

Incidence of reproduction disorders, clinical mastitis and lameness in cross-breed HF × BW cows and Jersey cows maintained in the same conditions

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Summary

The aim of this analysis was a comparison of the incidence of reproduction disorders, clinical mastitis and lameness in Holstein-Friesian and Jersey cows maintained at the same farm during three years. The herd consisted of 125 cross-breed HF × BW cows and 39 Jersey cows. Incidence of silent heat was 28.5% in HF, and 26.3% in Jersey. Cystic ovarian disease occurred in 3.8% HF and 3.9% of Jersey cows. Retained placenta was observed in 6.6% HF and 3.1% Jersey, and endometritis in 8.9% and 4.4%, respectively. 13.5% HF suffered from lameness and only 1.5% Jersey ($p \leq 0.05$). Prevalence of clinical mastitis was at a similar level (HF – 54.7%, Jersey – 50.7%). Incidence of reproduction disorders and clinical mastitis was very similar for both analyzed breeds, despite of the difference of milk production. On the other hand there was considerably less lameness in Jersey than in Holstein cows.

Keywords: cows, Holstein-Friesian, Jersey, diseases

Some significant changes in dairy cattle breeding have taken place in Poland within recent years. They are connected mainly with introducing new, highly-effective breeds and changing the systems of animal maintenance (16). There is an upward trend for breeding the Holstein-Friesian (HF) breed that guarantees the highest milk yield (16). It leads to a displacement of less productive breeds or those of dual purposes, both native ones – Lowland Black-and-White or Red Polish cows – and imported ones – e.g. Jersey cows.

The increased dairy production entails the increase of costs to be incurred by a breeder, which include the increased forage and environmental requirements of the HF breed (16). Moreover, of some importance are costs connected with treating the animals and with a higher risk of their early culling due to the breed's higher susceptibility to illness. This results in the need for searching for alternative breeds, one of which, however rare in Poland, is the Jersey one. There is not much information referring to the health of that breed or of comparing it to the data on the cattle of the HF breed (7, 25). The so-far-performed analyses usually refer to some chosen aspects of the breeding, such as intercalving periods, the age of the first parturition,

occurrences of udder diseases, or qualitative features of the obtained milk (3, 8, 18, 24, 25, 27).

The aim of the following research was to analyze and compare the incidence for breeding disorders, clinical cases of *mastitis* and lameness in cows of the HF and the Jersey breeds maintained in the same conditions for 3 years.

Material and methods

The research was carried out in a dairy herd in North-Eastern Poland during the period from August 2003 to August 2005. The herd consisted of 125 cows that were the Holstein-Frisian and the Black-and-White cross-breeds (with the share of the HF breed genes > 50%) plus 39 cows of the pure Jersey breed. They were maintained in the same conditions, where one milking parlor was used for milking. The cows were fed using the Partial Mix Ration (PMR) method and, additionally, at their foraging stations, depending on the cows' yields, they were given concentrates. The basis of the summer feeding was as follows: pasture, hay-silage, maize-silage, full-portion feed concentrates plus mineral and vitamin supplements. The winter feeding was based upon hay-silage, maize-silage, concentrates plus mineral and vitamin supplements. All year long, the cows had free access to salt licks. To limit the incidence of *mastitis*, an inspection of the entire milking installation was

performed once a year, the cows' teats were washed with water and detergent before milking and post-milking dipping was performed routinely. All the cows were dried off with antibiotics.

Clinical examinations and observations in the herd were performed at 4-week intervals. During the visit, a gynecological examination was performed and data on animals' health were completed. Conditions of the *uterus* and the ovaries were estimated in a rectal examination in the following cases: lacking estrus up to 60 days after the parturition (a.p.), animals with pathologic secretions from the reproductive tracts, animals inefficiently inseminated minimally 3 times after inseminations performed at least 30 days before (pregnancy control), after retained placenta (presence of fetal membranes up to 24 h a.p.), after difficult parturitions (caesarean section, fetotomy, uterine torsion, uterine prolapse), and after abortions. Depending on the needs, the rectal examination was supplemented with an ultrasound examination (Pie Medical Falco Vet 100, a linear probe of 5 and 7.5 MHz frequencies) and vaginal endoscopy. The findings of the clinical examinations were registered according to the so-called Hannover Key.

