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Animal Welfare Assessment Based on Welfare Quality® Criteria in a Dairy Farm in Turkey

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Abstract

This study served as a pilot to examine the practical implementation of the Welfare Quality® assessment protocol for cattle in dairy farms in Turkey. The study was carried out in the large-scale dairy farm of Atatürk University, in a free-stall-housed herd composed of Holstein, Brown Swiss and Simmental cattle. Whether the standards of the farm management programme and some of the welfare criteria chosen from the protocol were met was determined with the scoring method described in the Welfare Quality® publications. The somatic cell count (SCC) of the milk samples, and the avoidance distance and body condition score (BCS) of the animals were also determined and recorded. The body condition scores (BCS) of the Holstein, Simmental and Brown Swiss cattle were determined as 2.56, 3.16 and 3.88, respectively. Only 7% of the 53 cows had lameness, and none of the animals were evaluated as 'resting a foot, standing on the edge of a step, displaying stepping (weight shifting) or showing reluctance to bear weight'. The animals were also evaluated based on some health indicators. The percentages of all animals displaying nasal and ocular discharge were 16% and 9%, respectively. No clinical signs were recorded for hampered respiration, diarrhea, vulvar discharge. The mean SCC of the milk samples was (log 10) 4.43 cells/ml and below the European Union's raw milk SCC threshold. In conclusion, according to the assessment based on Welfare Quality® criteria, excluding SCC, the animal welfare level at the dairy farm of Atatürk University was scored as %70.92 and was considered to meet the relevant EU standards.

Key Words: Dairy cattle, welfare assessment, welfare level, welfare quality

Türkiye'deki Bir Süt Çiftliğinde Welfare Quality® Kriterlerine Göre Hayvan Refahının Değerlendirmesi

Öz

Bu çalışma, Türkiye'de yetiştirilen süt sığırları için Welfare Quality® değerlendirme protokolünün pratik uygulamasını incelemek amacıyla yürütülmüş olup pilot bir görev üstlenmiştir. Çalışma, Atatürk Üniversitesi'nde bulunan serbest dolaşımlı, bağsız ve duraklı büyük bir süt çiftliğinde, Holstein, Esmer ve Simental sığırlardan oluşan sürüde gerçekleştirilmiştir. Çiftlik yönetim programının standartlarının ve protokolden seçilen bazı refah kriterlerinin karşılanıp karşılanmadığı, Welfare Quality® yayınlarında tanımlanan puanlama yöntemleri ile belirlenmiştir. Süt örneklerinin Somatik Hücre Sayısı (SCC), hayvanların kaçınma mesafeleri ve vücut kondisyon skorları (BCS) da belirlenmiş ve kaydedilmiştir. Holstein, Esmer ve Simental sığırlarının vücut kondisyon skorları (BCS) sırasıyla 2.56, 3.16 ve 3.88 olarak belirlenmiştir. Denemede kullanılan 53 baş ineğin sadece %7'sinde topallık tespit edilmiş ve yere basamayan, adım atmada zorlanan, bir yere yaslanmadan duramayan hiçbir hayvanın varlığına rastlanılmamıştır. Ayrıca hayvanlar bazı sağlık göstergelerine göre de değerlendirmeye tabi tutulmuştur. Tüm hayvanlar içerisinde burun ve göz akıntısı olduğu tespit edilen hayvanların oranı sırasıyla %16 ve %9 olarak belirlenmiştir. Solunum güçlüğü çeken, ishal veya vulva akıntısı olan herhangi bir hayvana rastlanılmamıştır. Analiz edilen süt örneklerinin ortalama Somatik Hücre Sayısı (log 10) Avrupa Birliği'nin çiğ süt Somatik Hücre Sayısının eşiğinin altında ve 4.43 hücre/ml olarak tespit edilmiştir. Sonuç olarak, Welfare Quality® kriterlerine göre yapılan değerlendirmeye göre, Atatürk Üniversitesi süt çiftliğindeki hayvan refahı düzeyi %70,92 olarak belirlenmiş ve bu oranın somatik hücre sayısı hariç AB standartlarını karşıladığı kabul edilmiştir.

Anahtar Kelimeler: Sütçü sığır, refah değerlendirmesi, refah düzeyi, refah kalitesi

INTRODUCTION

Good health is required for good animal welfare, and one of the five freedoms of animals is freedom from pain, discomfort and distress. Farm animals raised humanely are healthier. Animal welfare is multidimensional; its assessment relies on complementary measures covering all dimensions. In the last decade, the welfare of farm animals has attracted a growing interest and concern. Consumers are more aware of the impact of farm animal welfare on public health, product safety and health issues. Since 2012, EU policies have required that, indicators, related to the welfare status of the animals, be carefully monitored and evaluated at farm level (1, 2).

