WELFARE AND BIOSECURITY INDICATORS EVALUATION IN DAIRY PRODUCTION

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Abstract: Evaluation of welfare and biosecurity indicators: (1) management, planning and organization of welfare protection and biosecurity, (2) personnel capacities in providing welfare and biosecurity, (3) breeders attitude towards animals needs, (4) welfare and biosecurity plans, (5) animals surveillance and inspection, (6) animal treatment, (7) spacing and housing, (8) microclimate and (9) hygienic conditions, (10) feeding and watering, (11) behaviour, (12) health status, (13) productivity, (14) distress indicators and (15) biosecurity results on two dairy farms are given in this paper. Methods developed by Sandrum et al. (1994), Bartussek (2000), Keeling and Veisseir (2005) and Blokhuis (2008), modified for domestic growing conditions, were used to create parameters and indicators of welfare and biosecurity. Therefore, grade scale was defined: (5) – excellent, (4) – very good, (3) – good, (2) – sufficient, (1) – insufficient, but there are resources for improvement, (0) insufficient, with no resources for improvement. Final rank was formed as average indicators grade, according scale: 0-1,99 insufficient, 2,00-2,49 sufficient, 2,5-3,49 good, 3,5 – 4,49 very good, 4,5 – 5,00 excellent. SWOT analysis was also used to establish advantages, limitations and possibilities for animal welfare and biosecurity of production improvement. The most important limitations are considering lack of training of personnel to fulfil standards and lack of welfare and biosecurity plans and all technology procedures descriptions, failures to fulfil spacing, microclimate and hygienic conditions, which had deleterious reflection on health status and production. Full circle indicators list with a numerous parameters could be useful for systematic evaluation of welfare and biosecurity quality.

Key words: indicators, welfare, biosecurity, dairy

Introduction

Animal welfare and biosecurity on dairy farms becomes more important as part of growing technology and herd health protection. Welfare of dairy cows is measured through level of accommodation to living conditions which assure
quality in respect of feeding and watering, spacing, physical, mental and thermal comfort, basic behavioural patterns expression, social contacts with other cows, absence of unpleasant emotional and somatic experiences, such as pain, suffering, fear, stress, boredom, diseases and injuries (Broom, 1996, Bracke, 2001; Hristov et al., 2007b).

Detail description of welfare and biosecurity on farms is presented by Hristov et al. (2008). The most important aspects of obtaining welfare in farm rearing conditions were presented in review paper by Hristov et al. (2007b). Minimal standards regarding rearing conditions and welfare of cows were given in paper by Hristov et al. (2007a). Spacing assessment results regarding welfare were presented by Hristov and Relić (2009), and microclimate and hygienic conditions by Hristov et al. (2006). Assessment of rearing conditions and welfare of dairy cows were given by Maksimović and Hristov (2007), as well as by Relić et al. (2008). The most significant failures in obtaining welfare for dairy cows were presented by Hristov and Stanković (2009).

Farm level biosecurity is a type of risk management. When considering farm level biosecurity, it is useful to think simultaneously about three related concepts: biosecurity planning, Hazard Analysis and Critical Control Points (HACCP), and risk management. Biosecurity plans are for prevention of some negative event and for the improvement of business (Uhlehoop, 2007). Biosecurity measures were presented by Hristov et al. (2007), as well as the most significant failures in biosecurity obtaining by Stanković and Hristov (2009).

Literature data point the need to investigate numerous welfare and biosecurity indicators on dairy (Bartussek et al., 2000; Rousing 2000; Bracke et al., 2001; Blockhius, 2008). There are many parameters and other elements which are very useful in qualitative and quantitative evaluation of these indicators.

Regarding presented literature data, the purpose of this paper is assessment of the most important welfare and biosecurity indicators, using many parameters and elements for their qualitative and quantitative evaluation on two different sized dairy farms.

**Materials and Methods**

Evaluation of 15 welfare and biosecurity indicators, based on 284 qualitative and quantitative parameters, on two different sized dairy farms are presented in this paper. These indicators are: (1) management, planning and organization of welfare protection and biosecurity, (2) capacities of personnel in obtaining welfare and biosecurity, (3) farmers attitude to animals needs, (4) plan of welfare and biosecurity securing, (5) surveillance and inspection of the cows, (6) treatment of the cows, (7) spacing and rearing conditions, (8) microclimate conditions, (9)
Welfare and biosecurity indicators

hygiene conditions, (10) feeding and watering, (11) behaviour, (12) health status, (13) productivity, (14) distress indicators and (15) biosecurity.

