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REPORT OF THE OIE *AD HOC* GROUP ON ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS[1]

Paris, 22–24 March 2016

The OIE *ad hoc* Group on Animal Welfare and Pig Production Systems (the *ad hoc* Group) met at the OIE Headquarters on 22–24 March 2016.

The members of the *ad hoc* Group and other participants at the meeting are listed at Annex I. The adopted agenda is at Annex II.

Dr Derek Belton, Head of the Trade Department of the OIE, welcomed all members and thanked them for their agreement to work with the OIE on this topic. Dr Belton commented to the *ad hoc* Group that the development by the OIE of animal welfare standards relevant to livestock production systems is a key component of the OIE's animal welfare programme. Dr Belton emphasised that this topic is of great interest to OIE Member Countries and many organisations that are associated with the OIE.

Dr Belton reminded members that in developing their recommendations the diverse conditions relevant to all 180 OIE Members should be taken into account. Dr Belton explained the procedure of adoption of OIE standards. The report of the meeting will be submitted to the OIE Animal Welfare Working Group (AWWG) for comments and will be presented to the Terrestrial Animal Health Standards Commission (Code Commission). The full report of the Code Commission (including the report of the *ad hoc* Group on Pig Production Systems) will then be submitted to OIE Members for comments. Dr Leopoldo Stuardo stressed that OIE standards should be flexible, not prescriptive, and they should be science-based and outcome focused. It is important to list relevant scientific references in the report as science is the unique common denominator for OIE Members. Dr Belton confirmed that the development of OIE standards is normally based on a two-year cycle and indicated that the OIE would probably reconvene the *ad hoc* Group at the beginning 2017 to review Member Countries' and Code Commission comments on the Group's report.

1. Introduction

After the formal presentation of each of the member of the Group and from the OIE staff, Dr Stuardo informed that Professor Wang Lixian sent his apologies for absence from the meeting due to administrative problems. Dr Stuardo confirmed that he will continue to be a member of the Group and that OIE will send him the report and the draft chapter for comments.

Dr Birte Broberg, Chair of the *ad hoc* Group, thanked the OIE for the opportunity to work on this very important topic for the pig industry, and noted the need for relevant international guidelines on this subject.

2. Confirmation of the Terms of Reference (ToR) and discussion of working documents and other relevant documents provided

Dr Stuardo indicated that the proposed terms of reference were based on the model prepared by the AWWG and the *ad hoc* Group on Animal Welfare and Livestock Production Systems, which have been used to guide the development of all of adopted animal welfare in livestock production systems chapters.

Dr Broberg indicated that the ToR is broad and give the necessary flexibility to develop the proposed new chapter. The Group agreed to use the proposed ToR to develop the requested chapter.

The terms of reference for the *ad hoc* Group are presented in Annex III.

[1] Note: This *ad hoc* Group report reflects the views of its members and may not necessarily reflect the views of the OIE. This report should be read in conjunction with the September 2016 report of the Terrestrial Animal Health Standards Commission because this report provides its considerations and comments. It is available at: http://www.oie.int/en/international-standard-setting/specialists-commissions-groups/code-commission-reports/meetings-reports/

Dr Broberg noted that the Group has received a significant number of documents from the members of the Group and from the OIE Headquarters, including one from the International Coalition for Animal Welfare (ICFAW), sent to the OIE by Dr Peter Thornber, member of the AWWG representing World Animal Protection.

The Group agreed that there is useful information in most of the documents, but different realities should be taken into account when developing the recommendations.

The discussion paper on the development of animal welfare guidelines for production systems (terrestrial animals), the Recommendations to the OIE in Developing Guidelines on Animal Welfare in Livestock Production Systems and other relevant documents presented during the meeting are provided in Annexes IV, V and VI respectively.

3. Development of the draft new standard

Dr Bierte Broberg noted at the beginning of the discussion that the various pig production systems used around the world have different unique specificities. In this respect, the group discussed how to structure the new chapter and decided to make a common chapter for all production systems and indicate the differences for specific systems as necessary.

The *ad hoc* Group agreed that outcome-based criteria or measurables may give a better indication of animal welfare than input design criteria because they reflect the complex interaction of multiple design inputs. Documents submitted by the members of the *ad hoc* Group were discussed.

When the Group discussed the recommendations on common procedures conducted in pig production systems, they agreed there are a range of practices that should be considered beyond the current topical issue of tail docking.

A draft new chapter for the *Terrestrial Animal Health Code (Terrestrial Code)* was developed during the meeting and can be found in Annex VII.

The draft new chapter is structured along the following lines:

a) definition of pig production systems, management and environmental enrichment;

b) scope of the recommendations;

c) description of existing pig production systems;

d) identification and brief description of relevant 'outcome-based criteria or measurables';

e) recommendations for measures applied to pigs;

f) references.

The Group agreed that the trend away from the use of gestation crates and toward management of pregnant sows in groups should be taken into account in the on-going development of animal welfare recommendations for pig production systems.

4. Review and finalise the report of the meeting

The *ad hoc* Group agreed to complete their meeting report and draft standard by April 2016 for submission to the June AWWG meeting.

5. Next meeting

It was agreed that the next meeting will take place after receipt of comments on the report of the September 2016 Code Commission meeting, most probably in March 2017.

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…/Annexes

Annex I

OIE *AD HOC* GROUP ON ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS

Paris, 22–24 March 2016

List of participants

MEMBERS OF THE *AD HOC* GROUP

Dr Birte Broberg (Chair)
Senior Veterinary Officer
Animal Welfare and Veterinary Medicine
Ministry of Environment and Food
The Danish Veterinary and Food Administration
Stationsparken 31-33 l DK-2600
Glostrup Tlf.
DENMARK
Tel.: +45 72 27 69 00
bb@fvst.dk

Prof. Paul Hamilton Hemsworth
Director
Animal Welfare Science Centre
Faculty of Veterinary and Agricultural Sciences
The University of Melbourne
Parkville, 3052
AUSTRALIA
phh@unimelb.edu.au

Dr Jennifer A. Brown
Research scientist – Etology
Prairie Swine Centre
Box 21057
2105 – 8th Street East
Saskatoon, Saskatchewan
S7J 5N9
CANADA
jennifer.brown@usask.ca

Prof. Wang Lixian
(Invited but could not attend)
Director
Pig Research Center
Beijing Institute of Husbandry & Veterinary,
Chinese Academy of Agricultural Sciences
CHINA
iaswlx@263.net

Dr Antoni Dalmau Bueno
Researcher
IRTA. Animal Welfare Unit
Monells (Girona)
Finca Camps i Armet, SN
SPAIN, ES-17121
Tel.: +34 902 789 449 + 1434
antoni.dalmau@irta.cat

Dr Cleandro Pazinato Dias
Consultant IICA and MAPA
Av. José Gabriel de Oliveira,
915 ap. 1102 Torre I
Aurora - Londrina
86047360, PR
BRAZIL
Tel.: +43 911 269 38
cleandropazinato@uol.com.br

OIE HEADQUARTERS

Dr Derek Belton
Head
International Trade Department
d.belton@oie.int

Dr Leopoldo Stuardo
Chargé de mission
International Trade Department
l.stuardo@oie.int

Dr Gowoon Jung
Intern
International Trade Department
g.jung@oie.int

Annex II

OIE *AD HOC* GROUP ON ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS

Paris, 22–24 March 2016

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Adopted agenda

1. Welcome and introduction – Dr Derek Belton

2. Introduction of members – Background and representation

3. Confirmation of Terms of Reference and comments from the Chair of the *ad hoc* Group

4. Discussion of working documents and other relevant documents provided by the members of the *ad hoc* Group

5. Development standards

6. Review and finalise report of meeting

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Annex III

OIE *AD HOC* GROUP ON ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS

Paris, 22–24 March 2016

Background and Terms of Reference

Background

Animal welfare was first identified as a priority in the OIE Strategic Plan 2001–2005. OIE Member Countries mandated the organisation to take the lead internationally on animal welfare and, as the international reference organisation for animal health, to elaborate recommendations and guidelines covering animal welfare practices, reaffirming that animal health is a key component of animal welfare.

