Application of the Welfare Quality® animal welfare assessment system in Finnish pig production, part II: Associations between animal-based and environmental measures of welfare

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Abstract

This study aimed to establish associations between the environment and animal-based measures of welfare collected on 158 Finnish farms according to the Welfare Quality® systems for pigs. The data consisted of 95 welfare assessments in fattening pigs and 103 in sows, including suckling piglets. Principal Component Analysis had previously been applied to animal-based welfare measures (ABWM) and to the 20 descriptors of QBA to identify distinct types of welfare problems (WPT) and mood (MT), respectively. Generalised linear modeling was used to investigate environmental (space allowance, group size, feeding arrangement, floor type and use of enrichment or bedding) effects on WPT and MT scores. Those ABWMs not contributing to the major WPTs, but occurring on more than 40% of the farms, were considered important and used as outcome variables as well. The most important environmental determinants of pig welfare were space allowance for fattening pigs, group size in gestation and in the use of bedding for both fattening pigs and gestating sows. Bedding decreased tail biting and signs of fighting when used as a fairly thick layer for fattening pigs. In sows, the benefits of bedding, including less frustration and bursitis, required a smaller amount of material than in fattening pigs. An increasing space allowance was advantageous for fattening pigs, although signs of fighting increased in very spacious bedded pens. The positive effects of space, including a decrease of tail lesions and a more positive mood continued at least up to 1.5 m² per fattening pig. Signs of resource shortage in sows increased with a growing group size according to a steepening curve.

Keywords: animal-based welfare measures, animal welfare, environmental welfare measures, pig, Principal Component Analysis, Welfare Quality®

Introduction

Increasing consumer awareness of food animal welfare has augmented the need for feasible assessment tools. The main focus for welfare assessment — the animal or its environment — has been subject to much debate. The earliest instruments, such as the ANI (TGI) 35L (Bartussek 1999) emphasised the latter heavily. This input-based approach has been criticised by, eg Whay and others (2003), pointing out the superiority of animal-based or output indicators as sensitive descriptors of the actual status of an individual.

At present, features of the environment and management are reassigned a role as risk factors or welfare hazards (AHAW 2012). Modern, scientifically based, on-farm welfare assessment systems, such as the Welfare Quality® (Welfare Quality® [WQ] 2009), focus heavily on outcomes. The systems do, for example, apply a method called Qualitative Behavioural Assessment (QBA) allowing the observer to subjectively describe the ‘body language’ of pigs according to pre-defined descriptors or expressive qualities (Wemelsfelder et al 2000; Wemelsfelder & Millard 2009).

Animal-based measures are, however, not without downsides. They require time-consuming data collection, interpretation may be difficult and generalisability of the results uncertain (Johnsen et al 2001). Validity and sensitivity issues of the WQ systems for cattle have been communicated by Knierim and Winckler (2009).

The EU Scientific Panel on Animal Health and Welfare (AHAW) has put forward a method addressing the feasibility issues of outcome measures by grouping them into ‘toolboxes’ or shortlists (AHAW 2012). Appropriate toolboxes are chosen in any given situation based on factors such as identified environmental hazards, the purpose of the welfare assessment and/or financial constraints. This approach resembles the ideas of Bracke (2007), suggesting an interplay between input and output measures, where the latter are used as critical control points verifying the predictions being made by the former.

The process of building comprehensive toolboxes requires thorough knowledge about the associations between animal-based welfare measures, environmental and other