

Animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, pregnant, farrowing sows and unweaned piglets¹

Scientific Opinion of the Panel on Animal Health and Welfare

(Question No EFSA-Q-2006-028)

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The Scientific Panel for Animal Health and Welfare (AHAW) of the European Food Safety Authority adopted the current Scientific Opinion on 10 October 2007. The Members of the AHAW Scientific Panel were:

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SUMMARY

Council Directive 91/630/EEC², as amended, laying down minimum standards for the protection of pigs, requires the Commission to submit to the Council a report, based on a Scientific Opinion of the European Food Safety Authority (EFSA), concerning the welfare various aspects of housing and husbandry systems for farmed pigs. EFSA was then required to provide a Scientific Opinion on the animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, farrowing and pregnant sows. The opinion should consider, *inter alia*, the effects of stocking density, the implications of space requirements and the impact of stall design and different flooring types taking into account different climatic conditions, the latest developments of group housing systems for pregnant and farrowing sows with piglets through weaning and the latest developments of loose-house systems for sows in the service area and for farrowing sows with piglets through weaning.

The Scientific Opinion was adopted by the Scientific Panel on Animal Health and Welfare (AHAW) on 10 October 2007.

From the data presented in the Scientific Report several factors affecting animal welfare were identified which lead to several related conclusions in the Scientific Opinion. The conclusions involve inadequate flooring leading to claw injuries, over grown claws and pain, faecal contamination of pigs if space is too restricted or improperly designed, lack of foraging material especially for restrictively fed pigs that may lead to frustration and lack of bulky or high-fibre feed which is associated with frustration and pain due to stomach ulcers. Conclusions are also made on the housing conditions where the pigs are not able to regulate their thermal comfort being identified as a severe or critical welfare hazard, and a conclusion where the housing of sows in individual stalls from weaning until 4 weeks after mating causes stress. Mixing of sows due to frequent regrouping is concluded to cause stress and increased aggression. Housing of farrowing sows in crates is concluded to severely restrict their freedom of movement increasing the risk of frustration. Nest building is concluded to be triggered by internal hormonal factors because the motivation for nest building is high. As a consequence, lack of material for nest building is very likely to cause stress and impaired welfare. Piglet mortality is concluded to be a multi factorial issue and a major welfare problem. Great variation in piglet mortality in different systems makes it difficult to draw a general conclusion about the influence of the farrowing systems on piglet mortality. The causes of piglet mortality and associated welfare problems may differ significantly between the different farrowing systems. The primary cause of piglet mortality is often unknown; however mortality due to crushing has been reported higher in loose housing systems. This was also the case in a recent large-scale study on indoor loose farrowing and crate systems, although no difference in total piglet mortality was observed. The use of breeding goals for large litter size implies increased piglet mortality. Mutilations to piglets such as tail docking and teeth clipping were concluded

² E.C.O.J. n° L340 of 11/12/1991, p. 33.

to be associated with pain. Conclusions further involve colostrum intake in piglets, access to creep feed before weaning to reduce starvation and diarrhoea, age at weaning where weaning before 4 weeks causes diarrhoea and weight gain retardation. Inappropriate behaviour of stockpersons towards pigs is stressful and induces fear.

In addition, from the Risk Assessment (RA) major welfare risks were identified for each of the animal categories considered. In the case of sows from weaning to 4 weeks after weaning, major identified risk were: a) frustration, stereotypies and restlessness due to lack of fibre diet and lack of or no appropriate foraging material; b) frustration due to being kept in crates; c) pain due to stomach ulcers caused by inappropriate feeding; and d) impaired getting up and lying down behaviour due to being kept in crates. In pregnant sows, major welfare risks were: a) pain due to leg injuries and stress caused by inadequate flooring conditions; b) stress due to insufficient space allowance in loose housed sows; and c) frustration due to lack of fibrous diet and foraging material. Major welfare risks in farrowing sows were; a) frustration and stress due to insufficient space and due to lack of foraging and nest building material; and b) claw damage, shoulder lesions and teat damage due to inadequate flooring conditions. In piglets, frustration and stress due to forced weaning procedures and lack of foraging material were identified as major risks.