The standards setting procedure of the OIE

The OIE develops standards through the work of expert *ad hoc* Groups that are convened to develop draft texts for the OIE *Terrestrial Animal Health Code (Terrestrial Code)*. The draft texts are normally reviewed by the OIE Animal Welfare Working Group (AWWG), which provides recommendations to the OIE Terrestrial Animal Health Standards Commission (the Code Commission). Following review by the Code Commission, draft texts are sent to OIE Member Countries for comment. After two rounds of comments, a draft text may be proposed for adoption in the *Terrestrial Code*, in accordance with the democratic and transparent standard setting procedures of the OIE, at the World Assembly of Delegates which is held each year in May. Reports of *ad hoc* groups on animal welfare are normally released to the public as annexes to reports of the Code Commission. The Code Commission meets in February and September every year and its reports (in English, French and Spanish) are placed on the OIE Internet site after the meetings (normally in March and October).

Animal Welfare and livestock production systems

In May 2005, the OIE World Assembly of Delegates endorsed the proposals of the AWWG for the animal welfare priorities for 2005/2006. Among those priorities was the development of animal welfare guidelines for terrestrial animal production systems.

In April 2008, the OIE *ad hoc* Group on Animal Welfare and Livestock Production Systems proposed that the OIE develops guidelines based on species, with specific production sectors to be considered separately. The OIE was requested to focus on commercial scale production and particularly on products traded internationally. It was also suggested that the guidelines for a particular species should address all currently used production systems (e.g. extensive, intensive and mixed) and management procedures, in order to cover all practices used in the 180 Member Countries.

In 2009, and based on the priorities raised by the *ad hoc* Group on Animal Welfare and Livestock Production Systems, the OIE started a process to draft standards on animal welfare on animal production systems. At this moment, three OIE standards on animal production systems have been adopted: broiler chickens, beef cattle and dairy cattle.

As a consequence on the discussion during the adoption of the above mentioned standards, notably in relation to the inclusion of specific animal welfare measurables, it was agreed to develop some general principles for animal welfare and livestock production systems. These general principles were adopted in May 2012, as a new Article 7.1.4. “General principles for the welfare of animals in livestock production systems” of Chapter 7.1. of the *Terrestrial Code*.

Annex III (contd)

Terms of Reference

Taking into account:

- The background history of the OIE regarding animal welfare and production systems;
- The discussion paper on the "Development of animal welfare guidelines for production systems", written by the AWWG in 2006;
- The recommendations of the OIE *ad hoc* Group on Animal Welfare and Livestock Production in 2008, and
- The existing animal welfare and animal health standards in the *Terrestrial Code*, in particularly the Chapter 7.1, Article 7.1.2 on the "Guiding Principles for animal welfare" and Article 7.1.4 on the "General Principles for the welfare of animals in livestock production" (http://www.oie.int/index.php?id=169&L=0&htmfile=titre_1.7.htm).

The *ad hoc* Group is asked to elaborate draft animal welfare standards for pig production systems, (intensive, extensive and semi-intensive) for eventual inclusion in the *Terrestrial Code*. These standards should cover inter alia:

- appropriate definitions and scope;
- housing;
- feeding and watering of the animals;
- environmental considerations;
- management of endemic diseases;
- prevention of major infectious diseases (biosecurity) and planning for managing disease outbreaks (including emerging diseases);
- emergency management plans (e.g. disease outbreak, failure of electrical systems, fire, etc.);
- handling facilities (on farm only – transport and slaughter are covered elsewhere in the *Terrestrial Code*);
- management practices (e.g. castration, tail docking, teeth trimming, and nose ringing);
- breeding;
- farrowing;
- personnel training;
- protection from predators.

These standards must:

- be based on science (scientific references must be provided);
- harmonised in their structure with the rest of the *Terrestrial Code*, including the other animal welfare and production systems chapters;
- use criteria that address the outcome at the animal level (animal-based).

In developing these standards, the *ad hoc* Group should review relevant resource materials, including extracts from the *Terrestrial Code*, reports from AWWG and other *ad hoc* group meetings and examples of existing practices from all five OIE Regions. A draft document is expected after the first meeting and will be submitted to the AWWG, the Code Commission and OIE Member Countries, for comments, to be addressed by the *ad hoc* Group in a second meeting.

Discussion paper on the development of animal welfare guidelines for production systems (terrestrial animals)

(Developed by the OIE Animal Welfare Working Group, 2006)

Background

The OIE International Committee in May 2005 endorsed the proposals of the Animal Welfare Working Group for priorities for 2005/2006. Among those priorities was the development of animal welfare guidelines for terrestrial animal production systems.

The development of global OIE animal welfare guidelines for production systems will be challenging for a number of reasons. Worldwide, animals are raised under extremely diverse conditions ranging from intensive systems with animals kept permanently indoors, to extensive systems with little or no housing. These different systems involve very different animal welfare challenges. There are also large differences from country to country in the level of priority accorded to the welfare of food animals.

Nonetheless, because of the close link between animal welfare and animal health, guidelines designed to improve animal welfare will often lead to better animal health, productivity and food safety. Especially in cases where these relationships can be clearly demonstrated, animal welfare guidelines may be broadly acceptable to Member Countries.

This discussion paper sets out some of the key issues that need to be considered in developing animal welfare guidelines for production systems, and suggests next steps in this area.

Animal-based and resource-based criteria

Animal welfare guidelines may include (1) animal-based criteria and (2) resource-based criteria of animal welfare. Resource-based criteria (also called design criteria or input criteria) indicate the resources that should be provided. These often specify space allowances and dimensions, ambient temperature range, humidity, condition of the litter, air quality, availability of feed and water, frequency of inspection, and biosecurity and sanitation measures. Animal-based criteria (also called performance criteria or output criteria) are described/specified in terms of the animals' state. They often include such elements as survival rate, incidence of disease and injury, body condition scoring, the ability of animals to behave in certain ways, and the reaction of animals to their handlers.

Resource-based criteria are widely used in animal welfare assurance programmes because they are often easier to evaluate and score than animal-based criteria. However, they have important limitations:

– Resource-based criteria are generally derived from research carried out with specific species/breeds and production systems, and they may not be applicable to other breeds and other production systems. For example, a space allowance that minimises crowding-related problems in light hybrid hens in battery cages may not apply to other breeds or to other housing systems.

– The welfare of animals is strongly influenced by the skill and attitude of animal handlers, and it is difficult to develop and implement resource-based criteria to describe these elements.

– Resource-based criteria are often created in response to well researched problems such as over-crowding and air quality, and they may not apply to new or emerging problems such as new diseases or genetic modifications of the animals.

Perhaps because of these limitations, research shows that animal production units that conform to the same resource-based criteria may still have widely varying animal welfare outcomes.

Animal-based criteria are not as widely used in existing animal welfare standards but they should, in principle, be applicable to any production system. In fact animal-based criteria may provide a better measure of the animal welfare outcomes because they reflect the influence of variables (e.g. experience and attitude of handlers, presence of emerging diseases) that may be missed by resource-based criteria. However, many animal welfare concerns are difficult to address using animal-based criteria. Examples include the capacity of the ventilation system to prevent extreme temperatures, the use of pain mitigation for surgical procedures, and the implementation of appropriate biosecurity measures.

A reasonable approach, therefore, would be for the OIE to incorporate animal-based criteria in its guidelines where feasible and to supplement these with resource-based criteria where there is a good scientific basis for doing so. Thus, for example, animal welfare guidelines for chickens might specify certain levels of survival and freedom from disease and injury (animal-based criteria) and would also recommend requirements for ambient temperature, humidity, air quality and litter quality (resource-based criteria) for birds that are kept indoors.

Clarifying the objectives of animal welfare guidelines

Animal welfare guidelines are generally designed to achieve one or more of three objectives:

1) to protect the basic health and normal functioning of animals, for example by preventing and alleviating disease, injury, malnutrition and similar harm;

2) to protect the psychological well-being of animals, for example by preventing and alleviating pain, fear, distress and discomfort;

3) to provide living conditions that are considered to be 'natural' for the species, for example by providing a social and physical environment where animals can perform key elements of their natural behaviour.

The three objectives overlap. For example, preventing injury is important for psychological well-being, and preventing pain and fear can be important for normal functioning. However, the overlap is not perfect. For example, environments that limit the spread of disease do not necessarily allow natural behaviour and vice versa.

The three objectives are based on somewhat different bodies of scientific research. The research relevant to objective 1 includes studies of survival rate, incidence of disease and injury, body condition scoring, and productivity measures. The research relevant to objective 2 includes studies of pain, fear and distress in animals, studies of ways to alleviate such states, and studies that determine the animals' own preferences and aversions. Research relevant to objective 3 includes studies of the normal (and abnormal) behaviour of animals, how these are influenced by the social and physical environment, and the strength of the animals' motivation to carry out elements of their natural behaviour.

