

THE STATE OF WELFARE ON SERBIAN DAIRY FARMS

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Abstract: The aim of this study was to analyze the overall welfare state on Serbian dairy farms, as well to suggest measures for its improvement. The assessment was done according to Welfare Quality® Assessment Protocol for Dairy Cows on 16 selected commercial farms in which the cows of Simmental and Holstein-Friesian breeds were reared (N=4833). Welfare state on each farm was evaluated by relevant measures that indicated insurance of appropriate feeding, housing, health and behavior as basic principles of welfare. Overall score (0-100 points) enabled finally categorization of farms into one of four welfare category (not classified, acceptable, enhanced and excellent). Based on results, half of the farms were assigned to acceptable, and other half to enhanced welfare category. Housing conditions on the majority of farms (63%) were assessed as unacceptable (≤ 20 points) due to poor hygiene and discomfort. Cows were kept tied continuously on more than one third of farms which together with lack of pasture (17 days/year on average) restricting their comfort and freedom of movement. This may be also linked to low scored behavioral insurance (32 points), especially inability to express its natural forms (6.7 points). Health condition was estimated as acceptable, but endangered welfare by high incidence of laminitis (38%), distocya (4.2%) and mortality (6.7%). Commonly performed dehorning procedure (79%) without anesthetic/analgesic application caused pain and stress in affected animals. Overall assessment score (2.5/5) showed the need for improvement in all areas of dairy cows' welfare, especially in terms of their housing and management.

Keywords: welfare assessment, feeding, housing, health, behavior

Introduction

Broom (1986) describes welfare as a state of well-being of the animals, which is created as a response to its attempts to cope with the impacts of the

environment. It means to establish control over the mental and physical stability. Since the response to a particular challenge of the environment can be one or more of combat strategies (behavioral, physiological, immunological, etc.), there is a wide range of indicators of animal welfare that can be used to assess and determine the level of its quality. Analysis of the state of welfare is the first step in defining strategies for improvement, which is of great significance considering that the concern about the welfare of farm animals is not only to the benefit of animals, but also people with concurrent positive effects on environmental protection (*Gregory 1993; Scanga et al., 1998; Cook, 2004; Hill et al., 2007; Lindenlauf et al., 2010*).

At the present time, taking into account the gravity and exposure to impacts that threaten the animal welfare, as well as the number of farmed animals, the issue of welfare of dairy cows is second to the welfare of broiler chickens in Europe (*EFSA, 2009*). Defining, implementation, analysis of the relevance and development of standards for the protection of animal welfare on cattle farms have become a very important topic in the late 20th and early 21st century. Protecting the welfare of dairy cows is a complex issue, which involves a range of different aspects and requires urgent action in changing the genetic selection and system of management. The most interested parties are consumers of animal products and agricultural producers, but also all those who are directly or indirectly involved in the production of food. In addition, the protection of the welfare of dairy cows is associated with environmental issues, sustainable development, and a whole range of medical, hygienic, economic and social problems of a society.

In Serbia, in 2009, the Animal Welfare Law was passed and related regulations for the protection of animal welfare on farms, during transport and during their stay at the slaughterhouse, however, the technical and scientific analysis of the application of these regulations are not yet completed. Previous studies in the field of welfare of cattle in our country are mostly fragmented and analyze certain aspects of the quality of animal welfare (*Hristov et al., 2006, 2008, 2011; Ostojić Andrić et al., 2011, 2012, 2015, 2016*). Bearing in mind that, in our country, the interest in the welfare of farm animals is growing, not only among consumers of animal products, but also the producers, these investigations are becoming more necessary.

The aim of this study was to analyze the factors of importance for ensuring the animal welfare, to show the average condition/status of welfare on dairy farms in Serbia, as well as to indicate the key risks to the welfare and propose measures for its improvement.

Materials and Methods

The study was conducted on a total of 16 farms with different housing (tied, free) and different capacity (small, medium, large) in which the cattle of

Simmental and Holstein - Friesian breeds were reared. Minimum number of cows in the sample was 30 and the average per farm was 64 animals in two repetitions - during winter and summer season. The welfare assessment was done by the *Welfare Quality® Assessment Protocol for Dairy Cows (2009)* that is specifically designed to assess relevant indicators of welfare from the viewpoint of the animals themselves. The protocol includes 29 indicators used to determine the 12 criteria: the absence of long-term hunger and thirst, comfort, thermal comfort, freedom of movement, lack of injuries and illness, absence of pain due to management procedures, expressing social and other behaviours, good human - animal relations and a positive emotional state. By aggregation of these criteria the values of 4 basic principles of welfare are determined: good nutrition, good housing, good health and appropriate behavior. Welfare state was (partialy and overall) determined by classifying each criteria and principle into one of four categories of welfare quality according to score (0-100 points) and given descriptive rating scale (1-4): 1-unacceptable (<20 points), 2-acceptable (20-55 points), 3-enhanced (55-80 points) and 4-excellent (>80 points).

