

STUDY ON THE INFLUENCE OF THE FEEDING PROGRAM ON THE PREPARATION OF HEIFERS FOR FIRST INSEMINATION

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Abstract

This study wants to demonstrate the importance of the feeding program on preparing heifers for first insemination. The study was done on a group of 35 heifers aged between 9-12 months on Agroserv Dairy Măriuța. The varieties of the experimental group belong to the Holstein breed and are inseminated at the age of 12 months and the body weight of 400 kilos. The role of the dissimilar feeding program is to help the heifersto reach the body weight 75% of the adult weight, to show the heat and to install gestation.

Key words: inseminate, gestation, feeding program, heifers, body weigh.

INTRODUCTION

Milk price is influenced by the big importators like China and Russia, they reduced the acquisitions from international market, which led to a surplus.

Although many regions are in full swing, demand for milk has increased significantly. In this direction, the trend is to expand over the next decade, amid the growth of the population and the change of diet in favor of dairy products. Prices will rise moderately over the next five years, after which they will stabilize around 360 euros / t, analysts said.

Only 7.5 % from mondial milk production will be traded on external markets until 2025, with the risk for imbalances for short time. In next 10 years, half from surplus produced by European Union it can be transform in skimmed-milk powder, for export and more then 30 % will be processed by the milk industry, for domestic consumption (European Commission, 2018).

This situation motivates farmers to find ways to produce more milk, choosing two ways, the first is to increase the flock and a second way is to increase the production of milk on the cow's head. The best way is to combine the two ways by establishing a performing genetics and feeding programs studied in detail.

The increase and exploitation of dairy cattle is one of the most complex types of exploitation due to the long growth period. It is precisely because of these factors that the age of breeding input is advanced compared to other species. The note on the rise and exploitation of dairy cows over time has been forced, precisely to help the farmer to have his first hen at the age of 24 months. These 24 months are permanent monitoring of females from the first day of life. Studies encourage farmers to harvest calves at the age of 12 months, the basic condition being body weight.

The study made by Penev et al. (2014) in Bulgaria on 818 heifers from 17 farms shows that age of first insemination was for 16 months.

It has also been observed that where the age of breeding is lower, the number of straws per gestation is lower.

Thus, for heifers inseminated after 26 months, the number of insemination ranged from 2.7 to 3.7 straws per gestation, unlike those introduced at reproduction below 25 months, where the average number of inseminations was 2.1.

The clear conclusion is that the economic efficiency of the farm correlates positively with the early introduction to breeding.

Heifers are considerate an important source of profit. According to estimations in the

statistical records for the increase of one heifer from birth to birth, costs are between 1595 and 2935 \$, which is one of the highest expenditures (Stuttgen et al., 2008). To reduce juggling costs, the U.S. Department of Agriculture (USDA) recommends reducing the age of the first calving.

Studies made by Stuttgen et al. (2008) and Lormore et al. (2005) have highlighted the fact that farmers, on those farms where the heifers have first calving between 22 and 24 months, have a higher profitability.

For each month of fertility delay over the average age of 22 months, farmers spend \$ 100 extra for each heifer. These losses are caused by the quantity of less milk recovered on the market as well as by the additional costs of feeding and maintenance (Lormore, 2005).

The age of first calving can decrease to 22-23 months, but before the first insemination is done, the female need be prepared on the basis of a strict feeding program. Before the first insemination, the heifer has to reach the criteria of height and weight, so that the calving to be normal.

MATERIALS AND METHODS

For this study data are from the zootechnical records of S.C AGROSERV MARIUTA S.R.L. Two experimental lots, each with a total of 15 heifers of the Holstein breed, aged between 9 and 12 months, were made to carry out the experiment. Experimental lots received different ratios (ration A and ration B), and the rest of the heifers received different ration, which consisted of the control group. This study was conducted between January and March 2019, temperatures being specific to temperate-continental climate in our country.

The vines were subjected to regular weighing, having a daily average gain of 900 g -1000 g from birth to the first insemination. The animals were weighed monthly at the same time, preferably before the meal, and the results obtained were used to regulate ration.

The heifers were fed at the same time, the feeding time being about 1 hour. Exit at the feeding stand is done at the same time, checking it by the responsible caretaker, thus eliminating the hierarchy of animals and their unevenness in the group.

During the experiment, the following indicators were followed: stocking density, ration type, daily average gain, calf weight, weaning, and first insemination.

