WELFARE CONDITIONS OF DAIRY COWS FROM THE POINT OF PERFORMANCE EFFICIENCY

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Key words: dairy cow, welfare, milk production

Introduction

The extent to which husbandry systems take account of the needs of livestock can be established with the help of various complementary parameters, i.e., production indicators (performance, yield), physiological indicators (endocrine changes, cardiovascular responses, neurochemical changes, immunosuppression), pathological indicators like morbidity and mortality, disease, lesions or damage to the integument, ethological criteria such as abnormal behavioural patterns which show that the individual has difficulties coping with its environment and the results of environmental preference testing or of experiments designed to test the strength of an animal's motivation to achieve a reward or carry out a particular activity (Bartussek, 1999).

The way in which we treat our food animals has changed considerably in the last 50 or so years, and this is at the root of the shift in public opinion. Historically, the basis of good welfare was good animal husbandry – producers were generally small scale and labour-intensive, with animals treated as individuals. But, following the advent of intensive, high technology agricultural systems, the relationship between good welfare and production broke down. As production systems became large-scale, animals were no longer treated as individuals and their value to the producer consequently diminished. Intensive farming methods involve removing animals from their "natural" environment, altering their normal social structures and behaviours, and raising them in increasingly large numbers in controlled conditions with the help of hormones, antibiotics and vaccines.

A decrease in productivity, such as a drop in milk yield, can indicate a welfare problem. Likewise, decreases in reproductive rates or increases in mortality or morbidity should be clear signs that the well-being of livestock is declining. Illness and injury can indicate poor welfare. Other symptoms of problems are changes in behaviour; animals that are lethargic, unwilling to move, or that have become aggressive are unlikely to be doing well (Pawelek and Croney, 2003). The physiological and behavioural responses of dairy cattle to stress can reduce their productivity, their health and their welfare. Dairy cattle that have been

selected for high milk production seem particularly susceptible to stress and are at more risk of behavioural, physiological and immune problems (Rauw et al 1998) and so require higher levels of care and management. Understanding how to design environments for dairy cattle so as to reduce stress is essential to maintain the long-term profitability and sustainability of the dairy industry. The main stress factors affecting dairy cows include: chronic stress resulting from poorly designed housing; poorly designed stalls for cattle, such as those that are too short or with inadequate flooring, lead to reduced occupancy of free-stalls, reduce the time the cattle spend resting and increase the chance of injury and lameness; chronic stress on heifers is likely to affect their health and performance as milking cows. Although when is placed the emphasis on these physiological consequences of stress, dairy cattle also respond to stress with a number of behavioural changes, especially changes in the time spent eating and resting, which can be equally important for production. High producing dairy cows spend about 40-50% of the day lying down and adequate rest is necessary to ensure their high production. Blood flow to the udder is doubled when cows are lying down and, since cows tend to ruminate for longer periods when lying down compared to when standing up, maximizing the time spent laying down is important for optimizing rumination time. Furthermore, the animal's behaviour is often the best indicator that the animal is under stress. It is clear that, to ensure good health and productivity of dairy cattle, it is essential to identify the principal sources of stress, and to find effective and affordable ways of reducing this stress.

In fact, productivity can be used as an indirect measure of animal welfare level. In high-performing dairy herds, cattle that have a positive relationship with their handlers tend to move more quickly into the milking parlour, have smaller flight zones, and are less nervous and more settled. Adopting this approach to animal care and management can result in greater ease and efficiency of management as well as reduced production losses and, in some cases, increased productivity. Several researchers have shown that the flight distance, i.e., how close a human can approach before a stationary cow moves away, is not correlated to high milk production (Purcell et al., 1988).

Material and methods

Three dairy farms with different technologies and management practises were included in the observation. Dairy Holstein cows in the farm 1 were housed in three reconstructed three-row freestall barns with about 220 lying littered boxes with opened one long side and natural roof ventilation. Milking parlour was installed in a separate part of the stable. Milking was carried out four times daily in the first 100 days of lactation and than twice daily. Standard feed ration (TMR) observing difference energy requirements of the

production cow groups was given two times daily. There was evident tendency to assurance higher level of welfare of stabled cows. Dairy Holstein cows in farm 2 were stabled in an eight-row tie litter free lying boxes of short length with natural roof ventilation. Milking was carried out three times daily, cows in the late of lactation two times daily, in milking parlour. Standard feed ration (TMR) was given two times daily. There were used pastures through pasture season for lower yielding cows because of already unsatisfactory stable condition. In farm 3, there were reared crossbreeds of the Czech pied cattle and Holstein cows. Dairy cows were housed in a tie littered stable. Milking was carried out on the stall two times daily. Cows were fed with non-complex TMR and than concentrates according their milk production. From point of view cow's welfare this type of housing is already considered undesirable.

Results

The average milk production in the 305-d lactation of cows from the farm 1 was 9087 kg (with 3,45% content of milk fat and 3,25% content of milk protein). In average, the peak milk yield was about 40 kg of milk, but there were a few cows with production over 60 kg of milk. Milk production in the lactation was in the group of the best eighty Holstein herds in the Czech Republic. On the other hand the low value of content of milk fat signalised that health status of herd is not optimal.

