DOI: 10.21005/AAPZ2022.61.1.01

FOLIA POMERANAE UNIVERSITATIS TECHNOLOGIAE STETINENSIS
Folia Pomer. Univ. Technol. Stetin., Agric., Aliment., Pisc., Zootech. 2022, 362(61)1, 5–14

Received 10 Jan 2021
Revised 28 Jan 2022
Accepted 1 Feb 2022

Jarosław PYTLEWSKI[1], *Ireneusz R. ANTKOWIAK*[1], *Ewa CZERNIAWSKA-PIĄTKOWSKA*[2]

CHARACTERISTICS OF REPRODUCTION TRAITS IN COWS WITH RECORD LIFETIME MILK YIELDS

[1] Department of Animal Breeding and Product Quality Assessment, Poznań University of Life Sciences, Poznań, Poland
[2] Department of Ruminant Science, West Pomeranian University of Technology, Szczecin, Poland

Abstract. The aim of this study was to characterise basic reproduction indexes and to investigate the effect of selected factors on values of analysed fertility parameters in cows (100 head) with record lifetime milk yields. The experiments were conducted on Polish Holstein-Friesian Black-and-White cattle. Cows with lifetime milk yields of min. 100 thousand kg milk were considered record holders. Animals were selected at random from herds covered by performance testing in the Poznań testing region in the years 2003–2016. It was shown that analysed cows with record lifetime milk yields exhibited slightly reduced fertility. The animals had the preferred mean age at first calving and adequate average length of pregnancy. Relatively high numbers of semen doses required for successful insemination resulted in an extended length of calving interval, interpregnancy period and artificial mating service.In the management of dairy cow herds focusing on high lifetime productivity and fertility traits it is recommended to control reproduction so that calvings take place in winter and cows calve for the first time at the age of maximum 27 months.

Key words: Polish-Holstein-Friesian Black-and-White cattle, cows in record-keeping, reproduction traits.

INTRODUCTION

Due to the already reached relatively high milk yield levels at present selection in dairy cattle focuses primarily on the improvement of the so-called functional traits. Less emphasis in selection goals will be placed on milk production traits, and more on health, reproduction, and efficiency traits and on environmentally friendly production with reduced waste and gas emission (Weller et al. 2017). The cows with long productive lives are characterised by high lifetime productivity, which in turn has a significant effect on profitability of raw milk production. However, the heritability coefficient for the length of productive life in Holstein cows is low, amounting to approx. 0.06–0.08 (Roxström and Stranberg 2002). Cow longevity and lifetime performance traits are good indicators of breeding effectiveness and animal welfare. Unfortunately, a high milk yield is often associated with deteriorated cow health and fertility and, consequently, with an increased culling rate (Adamczyk et al. 2017). Animals with high lactation milk yields are prone to numerous diseases, mainly metabolic, which typically result

Corresponding author: Ireneusz R. Antkowiak, Department of Animal Breeding and Product Quality Assessment, Poznań University of Life Sciences, Złotniki, Słoneczna 1, 62-002 Suchy Las, Poland, e-mail: ireneusz.antkowiak@up.poznan.pl

from inadequate nutrition in individual physiological periods. Mastitis, i.e. inflammation of the udder, is a frequent condition observed in dairy cows, which severity typically increases with age. Although has been reported that increased somatic cell count (SCC) early in the first lactation to increase culling risk throughout the this lactation (Acher et al. 2013).

In opinion Martin et al. (2018), genetic correlations between clinical mastitis and other economically important traits indicated that selection for mastitis resistance would also improve resistance against other diseases and enhance both fertility and longevity. The management system of cattle may also affect the incidence of diseases, primarily those of limbs. The above mentioned causes may lead to premature culling of cows. In turn, this results in the need to purchase replacement heifers, which generates additional costs of raw milk production. In the opinion of Harder et al. (2006), intensive selection towards an increased milk yield contributes to a decreased genetic resistance to disease. According to Adamczyk et al. (2021) reasonable to consider Holstein-Friesian cows aged at least 9 years at culling to be long-living animals. This is primarily evidenced by the rapid increase in the culling due to old age in relation to younger cows. Nowadays the above age limit can be suggested as a criterion of longevity for Holstein-Friesian cows but the criterion should be updated to the relation genotype-environment-economy that tends to change over time.

