

Influence of Perinatal Diseases on Cow Milk and Breeding Usefulness

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Investigations have shown that perinatal diseases of the prepartum period leads to greater milk productivity in comparison to healthy animals, obtained from cows possessing follicular cysts on ovaries, with uterus inflammation and mastitis. The lowest daily productivity was observed for cows in which ketose was diagnosed, whereas cows with mastitis showed the highest productivity. Occurrence of the disorders was correlated with elongation of OMC by 9-109 days in relation to the healthy cows. The occurrence of follicular cysts and inactivity of the ovaries had most adverse influence on the length of OMC, i.e. extending it by 230 and 228 days, respectively. Reproductive indices decreased in all cases of prepartum disorders, however, the differences were not confirmed statistically.

Key words: Milk cows, perinatal diseases, milk, reproduction.

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The cow metabolic, digestive and posttraumatic disorders of perinatal diseases belong to the most frequent disorders affecting even 1/3 of the livestock population (ERB and GROHN 1988; SAKOWSKI *et al.* 1989). Their frequency increases proportionally to milk productivity. Reported by KONDRACKI *et al.* (1996) and MAŁECKI-TEPICHT *et al.* (2000) the main reason for these disorders is insufficient environmental conditions. Numerous papers have shown a large impact of perinatal diseases on cow fertility and milk productivity (BRZOZOWSKI 1990; GNYP 1993; ŁUKASIEWICZ *et al.* 1987; MAŁECKI-TEPICHT *et al.* 2000; PRZYBYLSKA & REKLEWSKI 1990; SKRZYPEK *et al.* 1993; TRAUTMAN *et al.* 1991). The most frequent postpartum complication is placenta retention. This affects 2.9-11.8% of the cows in Poland (BRZOZOWSKI *et al.* 1994; KUŹMA & KUŹMA 1994; MAŁECKI-TEPICHT *et al.* 2000; NOGALSKI *et al.* 2001). LYONS *et al.* (1991) found a negative correlation between the occurrence of membrane retention and cow milk productivity. However, the results obtained by MURAWSKI *et al.* (1984) show that membrane retention is the most important source of cow fertility disorders. Other diseases that cause fecundity disorders are follicular cysts (MAŁECKI-TEPICHT *et al.* 2000) and postpartum paralysis (SZUBA-JABŁOŃSKI *et al.* 1994). MAŁECKI-TEPICHT *et al.* (2000) and SABA *et al.* (1990) have shown that in herds with numerous cases of follicular cysts and ovarian afuction, dis-

tinct elongation of the interpregnancy interval and intercalving period and an increase in the insemination index and drop in fecundability after the first artificial insemination treatment may be observed. Milk gland inflammation occurs frequently during the prepartum period. Often it appears as a result of another nosologic unit, for instance postpartum paraplegia, ketose, and placenta retention. Mastitis involves substantial economic loss caused by reduced productivity (SKRZYPEK *et al.* 1994). Moreover, GULIŃSKI *et al.* (2003) have shown that the inflammatory condition of the milk gland has a negative impact on fertility indexes.

The purpose of this investigation was to analyse the influence of perinatal diseases on cow milk and breeding usefulness.

Material and Methods

The investigations were carried out on 444 Black and White cows with various proportions of Holstein-Fresian breed genes, bred in 5 farms included in the system of milk usefulness evaluation, with the approximate milk productivity amounting to 7000 kg.

Perinatal diseases was diagnosed by a veterinary physician and recorded in the breeding documentation. The disorders were classified as placenta retention, paraplegia post partum, follicular cysts,

