Estimation of Risk Factors - Useful Tools in Assessing Calves Welfare

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Abstract
The study has been aimed at identify risk factors that may be used in welfare assessment of calves reared in intensive farming systems. These factors may be useful to the farmers in planning breeder measures in order to increase the animal welfare levels in relation to the legislative requirements. The estimation considered the housing conditions of calves aged 0-6 months grouped in two lots A (n: 50) and B (n: 60), depending on their accommodation system. We have monitored the calves’ decubitus on the housing surface, body hygiene as well as that of the resting area and the thermal comfort. The assessment was made by direct observation and numerical estimation, based on the Welfare Quality® 2009 protocol (Assessment protocol for cattle) as well as by means of a calves safety and welfare evaluation chart according to the European and national legislation on minimum calves safety and protection standards. Data collected and processed have shown the fact that not all housing conditions completely answer calves physiological requirements. Thus the appropriate housing criterion in the present study was met at B lot of 85 % and to a much smaller degree by the A lot (76 %). The assessment carried out by means of the safety chart have indicated that only the minimum criteria for calves rearing were met, which does not translate into a high level of their welfare.

Keywords: assessment, calves, welfare.

1. Introduction
We cannot speak about milk production in cattle rearing if we disregard calves and moreover the rearing conditions that would meet their physiological needs. Amongst advantages we could list: animal protection against excessive environmental factors, optimal micro-climate parameters, automation and mechanization of feeding, watering, caretaking and waste disposal processes. However rearing conditions may entail some disadvantages such as: space limitation and movement restrictions, increased risk of transmitting contagious diseases, animal exposure to a faulty environment, etc.

There is high interest today in cattle rearing in those management instruments that motivate, prepare and guide farmers in satisfying the consumers’ requests. When promoting farm animal welfare a practical assessment method must be implemented this would be independent from the legislative one that is meant to ensure an animal protection standard [1].

To practically assess animal welfare today one may use ANI 35-L system, "the five animal freedoms" as well as the system based on the number of accountable factors (protocol obtained following a European project - Welfare Quality®, 2009) [1,2].

Welfare assessment of farm animals in our country is performed from the perspective of their protection as a consequence of applying current legislation that regulates the sanitary veterinary norms and which in turn set minimum protection standards for the livestock.

2. Materials and methods
The study was carried out on two dairy farms in the southern part of the country. The calves were

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grouped in two (A and B lot), depending on the animals' housing system. The two lots were representative for the two farms: A lot, calves housed (n: 50) until the age of 8 weeks in individual wooden boxes with paddock; the housing surface measured 1.20 m²/animal; B lot, calves (n: 60) until the age of 8 weeks housed in individual armed polyester fibre glass boxes, with a paddock that displayed a housing surface of 1.40 m²/animal. The boxes featured a wooden slat paddock (A lot); wire netting panels or racks (B lot). On the frontal wall of the paddock the milk the hay feeding and watering devices are installed (lot B), and on one of the lateral walls the hay trough and formula bucket are placed. The calves have free access to the paddock. The calves older than 8 weeks in lot A were housed in collective pens inside the shelter, while the calves in lot B were housed in collective pens outside the shelter. Inside pen group size was 10 animals and the outside pen group size was 20 animals, with a surface of 2.25 and 3.25 m²/animal, respectively.

The following methods were used in order to assess calves welfare: direct observation and numerical estimation for each individual and the entire animal group respectively. We have therefore monitored: comfort of housing place (lying down on the resting area), freedom of movement (0 points for un-slippery floor; 2 points for the slippery floor; 4 points for highly slippery floor that posed movement difficulties to the calves); calves bodily hygiene (0 points for clean hair coating; 1 point for hair coating dirty in less than 25% of the body surface and 2 points for a dirty hair coating in more than 25% of the body surface), resting area; thermal comfort (0 points for dry hair coating; 1 point for wet hair coating) and freedom of movement with highlight on compliance with minimum technological requirements.

Successive trips to the farms participating in the study were made in order to collect data; data collection was performed weekly over the course of one years immediately following calving until the calves were weaned. Average duration of observation was approximately 1 hour daily at different times during the day – morning, noon, afternoon. Observations were made without removing animals from their shelters.

