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# COMPARATIVE STUDY OF THE QUALITIES OF COWS FROM MOLDOVIAN TYPE OF BLACK SPOTTED AND RED OF STEPPE BREEDS

**Serghei CHILIMAR**

State Agrarian University of Moldova, Mirceşti 42 2049, Chişinău, Moldova

Corresponding author email: s.chilimar2011@yandex.ru

***Abstract***

*There were studied the qualities of milk production of cows from Moldovan type of Black Spotted breed. There was proved that cows with three or more lactations of this type have milk production 4016 ± 163.2 kg or 74 kg more than cows of Red of Steppe breed that were in the same conditions of feeding and maintenance. Level of obtained production is less than the genetic potential of new Black Spotted type. There are proposed some measures of a fuller achievement of genetic potential in cattle growth in the household sector.*

***Key words:*** *cattle, breeds, Black Spotted, Red of Steppe, production, milk.*

## INTRODUCTION

Cattle are, without doubt, one of the most important species of farm animals. In most countries of the world, Cattle farming is the main branch of the livestock sector. These animals are the main suppliers of milk and meat - first necessity food products. From cattle is obtained and the largest amount of leather and organic fertilizers. Cattle exploit large amounts of residues of plant cultivation and processing industry of agricultural raw materials. They also can be used as labor force for agricultural works, transportation of goods, especially in mountainous areas, where it can not be used agricultural machinery and trucks.

Milk and resulting products from its processing: fermented milk, cheese, butter etc., come in 90 - 95% of cattle farming. In addition to milk, beef has a rather high proportion (about 30-40 percent) of total meat consumption of the population, represents an important ingredient in the production of sausages. Milk is the most important product obtained from cattle, because of it there are processed all dairy products and it is very healthy for humans, especially for growing children, sick and old age people.

Main branch of livestock sector in Moldova is cattle farming, which aims to produce milk and meat - valuable food to feed people and raw materials for enterprises of milk and meat industrial processing (Bucătaru N, Radionov V., 2001; Chilimar, 2004).

Although the mass privatization of land and agricultural wealth was completed more than ten years ago to us, the current state did not become much better compared with 2000 year, the year of the completion of reforms. To us, cattle farming had the highest degree of development in the period 1989-1990, when there were recorded the superior indices of cattle herd, of its productivity and of global production of milk and meat. In the coming years, because of failed agrarian reforms, there was a downgrade of all agriculture branches, including cattle farming sector, particularly of economic indices of cattle milk and meat production.

**Goal** of the conducted research constitutes the analysis of exploitation and growth activity of cattle from Moldovan type of Black Spotted breed from 'south' subtype of Moldovan type of Black Spotted breed by appreciating the qualities of the animals from milk production farm of S.A. Nistru - Olanesti and developing the recommendations to enhance economic efficiency of milk production by using intra-rasial type of Black Spotted breed.

## MATERIALS AND METHODS

Cattle are the most important species from livestock animals. Their proper feeding is a prerequisite to their health, welfare and their efficiency. Practitioners of organic agriculture will not be successful without cattle farming and manure using from these farm animals. In

practice of organic farming, farmers often face difficulties in establishing a fair ration of food for their cattle and obtaining organic products of animal origin, very much requested by consumers in all countries (Bucătaru N, Radionov V., 2001; Chilimar S., Miron I., 1999).

Fodders used in feeding of milk producing animals are grouped in: succulent fodders (green fodders, winter succulents, corn silage, the semi-silage of alfalfa, the semi-silage of meadow grass, fodder beet, fodder kohlrabi, fodder potatoes, beet noodles, molasses), fiber and roughage fodders, concentrated fodders (maize grains, barley grains, oat grains, rye grains, wheat grains (non-food), sorghum grains, peas grains, sunflower, soya beans, wheat bran, sunflower meal, soybean meal, flax meal, meat flour, fish flour), synthetic substances.

## RESULTS AND DISCUSSIONS

In 2009, from the entire area of agricultural land in Stefan−Voda district 38.7% belonged to enterprises and organizations, 30% to peasant households (farmers), including 13.6% to auxiliary households (lots around the house and gardens), 0.3% to fruit associations and vegetable lots, 17.4% to other landowners. In these circumstances it is not easy to organize dairy farms with modern and advanced technologies. To note that for fodder crops cultivation there was not used arable land, which grains are used as food and fodder cereals.

