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ANIMAL WELFARE AS A PILLAR OF A SUSTAINABLE FARM ANIMAL PRODUCTION

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ABSTRACT

Despite research and legislation carried out in the last decades, we are still in progress to fulfil the public concerns about the definition of sustainable production standards as regards the welfare of farm animals. The assessment of animal welfare on-farm is nowadays one of the outstanding issues for several reasons: 1) identify risk factors still present at the farm level for livestock welfare, 2) find solutions to overcome welfare problems, 3) define minimum requirements for all the farm animals species and categories or refine the exiting recommendations, 4) create certification schemes for labelling welfare friendly farm animal products. Ideally a standardized welfare assessment protocol should be based on a multidisciplinary approach but, for feasibility reasons, most of the proposed monitoring schemes have been based mainly on the evaluation of farm housing and facilities. The Welfare Quality® research consortium is currently working on a new assessment tool largely based on valid and reliable measures recorded by clinical and behavioural observation of the animals. Differing from the existing protocols for animal welfare assessment, the Welfare Quality® scheme aims to be a valuable support to farmers and the animal industry in their efforts to improve the welfare status of farm animals. Therefore the system shall provide a feedback of information on how to improve welfare along the productive chain of farm animals. The routine application of this type of assessment schemes appears an effective tool to promote a general improvement of the quality of life of farm animals as well as to address the consumer choices towards welfare friendly animal foodstuffs.

Key words: animal production / farm animal welfare / assessment systems

DOBRO POČUTJE ŽIVALI KOT STEBER SONARAVNE ŽIVINOREJE

IZVLEČEK

Kljub raziskavam in zakonodaji zadnjih desetletij še vedno skušamo opredeliti norme za sonaravno živinorejo z ozirom na dobro počutje živali ter tako odgovoriti na vprašanja zaskrbljene javnosti. Ocena dobrega počutja živali na farmah je danes prednostna naloga iz več vidikov, in sicer: 1. določitev rizičnih dejavnikov za dobro počutje živali na farmi; 2. najti je potrebno rešitve za premostitev težav z dobrim počutjem živali; 3. določitev minimalnih zahtev za vse vrste in kategorije farmskih živali oziroma prevetritev že obstoječih priporočil; 4. osnovanje primernih oznak za proizvode iz živalim prijaznih farm. Idealno bi bilo, da bi bilo ocenjevanje interdisciplinarno, vendar je do sedaj večina predlaganih opazovalnih shem slonela na evalvaciji hlevov in naprav. Raziskovalni konzorcij Welfare Quality® se trenutno ukvarja z novim ocenjevalnim orodjem na osnovi veljavnih in zanesljivih rezultatov meritev, pridobljenih s kliničnimi in vedenjskimi opazovanji živali. V nasprotju z obstoječimi protokoli za ocenjevanje dobrega počutja živali pa naj bi nove sheme Welfare Quality® predstavljale podporo kmetom in industriji pri njihovih prizadevanjih za izboljšanje počutja farmskih živali. Sistem bo zagotavljal informacije o tem, kako izboljšati počutje farmskih živali v celotni proizvodni verigi. Rutinska uporaba takšnih ocenjevalnih shem se zdi učinkovito orodje za promocijo splošnega izboljšanja

življenja farmskih živali, pa tudi primeren nagovor potrošnikom, naj se odločijo za hrano iz živalim prijaznih rejskih okolij.

Ključne besede: živinoreja / dobro počutje farmskih živali / ocenjevalni sistem

INTRODUCTION

The importance of animal welfare is well recognized by EU citizens, who assigned, on a scale from 1 to 10, an average score of 7.8 to the question "How important is to you that the welfare of farmed animal is protected?" (EC, 2007a). Most of them believe that animal welfare standards have been improved over the last ten years, but the large majority of public (77%) deems that further improvements are needed. Moreover, it is common opinion that rearing systems with a high stocking rate are negatively related to the animal well being since for the large majority of the urbanized people the perception of farm animal welfare is related to a 'natural' behaviour in a 'natural' environment (Webster, 2001). The increasing consumer demand for animal products deriving from welfare friendly rearing systems have placed pressure on the dairy, meat, egg and wool production chains in order to certify or improve the well being status of their animals (Steward *et al*., 2005). Therefore, recent concepts of sustainability in livestock production put a growing concern on the animal welfare issue.