Data processing and categorization of welfare quality of the investigated dairy farms was conducted using software specially developed under the Protocol, and the respective statistical parameters were analyzed with the program StatSoft. Inc. (2004), Statistica for Windows version 7.

Results and discussion

Overall welfare assessment

The overall assessment of the welfare quality of the dairy farms in Serbia was conducted by collecting data relating to the principles of good nutrition, good housing, good health and appropriate behaviour. Software analysis showed the overall state of welfare, i.e. the categorization of farms as unacceptable (score 1), acceptable (score 2), enhanced (score 3) and the welfare of excellent quality (score 4).

Table 1. Categorization of Serbian dairy farms (N=16) according to overall welfare assessment

Farms (1 - 16)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Overall welfare assessment (descriptive rating scale from 1 to 4)	2	2	2	3	2	3	3	3	3	3	2	2	3	2	3	2

Research results (Table 1) show that one-half of the surveyed farms is classified as acceptable (score 2) and the other half is classified into the category of welfare of enhanced quality (score 3). None of the studied farms are classified into categories of unacceptable (score 1) or excellent (score 4) quality on the basis of which it can be argued that on the observed farms the conditions are provided that meet more than the basic needs of animals in terms of nutrition, health, comfort in housing and expression of behavior of cows. By comparison, a survey conducted by the same methodology on farms in the EU (*Welfare Quality Network, 2012*) showed a great similarity with the results presented in this research. In 2012, the share of farms with an acceptable quality of welfare in the EU was 47%, with acceptable quality 51%, and with unacceptable quality of welfare 2%, while in our country none of the evaluated farms are classified in the latter category.

Good feeding

According to the results presented in Table 2, nutrition of dairy cows, at least when it comes to the lack of long-term starvation and thirst, is not a problem on our farms as opposed to Europe, whose score on average is lower. Most of the observed farms (44%) showed the value of this principle in the range from 90 - 100 points and only 6.25% showed the value of less than 20 points. The average value of the principle of good nutrition on farms in the EU stood at 52.3, and in Serbia 76 points with similar variation - S (28.5 vs. 25.31, respectively). Greater deviations from optimal are present in tied system compared to the free range system, especially when it comes to the share of cows of fattened condition (4.27%). It is known that, same as malnutrition, enhanced fattening of cows can also lead to problems in breeding, especially in terms of reduced reproductive capacity, difficulties in calving and fatty degeneration of the liver (*Reid et al., 1986*). Therefore, it is obvious that in our conditions, greater attention should be paid to proper balanced diet and its qualitative rather than quantitative aspects.

Table 2. Animal welfare status of Serbian dairy farms (Total score and categorization of welfare principles/criteria)

Welfare principles/criteria	\bar{x}	<i>SD</i>	S^2	<i>Min</i>	<i>Max</i>	<i>Welfare Categories</i>
I Good feeding	75.97	25.31	640.39	12.20	100.00	Enhanced
1. Absence of prolonged hunger	78.84	19.51	380.77	40.30	100.00	Enhanced
2. Absence of prolonged thirst	88.41	29.58	875.02	3.00	100.00	Excellent
II Good housing	36.59	19.37	375.18	7.30	65.40	Acceptable
1. Comfort around resting	25.77	12.50	156.32	2.70	45.10	Acceptable
2. Freedom of movement	56.94	39.25	1540.58	15.00	100.00	Enhanced
III Good health	41.17	8.11	65.78	23.90	56.60	Acceptable
1. Absence of injuries	51.57	14.85	220.40	21.00	81.10	Acceptable
2. Absence of diseases	59.53	21.67	469.70	30.20	100.00	Enhanced
3. Absence of pain induced by management procedures	41.00	28.86	833.03	20.00	100.00	Acceptable
IV Appropriate behavior	31.93	13.77	189.50	15.40	81.10	Acceptable
1. Expression of social behaviour	98.68	1.42	2.01	95.00	100.00	Excellent
2. Expression of other behaviours	6.73	20.23	409.38	0.00	79.10	Unacceptable
3. Good human-animal relationship	64.10	20.25	410.20	24.40	93.90	Enhanced
4. Positive emotional state	50.74	20.90	436.80	10.20	92.70	Acceptable
Overall welfare assessment, average value (1-4)	2.47	0.51	0.26	2.00	3.00	Acceptable

