

THE REPRODUCTIVE CAPACITY INDICATORS IN ACCORDING TO THE SEASON AND OF THE LEVEL OF MILK PRODUCTION OF THE COWS' POPULATION OF BLACK-SPOTTED BREED

Vera Granaci^{1*}, Alisa Pîrlog¹

¹The State Agricultural University of Moldova, Kishnew, Republic of Moldova

Abstract

The dynamics of indicators of the reproductive capacity in according to the photoperiodicity and of the milk production level of cows population of black-spotted breed was studied. In order to characterize the effect of the season and of the level of milk production on the reproductive capacity indicators of cows there were examined their individual cards, the data of the primary zootechnical records and reporting, there were also carried out own researches (control milk yields and the determination of fat content in the milk). It was established that both factors: season of the year) so as level of milk production) affect the indicators of the reproductive capacity. The main indicators of the reproductive capacity of the studied cows' population react differently to the season of the year. The highest indicators of the service period duration, of the estrus intensity and of the character of birth processes are observed in the spring and summer months. The coefficient of cows' fertilization after the first insemination is higher in autumn. The indicators of the reproductive capacity of the cows from the analyzed population are significantly reduced, starting with 7000 kg of milk. The most problematic on a farm is the reproduction of cows exceeding the level of productivity above 7000 kg of milk per lactation.

Key words: reproductive capacity, milk production, photoperiodicity, cows' population, black-spotted breed

INTRODUCTION

Cattle reproduction is an important part of their breeding technology, their maintenance, obtaining products from them. It determines the efficiency, profitability and productivity of livestock animals.

That's why, the further improvement of the productive and breeding qualities and of the profitability of dairy cattle is still relevant, regardless of the forms of ownership, ranging from large breeding farms to small farms and even rural households.

The purpose of the research is to study the influence of the photoperiodicity and of the level of milk production on the reproductive capacity indicators of the population of cows of Black-spotted breed.

MATERIAL AND METHOD

The work was carried out in the conditions of two breeding farm from the south of Moldova (Kantemir and Ciadir Lunga district. The subject of the study was the population of cows of Moldavian type Black-spotted breed, exploited under the conditions of the production activity of the mentioned breeding farm.

In order to characterize the effect of the season and of the level of milk production on the reproductive capacity indicators of cows there were examined their individual cards, the data of the primary zootechnical records and reporting, there were also carried out own researches (control milk yields and the determination of fat content in the milk).

The indicators of milk production of the experimental animals were studied (milk yield for 305 days of the first lactation - the average percentage of fat in the milk, the amount of produced milk fat during lactation). There were also examined the

*Corresponding author: ms.granaci@mail.ru

The manuscript was received: 04.10.2017

Accepted for publication: 14.02.2018

indicators of cows' reproductive capacities (the duration of the service period and of the period between births, the ratio of cows' fertilization after the first artificial insemination and the ratio of utilization of cows' reproductive capacity).

The reproductive capacity ratio is determined by the formula (FF Eisner, 1981):

The statistical data processing was computerized by the methods of variation statistics.

RESULTS AND DISCUSSIONS

The functional activity of the sexual apparatus of cows is dependent on many external factors, such as the feed factor, duration of daylight, humidity, temperature, and others [1;2;3;4]. The season of the year affects the functionality of the female sexual apparatus through these factors. The results obtained from the study of the dynamics of the reproductive cycle indicators of cows of Moldavian type, Black-motley breed, are shown in Table 1.

Table 1 The influence of the season on cows' reproduction indicators, black-motley breed

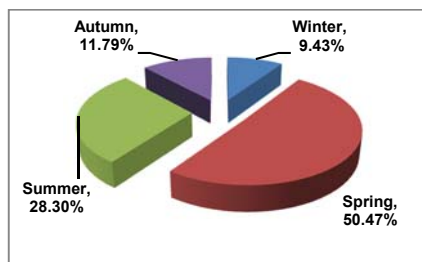
№	Indicators	Seasons			
		Winter	Spring	Summer	Autumn
1	The number of births: (heads) %	29.30	47.50	17.70	5.50
	including:				
	✓ normal, %	87.93	91.49	94.28	100
	✓ difficult, %	6.90	5.32	5.71	0
	✓ the delay of the afterbirth, %	5.17	3.19	0	0
2	Cows' fertilization after the first insemination, %	75.00	84.11	80.00	88.00
3	The duration of the service period, days	75.5±12.8	69.5±9.8	68.2±15.8	77.6±11.2

The analysis of the data (Tab. 1) shows that the main indicators of the reproductive capacity of cows from the given population depend on the season. Thus, the largest number of births is observed in the winter and spring months. Of the total number of births received during the year, 76.8% take place in this period, including 47.5% in the spring months. In the summer time, this indicator decreases and reaches a minimum value in the autumn months.