During the last decades, extensive experimental studies have been carried out to gather information about the way animals are kept on farm and to inform the societal debate on animal welfare. Much of these studies were addressed to describe the living conditions of farm animals and to understand their needs, preferences or aversions (Rushen, 1986; Webster, 2005).

The basal needs of farm animals have been set by the Council of Europe through the "European Convention for the protection of animals kept for farming purposes" (1976). Livestock should have free access to adequate quantity of feed and fresh water, they should be reared in a suitable environment and any source of physical pain or any kind of suffering should be avoided. Based on the existing scientific information, the European Union set official regulations with minimum requirements for the protection of several livestock species on-farm, during transport and at the slaughterhouse. However, despite research and legislation, we are still in progress to fulfil the public concerns about the definition of sustainable production standards that guarantee animal welfare in addition to food hygiene and traceability. Therefore, nowadays the major issue among the stakeholders of the livestock production is addressed towards the creation of standardized methods to assess the animal welfare along the entire production chain (McGlone, 2001).

AIMS AND ENDUSERS OF AN ANIMAL WELFARE ASSESSMENT PROTOCOL

The set-up of a validated assessment method to evaluate animal welfare could have several aims and addressees, with farmers in first place. Indeed, at farm level the application of a welfare monitoring protocol could be a useful tool to identify risk factors that impair livestock welfare (Sørensen *et al*., 2001). The consequent accomplishment of solutions and advises to overcome these specific welfare problems would bring a significant benefit to animals and farm economics by reducing medical treatments and culling rates on one side and by improving animal performance on the other one.

From the outcomes of the monitoring scheme, the legislator could define minimum requirements for all the farm animals species and categories even refining the exiting recommendations (Botreau *et al*., 2007). Moreover, the assessment protocol would allow to check the compliance with the legislation in force by the producers with the consequent payment or negation of the EU subsidy according to the Common Agricultural Policy.

The availability of an officially recognized monitoring system could also replace the existing certification schemes used to label welfare friendly farm animal products. The exclusive use of scientifically based measurements would warranty for fairness, transparency and robustness of the system. In a free market society, the consumer would benefit of this tool which allows to recognize and choose animal products with a true intrinsic added value coming from rearing systems particularly caring for the animal needs (Webster *et al*., 2004)

FEATURES OF THE IDEAL ANIMAL WELFARE ASSESSMENT PROTOCOL

Measurement and assessment of animal comfort and well-being at farm level is a challenge to scientists. The ideal assessing protocol should be based on a multidisciplinary approach that considers animal parameters such as productivity, behaviour, physiology, health and immunity as well as important society issues as environmental protection, food safety, farmer and consumer economics (Table 1). For feasibility reasons, the development of a standardized methodology inclusive of all these parameters seems too complex and unrealistic. Such approach would indeed require a join effort by multidimensional teams made of animal scientists, economists and sociologist (McGlone, 2001). Nowadays it seems more reasonable to consider as ultimate method a weighed aggregation of parameters descriptive of the animal physical and mental status with measurements of the quality of both housing environment and stockmanship.