In the farm 2, there was the average milk production in 305-d lactation 9018 kg (with 4,25% content of milk fat and 3,16% content of milk protein). The course of lactation curves was similar with lactation of cows from the farm 1. The evident difference between cows from the farm 1 and 2 was in body condition score of cows. Cows from farm 2 were clearly thinner, the body condition score on peak production was in average 2,1; in the farm 1 than 2,6; respectively. This corresponded also with lower content of milk protein in milk and signalised problems with energy supplying the cows.

Cows from the farm 3 had the average milk production in 305-d lactation 5281 kg (with 4,26% content of milk fat and 3,45% content of milk protein). There is evident lower milk production that is mainly influenced by genetic merit the cows but also worse conditions which this type of housing offers in total. These include more difficult manure handling, feeding, milking and controlling air condition in barn.

Discussion

Milk production has been on a steady increase thanks to improvements in genetics, nutrition, milking systems, facility design, health programs and management. Dairy herd performance reflects the quality of care received at every stage of the production cycle. The main items that influence the comfort of a dairy cow include stall design, bedding, flooring,

and ventilation, nutrition, water quality, sanitation, milking equipment, farming traditions, cow handling facilities, reproduction, water and feed availability, whether or not a cow is allowed on pasture, and many more. Many welfare problems are consequently the result of the animal not being fully adapted to the production system.

Indoor climate of livestock buildings is of importance for the well-being and health of animals and their production performance. The complexity of relations between the physiological needs of the animals, and the influence of the ambient environment in some instances also acts as a limiting factor that can hamper the optimal feed consumption, unavoidable for the healthy development of the animal and the good economical result. Stable environment and mainly temperature (namely the hot summer temperature) do influence the dairy cows' performance. That means, the production of the farm animals depends not only on their genetics and feeding, but also an their relation to the environment The successful stockman will create for animals the environmental condition, which minimise stress, excessive competition for feed and water and potential of injury. In free stalls have animals a greater freedom for movement and exercise, and more opportunity for social interaction (Stookey, 1994). Free stalls result in fewer injuries, lower bedding requirements, ability to fit more animals per unit area and cleaner cows, unlike tie-stalls which also tend to inhibit heat detection (Radostitis et all., 1994). Comfort and cleanliness of animals is dependent not only on amount and type of bedding, but also in animal stocking density, type of shelter, temperature and humidity levels (National Research Coucil,1990).

In this study, milk production of dairy cows from the three observed farms indicated that design of housing and management practice may influence on one side positively milk yield (the farm 1, where is a pursuit of assurance the principles of welfare) and on other side negatively (the farm 3, where is an old stable out of condition). On the other hand, milk production of cows from the farm 1 and 2 is similar, but the environmental conditions within the stables are considerably different. However, seeing the cows we can evaluate that cows from the farm 1 look evidently better, are clean and in better body condition. Animals are genetically programmed to produce and so dairy cows from the farm 2 are obviously well adapted on their environmental conditions. This adaptation (high milk production) is however paid in their worse body condition, higher incidence of health problems and higher level of culling.

In the past, farm animal welfare has been considered primarily in relation to maximization of productivity. Fox (1984) states that there are no clear-cut correlations between productivity and animal well-being. When greater attention is given to the animals'

physiological, emotional, and behavioural well-being, he states, the animal will be healthier and more productive. In addition to productivity, criteria that should be considered in assessing welfare or well-being are animal behaviour, health, musculoskeletal soundness (lameness), reproduction, immune status, and physiological endpoints (Albright, 1987 and Zimbelman, 1991). It is vital both for the health and well-being of the animals involved and for the financial future of the farming industry that an increasing critical interest should be taken in the mixture of economic, scientific, ethical, aesthetic, and practical concepts that make up the complex subject of animal welfare, and that action should be taken on the new knowledge and ideas thus gained (Ewbank, 1988).

Conclusion

The scientific assessment of the well-being of an animal involves finding indicators of three broad criteria: 1) a high level of biological functioning; 2) freedom from suffering in the sense of prolonged fear, pain, and other negative experiences; and 3) positive experiences such as comfort and contentment. Individual productivity can reflect biological functioning, with reductions in productivity having possible implications for suffering and other negative experiences. Effect on welfare which can be described include those of disease, injury, starvation, beneficial stimulation, social interactions, housing conditions, deliberate ill treatment, human handling, transport, laboratory procedures, various mutilations, veterinary treatment or genetic change by conventional breeding or by genetic engineering. It was defined welfare in such a way that it can be readily related to other concepts such as: needs, freedoms, happiness, coping, control, predictability, feelings, suffering, pain, anxiety, fear, boredom, stress and health. Although poor production can sometimes be an indicator of poor welfare; high production levels do not necessarily imply a good welfare state. High production levels may lead to poor welfare. It is true that welfare is important for functioning, but in many cases animals can continue to produce while in a state of poor welfare. Moreover, high-yield or superior production often is attained at the expense of the animal's broader welfare and in that sense can be said to be incompatible with welfare. Animals have the ability to adapt to a significant degree to their environments, including painful or stressful ones, although the adaptation may be accompanied by severe stress.

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