

THE ASSOCIATION BETWEEN REPRODUCTIVE DISORDERS AND LIFETIME PERFORMANCE IN POLISH HOLSTEIN-FRIESIAN COWS

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Abstract. The aim of the study was to determine the relationship between diseases of the reproductive tract and intensity of culling, and lifetime productivity of cows. Investigations were conducted in a large herd of Polish Holstein-Friesian cows of Black-and-White strain. When analyzing the intensity and causes of culling of animals in terms of the SYMLEK system codes it was shown that the largest number of animals (40.67%) was removed from the group comprising infertility and diseases of the reproductive tract. The most frequent cause of culling in animals from this group was infertility (71.67%), followed by retention of placenta with complications (7.08%), damaged inguinal ligament (6.23%), milk fever (4.81%), intrauterine tumours and adhesions (3.40%) and metritis (2.83%). The other specific causes of culling cows from this group were of minor importance, accounting for 1.42 to 0.57%. Statistical analysis showed a significant effect of selected specific causes of culling from the group of infertility coupled with diseases of the reproductive tract on lifespan, length of productive life and milking period as well as traits of lifetime milking performance, except for fat yield per day of productive life and day of lactation.

Key words: dairy cows, culling, lifetime performance, reproduction

INTRODUCTION

Good fertility is the foundation of cattle performance. Among others, the number of calves born, the size of the herd required for reproduction, selection progress, the volume of production of cattle depend on fertility. It is assumed that the average calving interval (ACI) should be approx. 365 days, whereas in highly producing cows with yields of over 6 000 kg milk per each 1 000 kg milk over that level it may be extended by 10–14 days. Norman et al. [2007] reported that selection towards increased productivity results in an extension of anoestrus of cows. Different types of problems with fertility are defined as infertility and constitute a major cause of elimination of cows from the herd.

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The most important causes for elimination of cows from the herd include disorders in reproduction and low milk yield, caused indirectly by diseases of the mammary gland. Causes of culling may also be random in character, e.g. when they are not directly connected with the genetic ability of an animal to reach a specific production level, but they are caused by its health condition. In order to obtain a constant selection response in production herds the level of culling per year should be approx. 20%.

The aim of the study was to determine the relationship between the incidence of diseases of the reproductive system and the intensity of culling and lifetime productivity of Polish Holstein-Friesian cows.

MATERIAL AND METHODS

Investigations were conducted in a herd of Polish Holstein-Friesian cows of Black-and-White variety, being a property of a Hodowla Roślin Szelejewo Ltd. farm. Analyses were carried out on 868 animals 868, culled in the years 2002–2007.

The annual stocking of animals in the period of analysis ranged from 447 (2005) to 487 head (2002). Cows were kept in two free-stall barns in the cubicle system with straw-littered stalls. Manure was mechanically removed on a daily basis using a telescope manure loader. Animals used a shelter being an extension of the barn, where they had access to a covered yard and a feeding trough. Cows were milked twice a day in a herringbone milking parlour (2 x 12) by FARMTEC with a crowd gate and rapid exit facilities.

Feed rations were determined using the INRA program. Cows were fed according the TMR system with the application of six technological groups. Throughout the entire experimental period animals were fed in a similar way using feeds produced on the farm. The main roughages were maize silage, lucerne haylage and meadow haylage. Moreover, ensiled maize kernels, pressed ensiled sugar beet pulp and straw were also used. Concentrates were fed, depending on the technological group, in the amount ranging from 0.7 to 11 kg. Cows were dried off 6 weeks before calving under antibiotic protection. Two weeks before expected calving cows were transferred to a calving barn.

Source data on culled cows came from the breeding documentation of the farm-, heifer cow“ charts, official Production Value Appraisal of Dairy Cows documentation (Score Reports 2) and veterinary records.

Causes of cow culling were grouped according to the codes of the SYMILK system (low yields – 07), diseases of the udder (08), infertility and diseases of the reproductive system (09), old age (11), metabolic diseases and diseases of the alimentary system (12), diseases of the respiratory system (13), diseases of the locomotory system (14), casualties (15), other (16). Within culling causes from the group of infertility and diseases of the reproductive system the following specific causes of cow culling were identified: infertility (without a diagnosed disease), retention of the placenta with complications, damaged inguinal ligament, milk fever, intrauterine tumours and adhesions, metritis, rupture of pubic symphysis, ovarian cysts, abortion, atrophied foetus and uterine haemorrhage. Culled cows were characterized on the basis of the following parameters: lifespan, length of productive

life, number of milking days, age at first calving, lifetime productivity, lifetime productivity per day of life, day of productive life and milking day. Lifetime productivity of cows was expressed in the yields of milk, fat corrected milk (FCM), fat and protein.