Table 1. List of potential parameters to be included in an ideal animal welfare assessment protocol (McGlone, 2001)

Category of parameters	Parameter
Animal and farm related issues	
level of productivity	– direct animal productivity – human labour requirement – production costs
behaviour	– maintenance behaviours – abnormal behaviours – other appropriate behaviours
physiology	– endocrine measures – blood pressure, heart and respiratory rate
health and immunity	– incidence of diseases – level of immune protection
anatomy	– bone strength and rate of injury – wounds and lesions
Other society issues	
environmental impact	– soil, water and air pollution
worker health and safety	
food and feed safety	– drug residues and safety
economics	– farmer and consumers economics
International trade and protection of local food production	
Public perception and comunity interactions of the farm	

STRENGHT AND WEAK POINTS OF SOME EXISTING PROTOCOLS FOR WELFARE ASSESSMENT

Several evaluation systems have been developed and applied to discriminate farms that offer a good status of welfare to animals from those that do not. The Austrian ANI-system (Animal Needs Index-35) proposed by Bartussek (1999), has been applied to all categories of cattle, laying hens and pigs. It considers measures of provision of resources along with stockmanship quality by analysing five components of animal's environment (Table 2). The main strength point of the system is its simple application and the possibility to be used by any experienced person in livestock husbandry not necessarily qualified with an academic degree. An overall index is calculated by summing up the scores of single parameters and the judgement of the farm related to the animal welfare is then given based on the index allocation using a six categories score system. The way that the overall index is calculated which offers the possibility of compensating poor conditions for one component with a better score for another one might be debatable. In general the system appears mainly oriented towards an indirect evaluation of the animal welfare based on environmental parameters since a few behavioural (resting, lying) and clinical measures (tegumental status and health) are taken by a direct observation of the animals. The main shortcoming of the protocol, which is recognized by the proponent himself, is the lack of parameters to assess human-animal relationship.

Table 2. Structure of ANI-35 for cattle (Bartussek, 1999)

Field of influence	Criteria to be evaluated
Possibility of mobility	– space allowance per animal – normal behaviour at resting, lying, rising in loose housing – tied housing – outdoor exercise or pasture
Social contact	– space allowance per animal – social structure of the herd integration of followerrs – outdoor exercise or pasture
Quality of flooring	– resilience, cleanliness and slip resistance of laying area – floor condition of moving and exercise area – Alpine pasture/pasture
Stable climate	– light – air quality – draughts within laying area – time spent outside
Care of stockman	– cleanliness of housing and animals – state of technical equipment – state of coat of the animals – technopathies – animal health

A similar system, the Tiergerechtheitsindex-200 (TGI-200), has been proposed in Germany by Sundrum *et al*. (1994), to certify the level of welfare of several farm species. The assessment protocol considers seven different items (Table 3) whose scores are summarized in an overall index. The strength points of this approach were that all the considered criteria were selected based on their high repeatability and feasibility. Moreover, the time budget required to carry out the whole evaluation was more than reasonable taking from half to one hour. Once again the weak point of the method is that it was substantially based on environmental information and its outcome represented an estimation of the quality of the farm housing facilities. This limitation was underlined by the author himself who suggested that this tool was not capable to judge the animal welfare situation on a farm but it could be considered as a first step aiming at the development of a more integrated approach (Sundrum, 1997).

Table 3. Structure of TGI-200 (Sundrum, 1997)

Field of influence	Criteria to be evaluated
Behavioural patterns	
✓ locomotion	– space allowance for locomotion – quality of the tethering – skid resistance of the floor – access to open yard or pasture
✓ feeding behaviour	– design of feed troughs – manger space allowance and number of drinking facilities – social structure of the herd integration of followers – feeding frequency – access to pasture
✓ social behaviour	– space allowance for social contact and housing design – structure of the herd – access to open yard or pasture
✓ resting behaviour	– space for lying – floor covering and quality of the litter – access to pasture
✓ comfort behaviour	– scrubbing facilities – cleanliness of the floor – quality of bedding – access to open yard or pasture
Hygiene	
	– preconditions for suitable stable climate and ventilation – cleanliness of the bedding and the floor – daylight – access to open yard or pasture
Management	
	– working conditions of the facilities – cleanliness of feed trough and drinkers – trimming of claws – documentation