Good housing

Poor housing conditions are certainly one of the most significant welfare problems in our country. This is at the same time field of welfare in which, according to the results of the research, there are largest deviations in relation to the situation in EU countries. The housing conditions on the largest number of dairy farms (31.25%) were evaluated as unacceptable while in the EU the largest number of farms (50%) rated acceptable to the enhanced quality score (*Welfare Quality Network, 2012*). This observation is further confirmed by the fact that in our study none of the farms is rated excellent category while in the EU 2% of farms are classified within this category.

Analysis of indicators of housing conditions suggests that the main reason for this condition is primarily poor cow comfort. The comfort conditions are

estimated as poor on the basis of high share of cows that lie outside the bed (36.54%), which may be the result of inadequate or insufficiently sized beds. In addition, the farms surveyed showed a very poor state of hygiene of dairy cows with a high percentage of cows with contaminated parts of the lower leg (84.64%), rump (71.34%) and udder (60.07%). This indicates inadequate hygiene of cow beds and facilities, insufficient amount of bedding, but it can also be an indicator of the disorder in rumen digestion (*Huxley and Whay, 2006*). Extended time of cow's lying down of 6.25 seconds was also one of the indicators of cows' discomfort and in this case constituted a high incidence of laminitis (37.45%).

Although the freedom of movement of dairy cows on nearly half of the observed farms was scored as excellent, one third of farms showed unacceptable scores in evaluation of this criterion. The main reason for the limited freedom of movement is tied system of housing applied on six of the sixteen examined farms and especially rare use of grazing which was practiced only on two farms. By comparison, in the EU, in recent years the freedom of movement of dairy cows has significantly improved resulting in a maximum score for this welfare criterion in 2012 (*Welfare Quality Network, 2012*). The importance of ensuring freedom of movement is reflected in its positive impact on the comfort and health of dairy cows as well as to the expression of normal behavior patterns.

Good health

The health status of dairy cows on 81.25% of farms was scored as acceptable and on 18.75% as enhanced. The above-mentioned results are very encouraging when compared with estimates of this principle in EU countries (*Welfare Quality Network, 2012*). In fact, despite of poorer housing conditions established on farms in our country, the average score is similar to the health status assessed on farms in the EU where the housing conditions are significantly more acceptable in terms of welfare. A possible reason for this phenomenon is the increased average milk yield of cows on European farms and greater exposure to selective pressures. However, it was found that certain diseases and disorders in the examined farms in Serbia represent a risk to the welfare of farmed animals. Such is the case with the incidence of dystocia and laminitis (4.18% and 37.45%), which combined with a high mortality rate (6.70%) represent serious welfare problems.

In Serbia, one of the major welfare problems certainly is dehorning of calves, done without the use of analgesics and anesthetics, which leads to activation of the chain reaction of pain - stress - distress and endangering physical condition and behavior of animals (*Anderson and Muir, 2005*). Given the objective of dehorning, animals grown in free systems are more exposed to this danger. In most European countries the use of anesthetics and analgesics, to a lesser extent, is applied as standard procedure and is expected to soon become part of the protocol in Serbia.

Appropriate behavior

The values of this principle criteria (Table 2) indicate that opportunities for securing appropriate behavior on farms in Serbia, on average, are lower than the same in the EU. The greatest number of the examined farms (87.5%) is estimated in the range from 21 to 50 points, which corresponds to acceptable score. The average value of this principle was about 32 points while the farms in the EU (*Welfare Quality Network, 2012*) show slightly higher value (43 points) with a similar variability - S (13 vs. 15 points, respectively). Similar to the results of the assessment presented here, also in the EU the largest number of farms (59%) are scored as acceptable in regard to this principle, but compared to farms in Serbia, where only 6.25% of farms showed enhanced score for this criterion, 35% of farms in the EU are scored as enhanced.

The highest deviation in the negative sense, was identified in the expression of behavior characteristic for grazing on pastures, which the majority of examined farms (87.5%) did not practice. This can be considered a high risk to the welfare, given the importance and positive impact of grazing in terms of providing good health and productivity (*Krohn, 1994; White et al., 2001*).

