

THE WELFARE ASSESSMENT OF TIED DAIRY COWS IN 52 SMALL FARMS IN NORTH-EASTERN TRANSYLVANIA USING ANIMAL-BASED MEASUREMENTS

Silvana Popescu*, Cristin Borda, Carmen Dana Sandru, Razvan Stefan, Eva Lazar

University of Agricultural Sciences and Veterinary Medicine, Faculty of Veterinary Medicine, Manastur street, no. 3-5, 400372, Cluj Napoca, Romania

*Corresponding author, E-mail: popescusilvana@yahoo.com

Summary: The aim of this work was to assess the dairy cows' welfare in small farms in the region of North-Eastern Transylvania (Romania) based on several animal associated parameters: body condition score (BCS), body hygiene (cleanliness), lameness, skin injuries, fur condition and flight distance, respectively. Four hundred and seventy three dairy cows housed in tie-stalls in 52 small farms were assessed (5-20 cows/farm). The indicator parameters were determined through specific methods. Among the 473 evaluated cows 267 (56.45%) had a BCS between 1.5 – 2 being considered thin cows; 162 (34.25%) had dull hair on their back; 68 (14.38%) showed skin lesions in different body zones; 69 (14.59%) showed fear at the observer's approach; 23 (4.86%) were moderately lame. The percentage for scores of 3 and 4 in body cleanliness was 11% at the level of the lower legs, 14% in the udder region and 19% in the area of the flank and upper legs. The obtained results indicate that more than half of the assessed cows are thin, which has a negative impact on their health and welfare. The main factors that affect the dairy cows' welfare in North-Eastern Transylvania are inappropriate feeding and the tied housing system.

Key words: body condition; body cleanliness; lameness; skin lesions

Introduction

The dairy cows' welfare represents nowadays a permanent concern in many countries due to its impact on animals' health and productivity and implicitly upon public health. Due to the fact that the dairy cows' welfare has become increasingly related to milk quality, its monitoring constitutes an additional guarantee for the consumers that the products they buy are from healthy animals, maintained and kept in conformity with good practice rules in farming (1).

The economical importance of the animals' welfare assessment lies in the detection of the inadequacies in the first stage and their corrections in the second stage. The farm animals' welfare is provided especially through breeding systems adequate to the health and behavioral needs of the animals

as well as through good practices in animal keeping and rearing (2, 3).

Traditionally, farm animals' welfare assessment has focused on the measurement of resources provided to the animal such as housing and its design criteria (5). The use of such indirect resource-based criteria is attractive because their measurement is mostly quick, easy and reliable. Other husbandry aspects that affect animal welfare are management practices and the human-animal relationship. Their measurement is often less easy. However, the provision of good management and environmental resources does not necessarily result in a high standard of welfare. Welfare assessment should therefore primarily be based on animal-related parameters, such as behaviour, body condition score (BCS), body cleanliness, lameness, skin lesions, injuries and swellings, animal-human relationship and so on. Attempts to create an operational welfare assessment protocol primarily relying on animal-related parameters have mainly been made with regard to dairy cows (5-7).

In Transylvania (Romania) the majority of dairy cows are kept in extensive breeding systems, in small and medium-size farms with tie stalls. It is assumed that the welfare of these animals is better than that of those kept in intensive breeding systems. However, our researches showed that the housing and management of the former has several deficiencies with negative repercussions on the dairy cows' health and welfare (8).

This study's aim was the assessment of dairy cows' welfare kept in tie stalls in small farms in the North-Eastern region of Transylvania, using animal-based indicators.

Materials and methods

The study was conducted at 52 small farms (5-20 cows/farm) in North-Eastern Transylvania, between March and April 2009. The cows' welfare was assessed based on several animal associated indicators, namely: body condition score (BCS), body cleanliness, lameness, skin lesions, fur condition, flight distance. We evaluated 473 dairy cows housed in closed shelters with tie-stalls before the beginning of the grazing season (April-October). During the winter, cows are kept inside the shelters for the whole period and in summer the cows are on the pasture all day long. Each cow was evaluated by two expert examiners. For the assessment of some parameters (lameness, flight distance) the cows were untied and moved outside the shelter.

