

## STUDY ON INDICES OF REPRODUCTION AT POPULATION OF THE HOLSTEIN COWS OF DIFFERENT ORIGIN IN THE SOUTH AREA OF REPUBLIC OF MOLDOVA

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### **Abstract**

*Breeding indices and their interrelations were studied with the Dutch and German Holstein cow populations, exploited in the southern part of the Republic of Moldova. It was established that regardless of origins of cow population both duration of service-period as well as during of calving interval significantly prevail admitted optimal value. The best results regarding the time of service -period and interval between calving is registered at the population of Holstein cows of Dutch origin. The calving interval, in the average on population of cows of Dutch origin exceeds the optimal admissible value by 16.93%. Under similar conditions, maintenance and operating on cows of the German origins the calving interval duration exceeds the target value by 21.2%, being higher comparing with the results established at cows of Dutch origins by 3.5%. The coefficient of reproductive capacity utilization on average at cows in cows of Dutch origin is 0.86 and that of German origin is 0.83. In the investigated populations, were established links under medium, weak and very weak, both positive and negative, between breeding indices and the age of cows.*

**Key words:** service period, calving interval, dry period, reproduction rate, correlation.

### **INTRODUCTION**

Reproduction influences the rate of breeding of cattle, the level of economic output, the genetic structure of the populations, the state of animal health and the economic efficiency of cattle breeding. Breeding parameters (fecundity, birth, the calving-interval, etc.) directly affect the rate of breeding of cattle.

The maximum use of cow breeding capacity is among the most important conditions that determine the large efficiency of cattle specialized for milk production. The genetic potential of productivity can be achieved only under the conditions of a high level of the functionality of the reproductive apparatus (Leading, 2003; Lavelin, 2009; Frolova, 2014). As with other animal species and at cattle, the function of the reproductive apparatus being very complex is subjected to the influence of a multitude of factors (Mishchenko et al., 2005; Frolova, 2014).

The most important points that can influence the brain activity in the process of releasing hormones are large milk production, fodder

mistakes, the form of the stable, but also early sowing, seasonal influences, etc. (Azarov et al., 2009; Firsova, 2012).

The role of endocrine status on the cow reproductive function has been exposed in numerous researches (Nezhdanov and Safonov, 2008).

Starting of the many factors that influence the deploy of the reproduction function and its results, in the following we have proposed presentation and analysis of breeding index dynamics on successive lactations and interdependence with the age of Holstein cows of different origin exploited in the southern area of the Republic of Moldova.

### **MATERIALS AND METHODS**

It was experimenting with cow populations of Dutch Hostein race exploited in the production activity course of LLC "DokSanCom", district Ceadir-Lunga and two populations of Dutch and German Hostein cow exploited on the course production activity of JSC "AYDYN", Komrat.

The study was targeted the assessment of the duration of the dry period (RM), service-period (SP), calving interval (CI), reproductive capacity coefficient (CRC) on successive lactations and interrelationships of reproduction indices depending of populations age to such animals.

Statistical processing of the experimental results was performed by computer, through mathematical analysis of biological phenomena.

## RESULTS AND DISCUSSIONS

Of the four categories of qualities to which it refers, mainly, the improvement of dairy cows, along with production, body conformation, conformation and functionality of the mammary gland, a special place occupies the breeding indexes, because mammalian females at the end of the reproduction cyclograma ensure the outgrowth of the biological potential of the sire males fertility through a higher natality and prolificity with the highest values (Bogdan et al., 1984). In accordance with the proposed purpose, we evaluated the duration of dry period at cows population of Holstein race (Figure 1).

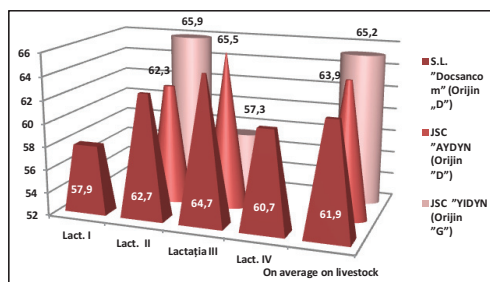


Figure 1. Breast restenosis duration at Holstein cows of different origin, days

The analysis of the presented data reveals that regardless of the origin of the animals, the number of lactation, as well as the conditions of exploitation and maintenance, the duration of the breast restenosis, in the average per capita, is smaller in the population exploited within the LLC "DokSanCom", the maximum being at cows of German origin exploited in JSC "AYDYN" (the optimal duration being considered 60 days), the differences are statistically commensurable. On the basis of

these data, we can conclude that in the investigated zootechnical units, the preparation of the females for a new breeding cycle, as well as a high productivity in the later lactation, begins in the period of breast restenosis.

Duration of the service-period represents practical interest, because it directly influences the duration of the calving-interval, the number of obtained calves per 100 cows over a year, and the milk productivity. The results of the service-period study (Figure 2) are presented below.