In the past, confusion has sometimes occurred because different standards, which are all claimed to address animal welfare, have involved very different requirements. Often such differences arise because the different standards address different objectives and rely on different bodies of research. In order to avoid confusion, it is important that recommendations be clear as to the welfare objectives they are intended to address.

Standards based on objective 1, because they reinforce basic health and functioning of animals, tend to be the most aligned with the traditional objectives of animal producers and veterinarians. The cost/benefit ratio is often favourable because implementation often leads to measurable improvements in productivity (e.g. improved survival or reduced mortality due to stress and disease). Hence, these standards are likely to be the most acceptable to animal producers and in cultures where concern for the welfare of animals is relatively low. However, in cultures where the public is actively interested in and concerned about animal welfare, standards based on objective 1 are likely to be viewed as minimum standards that promote productivity rather than animal welfare per se.

Standards based on objective 2 (alleviating pain and distress, etc.) vary in their ease of implementation and their economic implications. Some (such as handling animals in ways that do not cause distress) should be relatively easy to implement, involve little or no cost, and may produce measurable economic benefit. Others (such as requiring anaesthesia for minor surgery) may be difficult and costly to implement. The level of acceptance by producers will likely vary accordingly. In countries which accord a high priority to animals welfare, standards based on objective 2 tend to be strongly supported by the concerned public who generally see the alleviation of pain and distress as a key element of animal welfare.

Standards based on objective 3 (providing more 'natural' living conditions) can have widely varying implications. Some requirements, such as providing more natural social grouping of animals, can be achieved in confinement production systems with only small cost implications. Others may require substantial redesign of animal environments and incur higher land and labour costs. Such standards may, however, allow producers using alternative production systems to market products to consumers who support such standards.

In proposing OIE guidelines on animal production systems, one approach would be to focus principally on objective 1 because of the clear linkage with animal health and traditional veterinary priorities of this objective, and to propose the adoption of guidelines based on objectives 2 and 3 where this is feasible and appropriate. If this approach is used, however, it should be made clear that the guidelines are intended as basic guidelines designed mainly to promote the health and functioning of animals as health is the one of the key components of welfare. In cultures that place a high priority on animal welfare, the development and implementation of guidelines that more closely address animal welfare objectives 2 and 3 would be appropriate to meet societal expectations.

Clarifying the underlying science

In the past, the development of animal welfare guidelines for production systems has sometimes been hampered by a lack of clarity over the scientific literature. In some cases organiations have attempted to create guidelines without a clear review or understanding of the science. In other cases, scientific reviews are available but these lead to conflicting conclusions. Guidelines that lack a clear and transparent link to science are often criticised as reflecting the subjective views or self-interest of those (animal producers, regulators or animal welfare organizations) that produce them.

In general, then, a good first step in developing animal welfare guidelines for a given production system is to ensure that a competent review of the relevant science is in place and widely accepted. If there is no such review, or if there are significant conflicts among existing reviews, then a new review may need to be created before beginning to develop a guideline.

Recommended next steps

Given the number of strategic decisions involved in the development of guidelines for terrestrial animal production systems, the Working Group on Animal Welfare recommends that the OIE proceed as follows.

Appoint an *ad hoc* group to consider the issues presented in this paper and prepare a Guidance Document on the development of animal welfare guidelines for terrestrial animal production systems. The *ad hoc* group should, at a minimum, consider and report on the following:

– the various objectives of animal welfare guidelines, how these relate to animal health, and the role that the objectives should play in OIE guidelines;

– the advantages and disadvantages of animal-based versus design-based criteria, with examples and recommendations on how these different criteria should be addressed in developing OIE guidelines;

– the role of science in animal welfare guidelines, with recommendations on how the OIE should proceed to ensure that guidelines are clearly and transparently based on relevant science;

– a proposed strategy, including whether to approach the development of guidelines based on species (e.g. *Gallus gallus*) or production systems (e.g. caged layers);

– recommendations on the composition of expert groups including the appropriate scientific expertise, regulatory experience and regional and cultural representation;

– priorities for development of guidelines (species, production systems).

This Guidance Document should be submitted to the Animal Welfare Working Group and, if endorsed, submitted to the OIE Code Commission and possible distribution to OIE Delegates.

With the Guidance Document in place and endorsed by the International Committee, the OIE could proceed by appointing one or more *ad hoc* groups to work on particular animal species or production systems. Such groups should begin with the creation of a comprehensive review of the literature where this is needed.

Annex V

Recommendations to the OIE in Developing Guidelines on

Animal Welfare in Livestock Production Systems

Objectives of animal welfare guidelines

In keeping with the OIE mandate, the key objective of the OIE's animal welfare guidelines is to assure and support the essential linkage between animal health and animal welfare. In the context of this paper, animal health refers not only to freedom from diseases listed by the OIE but also to freedom from other diseases (e.g. mastitis, lameness), injuries and other conditions (e.g. malnutrition) that significantly affect the biological functioning.

In this respect, considerations relating to affective states and animal behaviour may be relevant insofar as the scientific evidence shows that they are related to animal health.

Maintaining freedom from OIE listed diseases is an important element of animal welfare and the guidelines should provide for the implementation of appropriate biosecurity measures to exclude these diseases. The guidelines should also be cross referenced to appropriate chapters in the *Terrestrial Code* that deal with the surveillance, reporting, control and eradication of listed diseases.

Existing OIE standards

Review of relevant existing OIE standards contributing to the objective described above will be made.

Animal-based versus design-based criteria

Animal-based criteria (also called performance or output criteria) are described in terms of the animal's state. They include such elements as survival rate, incidence of disease and injury and body condition scoring. Many problems are multifactorial and it is therefore difficult to provide specifications (resource-based criteria) for all contributing factors. The most practical solution is to monitor animal-based criteria to ascertain if animal welfare problems are occurring.

Resource-based criteria (also called design criteria, input criteria and engineering criteria) indicate the resources that should be provided. These specify such elements as space allowances and dimensions, ambient temperature range, humidity and condition of the litter. Resource-based criteria are usually based on specific research with a particular species in a particular production system. For example, heat stress is well studied in cattle. Resource-based criteria to prevent thermal stress would include specifying acceptable temperature and humidity range and rates of ventilation. However, the precise recommendations would have to be tailored for the genotype, reproductive state and history of the individual animal. Animal-based criteria such as respiratory rate and rectal temperature as measures of thermal stress, on the other hand, would be applicable across animal and genotype.

Consider the example of tail-biting in fattening pigs. Investigating the incidence and severity of tail biting is best accomplished by monitoring lesions, either by examining the pigs during the fattening period or by monitoring at the abattoir. However, correcting the problem will likely require modifying resources, for example the design of housing, stocking density, provision of material for rooting, air quality, nutrition, general hygiene and the provision of veterinary attention.

Annex V (contd)

List of advantages and disadvantages of animal-based and resource-based criteria

Animal-based criteria: advantages

- Provide information on the actual state of the animal, regardless of the number of variables affecting that state
- Can be used in a range of production systems, species, genotypes, etc.
- Can be quantitative or semi-quantitative (objective interpretation is possible)
- Can be used to get an appreciation of the impact of animal handling
- Post mortem monitoring may be less costly and is not stressful to the animal.

Animal-based criteria: disadvantages

- May be costly to implement and stressful to the animal if based on direct intervention with individual live animals
- Can be difficult to interpret behaviour (e.g. response to chronic pain or stress)
- Range of 'normal' values and acceptable variation from normal may be difficult to establish
- Quantification may be technically difficult and require specialized training
- Identify the problem but do not indicate what corrective measures are appropriate.

Resource-based criteria: advantages

- Can be easier and less costly to implement and interpret as to whether the value is within the established tolerance
- Required corrective action is evident
- Easier to calculate the cost of modifying these criteria
- Can be quantitative or semi-quantitative (objective interpretation is possible)
- Can be used in a preventative mode (e.g. biosecurity measures).

Resource-based criteria: disadvantages

- Difficult to develop and implement criteria relating to handling of animals
- Criteria may not be generally applicable (they are developed on the basis of research in particular species, breeds and production systems)
- May not be available in regard to new problems (as are mainly based on research to address known problems)
- Provide only partial information on the impact on animal welfare (as many variables contribute)
- May not be well validated with respect to the overall impact on animal welfare.