At present healthy, high-producing cows with high milk yields are preferred. Animals with lifetime yields of min. 100 thousand kg milk are considered to be record-holders. Many researchers and practitioners indicate relationships between milk yield levels and reproduction in dairy cows. In high-producing cows we typically observe a decrease in fertility, resulting in a deterioration of calculated reproduction indexes. Twardoń (2001) was of an opinion that sexual disorders are mainly determined by environmental factors, primarily nutrition. However, in the opinion of Fleming et al. (2019) in dairy production, high fertility contributes to herd profitability by achieving greater production and maintaining short calving intervals. Improved management practices and genetic selection have contributed to reversing negative trends in dairy cow fertility, but further progress is still required.

It is of interest from the point of view of both dairy cattle breeders and milk producers to characterise fertility in record-holding cows. The aim of this study was to determine basic reproduction indexes and to investigate the effect of selected factors on the levels of analysed fertility parameters in cows with record lifetime milk yields.

MATERIAL AND METHODS

The experimental material comprised cows (100 head) with record lifetime milk production exceeding 100 thousand kg milk. Animals were selected at random from herds covered by milk recording in the Poznań milk recording region in the years 2003–2016. Data for analyses were retrieved from the Symlek IT system. Record-holding cows came from randomly selected groups of farms, which were divided depending on the herd size criterion into those with max. 20, 20.1–50, 50.1–150 and over 150 cows. The following data were collected from the computer programme developed for reproduction performance testing of record-holding cows: the date of birth, dates of service or insemination, dates of calving, length of pregnancy as well as calving interval, interpregnancy period, artificial mating service and the dry period.

Values of basic reproduction indexes were estimated and the effect of selected factors (age at first calving, lactation rank and calving season) on levels of analysed fertility parameters was determined in cows with record lifetime milk yields.

Statistical analyses were performed using the SAS® statistical package (2015). Basic statistical parameters were calculated using the MEANS procedure. Significance of the effect of experimental factors (testing year, calving season, lactation, group of age at first calving) was analysed applying multivariate analysis of variance with the use of the GLM procedure according to the following linear model:

$$y_{ijklm} = \mu + r_i + s_j + l_k + w_l + e_{ijklm}$$

where:

y_{ijklm} – *phenotypic value of analysed trait;*
μ – *population mean;*
r_i – *fixed effect of i-th year (I = 1, 2, …,14);*
s_j – *fixed effect of j-th calving season of the cow (j = 1, 2, 3, 4);*
l_k – *fixed effect of k-th group of lactation of the cow (k = 1, 2, 3, 4);*
w_l – *fixed effect of l-th group of age at 1st calving (l = 1, 2, 3);*
e_{ijklm} – *random error.*

Statistically non-significant factors in the model were eliminated and calculations were repeated. In order to conduct detailed comparisons of object means multiple comparisons were performed using the Duncan multiple range test.

RESULTS

Table 1 presents mean values of basic reproduction indexes in cows with record lifetime milk yields. The average age at first calving (26 months) fell within the standard limits for Polish Holstein-Friesian Black-and-White cows. However, record-holding cows were characterised by a relatively high number of semen doses per effective insemination (3,2). The value of this reproduction parameter most probably had a significant effect on the other reproduction indexes. The duration of calving intervals (445.2 days) and the interpregnancy period (165.1 days) may be considered extended. Similarly, analyses showed longer duration of postpartum resting period (91 days), artificial mating service (108.4 days) and the dry period (61.7 days). In contrast, the length of average pregnancy (278.8 days) was typical of Polish Holstein--Friesian Black-and-White cattle.

