

PIG WELFARE AT DIFFERENT PRODUCTION SYSTEMS

Zoran Luković, Dubravko Škorput, Danijel Karolyi

University of Zagreb, Faculty of Agriculture, 10000 Zagreb, Croatia
Corresponding author: Zoran Luković, lukovic@agr.hr
Review paper

Abstract: Animal welfare is increasing interest worldwide. Pig farming is one of the most intensive of all livestock production systems. Pigs are very adaptable animals and could be reared at different production systems. In many countries in region pigs are still reared in three production systems: farm enterprises, full-time family farms, and part-time family farms. In intensive production systems pigs are housed mainly indoors, while pigs in less intensive systems often could be found in outdoor or semi-outdoor environment. Rearing pigs in outdoor environment allows studying natural behaviour of pigs, as one of the most important criteria for animal welfare assessment. Although it is generally considered that pigs kept outdoors have fewer problems with welfare, there are some critical points needed to be considered. Malnutrition of different categories of pigs and exposure to parasites and infectious diseases are the most common reasons for concern about outdoor pig production systems. According to the principles of five freedoms, differences between the different production systems will be discussed and divergences from the EU recommended resources will be highlighted.

Key words: pigs, welfare, five freedoms, production systems

Introduction

Animal welfare is increasing interest worldwide. Animal welfare is a diverse area often described by the five freedoms (*FAVC, 1979*). Pig farming is one of the most intensive of all livestock production systems. Pigs are very adaptable animals and could be reared at different production systems (*Uremović et al., 2001a*). Consumers often have a favourable perception of some alternative production systems, like outdoor or deep litter, considering it more humane, sustainable and environmentally friendly (*Edwards, 2005*). Of course, pigs kept outdoor could also face some welfare problems such as thermal stress, parasite pressure, and competition for food. Additionally, absence of one particular

indicator of poor welfare, for example when growth rate is good, cannot be taken to mean that there is no welfare problem (*Broom, 1986*). No matter which production system is considered, welfare of pigs should be improved according to consumer demands and their willingness to pay higher price for products obtained from animals reared in welfare friendly systems (*Borgen and Skarstad, 2007*).

Changes in animal agriculture over the last half of the 20th century have drastically altered farming practices and management. On the large, commercial operations, pigs are primarily confined indoors in industrialized facilities (*HSI, 2014*). Large scale farms with more thousand breeding sows in one location became the dominant production type. Less intensive pig production systems are generally diverse worldwide. So, they differ by pig genotype used, environmental conditions, and other natural resources (food, manipulative materials). Outdoor pig farming is defined as a system that allows the pigs outside access including contact with soil and growing plants in which animals can express their natural behaviour (*Miao et al., 2004*).

Assessment and comparison of welfare of pigs in different production system often use resource-based method described by five freedoms criteria as suggested by *Brambell (1967)*. Another approach to determine welfare of pigs in different systems is to use animal-based indicators, like feeding and housing principles (*Temple et al., 2012*). So, in the further chapters each freedom will be discussed according to different production systems: intensive and alternative, mainly deep litter and outdoor. Of course, between those two main systems is plenty of different systems with some characteristics of the first or the second one. Aim of this paper is to determine the main critical points in welfare of pigs at different production systems.

Freedom from hunger and thirst

Freedom from hunger and thirst should be ensured by providing fresh water and pig category specific diets (*EC Directive, 2001*). Water supply should be ad libitum, and pigs need to feed more than once a day. Appropriate quantity and quality of food are the one of most important conditions for success in any kind of livestock production. In the intensive confined systems, different categories of pigs are fed by complete food mixtures created mainly by professional nutritionist. Sows should be provided with sufficient quantities of high-fibre and high-energy food (*EC Directive, 1991*). Beside positive effect on sows, *Bernardino et al. (2016)* noted that high fibre diets during pregnancy influence on less aggression among piglets prior to weaning.

In less intensive system, quality of food often depends on farmer's knowledge about nutritional needs of pigs. *Luković et al. (2017)* showed that very

small number of pig owners consulting professionals of animal nutrition to prepare diets for their pigs. *Wellbrock (2008)* reports that part-time family farmers provided their pigs with kitchen leftovers, green grass and potatoes, bread and whey, and did not comply with the EU recommended feed compositions. In rough outdoor environment with limited amount of food, malnutrition of pigs is a common case, especially visible in sows as low body condition after lactation (*Luković et al., 2017*). Because of group feeding of all categories, there is no way to feed sows according to body condition.