The criteria for use by the OIE must be devised in a manner that provides for them to be adapted and used in a wide range of environments and circumstances, in order to be widely applicable to OIE Members.

In keeping with the OIE's proposed definition of animal welfare, the OIE guidelines should focus on animal-based criteria. Animal-based criteria should be supplemented with resource-based criteria where these criteria are well validated scientifically as these provide some practical advantages.

The incorporation of resource-based criteria is more likely to be useful when dealing with livestock production systems and livestock that are very similar, regardless of the country/region of production.

The role of science in animal welfare guidelines

The guidelines should be based on scientific information and, to the extent that is possible, on peer-reviewed literature. However, there is a major shortage of scientific studies and publications on animal welfare from some regions, including Africa, Asia, Latin America and the Middle East, with the majority of scientific information reflecting work in the European Union, North America and Australia/New Zealand.

OIE should support the conduct of studies to generate information relevant to other regions.

Informed judgement of veterinarians and other relevant professionals is also a valid input to the development of OIE guidelines. This may be particularly relevant in addressing guidelines for livestock production systems where there is a shortage of published scientific studies.

The OIE should make clear the source and basis of its guidelines, whether this relates to professional judgement or published studies.

The OIE should undertake a review of published scientific information on:

1) based and resource-based criteria relevant to each guideline proposed for development (e.g. beef cattle and broiler chickens); and

2) relationship of affective states (e.g. chronic fear) and animal behaviour (e.g. nesting) to animal health.

The results of these reviews should be provided to OIE Delegates and animal welfare focal points to improve the transparency of the OIE guidelines' scientific basis.

When establishing national animal welfare policies, societal value judgements may play a large part. While science can provide useful information, ethical and social considerations may be more influential. The OIE should avoid making recommendations based on value judgements that lack a scientific basis.

Recommended strategy for the OIE

The development of guidelines based on species or sector

It is proposed that the OIE develop guidelines based on species, with specific production sectors to be considered separately as set out below. The OIE should focus on commercial scale production and particularly of products traded internationally. The guidelines for a particular species should address all currently used production systems (e.g. extensive, intensive and mixed) and management procedures (e.g. beak trimming, dehorning). The establishment of guidelines on a species by species basis is appropriate in view of the adoption of animal-based welfare criteria. Regardless of the production system, it is possible to establish animal health and welfare principles that are generally relevant to individuals of the same species.

Appropriate criteria for establishing the priority species/sectors include:

- Products that are extensively traded internationally
- Products that are internationally traded and the subject of actual or proposed animal welfare standards, measures or restrictions (government or private)
- Availability of relevant scientific information
- Likely positive impact on animal welfare of introducing standards
- Input from OIE Members and Regions regarding issues and concerns
- Relevance of one guideline for others (e.g. the OIE guideline on chickens could be used as a model to develop guidelines on ducks and turkeys).

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Annex VI

OIE *AD HOC* GROUP ON ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS

Paris, 22–24 March 2016

List of Documents

1) Welfare Quality® assessment protocol for pigs (sows and piglets, growing and finishing pigs)

2) Recommendations for the on farm welfare of pigs. Submission to the OIE by the International Coalition for Animal Welfare (ICFAW).

3) Criteria or measurables for the welfare of pigs. Working document prepared by Rebecca Hibbard. Intern at the OIE International Trade Department.

4) Commission Staff Working Document on best practices with a view to the prevention of routine tail-docking and the provision of enrichment materials to pigs.

5) Commission Recommendation (EU) 2016/336 of 8 March 2016 on the application of Council Directive 2008/120/EC laying down minimum standards for the protection of pigs as regards measures to reduce the need for tail-docking.

6) Scientific Opinion concerning a Multifactorial approach on the use of animal and non-animal-based measures to assess the welfare of pigs. EFSA Panel on Animal Health and Welfare (AHAW).

7) Scientific Opinion on the use of animal-based measures to assess welfare in pigs. EFSA Panel on Animal Health and Welfare (AHAW).

8) Animal Welfare (Pigs). Code of Welfare 2010. A code of welfare issued under the Animal Welfare Act 1999. New Zealand.

9) Canadian code of practice for the care and handling of pigs, 2014. National Farm Animal Care Council (NFACC). Canada.

DRAFT CHAPTER 7.X.

ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS

Article 7.X.1.

Definitions

'Pig production systems' are defined as all commercial systems in which the purpose of the operation includes some or all of the breeding, rearing and management of pigs intended for production of *meat*.

For the purpose of this chapter, 'management' is defined at the farm management level and at the *animal handler* level. At the level of farm management, human resources management practices including selection and training, and animal management practices, such as best practice in housing and husbandry and implementation of welfare protocol and audits, all impact on *animal welfare*.

At the *animal handler* level this requires a range of well-developed husbandry skills and knowledge to care for animals.

For the purpose of this chapter, 'environmental enrichment' means increasing the complexity (e.g. foraging opportunities, social housing) of the animal's environment to foster the expression of normal behaviour and reduce the expression of abnormal behaviour and provide cognitive stimulation. The endpoint of enrichment should be to improve the biological functioning of the animal (Newberry, 1995).

Article 7.X.2.

Scope

This chapter addresses the welfare aspects of pig production systems. However, *captive wild* pigs are not considered.

Article 7.X.3.

Commercial pig production systems

Commercial pig production systems include:

1. Indoors

   These are systems in which pigs are kept indoors, and are fully dependent on humans to provide for basic animal needs such as food and water. The type of housing depends on the environment, climatic conditions and management system. The animals may be kept in groups or individually.

2. Outdoors

   These are systems in which pigs live outdoors with shelter or shade, have some autonomy over access to shelter or shade, and may be fully dependent on humans to provide for basic animal needs such as food and water. They are typically confined in paddocks according to their production stage.

3. Combination systems

   These are systems in which pigs are managed in any combination of indoor and outdoor production systems, depending on weather or production stage.

Article 7.X.4.

Criteria (or measurables) for the welfare of pigs

The following outcome-based criteria, specifically animal-based criteria, can be useful indicators of *animal welfare*. The use of these indicators and their appropriate thresholds should be adapted to the different situations in which pigs are managed. Consideration should also be given to the design of the systems. These criteria can be considered as a tool to monitor the efficiency of design and management, given that both of these can affect *animal welfare.*

1. Behaviour

Certain behaviours could indicate an *animal welfare* problem. These include changes of feed and water intake, altered locomotory behaviour and posture, altered lying time, altered respiratory rate and panting, coughing, shivering and huddling, increased agonistic behaviours and stereotypic, apathetic or other abnormal behaviours (e.g. tail biting).

Stereotypy is defined as a sequence of invariant motor acts, which provide no obvious gain or purpose for the animal. Some stereotypies commonly observed in pigs include sham chewing, tongue rolling, teeth grinding, bar biting and floor licking.

2. Morbidity rates

Infectious and metabolic diseases, lameness, peri-partum and post-procedural complications, injury and other forms of morbidity, above recognised thresholds, may be direct or indirect indicators of the *animal welfare* status of the whole *herd*. Understanding the aetiology of the disease or syndrome is important for detecting potential *animal welfare* problems. Mastitis and metritis, leg and hoof, and reproductive diseases are also particularly important animal health problems for pigs. Scoring systems, such as for body condition, lameness and injuries, provide additional information.

Both clinical examination and pathology should be utilised as indicators of disease, injuries and other problems that may compromise *animal welfare*.

3. Mortality and culling rates

Mortality and culling rates affect the length of productive life and, like morbidity rates, may be direct or indirect indicators of the *animal welfare* status. Depending on the production system, estimates of mortality and culling rates can be obtained by analysing the causes of *death* and culling and their temporal and spatial patterns of occurrence. Mortality and culling rates, and their causes, when known, should be recorded regularly, e.g. daily, and used for monitoring e.g. monthly, annually.

Necropsy is useful in establishing the cause of *death*.

4. Changes in body weight and body condition

In growing animals, body weight changes outside the expected growth rate, especially excessive sudden loss, are indicators of poor *animal welfare* and health.

In mature animals, body condition outside an acceptable range may be an indicator of compromised *animal welfare*, health and reproductive efficiency.

5. Reproductive efficiency

Reproductive efficiency can be an indicator of *animal welfare* and health status. Future performance of sows or gilts can be affected by under- or over-nutrition at different stages of rearing. Poor reproductive performance, compared with the targets expected for a particular breed or hybrid, can indicate *animal welfare* problems.

