12. Outdoor housing systems for Bísaro pig breed with a hoop barn: some effects on welfare

J.P. Araújo[1], *I. Amorim[2,3]*, *J. Santos Silva[4]*, *P. Pires[5]* and *J. Cerqueira[2]*
[1]*Mountain Research Centre, ESA-IPVC, Portugal;* [2]*Agrarian High School of Ponte de Lima, Polytechnic Institute of Viana do Castelo, 4990-706, Ponte de Lima, Portugal;* [3]*Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto;* [4]*Ministry of Agriculture and Rural Development (Portugal), Guimarães, Portugal.* [5]*Technology and Management High School, Polytechnic Institute of Viana do Castelo, Portugal; pedropi@esa.ipvc.pt*

Abstract

A growing interest has been shown in outdoor swine production systems due to the lower initial investment cost (facilities, buildings and equipment's). Simultaneously, concerns with animal welfare and awareness of niche marketing opportunities have increased the interest in the production of free-range animals. The Bísaro pig production in the northern region of Portugal has mainly adopted the traditional system rather than alternative outdoor systems. Facilities and accommodation factors influence both the environment and animal welfare and growth performance, making this issue a key point for efficient management, quality and food safety. The aim of the ongoing study presented in this paper is to test and to demonstrate an alternative building system for fattening Bísaro pigs (hoop barn with free access to open air) respecting good production practices and animal welfare. A total of 30 pigs of the Portuguese breed Bísaro, aged 3 months old, were equally distributed in number and gender in three batches, placed on a hoop barn with dimensions of 3 m^2/animal indoor and 200 m^2/animal outdoor (free access). Each animal has 30 cm of manger available and each batch has three fresh watering points. All the animals have been bimonthly evaluated according to the protocol assessment of Welfare Quality available for pigs, regarding the following parameters: (1) comfort around resting (manure on the body); (2) good health (absence/presence of injuries); (3) appropriate behaviour (fear of humans). Remarkably, to date almost the total of the animals regardless the batch in which they are included, presented no significant alterations in the first two measures exhibiting excellent scores values. Minor differences have been noticed in the animal's interaction with humans, intra-and inter-batches.

Keywords: pig, Bísaro breed, alternative production system, hoop barn, animal welfare

Introduction

Animal and environmental care, health, product safety and consumer acceptance are important factors for the assessment of pig housing (Von-Borell *et al.*, 2011). Alternative housing systems such as outdoor housing and application of environmental enrichment have gained interest (Millet *et al.*, 2005), and generally improve welfare by providing the opportunity to express species-specific and natural behaviour and engaging interaction with conspecifics (social behaviour). However, by permitting a wider range of behaviour, this kind of facilities might lead to other welfare problems mainly related to health (Barnett *et al.*, 1990) One alternative swine production system is deep-bedded hoop barns or hoops. Previous studies showed that pigs' growth performance is similar in hoops or confinement (Honeyman and Harmon, 2003).

The Bísaro breed is well adapted to the northern Iberian climate and environment. It was the most important swine breed of the north of Portugal until the middle of the 20th century. This breed was discovered on the brink of extinction in the beginning of 1990 and it has been preserved in small family farms where the animals are self-sufficient (Santos Silva and Tirapicos Nunes, 2013). Since

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1995, a conservation program has been developed. Currently, there are approximately 3,962 (year 2014) registered Bísaro sows in the herd book (ANCSUB, 2016), which are raised in traditional family farms (50%) and kept in semi-intensive outdoors systems or semi-extensively sufficient (Santos Silva and Tirapicos Nunes, 2013), on farms with an average of 30 sows (ANCSUB, 2016). The high prolificacy of this breed, the facility in raising the piglets and the quality of the meat provided are the main reasons for Bísaro breed conservation. The gentle character of these animals and their great ability to adapt to the traditional operating systems are also relevant factors. Bísaro meat allow the production of a great diversity of regional products, which in the current context of specific quality products, still have a market (niche) to explore displaying an important economic value sufficient (Santos Silva and Tirapicos Nunes, 2013).