In the United Kingdom, the Bristol Welfare Assurance Program (Main *et al*., 2003) was developed to assist farmers for compliance with existing animal welfare-related requirements in certification schemes. Specific protocols were developed for dairy and beef cattle, pigs and laying hens. In comparison to the previous mentioned methods, this assessment protocol was mainly animal-based aiming at giving a more direct view of how the animals are coping with their surrounding environment. The animal-based parameters included in the check list have been chosen by a group of experts according to their relevance to welfare, their reliability and feasibility as well as their incidence on the farm profits. The assessor collects for the selected parameters either direct information from animal observations or data from farm records. When exceeding an intervention threshold for a given parameter, the assessor further investigates the related specific resources to identify the limiting factors. In parallel, the farmer's awareness about the welfare problem is examinated recording whether appropriate prevention of treatment protocols are applied. The way the method was conceived and how it works represent its main strength points. Moreover, the protocol is flexible to future updates when new scientific knowledge or welfare standards become available (Main *et al*., 2003). The only shortcoming of the method is the lack of any advice for the farmer about specific husbandry solution capable to overcome the critical points arisen from the assessment. According to the proponents, this duty should be in charge of the attending farm veterinarian.

TOWARDS A NEW ANIMAL WELFARE ASSESSMENT SYSTEM

The European Commission in order to meet social concerns on animal protection across the member States funded within the Sixth Framework Programme the integrated project Welfare Quality®, involving 44 research groups and industrial partners in 13 European countries and 4 Latin American countries (www.welfarequality.net). Aiming at an integration of animal welfare in the food quality chain, the project investigates consumer, retailer and producer expectations in terms of farm animal welfare (Blokhuis *et al*., 2003). Two main targets of the project activity are addressed towards the animal welfare assessment issue:

1) the development of standardized monitoring system for different categories of selected farm animal species (cattle, poultry and pigs);
2) the definition of integrated, knowledge-based, practicable species-specific strategies to improve farm animal welfare.

The former task has been developed according to a set of fundamental principles:

- the exclusive use of valid and reliable measures;
- the possibility to be applied on all the existing rearing systems;
- the requirement of a reasonable time budget;
- the easy use by a single trained assessor.

A further basic principle of the proposed methodology was the exclusion of all the measures that require invasive procedure since they may cause a stress response affecting the measure of interest (Stewart *et al.*, 2005). Therefore all the physiological parameters obtained from blood sampling or from other minimal invasive handling of the animals were not considered.

The rationale of the protocol considered animal-based measures as the main tool to assess animal welfare and their integration with some resource and management measures capable to identify causes of poor welfare. The first step for the development of the protocol was the definition of 12 sub-criteria that can be clustered in 4 main descriptors of animal welfare as shown in Table 4. A wide list of potential measures was then created for each sub-criteria considering all the parameters available from the scientific literature. This list was then submitted to a group of experts for each category of farm animals in order to skip the parameters which were not considered reliable and feasible on commercial farms. The final outcome was the

proposal of a full monitoring scheme for the following seven categories of farm animals: dairy and beef cattle, veal calves, sows, fattening pigs, broilers and laying hens.

Table 4. General framework of the animal welfare assessment scheme in Welfare Quality®

Criteria	Sub-criteria	
Correct feeding	1.	Absence of hunger
	2.	Absence of thirst
Correct housing	3.	Resting comfort
	4.	Thermal comfort
	5.	Easiness of movements
Good health	6.	Absence of injuries
	7.	Absence of disease
	8.	Absence of pain caused by farm practices
Appropriate behaviour	9.	Expression social behaviour
	10.	Expression of other behaviour
	11.	Good human-animal relationship
	12.	Absence of general fear

A further action towards the development of the final monitoring scheme has been the testing of this prototype on a large sample of commercial farms located in different European countries. The objective of this activity has been to apply the assessment scheme to a wide set of farms which adopted different feeding, housing and management practices and to consider potential geographical and seasonal effects. This task required for each category of farm animals the set up of specific stages where the assessors in charge of the testing were trained in the carrying out of the different measures. At the same time, a group of experts had defined the suitable schedule for the application on-farm of the assessment. The measures considered by the full monitoring where ordered in a logical sequence and their time budget was established. For cattle, for example, the tests of general mental status of the animal and of human-animal relationship were the starting measures of the protocol in order to avoid a biased response by the animals. Behavioural observations were the next measures taken by the assessors followed by the clinical examinations. Management and resource checklists were the last group of measures to be recorded.

