The welfare implications of large litter size in the domestic pig I: biological factors

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Abstract

Increasing litter size has long been a goal of pig breeders and producers, and may have implications for pig (Sus scrofa domesticus) welfare. This paper reviews the scientific evidence on biological factors affecting sow and piglet welfare in relation to large litter size. It is concluded that, in a number of ways, large litter size is a risk factor for decreased animal welfare in pig production. Increased litter size is associated with increased piglet mortality, which is likely to be associated with significant negative animal welfare impacts. In surviving piglets, many of the causes of mortality can also occur in non-lethal forms that cause suffering. Intense teat competition may increase the likelihood that some piglets do not gain adequate access to milk, causing starvation in the short term and possibly long-term detriments to health. Also, increased litter size leads to more piglets with low birth weight which is associated with a variety of negative long-term effects. Finally, increased production pressure placed on sows bearing large litters may produce health and welfare concerns for the sow. However, possible biological approaches to mitigating health and welfare issues associated with large litters are being implemented. An important mitigation strategy is genetic selection encompassing traits that promote piglet survival, vitality and growth. Sow nutrition and the minimisation of stress during gestation could also contribute to improving outcomes in terms of piglet welfare. Awareness of the possible negative welfare consequences of large litter size in pigs should lead to further active measures being taken to mitigate the mentioned effects.

Keywords: animal welfare, birth weight, litter size, mortality, piglet, sow

Introduction

Following the initial domestication of the wild boar about 10,000 years ago (Larson et al 2011), humans began selecting for particular traits in pigs (Sus scrofa domesticus) creating a range of domestic breeds with different physical, behavioural, physiological and reproductive characteristics. In the last century, as knowledge about the principles of inheritance increased, the process of selection in pigs has been conducted in a more systematic fashion. Selection was initially focused on physical appearance but, from the 1950s onwards, production traits were increasingly used (Dekkers et al 2011). Initially, major progress was seen in carcase traits and growth rate while reproductive output showed little gain. As a consequence, over most of the history of pig production, litter size changed relatively little. However, as pig production further increased in intensity, improvements in litter size were achieved through better management and nutrition and, more recently, through effective implementation of genetic selection for litter size.

The pig industry is subject to numerous drivers, but ultimately its aim is to produce a quality product at a competitive price and in a socially acceptable way (Webb 1998; Spötter & Distl 2006). The drive for increased litter size is a consequence of the desire to improve production efficiency by increasing the number of slaughter animals produced per sow. This maximises financial gains and also reduces the environmental impact (per kg of product) of pork production. However, concern has been expressed that increasing litter size may be detrimental to animal welfare (Prunier et al 2010).

This paper aims to provide an overview of the main welfare concerns for piglets and sows resulting from biological factors associated with large litter size. The welfare concerns discussed include the association between large...