MILK FEVER *(PARESIS PUERPERALIS)* - NUTRITION PROBLEM OR METABOLIC DISEASE IN INTENSIVE AND EXTENSIVE CONDITIONS OF BREEDING OF HIGH DAIRY COWS IN RADOVISH REGION - NORTH MACEDONIA

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Abstract

The aim of this experiment was examine the influence of nutrition in intensive and extensive conditions of breeding on milk fever *(Paresis puerperalis)* in high dairy cows in North Macedonia. The research was conducted in the two farms, near by the Radovish, North Macedonia in 2018 year. The research was done on Holstein-Friesian breed cows, kept the intensive conditions in farm DPUT import-export Livestock Donev Ltd Radovish 20 cows and extensive conditions in individual farm in the village Voislavci, Radovish 19 cows. The survey was conducted in the period from 01/01/2008-20/10/2018. The number of dairy cows in two farms in Radovish region totaled 39 heads. In intensive breeding was 20 cows or 51.28% and in extensive breeding 19 cows or 48.72%. The number of dairy cows in intensive breeding with occurrence of milk fever was 12 cows or 60.00% and without occurrence of milk fever 8 cows or 40.00%. The number of dairy cows in extensive breeding with the occurrence of milk fever was reduced to a minimum and does not have one cow, a while without the occurrence of milk fever at the site were 19 cows, or 100.00%. Diagnosed moustly cows with good lactation after calving normally. In firstcalving disease almost never appears, but with the increasing number of calving percentage of cases increase, so the ninth calving occurs up to 20% of calving cows. On the statistics database from the Veterinary Station Univet-Radovish and our trials may come to the general conclusion that the milk fever almost gone in an extensive way of breeding cows in compared to intensive way of breeding of cows that appears.

Key words: *High dairy cows, Holstein-friesian, Nutrition, Milk fever, Metabolic disease.*

Introduction

Milk fever, metabolic disease, is similar in cows, sheep and goats. Here we will focus on milk fever in cows, the same applies to sheep and goats. The disease occurs sporradically, and sometimes up to 25% of the number of cows calving (*Nielsen, 2003*). Diagnosed moustly cows with good lactation after calving normally. In firstcalving disease almost never appears, but with the increasing number of calving percentage of cases increase, so the ninth calving occurs up to 20% of calving cows. Is observed in some animals is repeated. Milk fever is afebrile paresis condition of cows and is directly tied to partus and early lactation, usually 2-4 days after calving *(Horst, 1997)*. This disease occurs as imbalance of calcium metabolism which leads to a dramatic decrease in the level of calcium in the blood than normal 2,5 mmol/l of 1,5 mmol/l. But today it is proven that magnesium deficiency plays a role in the onset of this disease. Calcium

acts on the transmission of nerve impulses. When calcium deficient cow has first weakens and hypothermia in the later stage is able to be at a standstill, but it lies with the breast facing the head side, reflexes are weakened and is present hypothermia *(Enemark, 2003)*.

With a rise in milk yield in cows occurs and increase the number of human cases of milk fever. About tests performed in the state Viskonzin-USA, in the areas with highest annual milk yield of cows, about 8% of the cows were obols of milk fever *(Houe, 2001)*. Among cows after the first lactation, the number of registered cases exceeds 10%. In this regard, there have been significant differences between certain breeds of cows. According opinion which prevails today growing number of diseases from milk fever is caused by diet and keeping the cows.

Material and Methods

Within this research included 20 dairy cows of the Holstein-Frisian breed who breeding on intensive way and 19 cows reared on extensive way. The research was carried out by colleagues from Veterinary station Univet Radovis and in farm DPUT import-export Livestock Donev Ltd as an example of breeding high dairy cows in intensive conditions and in individual farmer in the village Voislavci, Radovish examined the occurrence of milk fever in extensive breeding conditions and we are served with statistics and their record of Veterinary station Univet the occurrence of milk fever in the past few years.

We walked on the field by an application from the owners after calving when the cow falls and illness from milk fever, based on the clinical picture diagnosed that it was milk fever. Diseased cows were terapeutic with success. According to that guide and Veterinary station Univet our interventions on the field came to the conclusion that milk fever occurs more in high dairy cows that are raised in intensive way of breeding compared to extensive or semiintensive way of breeding. The explanation is that cows are grown extensively, so called free way take the necessary minerals, which are found everywhere around us. The occurance of milk fever, based on the clinical picture *(Tosefski, 2005; Popovski, 2004)*.