Table 1. Average values of basic reproduction rates for record-holding cows

Traits	N	$\bar{x}$	SD	CV
Age at first calving [days]	100	791.6	67.4	8.5
Age at first calving [months]	100	26.0	2.2	8.5
Intercalving period [days]	646	445.2	100.7	22.6
Interpregnancy period [days]	546	165.1	95.9	58.1
Dry period [days]	614	61.7	33.2	53.8
Postpartum resting period [days]	616	91.0	44.4	48.7
Period of insemination service [days]	374	108.4	86.2	79.5
Insemination index	616	3.2	2.8	86.8
Pregnancy [days]	618	278.8	5.7	2.0

Table 2. Values of basic reproductive rates for cows of record-holders depending on their age at the first calving

Traits	Significance of effects	Age at first calving [months]								
		≤ 25.0			25.1–27.0			> 27.0		
		N	$\bar{x}$	SD	N	$\bar{x}$	SD	N	$\bar{x}$	SD
Age at first calving [days]	–	40	733.4	21.6	32	789.9	16.5	28	876.6	56.1
Age at first calving [months]	–	40	24.0	0.7	32	25.9	0.5	28	28.7	1.8
Calving interval [days]	*	256	437.5[a]	98.9	213	437.5[a]	87.1	177	465.5[b]	115.2
Interpregnancy period [days]	NS	230	162.0	99.6	172	158.6	88.1	144	177.7	98.5
Dry period [days]	NS	250	59.7	25.2	196	60.2	23.0	168	66.4	49.5
Postpartum resting period [days]	*	262	85,2[a]	34,8	193	91,9[ab]	44,6	161	99,5[b]	55,5
Period of insemination service [days]	NS	161	108.7	90.5	113	103.6	78.4	100	113.6	88.0
Insemination index	NS	262	3.3	2.5	193	3.4	3.6	161	2.9	2.0
Pregnancy [days]	*	257	278.3[a]	6.0	198	278.5[a]	5.6	163	280.0[b]	5.2

Effect of factor: *significant (P ≤ 0.05); NS – non-significant (P > 0.05).
Means denoted with different letters (in rows) differ statistically: a, b – P ≤ 0.05.

Table 3. Values of basic reproductive traits for record-holding cows in subsequent lactations

Traits	Significance of effects	Lactation											
		1			2			3			> 3		
		N	$\bar{x}$	SD	N	$\bar{x}$	SD	N	$\bar{x}$	SD	N	$\bar{x}$	SD
Calving interval [days]	*				68	421.4[a]	87.2	76	422.9[a]	80.4	502	451.7[b]	104.3
Interpregnancy period [days]	*	61	143.0[a]	90.4	63	143.2[a]	77.5	65	157.2[a]	87.8	357	174.1[b]	100.1
Dry period [days]	NS	64	57.5	23.5	68	58.5	17.4	75	57.5	22.9	407	63.7	37.7
Postpartum resting period [days]	*	62	86.6[a]	32.6	63	84.7[a]	33.8	66	90.2[a]	38.2	425	92.8[b]	47.9
Period of insemination service [days]	NS	36	94.4	86.3	38	94.7	69.5	41	105.7	80.7	259	112.8	89.1
Insemination index	*	62	2.6[a]	2.1	63	2.8[a]	2.0	66	2.7[a]	2.3	425	3.5[b]	3.0
Pregnancy [days]	NS	52	277.8	5.2	64	279.0	4.7	68	279.1	5.6	434	278.9	5.9

Effect of factor: *significant (P ≤ 0.05); NS – non-significant (P > 0.05).
Means denoted with different letters (in rows) differ statistically: a, b – P ≤ 0.05.

