prescriptions about what is morally right and wrong to do to the natural world. The ethical issues at stake here centre around the moral status of Nature. Nature can be seen as benevolent and intrinsically good, as hostile and intrinsically bad, and as neutral (with modern biotechnology as a neutral technique that can be used for good or evil)'.

Common sense and the scientific perception of nature

Taking up the view that conceptions of nature and the natural always have a normative component, let us compare the reports [5,8] with [9,10]. In the first two, biological (scientific) arguments are used against a moral claim. It is supposed that nature is neutral and that genetic engineering is a neutral technique that can be used for good or evil. This implies that we have to look at the consequences of genetic engineering for the animals concerned. In the Nuffield report [8] it is openly stated that 'the report is grounded in liberal, scientific values and takes a broadly utilitarian approach to ethics'. When nature or the natural is defined in a scientific context, it is believed to be value-free, neither good nor bad. The utilitarian approach is thus closely allied to the choice of scientific values [11]. Intrinsic arguments are ruled out almost by definition.

By saying that natural scientists cannot make much sense of the distinction between natural and unnatural, circularity arises in the argumentation in the Nuffield report because nature (the natural) is defined as what occurs as the result of natural processes and can be explained by natural science. It is interesting to contrast this with the view of Wolpert [12], who is in favour of genetic engineering. Wolpert argues that natural science is 'unnatural', compared with what in common sense experience is called natural. He gives good arguments for the view that the scientific (analytic, reductionistic) perception of nature underlying GM is strikingly different from the perception of nature in daily life. Could this mean that people who reject GM because it is unnatural refer to their own holistic experience of plants, animals, landscapes and so on? In that case, arguing against this by just switching to the scientific definition of nature will not convince such people.

Two examples might be illustrative of the tension between common sense concepts of nature and animals and the scientific concept: the history of cattle breeding and sociological analysis of animal experiments.

History of cattle breeding

Step by step (artificial selection, artificial insemination, embryo transplantation, genetic engineering and cloning) the animal's own role in the process of reproduction is completely taken away from the animal and brought under human control. Its 'intrinsic value' is not respected. The widely used argument that this process started with traditional breeding, does not justify further steps in this process. But not only the animal itself, the farmer also loses control over animal reproduction by becoming dependent on specialised scientists – the farmer's own relation and experience with animals is neglected. Seen from this point of view it is clear that the process of reproduction is increasingly becoming more unnatural. The concept of the natural is here directly related to the amount of independence of the animal from human control. No respect is shown for its independence or self-regulation, its 'otherness', for instance as defended by Lee [13].

Sociological analysis of animal experiments

Another example of the difference between common sense perception of what is natural, and scientific perception is given by sociologists including Lynch [14], Arluke [15] and Wieder [16]. Lynch has described how animals used in laboratories for neurological research are transformed from 'naturalistic animals' into what he calls 'analytic animals'. Naturalistic animals are the individual animals we know from direct human experience ('holistic naturalistic creatures'). They are, during the experiment, methodologically transformed into anonomous, analytic objects of technical investigation (artefacts). In this process all the characteristics of the animal as perceived in direct human perception, in a specific situation, are

abstracted from. It does not mean that the animals are actually treated as instruments, without any respect. It is in the language used by scientists (in scientific articles) that any reference to their subjectivity, to their feelings is left out. Also the human-animal relationship changes in this process. With transgenic animals it is increasingly becoming common practice that these animals are not made and looked after by the scientists who do the experiments but by specialised laboratories. Methodologically, the animal is treated as an object, as a research instrument.

We can now better appreciate some of the arguments used in reports [9,10]:

- The notion of the relatedness of all life. If we include the human–animal relationship, in which the animal is perceived as a 'naturalistic, holistic animal', then we can say that moral feelings have to do with this relatedness.
- The reduction of living wholes to DNA. In the molecular-biological perspective of animals it is difficult for lay people to experience this relatedness. Qualitative differences between species disappear at the molecular-biological level.
- The direct manipulation at the level of DNA. This is a totally new technological feature not available in traditional breeding.

The Task Group on Public Perceptions of Biotechnology [10] said that: 'In any useful sense modern biotechnology does involve a significant departure from what has gone before. It therefore lays itself open to the charge that it is 'unnatural". When we compare this with the arguments used by biotechnologists against the idea that GM is unnatural, we see that what makes GM unnatural is not human interference with pristine nature as such. That species change in the process of evolution (a long-term process) does not justify direct intervention in the genome of animals by humans at the level of DNA. The gene-constructs used in GM do not occur in nature; they are human constructs. The argument that also traditional breeding is already an unnatural activity is not an automatic moral justification for a next, and significantly different step in this process. It might also be the case that the technique of GM has made us retrospectively aware of what we have been doing to animals in the past and human moral awareness might change over time. The choice between different normative conceptions of nature cannot be decided by statements of a factual nature. That human attitudes towards nature have a very important role in debates about biotechnology can become clearer when we consider the reasons for rejecting GM in organic farming.

