Application of the Welfare Quality® animal welfare assessment system in Finnish pig production, part I: Identification of principal components

C Munsterhjelm*, M Heinonen and A Valros

Department of Production Animal Medicine, PB 57, FiN-00014 University of Helsinki, Finland

* Contact for correspondence and requests for reprints: camilla.munsterhjelm@helsinki.fi

Abstract

The Welfare Quality® (WQ) on-farm welfare assessment protocols for fattening pigs (n = 95 farms) and sows, as well as suckling piglets (n = 103 farms), were applied on Finnish farms. In order to identify distinct types of welfare problems (WPTs) Principal Component Analysis (PCA) was applied to the pooled animal-based items within both categories of animals. Measures describing suckling piglets did not contribute to the WPTs. The main WPTs (seemingly) reflected fighting in fattening pigs and lack of bedding in both fattening pigs and sows. The results imply that WQ includes biologically plausible shortlists of animal-based measures with decent to good internal consistency describing distinct types of welfare problems in growing pigs and in sows. The 20 descriptors of Qualitative Behaviour Assessment were analysed similarly to identify distinct mood types, which were named active positive, passive positive and passive positive behaviours. The different mood types had close to identical build-up in both fattening pigs and in sows and suckling piglets.

Keywords: animal welfare, growing pig, internal consistency, Principal Component Analysis, sow, Welfare Quality®

Introduction

The increasing public interest in food animal welfare has augmented the need for valid, reliable and feasible assessment tools for on-farm use. The most comprehensive contribution in this field is the Welfare Quality® system (WQ), developed by a research collaboration in 2004–2009 within the 6th EU Framework programme. Aims of the project were to develop scientifically based, standardised ways of measuring animal welfare and, at the same time, produce information useful both for the consumer and for animal unit managers (Blokhuis et al 2003). The WQ systems rely on animal-based attributes and include assessments of behaviour, one of which is Qualitative Behaviour Assessment (QBA), a method estimating emotional state by allowing the observer to subjectively describe the ‘body language’ of animals according to pre-defined descriptors or expressive qualities (Wemelsfelder et al 2000; Wemelsfelder & Millard 2009). For pigs, protocols exist for growing pigs and for sows in all production stages, including suckling piglets (Welfare Quality® 2009).

To date, the application of the WQ systems has been limited for other than research purposes. Time-consuming and thus costly data collection is probably the most important cause, however, some reliability and validity issues have also been raised (Knierim & Winckler 2009). To address feasibility issues and produce methods for a broad range of different purposes, the European Food Safety Authority Panel on Animal Health and Welfare (AHAW) put forward a novel approach in on-farm welfare assessment methodology in 2012 (AHAW 2012). The idea is based on ‘toolboxes’ or collections of animal-based welfare measures. The tools in the boxes are animal-based measures or shortlists thereof, each of which are intended to be applied for specific purposes or situations. A specific aim could, for example, be to evaluate actual effects of a known environmental hazard, such as low space allowance or lack of enrichment on a farm with growing pigs. In the example cases the assessments would concentrate on the types of welfare problems known to be caused by crowding and by barren surroundings. The toolbox approach may originate from 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 WQ systems may be used both for standardised data collection (Forkman & Keeling 2009) during the process of toolbox building as well as a source of candidate attributes for inclusion in the toolboxes. Numerous ongoing research projects serve to accumulate data, and knowledge on validity and reliability exists for most of the measures (Forkman & Keeling 2009). Being comprehensive collections of animal-based welfare measures, the WQ systems can be hypothesised to contain information about distinct dimensions or types of animal welfare problems. Identified welfare problem types (WPTs) have the form of shortlists of attributes measuring a common phenomenon, which in psychometrics are referred to as scales. The degree to which the attributes in a scale measure the underlying phenomenon can be evaluated by calculating Cronbach’s alpha (Cronbach 1951). These shortlists are possible tools in the AHAW toolboxes.