Fig 1. Milk fever clinical picture

Table 1. Occurrence of milk fever in intensive breeding conditions Donev Ltd Radovish period between 01.01.2008 and 20.10.2018 year

No.	Number of occurrence of milk fever	Ear tag	Date of born	Number of calving
1.	1	MK16938234	22.03.2012	2
2.	4	MK12186112	15.05.2008	9
3.	4	MK12185504	26.10.2008	8
4.	4	MK16644779	18.10.2008	6
5.	3	MK15481092	17.07.2009	5
6.	3	MK16320765	31.12.2009	4
7.	2	MK15813886	10.05.2010	4
8	2	MK18137194	28.08.2011	3
9.	2	MK17973847	26.11.2011	3
10.	1	MK16939035	22.03.2015	2
11.	1	MK18368246	01.09.2012	2
12.	1	MK18366567	08.04.2013	1
13.	0	MK18988147	08.08.2013	1
14.	0	MK18873791	14.01.2014	1
15.	0	MK18874006	14.01.2016	1
16.	0	MK19146300	13.02.2017	1
17.	0	MK18873993	04.03.2018	1
18.	0	MK20413750	05.11.2014	1
19.	0	MK20444092	25.11.2014	1
20.	0	MK20414399	23.12.2014	1

Fig 2. High dairy Holstein-frisian cows in intensive conditions

Table 2. Presence of milk fever in extensive conditions in individual farmer in the village Voislavci, Radovish period from 01.01.2008 to 20.10.2018

No.	Number of occurrence of milk fever	Ear tag	Date of born	Number of calving
1.	0	MK11751298	12.07.2008	5
2.	0	MK14290374	12.12.2009	4
3.	0	MK17674874	05.02.2011	3
4.	0	MK19228808	10.01.2013	1
5.	0	MK20415389	16.06.2014	1
6.	0	MK23147157	14.02.2011	3
7.	0	MK20783990	02.08.2009	4
8.	0	MK20626327	19.03.2010	4
9.	0	MK20385743	12.06.2012	2
10.	0	MK14289118	02.07.2011	3
11.	0	MK10822104	09.06.2015	5
12.	0	MK20762162	08.03.2014	1
13.	0	MK14768683	03.06.2012	2
14.	0	MK23311257	21.06.2017	4
16.	0	MK23147007	01.09.2016	5
17.	0	MK22122157	11.07.2012	3
18.	0	MK21207787	16.06.2014	1
19.	0	MK23147111	12.03.2018	4

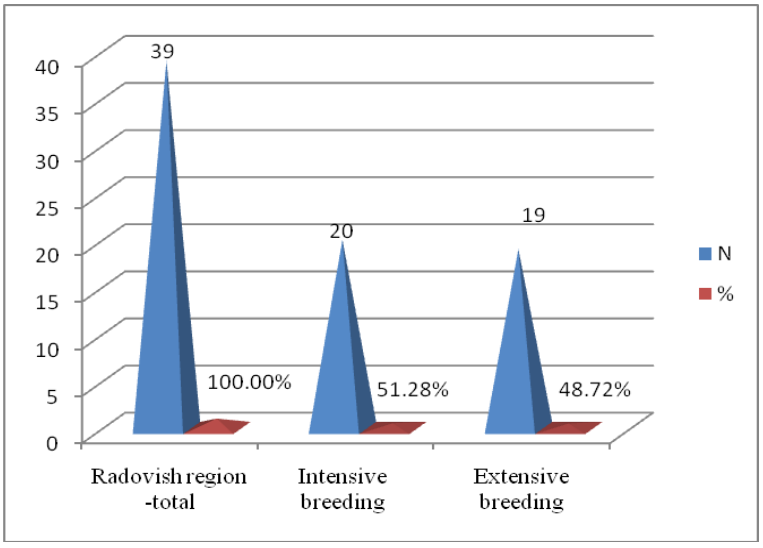
Fig 3. High dairy Holstein-friesian cows in extensive conditions

Results and Discussion

Based on the presented research obtained results are shown in follow these tables

Table 3. Number of dairy cows in a two farm in the Radovish region in intensive and extensive breeding