The Bísaro pig production in the northern region of Portugal has mainly adopted the traditional system rather than alternative outdoor systems The main weaknesses of this system is related with the very small dimensions of the pig farms and with the buildings and animal facilities that are rudimentary, poorly dimensioned, which is problematic in terms of productivity, animal welfare and food safety sufficient (Santos Silva and Tirapicos Nunes, 2013). The accommodations used in the traditional system are very different and must be adapted (location, dimensions and materials) to the needs of the animals, according to physiological, geographical and environmental conditions of each region. Thus, a growing interest has been shown in outdoor swine production systems due to the lower initial investment cost (facilities, buildings and equipment's).

This work aims to demonstrate an alternative (sustainable) building and accommodation system for fattening Bísaro pigs (hoop barn with free access to open air) respecting good production practices and animal welfare.

Material and methods

A total of 30 pigs of the Portuguese Bísaro breed, aged 3 months old, arrived in November 2015 to Agrarian High School of the IPVC and were equally divided in number and gender in three batches, placed in a hoop barn with dimensions of 3 m^2/animal indoor and 200 m^2/animal outdoor (free access) (Figure 1). Each animal has 30 cm of manger available and each batch has three fresh watering points.

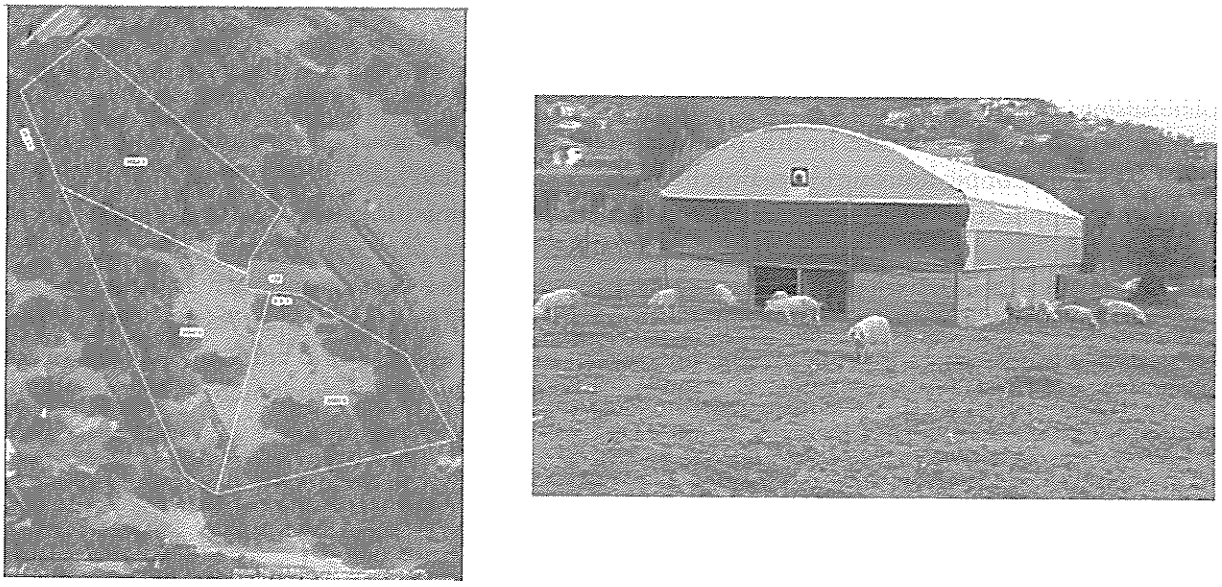

Figure 1. Hoop barn with outdoor access.

For the welfare assessment reported here, all the animals were bimonthly evaluated by two observers regarding 3 of the 12 parameters stated in the protocol of Welfare Quality® Assessment for pigs (Welfare Quality, 2009) (Table 1). Human animal relationship was assessed by entering the pens, walking around the group slowly until returning to the starting point and waiting for 30 s before again walking around slowly in the opposite direction. The animals' response to the presence of the assessor was registered.

Results and discussion

Concern with animal welfare and awareness of niche marketing opportunities have increased the interest in free range and other alternative production systems with outdoor access. In this study we report initial results of an animal-based welfare assessment of pigs kept in a hoop barn with free outdoor access. The welfare assessment method follows the approach defined in the Welfare Quality project, giving preference for animal-based measures (Czycholl *et al.*, 2015). Following this approach, the amount of manure on the body is used as an indicator of comfort during rest (Otten *et al.*, 2013; Temple *et al.*, 2011a). For this parameter, the three batches of pigs in the present study presented similar results with the majority of pigs showing signs of good welfare quality and achieving a null score (100%) (Figure 2). Differences in this measure has previously been found between pigs housed in a conventional indoor system in two different farms, where differences were attributed to higher temperatures at the farm with the highest score (dirtier pigs) (Renggaman *et al.*, 2015). In our study, all the batches were subjected to the same physical conditions of space and temperature, and the animals could choose freely between being inside the barn or in the outside area.