At all production systems, pigs should need to have constant availability to fresh water. Even a smaller shortage of drinking water can lead to dehydration and for a longer time to reduction of production traits in pigs (*Fraser et al., 1990*). In some outdoor systems, pigs of local breeds kept in the forest during all year used water from the forest's creek passed through. The potential problem of using natural sources of drinking water (creeks, ponds) is freezing during the winter because of extremely low temperatures or extreme droughts in the summer when creeks can dry up (*Luković et al., 2017*). Under these conditions, water should be additionally provided to pigs from other sources (tanks).

Freedom from discomfort

Discomfort can be avoided by assuring adequate environmental conditions. All pigs should have access to clean, dry, and thermally comfortable areas. Comfortable areas for pigs in intensive system are often connected with floor type (*Uremović et al., 2001b*), while poorly maintained or slippery flooring are still common causes of physical injuries (*Kilbride et al., 2008*). Further, young animals are especially sensitive to low temperature, so too cold environment could be cause of high mortality rate in piglets. In fully slatted floor, width of slats and openings need to be in accordance with EU regulation (*EC Directive, 1991*), thus avoiding injuries in pigs.

Outdoor pigs need shelters for protection against sun in the summer months and cold in winter time. Additionally, outdoor pigs showed natural behaviour wallowing in the mud, mainly for cooling, sunburn protection and the removal of ecto-parasites (*Bracke and Spoolder, 2011*). The practice of nose-ringing outdoor pigs has been questioned on ethical grounds, although nose rings are widely used commercially to reduce the pasture damage that is caused by indiscriminate rooting of the paddock (*Edge et al., 2005*). Although, some alternatives to use of nose rings were suggested, the only effective way to reduce pasture damage is to assure enough large area for outdoor pigs and to rotate pastures.

Freedom from pain, injury and diseases

Using of preventive measures, rapid diagnosis and immediate treatments is the best way to ensure freedom from pain, injury and diseases (*Salajpal et al., 2013*). Pig facilities in intensive systems should assure comfortable environment for pigs and freedom from injury of any kind. There is some evidence that leg injuries are more likely to occur on concrete, barren or fully-slatted floors than on straw-bedded, concrete floors (*Scott et al., 2006*).

Pain is mainly related to some procedures, like tail docking, teeth clipping and castration, where it may not be carried out routinely, except castration of male fattening pigs. All interventions should be carried out by trained persons, what is sometimes problem at small units, especially at part-time family farms. In outdoor pigs, of local less productive genotypes, procedures like tail docking and teeth clipping were not used at all (*Luković et al., 2017*). From the point of view of disease in pigs at different production systems, fact is that pigs could get sick from the same diseases regardless production system. In intensive confined systems, there is higher incidence of respiratory and digestive diseases, mainly because overcrowding of facilities and bed environmental conditions (temperature, humidity, gasses). On the other hand, in outdoor systems pigs are at risk from infectious diseases like swine fever, brucellosis, leptospirosis etc. (*Salajpal et al., 2013*). There is also some higher incidence of endo and ecto-parasitism in outdoor pigs in comparison to indoor ones. In study by *Guy et al. (2002)* it was concluded that for the finishing systems used in this study, pig welfare was enhanced in both outdoor paddocks and straw yards compared to fully-slatted pens.

One additional problem of small pig units in relation to farm enterprises is absence of any herd health risk plan what is very important especially in the frame of protection of local pig breeds of small population size (*Luković et al., 2017*).

Freedom to express natural behavior

One of the criteria for assessment of animal welfare is possibility to express natural behaviour (*Špinka, 2009; Kittawornrat and Zimmerman, 2010*). Pigs in intensive production systems don't have possibility to express some form of natural behaviour as pigs reared outdoor. This is obvious that pigs reared in barren industrial environment don't have access to manipulative materials (straw, soil, wood), and foraging or feeding behaviour differs completely in relation to pigs in natural environment. Pigs with straw were more active, spending a large proportion of time manipulating straw, and they don't spend time in behaviour directed at other pigs (*Scott et al., 2006*). *Scott et al. (2007)* also noted that in the absence of

straw, significantly more investigatory behaviours were directed towards pen components, with a similar tendency in behaviours directed at pen-mates.