**Red of Steppe breed** was formed in the Southern regions of Ukraine by crossing local populations of Grey of Steppe breed with some breeds from group of red breeds brought by Russian and German settlers to the mentioned territories in inadequate conditions of insurance with required quantities of fodders. This influenced the body weight of adult cows, that did not exceed 450-500 kg, milk production no more than 3-5 thousand kg per year and low qualities of meat production. From the second half of the nineteenth century, Red of Steppe breed has spread to the Southern districts of Moldova too. To increase milk production, Red of Steppe breed has been crossed in our country with cognate breeds Angheln from Germany, Red Estonian, Brown Latvian and during the years 1960 - 1974 also with Jersey breed to increase the fat content in milk. Currently Red of Steppe breed is characterized by the production of 3-4 thousand kg of milk per year, it has adapted quite well to the climatic and food conditions from the South.

**Creation of Moldovan type of Black Spotted cattle**. In the Republic of Moldova, in the first half of the twentieth century, there grew two breeds of cattle: Red of Steppe breed in South and Central districts, Simmental breed in the North districts and in some localities from the Center of republic. Since the early twentieth century until the early sixty, there practiced pure breed cattle farming, using to improve Red of Steppe breed bulls from Angler, Red Estonian, Brown Latvian breeds too. Improvement of Simmental cattle was practiced by pure breed methods, using valuable bulls imported from Ukraine and other parts of the former USSR (Chilimar et al., 2001; Chilimar et al., 2001).

During the sixties and until 1974 to increase the fat content of milk cows from Red of Steppe and Simmental breeds were crossed with bulls from Jersey breed, pure breed and resulting half-breeds from crossing Black Spotted and Jersey breeds. There was achieved an insignificant increase of fat content, but cow productivity remained low (2500 − 3000 kg). For these reasons, and taking into account the need to increase milk production from 1974 there was developed a program for creating Moldovan type of Black Spotted breed (Chilimar, 2003). Principled scheme of creation of Moldovan Black Spotted new type of cattle is shown in Figure 1. Milk production of cows from Moldovan type of Black Spotted breed is shown in table 1.

