Study on Phenotipic Parameters of the Milk Production in Romanian Spotted Primiparous Cows from the Research and Development Station for Bovine Arad

Florin Cristian Neciu 1*, Ludovic-Toma Cziszter 2, Radu Ionel Neamţ 1, Liviu I. Costin 1

1 Research and Development Station for Bovine - Arad, 310059 - Arad, Bodrogului 32, Romania
2 Faculty of Animal Sciences and Biotechnologies - Timisoara, 300645, Calea Aradului 119, Romania

Abstract
The aim of the study was to investigate the phenotypic parameters of the milk production and the influence of some environment factors in 93 Romanian Spotted primiparous cows from the Research and Development Station for Bovine Arad. The studied parameters were total milk yield per lactation, milk fat and milk protein yield. The average milk production in year 2010 was 6335.1 kg milk with 4.04% fat, 255.6 kg fat and 3.209% protein, 203.6 kg protein. In year 2011, the recorded production was 5756.7 kg milk with 3.94% fat, 227.2 kg fat and 3.202% protein, 184.6 kg protein. A reduction of production from 2010 to 2011 was observed, probably caused by a worse agricultural year and less feed production. After statistical analysis of data distinct significant differences were obtained for milk yield and protein yield, and a very significant difference for protein yield. Differences for fat and protein percentage were not significant from one year to another due to a ration structuring strategy.

Keywords: milk production, primiparous cows, Romanian Spotted.

1. Introduction
Milk is a physiological secretion of the mammary gland, being considered a complete food due to its fat, protein, vitamin and minerals content. Chemical composition of the milk is influenced by a great number of internal and external factors, such as feeding level, ration composition, genetic potential of cows, breed, parity etc.[1]. Obtaining high milk productions with superior quality are important challenges to be taken into account in dairy farms in order to increase the efficiency of the enterprise. Today, a cow producing below 4000 litres of milk per lactation is not efficient. Thus a genetic improvement of the cow population is required taking into account that this value is hardly achieved as a country average. In Romanian Spotted breed, the successive lactation are disposed in a Gauss curve along the productive life of a cow, where the first lactation is the lowest, progressively increasing to a maximum level, generally in the fourth lactation, and then a descendant trend is observed until the culling [2]. In the circumstances that the productive longevity is lower and lower, it is beneficial that milk production should be high starting with the first lactation. Another positive influence factor on the economics of the farm is the variability between animals. It is recommended a low variability from cow to cow in order be able to cull the minus-variants. In the studied farm the low variability of the animals was obtained during generations by using a small number of bulls in artificial insemination (AI), maximum 2 bulls per generation [3].

Even in this situation some random factors could appear to alter the milk production, factors that are not dependent on the farmers will or power. These factors are climatic factors, and they could change
all the genetic improvement plans and in the same time the economic efficiency of a farm.

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2. Materials and methods

The study was carried out on 93 primiparous Romanian spotted cows, Fleckvieh type, from the Research and Development Station for Bovine Arad. Data were collected in January 2010-December 2011. There were 42 cows in 2010 and 51 cows in 2011. Animals were raised in loose housing, on deep litter under a shelter and free access to feed. In summer, the ration consisted of green alfalfa, green Sudan grass, 30% corn silage, concentrates and mineral supplement according to production level.

In the winter the ration consisted of alfalfa haylage, alfalfa hay, Sudan grass hay, corn silage and concentrates according to production level.

Cows were milked twice a day in a 2x14 herringbone parlour. Production was recorded by the computer software. Data collection was carried out using the auto-control method as well as the results provided by the official control of performance. Milk, fat and protein yields were statistically analysed, and the two years of production were tests using t test.

3. Results and discussion

Milk production, fat yield and protein yield in the two years of production are presented in Table 1, 2, and 3.

Table 1. Milk yield of primiparous Romanian Spotted cows

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Milk yield (kg)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>42</td>
<td>6335.1</td>
<td>155.9</td>
</tr>
<tr>
<td>2011</td>
<td>51</td>
<td>5756.1</td>
<td>117.6</td>
</tr>
</tbody>
</table>

Table 2. Fat percentage and yield in primiparous Romanian Spotted cows

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Fat percentage (%)</th>
<th>SD</th>
<th>Fat yield (kg)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>42</td>
<td>4.04</td>
<td>0.036</td>
<td>255.6</td>
<td>6.1</td>
</tr>
<tr>
<td>2011</td>
<td>51</td>
<td>3.94</td>
<td>0.054</td>
<td>227.2</td>
<td>5.57</td>
</tr>
</tbody>
</table>

Table 3. Protein percentage and yield in primiparous Romanian Spotted cows

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Protein percentage (%)</th>
<th>SD</th>
<th>Protein yield (kg)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>42</td>
<td>3.209</td>
<td>0.025</td>
<td>203.6</td>
<td>5.43</td>
</tr>
<tr>
<td>2011</td>
<td>51</td>
<td>3.202</td>
<td>0.034</td>
<td>184.6</td>
<td>4.48</td>
</tr>
</tbody>
</table>

Analysing results in Tables 1 to 3, a reduction of milk, fat and protein yields in 2011 compared to 2010 was observed. This reduction was caused mainly by environmental factors. To support this statement we mention that both housing and feeding conditions were identical during the two years. Differences appeared only in feeding, both at the quantity and quality of feedstuffs were affected by the climatic conditions.

In our case, it was considered that the climatic factors had a important impact on obtained production.

Differences between the two studied years are presented in Table 4.

Table 4. Differences and their statistical significance for milk, fat and protein yields

<table>
<thead>
<tr>
<th>Year</th>
<th>Milk</th>
<th>Fat percentage</th>
<th>Protein percentage</th>
<th>Fat yield</th>
<th>Protein yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td>0.003**</td>
<td>0.107ms</td>
<td>0.863ns</td>
<td>0.001***</td>
<td>0.006**</td>
</tr>
</tbody>
</table>

ns-non-significant, **-distinct significant, ***-very significant

Year 2011 was an extremely hard agricultural year, leading to a low feed production, quantitatively and qualitatively. Great problems occurred during the hot season, when the green fodder was hard to supply for cows. Thus, primiparous cows suffered even more, and they
could not reach the higher milk production after calving, thus the plateau was lower and shorter. During the winter time, the insufficient hay, concentrates and corn silage determined a low milk production. With the lower rations, primiparous cows suffered also from the bunk competition of older cows. Total fat and protein yields, which follow the milk yield, were much lowered in year 2011 compared to year 2010. Fat and protein percentages were not significantly different between the two years due to a feeding strategy started in spring of year 2011, consisting in feeding the corn silage together with the green fodder all through the hot season.

4. Conclusions

In order to increase the efficiency of a dairy farm a strict genetic improvement programme is to be implemented using only 2 bulls for AI per generation. This will allow making a more homogenous population, with a low variability between animals, eliminating the minus variants. In Romanian Spotted breed the first lactation should make up for 75% to 85% from the maximum lactation, especially in circumstances when the productive longevity has a decreasing trend due to an excessive genetic improvement and specialisation of the breeds. Unfortunately these objectives are not enough to guarantee high milk production in order to offer a constant efficiency of the farm. When from one year to another the agricultural conditions are different, we have to take into consideration that a hard agricultural year could scatter the whole farmer’s work. Results of this paper show with strong evidence that the genetic improvement of the breed built over many years had no effect in a very dry year, when the quality and quantity of the feed produced cannot supply for the animal consumption demand.

References