Lack of space and the artificial group structure of pigs in intensive systems can negatively influence social interactions. Social behaviour related to grouping or mixing of pigs in different production stages is also often disturbed resulting in aggression among animals. To ensure sow welfare, housing design must, at the very least, ensure unimpeded access to necessary resources, opportunity to avoid or escape from potential aggressors, and avoidance of chronic physiological stress (*Weng et al., 1998*). The results indicate that a minimum space of between 2.4 and 3.6 m² per sow was necessary in the conditions of this experiment to promote good welfare.

Provision of sows with nesting material before parturition and potential to show maternal behaviour is one of the key advantages of alternative production systems in comparison to industrial pig farming. The results of *Akos and Bilkei (2004)* indicate that, although an outdoor environment may better satisfy the ethological needs of the animals, indoor production systems allow the breeding female a longer life and higher production level. Continental climate with high temperature fluctuations may present a risk factor for successful low-investment outdoor sow systems (*Uremović et al., 2003*).

Freedom from fear and distress

To prevent fear and distress, any conditions which may cause mental suffering should be avoided (*EC Directive, 2001*). All procedures with piglets should be applied by trained persons with aim to reduce stress as much as possible. In intensive production systems pigs are moved from one to another place several times during lifetime, and this movement could be important source of stress, especially in time of weaning (*Sutherland et al., 2014*). Weaning time is probably one of the most critical period in life of piglets because of more stressors at the same time, including handling at loading and unloading, mixing with unfamiliar pigs, feed and water withdrawal, exposure to a new environment, vibrations and noise, etc. Lactation length is usually longer in outdoor production system than in intensive systems, but prolonged lactation in some cases is unfavourable from sow's welfare point of view. This is obvious in group feeding of pigs, where sows after two months of lactation have a serious problem with body condition, and subsequent return to oestrus (*Luković et al., 2017*).

One potentially new welfare problem should be discussed considering highly productive sows, where high level of production, i.e. litter size could be also stress for sow and piglets (*Baxter et al., 2013*). Welfare issues related to litter size in pigs are complex, affecting sows and piglets. Management interventions that are

used when litter size routinely exceeds the ability of individual sows to successfully rear all the piglets could be additional triggers of stress, and consequently triggers of reduced welfare.

Conclusions

There is a plenty of room to improve pig welfare in both, intensive and alternative production systems. Criteria of welfare defined as five freedoms indicate critical points in all pig categories. Although, alternative production systems assure better welfare of pigs related to freedom to express natural behaviour, there are still many problems in welfare of all categories of pigs. Malnutrition of different categories of pigs and exposure to parasites and infectious diseases are the most common reasons for concern about outdoor pig production systems. Further education of the farmers at large and especially small family farms is necessary to improve welfare of pigs.

Dobrobit svinja u različitim proizvodnim sistemima

Zoran Luković, Dubravko Škorput, Danijel Karolyi

Rezime

Dobrobit životinja je sve veći interes širom sveta. Uzgajanje svinja je jedan od najintenzivnijih sistema stočarske proizvodnje. Svinje su veoma prilagodljive životinje i mogu se odgajati u različitim proizvodnim sistemima. U mnogim zemljama u regionu svinje se još uvek gaje u tri proizvodna sistema: poljoprivredna preduzeća, porodične farme sa punim radnim vremenom i porodične farme sa delimičnim radnim vremenom. U intenzivnim proizvodnim sistemima svinje se smeštaju uglavnom u zatvorenom prostoru, dok se svinje u manje intenzivnim sistemima često mogu naći u otvorenom ili poluotvorenom okruženju. Uzgoj svinja u prirodnom okruženju omogućava proučavanje prirodnog ponašanja svinja, kao jedan od najvažnijih kriterijuma za procenu dobrobiti životinja. Iako se uopšteno smatra da svinje na otvorenom imaju manje problema sa dobrobiti, potrebno je razmotriti neke kritične tačke. Neuhranjenost različitih kategorija svinja i izloženost parazitima i zaraznim bolestima su najčešći razlozi za zabrinutost oko sistema za proizvodnju svinja na otvorenom. Prema principima pet sloboda, razmatraće se razlike između različitih proizvodnih sistema i istaknuće se razlike u odnosu na resurse preporučene EU.

Ključne reči: svinje, dobrobit, pet sloboda, proizvodni sistemi

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