The body condition score (BCS) was assigned according to the system elaborated by Edmunson et al. (9), modified after Ferguson et al. (10) and Thomsen and Baadsgaard (11) with scores from 1 to 5. Thus, a fat cow is one with $BCS \geq 4$; a cow with normal body condition is one with $2.25 \leq BCS \leq 3.75$; a thin cow is one with $1.5 \leq BCS \leq 2$ and an emaciated cow is one with $BCS \leq 1.25$. For the appraisal of the cow's body cleanliness the scoring system elaborated by Cook et al. (12) was used, which assesses the degree of manure contamination in three body regions: udder, lower and upper leg and flank, awarding points (from 1 to 4). For each area a different score was assigned. At the end, the proportion of scores of 3 and 4 (which means "too dirty") was calculated for the three body regions of the cows. The skin lesions were assessed in all body areas (neck, shoulder and withers, knee, ribs, back/spine, tailbone, hipbone, point of hock, inside of the hock and stifle) through the method proposed by Leeb et al. (13). The lameness was evaluated based on the system elaborated by Sprecher et al.

(14). The fur condition was assessed based on the aspect of the hair of the dorsal region of the cow's back: shiny hair; dull hair with little dust on the back; very dull hair with much dust on the back – through the method proposed by Thomsen and Baadsgaard (11). Flight distance (avoidance distance) was appreciated by measuring the distance (in meters) to how close we could approach the cow before it retreats from us (13). In order to determine the avoidance distance, the cows were untied and moved outside the barn. The participant in the test waited at a distance of 3 to 4 m for the cow to look at him before approaching, i.e. more or less directly from the front, walking slowly (one moderate step per second), looking at the cow without direct eye contact, and keeping arms and hands close to the body. We considered that the cows do not show fear when the avoidance distance is smaller or equal to 1 m and that the cows show fear when the avoidance distance was more than 1 m.

After the cows' assessment, the results were expressed as percentages.

Results

The results obtained through the assessment of the 473 cows are shown in Figures 1 - 3. Figure 1 shows that 56.45% of the assessed cows had a BCS between 1.5 and 2, being considered thin cows; 34.25% had dull hair on their back; 14.59% showed fear at the approach of the examiner; 14.38% had skin lesions in different body regions (neck, shoulder, legs); 4.86% were moderately lame.

The percentage of the 3 and 4 scores of body cleanliness at the level of the three evaluated body areas for the 473 assessed cows were: lower legs 11%, udder 14%, flank and upper legs 19% (Figure 2).

The distribution of the BCS scores is shown in Figure 3.

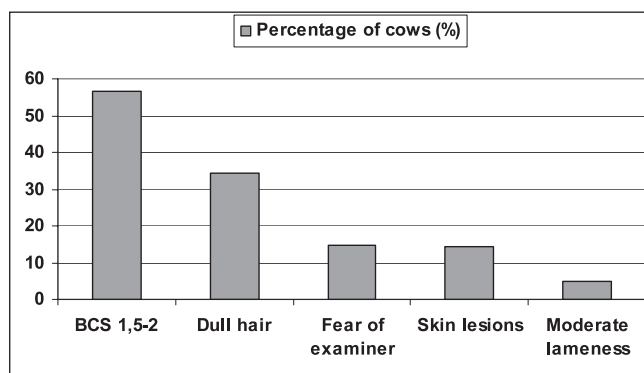


Figure 1: The distribution of the assessed indicators in the 473 dairy cows, except for the body hygiene scores

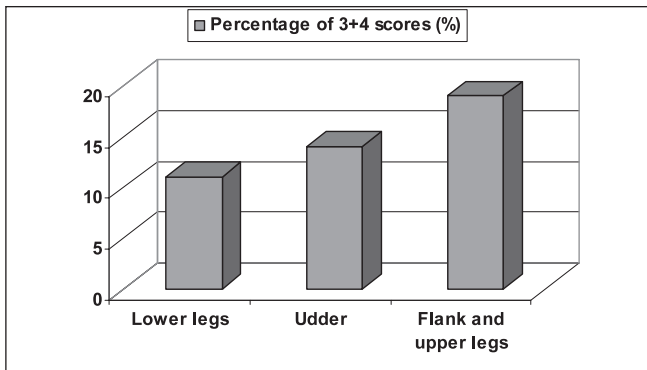


Figure 2: The distribution of 3 and 4 hygiene scores in different body zones of the assessed dairy cows