The length of life comprised a period from the date of birth to the date of culling, while the length of productive life – the time from the date of first calving to the date of culling.

In this study the level of culling was determined depending on the cause: according to the SYMLEK system and specific causes from the group comprising infertility, diseases of the reproductive system. The effect of six most important specific causes of culling from the group of infertility, diseases of the reproductive system on milking performance traits of cows was investigated.

In the calculations MS Excel[®] spreadsheet and the SAS statistical package SAS [2007] were used. The multivariate analysis of variance was applied, taking into consideration the following effects: genotype, cause of culling and age at first calving as the concomitant variable. The least significant difference (LSD) test was used to calculate the significance of differences between means. In the calculations the MEANS, FREQ and GLM procedures were applied.

RESULTS AND DISCUSSION

The culling rate of cows in the analyzed period was 30.79% (Table 1). When analyzing the intensity and causes of culling in terms of the SYMLEK system codes it was shown that the biggest numbers of animals (40.67%) were eliminated from the herd due to infertility and diseases of the reproductive system, followed by casualties (15.55%) and metabolic diseases and diseases of the alimentary system (13.94%), with diseases of the motoric system ranking fourth (11.98%), and diseases of the udder ranking fifth (9.79%).

Table 1. Mean culling rate of cows and intensity and causes elimination of animals elimination from the herd according to codes of the SYMILK system

Tabela 1. Średni współczynnik brakowania krów oraz intensywność i przyczyny ubycia zwierząt ze stada według kodów systemu SYMLEK

Specification – Wyszczególnienie	N	%
Mean culling rate of cows – Współczynnik brakowania		30.79
Low productivity – Niska wydajność	51	5.88
Diseases of the udder – Choroby wymienia	85	9.79
Infertility, diseases of the reproductive system – Jałowość, choroby układu rozrodczego	353	40.67
Old age – Starość	9	1.04
Metabolic diseases and diseases of the alimentary system – Choroby metaboliczne i układu pokarmowego	121	13.94
Diseases of the respiratory system – Choroby układu oddechowego	6	0.69
Diseases of the locomotory system – Choroby układu ruchu	104	11.98
Casualties – Wypadki losowe	135	15.55
Other – Inne	4	0.46
Total reasons for culling – Razem przyczyny brakowania	868	100.00

Table 2 presents data concerning the intensity and specific causes of culling for cows from the group comprising infertility, diseases of the reproductive system. The most frequent cause of eliminating animals from the herd was infertility, accounting for 71.67% all culling cases in this group. In terms of the decreasing frequency it was followed by retention of placenta with complications (7.08%), damaged inguinal ligament (6.23%), milk fever (4.81%), intrauterine tumours and adhesions (3.40%) and metritis (2.83%). The other causes for the elimination of cows from this group comprised a slight proportion of the total.

Table 2. Intensity and specific causes of cows culling from the group comprising infertility, diseases of the reproductive system

Tabela 2. Intensywność i szczegółowe przyczyny brakowania krów z grupy jałowość, choroby układu rozrodczego

Cause of culling – Przyczyna brakowania	N	%	% in the group % w grupie
Infertility – Jałowość		29.15	71.67
Retention of placenta with complications – Zatrzymanie łożyska z powikłaniami	253	2.88	7.08
Damaged inguinal ligament – Uszkodzenie więzadła miednicy	25	2.53	6.23
	22	1.96	4.81
	17	1.38	3.40
Milk fever – Zaleganie poporodowe	12	1.15	2.83
	10	0.58	1.42
Intrauterine tumours and adhesions – Guzy i zrosty macicy	5	0.35	0.85
Metritis – Zapalenie macicy	3	0.23	0.57
Rupture of pubic symphysis – Pęknięcie ścięgna łonowego	2	0.23	0.57
Ovarian cysts – Cysty jajników	2	0.23	0.57
Abortion – Poronienie	2	0.23	0.57
Atrophied foetus – Zasnęty płód	2	0.23	0.57
Uterine haemorrhage – Krwotok z macicy		0.23	0.57
Total – Razem	353	40.67	100.00

