

Ewa CZERNIAWSKA-PIĄTKOWSKA, Weronika GAJDKA

THE IMPACT OF EFFICIENCY ON BREEDING INDICATORS OF COWS

WPLYW WYDAJNOŚCI KRÓW NA WSKAŹNIKI ROZRODU

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Streszczenie. Przeanalizowano wpływ wydajności mlecznej na długość okresu międzyciążowego w stadzie krów rasy polskiej holsztyńsko-fryzyjskiej odmiany czarno-białej (phf cb). Przyjęto 3 klasy wydajności mlecznej krów: poniżej 6000 kg mleka z laktacji 305-dniowej, 6000–9000 kg i powyżej 9000 kg mleka. W rozpatrywanym stadzie bydła zaobserwowano tendencję do wydłużania się okresów międzyciążowych w miarę rosnącej wydajności mlecznej krów. Na podstawie analizy wartości indeksu inseminacyjnego, w zależności od wydajności mlecznej krów, najmniejszą wartość tego indeksu (1,23) stwierdzono u krów o wydajności poniżej 6000 kg. Największą wartość indeksu inseminacyjnego (1,47) zanotowano u krów o wydajności mlecznej powyżej 9000 kg.

Key words: cows, interpregnancy, milk, period.
Słowa kluczowe: krowy, mleko, okres międzyciążowy.

INTRODUCTION

Milk productivity and fertility of cows is the subject of many studies conducted both in the country and abroad. For achieving good effect both production and economic justified by the fact of avoiding committing a series of errors and breeding habits. These errors can lead to a reduction in health and reproductive parameters. Maintaining the adequate level for reproduction determines the proper course of breeding and selection and also determines the usefulness of milk cows. Improper supervision of stocks also has a negative effect on the fertility of cows (Mordak 2008). Increasingly, we noticed the negative impact of increasing milk productivity on fertility of cows. In high-performance cows Krzyżewski and Reklewski (2003) noted the following negative factors: lack of oestrus, decreasing the effectiveness of pregnancy after the first insemination and sterility. These occurrences are responsible for lengthening of interpregnancy periods. Spontaneous lengthening of interpregnancy periods can be observed in cows of high performance, but also appears to be intentional actions of breeders to extend these periods (Gil et al. 2007). The desirability of extending these periods is disputable. Its followers trace the benefits of improved indicators of both fertility and the health of the cows and to increase milk productivity. In cows, which undergone intentionally

extended interpregnancy periods, fewer cases of mastitis and metabolic disorders was found (Krzyżewski et al. 2004). In addition, a positive correlation between the elongated interpregnancy periods and milk productivity of cows in the next lactation was observed (Cichocki et al. 1999). While opponents believe that it is more profitable from an economic point of view, to keep within 12 months between calving periods, taking into account the cost of food, maintenance and the number of calves born per cow. One of the main reasons for the deterioration of the indicators of breeding cows with high production potential is incorrect and insufficient nutrition, inadequate to physiological needs (Januś and Borkowska 2010).

The aim of this study was to analyze the impact of the level of milk productivity on the length of interpregnancy period of cows in the herd Polish Holstein-Friesian Cubic black and white breed (phf cb).

MATERIAL AND METHODS

Studies were carried out on a farm in West Pomerania province. Cows were kept bound. Cows were fed according to TMR system, only highly productive cows were fed with extra serving individually directly to the troughs. Ration consisted of: grass silage, haylage, beet pulp, a mixture of meaty, meal solvent extracted soybean meal and rapeseed meal. Milking wire was held by a milking machine company Alfa Lavel Agri. Milk was obtained two times a day.

The material consisted of 242 cows of Polish Holstein-Friesian black-and-white breed (phf cb). On the basis of the breeding documentation, cows' and heifers' card list, inseminated cows' list, interpregnancy periods length(OMC) for individual cows has been calculated and the index of insemination has been assessed. Insemination index is the number of insemination treatments per one fertilization. For optimal value of insemination index is assumed a rate which do not exceed 1.6 (Januś and Borkowska 2006), it allows to assess the fertility of the tested animals as satisfactory. Depending on the productivity of dairy, cows were divided into three groups. The first were the animals that produce up to 6.000 kg of milk, the other animals with a productivity of 6.000–9.000 kg, a third of those producing more than 9.000 kg of milk. The results were subjected to statistical calculations using Statistica® 9 PL (StatSoft Inc. 2010).

RESULTS AND DISCUSSION

Analyzing the data from Table 1 concerning the duration of interpregnancy period of cows, depending on the level of milk productivity it can be seen that they were too long, especially in cows with milk productivity of less than 6.000 kg. In case of 1 interpregnancy period, with an increase in milk productivity lengthened the duration of that period. In cows with milk productivity above 9.000 kg OMC was 163.75 days, while in cows with milk productivity under 6.000 kg was 104.14 days. The longest duration of OMC II was also observed in cows with milk productivity above 9.000 kg and lasted 203 days. Analyzing II OMC can be observed that, as in the case of I OMC, the shortest period observed in animals with a capacity of less than 6.000 kg of milk. Other result was obtained in the case of the third OMC, because it took the longest of the animals of milk productivity of less than 6.000 kg