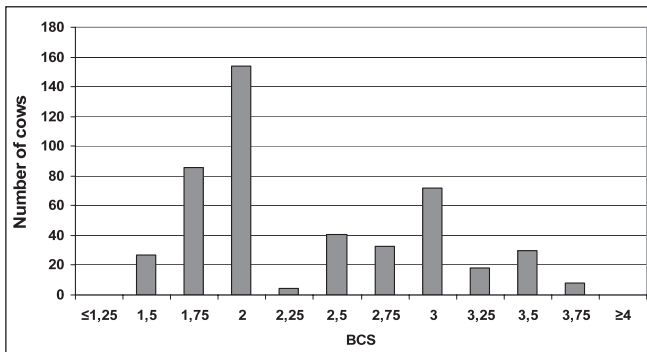


Figure 3: Distribution of body condition scoring in 473 assessed dairy cows

Discussion

In our study the greatest and the most frequent deviation from normality was in BCS. This can be due to the insufficient forage in that period of the year or the inappropriate quality of the feed. Frequently, thin cows do not clinically show the oestrus or become temporally infertile until they begin to gain or at least maintain their body weight. The nutrition of these animals should provide energy for maintenance of their productions and, in the same time, to supply the gain in body weight (9, 10). The body-condition scoring is an assessment tool in the evaluation of the fattening or the body weight loss in dairy cows according to a scale ranging from 1 to 5. In our study the system assigning BCS was the one modified by Thomsen, because it was considered that only extreme deviations from the ideal body condition are relevant from the point of view of the dairy cows' health and welfare and because the original system doubles the time needed for assessment (11). The body condition influences productivity, reproduction, health and longevity of dairy cows. The fat or thin state of cows can constitute an indicator of nutritional, metabolic disorders, health problems

or can indicate poor management at farm level (7).

The next indicator modified relative to normality was the fur condition. The aim of this parameter's assessment was to appreciate if the cow is able or not to maintain her skin clean (2, 11). The absence of self-grooming can indicate illness, poor general condition, inability to perform certain movements. Our study's result could be influenced by the length of the chains that tether the cows, limiting the movement possibilities of the animals.

In the majority of investigated farms the animal - human relationship could be considered as good, taking into account that only 69 of the assessed 473 cows showed fear at the approach of the examiner. The measurement of the flight distance is a recognised method in the evaluation of an animal's reaction to humans (15,16). The test can be influenced by different factors (lameness, the social environment of the testing, the past experiences of the animal, the observer known/unknown for the animal etc). It generally reflects the quality and quantity of the animals' manipulation by man and the human-animal relationship (stockmanship). If the animal allows the participant to the test to come within a small distance, this means that the animal does not show fear. In this case, all daily inspections and manipulation procedures will be less stressful for the animal. Thus, it is a good indicator of „positive health” (13). It was stated that the nature of the animal-stockman relationship influences the behavior, milk production and welfare of dairy cows (17). Hemsworth et al. (15) established a correlation between the cattle-person's attitude and the dairy cow's fear and milk production, indicating a possible way to decrease the fear and increase the productivity through revision of the stockperson's attitude and behavior. In extensive breeding systems for dairy cows stockmanship is better, comparative to intensive breeding (8) because of the smaller number of animals and due to their frequent contact with humans at feeding, watering, milking, cleaning the shelter, all this processes being done by manpower.

The skin lesions had a low percentage in our study, comparative to the results of other researches (18), probably due to the simple barns, with only a few equipments, and due to the straw bedding used. Skin lesions (hair loss, small wounds) were possible, especially in the neck region, caused by the chain used for the cows' tethering. The cows (14 cows) presenting lesions (hair loss, swelling of the skin, small wounds) on their legs had the locomotion score of 3 (moderately lame). These lesions not only cause

pain, but can also indicate problems of welfare and production. The skin lesions and swellings reflect the impact of the nearest environment on the animals' bodies (13). Injuries can be caused through the animals' contact with hard floors, with the confinement system, with the watering and feeding eaves or by hitting other hard elements inside the shelter.

