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The Basic Principles of Dairy Cattle Welfare Plan Creation and Implementation

Slavča Hristov[1], Branislav Stanković[1], Dušica Ostojić-Andrić[2]

[1]*Faculty of Agriculture, University of Belgrade, Republic of Serbia*
[2]*Institute for Animal Husbandry, Zemun–Belgrade, Republic of Serbia*

Abstract

In this review paper basic principles of dairy cattle welfare plan creation and implementation were given. The plan includes goals intended to be achieved related to specificities of dairy farm technology, selection of measures and procedures that have to be included, order and manner of measures and procedures description, as well as plan implementation.Efficiency and further sustainability of the plan implementation could be measured through differences between dairy cattle welfare level before and after the plan application using questionnaire containing complex indicators, such as: 1. planning, organisation and implementation of dairy cattle welfare standards, 2. competence of employees in relation to dairy cattle welfare, 3. stock-keeper attitudes towards dairy cattle behavioural needs, 4. monitoring and inspection of dairy cattle and equipment, 5. handling of dairy cattle, 6. feeding and watering of dairy cattle, 7. accommodation, microclimate and sanitary conditions on farm, 8. hygiene and body care of the dairy cattle, 9. production and reproduction of dairy cattle and 10. behaviour and health status of dairy cattle.Stock-keeper should define and write the plan in close cooperation with veterinarian and other professionals, when necessary, experts and technical persons who are engaged in providing advice on production technology especially engineers of animal husbandry. At least once a year, it is necessary to reconsider and supplement the plan by current scientific knowledge and new practical experience.

Key words: welfare, plan, creation, implementation, dairy farm

Introduction

In modern dairy cattle production, as well as production in other sector and areas of agriculture, the key issue is proper planning of all relevant activities. The planning involves many aspects of complex technological process of farming and production of all dairy cattle categories. One of the key pillars of the planning is dairy cattle welfare plan. This plan is necessary to define, create and implement in a professional manner with consideration of all components in it, as well as ways of their management and control. Stock-keeper should develop, define and write the plan attached to the welfare of dairy cattle in close cooperation with veterinarian and other professionals, when necessary, experts and technical persons who are engaged in providing advice in production technology, especially engineers of animal husbandry. Particularly important aspect is regular analysis of the plan implementation, reviewing and updating every year. Stock-keeper, veterinarian and the other professionals have to bear in mind that the plan should set out overall dairy cattle welfare, health and husbandry activities that cover complete year cycle of production, and essentially include strategies to prevent, treat or limit disease problems. It is also very important that the plan should include records that enable stock-keeper and veterinarian to regularly monitor and assess the welfare of every animal in the herd (Anon., 2003; FAO and IDF, 2011; Anon., 2014).

The basis for the definition of the plan could be found in the publications that consider welfare of cattle (Broom and Fraser, 2007), welfare of dairy cattle - today and tomorrow (Hristov et al., 2012a), welfare of dairy cattle - key concepts and the role of science (von Keyserlingk et al., 2009), application of methods to assess the welfare of dairy cows on farms in Serbia (Relić et al., 2010), different approaches to assess the welfare of dairy cows with some results in Serbia (Hristov et al., 2014a), the most significant failures in the provision of animal welfare on cattle farms (Hristov and Stanković, 2009) and associations between variables of routine herd data and dairy cattle welfare indicators (de Vries et al., 2011).

In this review paper basic principles of dairy cattle welfare plan creation and implementation were given. The plan includes goals intended to be achieved related to specificities of dairy farm technology, selection of measures and procedures that have to be included, order and manner of measures and procedures description, as well as plan implementation.

Components of dairy cattle welfare plan

As results of national project (Anon., 2011) the standards of dairy cattle welfare were initiated in Serbia. These standards are described in publications by Hristov et al. (2010) and Hristov and Stanković (2014). They are based on study of the current state of dairy cattle welfare in the country as well as the standards prescribed in specific guides, such as code of recommendations for the cattle welfare (Anon., 2003) and guide to good dairy farming practice (FAO and IDF, 2011) and detailed consideration of scientific report on the effects of farming systems on dairy cow welfare and disease (EFSA, 2009), opinion on the welfare of the dairy cow (FAWC, 2009) and publication on implementing effective standards and scoring systems for assessing animal welfare on farms (Grandin, 2010a). The standards include written dairy cattle welfare plan, competence of stock-keeper, dairy cattle specialist competence, space, microclimate and hygienic conditions on farm, veterinary and zootechnic practices, health status, satisfaction of dairy cattle behaviour needs, some physiological and behavioural indicators and finally production indicators. The most important components of the plan are related to health, nutrition and watering of dairy cattle, housing and proper management of technological process as a whole (Hristov and Stanković, 2014).