Table 1

Cow milk usefulness depending on perinatal diseases occurrence

Diseases	n	Statistical measures	Milk productivity (kg)	Trial milking I (kg)	Trial milking II (kg)	Trial milking III (kg)	Trial milking IV (kg)	Trial milking V (kg)
Healthy	237	LSM SE	7373 88	27.9 B 0.91	30.6 a 0.44	29.1 A 0.41	0 28.2 0.41	25.8 0.40
Placenta retention	32	LSM SE	7341 228	26.6 1.10	30.2 1.19	28.3 a 1.11	27.9 1.11	25.6 1.03
Paraplegia post partum	10	LSM SE	6448 395	22.2 1.86	30.3 2.07	28.8 1.90	26.3 2.07	24.9 1.95
Follicular cysts	7	LSM SE	7851 473	27.3 2.43	29.9 2.59	30.1 2.38	27.7 2.35	26.2 2.21
Ovarian cysts	19	LSM SE	7365 287	27.4 1.44	30.4 1.53	30.4 B 1.41	27.1 1.39	23.6 1.34
Ovarian inactivity	5	LSM SE	6839 559	28.3 2.88	28.8 3.07	27.2 3.15	23.9 3.10	27.2 2.93
Inflammation of uterus	12	LSM SE	7672 361	26.1 1.72	29.8 1.83	28.7 1.75	28.5 1.79	24.1 1.76
Torsion of abomasums	3	LSM SE	6551 722	21.3 3.72	19.9 3.96	19.8 3.64	20.0 3.59	19.6 3.38
Ketose	16	LSM SE	6817 334	20.0AB 1.61	22.7ab 1.71	20.0 ABCa 1.57	25.6 1.60	22.2 1.51
Mastitis	103	LSM SE	7400 126	28.2 A 0.61	30.3 b 0.66	28.6 C 0.51	26.6 0.60	25.9 060

Mean values in columns with the same capital letters at $P \leq 0.01$ differ significantly.

ovarian cysts, inflammation of uterus, torsion of abomasum, ketose, mastitis. Data on cow usefulness were gathered from the documentation (heifer-cow cards, T-1 forms, reports) maintained by the farms.

The variation analysis method was applied to evaluate the influence of perinatal diseases on milk usefulness (milk productivity during the lactation period, daily productivity in the first 5 attempts of trial milking) and on breeding usefulness ((the interpregnancy interval (OMC), rest period (OS), service period (OU) and the insemination index (II)).

Results

Through analysis of cow milk usefulness (Table 1) it was found that perinatal diseases significantly impact the productivity in the first 3 attempts of trial milking. The lowest productivity in the first trial milking (20 kg) was recorded in cows in which ketose was found, whereas the highest productivity (more than 28 kg) was observed for cows in which ovarian inactivity or mastitis was recorded. Productivity was also low in the second and third trial milking for the cows with ketose when compared to the results obtained from the re-

Table 2

Cow breeding usefulness depending on perinatal diseases occurrence

Diseases	n	Statistical measures	Interpregnancy interval (days)	Rest period (days)	Service period (days)	Insemination index
Healthy	237	LSM	121	88	32	1.7
		SE	4.19	2.78	3.76	0.07
Placenta retention	32	LSM	138	83	52	2.0
		SE	11.57	2.78	10.23	0.19
Paraplegia post partum	10	LSM	170	121	49	1.8
		SE	20.37	13.56	18.31	0.34
Follicular cysts	7	LSM	230	129	101	2.3
		SE	24.35	16.20	21.89	0.41
Ovarian cysts	19	LSM	178	112	66	2.6
		SE	14.78	9.88	13.28	0.24
Ovarian inactivity	5	LSM	228	119	109	3.3
		SE	37.20	24.76	33.43	0.62
Inflammation of uterus	12	LSM	172	115	57	2.2
		SE	18.60	12.38	16.71	0.31
Torsion of abomasums	3	LSM	159	98	61	2.0
		SE	37.20	24.76	33.43	0.62
Ketose	16	LSM	175	105	70	2.1
		SE	16.11	10.72	14.47	0.27
Mastitis	103	LSM	130	92	38	1.8
		SE	6.35	4.22	5.70	0.10

maining cows (except for those with torsion of abomasum). Healthy cows yielded 27.9 kg of milk in the first trial milking. The milking rate of these cows increased up to the second trial milking, in which the maximum productivity was attained (30.6 kg), afterwards their productivity systematically decreased. A similar course of lactation was observed for cows in which placenta retention, paraplegia post partum, ovarian cysts, inflammation of uterus and mastitis were found. Cows with follicular cysts were found to have an increasing milking rate up to the third trial, in case of the cows with ketose the productivity fluctuated from 20 kg in the first and third milking up to 25.6 kg in the fourth trial milking, whereas the lactation course for the cows with torsion of abomasum was very even

(each trial milking yielded about 20 kg of milk). Despite statistically confirmed diversification of daily productivity in the first three attempts of trial milking, depending on the type of perinatal diseases, the differences shown in the lactation efficiencies were insignificant. The lactation efficiency of the healthy cows was 7373 kg, higher efficiency was observed for the cows with follicular cysts (+478 kg), with inflammation of uterus (+299 kg), and with mastitis (+27 kg). In turn, less milk was obtained from the cows with paraplegia post partum (-925 kg), with ovarian inactivity (-534 kg), with torsion of abomasum (-822 kg) and with ketose (-556 kg).