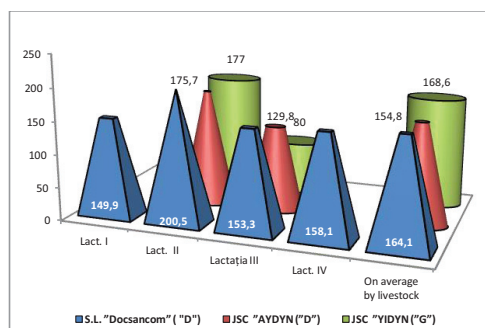


Figure 2. Service-period duration at Holstein cows of different origin (days)

The duration of the service-period in both the livestock and the successive lactations is well above the optimal admissible value. On average, the highest value is found at cows of German origin. In the similar conditions of exploitation and maintenance condition at Dutch origin cows the service-period is higher by 8.19%. Dutch origin cows exploited in different livestock units are showing a difference of - 6.01% in favor of the contingent of JSC "AYDYN". The longest duration is at the exploited population in LLC "DokSanCom", prevailing the indices of the population of the same origin in JSC "AYDYN" by 12.37% and that of the German origin by 11.72%. As a result of the service-period examination, at the investigated cows' populations, being in the III lactation, a decrease in both the average herd scores and with the cows being in the II lactation. At cows of Dutch Holstein in LLC "DokSanCom" the result is lower by 23.54% compared to those of II lactation. At the Holstein Dutch population of JSC "AYDYN" the decrease in comparison to the animals in the II<sup>nd</sup> lactation is 27.07%. At

Holstein of German origin in the III<sup>rd</sup> lactation, the duration of service-periods is lower than in II<sup>nd</sup> lactation by 47.81% or about twice lower. At these, being the best results, the achieved performance is practically approaching the admissible limits, taking into account the average level of milk productivity per unit. According to the maintenance and exploitation standards at Dutch Holstein cows, the results are better for the population of JSC "AYDYN". Here the duration of the service-period is by 15.33% lower compared to the population of LLC "DokSanCom".

The length of service-period of the cow is influenced by genetic factors (breed, individual, etc.) (Leading, 2003; Artyukh et al., 2004.). Limits admitted for service-period, depending firstly on the level of milk production at cows is considered to be: 45 days for those with low milk production; 60 days, for those with average milk production; 70 days for those with high production. Even so, in our case, the length of the service-period is over, at least, 2 times the maximum admissible value for cows with high milk yields.

In continuation, we present the results regarding the duration of the calving interval (Figure 3).

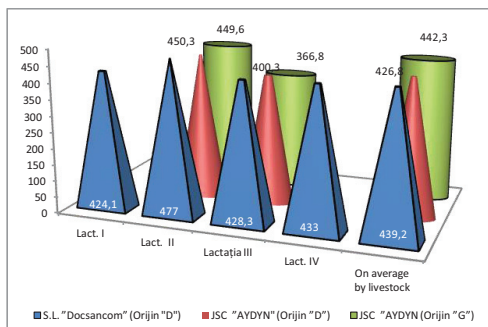


Figure 3. The duration of the calving interval at Holstein cows of different origin (days)

According to the length of the service-period, the interval between calves exceeds significantly the optimal value of 365 days. On average, on the analyzed populations, the duration of the calving interval of the Holstein German population exceed by 21.18% the Holstein Dutch of the LLC "DokSanCom", by 20.33% that of the JSC "AYDYN" and by 16.93% the optimal value of 365 days. The

highest value is found at cows of II lactation. The Dutch Holstein population of the LLC "DokSanCom" surpassed by 30.7%, that of the JSC "AYDYN" by 23.37% and Holstein German by 23.18% optimum for 365 days. At the cattle breed getting each year, from each cow of a healthy calf, represents at the same time the only chance of re-dairying, with all its consequences. But for this, an important link is represented by the normal organization and development of the breeding activity. In the following figure we present the coefficient of reproductive capacity at cows (Figure 4)

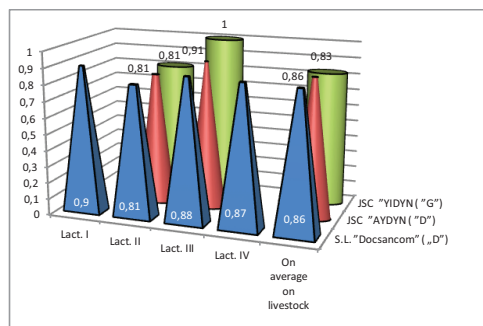


Figure 4. The value of Reproductive Capacity Coefficient at Holstein breed cows of different origin

Reproductive capacity at cows is normally 1.0. Analyzing the data presented in Figure 4, we conclude that in the average per capita, the best results are attested at the Holstein Dutch populations, regardless of the exploitation and maintenance conditions. In correlation with the lactation order number at all populations, the results are similar and the lowest at cows of the II lactation. At cows of the III lactation the best results are at German type of JSC "AYDYN". The minimum value is recorded at cows exploited in LLC "DokSanCom". Although the preparation per unit of the uterus for the next breeding cycle begins during breast restenosis, there are also still unused reserves of cow's reproductive capacity.