The analysis of data recorded during the testing could generate several useful information. First of all it should find out significant relationships among animal-based measures included in the checklist and consequently it could allow to simplify the full monitoring by removing some of the correlated ones. A simplified final assessment scheme would have the advantage of requiring a shorter time budget without losing its robustness in terms of detecting the real welfare status of the animals. Another main outcome from the testing data could be the identification through a proper risk factor analysis of the management and environmental causes of poor welfare for diverse rearing systems of farm animals.

Differing from the previously mentioned protocols for animal welfare assessment, farmers may use the Welfare Quality® scheme as a tool to improve the welfare status at their farm. Therefore the system shall provide a feedback of information to the farmers along with a set of practical solutions and advices on how to improve animal welfare. A group of experts is in charge to identify for each of the 12 sub-criteria used to describe the welfare status of the farm animals a proper list of practical strategies capable to improve it.

The main benefits of the integration of this animal welfare monitoring scheme within the chain of production of farm animals are shown in Fig. 1. The practical improvement strategies

provided by the system should give a valuable support to farmers and animal industry in their efforts to improve the welfare status of farm animals. Information generated by the application of the assessment protocol could be useful to certify and label specific animal product coming from welfare friendly productive chains. Consistent with the Bristol Welfare Assurance Program, the Welfare Quality® assessment scheme is open to future updates based on new scientific knowledge.

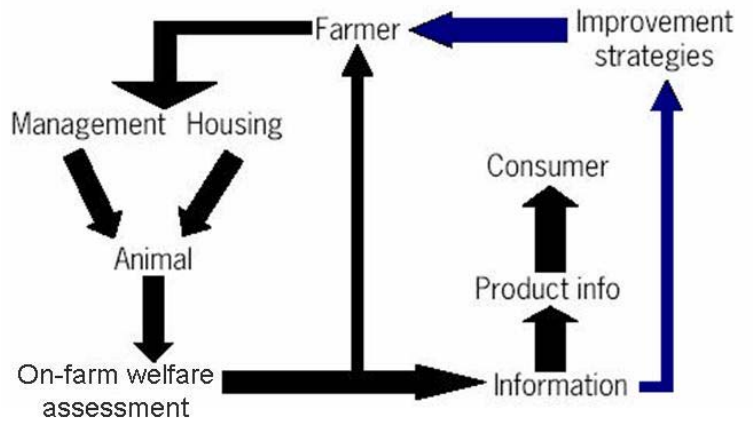

Figure 1. Flowchart of Welfare Quality® (adapted from Blokhuis, 2007).

CONCLUSIONS

Public concerns about the definition of sustainable standards in farm animal husbandry have focused their attention on the animal welfare issue as well as on food hygiene and traceability. The scientific research has clearly demonstrated that the improvement of the animal welfare on-farm is an effective tool to boost the farm profits by reducing costs related to poor animal health and performance. In order to improve the welfare standards of livestock it is required to develop reliable assessment schemes capable to detect the main risk factors in any type of rearing system. These monitoring systems should be largely based on direct measures recorded by clinical and behavioural observation of the animals and they could be integrated by environmental and management data. A suitable welfare assessment tool should either detect the limiting factors or identify practical solutions to overcome them. At this regard, it is likely that future advances in farm technology and engineering will solve some welfare constraints linked to the farm facilities and the environment. A more difficult step will certainly be the achievement of a significant upgrading of the stockman skill through the adoption of welfare friendly farm practices.

Since animal welfare must be considered a pillar of a sustainable farm animal breeding, the welfare assessment should be a routine practice integrated within the productive chain of animal foodstuffs. The consumers should get a clear communication about the animals' quality of life in order to be able to identify and freely choose animal products obtained with a given level of welfare. This last issue appears the strongest tool to drive the entire productive chain to the welfare target.

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