The influence of the perinatal diseases on the reproductive indices was not statistically confirmed in the analysed population (Table 2). A deteriorat-

ing fertility trend was observed for cows in which perinatal diseases was diagnosed when compared to the healthy animals. The shortest interpregnancy interval (121 days), and at the same time the closest to the optimal one, was observed for the cows which did not have any disorders. Occurrence of the diseases was connected with the elongation of OMC by 9 – 109 days in relation to the healthy cows. The most adverse influence on the length of OMC was recorded for follicular cysts (230 days) and ovarian inactivity (228 days).

The rest period (in this period a series of important physiological adaptation mechanisms take place during which cattle adapt to the increased demand of the milk gland for alimentary components, occurring during lactogenesis) lasted 88 days for healthy cows, an elongation of this period was observed for the cows with follicular cysts (129 days), with paraplegia post partum (121 days) and with ovarian inactivity (119 days). In case of all perinatal diseases, an extension of the service period in relation to the healthy cows was found as well. The most important values of this index were recorded for the cows with ovarian inactivity (109 days), with follicular cysts (101 days) and with ketose (70 days). The value of the insemination index was also higher for cows with perinatal diseases than for the healthy cows, particularly high values were recorded in case of ovarian inactivity (3.3).

Discussion

This investigation has shown that perinatal diseases lead to greater milk productivity in comparison to healthy animals, obtained by cows possessing follicular cysts on ovaries, with uterus inflammation and mastitis. A similar result was shown by SKRZYPEK *et al.* (1993), who found that cows affected by the disorders yielded higher milk productivity. However, the author's opinion is that the advantage in milk productivity seems to be of slight economic significance in view of many negative consequences which are caused by the perinatal diseases. However, SAKOWSKI *et al.* (1989) did not find any clear correlation between the perinatal diseases and subsequent productivity. Ketose was the reason for the milk productivity drop in this study, likewise LIPIEC and FILAR (1990) advise that at present ketose is one of the most important inducers of a decrease in milk productivity.

The productivity in the first five attempts of trial milking for the cows with mastitis was compared in relation to the healthy cows. GULIŃSKI *et al.* (2003) noted a reduction of daily productivity during the first five months of lactation for the cows having more than 400.000 somatic cells in 1 ml of

milk. The results obtained here are in accordance with BRZOZOWSKI *et al.* (1994), who observed an extension of the service period by 7.41 days in cows with placenta retention, an extension of the interpregnancy interval by 6 days and a shortening of the rest period by 4 days in relation to the average values for a given population.

Also, the results of SZUBA-JABŁOŃSKI *et al.* (1994) show that the fertility indices decrease for cows with placenta retention. JAŚKOWSKI (1983) also obtained results showing the adverse influence of placenta retention on reproduction. MAŁECKI-TEPICHT *et al.* (2000) investigated imported animals of the hf breed and found that the insemination index increased by 1.47 and OMC was extended by 174 days in herds in which ovarian cysts and inflammation of endometrium occurred frequently. In many milk cow herds inflammation of uterus and ovary functionality disorders occur during the postpartum period. It is estimated that inflammation of the uterus takes place in 10-20% of cows (JAŚKOWSKI 1983; SABA *et al.* 1990), causing substantial losses in the farming business (SZAREK *et al.* 2004). Not only do rejections and breeding costs increase, a negative impact on fertility is also apparent. MAŁECKI-TEPICHT *et al.* (2000) and SABA *et al.* (1990) show that fertility indices were decreased in the presence of follicular cysts. KU MA and ROMANIUK (1993) found that the frequency of follicular cyst occurrence depends mainly on the breeding and feeding conditions. During the prepartum period, mastitis occurs frequently. It reduces postpartum immunity, making it easier to infect the milk gland with microbes. An additional risk involves teat sphincter loosening caused, among other things, by high postpartum milk productivity (EMPEL *et al.* 1987). GULIŃSKI *et al.* (2003) show that the udder inflammatory condition has a negative impact on fertility indices. Similar relations regarding the influence of other perinatal diseases on the reproductive indexes were observed by BRONICKI and DEMBINSKI (1993), BUSCH and HARTWIG (1984), GULIŃSKI *et al.* (2003), KU MA and ROMANIUK (1993), SABA *et al.* (1990).

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