Examples may include:

– low conception rates,
– high abortion rates,
– metritis and mastitis,
– low litter size,
– low numbers born alive,
– high numbers of stillborns or mummies.

6. Physical appearance

Physical appearance may be an indicator of *animal welfare* and health. Attributes of physical appearance that may indicate compromised welfare include:

– presence of ectoparasites,
– abnormal texture or hair loss,
– excessive soiling with faeces in indoor systems,
– swellings, injuries or lesions,
– discharges (e.g. from nose or eyes),
– feet and leg abnormalities,
– abnormal posture (e.g. rounded back, head low),
– emaciation or dehydration.

7. Handling response

Improper handling can result in fear and distress in pigs. Fear of humans may be an indicator of poor *animal welfare* and health. Indicators include:

– evidence of poor human-animal relationship, such as disturbed behaviour when being moved or when *animal handlers* enter a pen,
– animals slipping or falling during handling,
– injuries sustained during handling, such as bruising, lacerations and fractured legs,
– animals vocalising abnormally or excessively during restraint and handling.

8. Lameness

Pigs are susceptible to a variety of infectious and non-infectious musculoskeletal disorders. These disorders may lead to lameness and to gait abnormalities. Pigs that are lame or have gait abnormalities may have difficulty reaching food and water and may experience pain. Musculoskeletal problems have many causes, including genetic, nutrition, sanitation, floor quality, and other environmental and management factors. There are several gait scoring systems available.

9. Complications from common procedures

Some procedures such as surgical castration, tail docking, teeth clipping or grinding, tusk trimming, identification, nose ringing and hoof care are commonly performed in pigs to facilitate management, to meet market requirements and improve human safety and *animal welfare*.

However, if these procedures are not performed properly, *animal welfare* and health can be compromised.

Indicators of such problems include:

– post-procedure *infection* and swelling,
– post-procedure lameness,
– behaviour indicating pain, fear and distress,
– morbidity, mortality and culling rates,
– reduced feed and water intake,
– post procedure body condition and weight loss.

Article 7.X.5.

Recommendations

Ensuring good welfare of pigs is contingent on several management factors, including system design, environmental management, and animal management practices which include responsible husbandry and provision of appropriate care. Serious problems can arise in any system if one or more of these elements are lacking.

Articles 7.X.6. to 7.X.26. provide recommendations for measures applied to pigs.

Each recommendation includes a list of relevant outcome-based measurables derived from Article 7.X.4.

This does not exclude other criteria being used where or when appropriate.

Article 7.X.6.

Housing

When new facilities are planned or existing facilities are modified, professional advice on design in regards to welfare and health of animals should be sought.

Housing systems and their components should be designed, constructed and regularly inspected and maintained in a manner that reduces the risk of injury, disease or stress for pigs. Facilities should to allow for the safe, efficient and humane management and movement of pigs.

There should be a separate area where sick and injured animals can be treated and monitored. When a separated space is provided, this should accommodate all the needs of the animal e.g. recumbent or lame animals or animals with severe wounds may require additional bedding or an alternative floor surface.

Pigs should not be tethered as part of their normal housing systems.

Good outcomes in the welfare and health of animals can be achieved in a range of housing systems. The design and management of the system are critical for achieving that.

Pigs are social animals and prefer living in groups, therefore housing systems where pregnant sows and gilts can be kept in groups are recommended.

Outcome-based criteria (or measurables): physical appearance (injuries), behaviour, changes in body weight and body condition, handling response, reproductive efficiency, lameness and morbidity, mortality and culling rates.

Article 7.X.7.

Personnel training

Pigs should be cared for by a sufficient number of personnel, who collectively possess the ability, knowledge and competence necessary to maintain the welfare and health of the animals.

All people responsible for pigs should be competent through formal training or practical experience in accordance with their responsibilities. This includes understanding of and skill in animal handling, nutrition, reproductive management techniques, behaviour, *biosecurity*, signs of disease, and indicators of poor *animal welfare* such as stress, pain and discomfort, and their alleviation.

Outcome-based criteria (or measurables): handling response, physical appearance, behaviour, changes in body weight, body condition, reproductive efficiency, lameness and morbidity, mortality and culling rates.

Article 7.X.8.

Handling and inspection

Pigs should be inspected at least once a day when fully dependent on humans to provide for basic needs such as food and water and to identify welfare and health problems.

Some animals should be inspected more frequently, for example, farrowing sows, new born piglets, newly weaned pigs and newly-mixed gilts and sows.

Pigs identified as sick or injured should be given appropriate treatment at the first available opportunity by competent *animal handlers*. If *animal handlers* are unable to provide appropriate treatment, the services of a *veterinarian* should be sought.

Recommendations on the handling of pigs are also found in Chapter 7.3. In particular handling aids that may cause pain and distress (e.g. electric goads) should be used only in extreme circumstances and provided that the animal can move freely. The use of electric prods should be avoided (see also point 3 of Article 7.3.8.), and in any case should not be used in sensitive areas including the udder, face, eyes, nose or ano-genital region.

Exposure of pigs to sudden movement or changes in visual contrasts should be minimised where possible to prevent stress and fear reactions. Pigs should not be handled aggressively (e.g. kicked, walked on top of, held or pulled by one front leg, ears or tail). Pigs that become distressed during handling should be attended to immediately.

Pigs should be restrained only for as long as necessary and only appropriate, well-maintained restraint devices should be used.

Outcome-based criteria (or measurables): physical appearance, behaviour, changes in body weight and body condition, handling response, reproductive efficiency, lameness and morbidity, mortality and culling rates.

Article 7.X.9.

Painful procedures

Some procedures such as surgical castration, tail docking, teeth clipping or grinding, tusk trimming, identification, and nose ringing are commonly performed in pigs. These procedures should only be performed to facilitate management, to meet market requirements and improve human safety and *animal welfare*.

These procedures have the potential to cause pain and thus should be performed in such a way as to minimise any pain and distress to the animal.

Options for enhancing *animal welfare* in relation to these procedures include the internationally recognised ‘three Rs’ which involves replacement (entire or inmunocastrated males vs. castrated males), reduction (tail docking and teeth clipping only when necessary) and refinement (providing analgesia or anaesthesia).

Outcome-based criteria (or measurables): complications from common procedures, morbidity rates, mortality and culling rates, abnormal behaviour, physical appearance and changes in weight and body condition.

Article 7.X.10.

Feeding and watering of animals

The amount of feed and nutrients pigs require in any management system is affected by factors such as climate, the nutritional composition and quality of the diet, the age, gender, size and physiological state of the pigs (e.g. pregnancy, lactation), and their state of health, growth rate, previous feeding levels and level of activity and exercise.

All pigs should receive adequate quantities of feed and nutrients each day to enable each pig to:

– maintain good health;

– meet its physiological demands; and

– avoid metabolic and nutritional disorders.

Feed and water should be provided in such a way as to prevent undue competition and injury.

Pigs should be fed a diet with sufficient fibrous feedstuffs in order to reduce as much as possible the occurrence of gastric ulcers (Hedde *et al.*,1985).

All pigs should have access to an adequate supply of palatable water at a temperature that does not inhibit drinking and that meets their physiological requirements and is free from contaminants hazardous to pig health (Patience, 2013).

Outcome-based criteria (or measurables): changes in body weight and body condition, agonistic behaviour at feeding and watering places and abnormal behaviour such as tail biting, mortality and culling rates, and morbidity rates (gastric ulcers).

Article 7.X.11.

Environmental enrichment

Animals should be provided with an environment that provides complexity and cognitive stimulation (e.g. foraging opportunities, social housing) to foster normal behaviour, reduce abnormal behaviour and improve biological function.

Pigs should be provided with multiple forms of enrichment that aim to improve the welfare of the animals through the enhancement of their physical and social environments, such as:

– sufficient quantity of suitable materials to enable pigs to fulfil their innate needs to look for feed (edible materials), bite (chewable materials), root (investigable materials) and manipulate (manipulable materials) (Bracke *et al.*, 2006);

– social enrichment which involves either keeping pigs in groups or individually with visual, olfactory and auditory contact with other pigs;

– positive human contact (such as pats, rubs and talking).

Outcome-based criteria (or measurables): physical appearance (injuries), behaviour (stereotypies, tail biting), changes in body weight and body condition, handling response, reproductive efficiency, lameness and morbidity, mortality and culling rates.

Article 7.X.12.

Prevention of abnormal behaviour

In pig production there are a number of abnormal behaviours that can be prevented or minimised with management procedures.