Recommendations presented in the Scientific Opinion are related, among others, with the need to improve the management procedures, the flooring conditions avoiding injuries, and the design of the housing systems allowing the access to sufficient material to enable proper investigation and manipulation activities. The appropriate design of housing systems has to allow an immediate contact between sow and piglets after birth to ensure colostrum uptake, to regulate their thermal comfort, avoid mixing of unfamiliar animals and animals of larger difference in size or age, and provide creep feed for piglets at least one week before weaning. Genetic selection for litter size should not exceed, on average, 12 piglets born alive, and the provision to boars of the sufficient space to allow all normal movements were additional recommendations presented in the Scientific Opinion.

The recommendations for further research were, among others, to increase the general knowledge on the sows and boars farm conditions at EU level in order to improve the evaluation of the exposure to risk factors involved in welfare adverse effects and be able to make more precise recommendations for welfare improvements.

Based on the general RA made in the Scientific Report, detailed RAs focusing on specific aspects were suggested, and where welfare indicators are scientifically evaluated and proven valid, such should preferably be used in these assessments.

Key words: Pig Welfare, pregnant sows, farrowing sows, breeding boars, unweaned piglets, housing systems, husbandry systems, pig management.

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1. BACKGROUND

Council Directive 91/630/EEC³, as amended, laying down minimum standards for the protection of pigs and requires the Commission to submit to the Council a report, based on a scientific opinion of the European Food Safety Authority (EFSA), concerning various aspects of housing and husbandry systems for farmed pigs. In this context and upon requests from the Commission, EFSA has already issued opinions⁴ on “welfare aspects of the castration of pigs” and “the welfare of weaners and rearing pigs: effects of different space allowances and floor types”.

Council Directive 91/630/EEC, as amended, also provides for the Commission to report to Council, on the basis of an EFSA scientific opinion, on the effects on welfare of numerous other aspects of housing and husbandry systems for farmed pigs, such as the effects of stocking density, including group size and methods of grouping the animals; the implications of different space requirements, including the service area for individually housed adult breeding boars; the impact of stall design and different flooring types; the risk factors associated with tail-biting and possible means to reduce the need for tail-docking; the latest developments of group-housing systems for pregnant sows and also loose-house systems for sows in the service area and for farrowing sows which meet the needs of the sow without compromising piglet survival.

It should be noted that for weaners and rearing pigs EFSA has already issued a scientific opinion on the impact of different space allowances and flooring types, and so in respect of these two issues the new EFSA opinions should consider other categories of pigs (e.g. sows including farrowing sows, boars, pigs recruited for breeding programmes etc.). The Commission’s report to Council will be drawn up also taking into account socio-economic consequences, consumers’ attitudes and behaviour, sanitary consequences, environmental effects and different climatic conditions concerning this issue.

2. TERMS OF REFERENCE

Mandate 1: Request for a scientific opinion concerning animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, farrowing and pregnant sows

The opinion should consider, inter alia, the following specific issues:

- The effects of stocking density, including the group size and methods of grouping the animals, in different farming systems on the health and welfare of adult breeding boars, farrowing and pregnant sows.
- The animal health and welfare implications of space requirements; including the service area for individually housed adult breeding boars.
- The impact of stall design and different flooring types on the health and welfare of breeding boars, pregnant and farrowing sows with piglets through weaning taking into account different climatic conditions.
- The latest developments of group housing systems for pregnant and farrowing sows with piglets through weaning, taking account both of pathological, zootechnical, physiological and ethological aspects of the various inside/outside -systems and of their health and environmental impact and of different climatic conditions.

³ E.C.O.J. n° L340 of 11/12/1991, p. 33.

⁴ http://www.efsa.eu.int/science/ahaw/ahaw_opinions/catindex_en.htm

- The latest developments of loose-house systems for sows in the service area and for farrowing sows with piglets through weaning, which meet the needs of the sow without compromising piglet survival.

Mandate 2: Request for a scientific opinion concerning animal health and welfare aspects of different housing and husbandry systems for farmed fattening pigs

The opinion should consider, inter alia, the following specific issues:

- The effects of stocking density, including the group size and methods of grouping the animals, in different farming systems on the health and welfare
- The animal health and welfare implications of space requirements
- The impact of stall design and different flooring types on the health and welfare of fattening pigs taking into account different climatic conditions.

