

THE INFLUENCE OF IBR INFECTION ON THE MILK PRODUCTION COSTS IN DAIRY FARMS

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Abstract. Under the "Zdrowa Krowa" programme in 2010 on 23 farms specialized in milk production the degree of infection IBR was determined. Conducted surveys, economic analysis and assessment of changes of technical and production allowed to estimate production losses to 619.96 zł per cow. In relation to the test group of farms the issue of IBR applies to entities with a higher degree of specialization as well as producing in larger herds. The problems of increasing production provides short lifespan of cows related to the purchase and culling animals. The economic calculation is also negatively affected by extending the open day period up to 156 days.

Introduction. Dairy industry in Poland still is one of the most influential branch of animal production. The share of milk production in total animal production commodity is estimated at over 32% (Ziętara, 2012). As the result of market conditions we can observe a progress in production concentration forced by worsening profitability in agriculture production, including milk. The biological and technological advancement of dairy production caused the increase in individual milk yield as well as progressing specialization (Ziętara, 2007). The average milk production per year grew from 3000 kg to 7582 kg in all farms under the milk recording system (GUS 2015). The progress described above becomes possible through the use of high-performance breeds of dairy cattle. High individual milk yield is linked to the necessity of purchasing the high quality breeding material. Also, an important issue is the quality and health status. In low profitable production conditions economic efficiency becomes a serious problem. Unfavourable market conditions restricted by a specified farm potential for development and the increasing production costs finds justification in reduction in numbers of milk producing units. During 2005-2012 the number of dairy farms decreased by nearly 45% - to around 443 000. Falling milk prices are forcing milk producers to detailed analysis of production cost. Dairy producers, usually are focused on the feeding costs, representing by more than 50% expressed in total production expenditures, while the major problem are

rapidly increasing veterinary costs. However, using the effect of economics of scale equipped in appropriate production factors, we can maximize business effects (Runowski 1994). Research conducted by the Institute of Agriculture and Food Economy argue that the increase in milk yield in the particular conditions, stimulate income despite higher costs of animal health, however the introduction of highly productive animals increase the production expenditures (Skarżyńska 2012). In most cases, we forget about careful analysis of the veterinary costs and the possible consequences of the occurrence of diseases. The standard veterinary costs account for only about 7% of the total production cost and are classified as other direct costs but their growth is a signal of unfavourable trends and the beginning of the problems with the health status of the herd. Their growth should be taken as a serious signal for disadvantageous tendencies and a beginning of herd health problems. A serious threat is therefore viral diseases that could affect economic results and at the same they can be bring to the herd from the outside. Purchase of unknown breeding material, insemination or a technician visiting many herds may generate extensive production losses. One of the most serious viral infections remains infectious bovine rhinotracheitis - IBR. The virus is dangerous due to the asymptomatic nature and the fact that the infected animals pose a threat through their all lifespan. The economic consequences of infection are problems with reproduction, lower milk production, difficulty in calves rearing, as well as elevated mortality reaching up to 15%. Individual occurrence may cause 100% morbidity. Bearing in mind the fact that the only effective way to prevent disease spreading are vaccination and culling, the IBR may be the beginning of the end of milk production on the farm. The important matter is then, to quickly and efficiently determine the herds' health status. The disease was discovered in the 60s, caused by cattle *Herpesvirus* is a threat and a basic reason for lowering production efficiency on farms where it thrives. The most basic method to limit production losses is to determine the stage of herds' infection are vaccinations and a development of the culling plan (Kotowski A, Kotowska E, 2015). Apart from the veterinary diagnostic, also economic outcome is a way to notice a health problem in the herd. By defining production costs it is difficult to precisely determine how much will a specific disease cost, although by comparing direct costs there is a chance to estimate possible losses.

Objective. Objective of the study was to determine the effect of IBR profitability, costs and results of milk production. Changes profitability determined depending on the degree of infection of cattle

Material and methods. The analysis included farms specialized in milk production, under the milk recording system. The research was realized

within “Healthy Cow” programme in years 2010-2012. In selected 23 dairy farms, the herds’ health status and the stage of infection based on blood tests, were done. The farms were divided into 3 groups, depending on the stage of herds’ infection (herds free from IBR – 8 farms, herds infected in 6 to 25% , and 8 farms and herds infected in over 25%). All units included in the research are highly specialized dairy units simultaneously keeping high production Holstein-Frisian cows. The size of the herds were accounted from 20 to 120 cows. Basing on questionnaires describing in details all incidents on farms, the individual costs of milk production were calculated. Because of various level of indirect costs on farms, the analysis includes only elements unquestionably linked to milk production. The goal remains to determine economic losses and changes in the structure of individual costs based on the direct surplus bill, which is the difference between production value and direct costs. In research technological parameters were calculated on the basis of record reports. Selected reproduction parameters: open days, calving index, service period and functional longevity were analysed. The analysis cover the year 2010.