Table 3 contains results of lifetime productivity of culled cows taking into consideration selected culling causes from the group of infertility, diseases of the reproductive system. In this study lifespan, length of productive life and length of milking period as well as milking performance traits were compared for cows eliminated from the herd due to the six most common culling causes. Statistical analysis showed a highly significant effect of investigated culling causes on lifespan and length of productive life of cows and significant relationships between culling causes and milking performance traits. Cows eliminated from the herd due to infertility lived longest (5.2 years), had the longest productive lives (1 136 days) and the longest milking period (922 days). In turn, the lowest values of the above mentioned traits were found for cows culled from the herd due to intrauterine tumours and adhesions (3.2 years, 423 and 410 days, respectively). Lifespan and length of productive life of cows culled due to the incidence of intrauterine tumours and adhesions differed at the level of significance $p \leq 0.01$ from the analogous traits of animals removed from the herd due to infertility and milk fever. The group of cows with the lowest

number of milking days differed significantly in terms of this trait from all the other populations, except for animals removed from the herd due to damaged inguinal ligament.

Table 3. Mean lifetime productivity of culled cows in terms of selected culling causes from the group comprising infertility, diseases of the reproductive system
Tabela 3. Produkcyjność życiowa krów wybrakowanych z uwzględnieniem wybranych przyczyn ubycia z grupy jałowość, choroby układu rozrodczego

Characteristics Cechy	Significance of the effect Istotność wpływu	Causes of culling – Przyczyny brakowania					
		infertility jałowość	retention of placenta with complications zatrzymanie łożyska z powikłaniami	damaged inguinal ligament uszkodzenie więzadła miednicy	milk fever zaleganie poporodowe	intrauterine tumours and adhesions guzy i zrosty macy	metritis zapalenie macy
Length of life, days Długość życia, dni	**	1905A	1510	1692	1820B	1179AB	1459
Length of life, years Długość życia, lata	**	5.2A	4.1	4.6	5.0B	3.2AB	4.0
Length of productive life, days Długość użytkowania, dni	**	1136A	761	915	1034B	423AB	672
Number of milking days, days Dni doju, dni	*	922a	820d	788	848c	410abcd	858b
Milk, kg – Mleko, kg	*	22875a	20114b	21418c	22129d	9581Aabcd	24762A
Fat, kg – Tłuszcz, kg	*	960.9A	784.6a	863.6b	934.4c	386.5Aabcd	910.1d
Protein, kg – Białko, kg	*	770.9a	670.8b	719.3c	761.6d	316.4Aabcd	816.1A
FCM, kg	*	23563a	19815b	21521c	22867d	9630abcde	23557e

* $P \leq 0.05$; ** $P \leq 0.01$; NS – non-significant. Means marked with identical letters differ significantly; large letters – $P \leq 0.01$, small letters $P \leq 0.05$.

* $P \leq 0,05$; ** $P \leq 0,01$; NS – nieistotne. Średnie oznaczone takimi samymi literami różnią się istotnie; duże litery – $P \leq 0,01$, małe litery – $P \leq 0,05$.

When analyzing lifetime productivity of culled cows it was shown that the highest production of milk (24 762 kg) and yield of protein (816.1 kg) were recorded for animals culled due to metritis. In turn, the biggest amount of FCM (23 563 kg) and fat (960.9 kg) were collected from cows culled due to infertility. The worst production results were found for animals eliminated from the herd as a result of incidence of intrauterine tumours and adhesions. Statistical analysis showed that cows with the lowest yields of milk, fat and protein differed in terms of the analyzed parameter significantly ($p \leq 0.01$) from the group of animals with the highest value of milking performance traits and significantly from all the other populations of cows. In case of lifetime milking productivity expressed in kilograms of fat corrected milk with fat content of 4% (FCM), the group of animals culled due to intrauterine tumours and adhesions differed from the other populations of culled cows ($p \leq 0.05$).

Table 4 contains results concerning lifetime productivity of cows per day of life, day of productive life and milking day in terms of the selected causes of culling of animals from the group of infertility, diseases of the reproductive system. No significant relationship was found between causes of culling and fat yield per day of productive life and milking day. In turn, a significant ($p \leq 0.01$) effect of culling causes was recorded for the production of milk per day of life, day of productive life and milking day, as well as yield of protein per day of life and day of productive life and yield of milk expressed in kilograms of FCM per day of life. Significant relationships were found between causes of culling and yield of fat per day of life and yield of FCM per day of productive life and milking day, as well as yield of protein per milking day.