Recorded data have been statistically processed and interpreted in accordance with the literature.

RESULTS AND DISCUSSIONS

Getting better heifers is done by paying special attention to the calves so that they grow harmoniously. Heifers should receive 3-4 liters of colostrum in their first 6 hours of life. Their accommodation should be in clean, dry and well-ventilated barns.

Periodically, body measurements are performed to track the individual growth plan, and based on the nutrition plan, the birth weight should double around the age of 60 days. The replacement needs to be calculated annually according to the number of animals reformed and the direction of the farm. The need may be covered by purchases of heifers or by replacement from their own herd.

The studied farm aims to maintain a number of 860 cows in milking, the consistency of this average number will be possible by producing breeding animals with a very good genetic baggage.

It should be noted that the heifers become the second or the first expense of the farmer, who in this position will have to choose a qualified staff and personified feeding program (Penev et al., 2014).

In prepuberty period, it is ideal for heifers to take weight 2.15% per day and in post-puberty period to take 1.65% per day. This increase will help the protein, the protein need to be 14-15% in prepuberty and 13-14% post-puberty. The ratio can be easily made from fodder and premix.

Energy of fodder will be calculated according with heifers weight and environment factors, generally the ratio for this category will be by 130 kcal (3)

This period from each cow life is very sensitive the nutritionist's advice is to juggle with a fiber level of 23 to 31% towards the end of the growing period.

Also they suggest to limit the administration of alfalfa hay and cereals, because this

combination can have like results meteorism. The belong ration is planning to prepare the organism for first breeding. Experimental Group 1 received ration A from the age of 5 months until confirmation of gestation and experimental Group 2 received ration A up to 9 months of age after which ration B was administered (Table 1)

Table 1. Diferent structures of ration for xperimental heifers group

RATION A	
Fodder	Quantity/head (kg)
Alfalfa silage	4.5
Alfalfa hay	3
Corn meal	1.5
Wheat meal	1
Corn silage	10
Soy bean meal	0.85
Calcium	0.05
Premix	0.1
Salt	0.05

RATION B	
Fodder	Quantity/head (kg)
Straws	2.5
Alfalfa silage	8
Soy bean meal	0.45
Corn silage	11
Salt	0.05
Premix	0.1
Calcium	0.05

The eligibility criterion for breeding is to reach a minimum of 380 kg at the age of 12 months. Since the animals in experimental group 1 received a higher energy-protein ratio throughout the test, they had a mean weight of 420 kg with variations between 400 and 460 kg.



Figure 1. Dairy Farm heifers

The heifers from group 2 was feeding with ration 2 from 9 months of age, which in terms of protein and energy is lower than ration 1. The average weight for this group at 12 months was 395 kg, varying from 365 kg to 410 kg (Table 2).

From the analysis of the two groups we can see that the calves had equal average weight at birth but at weaning they have different weights, 77.6 kg for group 1 and 92.2 for group 2.

Table 2. Weaning weight variation between experimental groups

Experimental lot 1				Experimental lot 2			
No.	Birth weight (kg)	Weaning weight (kg)	First service Weight (kg)	No.	Birth weight (kg)	Weaning weight (kg)	First service Weight (kg)
1	50	89	460	1	50	102	360
2	32	90	420	2	32	75	365
3	55	91	435	3	55	105	405
4	45	78	425	4	45	92	395
5	43	75	410	5	43	90	410
6	42	74	410	6	42	91	410
7	41	75	415	7	41	84	400
8	40	76	435	8	40	82	410
9	39	79	440	9	39	81	440
10	43	78	415	10	43	87	370
11	45	77	410	11	45	107	400
12	46	75	405	12	46	110	370
13	44	72	400	13	44	91	390
14	43	71	405	14	43	93	405
15	42	68	415	15	42	99	395
X	43.33	77.6	420	X	43.33	92.6*	395

The studies from USA show that the Holstein heifers are ready for AI when they reached 55% from the adult weight. That means the heifers must to have minimum 380 kg weight and the height 125-130 cm. A farm is considered effective when the average age of first calving is 23-24 months.

The heifers from group 1 with 420 kg average weight at first service become pregnant after 2 shots in average. The group 2 had 395 kg average weight at first service and they need 1.2 shots.

This results show us that the ration for group 2 was more efficient because the heifers were not fat and become pregnant early with higher conception rate.