Additionally, during every visit the following data were collected: milk yield and qualitative indicators for milk, incidence of *mastitis*, hypocalcaemia, retained placentas, abortions, lameness, diseases of calves, and a number of culled cows and their causes.

The obtained data were analyzed statistically using the χ^2 test and the u test.

Results and discussion

In Polish literature there is no epidemiological data on the frequency of health disorder occurrences in cows of the Jersey breed. Only that breed's milk yield and its composition have been described: factors that decide on the usefulness of that material for the dairy industry (8). A daily yield of milk in the discussed herd for both breeds is presented in tab. 1. On recalculating it into a standard 305-day lactation, the milk yield of circa 4000 l for the Jersey breed and circa 6250 l for the HF cross-breeds was obtained. Those values are slightly different from the ones recognized as typical for both breeds; Fonseca (7) presents a higher yield (5850 – Jersey, 9174 – HF) and Washburn et al. (26) states that in the United States, at the end of 1990s, the milk yield of the Jersey breed cows was circa 6375 kg of milk.

The incidence of reproduction system, udder and limb disorders in cows of both breeds is presented in tab. 1. Silent heat was the most common reproductive problem in the examined herd, however, ovarian cysts and ovarian afuction were also diagnosed but in comparatively rare cases. The frequency of silent heat in the HF cows was circa 28% of animals, which is in accordance with the findings of other authors (4, 6). However, the literature lacks data on occurrences of silent heat in Jersey breed cows. In the discussed herd, it was 26.3%. Silent heat may be caused, apart from many other factors, by low effectiveness of detecting

Tab. 1. Daily milk production, incidence of reproduction disorders, lameness, clinical *mastitis*, and culling of the cows of both breeds during three years

Analyzed traits	HF	Jersey
Daily milk production (l)	20.5	13.1
COD	3.8%	3.9%
Ovarian afuction	2.4%	0%
Silent heat	28.5%	26.3%
Retained placenta	6.6%	3.1%
<i>Endometritis</i>	8.9%	4.4%
Limb diseases	13.5%*	1.5%*
Clinical <i>mastitis</i>	54.7%	50.7%
Hypocalcaemia	1.6%	0%
Culling	8.9%	8.7%

Explanation: * – differences statistically significant $p \leq 0.05$

that condition. Due to a close occurrence rate of that disorder in the cows of both breeds, it should be suspected that insufficient detection of *estrus* was decisive in the discussed herd. Among other causes of silent heat the following may also be listed: high milk yield, energy shortages and excessive adiposity characteristic for the high-milk breeds (22).

It seems that in the examined herd those factors, particularly the yield level, did not substantially influence the occurrences of silent heat. Although the animals of both breeds differed significantly in their milk yields, silent heat was on the same level in both groups, which indicates a shared cause of an organizational nature.

The incidence of ovarian cysts was very similar in both breeds (3.8% – HF, 3.9% – Jersey), and low (9.22) when compared to the results of other authors. On performing a similar data analysis referring to the same breeds, Fonseca (7) has stated that the discussed condition affected nearly 7% of Jersey cows, but only 4% of the Holstein-Friesians. The authors' previous research and those of other authors show that presently, in comparison to Polish data from the beginning of the 1990's, ovarian cysts are diagnosed less often (2). This trend may be a result of the general improvement of the feeding level of the dairy cattle herds in Poland, which makes energy shortage, considered to be the main cause of that condition, of lesser importance (17). Another explanation may be provided by the fact that the examinations for this study were performed relatively late after parturitions, which is connected with possibility of self-curing that often may happen up to the 60th day after parturition (17).