Regarding lameness, it had a reduced proportion (Figure 1). This result is surprisingly low compared with the results of other studies. Thus, several authors showed that lack of exercise and pasture lead to increasing feet-problems (3, 19). However, recent figures for the prevalence of lameness in European countries range from 22% (7) to 45% (20) for loose-housing systems and from almost 1% to 21% for systems in which cows are tied for at least part of the time (21). Lameness evaluation in cattle and the evaluation of gait abnormalities are subjective. The locomotion assessment system suggested by Sprecher and others (1997) was used because it presents clear and objective descriptions which differentiate between scores. Lameness represents a major welfare problem in dairy cows, inducing pain and long-term discomfort.

The body hygiene was evaluated through the percentage of the cows with the 3 and 4 scores in three body regions: lower and upper legs, flank and udder. A high percentage of 3 and 4 scores indicate a poor, unacceptable hygiene, with severe consequences on the cows' health, production and welfare. The obtained results indicate lower percentages of the 3 and 4 scores in the three body regions, comparative with the results of other studies (12, 21, 22). Also, one should note the low percentage of the dirty lower legs in comparison with the area of upper leg and flank, similar to the specifications in the scientific literature. It is asserted that cows housed in tie-stall shelters have more elevated hygiene scores in the body region of the upper leg and flank than in the area of lower leg, due to the decubital resting in the manure deposits in the stalls (12). This body region can also become dirty in poorly maintained stalls, with manure on the separating elements or through the movements of the dirty tail around the hind quarter of the body (21). The body hygiene assessment can provide more information about the animal's comfort and attitude of the stockperson and his attention for the animal.

The obtained results indicate that more than a half of the assessed cows were thin, which has negative impact on their health and welfare. The main causes affecting the dairy cows' welfare in small

farms in the North-East of Transylvania are inappropriate feeding and the tied housing system.

References

1. Broom DM. Welfare. In: Andrews AH, Blowey RW, Boyd H, Eddy RG, eds. *Bovine medicine: diseases and husbandry of cattle*. Oxford: Blackwell, 2004: 955-67.
2. Bowell VA, Rennie LJ, Tierney G, Lawrence AB, Haskell MJ. Relationship between building design, management system and dairy cow welfare. *Anim Welfare* 2003; 12: 547-52.
3. Regula G, Danuser J, Spycher B, Wechsler B. Health and welfare of dairy cows in different husbandry systems in Switzerland. *Prev Vet Med* 2004; 66: 247-64.
4. Bartussek H. An historical account of the development of the Animal Needs Index ANI-35L as part of the attempt to promote and regulate farm animal welfare in Austria: an example of the interaction between animal welfare science and society. *Acta Agric Scand A Anim Sci* 2001; 30: 34-41.
5. Capdeville J, Veissier I. A method of assessing welfare in loose housed dairy cows at farm level, focusing on animal observations. *Acta Agric Scand A Anim Sci* 2001, 30: 62-8.
6. Main DCJ, Whay HR, Green LE, Webster AJF. Effect of the RSPCA Freedom Food scheme on the welfare of dairy cattle. *Vet Rec* 2003; 153: 227-31.
7. Whay HR, Main DCJ, Green LE, Webster AJF. Assessment of the welfare of dairy cattle using animal-based measurements: direct observations and investigation of farm records. *Vet Rec* 2003; 153: 197-202.
8. Popescu S, Borda C, Lazar EA, Hegedüs IC. Assessment of dairy cow welfare in farms from Transylvania. In: *Proceedings of the 44th Croatian & 4th International Symposium on Agriculture*. Opatija, Croatia, 2009: 752-6.
9. Edmonson AJ, Lean IJ, Weaver LD, Farver T, Webster G. A body condition scoring chart for Holstein dairy cows. *J Dairy Sci* 1989; 72: 68-78.
10. Ferguson JD, Galligan DT, Thomsen N. Principal descriptors of body condition score in Holstein cows. *J Dairy Sci* 1994; 77: 2695-703.
11. Thomsen PT, Baadsgaard NP. Intra- and inter-observer agreement of a protocol for clinical examination of dairy cows. *Prev Vet Med* 2006; 75: 133-9.
12. Cook NB. The influence of barn design on dairy cow hygiene, lameness, and udder health. In: *Proceedings of the 35th Ann Conv Amer Assoc Bov*

Pract. Madison, 2002; 97-103.