Many of these problems are multifactorial and minimising their occurrence requires an examination of the whole environment and of several management factors. However some recommendations to reduce their occurrence include:

1) Oral stereotypies (e.g. bar biting, sham chewing, excessive drinking) in adult pigs can be minimised by providing environmental enrichment and increasing feeding time and satiety by increasing fibre content in the diet or foraging roughage (Robert *et al.*,1997; Bergeron *et al.*, 2000).

2) Tail biting may be reduced by providing an adequate enrichment material and an adequate diet (avoiding deficiencies of sodium or essential amino-acids), and avoiding high stocking densities and competition for feed and water (Walker and Bilkei, 2005). Other factors to consider include animal characteristics (breed, genetics, gender) and social environment (*herd* size, mixing animals) (Schroder-Petersen and Simonsen, 2001; EFSA, 2007; Taylor *et al.*, 2010).

3) Belly nosing and ear sucking may be reduced by increasing the weaning age, and providing feed to piglets prior to weaning to avoid the abrupt change of feed (Marchant-Forde, 2009; Sybesma, 1981; Worobec, 1999).

4) Vulva biting may be reduced by minimising competition in accessing the feeding area (Bench *et al.*, 2013; Leeb *et al.*, 2001; Rizvi *et al.*, 1998).

Outcome-based criteria (or measurable): physical appearance (injuries), behaviour (abnormal behaviour), morbidity rates, mortality and culling rates, reproductive efficiency and changes in body weight and body condition.

Article 7.X.13.

Space allowance

Space allowance should be managed taking into account different areas for lying, standing and feeding. Crowding should not adversely affect normal behaviour of pigs and durations of time spent lying.

Insufficient and inadequate space allowance may increase stress, the occurrence of injuries and have an adverse effect on growth rate, feed efficiency, reproduction and behaviour such as locomotion, resting, feeding and drinking, agonistic and abnormal behaviour (Gonyou *et al.*, 2006; Ekkel, 2003; Turner, 2000).

1. Group housing

   Floor space may interact with a number of factors such as temperature, humidity, floor type and feeding systems (Marchant–Forde, 2009; Verdon, 2015). All pigs should be able to rest simultaneously, and each animal lie down, stand up and move freely. Sufficient space should be provided to enable animals to have access to feed, water, to separate lying and elimination areas and to avoid aggressive animals.

   If abnormal behaviour is seen, corrective measures should be taken, such as increasing space allowance and providing barriers where possible.

   In outdoor systems where pigs have autonomy over diet selection, stocking density should be matched to the available feed supply.

   Outcome-based criteria (or measurables): reduction or variation in body weight and body condition, increasing agonistic and abnormal behaviour such as tail biting, injuries, morbidity, mortality and culling rates, and physical appearance (e.g. presence of faeces on the skin).

2. Individual pens

   Pigs must be provided with sufficient space so that they can stand up, turn around and lie comfortably in a natural position, and that provides for separation of dunging, lying and eating areas.

   Outcome-based criteria (or measurables): increasing abnormal behaviour (stereotypies), morbidity, mortality and culling rates, and physical appearance (e.g. presence of faeces on the skin, injuries).

3. Stalls (crates)

Stalls must be sized appropriately to allow pigs to:

– be able to stand up in their natural stance without contact with either side of the stall,

– stand up without touching the top bars,

– stand in a stall without simultaneously touching both ends of the stall,

– lie comfortably on their sides without disturbing neighbouring pigs.

Outcome-based criteria (or measurables): physical appearance (e.g. injuries), increasing abnormal behaviour (stereotypies), reproductive efficiency, lameness and morbidity, mortality and culling rates (e.g. piglets).

Article 7.X.14.

Flooring, bedding, resting surfaces

In all production systems pigs need a well-drained and comfortable place to rest.

Floor management in indoor production systems can have a significant impact on pig welfare (Temple *et al.*, 2012; Newton *et al.*, 1980). Flooring, bedding, resting surfaces and outdoor yards should be cleaned as conditions warrant, to ensure good hygiene, comfort and minimise risk of diseases and injuries. Areas with excessive faecal accumulation are not suitable for resting.

Floors should be designed to minimise slipping and falling, promote foot health, and reduce the risk of claw injuries.

If a housing system includes areas of slatted floor, the slat and gap widths should be appropriate to the claw size of the pigs to prevent injuries.

Slopes of the pens should allow water to drain and not pool in the pens.

In outdoor systems, pigs should be rotated between paddocks to ensure good hygiene and minimise risk of diseases.

If bedding is provided it should be suitable (e.g. hygienic, non-toxic) and maintained to provide pigs with a clean, dry and comfortable place on which to lie.

Outcome-based criteria (or measurables): physical appearance (e.g. injuries, presence of faeces on the skin, bursitis), lameness and morbidity rates (e.g. respiratory disorders, reproductive tract infections).

Article 7.X.15.

Air quality

Good air quality and ventilation are important for the welfare and health of pigs and reduce the risk of respiratory discomfort and diseases. Dust, micro-organisms and noxious gases, including ammonia, hydrogen sulphide, and methane, can be problematic in indoor systems due to decomposing animal waste (Drummond *et al.*, 1980).

Air quality is influenced strongly by management and building design in housed systems. Air composition is influenced by stocking density, the size of the pigs, flooring, bedding, waste management, building design and ventilation system (Ni *et al.*, 1999).

Proper ventilation is important for effective heat dissipation in pigs and to prevent the build-up of effluent gases (e.g. ammonia and hydrogen sulphide), including those from manure and dust in the housing unit. The ammonia level in enclosed housing should not exceed 25 ppm. A useful indicator is that if air quality is unpleasant for humans it is also likely to be a problem for pigs.

Outcome-based criteria (or measurables): morbidity, mortality and culling rates, behaviour (especially respiratory rate or coughing), reductions in weight and body condition.

Article 7.X.16.

Thermal environment

Although pigs can adapt to different thermal environments particularly if appropriate breeds are used for the anticipated conditions, sudden fluctuations in temperature can cause heat or cold stress.

1. Heat stress

   Heat stress is a serious problem in pig production. It can cause significant reductions in weight gain and fertility, or sudden death (Werremann and Bazer, 1985).

   The risk of heat stress for pigs is influenced by environmental factors including air temperature, relative humidity, wind speed, stocking density, shade and wallow availability in outdoor systems, animal factors including breed, age and body condition (Heitman and Hughes, 1949; Quiniou and Noblet, 1999).

   Animal handlers should be aware of the risk that heat stress poses to pigs and of the thresholds in relation to heat and humidity that may require action. If the risk of heat stress reaches too high levels the *animal handlers* should institute an emergency action plan that gives priority to access to additional water and could include provision of shade and wallows in outdoor systems, fans, reduction of stocking density and provision of cooling systems as appropriate for the local conditions.

   Outcome-based criteria (or measurables): behaviour (feed and water intake, respiratory rate, panting, agonistic behaviour), physical appearance (presence of faeces on the skin), morbidity, mortality and culling rates, and reproductive efficiency.

2. Cold stress

   Protection from cold should be provided when these conditions are likely to create a serious risk to the welfare of pigs, particularly in neonates and young pigs and others that are physiologically compromised (e.g. ill animals). This can be provided by extra bedding, heat mats or lamps and natural or man-made shelters in outdoor systems (Blecha and Kelley, 1981).

   Outcome-based criteria (or measurables): morbidity, mortality and culling rates, physical appearance (long hair, piloerection), behaviour (especially abnormal postures, shivering and huddling) and changes in body weight and body condition.

Article 7.X.17.

Noise

Pigs are adaptable to different levels and types of noise. However, exposure of pigs to sudden or loud noises should be minimised where possible to prevent stress and fear reactions. Ventilation fans, feeding machinery or other indoor or outdoor equipment should be constructed, placed, operated and maintained in such a way that they cause the least possible amount of noise (Algers and Jensen, 1991).

Outcome-based criteria (or measurables): behaviour (e.g. fleeing and vocalisation), physical appearance (e.g. injuries), reproductive efficiency, changes in body weight and body condition.

Article 7.X.18.

Lighting

Indoor systems should have light levels sufficient to allow all pigs to see one another, to investigate their surroundings visually and to show other normal behaviour patterns and to be seen clearly by staff to allow adequate inspection of the pigs. The lighting regime shall be such as to prevent health and behavioural problems. It should follow a 24-hour rhythm and include sufficient uninterrupted dark and light periods, preferably no less than 6 hours for both.