Table 4. Values of basic reproduction rates for cows of record-holders depending of the calving season

Traits	Significance of effects	Season of calving											
		Spring			Sommer			Autumn			Winter		
		N	$\bar{x}$	SD	N	$\bar{x}$	SD	N	$\bar{x}$	SD	N	$\bar{x}$	SD
Age at first calving [days]	NS	25	791.6	73.7	20	788.5	70.7	26	803.7	81.5	29	782.8	42.8
Age at first calving [months]	NS	25	26.0	2.4	20	25.9	2.3	26	26.3	2.7	29	25.7	1.4
Calving interval [days]	NS	131	444.7	101.7	169	446.2	101.5	180	452.1	105.0	166	436.9	94.4
Interpregnancy period [days]	NS	116	168.4	97.4	145	153.4	83.0	137	167.2	102.1	148	171.9	100.6
Dry period [days]	NS	133	62.0	25.8	162	61.8	45.2	152	59.9	23.5	167	63.1	32.5
Postpartum resting period [days]	NS	126	92.2	42.2	165	87.3	46.2	166	90.9	40.8	159	94.2	47.6
Period of insemination service [days]	NS	74	117.5	91.3	104	95.4	73.2	95	108.4	88.7	101	115.3	91.7
Insemination index	*	126	3.1^{ab}	2.7	165	3.2^{ab}	2.6	166	3.6^{a}	3.6	159	2.9^{b}	2.2
Pregnancy [days]	*	134	279.6^{a}	5.4	159	277.8^{b}	5.7	167	279.3^{a}	5.4	158	278.8^{ab}	6.2

Effect of factor: *significant ($P \leq 0.05$); NS – non-significant ($P > 0.05$).
Means denoted with different letters (in rows) differ statistically: a, b – $P \leq 0.05$.

Table 2 presents values of basic reproduction indexes in record-holding cows depending on their age at first calving. Statistical analysis showed significant ($P \leq 0.05$) dependencies between the age at first calving and the duration of calving interval, postpartum resting period and pregnancy. It was shown that record-holding cows which calved for the first time at an age of over 27 months were characterised by the longest calving interval. Those animals differed in this respect from cows which calved for the first time at a younger age, i.e. by 25.0 and between 25.01 and 27.0 months of life. Similar dependencies were observed for the length of pregnancy. In turn, for the length of postpartum resting period significant differences ($P \leq 0.05$) were shown only between cows calving for the first time at the youngest age (by the 25th month of life) and the oldest age (over 27 months).

Table 3 compares values of basic reproduction indexes in successive lactations in record-holding cows. Statistical analysis confirmed a significant ($P \leq 0.05$) effect of cows' age on the duration of calving interval, interpregnancy period, postpartum resting period and pregnancy. Significant dependencies (at $P \leq 0.05$) were also recorded between cows in successive lactations in the insemination index. For the above-mentioned reproduction parameters the oldest cows (being in their third and successive lactations) were characterised by inferior values of these reproduction indexes in relation to younger cows (being in their first or second lactations).

Analyses of the results concerning the effect of calving season on values of basic reproduction indexes in record-holding cows (Table 4) showed a significant effect ($P \leq 0.05$) of calving season on two of the assessed reproduction parameters, i.e. insemination index and length of pregnancy. Cows calving in the autumn compared to those calving in winter were characterised by a greater number of semen doses needed for successful insemination, 3.6 compared to 2.9. In turn, record-holding cows which calved in the spring and autumn were characterised by slightly longer pregnancies (279.6 and 279.3 days) in comparison to animals producing calves in the summer (277.8 days).

DISCUSSION

It is commonly acknowledged that heifers are inseminated or serviced when they reach the so-called breeding maturity, which is determined first of all by the development of their organism and body weight, rather than age. In the case of Polish Holstein-Friesian Black-and-White heifers the first insemination is typically performed at the age of 14–16 months. In the opinion of Kotowski (2015), Polish Holstein-Friesian heifers should be impregnated for the first time when reaching approx. 420 kg body weight. Studies conducted by Hibner et al. (1993) showed that impregnation of F_1 hybrid (ZB x HF) heifers aged max. 16 months caused no shortening in the length of their productive life or reduction of their lifetime productivity. In the opinion of Castle and Watkins (1988), calving of primiparous cows at a very young age imposes the need to perform less intensive annual rotation of cows in the herd, while it also results in increased lifetime yields. In turn, Dorynek et al. (2006) stated that age at first calving affected lifetime milk yields, 4% fat corrected milk (FCM) and protein corrected milk per day of life, day or productive life and day of milking. Studies conducted by those authors showed the most advantageous results for cows calving for the first time at an age of ≤ 26 months. In contrast, in this study the average age of first calving in record-holding cows was 26 months.