Farm animal welfare is related to several factors, including breeding methods, management practices, physical environmental conditions and resources presented to the animals, and animal-based traits (species, breed, sex, age, physiological status, needs). Animals respond to these factors, which have strong impact on them, by adjusting their physiological and behavioral statuses. Welfare refers to the long-term wellness

of an animal, which is the result of its acquired experiences of the living conditions that it copes with (1, 3-6).

Several methods are available for assessing farm animal welfare. Feeding, housing, health status and behavior are four basic criteria that represent the welfare status of animals (1, 4, 5).

Under the Welfare Quality® Project, objective tools (good feeding, good housing, good health, appropriate behavior) were developed to determine animal welfare at farm level. The criteria described in the protocol established under this Project can be used to assess the welfare level of various farm animal species (7, 8).

In Turkey, the bovine animal population is approximately 16 million heads and the majority of the total 1.250.947 bovine holdings are family-type farms, each housing 1-19 heads (91%). While Turkey's national legislation related to animal welfare is subject to ongoing improvement; actions for assessing and controlling the current situation have received little attention, in practice. Consequently, to the best knowledge of the authors, very few scientific literature is available on the assessment of the welfare of animals, especially dairy cattle, in Turkey (9, 10, 11).

The aim of the present study was to determine the welfare level of dairy cattle, based on the Welfare Quality® criteria used by EU Member States. This study was designed both as a first step to pave the way for future research on welfare assessment and scoring and to contribute to extending the use of welfare assessment throughout Turkey.

MATERIALS AND METHODS

This study served as a pilot to examine the practical implementation of the Welfare Quality® assessment protocol for cattle in dairy farms in Turkey. The study was carried out at the large-scale dairy farm of Atatürk University and in a free-stall-housed herd composed of 43 lactating cows (18 head Holstein, 16 head Brown Swiss, 9 head Simmental); 10 dry cows (4 head Holstein, 4 head Brown Swiss, 2 head Simmental); 30 heifers (13 head Holstein, 11 head Brown Swiss, 6 head Simmental) and 21 calves (9 head Holstein, 7 head Brown Swiss, 5 head Simmental.

Whether the standards of the farm management programme and some of the welfare criteria chosen from the protocol were met was determined with the scoring method described in the Welfare Quality® publications. The somatic cell count (SCC) of the milk samples, and the avoidance distance and body condition score (BCS) of the animals were also determined and recorded. The Welfare Quality® principles, criteria and measures evaluated in this research are presented in Table 1. The most of the measures were evaluated by examining the animals, whilst the remaining were evaluated based on farm management and housing records.

Table 1. The welfare principles, criteria and measures evaluated in the present study (7).

Welfare principle	Welfare Criteria	Measures
1. Good feeding	1.1. Absence of prolonged hunger	1.1.1. Body Condition Score
	1.2. Absence of prolonged thirst	1.2.1. Water provision
		1.2.2. Cleanliness of water points
		1.2.3. Water flow
2. Good housing	2.1. Comfort around resting	2.1.1. Cleanliness of udders
		2.1.2. Cleanliness of flank/upper legs
	2.2. Ease of movement	2.1.3. Cleanliness of lower legs
		2.2.1. Presence of tethering
		2.2.2. Access to outdoor loafing area or pasture
3. Good health	3.1. Absence of injuries	3.1.1. Lameness
		3.1.2. Integument alterations
	3.2. Absence of disease	3.2.1. Nasal discharge
		3.2.2. Ocular discharge
		3.2.3. Hampered respiration
		3.2.3. Diarrhea
		3.2.4. Vulvar discharge
		3.2.5. Mortality
		3.2.6. Dystocia
		3.2.7. Downer cows
	3.3. Absence of pain induced by management procedures	3.3.1. Disbudding/Dehorning
		3.3.2. Tail docking
	3.4. Udder health	3.4.1. Somatic Cell Count (SCC)
4. Appropriate behavior	4.1. Expression of other behaviors	4.1.1. Access to pasture
	4.2. Good human-animal relationship	4.2.1. Avoidance distance

Total welfare scores were expressed on a 0-100 value scale, where 0 represented the worst and 100 the best level of welfare. The calculation of the scores for each criterion was made using a web scoring system developed under the Welfare Quality Project® (1, 12-15).