Mandate 3: Request for a scientific opinion concerning the risks associated with pig tail biting and possible means to reduce the need for tail docking considering the different housing and husbandry systems

This Scientific Opinion will refer only to Mandate 1 as referenced above.

3. ACKNOWLEDGEMENTS

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The scientific co-ordination for this Scientific Report has been undertaken by the EFSA AHAW Panel Scientific Officers Denise Candiani and Oriol Ribó. The Scientific Officers of the AHAW Panel Ana Afonso and Elisa Aiassa who have also collaborated are gratefully acknowledged.

4. SCOPE AND OBJECTIVES OF THE SCIENTIFIC REPORT

In 1997, the Scientific Veterinary Committee of the European Commission published the report *The Welfare of Intensively Kept Pigs*. The SVC (1997) Report contains information on the biology and behaviour of pigs in natural and semi-natural conditions, an overview of production systems, a production systems comparison, specific husbandry factors and pig welfare. Further, chapters covered socio-economic aspects. In that report conclusions and recommendations were made.

The “Scientific Report on animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, pregnant, farrowing sows and unweaned piglets” contains an update of the scientific information presented in the previous SVC Report excluding economic aspects which are not in the mandate for this report but including a risk assessment. The Report is one of five EFSA Reports on the welfare of pigs: “Welfare aspects of the castration of piglets (EFSA, 2004); “The welfare of weaners and rearing pigs: effects of different space allowances and floor types” (EFSA, 2005); “Animal health and welfare in fattening pigs in relation to housing and husbandry” (EFSA, 2007); and concerning “the risks associated with tail-biting in pigs and possible means to reduce the need for tail-docking considering the different housing and husbandry systems” (EFSA, 2007 under adoption procedure at the time of writing).

Factors which are important for pig welfare include housing (space and pen design, flooring and bedding material, temperature, ventilation and air hygiene), feeding (liquid feed, concentrates, roughage) and management (grouping, weaning, human-animal relations).

The measures used to assess welfare include behavioural and physiological measures, pathophysiological measures and clinical signs as well as production measures.

The Scientific Report is structured in 3 major parts. The first presents an overview of current housing and husbandry systems for sows, boars and unweaned pigs at EU level. The second part is a provision of recent scientific knowledge about the identified hazards affecting welfare and their consequences, together with a description of common diseases in sows, boars and unweaned pigs. The third part presents the risk assessment approach where the method of the RA is shown together with the RA outcomes.

The Scientific Opinion was adopted by the Scientific Panel on Animal Health and Welfare (AHAW) on 10 October 2007.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Outcomes from the data presented in the scientific report

5.1.1. *Flooring conditions*

CONCLUSIONS

- Claw injuries are good indicators of poor welfare due to inadequate flooring.
- Inadequate flooring conditions in housing systems for pregnant sows and boars will result in pain due to claw and leg injuries as well as of overgrown claws.
- Inadequate flooring conditions in different farrowing systems lead to painful limb lesions, shoulder lesions and teat damage in the sows as well as painful claw lesions and abrasions to the carpal skin of the piglets. Lesions also provide an entry for pathogenic organisms resulting in inflammation and pain.
- Pain due to leg injuries caused by partially slatted floors and overgrown claws in sows kept on deep litter in sows from weaning to 4 weeks after weaning.

RECOMMENDATION

- Whenever injuries (foot lesions and lameness) are observed, appropriate flooring conditions in combination with management procedures should be applied to avoid that situation.

RECOMMENDATIONS FOR FUTURE RESEARCH

- To be able to make more precise recommendations, there is a need for more knowledge on how sow and boar foot health is affected by different flooring conditions.
- Research into optimal floors for farrowing systems should be intensified, taking into account both characteristics for the sow (good foothold, sufficient abrasiveness) and for the piglets (small void area, low abrasiveness).

5.1.2. *Faecal contamination*

CONCLUSION

- Pigs divide available space into feeding, dunging and lying areas. If space is too restricted or not appropriately designed and managed, pigs lie in the dunging and feeding area which causes poor hygiene and frustration.

RECOMMENDATION

- The housing systems should enable sows and boars to minimize the risk of becoming faecal contaminated.