Table 4. Mean yields per day of life, day of productive life and milking day of culled cows in terms of selected causes of culling from the group of infertility, diseases of the reproductive system

Tabela 4. Produkcja na dzień życia, użytkowania i doju krów wybrakowanych z uwzględnieniem wybranych przyczyn ubycia z grupy jałowość, choroby układu rozrodczego

Traits Cechy	Significance of the effect Istotność wpływu	Causes of culling – Przyczyny brakowania					
		infertility jałowość	retention of placenta with complications zatrzymanie łożyska z powikłaniami	damaged inguinal ligament uszkodzenie więzadła miednicy	milk fever zaleganie poporodowe	intrauterine tumours and adhesions guzy i zrosty miacicy	metritis zapalenie miacicy
<i>Yield per day of life – Produkcja na dzień życia</i>							
Milk, kg Mleko, kg	**	11.1A	10.7B	11.4C	11.5D	6.7ABCDE	13.9E
Fat, kg Tłuszcz, kg	*	0.46A	0.41a	0.46B	0.48C	0.27ABCDa	0.51D
Protein, kg Białko, kg	**	0.37A	0.36B	0.38C	0.39D	0.22ABCDE	0.46E
FCM, kg	**	11.4A	10.5a	11.4B	11.7C	6.8ABCDa	13.2D
<i>Yield per day of productive life – Produkcja na dzień użytkowania</i>							
Milk, kg Mleko, kg	**	19.9A	20.3B	22.7a	21.6C	20.0D	26.8ABCDa
Fat, kg Tłuszcz, kg	NS	0.83	0.79	0.91	0.88	0.81	0.98
Protein, kg Białko, kg	**	0.68A	0.68B	0.76b	0.73a	0.64C	0.88ABCab
FCM, kg	*	20.4A	20.0B	22.8	21.8	20.1C	25.4ABC
<i>Yield per milking day – Produkcja na dzień doju</i>							
Milk, kg Mleko, kg	**	24.7a	24.2b	27.2d	26.3c	23.0Ad	29.1Aabc
Fat, kg	NS	1.03	0.94	1.10	1.06	0.93	1.06
Protein, kg Białko, kg	*	0.84	0.82	0.91	0.89	0.74A	0.95A
FCM, kg	*	25.3	23.8	27.3b	26.5	23.2ab	27.6a

* $P \leq 0.05$; ** $P \leq 0.01$; NS – non-significant. Means marked with identical letters differ significantly; large letters – $P \leq 0.01$, small letters $P \leq 0.05$.

* $P \leq 0,05$; ** $P \leq 0,01$; NS – nieistotne. Średnie oznaczone takimi samymi literami różnią się istotnie; duże litery – $P \leq 0,01$, małe litery – $P \leq 0,05$.

The highest values of milk performance traits per day of life were recorded for cows culled due to metritis and the lowest those culled due to intrauterine tumours and adhesions. Animals from the group eliminated due to intrauterine tumours and adhesions differed significantly (except for two cases) in yields of milk, fat, proteins and kgs of FCM from the other cows culled due to the incidence of other causes from the group of infertility, diseases of the reproductive system. Taking into consideration productivity of animals expressed in terms of day of productive life and milking day the most advantageous results of milking performance traits were recorded for cows culled due to metritis, followed by those eliminated from the herd due to damaged inguinal ligaments. The lowest milk yields per day of productive life were observed for cows from the group of infertile animals, while per milking day animals culled due to the incidence of intrauterine tumours and adhesions. When analyzing productivity of animals expressed per day of productive life and milking day, the lowest amounts of protein and FCM were obtained from cows culled due to intrauterine tumours and adhesions.

Kuczaj [1997] reported that culling rate usually falls within the range from 10 to 25%. Excessive value of this index has a negative effect on obtained breeding and economic results. When this rate is close to 35% it needs to be considered a disturbing phenomenon, breeders may find that they do not have a sufficient number of replacement heifers to maintain simple reproduction. Most probably intensive selection towards an increase in milking performance results in a reduced resistance to diseases and causes an increased risk of culling and as a consequence contributes to financial losses in milk production [Harder et al. 2006]. Most probably such a high proportion of casualties among causes of culling in case of dairy cows indicates that this term was generalized to replace all other causes of culling, which were not listed in the SYMLEK system. In this study the third cause of eliminating cows from the herd included metabolic diseases and diseases of the alimentary system. Such a high number of cows eliminated from the herd due to that cause most probably indicates a considerable decrease in feed consumption before parturition, which directly affects the uptake of feed after calving, resulting in a negative energy balance, possibly leading to increased incidence of metabolic diseases.

