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# Achieving sustainable production of pig meat

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# Pasture systems for pigs

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## 1 Introduction

Markets, through consumers, lead food demand and influence the definition and design of the agriculture production systems (McGlone 2013). Improved access to transparent and up-to-date information and increased purchasing power contribute to consumers making more selective purchasing decisions, demanding safe and high-quality farm products while giving considerations to animal welfare and environmental stewardship in the production process.

Pastured pork represents a buying alternative to consumers seeking products generated in systems perceived as more environmentally and animal welfare friendly than those from confinement production systems. Surveys designed to determine customer criteria leading to buying selection indicated that pig living conditions, especially those that offered access to pasture, were a determining criterion in buying at premium prices often twice the commodity price (Norwood and Lusk 2011).

Pasture-based pig production systems have the potentiality to differentiate their products, opening the door to the creation of niche markets (Barlocco 2005; Grosso et al. 2011). Breeds or genotypes, meat taste, quality and freshness, family-farm raised, locally

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raised, natural or humane are some of the attributes stated by the participants of the pastured pork supply chain (Honeyman 2004).

This chapter summarizes information related to pasture pig production systems and describes the pasture pig system developed at the Center for Environmental Farming Systems (CEFS), Goldsboro, North Carolina.

## 2 Characteristics of pasture pig systems

In pasture production systems, pigs are kept on paddocks where they can forage, have access to water, receive supplemental feed and are provided with shelter (Miao, Glatz and Ru 2004). In these systems maintaining soil vegetative cover is a primary objective. Pigs on pasture have the opportunity to express their natural behaviour such as exploring their surroundings, socializing, grazing, rooting (Bonde and Sørensen 2004; Laister and Konrad 2005) and allowing for better animal welfare (Barlocco 2005; Laister and Konrad 2005; Lindgren et al. 2014). Pasture pigs have access to diverse feed resources: grasses, legumes, herbs, roots, tubers, fruits, mast crops and small animals including invertebrates, reptiles, mammals and birds that contribute to their diet (Edwards 2003; Rodriguez-Estevéz et al. 2009c). The use of electric fences, portable shelters and equipment facilitate the implementation of modern practices and technologies, and have contributed to the renewed interest that farmers are showing to these production systems. Outdoor systems have provided performance indicators similar to those obtained indoor (Gentry et al. 2004; Miao, Glatz and Ru 2004), and up to 50% reductions in production costs (Grosso et al. 2011).

Pigs on pasture are exposed to environmental conditions that could cause thermal stress, either by excessive cold or by heat, and have a broader range of activity than indoor pigs, and those could be reflected in increased (+8 to +15%) maintenance energy requirements (Edwards 2003; Stern and Andresen 2003) and poorer feed conversion (Edwards 2005; Kongsted et al. 2015). In that sense, Edwards (2003) indicated that for certain northern European countries, feed allowance for outdoor pigs could be increased by up to 15% of those for indoor-raised pigs to counteract the effects of higher nutritional needs.

Health and welfare of pigs on pasture are under pressure by the potential exposition to weather conditions, predators, wild animals, parasites and pathogens (Hovi, Sundrum and Thamsborg 2003; Heyer, Andersson and Lundström 2006; Roepstorff et al. 2011; Lindgren et al. 2014). Special attention should be devoted to rats and mice control, as these frequent visitors to pasture pig systems could be important reservoirs of pathogens such as *Salmonella*, *Leptospira*, *Yersinia*, *Brucella suis*, *Erysipelothrix rhusiopathiae* and *Brachyspira hyodysenteriae* (Bonde and Sørensen 2004). Nevertheless, higher health status (fewer respiratory problems, skin lesions including abscesses and hernias, tail wounds, lesser incidence of stomach ulceration and body injuries, lower veterinary and medicine costs) has been associated with outdoor pigs (Guy et al. 2002b; Edwards 2005; Lindgren et al. 2014). Furthermore, gestating sows kept indoor had, respectively, higher skin temperature (32.1 vs 30.8°C) and respiratory frequency (31.04 vs 26.07 mov/min) than those kept on pasture; pasture pig experienced better thermal conditions and consequently lower heat stress (Nazareno et al. 2012). Outdoor sows showed lower risk of lameness than indoor sows (Knäuper-Rasmussen et al. 2014).

Success in sustainable farming depends on the appropriate selection of the animal to be managed on pasture (Hilimire 2011). Choosing the best animal for pasture pig systems

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