Statistical analyses: The recorded data were statistically analyzed with parametric (ANOVA with Welch Test for Unequal Sample Size) and nonparametric tests (Mann-Whitney U test) using the SPSS (2004) software package (16).

RESULTS

The body condition scores (BCS) of the Holstein, Simmental and Brown Swiss cattle were determined as 2.56, 3.16 and 3.88, respectively (P < 0.05) (Figure 1).

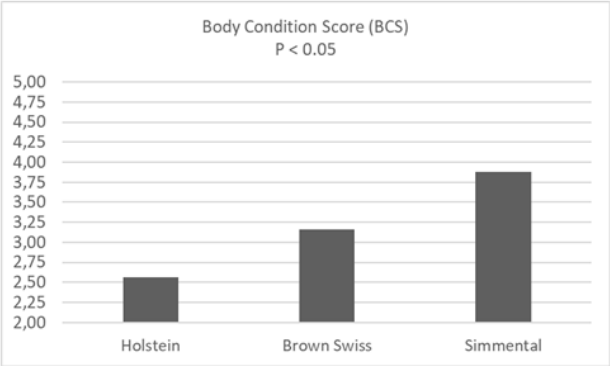

Figure 1: Body condition score (BCS) of Holstein, Brown Swiss, Simmental cattle

Water was provided to the animals at the farm such that there was one water bowl (50 cm diameter) per 13 cattle. The water bowls were observed to be clean, functional and in proper condition, and were adequately distributed throughout the barn area. Water flow was more than 10 l/min.

The cleanliness of the lower hind legs, flanks, tail and udders was scored as either clean (0) or dirty (2), and the mean score of the herd was 1 (median value) (Table 2).

Only 7% of the 53 cows had lameness, and none of the animals were evaluated as 'resting a foot, standing on the edge of a step, displaying stepping (weight shifting) or showing reluctance to bear weight'.

The skin was examined and scored as either normal (0) or abnormal (1) based on the absence or presence of hair loss, lesions, and swelling. None of these abnormalities were observed in the skin of the tarsi, hindquarters, carpi. However, there were lesions on the neck/shoulders/back (9%), flanks/sides/udders (7%) and in the areas with less hair (2%) (Table 2).

Table 2. Results of the statistical analysis of the body condition scores (BCS), lameness and somatic cell counts (SCC) for each cattle breed.

	Breeds	Mean	Standard Error	Median	P
Body Condition Score (BCS)	Holstein	2.56[c]	0.086		0.000
	Brown Swiss	3.16[b]	0.095		
	Simmental	3.88[a]	0.090		
Leg	Holstein	1	0	1	0.538
	Brown Swiss	0.94	0.063	1	
	Simmental	1	0	1	
Flank	Holstein	0.85	0.104	1	0.344
	Brown Swiss	0.81	0.101	1	
	Simmental	0.88	0.125	1	
Udder	Holstein	0.69	0.133	1	0.588
	Brown Swiss	0.69	0.120	1	
	Simmental	0.88	0.125	1	
Resting a foot	Holstein	0	0	0	
	Brown Swiss	0	0	0	
	Simmental	0	0	0	
Standing on edge	Holstein	0	0	0	
	Brown Swiss	0	0	0	
	Simmental	0	0	0	
Stepping	Holstein	0	0	0	
	Brown Swiss	0	0	0	
	Simmental	0	0	0	
Reluctance	Holstein	0	0	0	
	Brown Swiss	0	0	0	
	Simmental	0	0	0	
Somatic Cell Count (log 10 SCC/ml)	Holstein	4.44	0.31		0.829
	Brown Swiss	4.55	0.22		
	Simmental	4.30	0.30		

The cattle were also evaluated regarding some health indicators. The percentages of cows displaying nasal and ocular discharge were 16% and 9%, respectively. No clinical signs were recorded for hampered respiration, diarrhea or vulvar discharge.

The mean SCC value of the milk samples was (log 10) 4.43 cells/ml and below the European Union's raw milk SCC threshold.

At the dairy farm of Atatürk University, where the study was performed, animals are not tethered, and have enough

area to move around both in and outside the barn (Figure 2). The animals being housed in a free-stall system was considered to be an animal welfare-friendly practice.