Results of studies conducted by many authors [Skrzypek et al. 1986; Hibner 1991; Kamieniecki and Sablik 1991; Krencik and Łukaszewicz 1991; Sawa and Maciejewski 2000; Antkowiak et al. 2001] confirm that the most frequent cause of cow culling is infertility. An increase in milking performance results in reduced fertility of cows, although the biggest role is played by the interaction between feeding and fertility [Sheldon and Dobson 2003]. Raheja et al. [1989 a] determined genetic and phenotypic correlations between fertility and production traits in three lactations in Holstein cows, these correlations did not vary from zero and no genetic antagonism was shown between fertility and milk performance traits. Repeatability of fertility traits depending on lactation rank ranges from 0.05 to 0.16 [Raheja et al. 1989 b]. McConnel et al. [2008] monitored 21 states in the USA with the biggest cow populations in terms of health condition of cows and found that the level of culling increased with an increase in the proportion of lameness, lung diseases, antibiotic treatment of teats and extension of interpregnancy period. López-Gatiús [2003] was of the opinion that stress factors need to be reduced, as they have a negative effect on health condition and productivity of

cows. Results reported by that author showed that a cooler climate had a positive effect on fertility and protected against the risk of reproduction disorders.

In a study by Sawa and Maciejewski [2000], conducted on a population of Black-and-White cattle from the former Włocławek province, it was shown that casualties accounted for an identical percentage of cows eliminated from the herd as that recorded in this study. Moreover, those authors observed that in the course of several years the proportion of cows eliminated from the herd due to that cause increased from 6.6% to 32.3%. In studies by Czaplicka et al. [2002] and Olszewska [2003] it was shown that in terms of the number of animals the second group of cows culled from the herd comprised animals culled due to casualties (28.32% and 24.39%, respectively). Mastitis constitutes a significant problem in dairy cattle breeding. Sewalem et al. [2006] analyzed a relationship between somatic cell count in milk and longevity in a large population of dairy cattle from Canada. Those authors, found a dependence of an increased risk of culling and an increase in the number of somatic elements in milk of cows. Santos et al. [2004] showed not only an increased culling rate in cows as a result of mastitis, but also reduced effectiveness of reproduction. Many problems with cows in the periparturient period, including health problems and those associated with reproduction, most probably originate in the optimal feeding in the transition period. In the opinion of Beever [2006], a new strategy of feeding dry cows should be based on a low level of energy (9 MJ metabolic energy and 130 g crude protein per 1 kg dry weight of feed) and a high proportion of fiber in the feed ration. Balanced ration in the dry off period should contain a high proportion of chopped straw and it should be used ad libitum throughout the drying off period. Such a feeding regime introduced on 32 farms in France, Great Britain, Ireland and the USA brought advantageous effects, reducing problems with health condition and fertility of cows g cows. Studies conducted by Rajala-Schultz and Gröhn [1999] on the Finnish population of Ayrshire cows showed the biggest effect on the level of culling for mastitis, diseases of limbs and milk fever. Hortet and Seegers [1998] reported a reduction of daily milk yield in primiparous cows by 0.4 kg and multiparous cows by 0.6 kg at each two-fold increase in the geometric mean of SCC over 50 000 per ml milk.

Gröhn et al. [1998] found that ovarian cysts accounted for 10.6% culling risk, for retention of placenta it was 9.5%, metritis and milk fever accounted for 4.2 and 0.9%, respectively. López-Gatius [2003] recorded a higher frequency (12.4%) of the incidence of ovarian cysts in cows in the warm season of the year than it was in the cold part of the year (2.4%). Houe et al. [2001] reported that the level of incidence of milk fever ranged from 5 to 10%. Joosten et al. [1988], when studying the effect of retention of placenta in cows on the economics of milk production, showed that this disease caused an increase in culling rate, length of interpregnancy period, losses in milk yield and costs of veterinary services, with the highest financial losses caused by a reduced milk yield of cows. López-Gatius et al. [2006] found reduced fertility in cows with a manually removed placenta. In this study only 2 abortions were recorded, which were a cause for the elimination of animals from the herd. In turn, Bicalho et al. [2007] showed that a consequence of stillbirths is an increased risk of culling, as well as an increased number of service days in comparison to animals giving birth to a live calf. Those authors stated that losses in case of abortions are

much higher than the value of the calf. Similar results were reported in studies by Berry et al. [2007] and Bicalho et al. [2008], in which reduced milk yields were shown particularly in the period of early lactation in cows after abortions.