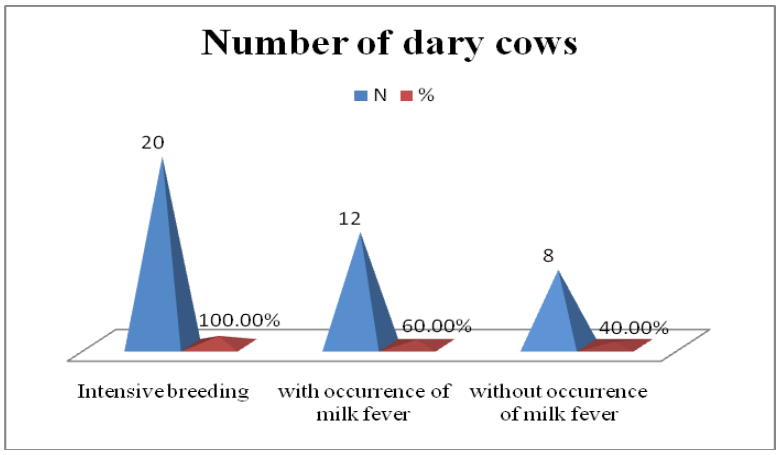
Number of dairy cows	N	%
Radovish region (two farms)-total	39	100.00%
Intensive breeding	20	51.28%
Extensive breeding	19	48.72%



The number of dairy cows in two farms in the Radovish region is total of 39 of the throat, which in intensive breeding (modern farm Livestock Donev DOOEL-Radovish) were 20 cows or 51.28% and in extensive breeding (of the individual farm village Voislavci, Radovish) 19 cows or 48.72%.

Table 4. Number of dairy cows in the contemporary farm Livestock Donev DOOEL Radovish-intensive breeding in the occurrence of milk fever and without the occurrence of milk fever

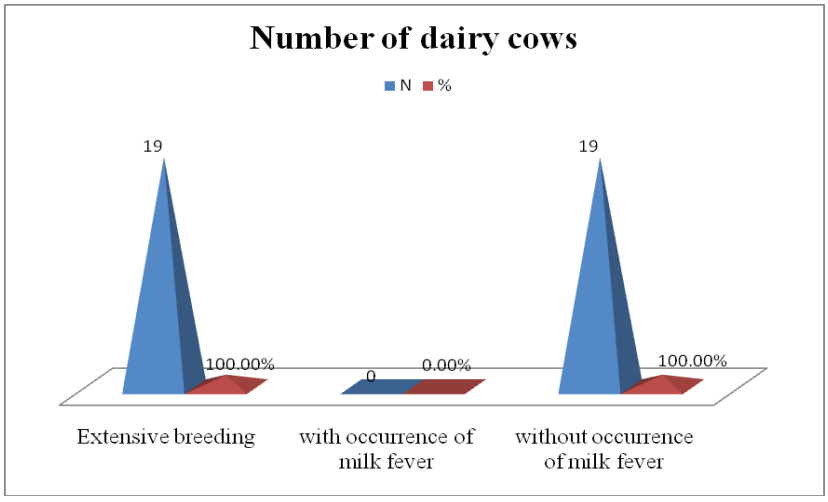
Number of dairy cows	N	%
Intensive breeding	20	100.00%
with occurrence of milk fever	12	60.00%
without the occurrence of milk fever	8	40.00%



The number of dairy cows in intensive breeding (modern farm Livestock Donev DOOEL-Radovish) with the occurrence of milk fever were 12 cows or 60.00% and while no occurrence of milk fever on 8 cows or 40.00%.

Table 5. Number of dairy cows in the individual farm on village Voislavci, Radovish in extensive breeding with the occurrence of milk fever and without the occurrence of milk fever

Number of dairy cows	N	%
Extensive breeding	19	100.00%
with occurrence of milk fever	0	0.00%
without the occurrence of milk fever	19	100.00%



The number of dairy cows in extensive breeding (individual farm village Voislavci, Radovish) the occurrence of milk fever was reduced to a minimum and does not have one cow, a while without the occurrence of milk fever at the site were 19 cows, or 100.00% .