Rejection of genetic engineering in organic farming

Organic farming is a form of agriculture that does not permit the use of GM. The organic way of producing food and organic food products is believed to be more natural than conventional farming, both by producers and consumers. There are good reasons to believe that the concept, or value of naturalness has an important role in the rejection of GM, in spite of the fact that different groups can be distinguished: the no-chemical approach, the agro-ecological approach and the integrity approach [17,18]. The evidence shows that many organic farmers use a different conception of nature. It has a cognitive component, which is ecologically and holistically inspired, and the technique of genetic modification does not fit into this view [19–21]. It has an emotive component, related to a non-anthropocentric, positive attitude towards nature, in which the animal (and nature in general) is seen as a more or less 'autonomous' partner with whom the farmer should cooperate. Ideally the farmer should be involved in the breeding process, and, as we have seen, this is not possible with several modern breeding techniques. And finally there is a normative component, which does not so much lie in the 'wildness' of nature but in respect for its otherness, its intrinsic value, its characteristic 'nature', or way of being. Respect for species barriers is part of this, and GM is believed to violate the integrity of living beings.

We see that respect for 'naturalness' in organic farming is a complex idea with several components of which a particular philosophy of nature and moral attitude towards nature are the most important. These aspects are neglected by Reiss and Straughan [5], by the Nuffield Council [8] and by many biotechnologists. I think that awareness of the arguments used in organic farming might be important for getting a better understanding of the intrinsic public concerns about GM, especially in connection with food.

References

1 Rollin, B.E. (1990) *The Frankenstein Syndrome. Ethical and Social Issues in the Genetic Engineering of Animals*, Cambridge University Press
2 Sandoe, P. *et al.* (1996) Ethical limits of domestication. *J. Agricult. Environ. Ethics* 9, 114–122
3 MAFF, (1995) Report of the Committee to Consider the Ethical Implications of Emerging Technologies in the Breeding of Farm Animals ('the Banner Report'), HMSO, London
4 AEBC (Agriculture and Environment Biotechnology Commission), (2002) *Animals and Biotechnology*, AEBC, London
5 Reiss, M.J. and Straughan, R. (1996) *Improving Nature. The Science and Ethics of Genetic Engineering*, Cambridge University Press
6 Verhoog, H. (2001) The intrinsic value of animals: its implementation in governmental regulation in the Netherlands and its implication for plants. In *Proceedings Ifgene Workshop 9-11 May in Dornach* (Heaf, D. and Wirz, J., eds) *Ifgene*
7 BioTIK-advisory body, (2001) *Ethics, A Tool for Making the Right Choices on Biotechnology*, National Consumer Agency, Copenhagen
8 Nuffield Council on Bioethics, (1999) *Genetically Modified Crops: the Ethical and Social Issues*, NCB, London
9 Bruce, D. and Bruce, A. (1999) *Engineering Genesis. The Ethics of Genetic Engineering in Non-Human Species*, Earthscan Publications
10 Task Group on Public Perceptions of Biotechnology, (1999) *Ethical Aspects of Agricultural Biotechnology*, European Federation of Biotechnology, Den Haag
11 Verhoog, H. (2002) Does genetic engineering impact the intrinsic value and integrity of animals? In *Proceedings Ifgene Workshop 18-21 Sept. 2002 in Edinburgh* (Heaf, D. and Wirz, J., eds) *Ifgene*
12 Wolpert, L. (1993) *The Unnatural Nature of Science*, Faber & Faber
13 Lee, K. (1999) *The Natural and the Artefactual. The Implications of Deep Science and Deep Technology for Environmental Philosophy*, Lexington Books
14 Lynch, M.E. (1988) Sacrifice and the transformation of the animal body into scientific objects: laboratory culture and ritual practice in the neurosciences. *Soc. Stud. Sci.* 18, 265–298
15 Arluke, A.B. (1988) Sacrificial symbolism in animal experimentation: object or pet? *Anthrozoös* 2, 89–117
16 Wieder, D.L. (1980) Behavioristic operationalism and the life world:

chimpanzees and chimpanzee researchers in face-to-face interaction. *Sociol. Inquiry* 50, 75–103
17 Verhoog, H. *et al.* (2003) The role of the concept of the natural (naturalness) in organic farming. *J. Agricult. Environ. Ethics* 16, 29–49
18 Baars, T. (2002) *Reconciling Scientific Approaches for Organic Farming Research* Doctoral Dissertation, Wageningen University and Research Centre
19 Lammerts van Bueren, E. (2002) *Organic Plant Breeding and Propagation: Concepts and Strategies* Doctoral Dissertation, Wageningen University and Research Centre
20 Alroe, H.F. *et al.* (2001) Does organic farming face distinctive livestock welfare issues? A conceptual analysis. *J. Agricult. Environ. Ethics* 14, 275–299
21 Lund, V. and Röcklinsberg, H. (2001) Outlining a conception of animal welfare for organic farming systems. *J. Agricult. Environ. Ethics* 14, 391–424