Loose rearing system is practiced on both farms, farm A, with capacity of 260 cows, and farm B, with 100 cows, both accompanied by cows’ offspring.

Methods developed by Sandrum et al. (1994), Bartussek (2000), Keeling and Veisseir (2005), as well as Blokhuis (2008) were used in creating indicators of welfare of cows, which were modified for domestic rearing conditions. To evaluate parameters and welfare indicators, grades were defined in this way: (5) – excellent, (4) – very good, (3) – good, (2) – sufficient, (1) – insufficient, but with resources to be improved, (0) insufficient, but with no resources to be improved. Final grade was formed on average grade of indicators, and following scale: 0.00 – 1.99 insufficient, 2.00 - 2.49 sufficient, 2.50 - 3.49 good, 3.50 - 4.49 very good, and 4.50 - 5.00 excellent. Finally, SWOT analysis was performed in order to establish advantages, limitations and possibilities to improve dairy cows’ welfare and facility biosecurity.

Results and Discussion

Welfare and biosecurity indicators on two farms were presented in Table 1.

Table 1. Welfare and biosecurity indicators assessment on dairy farms

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number of parameters</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm</td>
<td>A, B</td>
<td>A, B</td>
</tr>
<tr>
<td>1. Managing, planning and organization of welfare</td>
<td>9</td>
<td>3.00, 1.44</td>
</tr>
<tr>
<td>2. Competence of employees concerning welfare</td>
<td>21</td>
<td>3.28, 1.76</td>
</tr>
<tr>
<td>3. Attitude of breeders towards animal needs</td>
<td>26</td>
<td>2.50, 2.27</td>
</tr>
<tr>
<td>4. Planning of securing animal welfare</td>
<td>11</td>
<td>3.00, 1.38</td>
</tr>
<tr>
<td>5. Monitoring and animal inspection</td>
<td>20</td>
<td>3.60, 2.45</td>
</tr>
<tr>
<td>6. Procedures with animals - handling</td>
<td>9</td>
<td>3.44, 2.11</td>
</tr>
<tr>
<td>7. Spatial breeding conditions</td>
<td>14</td>
<td>3.21, 2.21</td>
</tr>
<tr>
<td>8. Microclimatic breeding conditions</td>
<td>9</td>
<td>3.11, 2.89</td>
</tr>
<tr>
<td>9. Hygienic breeding conditions</td>
<td>11</td>
<td>3.09, 2.45</td>
</tr>
<tr>
<td>10. Food and water supplying for animals</td>
<td>34</td>
<td>3.91, 2.47</td>
</tr>
<tr>
<td>11. Requisitions for normal animal behavior manifesting</td>
<td>12</td>
<td>3.80, 2.90</td>
</tr>
<tr>
<td>12. Health care of animals</td>
<td>27</td>
<td>3.44, 1.96</td>
</tr>
<tr>
<td>13. Protection of animals from distress</td>
<td>10</td>
<td>3.50, 2.30</td>
</tr>
<tr>
<td>14. Animal biosecurity</td>
<td>59</td>
<td>3.40, 2.21</td>
</tr>
<tr>
<td>15. Animal productivity</td>
<td>22</td>
<td>3.81, 2.31</td>
</tr>
</tbody>
</table>

According presented in Table 1., welfare and biosecurity indicators were much better for farm A (2.50 - 3.91) than farm B (1.38 - 2.90). The lowest grade was given for attitude of breeders towards animal needs (2.50), while the highest grade was given for feeding and watering (3.91). Feeding and watering (3.91),
productivity (3.81), requisitions for normal animal behaviour manifesting (3.80) and monitoring and animal inspection (3.60) were estimated as very good. The other indicators were estimated as good, in range form 2.50 (attitude of breeders towards animal needs) to 3.50 (protection of animals from distress).

In contrast to previous farm, planning of securing animal welfare (1.38), managing, planning and organization of welfare (1.44), competence of employees concerning welfare (1.76) and health care (1.96) were estimated as insufficient at farm B. The other indicators were estimated as sufficient, in range from 2.11 (animal treatment) to 2.90 (requisitions for normal animal behaviour manifesting).