The interaction between animals and people, i.e. their experience of people and mutual interactions have a major impact on health, productivity and welfare of farm animals, which is why they are considered as a significant indicator in the assessment of their welfare (*Hemsworth and Coleman, 2011; Waiblinger et al., 2003*). The average value of the criterion the good man-animal relationship was 64.1 points, with 43.75% of the farms scored as appropriate and as many as 25% of farms as excellent in regard to this criterion. According to the results of the *Welfare Quality Network (2012)*, average rating of this criterion on farms in the EU is 51.5 points, with only 8% of the farms scoring excellent and 50% of the farms scoring acceptable. This suggests that the relationship between breeders and cows in Serbia is satisfactory and on average even better than on the farms in the EU.

Conclusion

The results of the research of welfare on dairy farms in Serbia indicate that the quality of welfare in general is satisfactory, and that the dairy cows on average have slightly higher than minimum of their needs satisfied in terms of nutrition, housing conditions, securing appropriate health status and behavior. However, there is considerable room for improvement of the current situation, particularly with regard to the identified welfare risks. As the most significant welfare problems on dairy farms in Serbia the following can be emphasized: inadequate

housing conditions, health disorders, dehorning, problems of inadequate nutrition and expression of normal behaviour.

In regard to the identified major risk factors and current trends in the dairy cattle as recommendations for improvement of welfare, the following measures are proposed:

- Ensuring the appropriate space and comfort for keeping dairy cows;
- Ensuring the adequate size, quality and hygiene of the cow beds;
- Ensuring the greater freedom of movement of cows using the free housing system and grazing
- Optimal balancing of diet and continuous monitoring of physical fitness as an important indicator of many factors of welfare risk;
- Application of anesthetic and analgesic medications when dehorning as a pain management procedure;
- Prevention and control of diseases of the locomotor system, in the first place laminitis;
- Prevention and control of mastitis, metabolic and reproductive disorders;
- Improvement of breeding-selection program by defining the optimum balance between production and non-production traits;
- Education of farmers about the importance of ensuring the welfare of dairy cows and farm animals in general;
- Compliance with legal regulations and the constitution of national institutions for monitoring and controlling the quality of the welfare of farm animals;
- Consumer information and development of *animal - friendly* market as a direct support system in which production is carried out with the concern for animal welfare.

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Stanje dobrobiti na mlečnim farmama u Srbiji

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Rezime

Cilj ovog istraživanja bio je da se analizira stanje dobrobiti na mlečnim farmama u Srbiji, kao i da se predlože mere za njegovo unapređenje. Ocena stanja dobrobiti obavljena je putem Protokola za ocenu kvaliteta dobrobiti mlečnih krava na 16 odabranih komercijalnih farmi na kojima su gajene krave simentalске i holštajn-frizijske rase (N=4833). Stanje dobrobiti na svakoj od farmi procenjeno je na osnovu relevantnih pokazatelja koji ukazuju na stepen obezbeđenja odgovarajuće ishrane, uslova držanja, zdravlja i ponašanja kao osnovnih principa dobrobiti. Ukupan skor (0-100 poena) omogućio je konačnu kategorizaciju farmi u jednu od četiri kategorije stanja kvaliteta dobrobiti (nezadovoljavajuću, prihvatljivu, odgovarajuću i odličnu). Prema rezultatima istraživanja, jedna polovina farmi svrstana je u kategoriju prihvatljivog, a druga polovina farmi u kategoriju odgovarajućeg kvaliteta dobrobiti. Uslovi držanja su na većini farmi (63%) ocenjeni nezadovoljavajuće (≤ 20 poena) zbog loše higijene i diskomforta. Na više od trećine farmi krave su držane vezano tokom cele godine, što udruženo sa slabom primenom ispaše (17 dana/godini prosečno) značajno ograničava njihov komfor i slobodu kretanja. Ovo je svakako u vezi i sa niskom ocenom obezbeđenja odgovarajućeg ponašanja (32 poena), posebno kada je u pitanju mogućnost ispoljavanja njegovih prirodnih oblika (6.7 poena). Zdravstveno stanje u proseku je ocenjeno kao prihvatljivo, ali su visoka incidenca laminitisa (38%), otežanih telenja (4.2%) i mortalitet (6.7%) prepoznati kao glavni činioci rizika po dobrobit. Uobičajena praksa izvođenja obezrožavanja (79%) bez primene anestetika/analgetika na farmama u Srbiji uzrok je bola i stresa kod životinja. Prosečan skor celokupno ocenjene dobrobiti (2.5/5) ukazuje na potrebu za unapređenjem u svim segmentima obezbeđenja dobrobiti mlečnih krava, posebno menadžmenta i uslova držanja.

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