3. Results and discussion

In lot A boxes the percentage of the calves in resting position with their limbs spreading out was higher (53%) compared to the animals from the B lot (Figure 1). The percentage of calves in decubitus position with their limbs flexed under their bodies was higher in B lot (74%) compared to the A lot (26%).

![Figure 1. Percentage of calves observed in decubitus (lot A and B)](image)

This was mainly due to the housing surface which was smaller in the boxes from the A lot compared to the ones in the B lot, as calves did not have enough space (length of the resting area) in order to rest comfortably. Comfort of the resting area was ensured with both lots in the collective pens of the calves older than 8 weeks, and housing surface was provided here as well.

Total surface of box for the calves in lot A should have been 2.8 m long out of which 1.5 m the actual box and 1.3 m the paddock. The height and width of the paddock or individual box should have been 1 m. The wooden box built does not ensure maximum efficiency during decontamination process. The individual box that offers calves a dry environment, constant humidity and temperature and no draught highly reduces morbidity and allows for individual caretaking of the animals. Calves housing systems and available space allotted may impact animals' development and behaviours the animals will not be able to display. Dry, clean, comfortable resting area is very important from the perspective of the actual time calves spend there, their rest, sleep quality and maintaining bodily temperature within normal range [3,4].

In calves welfare assessment, cleanliness factor had a similar weightiness to other indicators evaluated, as follows: in lot A (Figure 2) the
The number of dirty calves (less than 25% of the body surface) was higher than the ones in lot B, where due to a larger housing surface the animals stayed clean even in the case of those suffering from digestive disorders (diarrhoea).

![Figure 2. Evaluation (%) of bodily hygiene (0, 1, 2 - points)](image)

Results of calves’ thermal comfort assessment indicated that this was ensured for both lots at the level of 0 points, which translates in the fact that the animals did not have wet hair on their dorsal side. Abundant bedding in calves rearing until they are weaned allows for comfortable resting, and during colder temperature months it may limit loss of body heat by thermal conductivity.

Easy movement of the calves was assessed for the animals older than 8 weeks, housed in collective pens inside the shelter for lot A and those outside the shelter for lot B by scoring points depending on the floor slipping degree. The score thus obtained (Table 1) was higher in lot A compared to lot B, due to the fact that waste was not periodically disposed of and in some of the boxes the water supply system was faulty and repairing time was not timely.

<table>
<thead>
<tr>
<th>Lot</th>
<th>Numerical estimation (points)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>A</td>
<td>51</td>
</tr>
<tr>
<td>B</td>
<td>77</td>
</tr>
</tbody>
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Animals’ movement in shelters of paddocks ensures a better blood supply and flow together with better muscular fitness. In order to prevent the negative consequences extended stabulation may have, the animals must be provided with a minimum time during which they can exercise, namely: at least two hours during cold season and at least four-five hours during hot season. Compliance with these requirements results in certain economic benefits. [3,4]

As far as the appropriate housing criterion is concerned, assessment of the resting area (lying down, calves and floor cleanliness), the thermal comfort and freedom to move have indicated that this criterion was met for B lot at 85% and to a lower degree met for A lot (76%).

### 4. Conclusions

Results obtained have indicated good housing conditions in the case of calves sheltered in collective pens of the B lot (85%), while in the pens for A lot the assessed conditions ensured to a lower extent the compliance with calves physiological requirements (76%).

According to these results, from the perspective of evaluation of microclimate and housing conditions we have concluded that animal welfare level was lower in lot A compared to lot B, which displayed a high level of animal welfare.

Based on assessment performed, housing conditions and microclimate may constitute risk factors for the welfare of calves in lot A, sheltered in collective pens inside where the inappropriate floor, uncomfortable resting area, insufficient sunlight exposure, social isolation, etc., have resulted once more in a low welfare level in calves. While assessing this criterion, inappropriate hygiene of bedding and environment may contribute to the occurrence of respiratory and gastrointestinal disorders.

Estimation of welfare levels assessed according to Welfare Quality® (2009) evaluation protocol and calves protection and safety chart (Ordinance ANSVSA no.72/2005 concerning minimum protection standards in calves) have indicated that only minimum requirements have been ensured in calves rearing by use of the former which does not mean that a high welfare level of animals is ensured. Application of methods based on calves requirements (food, water, shelter, health, display of natural behaviours) may help farmers improve their rearing conditions and obtain much sought after production results.
References