5.1.3. *Investigation and manipulation activities*

CONCLUSIONS

- Lack of foraging material, especially for restrictively fed pigs, is associated with frustration, the extent depending on the physiological condition of the animal. Frustration also may occur due to provision of an inappropriate material such as chains or tyres.
- Lack of bulky or high-fibre food for restrictedly fed sows, gilts and boars is associated with prolonged frustration and pain due to stomach ulcers is likely to occur. Therefore, appropriate provision of fibre is essential to avoid bad welfare.

RECOMMENDATIONS

- All pigs should have access to a sufficient quantity of material to avoid problems due to lack of investigation and manipulation activities⁵.
- New handling systems for manure should ensure the provision of destructible materials.

RECOMMENDATIONS FOR FUTURE RESEARCH

- More research is needed on how to improve the bulky content of feed to pregnant sows without increasing sow body conditions and weight severely. To facilitate more precise recommendations, studies on the relation between structure of the feed, satiety and occurrence of stomach ulcers are also needed.
- There is need for research into slurry systems that can handle straw or other organic materials in order to be able to provide the amount of nest building material, rooting material and bulky diets required by sows and boars.
- More research is also needed to increase knowledge on the use of different housing conditions, use of bulky feed, access to rooting material and thermal environment of sows and boars in order to be aware of the extent of different welfare problems in EU.

5.1.4. *Environmental conditions*

CONCLUSIONS

- If sows, piglets and boars are housed in conditions where they are not able to regulate their thermal comfort, thermal deviations from the comfort zone may constitute a severe or critical welfare hazard.
- A cold thermal environment increases the risk of hypothermia in the piglets reducing viability which, in turn reduces colostrums and milk intake and increases piglet mortality.

RECOMMENDATION

- Sows, piglets and boars should be housed in conditions where either climate can be controlled to be in the comfort zone of the pigs or when needed in conditions where they are able to regulate their thermal comfort (e.g. through showering facilities or sufficient space to lie separate when it is hot or through straw or shelter when it is cold).

RECOMMENDATION FOR FUTURE RESEARCH

- More research is needed on the impact of air quality on the welfare of sows and boars.

⁵ According to Directive 91/630/EC, as amended.

5.1.5. *Group housing systems for dry sows*

CONCLUSION

- Housing of sows in individual stalls from weaning and until 4 weeks after mating severely restricts their freedom of movements and causes stress. Further it does not allow sows to move and socially interact during a period of the reproductive cycle where they are highly motivated to do so.

RECOMMENDATION FOR FUTURE RESEARCH

- Further research should be carried out on the welfare and health effects of group-housed sows from weaning to 4 weeks after weaning.

5.1.6. *Mixing of sows*

CONCLUSIONS

- Keeping sows in intact groups from weaning to the end of pregnancy reduces aggression to a minimum compared to keeping them in dynamic groups, where new animals are repeatedly introduced. Pre-mixing small groups of dry sows before introduction to a large dynamic group reduces aggression at mixing.
- Grouping sows of same age or size minimize the risk for welfare problems in low ranked animals and when grouping of sows of different size appropriate measures, such as pre-exposure, should be taken to minimise aggression.
- Group housing results in greater levels of aggression and possible injuries compared to stall housing. However, aggressive interactions are less prolonged compared to unresolved aggression in stalled sows, where the dominance order is not settled.
- Frequent regrouping of sows, e.g. such as in the case of poor mating success, will led to more stress due to aggression and hierarchical fights and also increases the risk for problems with reproduction.

RECOMMENDATIONS

- In group housing systems mixing of animals of larger difference in size or age at breeding should be avoided as much as possible.
- Mixing of unfamiliar sows and gilts, should be avoided as much as possible.

5.1.7. *Housing systems for farrowing sows*

CONCLUSIONS

- Housing of sows in farrowing crates severely restricts their freedom of movement which increases the risk of frustration. It does not allow them, for instance, to select a nest site, to show normal nest-building behaviour, to leave the nest site for eliminative behaviour or to select pen areas with a cool floor for thermoregulation.
- Sows nest-building behaviour is triggered by internal hormonal factors. Thus, the motivation for nest building is high in spite of if housing conditions allow for nest building or not. As a consequence, lack of nesting material is very likely to cause stress and an impaired welfare.
- The level of piglet welfare and mortality on farms remains a major problem. Great variation in piglet mortality in different systems makes it difficult to draw a general conclusion about the influence of the farrowing systems on piglet mortality.
- Piglet mortality is a multi-factorial issue. The causes of piglet mortality may differ significantly between the different farrowing systems. The primary cause of piglet mortality is often unknown; however mortality due to crushing has been reported higher in loose housing systems.