A minimum of 40 lux of lighting is recommended for a minimum of 6 hours per day (Martelli *et al.*, 2005; Taylor *et al.*, 2006).

Artificial light sources should be located so as not to cause discomfort to the pigs.

Outcome-based criteria (or measurable): behaviour (locomotive behaviour), morbidity rates, reproductive efficiency, physical appearance (injuries) and changes in body weight and body condition.

Article 7.X.19.

Farrowing and lactation

Sows and gilts need time to adjust to their farrowing accommodation before farrowing. Nesting material should be provided where possible some days before farrowing (Yun *et al.*, 2014). Sows should be observed frequently around their expected farrowing times. As some sows and gilts need assistance during farrowing, there should be sufficient space and competent staff.

Outcome-based criteria (or measurables): mortality and culling rates (piglets), morbidity rates (metritis and mastitis), behaviour (stereotypies), reproductive efficiency, physical appearance (injuries).

Article 7.X.20.

Weaning

Weaning can be a stressful time for sows and piglets and good management is required. Problems associated with weaning are generally related to the piglet's size and physiological maturity. Early weaning systems require good management and nutrition of the piglets.

An average weaning age of three weeks or older is recommended (Worobec *et al.*, 1999).

Regardless of age, low weight piglets require additional care and can benefit from being kept in small groups in specialised pens until they are able to be moved to the common nursery area.

Newly weaned pigs are susceptible to disease challenges, so adherence to high-level hygiene protocols is important. The area that piglets are weaned into should be clean and dry.

All newly weaned pigs should be monitored during the first two weeks after weaning for any signs of ill-health.

Outcome-based criteria (or measurable): mortality and culling rates (piglets), morbidity rates (respiratory disease, diarrhoea), behaviour (belly nosing and ear sucking), physical appearance (injuries) and changes in body weight and body condition.

Article 7.X.21.

Mixing

Mixing of unfamiliar pigs can result in fighting to establish a dominance hierarchy, and therefore mixing should be minimised as much as possible (Moore *et al.*, 1994; Fabrega *et al.*, 2013). When mixing, strategies to reduce aggression and injuries should be implemented and animals should be supervised.

Measures to prevent excessive fighting and injuries can include (Arey and Edwards, 1998):

– providing additional space and a non-slippery floor,

– feeding before mixing,

– feed on the floor in the mixing area,

– provision of straw in the mixing area,

– providing opportunities to escape and to hide from other pigs, such as visual barriers,
– mix previously familiarised animals whenever possible,
– young animals should be mixed as soon after weaning as possible,
– avoid adding one or small number of animals to a large established group.

Outcome-based criteria (or measurables): mortality, morbidity and culling rates, behaviour (agonistic), physical appearance (injuries), changes in body weight and body condition and reproductive efficiency.

Article 7.X.22.

Genetic selection

Welfare and health considerations should balance any decisions on productivity and growth rate when choosing a breed or hybrid for a particular location or production system.

Selective breeding can improve the welfare of pigs for example by selection to improve maternal behaviour, piglet viability, temperament and resistance to stress and disease and to reduce tail biting and aggressive behaviour (Turner *et al.*, 2006).

Outcome-based criteria (or measurable): physical appearance, behaviour, changes in body weight and body condition, handling response, reproductive efficiency, lameness, and morbidity, mortality and culling rates.

Article 7.X.23.

Protection from predators

In outdoor and combination systems pigs should be protected from predators.

Outcome-based criteria (or measurable): morbidity, mortality and culling rates, behaviour, and physical appearance (injuries).

Article 7.X.24.

Biosecurity and animal health

1. Biosecurity and disease prevention

   Biosecurity plans should be designed, implemented and maintained, commensurate with the best possible *herd* health status, available resources and infrastructure, and current disease risk and, for *listed diseases* in accordance with relevant recommendations in the *Terrestrial Code*.

   These *biosecurity plans* should address the control of the major sources and pathways for spread of pathogen agents:

   – pigs, including introductions to the *herd*,
   – young animals coming from different sources,
   – other domestic animals, *wildlife*, and pests,
   – people, including sanitation practices,
   – equipment, tools and facilities,
   – *vehicles*,
   – air,
   – water supply, feed and bedding,
   – manure, waste and disposal of dead animals,
   – semen.

Outcome-based criteria (or measurables): morbidity, mortality and culling rates, reproductive efficiency, changes in weight and body condition, physical appearance (signs of disease).

a) Animal health management

Animal health management should optimise the physical and behavioural health and welfare of the pig *herd*. It includes the prevention, treatment and control of diseases and conditions affecting the *herd* (in particular respiratory, reproductive and enteric diseases).

There should be an effective programme for the prevention and treatment of *diseases* and conditions, formulated in consultation with a *veterinarian*, when appropriate. This programme should include the recording of production data (e.g. number of sows, piglets per sow per year, feed conversion, and body weight at weaning), morbidity, mortality and culling rate and medical treatments. It should be kept up to date by the *animal handler*. Regular monitoring of records aids management and quickly reveals problem areas for intervention.

For parasitic burdens (e.g. endoparasites, ectoparasites and protozoa), a programme should be implemented to monitor, control and treat, as appropriate.

Lameness can be a problem in pigs. *Animal handlers* should monitor the state of feet and legs and take measures to prevent lameness and maintain foot and leg health.

Those responsible for the care of pigs should be aware of early specific signs of *disease* or distress, such as coughing, abortion, diarrhoea, changes in locomotory behaviour or apathetic behaviour, and non-specific signs such as reduced feed and water intake, changes in weight and body condition, changes in behaviour or abnormal physical appearance.

Pigs at higher risk will require more frequent inspection by *animal handlers*. If *animal handlers* suspect the presence of a *disease* or are not able to correct the causes of *disease* or distress, they should seek advice from those having training and experience, such as *veterinarians* or other qualified advisers, as appropriate.

Non-ambulatory pigs should not be transported or moved unless absolutely necessary for treatment or diagnosis. Such movements should be done carefully using methods that avoid dragging the animal or lifting it in a way that might exacerbate injuries.

Animal handlers should also be competent in assessing fitness to transport, as described in Chapter 7.3.

In case of *disease* or injury, when treatment has failed or recovery is unlikely (e.g. pigs that are unable to stand up, unaided or refuse to eat or drink), the animal should be humanely killed as soon as possible in accordance with Chapter 7.6.

Outcome-based criteria (or measurable): morbidity, mortality and culling rates, reproductive efficiency, behaviour (apathetic behaviour), lameness, physical appearance (injuries) and changes in body weight and body condition.

b) Emergency plans for disease outbreaks

Emergency plans should cover the management of the farm in the event of an emergency disease outbreak, consistent with national programmes and recommendations of *Veterinary Services* as appropriate.

Article 7.X.25.

Emergency plans

Where the failure of power, water and feed supply systems could compromise *animal welfare,* pig producers should have contingency plans to cover the failure of these systems. These plans may include the provision of fail-safe alarms to detect malfunctions, back-up generators, contact information for key service providers, ability to store water on farm, access to water cartage services, adequate on-farm storage of feed and an alternative feed supply.

Preventive measures for emergencies should be input-based rather than outcome-based. Contingency plans should be documented and communicated to all responsible parties. Alarms and back-up systems should be checked regularly.

Article 7.X.26.

Disaster management

Plans should be in place to minimise and mitigate the effect of disasters (e.g. earthquake, fire, flooding, blizzard and hurricane). Such plans may include evacuation procedures, identifying high ground, maintaining emergency feed and water stores, destocking and humane *killing* when necessary.

Humane *killing* procedures for sick or injured pigs should be part of the disaster management plan.

Reference to emergency plans can also be found in Article 7.X.25.

Article 7.X.27.

Euthanasia (Humane killing)

Allowing a sick or injured animal to linger unnecessarily is unacceptable. Therefore, for sick and injured pigs a prompt diagnosis should be made to determine whether the animal should be treated or humanely killed.

The decision to kill an animal humanely and the procedure itself should be undertaken by a competent person.

Reasons for humane *killing* may include:

– severe emaciation, weak pigs that are non-ambulatory or at risk of becoming non-ambulatory,
– non-ambulatory pigs that will not stand up, refuse to eat or drink, have not responded to therapy,
– rapid deterioration of a medical condition for which therapies have been unsuccessful,
– severe, debilitating pain,
– compound fracture,
– spinal injury,
– central nervous system disease,
– multiple joint *infections* with chronic weight loss,
– piglets that are premature and unlikely to survive, or have a debilitating congenital defect, and
– as part of disaster management response.