The appearance of milk fever is tied with the age of the cows. Very rarely foresee what first calving cows and what in the second lactation. So each subsequent calving, increases the number of cases of this illness the. Cows once suffering from milk fever, prone to illness the phenomenon in the late lactation. Approximately half of the cows again disease of milk fever. Approximately 75% of cases of milk fever occurs between 1 and 24 hours after calving. Approximately 3% of the cases is appearing before calving, 6% in the cross-calving, 12% bettwen 25 and 48 hours after calving and 4% after two days *(Jovanovic and Jordanoski, 1994)*.

Until the emergence of the milk fever comes because of the low level of calcium in the blood of animals. The larger the amount of calcium in ration manly that cause this condition *(Oetzel, 2000)*. Therefore, the ratio of calcium to the phosphorus in the dairy cow rations, must not be higher than 2:1 for cows who suffer from this illness the. Name lactic cod e miss, as the animals do not have a fever during this illness *(Thilsing-Hansen et al., 2002)*. At the same time the temperature of patients living below the normal. At the beginning of the milk in cows with high milk yield represents a tremendous pressure on the balance of calcium, due to beginning large amounts of calcium are milk. All cow at a time to express calving insignificant hypocalcemia, while some bettwen them she hypocalcaemic measures to fulfill the clinical signs of milk fever *(Djurdjevic, 1992)*.

The role of the calcium is multiple in the body. In the form of salts of calcium phosphate and calcium carbonate gives firmness of the bone in which they are located around 99% of the total calcium in the body. In addition, calcium in the bones serves as a reserve of calcium in the body and is in constant exchange with the calcium in blood plasma *(Horst et al., 2003)*. The different fraction of calcium in the bones is in dynamic balance are calcium in the blood plasma. On this balance affect a range of factors, in particular vitamin D3, tireocalcitonin and parathormon *(Swenson, 1975)*.

The concentration of calcium in blood plasma ranges within the limits of 2.24 to 2.70 mmol/l (2.50 mmol/l) what greater number of mammals. Approximately half of calcium the plasma ion is in shape, approximately 45% is tied to proteins and the remaining 5% is located in the form of inorganic, inionic complexes. Ionic the plasma calcium plays an important role in coagulation the blood, and therefore it particularly in the hemostase. Its role in the maintenance

of the normal permeability of capillaries to is also known. Moreover, many important roles in the regulation of calcium the nerve-muscle sensitive. The increase of the concentration of calcium (hypercalcemia) and sensitive activity was decreased in the nerves and muscles and the cut of its concentration (hypocalcemia) increases their sensitives and leads to the appearance of the spontaneous tetanic cramps *(Roche, 2003)*. This is interpreted as the influence of the calcium ions of the liberation of acetilholin, which has the result of the occurrence of spontaneous depolarisation in nerve ganglia and nerve-muscular synapses *(Djurdjevic, 1992)*.

Calcium shall be entered in the body as food, which is located in the eyelids in the form of their salts. The majority on calcium reabsorbed in slim intestine. On the resorption of calcium in slim intestine factors influencing series: the relationship between amount of calcium and phosphorus in the amount of ration, the shape in which they are located calcium, mid pH, vitamin D, lactose, fat, phytic acid, etc *(Swenson, 1975)***.**

On ruminant animals slim intestine has absorbed calcium of food depending on the needs of the body. Unlike the young animals they have a huge need for growth and absorb calcium and maintain their proportion to the quantity you are taking in wide range of food, masks adult life, regardless of entre only absorb calcium for so hip it is necessary to replace the loss from secretion in the urine and intestines, not a bit of it. Calcium absorption of increases in adults living in the period when necessary to have large, for example, during the gravidity and lactation or in the period of deficit of calcium, but prior to report an increase, is needed substantial loss of bodily reserves of calcium *(Horst et al., 1994)*. The factors of food which affect the efficiency of the absorption of calcium has funded include the nature of the food, absolute and relative quantities of calcium and phosphorus which are present in food and the presence of inhibit substances. Calcium in the milk can be nearly completely absorbed, but calcium in animal feed is available just 50%. Added cereal grains in rouguage food significantly increases the availability of calcium *(Djordjevic et al., 2009)*.

Young animals has absorbed phosphorus from milk and from rougage food with great accessibility (80-100%), but the availability is much lower (50-60%) in adults animals. In the cereal grains 50-65% of phosphorus is in the form of phytate which virile to completely use ruminants *(Cilev et al., 2001)*.