The part of welfare plan that refers to animal health take into account the development of biosecurity standards on dairy farm, which are generally based on disease risk assessments, internationally accepted best practices and best-available science that can help mitigate disease. In essence, the biosecurity part of dairy cattle welfare plan addresses the risks associated with diseases and pests by focusing on three key actions: prevent the introduction of pathogens to cattle on dairy farms, prevent the spread of pathogens among cattle within a dairy farm and prevent the spread of pathogens between dairy farms or from dairy farms to other animal populations (Anon., 2013). In this part of the plan are defined all necessary measures that include good management of husbandry, good hygiene, reducing stress on the herd, effective disease control systems such as vaccination and worming program. The part of the plan also includes a special section that discusses the specific procedures to sick and injures animals (Stanković and Hristov, 2014). When it comes to diseases in our country were considered the most common health disorders and welfare of dairy cows and calves (Stanković et al., 2014a) and reproductive and related

disorders on dairy farms with different levels of welfare quality (Stanković et al., 2014b).

Substantially very important aspect of dairy cattle welfare plan related to regular use of body condition scoring which can contribute greatly to good husbandry and facilitate to avoid costly welfare problems. The method will be of benefit if stock-keeper uses it as a routine management tool to check that dairy cattle are in the target condition for each stage of the production cycle, particularly at drying off or weaning, calving, peak yield and early lactation (Anon., 2003; Grandin, 2010a). Early lactation in dairy cows is particularly important problem because of the negative energy balance (Ostojić-Andrić, 2013).

Stockmanship has the most significant influence on the welfare of dairy cattle. Competences of stock-keeper in terms of the welfare of dairy cattle have fundamental importance. These competencies include knowledge, skills and attitudes that stock-keeper have on this very complex issue. Knowledge mainly refers to the understanding of the basic physiological and behavioural needs of dairy cattle while skills are more associated with the manner of securing resources for the maintenance of well-being of the animals (Rushen and de Passillé, 2010; Anon, 2014). All stock-keepers should be competent for maintaining good health and well-being of dairy cattle, which should include the following procedures: marking of the animals, handling of the animals, milking, castration, dehorning of calves, prevention and treatment of primary or common types of lameness, control of mastitis, prevention and treatment of diseases caused by internal and external parasites and providing proper care to sick and injured animals. It is particularly important that stock-keepers are trained to provide assistance to cows at calving, if it is part of their duties. If stock-keepers is expected to perform specific duties on the farm, such as trimming hooves or calf dehorning, then they must have appropriate training. Otherwise, it is necessary to employ a veterinarian or, for some special duties, qualified and trained workers under contract (Anon., 2003; Anon., 2014).

In creation the part of the plan that related to provision of feed, water and other substances stock-keeper should have in mind that the animals shall be fed with high-quality diet which is appropriate to species, age and production and available in sufficient quantity to satisfy nutritional needs, maintain good health and promote a positive state of well-being. In additional to sufficient food all animals shall ether have access to a suitable

water supply and be provided with an adequate supply of fresh drinking water every day (Anon., 2003; Anon., 2014).

According to all analyzed guidelines (Anon., 2003, FAO and IDF, 2011; Anon., 2014), when define and create the part of the plan that relating of dairy cattle housing stock-keeper special attention should focus on ensuring that the materials used for the construction of pens, cubicles, equipment and other facilities are not harmful to the animals and allow thoroughly cleaning and disinfection. Where the animals are kept in a building they shall be kept on or have access at all the time to the lying area which either has well maintained dry bedding or surface that is well-drained. The freedom of movement of the animals regarding the species and in accordance with established experience and scientific knowledge shall not be restricted in such a way to cause unnecessary pain, stress, injury and suffering of animals. Animals should be given space appropriate to their physiological and ethological needs in accordance with established practical experience and current scientific knowledge. For the dairy cattle welfare essentially is providing suitable conditions in terms of straw yards, cubicles, cowsheds, space allowances, ventilation, lighting and equipment. All mechanical and automated equipment essential for the health and well-being of the animals should be inspected at least once a day to check that properly function and there is no defect in it. In the part relating to management, stock-keeper should have in mind that dairy cattle not kept in building should be given protection from adverse weather conditions, predators and risk to their health and shall, at all the time, have access to a well-drained lying area where necessary and possible. Some methods for assessment of housing conditions regarding the welfare of dairy cows are given in the paper by Hristov and Relić (2009).