Health is an important aspect of animal welfare and must be appropriately considered (Broom, 2006). In terms of absence of injuries, all the animals were classified with score 0. Up to date, with exception of a unique successfully treated parasitic outbreak caused by *Ascaris suum*, no signs of disease were detected in any of the batches.

Table 1. Criteria and scoring scale for the evaluation of housing, health and appropriate behaviour.[1]

Main principles	Welfare criteria	Measures/ animal-based measures	Score	Description
Good housing	comfort around resting	manure on the body	0	Less than 20% of the body surface is soiled
			1	More than 20% but less than50% of the body surface is soiled
			2	Over 50% of the body surface is soiled
Good health	absence of injuries	wounds on body	0	If all regions of the body have up to 4 lesions
			1	When 5 to10 lesions are observed on up to 5 zones of the animal or one zone has from 11 to 15 lesions
			2	When more than 10 lesions are observed on at least 2 zones of the body, or if any zone has more than15 lesions
Appropriate behaviour	good human-animal relationship	human animal relationship	0	Up to 60% of the pigs show a panic response
			2	More than 60% of the animals show panic responses

[1] Each animal was evaluated only from one side since it is reported that the amount of lesions and dirtiness scored on the right and left side of the animal do not differ statistically (Courboulay and Foubert, 2007).

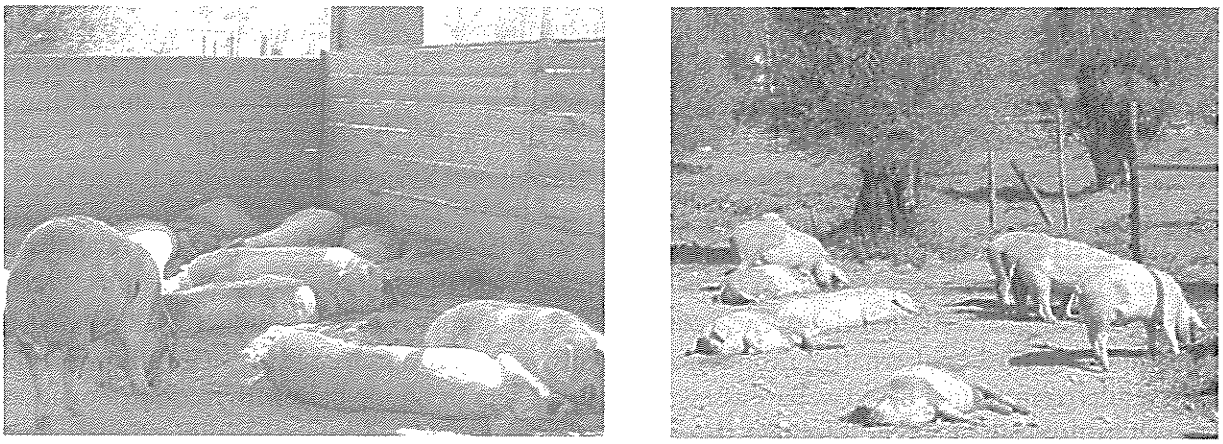

Figure 2. Manure on the body at different evaluation time points.