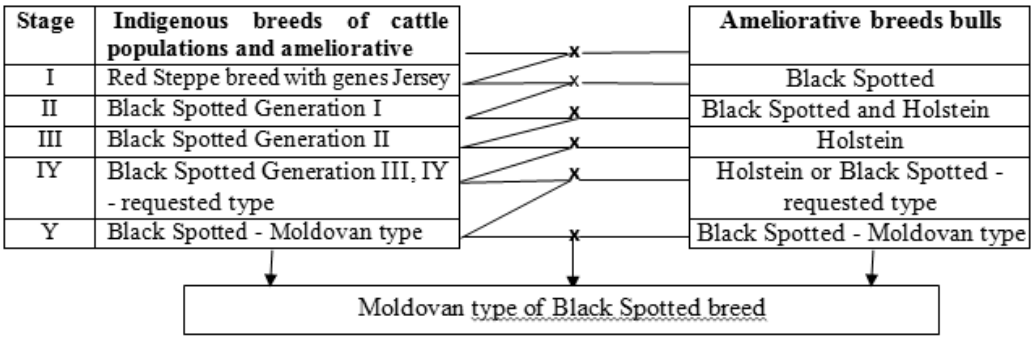


Figure 1. Principled scheme of creation the intrarasial type of cattle

Table 1. Productivity of cows per 305 days of first lactation

| The share of Holstein genes breed, % | n | Milk production | | ± In comparison with the standard of new type of cattle | |
|---|---|---|---|---|---|
| | | amount M ± m, kg | fat content M ± m, % | milk, kg | fat content M ± m, % |
| Subtype 'North' | | | | | |
| 25-50 | 75 | 4249±128.2 | 3.55±0.010 | + 449 | -0.05 |
| 51-75 | 604 | 5145±38.4 | 3.58±0.040 | +1345 | -0.02 |
| 76-87,5 | 1302 | 5224±26.4 | 3.58±0.002 | +1424 | -0.02 |
| 90 şi > | 342 | 4578±37.7 | 3.59±0.004 | + 778 | -0.01 |
| **Average:** | **2323** | **5077±20.0** | **3.58±0.002** | **+1277** | **-0.02** |
| Subtype 'South' | | | | | |
| 25-50 | 273 | 4862±72.6 | 3.69±0.010 | +1262 | +0.09 |
| 51-75 | 850 | 4634±58.9 | 3.71±0.010 | +1034 | +0.11 |
| 76-87,5 | 487 | 3938±58.7 | 3.74±0.007 | + 338 | +0.14 |
| 90 şi > | 68 | 3423±81.9 | 3.75±0.018 | - 177 | +0.15 |
| **Average:** | **1678** | **4420±37.8** | **3.72±0.006** | **+ 820** | **+0.12** |

Researches have shown that cows of the first generation obtained from crossing local populations from Red of Steppe and Simmental breeds with Black Spotted and Holstein ameliorative breeds compared to cows from local populations had higher indices of milk production and approximately the same fat content in milk. First generation cows, obtained from crossing Simmental cows with bulls of Black Spotted and Holstein breeds compared to the first generation cows obtained from crossing Red of Steppe with Black Spotted and Holstein breeds had more increased indices of milk production and almost the same fat content in milk (Chilimar S. et al., 2001; Chilimar, 2004).

With increasing the share of genes of Black Spotted breed cows from second population from crossing between Simmental x Black Spotted compared with cows from local population of Simmental breed had priority on milk production, but something less the fat content in milk. Similar results were obtained in the second generation from crossing Red of Steppe cows with bulls of Black Spotted and Holstein breeds. In this case, cows of second generation had the fat content in milk slightly lower compared to cows of local populations of Red of Steppe and Simmental.

Study of hybrid cattle with different rates of ameliorative breeds genes showed that concurrently with the increase of share of Holstein genes from 50 to 75% and from 75% to 87.5% there is a larger resemblance of new type of cattle with ameliorative breeds.

Researches' results have been obtained at cattle breeding farm of S.A. Nistru - Olanesti, where they grow cattle of Moldovan type of Black Spotted and Red of Steppe breeds. The

investigated livestock according to breed is shown in table 2, from which we see that primary breed in the analyzed household is Black Spotted, Moldovan type.

Table 2. Breed belonging of cattle from farm S.A. Nistru – Olanesti

| Specification | Black Spotted | | Red of Steppe | | Total | |
|---|---|---|---|---|---|---|
| | heads | % | heads | % | heads | % |
| Cattle livestock | 125 | 73.0 | 45 | 27.0 | 170 | 100 |
| Mean age, years | 6.5 | 100 | 7.7 | 100 | 6.9 | 100 |
| including: 3 | 15 | 12.0 | 5 | 11.1 | 20 | 11.8 |
| 4 | 18 | 14.4 | 4 | 8.9 | 22 | 12.9 |
| 5 | 15 | 12.0 | 5 | 11.1 | 20 | 11.8 |
| 6 | 16 | 12.8 | 6 | 13.3 | 22 | 12,9 |
| 7 | 17 | 13.6 | 8 | 17.8 | 25 | 14.7 |
| 8 | 15 | 12.0 | 4 | 8.9 | 19 | 11.2 |
| 9 | 10 | 8.0 | 6 | 13.3 | 16 | 9.4 |
| 10 | 12 | 9.6 | 4 | 8.9 | 16 | 9.4 |
| 11 | 7 | 5.6 | 3 | 6.7 | 10 | 5.9 |

From studied livestock of cows 73.0% belongs to Black Spotted breed and only 30.0% to Red of Steppe breed. Cows aged 3-4 years from Black Spotted and Red of Steppe breeds constituted, respectively, only 26.4 and 20.0%. Most of studied cows (76.8%) of Black Spotted breed were aged from 3 to 8 years and of Red of Steppe breed 71.1%. Cows with advanced age (from 9 to 11 years) in Black Spotted breed were 23.2%, and in Red of Steppe breed 28.9%.