13. Leeb CH, Main DCJ, Whay HR, Webster AJF. Bristol welfare assurance programme – cattle assessment. University of Bristol, UK 2004. <http://www.vetschool.bris.ac.uk>

14. Sprecher DJ, Hoesteler DE, Kaneene JB. A lameness scoring system that uses posture and gait to predict dairy cattle reproductive performance. *Theriogenology* 1997; 47: 1179-87.

15. Hemsworth PH, Coleman GJ, Barnett JL, Borg S, Dowling S. The effects of cognitive behavioral intervention on the attitude and behavior of stockpersons and the behavior and productivity of commercial dairy cows. *J Anim Sci* 2002; 80: 68-78.

16. Waiblinger S, Menke C, Fölsch DW. Influences on the avoidance and approach behaviour of dairy cows towards humans on 35 farms. *Appl Anim Behav Sci* 2003; 84: 23-39.

17. Waiblinger S, Menke C, Coleman G. The relationship between attitudes, personal characteristics and behaviour of stockpeople and subsequent behaviour and production of dairy cows. *Appl Anim*

Behav Sci 2002; 79: 195-219.

18. Thomsen PT, Østergaard S, Sørensen JT, Houe H. Loser cows in Danish dairy herds: definition, prevalence and consequences. *Prev Vet Med* 2007; 79: 116–35.

19. Hernandez-Mendo O, Von Keyserlingk MAG, Veira DM, Weary DM. Effects of pasture on lameness in dairy cows. *J Dairy Sci* 2007; 90: 1209-14.

20. Winckler C, Brill G. Lameness prevalence and behavioural traits in cubicle housed dairy herds: a field study. In: *Proceedings of the 13th International Symposium Conference on Lameness in Ruminants*. Maribor, Slovenia 2004: 160-1.

21. Zurbrigg K, Kelton D, Anderson N, Millman S. Tie-stall design and its relationship to lameness, injury, and cleanliness on 317 Ontario dairy farms. *J Dairy Sci* 2005; 88: 3201-10.

22. Popescu S, Borda C, Hegedüs IC, Sandru CD, Lazar E. Evaluation of the hygiene level in dairy shelters with Tie-stalls. *Bull Univ Agric Sci Vet Med Cluj–Napoca* 2009; 66: 253-8.

PRESOJA DOBREGA POČUTJA KRAV MOLZNIC V VEZANI REJI NA 52 MANJŠIH KMETIJAH V SEVERNOVZHODNI TRANSILVANIJI (ROMUNIJA) NA PODLAGI OCENJENIH ZUNANJIH LASTNOSTI ŽIVALI

S. Popescu, C. Borda, C. D. Sandru, R. Stefan, E. Lazar

Povzetek: Cilj dela je bil oceniti dobro počutje krav molznic na manjših kmetijah v severovzhodni regiji Transilvanije v Romuniji, na podlagi več parametrov, povezanih z živalmi: ocenjevanje telesne kondicije (BSC), telesne higiene (čistoča), šepanja, poškodb kože, kakovosti kožuha in razdalje pobega. Ocenjenih je bilo 473 krav molznic, nastanjenih v vezani reji na 52 manjših kmetijah (5-20 glav goved na kmetijo). S specifičnimi metodami so bili določeni kazalni parametri. Med 473 ovrednotenimi kravami molznicami je 267 krav (56,45 odstotka) imelo BSC med 1,5 in 2, kar pomeni, da so bile presuhe, 162 krav (34,25 odstotka) je na hrbtu imelo oslabiljeno dlako, 68 (14,38 odstotka) je na različnih delih telesa imelo poškodbe kože, 69 (14,95 odstotka) je ob pristopu opazovalca pokazalo strah in 23 (4,86 odstotka) je bilo zmerno šepavih. Rezultati 3 in 4 glede čistoče telesa so bili pri spodnjih delih okončin 11-odstotni, 14-odstotni v območju vimena in 19-odstotni v območju bokov in zgornjih delov okončin. Pokazalo se je, da je bila več kot polovica ocenjenih krav molznic presuha, kar ima negativen vpliv na njihovo zdravje in dobro počutje. Na dobro počutje krav molznic v severovzhodni Transilvaniji najbolj negativno vpliva neprimerno krmljenje in privezni sistem reje.

Ključne besede: telesna kondicija; telesna čistoča; šepanje; poškodbe kože