The human-animal relationship is very important and influences both animal production and welfare (Waiblinger *et al.*, 2006). Fear of humans is a direct reflection of how the pigs are handled. Other factors may also influence such as age, genetic background and space allowance (Temple *et al.*, 2011b); however in the present study these factors were constant. Our results clearly contrast with others (Renggaman *et al.*, 2015) that reported panic responses in pigs in a conventional indoor system in animals with different growing ages and space allowances. In a study of intensively and extensively housed Iberian pigs, the proportion of panic responses was higher in the latter (Temple *et al.*, 2011a). A possible explanation may be that in extensive systems, animals have fewer human contacts often experience human contact primarily in disturbing situations (Turner and Dwyer, 2007), resulting in animals being more fearful to the human presence. Fear is considered as a major welfare problem and the sudden, intense or prolonged elicitation of fear can seriously influence product quality (Waiblinger *et al.*, 2006). The quality of stockmanship is the main determinant of a good or bad human-animal relationship (Waiblinger and Spoolder, 2007). Remarkably, in the present study all the animals were scored with 0 regarding human animal interaction and more specifically, about 70% of the total animals showed no panic attitude towards the observer but instead approached with immense curiosity. These pigs received a daily food supplementation provided manually by the same technician. Pigs associate a rewarding experience of feeding with the handler and this will result in being less fearful of the handler and also of other humans (Hemsworth *et al.*, 1996). Animals that routinely receive frequent human contact are more able to ignore the stimulus person (Waiblinger *et al.*, 2006) while animals that receive less direct contact, such as extensively reared pigs, are more likely to show a clear response to the assessor presence. Most of the animals of the three batches show positive social behaviours such as sniffing, nosing, liking or even following the assessor. Interestingly, when the usual assessor was replaced by a person who was unfamiliar to the pigs, only 50% of the animals in each batch approached without any hesitation. The degree of curiosity of the animals can also affect the animals 'responses to people (De Passillé and Rushen, 2005).

The measures reported in this study correspond only to a part of a complete welfare assessment, but they all indicate high levels of animal welfare in this production system. This suggests that the system can be a viable solution that will enable sustainable development of high quality Bísaro products (regional, traditional and gourmet).

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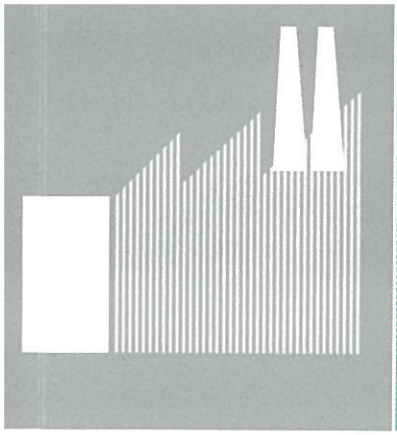
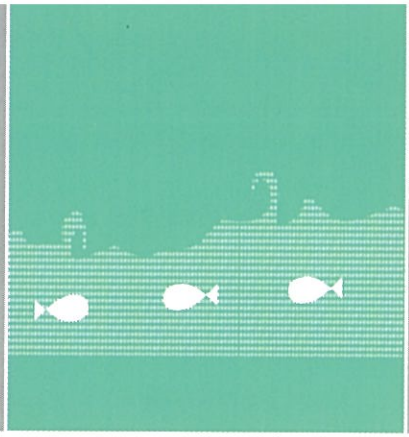
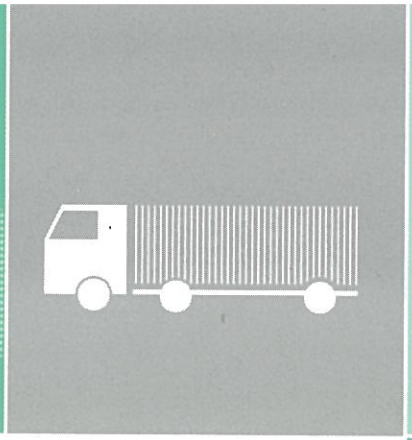
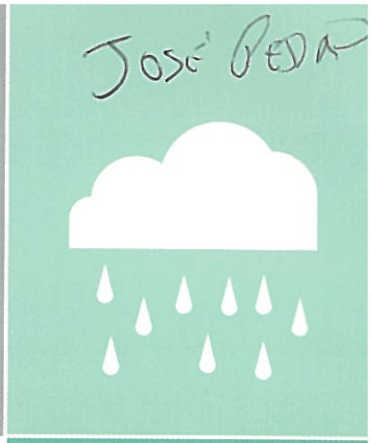

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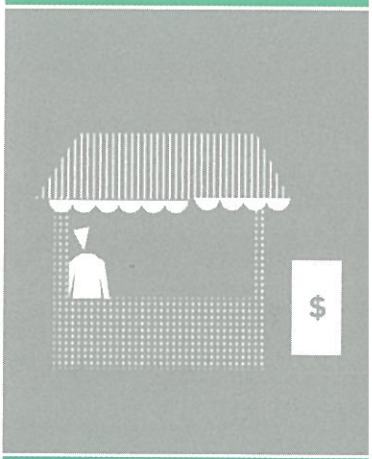

