Chapter 12

THE WELFARE OF PIGS AND MINIPIGS

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1. INTRODUCTION

The welfare of pigs is usually discussed in relation to animal production. Nearly all pigs are bred for the purpose of food production, often compromising welfare in favour of economical considerations (Schrøder-Petersen and Simonsen 2001). However, during the last two decades, pigs have increasingly been used as research animals, mainly because of prospects of xenotransplantation, but also as alternative non-rodent models in regulatory toxicology (Bollen and Ellegaard 1997). In Denmark, the use of pigs in biomedical research has increased by more than 500% from 1980 to 2001. Nevertheless, overall pig use is about two percent of the total number of animals used in biomedical research (Danish Animal Experiments Inspectorate 2001), which is insignificant compared to numbers of pigs in food production. Similar figures are seen in European statistics. In 1991, 48,420 (0.41%) pigs were used in biomedical research in the member states of the European Union, whereas this had increased to 6,749 (0.56%) in 1996 and 66,131 (0.67%) in 1999 (Commission of the European Communities 2002).

Animal welfare is a topic of concern in biomedical research. Apart from moral concerns and legislative obligations to secure good welfare for animals kept at the laboratory, a reduced animal welfare makes the results from biomedical research with animals unreliable (Van Zutphen et al. 1993). Moreover, when pigs are going to be used as organ donors, an optimal organ quality can only be guaranteed from a healthy, non-stressed pig (Olsson 2000).
We regard the welfare of a pig, as of any animal, a the state in which the animal is able to cope with its environment (Broom 1986). Welfare can vary from very poor to very good and scientific and objective measurements of welfare can be made. The state of an animal includes health and physiological functioning, as well as the feelings of the individual animal. Suffering is one of the most important aspects of poor welfare and, beside health and physiological functioning, feelings should be included wherever possible when trying to assess welfare (Dawkins 1990). In order to understand pig welfare, a good knowledge of the natural behaviour of pigs and differences between domesticated breeds is a necessary first step.

2. **PIG BREEDS AND BEHAVIOUR**

The wild boar, *Sus scrofa*, is the ancestor of all modern breeds of pigs. The first evidence of domestication in Europe is some 3,500 years old, although the cradle of the domesticated pig is claimed to have been in China, about 10,000 years ago (Porter 1993). *Sus scrofa* is a member of the pig family (Suidae), which includes species of non-ruminant, even-toed ungulates. Suidae are omnivores, and are divided into five genera, with a total of 13 species.

Through selection, numerous breeds of pigs have been developed. Existing breeds are relatively young in comparison to the history of domestication of pigs. Local Celtic pigs with lop-ears were widespread in European countries in the 18th and 19th centuries, and are considered to be the primogenitor of the Landrace. Crosses with Chinese breeds in the early 1800s, and with English breeds in the late 1800s, established the Danish Landrace, which was widely used for the derivation of other national Landrace breeds. The Yorkshire or Large White, a breed with pointed, standing ears, originated in England, and was exported to many countries around the world during the last half of the 19th century (Porter 1993). Pigs are numerous worldwide. The total number of pigs produced in the 15 countries of the European Union was 124 million in 2002 (FAO 2002).

Pure-bred pigs, such as the Landrace, Yorkshire, Hampshire and Duroc, are almost exclusively found in breeding herds. Modern production herds, however, utilize cross-breeding to produce hybrid grower pigs. Hybrid breeds are very common nowadays, and consequently, pigs obtained for the laboratory from an agricultural source will most likely be of a mixed breed. Hybrid breeds are selected for favourable production traits, and regarding animal welfare, hybrids have the advantage of being less sensitive to environmental stress than pure-bred pigs. Certain pure-bred breeds, such as the Pietrain, are particularly susceptible to stress (McGlone et al. 1998).