In the organization of breeding and improvement it is important to know the interrelationships between reproduction indices and milk yields at cows, since dairy secretion is a consequence of the reproduction function (continuity of the breeding) (Kononov, 2013; Firsova et al., 2012). In continuation we present some results on this subject (Figure 5).

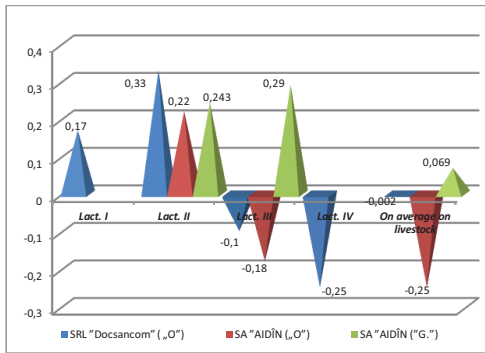


Figure 5. Interrelations service-period duration –the milk productivity on successive lactations at Holstein cows

In the average, the cow population of Dutch origin between the duration of the service period and the quantum of milk on the normal lactation, there are established negative correlative relationships, sub-media and weak, both negative and positive. Depending on the lactation order number, the same trend is observed.

In the following we present the interrelations between the duration of the interval between the calves and the milk yield according to the number of lactating order (Figure 6).

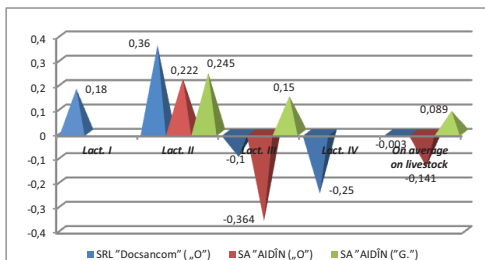


Figure 6. Interrelations the length of calving interval – the milk productivity on successive lactations at Holstein cows

Regarding the interrelations between the calving interval and milk productivity at Holstein cows, regardless of their origin, as well as the conditions of exploitation and maintenance, is found the presence of the positive sub-media correlation at animals of the II lactation. At cows of the III lactation, we observe the presence of the negative correlative bond sub-mediated at the Dutch Holstein population exploited in LLC "DokSanCom" and IV<sup>th</sup> at those exploited in JSC "AYDYN".

Next we present the interrelations character of the reproductive capacity utilization coefficient at the investigated cows population and milk production according to the lactation order number (Figure 7).

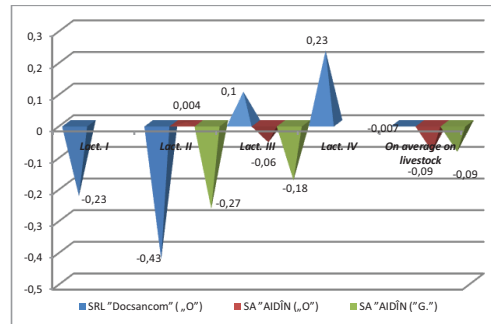


Figure 7. Interrelations the duration of the use of the coefficient of capacity of reproduction – the milk productivity at Holstein breed cows

Between the coefficient of the use of reproductive capacity at the cow populations of Holstein breed and the milk yield on successive lactations predominate negative correlative sub-media relationships and very weak, with the exception of cows of the III<sup>rd</sup> and IV<sup>th</sup> lactation cows exploited within the LLC "DokSanCom" at which there is a positive sub-media correlation.

## CONCLUSIONS

At Holstein breed population of indifferent origin, as well as the conditions of maintenance and exploitation of the main breeding indices (the duration of the service and the interval between the calves) prevail significantly over the optimally admitted values, with the exception of the duration of the dry-period, being within optimal limits.

On average, per capita the best results of the use of reproductive capacity at cows is attested at cows of Holstein Dutch population (0.86), regardless to the conditions of exploitation and maintenance. In relation to the lactation order number, at all populations the results are similar and the lowest at cows of the II lactation (0.81); at cows of the III lactation the best results are at Holstein of German origin.

In the investigated populations, were established average correlative links, weak and

very weak both positive and negative between breeding indexes and milk productivity.

Between the coefficient of reproductive capacity utilization at cows of the Holstein breed population and milk productivity on successive lactations predominates negative correlative relationships sub-media and very weak.

The results obtained with regard to breeding indexes and their interrelationships with the milk productivity indices in the studied populations argue the necessity of organizing selection and organizational works in order to improve them.

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