Efficiency and further sustainability of dairy cattle plan implementation

Efficiency and further sustainability of dairy cattle plan implementation could be considered through differences between cattle welfare level before and after plan application using questionnaire containing complex indicators, such as: 1. planning, organisation and implementation of dairy cattle welfare standards, 2. competence of employees in relation to dairy cattle welfare, 3. stock-keeper attitudes towards dairy cattle behavioural needs, 4. monitoring and inspection of dairy cattle and equipment, 5. handling of dairy cattle, 6. feeding and watering of dairy

cattle, 7. accommodation, microclimate and sanitary condition on farm, 8. hygiene and body care of the dairy cattle, 9. production and reproduction and 10. behaviour and health status of dairy cattle.

Selection and implementation of indicators in assessment of dairy cows welfare were considered by Ostojić-Andrić et al. (2013). The most important indicators of dairy cows welfare evaluation were described by Hristov et al. (2012b). Different approaches to assess the welfare of dairy cows with some results in Serbia were reviewed by Hristov et al. (2014). Earlier Whay et al. (2003) in their paper were discussed assessment of the welfare of dairy cattle using animal-based measurements during direct observations and investigation of farm records. Scientific opinion on the use of animal-based measures to assess welfare of dairy cows could be found in the report published by EFSA (2012).

The four basic principles that are detailed in the Welfare Quality® assessment protocol for cattle (Anon., 2009) and observed through the expression of adequate criteria and indicators are: 1. the principle of provision of food and water to animal, 2. the principle of ensuring adequate housing conditions, 3. the principle of ensuring good health and 4. the principle of ensuring the appropriate behaviour. Comprehensive assessment of the welfare quality on dairy cow farms based on the protocol was performed by Ostojić-Andrić (2013) in her doctoral dissertation. The same protocol to assessment the welfare of cows in free housing system was used by Hristov et al. (2011b). Somewhat earlier dairy cows welfare quality in loose versus tie housing system were reconsidered by Ostojić-Andrić et al. (2011).

The aim of the monitoring of dairy cattle welfare indicators is to identify and determine the severity of the problem that endangers or impairs the welfare of the animals. Identification of cattle welfare problems could be achieved through general clinical examination of animals, special and specific examination of animals, examination of the housing system, handling of animals and the relationship of the stock-keeper to the animals. Therefore, special attention should be given to how to improve livestock handling and reduce stress (Grandin, 2010b). Assessments of the seriousness of the problems that disturb dairy cattle welfare should take into account duration of causes and the number of animals for which the well-being is threatened or violated (EFSA, 2009; FAWC, 2009; Hristov and Stanković, 2009; EFSA, 2012). It is very important that there are associations between variables of routine herd data and dairy cattle welfare

indicators (de Vries et al., 2011) and relationship between rearing system, animal needs index and dairy cows milk traits (Hristov et al., 2014b).

One of the most important dairy cattle welfare problems are locomotion disorders. The most significant predisposing factors and causes of lameness of dairy cows were described by Hristov et al., (2011c). Hoof diseases make 90% of all the problems associated with locomotion apparatus disorders that cause lameness. The most frequent are laminitis, digital dermatitis and hoof ulcer. Locomotion disorders severely affect the welfare of dairy cattle and their production in the sense of milk production. The rise of the cost and a decrease of the financial effect of keeping dairy cows are also influenced by the expenses of the reproductive disorders and mastitis treatment, as well as large number of culled cows and discarding of the milk due to the withdrawal period (Zlatanović et al., 2012).

Great care for calves, particularly when stock-keeper purchases calves from a number of sources, should be part of written health and welfare plan. As calves are more susceptible to a number of diseases, good hygiene is essential, particularly with the equipment and utensils used artificially to rear calves. Particular attention should be given to the planning the inspection, procedures with sick and injured calves, providing feed, water and other substances, housing (floors, bedding and lying area, cleansing and disinfection), moving and selling calves, castration, disbudding or dehorning and removing a supernumerary teats. The most significant welfare problems in dairy calves in intensive rearing conditions have been investigated by Hristov et al. (2011a). These problems mainly result from insufficient intake of colostrum (separation from the dam), inadequate ventilation (resulting in inappropriate airflow, low or high temperatures, high humidity and poor air quality), poor floor conditions (wet floor, floor without bedding), poor monitoring of health, exposure to pathogens causing respiratory and gastrointestinal disorders and occurrence of iron deficiency. In addition, on cattle farms in our country welfare problems in calves originate from continuous restocking (no "all in - all out") and mixing calves from different sources, as well as insufficiently balanced solid food, lacking access to water and generally poor response of stock-keeper to health problems, especially required dietary changes. A special welfare problem is insufficient floor space allowance which results in calf discomfort.