The character of the birth process also shows seasonal dependence. The obtained data (Tab. 1) show that most births are difficult in the winter months when the animals have a sedentary lifestyle. In the spring and summer months, this indicator is reduced, and in the autumn period decreases to zero.

The duration of the service period varies significantly by seasons. The best performances are observed in the spring and summertime, when its value is 69.58 and 68.21 days, respectively. The obtained data are above the optimum value by 9.58% and 8.21%, respectively. When autumn comes the function of the cow's sexual apparatus begins to decrease, reaching a minimum in winter (tab. 1).

The occurrence of the first estrus with cows after giving birth is of great industrial importance, since this is the determining indicator of cows' fertility and of milk production uniformity throughout the year, of maintaining the stability of prices for milk and dairy products, and of ensuring the market demand for dairy products. The results of studying the effect of seasons on the rhythm of estrus occurrence and of the insemination of the cows from the analyzed herd are presented in diagram 1.



Diag. 1. The structure of estrus occurrence and the inseminations carried out during the year at the cows of Moldovan-type, Black-motley breed, Southern Zonal subtype

The analysis of the obtained data shows that of the total number of inseminations, carried out during the year (Diag. 1), 50.47% take place in the spring months. During the summer months before high temperatures were inseminated 30%. In the autumn period there were inseminated 11.79% of cows of the total number of the cows inseminated during the year. The lowest rates of estrus and inseminations occur in winter, only 9.43% of the total for the year.

The investigated indicators show a close relationship between the function of the sexual apparatus of cows with the season of the year. The Southern zonal subtype, created on the basis of absorbing cross between the local red steppe breed with black and colorful breed, well adapted to the hot climate of the steppe, showing a high functional activity of the sexual apparatus even in hot steppe climate.

Cows' fertilization after the first insemination (Tab. 1) also exhibits seasonal dependence. The highest indicators of cows' fertilization after the first insemination achieved 88% in autumn. In spring the value of the studied indicator is slightly lower and amounts to 84.11%. In the hot summer months cows' fertilization is 80%. The lowest rates are registered in the winter period.

As a result, it should be noted that the indicators of reproductive capacity of the cows of Moldavian type, Black-motley breed, Southern zonal subtypes respond

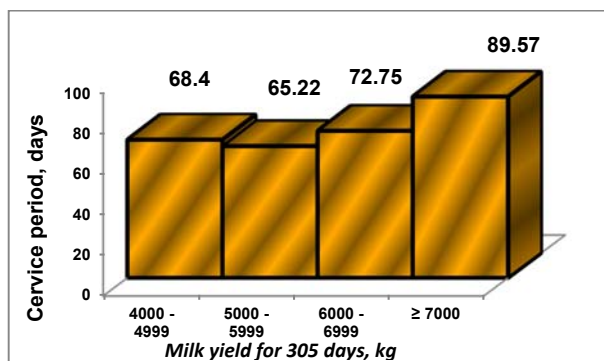
differently to the season of the year. The highest indicators of the service period duration, of estrus intensity and of the character of birth processes are observed in the spring and summer months. At the same time, the percentage of cows' fertilization after the first insemination is higher in autumn. These data are of local practical importance in the preparation of an action plan to combat the barrenness and sterility with cows and to increase the utilization rates of cows' reproductive capacity.

High rates of cows' reproduction depend on the characteristics of the given type, as well as on how they will be integrated into the technology of cultivation and exploitation.

Since the improvement of the level of milk production is constantly and intensively researched, the question of the relationship and interdependence of the level of milk productivity and cows' reproductive capacity is still relevant.

In order to perform the assigned tasks the analyzed population of cows was divided into 4 groups according to the level of milk production:

The service period is one of the key indicators of cows' reproductive capacity, on which the duration of the period between births and the output of calves per 100 cows depend. The results of this indicator studies are presented in diagram 2.