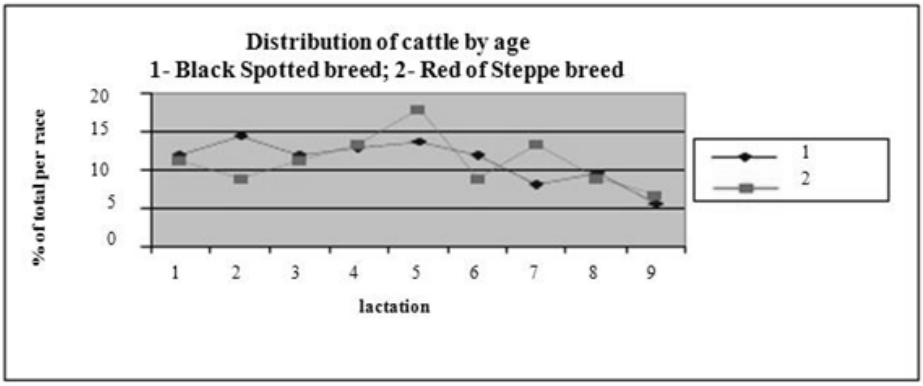


Figure 2. Cows age

It was determined that most of cows had a body weight from 350 to 550 kg and fattening condition – average, below average and weak, which influenced the delayed sowing of cows calved in winter and spring months, increase of duration of service - period up to 102 - 143 days.

| Breed | Lactation | n | Body weight, kg | | Breed standard,kg |
|---|---|---|---|---|---|
| | | | M ± m | Cv, % | |
| Black Spotted | I | 19 | 468.5 ± 10.30 | 7.56 | 480 |
| | II | 32 | 511.0 ± 5.04 | 5.53 | 520 |
| | III | 74 | 521.0 ± 6.97 | 6.02 | 550 |
| Red of Steppe | I | 6 | 443.3 ± 5.38 | 6.78 | 450 |
| | II | 8 | 481.0 ± 6.16 | 4.09 | 490 |
| | III | 31 | 509.4± 9.40 | 7.98 | 520 |

Analysis of data from Table 2 shows that cattle of Black Spotted and Red of Steppe breeds have a bodyweight lower than the breed standard, what it is explained by the low level of feeding and poor quality of feed used in this household.

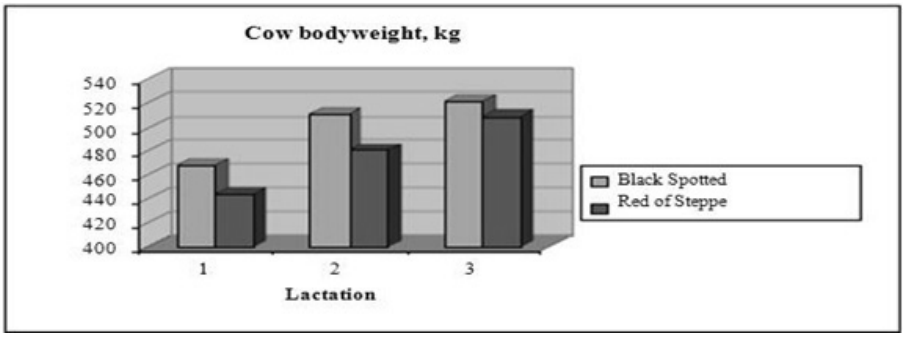


Figure 3. Dynamic of bodyweight based on lactation

From the information provided by the owners of cattle and by selective measuring of milk production from cows in the private sector, there has been established that annual milk production is within the limits of 2640-3975 kg and slightly varies from year to year.

It was found that cows from Moldovan type of Black Spotted and Red of Steppe breeds in first and second lactation had a greater difference in body weight compared with cows with three or more births.

In table 4 it is presented the information on breast resting and service-period at cows from Moldovan type of Black Spotted and Red of Steppe breeds.