The metabolism of calcium and phosphorus under the influence of paratiroide hormone calcitonin and vitamin D. Paratiroide hormone secret in response to hypocalcemia and stimulates the transformation of the 25-dihidroksiholekalciferol in dihidrooksiholekalciferol 1.25 (1.25 DHCC). Paratiroidne hormone along with 1,25-DHCC intestine stimulate the absorption of calcium *(Jorgensen, 1999)*. Calcium enters the blood from the intestines and bones, and when the level of calcium in serum will increase over normal paratiroide inhibit hormone and stimulate the secreting calcitonin. The increased concentration on calcitonin and blocked bone resorption and reduced the concentrations of the hormone paratiroide and activity was decreased absorption of calcium *(Stamatovic and Jovanovic, 1990)*.

System acidofictation caused by adding anions affect the function of the paratiroide hormone (PTH). The biggest effect on systemic acidofictation is increased response to PTH, resulting in the increased retention of calcium and enhanced mobilization of calcium from the bones. Cation anion reaction in food (CARF) in total ranging from -100 to -200 mEq/kg food DM e effective for control the milk fever *(Block, 1994)*. Natural food which is given to dairy cows on a molar basis will have high on sodium and potassium compared to chlorides and sulfure. Mixed meal, the negative value the CARF difficult to achieve in commercial terms for

dairy cows *(Radostitis et. al., 2007)*.

Milk fever is reduced by adding sulfure and chlorides in the relative abundance of sodium and potassium in the diet before calving Holstein cows *(Jovanovic et al., 2001)*. Nutrition rich are anions increases the plasma levels of the 1,25-(OH) 2D before calving, activate the intestine resorption of calcium and maybe even the mechanisms of bone resorption of calcium from the beginning of the lactation *(Grubic and Adamovic, 2003)*. For supervising the pH value of the urine is sensitive methods for the assessment of the risk of milk fever, pH value of the urine in the 48 hours before calving has a significant negative connection with calcium in serum and inorganic phosphates *(Golf, 2000; Golf and Horst, 2003)*.

Table 6. Comparison of the occurrence of milk fever in intensive and extensive farming

Occurrence of milk fever	Total number of cows in 2018	With occurrence of milk fever	Cured throats	Dead heads
Intensive breeding	20	12	12	0
Extensive breeding	19	0	0	0

According to our research intensive breeding of cows from milk fever from period of 01.01.2008-20.10.2018 year. The milk fever ill 12 heads (60%) who were cured completed, while extensive breeding from milkfever not disease one cow.

On the statistics database from the Veterinary Station Univet-Radovish and our trials may come to the general conclusion that the milk fever almost gone in an extensive way of breeding cows in compared to intensive way of breeding of cows that appears.

Conclusions

According implemented trials and the results thereof, can make the following conclusions:

✓ The number of dairy cows in two farms in Radovish region totaled 39 heads. In intensive breeding was 20 cows or 51.28%, and in extensive breeding 19 cows or 48.72%.

✓ The number of dairy cows in intensive breeding with occurrence of milk fever was 12 cows or 60.00% and without occurrence of milk fever 8 cows or 40.00%.

✓ The number of dairy cows in extensive breeding with the occurrence of milk fever was reduced to a minimum and does not have one cow, a while without the occurrence of milk fever at the site were 19 cows, or 100.00%.

✓ It needs to use a balanced diet of animals in terms of the composition of the meal and feeding according to the specific needs for each head. In addition, it is necessary to perform permanent control of metabolic profile as a way to control the health of the herd.

✓ It is necessary and indispensable application of the prophylactic and zoo all measures to ensure continued feeding of cows with quality, hygienic straight meal balanced in terms of all the necessary nutrients in accordance with accepted scientifically validated recommendations.

✓ In terms of economic damage should say that if time does not react with the necessary therapy could result is dead throat that comes to damage the farmer and job loss.

✓ Diagnosed moustly cows with good lactation after calving normally. In firstcalving disease almost never appears, but with the increasing number of calving percentage of cases increase, so the ninth calving occurs up to 20% of calving cows.

On the statistics database from the Veterinary Station Univet-Radovish and our trials may come to the general conclusion that the milk fever almost gone in an extensive way of breeding cows in compared to intensive way of breeding of cows that appears.

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