For a description of acceptable methods for humane *killing* of pigs see Chapter 7.6.

Scientific references

Algers, B., and Jensen, P. (1991). Teat stimulation and milk production during early lactation in sows: effect of continuous noise. Canadian Journal of Animal Science 71: 51-60.

Arey, D.S., Edwards, S.A. 1998. Factors influencing aggression between sows after mixing and the consequences for welfare and production. Livestock Production Science, 56: 61-70.

Bench, C. J., F. C. Rioja-Lang, S. M. Hayne, and H. W. Gonyou. 2013.Group gestation housing with individual feeding—I: How feeding regime, resource allocation, and genetic factors affect sow welfare. Livest. Sci. 152(2):208–217.

Bergeron R., Bolduc J., Ramonet Y., Meunier-Salaün M.C. & Robert S. (2000) Feeding motivation and stereotypies in pregnant sows fed increasing levels of fibre and/or food. Applied Animal Behaviour Science 70:27-40.

Drummond, John G.; Curtis, Stanley E.; Simon, Joseph; Norton, Horace W. 1980. Effects of Aerial Ammonia on Growth and Health of Young Pigs1. Journal of Animal Science, 50: 1085-1091.

Bracke, M.B.M., Zonderland, J. J., Lenskens, P., Schouten, W. G.P., Vermeer. H, Spoolder, H.A.M., Hendriks, H.J.M., Hopster, H. 2006. Formalised review of environmental enrichment for pigs in relation to political decision making. Applied Animal Behaviour Science 98: 165-182.

EFSA, (2007), 'Scientific report on the risks associated with tail biting in pigsand possible means to reduce the need for tail docking considering the different housing and husbandry systems'. Annex EFSA J., 611, 1–13 (Question no. EFSA-Q-2006-013, 1–98).

Ekkel, E.D., Spoolder, H.A.M., Hulsegge, I. and Hopster, H. (2003) Lying characteristics as determinants for space requirements in pigs. *Applied Animal Behaviour Science*. 80, 19-30.

Fàbrega, E., Puigvert, X., Soler, J., Tibau, J., Dalmau, A.. 2013. Effect of on farm mixing and slaughter strategy on behaviour, welfare and productivity in Duroc finished entire male pigs. Applied Animal Behaviour Science, 143: 31-39.

Blecha, Frank and Kelley, Keith W. . 1981. Cold Stress Reduces the Acquisition of Colostral Immunoglobulin in Piglets. Journal of Animal science, 52: 594-600.

Gonyou, H.W., Brumm, M.C., Bush, E., Deen, J., Edwards, S.A., Fangman, T., McGlone, J.J., Meunier-Salaun, M., Morrison, R.B., Spoolder, H., Sundberg, P.L. and Johnson, A.K. (2006) Application of broken-line analysis to assess floor space requirements of nursery and grower-finisher pigs expressed on an allometric basis. *Journal if Animal Science.* 84, 229-235.

Hedde, R.D., Lindsey, T.O., Parish, R.C., Daniels, H.D., Morgenthien, E.A., Lewis, H.B. Effect of diet particle size and feeding H2 receptors antagonists on gastric ulcers in swine. J Anim Sci. 1985;61(1):179-185.

Heitman, H. and Hughes, E.H. 1949. The effects of air temperature and relative humidity on the physiological well-being of swine. Journal of Animal Science, 8:171-181.

Leeb B., Leeb Ch., Troxler J. & Schuh M. (2001) Skin lesions and callosities in group-housed pregnant sows: animal-related welfare indicators. Acta Agriculturae Scandinavica, Section A, Animal Science 51:82-87.

Marchant-Forde, J. N. (editor) (2009a), The Welfare of Pigs. Ed. J.N. Marchant-Forde, Springer Science and Business Media, New York City, USA.

Martelli, G., Scalabrin, M., Scipioni, R., and Sardi, L. (2005). The effects of the duration of teh artificial photoperiod on the growth paramenters and behaviour of heavy pigs. Veterinary Research Communications 29: 367-369.

Moore, A.S., Gonyou, H.W., Stookey, J.M., McLaren, D.G., 1994. Effect of group composition and pen size on behaviour, productivity and immune response of growing pigs. Appl. Anim. Behav. Sci. 40, 13–30.

Newberry, R. C. 1995. Environmental enrichment: Increasing the biological relevance of captive environments. Appl. Anim. Behav. Sci. 44:229–243.

Newton, G. L.; Booram, C. V.; Hale, O. M.; Mullinix, B. G. 1980. Effect of Four Types of Floor Slats on Certain Feet Characteristics and Performance of Swine4. Journal of Animal Science, 50: 7-20.

Ni, J.Q., Vinckier, C., Coenegrachts, J., Hendriks, J.. 1999. Effect of manure on ammonia emission from a fattening pig house with partly slatted floor. Livestock Production Science, 59: 25-31.

Patience JF. Water in swine nutrition. In: Chiba LI, editor. Sustainable swine nutrition. Oxford: Blackwell Publishing Ltd; 2013. p. 3–22.

Quiniou, N. and Noblet. 1999. J. Influence of high temperature of multiparous lactating sows. Journal of Animal Science 77: 2124-2134.

Robert, S., Rushen, J. and Farmer, C. (1997), 'Both energy content and bulk of feed affect stereotypic behaviour, heart rate and feeding motivation of female pigs'. Appl. Anim. Behav. Sci., 54, 161–171.

Rizvi S., Nicol C.J. & Green L.E. (1998) Risk factors for vulva biking in breeding sows in southwest England. Veterinary Record 143:654-658.

Schroder-Petersen, D.L. and Simonsen, H.B. (2001), 'Tail biting in pigs'. Vet. J., 162, 196-210.

Stereotypic Animal Behaviour. Fundamentals and Applications to Welfare. Eds. G. Mason and J, Rushen, 2nd Edition, CABI, Wallingford, Oxfordshire, UK.

Sybesma, W. (editor). (1981). Welfare of pigs. Current topics in Veterinary Medical Animal Science 11. Martinus Nijhoff, The Hague, Netherlands.

Taylor, N.R., Main, D.C.J., Mendl, M. and Edwards, S.A. (2010), 'Tail-biting: a new perspective'. Vet. J., 186, 137-147.

Taylor, N., Prescott, N., Perry, G., Potter, M., Le Suer, C., and Wathes, C. (2006). Preference of growing pigs for illuminance. Applied Animal Behaviour Science 92:19-31.

Temple, D., Courboulay, V., Manteca, X., Velarde, A., Dalmau, A.. 2012. The welfare of growing pigs in five different production systems: assessment of feeding and housing. Animal, 6,4: 656-667

Turner, S.P., Ewan, M., Rooke, J.A. and Edwards, S.A. (2000) The effect of space allowance on performance, aggression and immune competence of growing pigs housed on straw deep-litter at different group sizes. *Livestock Production Science*. 66 (1), 47-55.

Turner, S.P., White, I. M. S., Brotherstone, S., Farnworth, M. J., Knap, P. W., Penny, P., Mendl, M. and Lawrence, A. B.. 2006. Heritability of post-mixing aggressiveness in grower-stage pigs and its relationship with production traits. Journal of Animal Science, 82: 615-620.

Walker, P.K. and Bilkei, G. (2005), 'Tail-biting in outdoor pig production'. Vet. J., 171, 367–369.

Werremann, R.P., and Bazer, F.W. (1985).Influence of environmental temeprature on prolificacy of pigs. Journal of Reproduction and Fertility, 33:199-208.

Annex VII (contd)

Worobec, E. K, Duncan, I.J.H., Widowski, T.M. The Effects of weaning at 7, 14 and 28 days on piglet behaviour. Appl Anim Behav Sci.1999;62:173–182.

Verdon, M., Hansen, C.F., Rault, J-L., Jongman, E., Hansen, L.U., Plush, K. and Hemsworth, P.H. (2015), 'Effects of group-housing on sow welfare: A review'. J. Anim. Sci., 93, 1999–2017.

Yun, J., Swan, K-M., Farmer, C., Oliviero, C., Peltoniemi, O., Valros, A. (2014). Prepartum nest-building has an impact on postpartum nursing performance and maternal behaviour in early lactating sows. Applied Animal Behaviour Science 160:31-37.