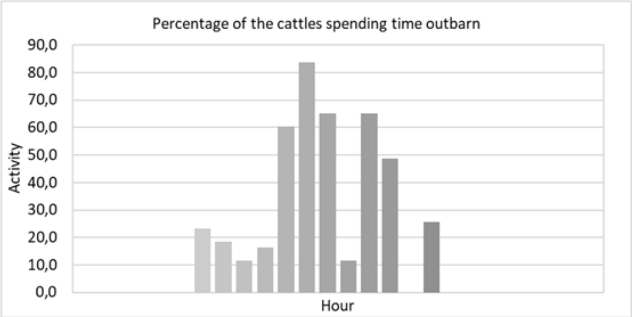

Figure 2: Percentage of the cattles spending time out barn

DISCUSSION AND CONCLUSION

The body condition score (BCS) of an animal is strongly correlated with its energy reserves. The ease and rapidity of scoring and high intra- and inter-observer repeatability make BCS a widely used herd management tool in bovine practice and scientific research (17). The mean BCS of the breeds (Holstein, Brown Swiss and Simmental) included in the present study was higher than the values previously reported for herds raised in Macedonia, Romania and Serbia, and was close to the value reported for cattle herds raised in Croatia, and revealed that, the criterion 'absence of hunger' was observed at the farm (18-21). With regard to water supply, the conditions of the assessed farm complied with the minimum standards suggested by the protocol, and the assessment results of the present study showed similarity to those determined in Macedonia and some other countries (1 drinker per 13 animals and 10 l/min) (18-20, 22).

Cleanliness is an important management factor in dairy farms. In the present study, the cleanliness score of the animals was evaluated as medium. According to the Welfare Quality® Assessment protocol, the cleanliness scores of the udders, flanks-tail-upper legs and lower legs were similar and revealed no serious problem. Since the animals were not tethered, it was observed that the bedding material of the parlor, and the resting and walking areas inside and outside the barn were clean and hygienic. In previous research, compared to the present study, higher cleanliness scores and better sanitation were detected in Serbia, Croatia, Romania and the Republic of Macedonia, whereas lower cleanliness scores and poor sanitation were detected in another study performed by the Wye Dairy Research Institute in the United Kingdom (UK) (3, 5, 6, 18, 19, 22, 23).

Lameness is a major welfare problem for dairy animals, which causes pain and discomfort, and may result in reduced milk production. The presence of dermal signs such as swelling, lesions and hair loss are indicative of poor welfare and husbandry conditions. In the present study, 7% of the cows had laminitis, 16% of the animals had lesions, and only 2% presented with hair loss. These results indicate that the animals included in the present study were provided with a balanced diet, exercised regularly, underwent periodical health examinations and were raised under good husbandry conditions, and also showed that the floor structure of the farm and the bedding material that was used met the relevant standards. When compared to the scores determined in the present study, significantly higher results were obtained for the incidence of lameness in previous research conducted in Eastern and Western European countries (3, 6, 19, 20, 23, 24)

Disease indicators and disease incidence demonstrate the level of welfare of a herd and are successfully used to measure it. Although no clinical symptoms indicative of hampered respiration was observed, few animals presented with nasal and ocular discharge, which was considered to be indicative of possible upper respiratory infection. Nevertheless, these results pointed out to better health conditions compared to those detected in nearby countries and demonstrated that that the implementation of strict biosecurity codes and the provision of well-organized health services would reduce the incidence of illnesses (18, 20, 24).

The EU milk quality standard (SCC not exceeding 400.000 cells/ml) is generally accepted to be the optimal standard. The results of the present study showed that the raw milk produced at the dairy farm was of high quality, owing to the management factors of the holding being above Turkey's average (2, 25-29).

The avoidance distance is defined as the distance to which an animal will allow a person to approach before it moves (4). The mean avoidance distance determined in the present study was 47.0 ± 68.5 cm, and the application of the Mann-Whitney U test to the avoidance data confirmed a good human-animal relationship to have been established at the dairy farm. While herds grazed on pasture are known to show an avoidance distance greater than 50 cm, the cattle included in this study were housed in a free-stall system and had the opportunity to move freely outside the barn, which also promoted good welfare and handling conditions at the farm.

In conclusion, according to assessments made in line with the methodology of the Welfare Quality Project®, the animal welfare level at the dairy farm of Atatürk University was scored as 70.92, and this level was considered to fulfill the relevant EU standards. Although the animal welfare level detected in the present study is high and encouraging, the results of this study are not representative of the general situation in Turkey. As cattle farming in Turkey mostly involves small family holdings and traditional methods, it is concluded that further research is required to determine the true welfare level of the cattle population, which is approximately 16 million heads.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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