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Introduction

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The conclusions of the Animal-Society forum pointed out a profound renewal of man–animal relationships over recent decades, attributable to changes in lifestyles in our societies. Among the factors inducing change, urbanization has played an important role in stretching the traditional link with farm animals to replace it with pets, which now often serve as the frame of reference for animal status. Other factors include changes in modern rearing methods which have changed the status of animals. Finally, and more recently, are the questions raised by animal experimentation. Animals are perceived differently according to the purpose for which they are raised, whether they be pets, livestock, farm animals or laboratory animals, and for each category there are models and specific norms dictating the degree of protection they are to be afforded.

The request for an expert scientific assessment

The French Ministries of Agriculture and Research issued a request for an expert scientific group assessment (ESCo) of the perception of pain by animals, particularly at the time of slaughter. The first questions to be addressed concerned the definition of animal pain in comparison with related concepts such as animal suffering and discomfort, and the clarification of the modes of expression of pain. Are all animals likely to feel pain and in what manner according to their phylogenetic position? The second question concerned the measurement of pain. What tools exist to identify and measure pain, and are they readily available to the experts? The consequences of pain on behaviour and performance of the animal were also to be documented. The group of experts was also required to report a list of alternatives and possible solutions to limit pain. Finally, they were requested to put the ethical and socio-economic stakes connected with the issue of animal pain into perspective.

The scope of the expert assessment

The conceptual framework for this expert report was defined as a position of acceptance of the legitimacy of livestock farming and its end purposes. Hence the assessment excluded extreme positions, consisting of the categorical refusal of the use of domestic animals for the benefit of man on one hand, and the total denial of animal pain on the other.

The scope of the assessment was limited to the component 'pain' which constitutes a specific scientific question, while still being inter-connected to other aspects of animal welfare. The causes and management of pain in farm animals were required to be examined within the context of current animal rearing systems. The notion of pain at the heart of current debates is often poorly defined. The objectives of the expert report requested from INRA were to bring this public controversy up to date on the state of knowledge about pain in animals.

The generic part of the ESCo inquiry on the mechanisms and expression of pain, based on knowledge acquired in humans and in laboratory animals, may find applications to animals in general. However, the expert report is focused on pain in farm animals, in connection with intensive rearing practices, but excluding animals reared for their fur. The choice to focus on pain in farm animals reveals a widening of a preoccupation that was long the exclusive concern of the agricultural circle. This issue relates to today's societal debates on the quality and affordability of food, the modes of food production and the ethical considerations on food consumption. This is especially the case when the food is derived from animals as living and sentient beings.

Animal pain, a multidisciplinary approach

Specific questions were raised about pain so as to be able to treat the topic in an objective manner and the phenomenon as an identifiable and measurable psychobiological element. However several difficulties were encountered. The first factor is that scientific knowledge about pain is as yet little developed. The recognition and taking into account of pain in human medicine – and even more so in veterinary medicine – are only recent. The second is that animals do not speak and can neither signal nor describe their pain, which can therefore only be assessed by humans as external observers. From this arises a third obstacle related to the public debate about animal pain, a debate that involves cultural, ethical and religious components which modulate or exacerbate perceptions.

The questions raised focus on all phases of animal life from birth to slaughter. They revolve around three main themes: Firstly, what definition should be given to animal pain? What does it encompass in comparison to related

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concepts, such as stress or suffering? Can we say that animals are more or less likely to feel pain according to their degree of phylogenetic evolution? How should pain be assessed? Using what criteria, with which tools and what reliability? Finally, how is pain treated on farms today and what are the limits to it being dealt with?

Treatment of the questions addressed to the ESCo

Prior to an examination of the neurophysiological dimension of pain, it became apparent that to situate correctly the current debate on pain, it should be examined in a historical perspective. The genesis of the debate was retraced and the various, ethical, legal, economic and cultural elements clarified so as to examine under what terms the question is framed today.

The concept of pain was examined by crossing the acquired knowledge about pain in human medicine and in veterinary medicine. This comparative approach enables a better definition and appreciation of the specificity of the phenomenon of pain in animals.

The ability to measure pain in animals using reliable criteria, and, if possible, by means which can be applied in the field, is clearly a central issue for the ESCo. This would allow not only the identification and characterization of the phenomenon of pain, thus demonstrating its existence, but also the consideration of ways to treat it.

Two articles in this issue are more specifically devoted to pain in animals in livestock farming. The assessment focused on a non-exhaustive list of situations in rearing and slaughtering livestock that are likely to cause pain and, where possible, alternative handling procedures which would minimize or eliminate pain.

Methods and scope of the ESCo

The experts conducted a critical analysis of some 1400 scientific articles from which they extracted and assembled data that were useful in casting light on the questions raised. The aim of this exercise was to expose not only the areas of consensus, but also the gaps, uncertainties and controversies in the field of knowledge. The stakes are high in this area of recent research, which involves a wide range of disciplines. The rapid changes are stimulated by the recognition of more and more neurological capacities in animals and by the pressure of public debate. In addition, the ESCo assessment provides keys to understanding the questions posed, both in terms of definitions, concepts and ideas and in recalling the biological mechanisms involved. The assessment outlines the conceptual framework that will allow structured analysis and facilitate the appropriation by the public players involved in the debate.

The skills put to work on this report originate from a wide range of disciplines in the domains of the human, social and economic sciences (history, anthropology, philosophy, ethics, law and economics) and the life sciences (neurophysiology, human clinical, veterinary medicine, genetics and ethology). The expert scientific assessment brought together around twenty experts from INRA and other research establishments (Assistance Publique – Hôpitaux de Paris, College de France, CNRS, veterinary schools) both in France and from abroad.

In addition to the corresponding authors who wrote the different articles included in this issue, some other scientific experts actively contributed to the work. We are very grateful to: Damien Baldin, Raphaël Larrère, Jocelyne Porcher and Noëlie Vialles for their contribution to '*The question of animal pain: the issues for debate*', to Claudia Terlouw, Luc Mounier and Patrick Prunet for their contribution to '*Sources of known and/or potential pain in farm animals*' and to Pierre-Louis Toutain for his contribution to '*Means of reducing pain in farm animals*'.

The ESCo report does not provide turnkey solutions to respond to practical questions on animal pain. It establishes the most complete diagnosis possible on the current state of knowledge about pain in farm animals and indicates options for action that are available to reduce it.

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