Gröhn and Rajala-Schultz [2000], when investigating populations of Holstein and Ayrshire cows, showed that the high yield was the primary factor reducing the effectiveness of the insemination procedure. In turn, dystocia, retention of placenta and early incidence of metritis contributed to a reduced milk yield of cows.

Most probably problems with the diagnosis of diseases resulted in the situation when infertile cows lived and were milked longest, whereas a consequence of early diagnosis of intrauterine tumours and adhesions was a prompt decision on the elimination of an animal from the herd, thus leading to results of the study concerning milking performance traits.

CONCLUSIONS

Concluding the culling ratio estimated for Polish Holstein-Friesian cows (30.79%) throughout the entire analyzed period was relatively high and could have affected the intensity of selection in the herd. When analyzing the intensity and causes of culling in terms of the SYMLEK system codes it was shown that the biggest numbers of animals (40.67%) were culled from the group of infertility and diseases of the reproductive system. The most frequent cause of culling for animals from that group was infertility (71.67%), followed by retention of placenta with complications (7.08%), damaged inguinal ligament (6.23%), milk fever (4.81%), intrauterine tumours and adhesions (3.40%) and metritis (2.83%). The other specific causes of culling for cows from this group constituted a slight proportion from 1.42 to 0.57%. Statistical analysis showed significant effect of selected specific causes of culling from the group of infertility and diseases of the reproductive system on the following parameters: lifespan, length of productive life and length of milking period, as well as lifetime milk production traits, except for yield of fat per day of productive life and milking day. Cows eliminated from the herd due to infertility lived longest (5.2 years), had the longest productive lives (1136 days) and the longest milking period (922 days). In turn, the lowest values of the above mentioned traits were found for cows culled due to intrauterine tumours and adhesions (3.2 years, 423 and 410 days, respectively). When analyzing lifetime productivity of culled cows it was shown that the highest milk production (24 762 kg) and protein yield (816.1 kg) were recorded for animals eliminated from the herd due to metritis. In turn, the biggest amounts of FCM (23 563 kg) and fat (960.9 kg) were obtained from cows culled due to infertility. The highest values of milk production traits per day of life, day of productive life and milking day were found for cows culled due to metritis, while the lowest for those culled due to intrauterine tumours and adhesions. Most probably problems connected with diagnosing diseases resulted in a situation when sterile cows lived longest and had the longest milking period, whereas a consequence of early diagnosis of intrauterine tumours and adhesions was a prompt decision to eliminate an animal from the herd, thus yielding the obtained results of analyses concerning milking performance traits.

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ZALEŻNOŚĆ MIĘDZY ZABURZENIAMI REPRODUKCYJNYMI I UŻYTKOWOŚCIĄ ŻYCIOWĄ U KRÓW RASY POLSKIEJ HOLSZTYŃSKO-FRYZYJSKIEJ

Streszczenie. Celem pracy było określenie zależności między schorzeniami układu rozrodczego a intensywnością brakowania i produktywnością życiową krów rasy polskiej holsztyńsko-fryzyjskiej odmiany czarno-białej. Badania przeprowadzono w dużym stadzie. Analizując intensywność i przyczyny ubycia zwierząt według kodów systemu SYMLEK wykazano, że najczęściej zwierząt (40,67%) brakowano z grupy jałowość, choroby układu rozrodczego. Najczęstszą przyczyną brakowania zwierząt z tej grupy była jałowość (71,67%), kolejnymi pod względem malejącej frekwencji przyczynami usunięć zwierząt ze stada były: zatrzymanie łożyska z powikłaniami (7,08%), uszkodzenie więzadła miednicy (6,23%), zaleganie poporodowe (4,81%), guzy i zrosty macicy (3,40%) oraz zapalenie macicy (2,83%). Pozostałe szczegółowe powody ubyć krów z tej grupy stanowiły niewielki udział od 1,42 do 0,57%. Przeprowadzona analiza statystyczna wykazała istotny wpływ wybranych przyczyn brakowania z grupy jałowość, choroby układu rozrodczego na: długość życia, użytkowania i doju oraz cechy życiowej użytkowości mlecznej za wyjątkiem wydajności tłuszczu w przeliczeniu na dzień użytkowania i doju.

Słowa kluczowe: brakowanie, krowy mleczne, produktywność życiowa, rozród

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