Incidence of retained placentas and *endometritis* (3-6%) in the examined herd may be described as low (tab. 1), when referring it to the medium values given in the literature that oscillate around 15% of animals (12, 20). Both a high level of hygiene of parturitions (a clean labor ward with single boxes) and properly

balanced nutrition, which limited possibilities of food shortages and metabolic disorders, may have had some influence on the low values of occurrences for those diseases. The aforementioned factors are considered to be the main causes of that group of disorders. Moreover, maintaining the cows in a cowshed with free stands, which made them move freely, created favorable conditions for involution and uterine self-cleaning processes. Similar results for those disorders in cows of both examined breeds have also been presented by Fonseca (7). However, the data on *endometritis* occurrences in the Holstein-Friesian cows in other countries are very divergent and fluctuate from 7.5% to 53% (10, 14). Most probably this results from the fact that the discussed condition is of a polyetiologic character.

Fonseca (7) surprisingly often diagnosed hypocalcaemia (9.5%) during the examination performed on Jersey breed cows. In our study there was no case of hypocalcaemia in that breed during the whole 3 years. Likewise in the HF breed cows that disease occurred only in 1.6% of the animals. Probably this was the result of preparing a properly balanced food portion, for disorders of mineral management are caused in most cases by malnutrition (13).

The frequency of occurrence of lameness differed statistically to a significant degree for the compared breeds (tab. 1). It was present only in 1.5% of the Jersey cows but it reached 13.5% in the HF ones. This group of conditions is of crucial significance for the productivity and health of the animals, for limb disorders influence directly or indirectly occurrences of other disorders, such as the decrease of milk yield, a weaker display of *estrus* manifestations or occurrences of ovarian cysts (17). Rare occurrences of limb disorders should be considered as a very good advantage of the Jersey cows. Washburn (27) has stated that the animals of that breed kept on pasturage did not have any problems at all with limbs, however such problems affected up to 25% of the HF cows maintained in the same conditions. Similarly, when performing an analysis of the risk factors referring to cows of various breeds raised in Denmark, Alban (1) has stated that the Jersey breed is characterized by the lowest risk of limb disorders. The smaller body mass of the Jersey breed cows, as compared to the HF ones, seems to be one of the factors influencing that situation. Another one is the breed's lower milk yield and thus a smaller amount of concentrates in a feeding portion. Large amounts of these in the forage used may lead to cases of subclinical acidosis that favor occurrences of lameness (13, 21).

Large differences in the level of milk yield between the studied breeds were the basis for the assumption that the incidence of *mastitis* in the cows would be quite varied. However, on analyzing the obtained data it has been proved that clinical *mastitis* occurred in both groups on a very similar level (tab. 1). Washburn (27), when making a similar comparison, has iden-

Tab. 2. Incidence of clinical *mastitis* in HF and Jersey cows according to lactation period during three years

Breed	Number (%) of infected quarters			Total
	0-100 days	101-200 days	> 200 days	
HF	96 (35.7%)	102 (37.9%)*	71 (26.4%)	269 (100%)
Jersey	29 (34.5%)	23 (27.4%)*	32 (38.1%)	84 (100%)

Explanation: as in tab. 1.

tified a significant difference in favor of the less productive breed (25.8% to 41.2%), and Schrick (24) states that this condition affected only 24.7% of the Jersey cows. Analyzing three following lactations and the time of *mastitis* occurrence during a lactation, it has been found that clinical bovine *mastitis* in the HF breed occurred significantly more often between the 100th and the 200th day of the lactation (tab. 2), whilst during other periods those differences were not crucial. It is difficult to interpret that fact in a clear-cut manner, however it may seem that it could be caused by a higher milk yield of the Black-and-White cows in that phase of lactation, which made them more prone to infections. That positive correlation between *mastitis* incidence and the milk yield has already been commonly acknowledged (11). However, a relatively high percentage of *mastitis* after the two hundredth day of lactation, which has been diagnosed in both breeds, could be caused by the way the cows were dried off in the discussed farm. It was based on a gradually less frequent milking of the cows, which led to retaining the milk in the udder and favored occurrences of *mastitis* in that period. That method is not recommended anymore due to both health and economical reasons (15), yet it is still preferred and applied by some part of farmers.