Table 3. Characteristic of breast resting and service – period

| Breed | Lactation | n | Duration of mammary period, days | | Duration of service - period, days | |
|---|---|---|---|---|---|---|
| Breed | Lactation | n | M ± m | Cv, % | M ± m | Cv, % |
| Black Spotted | I | 19 | 66.5 ± 9.2 | 49.95 | 113 ± 11.8 | 37.65 |
| Black Spotted | II | 32 | 54.4 ± 11.6 | 35.84 | 121.2 ±17.4 | 37.36 |
| Black Spotted | III | 74 | 61 ± 6.2 | 43.45 | 134.5 ± 14.7 | 62.24 |
| Red of Steppe | I | 6 | 63.7 ± 3.4 | 37.32 | 160 ± 8.0 | 29.81 |
| Red of Steppe | II | 8 | 58.4 ± 5.4 | 41.62 | 127 ± 12.8 | 67.55 |
| Red of Steppe | III | 31 | 54 ± 3.7 | 52.38 | 137 ± 6.8 | 58.8 |

Depending on the length of breast resting there is no significant difference between cows from Black Spotted and Red of Steppe breeds.

This parameter is within physiological norms. Duration of service-period of cows from both breeds is big and demonstrates that in both breeds cows had several repeated insemina-tions. Because of long duration of breast resting and service- period an annual quantity of milk is lost.

Characteristic of milk production, of fat content and of fat amount per normal lactation is presented in table 5 and fig. 4.

Table 4. Milk production per normal lactation

| Breed | Lactation | n | Milk production | | Fat content,% | | Amount of fat | |
|---|---|---|---|---|---|---|---|---|
| | | | M ± m, kg | cv,% | M ± m | cv% | M ± m, kg | cv, % |
| Black Spotted | I | 19 | 2756.0 ± 103.3 | 11.1 | 3.59 ± 0.02 | 1.63 | 98.9 ± 5.0 | 12.1 |
| | II | 32 | 3407.0 ± 136.1 | 10.4 | 3.52 ± 0.06 | 1.61 | 119.9 ± 6.1 | 12.0 |
| | III | 74 | 4016.0 ± 163.2 | 23.2 | 3.60 ± 0.01 | 1.63 | 144.6 ± 6.2 | 24.5 |
| Red of Steppe | I | 6 | 2456.0 ±148.9 | 13.7 | 3.65 ± 0.05 | 1.37 | 89.6 ± 2.0 | 16.2 |
| | II | 8 | 3200.0 ± 125.9 | 26.4 | 3.70 ± 0.01 | 2.46 | 118.4 ± 1.8 | 10.2 |
| | III | 31 | 3942.0 ± 77.3 | 23.2 | 3.66 ± 0.05 | 1.64 | 144.3 ± 3.0 | 23.6 |

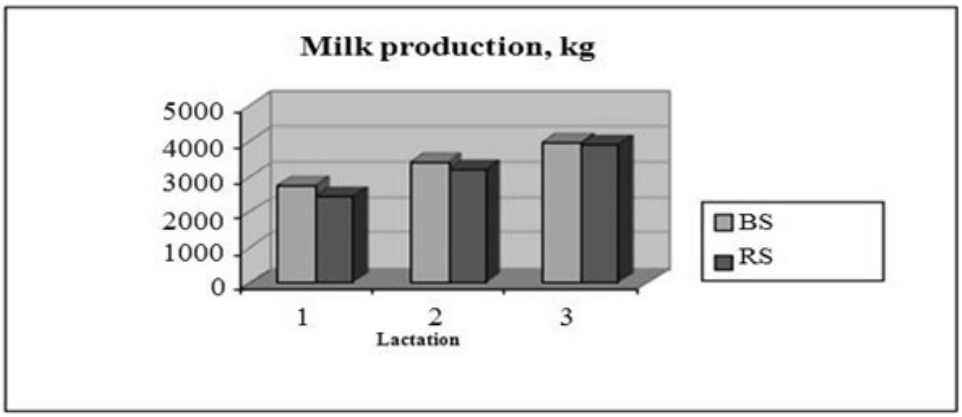


Figure 4. Milk production: BS - Black Spotted breed ( Moldovan type), RS - Red of Steppe breed

From the analysis of data from table 4 and figure 4 we can see that there are only some non-essential differences between indices of milk production of cows respectively on first, second and third lactations. One can mention only some trends, because the difference between groups of studied cows, statistically speaking, is not authentic. The biggest differrence in milk production was detected at cows from third lactation (4016 kg), which exceeded by this index cows in first and second lactations.

At Black Spotted breed cows the milk production on first and second lactations is lower than breed standard respectively with 494 and 193 kg or with 14.2 - 5.4%. This can be explained by some insignificant differences in the level of nutrition of cows in lactation one and two. Milk production of cows in lactation III and more lactations is practically at the level of requirements of breed standard.

