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Trained-user opinion about Welfare Quality measures and integrated scoring of dairy cattle welfare

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ABSTRACT

The Welfare Quality (WQ) protocol for on-farm dairy cattle welfare assessment describes 27 measures and a stepwise method for integrating values for these measures into 11 criteria scores, grouped further into 4 principle scores and finally into an overall welfare categorization with 4 levels. We conducted an online survey to examine whether trained users' opinions of the WQ protocol for dairy cattle correspond with the integrated scores (criteria, principles, and overall categorization) calculated according to the WQ protocol. First, the trained users' scores ($n = 8-15$) for reliability and validity and their ranking of the importance of all measures for herd welfare were compared with the degree of actual effect of these measures on the WQ integrated scores. Logistic regression was applied to identify the measures that affected the WQ overall welfare categorization into the "not classified" or "enhanced" categories for a database of 491 European herds. The smallest multivariate model maintaining the highest percentage of both sensitivity and specificity for the "enhanced" category contained 6 measures, whereas the model for "not classified" contained 4 measures. Some of the measures that were ranked as least important by trained users (e.g., measures relating to drinkers) had the highest influence on the WQ overall welfare categorization. Conversely, measures rated as most important by the trained users (e.g., lameness and mortality) had

a lower effect on the WQ overall category. In addition, trained users were asked to allocate criterion and overall welfare scores to 7 focal herds selected from the database ($n = 491$ herds). Data on all WQ measures for these focal herds relative to all other herds in the database were provided. The degree to which expert scores corresponded to each other, the systematic difference, and the correspondence between median trained-user opinion and the WQ criterion scores were then tested. The level of correspondence between expert scoring and WQ scoring for 6 of the 12 criteria and for the overall welfare score was low. The WQ scores of the protocol for dairy cattle thus lacked correspondence with trained users on the importance of several welfare measures.

Key words: animal welfare, welfare assessment, trained-user opinion, Welfare Quality

INTRODUCTION

Assessing animal welfare is a highly complex task. Animal welfare is a multidimensional concept that calls for a multicriteria assessment using a multitude of welfare indicators (Mason and Mendl, 1993; Fraser et al., 1997). To express the overall welfare status of a group of farm animals in a single score or index, indicator data should be integrated, which requires interpretation and balancing. No standardized and commonly agreed-on method for assessing the overall welfare status of a group of farm animals exists (i.e., there is no gold standard), which implies that some degree of subjectivity is inevitable when weighting different measures (Spooler et al., 2003). To be widely accepted, an overall welfare index ought to correspond

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with society's concept of animal welfare and with the opinion of experts (i.e., people who are seen by society to have adequate knowledge and expertise about animal welfare). However, opinions on the concept of animal welfare may differ between and even within experts and society. For example, producers tend to highlight basic health and functioning of farm animals, whereas nonproducers tend to emphasize farm animals' need for a natural living environment (reviewed by Sørensen and Fraser, 2010). It can be argued that it is too difficult for people without expertise in dairy cattle welfare and the specific welfare measures involved to adequately balance the importance of different welfare measures. It has been shown that providing detailed information about on-farm collection methods of welfare measures significantly influences the relative weights they are given by experts (Rodenburg et al., 2008). Therefore, the current study elicited experienced animal scientists on only the specific welfare measures involved.

To date, the Welfare Quality (WQ) protocols are most likely the most renowned and comprehensive method for overall welfare assessment of different farm animal species (chickens, pigs, and cattle; Welfare Quality Consortium, 2009). Unlike some other welfare assessment protocols, WQ relies predominantly on animal-based measures. Resource-based and management-based measures, in contrast, mostly reflect risk factors for welfare impairments instead of directly measuring welfare (Blokhuis et al., 2003, 2010). The WQ protocols are based on 4 main welfare principles (good feeding, good housing, good health, and appropriate behavior), which are split into 12 independent welfare criteria (Table 1). Various welfare measures ($n = 27$ for dairy cows) were selected by animal scientist to assess these welfare criteria based on validity, reliability, and feasibility of performing the measure on farm. The WQ protocol describes 3 steps for integrating these welfare

measures into an overall final welfare category. Methods of integration aim to be widely acceptable by society and therefore are based on expert opinion of social and animal scientists and stakeholders (Botreau et al., 2007), depending on the integration step. For interpretation of measures into criteria scores, animal scientists ($n = 6$) who were involved in the choice and development of the WQ measures were consulted (Botreau et al., 2008). They were asked to score several situations per criterion that could occur on farm. For example, for integument alterations within the criterion "absence of injuries," experts were asked to score 11 hypothetical farms with varying prevalence of hairless patches, wounds, and swellings. Calculation of criterion scores is based on expert scoring. Social scientists were also involved for aggregation from criteria to principle scores using a similar approach. For the final step, several scenarios for reference profiles were developed to aggregate principle scores into an overall category. First, these scenarios were tested for 69 European dairy farms (Austrian, German, and Italian) to compare their ability to discriminate between farms. Second, stakeholders were consulted to assess which scenario was most appropriate. Third, the degree to which each scenario matched with the general impression of observers for 44/69 dairy farms was assessed. The 4 overall categories (excellent, enhanced, acceptable, or not classified; Welfare Quality Consortium, 2009) were constructed to reflect both the multidimensional nature of welfare and the relative importance of the various welfare measures using mathematical operators that limit the amount of compensation that may occur between welfare measures (i.e., when a combination of positive scores compensates for 1 negative score; Botreau et al., 2009).

Recent critical evaluations of the WQ integration methods indicate that in the dairy cattle protocol a few resource-based measures appear to have a dispro-

Table 1. Principles, the corresponding criteria, and measures used in the Welfare Quality assessment protocol for dairy cows

Principle	Criterion	Measure
Good feeding	Absence of prolonged hunger	BCS (percentage very lean animals)
	Absence of prolonged thirst	Availability and cleanliness of water
Good housing	Comfort around resting	Lying duration, collisions during lying down, on edge or outside of lying area, cleanliness
	Thermal comfort	No measure for dairy cattle
	Ease of movement	Free stalls or presence of tethering and exercise
Good health	Absence of injuries	Lameness, integument alterations
	Absence of disease	Respiration or digestive diseases, mastitis, mortality, dystocia, downer cows
	Absence of pain induced by management procedures	Mutilations (dehorning, tail docking, use of anesthetics or analgesics)
Appropriate behavior	Expression of social behavior	Incidence of agonistic interactions
	Expression of other behaviors	Access to pasture
	Good human-animal relationship	Avoidance distance at feeding place
	Positive emotional state	Qualitative behavioral assessment

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