The preferred length of the postpartum resting period, i.e. the period between calving and the first artificial insemination (or mating service) in a given reproduction cycle should be at least 6 weeks. It is connected with the time required for cows to prepare for the next pregnancy. However, in the opinion of Bilik and Strzetelski (2006), the greatest capacity to conceive is reached by cows in the period of 70-90 days after calving. In this study the average value of this parameter in record-holding cows was close to the upper limit given by those authors.

The date of insemination typically coincides with the period of high milk yields and any nutrient deficits may affect growth and development of ovarian follicles as well as embryo survival rates. In this study record-holders were characterised by relatively high numbers of semen doses used for successful insemination (3.2). This reproduction parameter is related with the duration of the artificial insemination service and interpregnancy periods as well as calving interval, which in record-holding cows were longer. Some practitioners are of an opinion that the season of the year is of importance for the success of the performed artificial insemination service, as cool months promote conception, while hot months due to heat stress lead to an increased number of semen doses required for successful insemination. Sablik et al. (2001) stated that Holstein-Friesian cows from France were also characterised by a relatively long calving interval (over 400 days) and high values of the insemination index (over 3.5). The above-mentioned authors were of an opinion that low fertility of imported cows may be caused by inadequately balanced feed rations for high-producing cows. In a study by Pytlewski et al. (2006) it was observed that cows with the mean interpregnancy period ranging from 121 to 160 days had the longest lives, productive lives and milking periods, while they also were characterised by the greatest lifetime yields of milk, fat and protein. In the opinion of Litwińczuk et al. (1999), 70 to 100 days is the recommended duration of the interpregnancy period, while its extension or shortening results in a deterioration of milk yields in cows.

Gnyp et al. (1999) stated that cows coming from herds with high milk yields calved for the first time at a younger age, had longer productive lives and were milked longer. They were also characterised by better indexes of production efficiency, but inferior fertility compared to cows coming from herds with low milk yields.

The dry period is an important physiological period in the life of cows. During that period the body is preparing for lactogenesis, papillae in the rumen and the small intestine are regenerated due to the increased nutrient requirement in that physiological period (Annen et al. 2004). In this study the average the dry period in cows with record lifetime milk yields was approx. 62 days. In view of research results the dry period of only 30 days has no negative effect on milk yields and composition, or udder health status (Gulay et al. 2003). Contreras et al. (2004) reported that the dry period lasting 21 days in comparison to 60 days does not affect milk yields. However, Degaris et al. (2008) stated that with an extension of the dry period the yield of milk and protein increase, while fat concentration in milk decreases. In turn, Pytlewski et al. (2009) reported that in Polish Holstein-Friesian Black-and-White cows with a share of HF genes in their genotype exceeding 87.5% the most advantageous length of the dry period in terms of milk yield was 64 to 70 days.

In the evaluated cows with record lifetime milk production the length of an average pregnancy was typical of that breed. In this study no anomalies were found in that reproduction parameter. The physiological length of pregnancy in cattle is 270–290 days (mean 280 days) and it is dependent on many factors, e.g. breed, sex of the fetus, the number of fetuses, freedom of movement provided for the pregnant female and environmental conditions, including nutrition.

Summing up, it needs to be stated that the analysed cows with record lifetime milk yields were characterised by slightly lower fertility, frequently observed in high-producing animals. Nevertheless, the health status of these cows made it possible to extend their productive lives, which may indicate either their good resistance to increased burdens related with milk production or a less intense negative impact of the environment on their organisms. Proper herd management in dairy cows may contribute to improved fertility even in the group of high-producing cows and cows with record lifetime milk yields.