Results an discussion. The costs and profitability of milk production is determined by complexity of technological, breeding and organisational factors (Kopeć 1969). Analysing specified farms it is difficult to estimate possible losses caused by a specific morbid entity. The obtained results of economic and production losses are burdened depending on the intensity of herds’ infection, for IBR also the disease emission due to stress, transport or changes in nutrition. Proper diagnosis of the herd allows the elimination of the factors that could generate significant production losses as well as limit the use of herds’ genetic potential. The results reflect the average for the surveyed farms while bearing in mind that in the absence of complications, the infection can pass unnoticed.

Tab. 1 – Direct surplus and the cost of milk production per cow in PLN.

Specification	herd free of IBR	6-25% IBR	over 25% IBR
1	2	3	4
Number of households	8	8	7
Number of cows	42	33	80
Value of milk production	7 696	7 297	7 702
Average milk yield	6 364	6 265	6 127
Price per 1 l	1.21	1.16	1.26
Direct cost per 1 l	0.59	0.67	0.71
Total costs per 1 l	0.98	1.00	1.09%
Percentage worth of milk production from agricultural production	81.00	78.00	82.00
Feed	2 588.27	2 910,00	2 876,12
Veterinary sevicees, drugs, etc.	280.27	296.23	340.07

1	2	3	4
Insemination and semen	167.49	162.51	99.90
Yield condition score	82.44	79.90	88.51
Purchase of animals	524.86	679.25	848.18
Others	85.22	77.62	101.72
Direct costs	3 728.55	4 205.51	4 354.50
Surplus direct	3 967.45	3 091.49	3 347.50
Efficiency (value of production / direct costs * 100)	206, 41	173.51	176.87
Profitability index (price PLN/ 1 / total individual cost PLN/ 1 * 100)	123.40	116.47	115.33

As shown in table 1, the size of herds to be tested shall remain variable which can in a certain way affect the economic results achieved. IBR Problems arise, however, often on more specialized farms and sustaining a bigger herds. The individual milk yield of 6127 to 6364 litres may be considered inadequate to the genetic level of kept animals. Assessed in 2010 milk yield of cows under the record system, amounted to an average of 6980 litres (GUS 2014). The potential for production of cattle allow to increase the quantity of milk received. Differences in average productivity in the studied group of herds infected with IBR and free of it are 237 litres from a cow. Direct costs are lower in healthy herds by 625.96 zł per cow. Described differences are caused mainly by an increase in veterinary costs from 280.27 to 340.07 PLN per animal. Along with the stage of herd infection also increases the cost of purchasing animals. Although obtained in the analysed period economic efficiency convince that production was profitable (indicator of profitability from 115.33 to 123.40), more efficient farms were free from disease factors, and the difference in the value of direct surplus leads to the conclusion that the loss caused largely by IBR reach 619.96 PLN per one cow. With a herd of 80 pieces, we can talk about the amount of approximately 49,596.80 PN.

The results were confirmed by production indicators.

Table 2 – Selected technical-production indicators

Specification	herd free	6-25% IBR	area 25% IBR
Open days	142,00	148,00	156,00
Service period	22,00	41,00	57,00
AI index	1.53	1.83	1.93
Calving index	77.99	94.56	82.16
Functional longevity	3.56	3.56	2.77

Reproductive disorders occurring in milk cows are the main factor limiting the potential for production (Jankowska 2002). With regard to the test subjects we observe the extension of open days period by about 14 days. Also extends the time needed for effective fertilization (from 22 to 57 days), indicating the performance problems with AI. With the increasing infection

degree we also observed a decrease in the effectiveness of artificial insemination. For optimum assumed 1.5 servings of semen in order to effectively calve. In the surveyed farms index rises to 1.93. The average lifespan is also shortened. The results in Table 2 may be caused by environmental factors as well as the strategy of breeding the herd used by the farmer. Extending the period between calvings may be justified in the case of high-producing cows. Short lifetime of the herd (2.77) with capacities of 6127 litres aggravate the profitability of production.

Close. Infectious bovine rhinotracheitis is a factor causing losses in milk farming production. Developed results remain relevant to the specified study group of farms specializing in milk production. Although the production is carried out on farms profitable, losses caused by IBR can be estimated based on the direct surplus bill to 619.96 PLN per cow. Economic consequences in the herd of 80 cows represent the amount of approximately 49,596.80 PLN. In relation to the test group of farms the issue of IBR applies to entities with a higher degree of specialization as well as producing in larger herds. The problems of increasing production provides short lifespan of cows related to the purchase and culling animals. The economic calculation is also negatively affected by extending the open day period up to 156 days.

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