Indices of fat content and amount in milk from all cows of Black Spotted breed are inferior to breed standard, which shows the insufficient activity of selection and breeding activity of animals in the private sector.

There was too observed a greater variability in milk production at cows from pure breed (lactations II and III) compared with those from three and four generation. Variability of this index at cows with lactation II and III is also higher, compared with first lactation.

Concerning the productivity of cows from Red of Steppe breed, there was found a similar situation to cows from Black Spotted breed. Milk production of cows in lactation I and II is lower compared with breed standard, and at cows with three or more lactations the milk production was with 242 kg higher than standard. Milk fat content practically corresponds to the standard and fat amount only at first lactation cows was lower than standard and those with two-three and more lactations this index insignificantly exceeded the breed standard requirements.

All tested cows had cup and valve shaped udder, but 71% of Moldovan type of Black Spotted breed had valve shaped udder and of Red of Steppe breed only 50% had such a form. Speed of milking at cows of both breeds allows mechanized milking.

Economic efficiency of milk production is influenced by several factors, of which the most important are technology and level of production of cows which depends, primarily on animal breed. In assessing the economic efficiency of milk production there were used the indices of cows productivity from Moldovan type of Black Spotted breed compared with productivity of Red of Steppe cows (table 5).

Table 5. Economic efficiency of using cows from Moldovan type of Black Spotted breed and those of Red of Steppe breed

| Indices | Obtained production from 1 cow | | Black Spotted compared to Red of Steppe, ± |
|---|---|---|---|
| | Black Spotted | Red of Steppe | |
| Annual production of milk from a cow, kg | 3695 | 3199 | +496 |
| Price of cost of 1 kg, lei | 2.63 | 2.63 | - |
| The cost of milk produced by one cow per year, lei | 9717.9 | 8413.4 | +1304.5 |
| The amount of sold milk (80% of total) | 2956 | 2559 | +397 |
| The cost of 1 kg of milk on sale | 3.15 | 3.15 | 2.85 |
| Cost of sold milk, lei | 9311.4 | 8060.9 | +1250.5 |
| Profit from 1 cow per year, lei | +1571.1 | +1330.7 | +240.4 |

From the analysis of table data it can be concluded that cows growth from Moldovan type of Black Spotted breed compared to Red of Steppe breed cows provides:

- Increase of cows productivity from 3196 kg to 3695 kg or with 15.5%.
- For every cow from Moldovan type of Black Spotted breed it is obtained more production amounted to 1,304.5 lei per year.
- Increase of profit obtained from milk realization, produced by cows from Moldovan type of Black Spotted breed with 240.4 lei from each cow versus Red of Steppe cows.
- Increase of economic efficiency at milk production will be higher in the case of farm completion with animals from Moldovan type of Black Spotted breed.

## CONCLUSIONS

1. On research basis it can be concluded that cows from Moldovan type of Black Spotted breed under conditions of farmer households in the private sector have satisfactory qualities of milk production, but more reduced compared with the genetic potential of the new type.

2. Taking into consideration that the fundamental object in animal husbandry, including cattle, it is increasing the products of animal origin and, above all, of milk and meat production for satisfying human food demands, it requires the creation of better conditions for achieving productive qualities of new type of cattle developed in the Republic of Moldova.

3. To achieve this fundamental aim, it is necessary to establish firms with new technologies at new firms from the private sector households, by doing the following ways:

3.1. Orientation on implementation of cattle type from Black Spotted breed with higher milk production compared to Red of Steppe breed from South region of the Republic of Moldova.

3.2. Increase of genetic potential of cattle breeds via genetic improvement of production characters, creating of new lines with superior biological potential, eventually, introduction of some breeds with worldwide recognized biological value for increasing milk production of Moldovan type of Black Spotted breed.

3.3. Improvement of operating technologies according to the practiced system in family type farms from countries with a more developed and performant animal husbandry.

3.4. Creation of a strong forage base, through intensification of forage crops and correlation of necessary areas with cattle livestock and productions that it must achieve.

3.5. Reduction of the losses of young cattle by unjustified slaughter at early ages.

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