Diag. 2 The duration of the service period according to the level of cows' milk productivity

The analysis of the presented data shows that the duration of the service period is in a

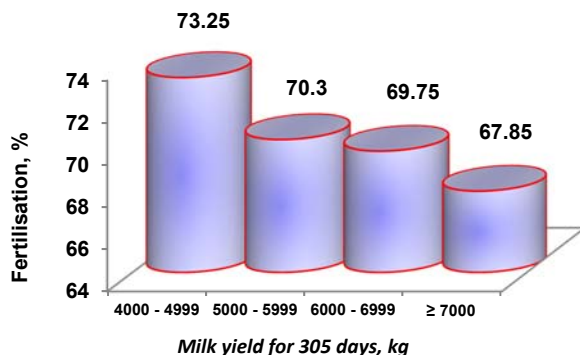
certain dependency on the level of cows' milk productivity. The longest duration of the

service period is observed with the animals with the level of milk production higher than 7000 kg of milk per 305 days of completed lactation, at a statistically significant difference equal to 49.3% ($P < 0.01$) compared to the optimal permissible value (60 days).

The duration of the service period with the cows with an average milk production level above 6000 - 6999 kg per lactation

prevails over the value of lower-producing cows by 11.5% (5000 - 5999 kg) and by 6.42% (4000 - 4999 kg), respectively. With high-producing cows the duration should be no more than 80 days.

The results of the effect of milk production level on the fertility of cows after the first insemination are presented in diagram 3.

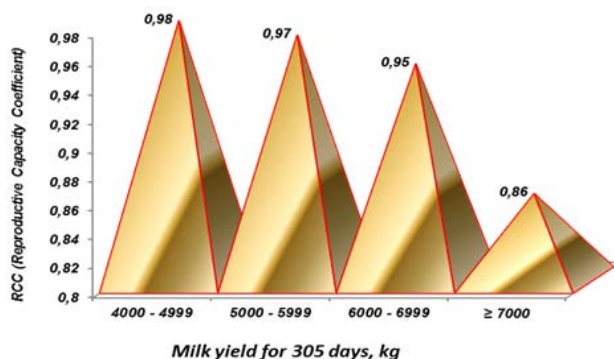


Diag. 3 Cows' fertilization after the first insemination according to the level of their milk productivity

The data from diagram 3.3 show that the coefficient of cows' fertilization after the first insemination varies in the limit 67.85% - 73.25%. As in previous cases, the lowest rates of cows' fertilization were obtained in the group of cows with productivity levels of more than 7000 kg of milk per normal lactation. The highest results of fertilization after the first insemination are registered with

the animals with the level of productivity of 4000 - 4999 per lactation. The data obtained in this case, are somewhat contradictory, however, it is seen that with an increase in milk yield per 1000 kg, the percentage of cows fertilization decreases by about 10%.

The relations between the level of milk production and the utilization of reproductive capacity of cows are presented in diagram 4.



Diag. 4 The reproductive capacity of cows according to the level of their milk productivity

The analysis of the data from diagram 4 shows that the utilization of the reproductive capacity of cows is higher with the cows having milk production levels of 4000 - 4999 kg of milk per normal lactation compared to the animals with higher productivity. In the group of cows with productivity level of 5000 - 5999 kg of milk per lactation the utilization of the reproductive capacity is 0.97%. The lowest coefficient of the utilization of the reproductive capacity of cows is observed in the group of animals with the productivity of more than 7000 kg of milk per lactation.

CONCLUSIONS

1. Both external factors (season of the year) and internal factors (level of milk production) affect the indicators of the reproductive capacity of cows.

2. The main indicators of the reproductive capacity of the studied cows' population react differently to the season of the year. The highest indicators of the service period duration, of the estrus intensity and of the character of birth processes are observed in the spring and summer months.

3. The coefficient of cows' fertilization after the first insemination is higher in autumn.

4. The indicators of the reproductive capacity of the cows from the analyzed population are significantly reduced, starting with 7000 kg of milk.

5. The most problematic on a farm is the reproduction of cows exceeding the level of productivity above 7000 kg of milk per lactation:

- The duration of the service period increases by 49.7%;
- The coefficient of cows' fertilization after the first insemination is below the optimum limit by 2.15%;
- The rate of the utilization of the reproductive capacity of cows is lower by 0.14 relative to the optimal value.

REFERENCES

- [1]. Pop, Ștefan, 2007: Cow programming for artificial insemination. *Brown. An. XII*, 31: 4-16.
- [2]. Smirnov, E, V. Focșa and Alexandra Constandoglo, 2007: Methods of creating the Black-Spotted Breed Moldavian type. Chișinău, Tipogr. "Elena V.I." SRL: 180.
- [3]. Zaversteaev B, 1989: Biotechnology in reproduction and breeding of cattle. L.: Agropromizdat, 255.
- [4]. Nauc V, Darii G, Melnicova G, 1989: The system of reproduction of cattle: Recomendații. Chisinev, 23.