- In a recent large-scale study on indoor loose farrowing and crate systems, no difference in total piglet mortality was observed.
- RA tables and figures ranked frustration and stress due to insufficient space and due to lack of foraging and nest building material (sows in farrowing crates and pens which are too small) as major risk factors for farrowing sows.

RECOMMENDATIONS

- It is the expert opinion of the WG that farrowing systems should allow for the handling of destructible nest material to enable investigation and manipulation activities.
- The ability for nest-building should also take into consideration the welfare of the piglets.
- The use of loose farrowing systems should be implemented only if piglet mortality in them is no greater than the mean level of mortality where the sows are kept in non loose farrowing systems. Efforts should be made to reduce piglet mortality.

RECOMMENDATIONS FOR FUTURE RESEARCH

- The welfare of sows and piglets in farrowing systems is due to a wide range of factors of which, some favours the welfare of the sows and others that of the piglets. There is a need for large scale epidemiological studies with appropriate welfare indicators and records of all important causal factors for the welfare of sows and piglets.
- Future research should be carried out to assess the minimum requirement for manipulable material to farrowing sows and to further quantify the detrimental effects of not being able to express the nest building behaviour.
- There is a need for evaluating how crating of sows affect sow-piglet interaction during nursing and sow weight loss during the course of lactation and its consequences for shoulder lesions.
- There is a need to further investigate the effects of maternal abilities on piglet welfare.
- Future research on piglet mortality should be carried out to assess in depth primary causes of piglet mortality in different types of farrowing systems.

5.1.8. Genetic selection

CONCLUSIONS

- Using breeding goals for large litter size (>11-12 piglets) implies increases in piglet mortality.
- In case of large litter size (>11-12 piglets), cross fostering may be used to increase piglets survival. It has however some negative effects, which are mainly seen when cross-fostering takes place after the first day of life.

RECOMMENDATION

- Genetic selection for litter size should not aim at exceeding having, on average, 12 piglets born alive in a litter.

5.1.9. Mutilation of piglets

CONCLUSION

- Mutilations to piglets such as tail docking and teeth clipping are associated with pain.

RECOMMENDATION

- A decision to grind corner teeth should be made taking into account the welfare of piglets as well as that of the sow.

5.1.10. Colostrum intake

CONCLUSION

- If pen design is not assuring an adequate contact between mother and offspring there is a risk that colostrum intake will be impaired resulting in a higher incidence of disease and mortality.

RECOMMENDATION

- Pens for farrowing sows should be designed to allow contact between sow and piglets shortly after birth in order to ensure an early intake of colostrum.

5.1.11. Creep feed

CONCLUSION

- If creep feed is not provided well before weaning there is a higher risk of starvation or diarrhoea as a result of weaning.

RECOMMENDATION

- Creep feed for piglets should be provided before weaning takes place to prepare the further feed consumption of piglets and improve the gut development. According to common practices, creep feed should be provided at least one week before weaning.

5.1.12. Age at weaning

CONCLUSION

- Early weaning before four weeks affects piglet gastrointestinal processes causing diarrhoea and weight gain retardation. Weaning at 3 weeks causes belly nosing, frustration and injuries due to chewing at pen mates.

RECOMMENDATION

- Weaning of piglets should not be carried out before they have a significant feed intake from creep feed and not before 4 weeks of age.

5.1.13. Housing of boars

CONCLUSION

- Housing boars in limited space restricts their freedom of movement and can promote body lesions in the mating area, enhanced with bad flooring conditions.

RECOMMENDATION

- Boars should be provided with sufficient space to allow all normal movements including those involved in mating.
- Boars should have sufficient space allowance for courtship and mating behaviour.

5.1.14. Training

CONCLUSION

- Inappropriate human behaviour such as slapping, kicking or using electrical prodders during moving, inspection and handling of sows, boars and piglets is stressful and induces fear.