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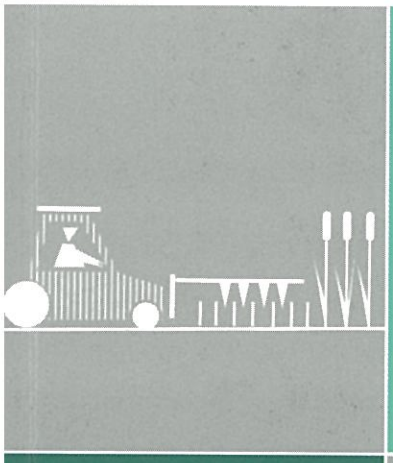
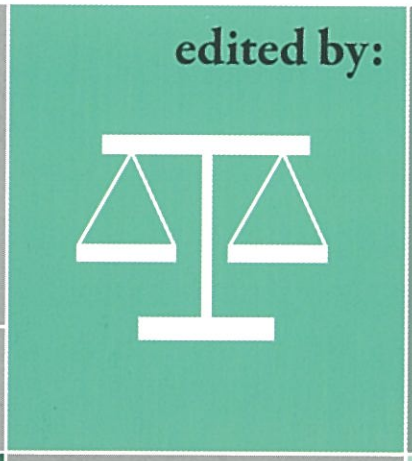
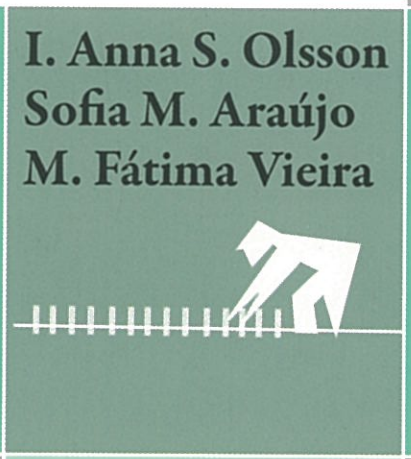
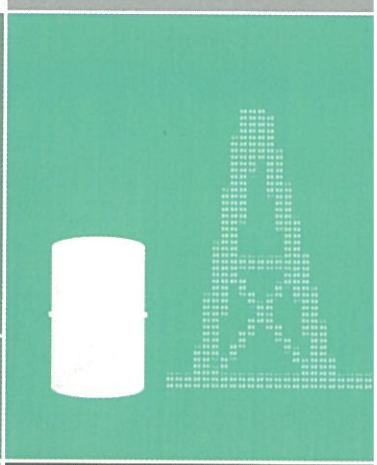



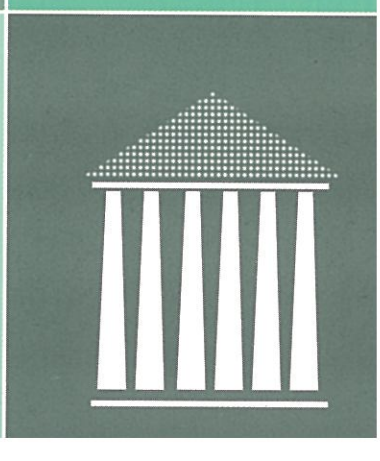

Food is at the centre of human existence. We eat every day, not only to satisfy our physical needs but also as part of cultural and social interaction. Food choices and markets shape the agricultural landscape and the cities we live in. Whereas what we choose to eat and feed our family is part of who we are, a growing number of actors compete to influence our food habits, through marketing strategies and nutritional advice. And ethical considerations are coupled with every choice over food – whether related to production, distribution, consumption, food waste, policy in general, marketing or advice.

Given the variety of implications the 'food problem' entails, the construction of an inclusive society must redirect the concerns about food in the present to the imagination of future alternatives. The search for innovative solutions calls for multidisciplinary critical enquiry – and utopian thinking will be instrumental in that regard.

This book brings together work by scholars in a wide range of disciplines addressing many different topics related to food futures. Topics covered include food and literature, food waste, food communication, food policy, corporate social responsibility and public procurement in food supply, responsible research and innovation in food production as well as sustainability and animal ethics and welfare.

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