According SWOT analysis, it was established that the most common failures in dairy cows welfare assurance were absence of any of plans for welfare securing, biosecurity and animal health, as well as certain spatial, microclimate and hygiene conditions, which manifest as numerous technopathies, etopathies and decrease, diminish) of production. Bedding on both farms were very bad, regarding all categories on farm B, and lactating cows stable on farm A. Poor status of yards and manure storage area at farm B was noticed as well. Important failure in obtaining satisfying biosecurity level were lack of disinfecting wheel and footbaths on farm A, and insufficient level of isolation on farm B, regarding to lack of green perimeter and unsatisfactory division of certain technological operations, such as feeding and manure removing. Detailed analysis pointed major limitations in obtaining required welfare and biosecurity level consider lack of qualifications of personnel, lack of plans for securing welfare or biosecurity or protocols for procedures for entire process of production (Rushen and De Passile, 1998). General list of indicators with numerous parameters, applied in this paper could be useful in systematic evaluation of welfare and biosecurity level on farms in our country.

Current situation on our dairy farms is result of adaptations to actual financial potential for a long time, without possibilities for long termed planning. Production often makes no profit, and the most of welfare or biosecurity standards are not in use. Production technology is outdated, but old farms adaptations or new farms building up are seldom performed according the latest scientific data. Some of the breeders try to improve their farm technology, but it is mostly incomplete, or elemental, or without introduction of welfare and biosecurity standards (Hristov et al., 2006, 2008; Hristov and Stanković, 2009; Hristov and Relić, 2009).

Performed investigations made no doubt about fact that producers generally have no information at all or have enough information about their animals physical and mental needs (more about this issue was presented by Fraser and Broom, 1990; Webster, 2005; Vučinić, 2006), not only in ethical point of view, but following consequences for cows health and production. The most producers do not consider lack of locomotion, as well poor microclimate or unsuitable stable floors as threat for their production (Hristov et al., 2006, 2008). Furthermore, producers do not consider consequences of introducing new animals with unknown health status origin in their herd, as well as importance of regular and proper hygiene and sanitation (Hristov and Relić, 2009).
As result of consumers’ pressure and the latest knowledge application in developed dairy countries, dairy cows rearing concepts are changing, as well as technology of production, according animal needs. Welfare and biosecurity standards are introduced to dairy cows production, ensuring certain quality level in securing welfare and biosecurity farm, which might be considered acceptable for cow organism (Fraser and Broom, 1990; Rushen and De Passile, 1998; Bracke, 2001; Webster, 2005).

Conclusion

According evaluation of the most important welfare and biosecurity indicators on two dairy farms with intensive system of rearing, it could be concluded that:

- Results of evaluation were much better for farm A (2.50 - 3.91) than for farm B (1.38-2.90).
- welfare planning was evaluated as insufficient on farm B (1.38), as well as managing, planning and organization of welfare (1.44), competence of employees concerning welfare (1.76) and health care of animals (1.96).
- The most common failures in dairy cows welfare were absence of any of plans for welfare securing, biosecurity and animal health protection, as well as certain spatial, microclimate and hygiene conditions, which manifest as numerous technopathies, etopathies and production decline.
- It is necessary to define welfare and biosecurity standards in dairy cows production in our country, which should be base for planning and improvement of welfare on dairy farms.

Acknowledgment

Paper was financed by Project TR 20110 „Welfare and Biosecurity Standards Development and Implementation in Improvement of Dairy and Pork Production” of Ministry of Science and Technology Development of Republic of Serbia.

Procena indikatora dobrobiti i biosigurnosti u gajenju goveda

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Rezime

U radu se razmatraju rezultati procene najznačajnijih indikatora dobrobiti i biosigurnosti na dve farme goveda, i to: (1) upravljanje, planiranje i organizacija zaštite dobrobiti i biosigurnosti, (2) kapaciteti zaposlenih lica u vezi obezbeđenja dobrobiti i biosigurnosti, (3) odnos odgajivača prema potrebama životinja, (4) plan
obezbeđenja dobrobiti i biosigurnosti, (5) nadgledanje i inspekcija životinja, (6) postupci sa životinjama, (7) prostorni i smeštajni uslovi, (8) mikroklimatski uslovi i (9) higijenski uslovi, (10) ishrana i napajanje, (11) ponašanje, (12) zdravstveno stanje, (13) produktivnost, (14) indikatori distresa i (15) biosigurnost.


Najznačajnija ograničenja se odnose na neobučenost zaposlenih lica u vezi standarda i nepostojanje planova dobrobiti i biosigurnosti i opisa procedura za sve faze proizvodnje, propuste u obezbeđenju prostornih, mikroklimatskih i higijenskih uslova gajenja, što se negativno odražava na zdravstveno stanje i produktivnost životinja. Zaokružena lista indikatora sa većim brojem parametara može se koristiti za sistematičnu procenu stanja dobrobiti i biosigurnosti.

References


Received 31 May 2009; accepted for publication 15 August 2009