RECOMMENDATION

- Animal handlers should not just be trained on technical aspects, but any pig management course should also target their attitude towards livestock keeping and increase their awareness that their actions affect animal welfare (and production).

5.1.15. *Space requirement in group housing systems*

RECOMMENDATION FOR FUTURE RESEARCH

- More research is needed on the adequate space requirements of sows housed in groups and its interaction with pen design and feeding method to avoid excessive aggression, injuries and fear.

5.1.16. *Data availability*

CONCLUSION

- Data reported from surveyed countries showed high variation between countries concerning the housing conditions, the supply of foraging substrate and more generally the fittings of the life area.

RECOMMENDATION FOR FUTURE RESEARCH

- There is a need for further survey in EU countries to describe in more detail the housing conditions of boars and sows, to complete data and to improve the knowledge concerning on-farm housing conditions. This will help to improve the evaluation of the exposure to risk factors likely to cause poor welfare of pigs.

5.1.17. *Welfare indicators*

RECOMMENDATION FOR FUTURE RESEARCH

- The methodology and the results (conclusion and recommendations) of this opinion as well as the previous opinions on pig welfare should be further analysed identifying welfare indicators (in particular animal-based) suitable for the development of an animal welfare monitoring system.

5.2. **Outcomes from the risk assessment**

Due to the limited amount of quantitative data on many effects of hazards on pig welfare, the risk assessment was mainly based on expert opinion. The methodology used does not give a precise numerical estimate of the risk attributed to certain hazards; however the output can be used to rank the problems and designate areas of concern, as well as, guidance for future research.

5.2.1. *Animal categories*

Sows from weaning to 4 weeks after weaning:

- Frustration, stereotypies and restlessness due to lack of fibre diet and lack of or no appropriate foraging material;
- Frustration due to being kept in crates;
- Pain due to stomach ulcers caused by inappropriate feeding;
- Impaired getting up and lying down behaviour due to being kept in small crates, the scenario considered in the RA being less than 220 cm long and 85 cm wide.

Pregnant sows:

- Pain due to leg injuries and stress caused by inadequate flooring conditions;
- Stress due to insufficient space allowance in loose housed sows (< 2,25 m² per sow)⁶;
- Frustration due to lack of fibrous diet and foraging material.

⁶ According to Directive 91/630/EC as amended.

Farrowing sows:

- RA tables and figures ranked frustration and stress due to insufficient space and due to lack of foraging and nest building material (sows in farrowing crates and pens which are too small) as major risk factors for farrowing sows;
- Claw damage, shoulder lesions and teat damage due to inadequate flooring conditions.

Unweaned piglets:

- Frustration and stress due to forced weaning procedures at 3 or 4 weeks of age;
- Frustration due to lack of foraging material.

5.2.2. *Management*

- Inappropriate human behaviour such as slapping, kicking or using electrical prodders during moving, inspection and handling of sows, boars and piglets is stressful and induces fear.
- Since the outcome of exposure to individual welfare risk factors often is multifactorial and which greatly can be influenced by management procedures (including health control and health service) applied and poor management skill and poor stockmanship is a risk factor.

5.2.3. *Recommendations for detailed risk assessments*

Based on the general risk assessment made in this report for sows, piglets and boars it is suggested to carry out detailed Risk Assessments regarding:

- the use of crates for sows in the first 4 weeks after service;
- the use of crates as well as group housing systems for farrowing and lactating sows;
- the frustration of pigs offered inappropriate foraging material;
- the effect of different flooring materials on injuries (claws, carpal joints, udders, shoulders) in sows, boars and piglets (up to weaning);
- weaning age, risk of disease and use of antibiotics;
- the thermal environment necessary for sows, boars and piglets, including critical temperatures at which measures have to be taken to safeguard the welfare of the pigs include space allowances here and regional effects;
- minimum space requirements for boars in the home pen and the mating area;
- optimum litter size in pig production.

Where welfare indicators are scientifically evaluated and proven valid, such should preferably be used in these assessments.

RECOMMENDATION FOR FUTURE RESEARCH

- In relation to the use of Risk assessment methods in animal welfare there are a need to study the relative severity and duration of different adverse effects as pain, frustration and stress.

6. REFERENCES

References used in this Scientific Opinion are available and listed in the Scientific Report published at the EFSA web (www.efsa.europa.eu).