Analysis of the frequency of occurrence of *mastitis* in the following lactations has shown that cows of the Jersey breed were taken ill significantly more often in the first lactation ($p \leq 0.05$). (fig. 1). The cause of that situation may be seen in the empty yields happening

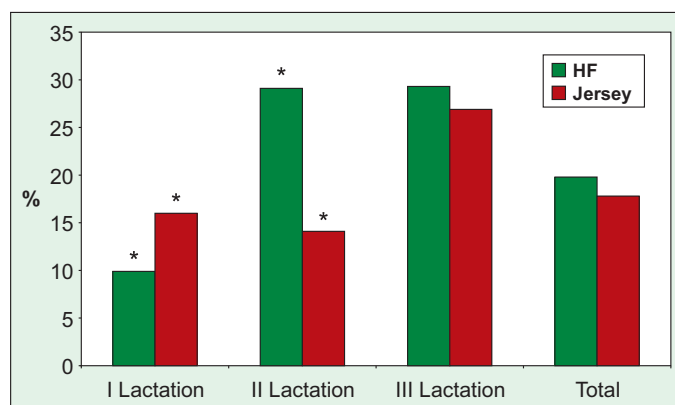


Fig. 1. Incidence of clinical *mastitis* in three successive lactations in HF and Jersey cows

Explanation: * – differences statistically significant $p \leq 0.05$

during the milkings or inappropriate parameters of the milking equipment such as underpressure, or bar frequency. This could lead to irritation of the udder, which created favorable conditions for mammary gland infections, the clinical effect of which was the increase in the number of infections of that gland. It is likely that during the following lactations the animals adapted to the milking conditions and that trend was no longer observed. In the second lactation, *mastitis* was observed much more often in the Holstein-Friesian cows, whilst in the third one – the frequency of its occurrences in both breeds was on a similar level. Moreover, in both studied groups more frequent cases of clinical inflammations in the hind quarters were found, which is confirmed as a typical phenomenon by other authors (5).

The level of the culling of dairy cows makes an essential feature of their usefulness. Attention should be paid to the very similar level of animal culling in both groups (tab. 1). It is surprising that in spite of a significantly higher percentage of the HF animals displaying lameness, no drastic exchange of the cows of that breed was observed in the herd. Apart from *mastitis* and reproductive system problems, limb disorders are considered to be one of the three main causes of the cow elimination (19), thus a higher percentage of culling in that group of animals may have been expected. However, it should be remembered that the level of culling in a herd depends mainly on the strategy accepted by the owner.

Summing up, it should be stated that, somewhat surprisingly, the frequency of occurrence of reproductive system and mammary gland diseases was very similar in both breeds in spite of a significant difference in milk yield that favored the HF animals. On considering that fact, the Jersey breed does not seem to be an advantageous alternative for the HF cows maintained in conditions typical for dairy cow breeding in Poland. However, the carried-out study has shown a definitely lower incidence of limb diseases in the Jersey cows. This is a very positive feature of that breed, even though in the light of our study it was of not an influence on lowering the percentage of culling. Similar frequencies of basic reproduction disorders in the Jersey and the HF cows also indicate a strong influence of environmental factors on the cows' reproductive functions. Genetic factors connected with breed differences seem to be of lesser importance in that situation. But at the same time the aforementioned influence indicates that conditions of breeding, systems of herd management and complying with the requirements of animal welfare are of great significance for an optimal breeding of the dairy cows.

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