and was 240.67 days, and the shortest in animals 6000–9000 kg and lasted 201.1 days. IV OMC lasted the longest, 200.82 days in animals with milk productivity 6.000–9.000 kg, and the shortest in cows with milk productivity of less than 6.000 kg (106.00 days OMC). Analyzing all interpregnancy period noted that the longest period lasted 240.67 days (III OMC), and the shortest 91.00 days (II OMC). No significant differences were found between the length of the next OMC, and the level of milk productivity of the analyzed animals. Our findings are comparable with the results of other authors. In studies Gil et al. (2007) also demonstrated worsening indicators of reproduction with increasing levels of productivity of dairy cows. The described indicators also deteriorated in research Gnyp et al. (1994) in cows element whose productivity exceeded 6.000 kg of milk. Also, other authors have noted a deterioration in indicators of breeding cows with high milk productivity, especially with a production capacity exceeding 8.000 kg (Juszczak et al. 1994; Rosa 2003; Sawa et al. 2012). Similar results were obtained Januś and Borkowska (2006), stated that with increasing length of interpregnancy period increased level of milk productivity of cows. In another study by the same authors (Januś and Borkowska 2010) there was no effect on the length of interpregnancy period milk productivity of cows. The average length of the OMC, which was calculated on the basis of all the four successive periods was 135.45 days in cows with milk productivity less than 6.000 kg, 172.66 days in animals for milk productivity in the range of 6.000–9.000 kg and 183.35 days in animals of the highest milk productivity (over 9.000 kg).

Table 1. Length of interpregnancy period cows, depending on the level of milk productivity and subsequent lactation $x \pm (s)$

Tabela 1. Długość okresu międzyciążowego krów w zależności od wydajności mlecznej i kolejnej laktacji $x \pm (s)$

Feature Cecha	The level of milk productivity of cows Wydajności mleczna krów [kg]					
	< 6000		6000–9000		> 9000	
I OMC	104.1	(68.45)	157.7	(79.04)	163.8	(80.33)
II OMC	91.0	(39.60)	131.0	(68.19)	203.0	(106.40)
III OMC	240.7	(215.23)	201.1	(110.42)	205.4	(120.78)
IV OMC	106.0	(56.57)	200.8	(126.75)	161.3	(93.38)

OMC – length of interpregnancy period cows – długość okresu międzyciążowego.

The reasons for prolong periods interpregnancy period cows shall be considered. As stated in their work Gil et al. (2007), lengthening periods are not always caused by breeders' intentions, and most often in handling with the animals. As the most common errors it is mentioned as follows: unbalanced rations, mainly in terms of energy in the perinatal period, overfeeding of animals in the dry period, poor detection of estrus, lack of routine medical examinations and delays in carrying out the insemination treatments. American scientists tests are proposed, and rectal administration of prostaglandins cows corpus persistent yellow, so that the duration of the shortened interpregnancy period from 120 days to 98 insemination ratio increased from 42% to 60% (Bronicki and Dembiński 1997).

Analyzing the data from the Table 2 on the value of index insemination depending on the level of milk productivity of cows, it can be observed that the lowest value of the insemination index (1.23) was found in cows with a productivity of less than 6.000 kg. The highest value of insemination index (1.47) was observed in cows with milk productivity above 9.000 kg. The average value of the insemination index, which was calculated on the basis of the entire herd of cows was 1.36. This result may provide a high efficiency of insemination treatments. In a study conducted by Januś and Borkowska (2010) insemination index of cows for milk productivity with less than 6.000 kg was 2.15, whereas for cows with a production capacity exceeding 9.000 kg, this ratio was 2.99. In other studies Januś and Borkowska (2006) for cows with milk productivity above 7.000 kg insemination index gained 2.17 level. In turn, as reported Sawa et al. (2012) for cows with milk productivity above 8.000 kg insemination index was 2.00. Comparing the values of the indicators examined reproduction, there was no statistically significant difference between cows in the analyzed herd. The results of their own (Table 2) demonstrate the effectiveness of these procedures in the flock tested insemination of cows. Insemination index is the number of insemination treatments per one fertilization. For optimal value of insemination index is assumed a rate which do not exceed 1.6 (Januś and Borkowska 2006), it allows to assess the fertility of the tested animals as satisfactory.

Table 2. The value of insemination index with the level of milk productivity
Tabela 2. Wartość indeksu inseminacyjnego z uwzględnieniem wydajności mlecznej

The level of milk productivity of cows Wydajność mleczna krów [kg]	Value of the insemination index $x \pm (s)$ Wartość indeksu inseminacyjnego $x \pm (s)$	
< 6000	1.23	0.44
6000–9000	1.38	0.69
> 9000	1.47	0.91

RECAPITULATION

In the present herd of cattle can be concluded that it was tended to lengthen the interpregnancy periods as increasing milk yield of cows. It was noted that with the increase in milk productivity prolonged interpregnancy periods. Value of the insemination index was the highest (1.47) in the group of cows with the highest productivity (> 9,000 kg of milk) as compared to the group of cows with the lowest productivity (< 6,000) 1.23. It should be kept in mind that many other factors may affect the elongation of the individual OMC. There were no significant differences in the fertility of cows in analyzed animals.

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Abstract. The aim of this study was to analyze the impact of the level of milk productivity on the length of interpregnancy period in a herd of cows of Polish Holstein-Friesian breed black-and-white breed (phf cb). Three divisions of milk productivity in cows herd has been adopted: less than 6.000 kg per lactation of 305 day, from 6.000–9.000 kg and more than 9.000 kg of milk. In the present herd of cattle it could be concluded that the level of milk productivity of cows affected the length of interpregnancy periods. It was noted that with the increase in milk productivity prolonged interpregnancy periods. Analyzing the value of the index of insemination depending on the level of milk productivity of cows can be observed that the lowest value of the index (1.23) was found in cows with a capacity of less than 6.000 kg. The highest index of insemination value (1.47) was observed in cows with milk productivity above 9.000 kg.