CONCLUSIONS

Cows with record lifetime milk production were characterised by the preferred mean age at first calving and appropriate average length of pregnancy. Relatively high numbers of semen doses required for successful insemination resulted in an extended duration of artificial mating service, interpregnancy period and calving interval.

In the management of dairy cow herds when focusing on high lifetime productivity and fertility traits it is recommended to modify reproduction so that calvings take place in winter and cows calve for the first time at an age below 27 months.

REFERENCES

Acher S.C., Coy F.Mc., Wapenaar W., Green M.J. 2013. Association between somatic cell count early in the first lactation and the longevity of Irish dairy cows. J. Dairy Sci. 96, 2939–2950.

Adamczyk K., Makulska J., Jagusiak W., Węglarz A. 2017. Associations between strain, herd size, age at first calving, culling reason and lifetime performance characteristics in Holstein-Frisian cows. Animal 11, 327–334.

Adamczyk K., Jagusiak W., Węglarz A. 2021. Associations between the breeding values of Holstein-Friesian bulls and longevity and culling reasons of their daughters. Animal 15, 1–8.

Annen E.L., Collier R.J., Mc Guire M.A., Vicini J.L. 2004. Effect of dry period length on milk yield and mammary epithelial cells. J. Dairy Sci. 87, E, suppl., 66–76.

Bilik K., Strzetelski J. 2006. Czynniki wpływające na wydajność rozrodczą krów w fermach mlecznych [Factors affecting the reproductive performance of cows in dairy farms]. Przegl. Hod. 8, 3–7. [in Polish]

Castle M.E., Watkins P. 1988. Nowoczesna produkcja mleka. Warszawa. PWRiL. [in Polish]

Contreras L.L., Ryan C.M., Overton T.R. 2004. Effect of dry cow grouping strategy and prepartum body condition score on performance and health of transition dairy cows. J. Dairy Sci. 87, 517–523.

Degaris P.J., Lean I.J., Rabiee A.R., Heuer C. 2008. Effect of increasing days of exposure to prepartum transition diets on milk production and milk composition in dairy cows. Aust. Vet. J. 86, 341–351.

Dorynek Z., Antkowiak I., Pytlewski J. 2006. A dependency between age at first calving and lifetime productivity of cows. Scr. Comen. Les. PWSZ Leszno, Ser. A Miscellanea, 107–114.

Fleming A., Baes C.F., Martin A.A.A., Chud T.C.S., Malchiodi F., Brito F.F., Miglior F. 2019. Symposium review: The choice and collection of new relevant phenotypes for selection. J. Dairy Sci. 102, 3722–3734.

Gnyp J., Kamieniecki K., Kowalski P., Małyska T. 1999. Efektywność użytkowania krów czarno-białych w stadach o różnym poziomie wydajności mlecznej [Efficiency of performance of – the black and-white cows in herds of different dairy yield level]. Zesz. Nauk. Prz. Hod. 44, 109–115. [in Polish]

Gulay M.S., Hayen M.J., Bachman K.C., Belloso T., Liboni M., Head H.H. 2003. Milk production and feed intake of Holstein cows given short (30 – d) or normal (60 – d) dry periods. J. Dairy Sci. 86, 2030–2038.

Harder B., Bennewitz J., Hinrichs D., Kalm E. 2006. Genetic parameters for health traits and heir relationship to different persistency traits in German Holstein dairy cattle. J. Dairy Sci. 89, 3202–3212.

Hibner A., Ziemiński R., Sakowski T. 1993. Próba określenia optymalnego terminu rozpoczęcia użytkowania mlecznego mieszańców F_1 (cb x hf) [An attempt to determine the optimal date of starting milking of F1 hybrids (cb x hf)]. Pr. Mater. Zootech. 44, 71–77. [in Polish]

Kotowski K. 2015. Skuteczna inseminacja [Effective insemination]. Bydło 3, 56–59. [in Polish]

Litwińczuk Z., Stenzel R., Kamieniecki K., Gnyp J., Szwarc B., Podolak G. 1999. Hodowla i użytkowanie bydła. Lublin, AR. [in Polish]

Martin H., Barkema W., Brito L.F., Narayana S.G., Miglior F. 2018. Symposium review: Novel strategies to genetically improve mastitis resistance in dairy cattle. J. Dairy Sci. 101, 2724–2736.