Farm managers must provide a sufficient number of competent and motivated stock- keepers who will take care of every individual in the herd, all categories of dairy cattle, particularly newborn calves. Motivated

employed persons should be properly introduced to the physiological and ethological needs of dairy cattle, and to be trained to protect of the animals against all possible or expected the welfare problems, before are given any obligation. This means that the stock-keepers should possess specific knowledge and skills, which can develop on-farm by working with a skilled stock-keeper who already has experience in the relevant field of dairy cattle welfare. Wherever possible, stock-keepers should attend courses organized by relevant organizations for dairy cattle welfare training (Anon., 2003; Anon., 2014).

At least once a year it is necessary to reconsider and supplement the plan with new practical and current scientific knowledge. This plan should include veterinary and technological activities covering the entire cycle of production and include strategies of prevention, treatment and reduction of existing welfare problems. The plan should include sufficient information to enable assessment of the production of the herd as a whole and estimation of the animal welfare and biosecurity. For all activities as planned, there should be records that would enable stock-keeper to continuously monitor and control the herd health and welfare (Anon., 2003; Anon., 2014).

The health and welfare of dairy cattle depends on them being regularly inspected. All stock-keepers should be familiar with the normal behaviour of dairy cattle and should observe for any signs of stress, distress or disease. To do this, it is important that stock-keepers have enough time to inspect the animals, check equipment and take action to deal with any dairy cattle welfare problem (Rushen and de Passillé, 2010).

Conclusion

On the basis of literature data about the basic principles of dairy cattle welfare plan creation and implementation and experience of authors it could be concluded:

- stock-keepers should be familiar with the basic principles of dairy cattle welfare plan creation and implementation;
- the plan should include goals in the field of dairy cattle welfare intended to be achieved;
- special attention should be addressed to the selection of measures and procedures that have to be included in dairy cattle welfare plan;
- particularly important aspect is regular analysis of the plan implementation, reviewing and updating every year;

- efficiency and further sustainability of dairy cattle plan implementation could be measured through differences between cattle welfare level before and after plan application by using appropriate indicators.

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Osnovni principi kreiranja i implementacije plana dobrobiti mlečnih goveda

Slavče Hristov[1], Branislav Stanković[1], Dušica Ostojić-Andrić [2]

[1]*Poljoprivredni fakultet, Univerzitet u Beogradu, Republika Srbija*
[2]*Institut za stočarstvo, Zemun - Beograd, Republika Srbija*

Sažetak

U ovom preglednom radu opisani su osnovni principi kreiranja i implementacije plana dobrobiti mlečnih goveda. Plan obuhvata ciljeve koji se žele postići u odnosu na specifičnosti tehnologije farmi goveda, izbor mera i postupaka koji treba da budu uključeni, redosled i način opisa mera i postupaka, kao i njegovu implementaciju.Efikasnost i održivost implementacije plana može se utvrđivati na osnovu razlika između nivoa dobrobiti mlečnih goveda pre i posle njegove primene putem upitnika sa složenim indikatorima dobrobiti, kao što su: 1. planiranje, organizovanje i implementacija standarda dobrobiti mlečnih goveda, 2. kompetencije zaposlenih lica u vezi dobrobiti mlečnih goveda, 3. stavovi odgajivača prema bihejvioralnim potrebama mlečnih goveda, 4. nadzor i inspekcija mlečnih goveda i opreme, 5. postupci sa mlečnim govedima, 6. ishrana i napajanje mlečnih goveda, 7. smeštajni, mikroklimatski i sanitarni uslovi na farmi, 8. higijena i nega tela mlečnih goveda, 9. proizvodnja i reprodukcija mlečnih goveda i 10. ponašanje i zdravstveno stanje mlečnih goveda.Odgajivač treba da definiše i napiše plan u tesnoj saradnji sa veterinarom i drugim stručnjacima, po potrebi ekspertima i tehničkim licima koja se bave pružanjem saveta u vezi tehnologije proizvodnje - posebno inženjerima stočarstva. Najmanje jednom godišnje potrebno je preispitati i dopuniti plan savremenim naučnim saznanjima i novim praktičnim iskustvima.

Ključne reči: dobrobit, plan, kreiranje, implementacija, mlečne farme