Pytlewski J., Antkowiak I., Dorynek Z. 2006. Relationship between interpregancy interval and lifetime productivity of cows. Ann. Anim. Sci. 6(1), 53–58.

Pytlewski J., Antkowiak I., Skrzypek R., Kęsy K. 2009. The effect of dry period lenght on milk performance traits of black-and-white polish holstein-friesian and jersey cows. Ann. Anim. Sci. 9(4), 341–353.

Roxström A., Strandberg E. 2002.Genetic analysis of functional, fertility, mastitis and production determined length of productive life in Swedish dairy cattle. Livest. Prod. Sci. 74, 125–135.

Sablik P., Kamieniecki H., Grzesiak W. 2001. Porównanie poziomu cech produkcyjnych i niektórych wskaźników rozrodczych krów holsztyńsko-fryzyjskich importowanych jako jałowice z Francji z wynikami uzyskanymi od krów miejscowych [Comparision of production traits level and some reproduction parameters of Holstein-Friesian cows imported as pregnant heifers from France, and the results obtained from local cows]. Zesz. Nauk. Prz. Hod. 59, 239–245. [in Polish]

SAS® user's guide. **Statistics version 9.4 edition.** 2015. Cary, NC, SAS Institute.

Twardoń J., Samborski Z., Denejka G.J., Dziecioł M. 2001. Wpływ schorzeń palców na zdrowotność układu rozrodczego i gruczołu mlekowego u krów [Influence of fingers disorders on reproduction system and udder salubrity in cows]. Med. Weter. 57, 653–657. [in Polish]

Weller J.I., Ezra E., Ron M. 2017. Invited review: a perspective on the future of genomic selection in dairy cattle. J. Dairy Sci. 100, 8633–8644.

CHARAKTERYSTYKA CECH ROZRODU KRÓW REKORDZISTEK POD WZGLĘDEM ŻYCIOWEJ PRODUKCYJNOŚCI MLECZNEJ

Streszczenie. Celem pracy było scharakteryzowanie podstawowych wskaźników rozrodu oraz zbadanie wpływu wybranych czynników na wielkość analizowanych parametrów płodności 100 krów rekordzistek pod względem życiowej produkcyjności mlecznej. Zwierzęta doświadczalne były rasy polskiej holsztyńsko-fryzyjskiej, odmiany czarno-białej. Za rekordzistki uznano takie krowy, które wyprodukowały w ciągu życia co najmniej 100 tys. kg mleka. Zwierzęta wybrano losowo ze stad objętych oceną wartości użytkowej w regionie Poznań w latach 2003–2016. Wykazano, że analizowane krowy rekordzistki pod względem życiowej produkcyjności mlecznej cechowały się nieco obniżoną płodnością. Zwierzęta te były w preferowanym średnim wieku podczas pierwszego wycielenia i charakteryzowały się właściwą przeciętną długością ciąży. Wykazane stosunkowo wysokie zużycie nasienia na skuteczną inseminację spowodowało wydłużenie okresów: międzywycieleniowego, międzyciążowego i usługi inseminacyjnej. Podczas zarządzania stadem krów mlecznych w aspekcie wysokiej produkcyjności życiowej i cech płodności zaleca się tak sterować rozrodem zwierząt, aby wycielenia przypadały na okres zimowy, przy czym pierwsze wycielenia powinny mieć miejsce do 27 miesiąca życia.

Słowa kluczowe: bydło rasy polskiej holsztyńsko-fryzyskiej, odmiany czarno-białej, krowy rekordzistki, wskaźniki rozrodu.