From the analysis of the results of the two experimental groups we can see that the animals had equal weights at birth (43, 33 kg) and at weaning they reached 77.6 kg experimental group 1 and 92.6 kg experimental group 2.

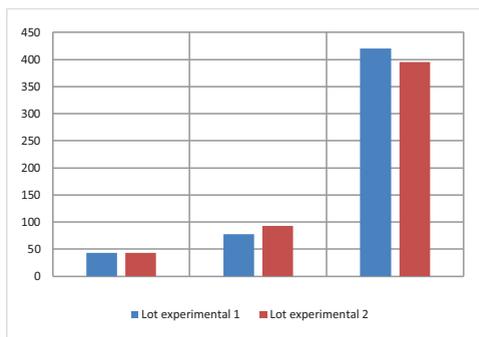


Figure 2. Results of the experiment

According to American researchers, for the Holstein breed the heifers are ready for breeding when they reach 55% of the adult size. Thus, a body weight of between 360 and 383 kg and the width of 125-130 cm is considered optimal. A farm is considered effective when all heifers are pregnant at the age of 15 months.

Table 3. Weight variation between experimental groups until first breeding

Experimental lot 1			Experimental lot 2				
No.	Birth weight (kg)	Weaning weight (kg)	First insemination Weight (kg)	No.	Birth weight (kg)	Weaning weight (kg)	First insemination Weight (kg)
1	50	89	460	1	50	102	360
2	32	90	420	2	32	75	365
3	55	91	435	3	55	105	405
4	45	78	425	4	45	92	395
5	43	75	410	5	43	90	410
6	42	74	410	6	42	91	410
7	41	75	415	7	41	84	400
8	40	76	435	8	40	82	410
9	39	79	440	9	39	81	440
10	43	78	415	10	43	87	370
11	45	77	410	11	45	107	400
12	46	75	405	12	46	110	370
13	44	72	400	13	44	91	390
14	43	71	405	14	43	93	405
15	42	68	415	15	42	99	395
X	43,33	77,6	420	X	43,33	92,6*	395

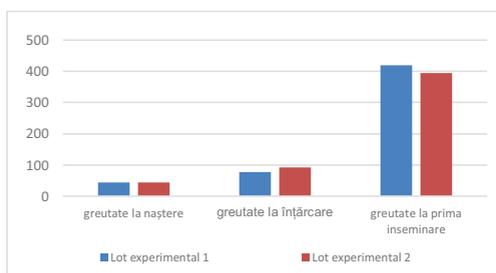


Figure 3. Weight variation from weaning to first breeding



Figure 4. Image from heifers barn

Heifers in experimental group 1 with a mean weight at first 420 kg insemination had a consumption of 2 inseminations per gestation. Experimental group 2 had a consumption of 1.2 insemination on gestation, which confirms that the optimum weight for the first insemination is 395 kilograms. Also, the fodder scheme for experimental group 2 proved effective.

CONCLUSIONS

The heifers are the most important group from farm because by the quality of them depends the future of farm.

The study made by us shows the importance of feeding plan and a good management for raising heifers such that they reached the optimal weight and height and a great body condition this meaning 380-400 kg weight and 125-130 cm height.

REFERENCES

- Dorobat, O.S. (2018). Research on introduction of modern feeding solutions for young female bovine intended for reproduction. *Scientific Papers. Series D. Animal Science*, LXI(2), 150-153.
- Lormore, M. (2005). The case for a quality dairy replacement program. *Proceedings. NRAES Dairy Calves and Heifers: Integrating Biology and Management Conference*.
- Stoica, I., Stoica, L. (2001). *Nutrition base and animals feeding*. Bucharest, RO: Coral Sanivet Publishing House.
- Stuttgen, S., Kohlman, T., Hoffman, P., Zwald, A. (2007). *There's nothing equal when raising heifers*. Hoard's Dairyman 2008:87. Dairy 2007 Part II: Changes in the U.S. Dairy Cattle Industry, 1991-2007. National Animal Health Monitoring Service, U.S. Department of Agriculture. Available at: <http://nahms.aphis.usda.gov/dairy/index.htm>.
- Lormore, M. (2005). Earlier first calving makes money. *Northeast Dairy Business*, 49-60.
- Stevenson, J.L., Rodrigues, J.A., Braga, F.A., Bitente, S., Dalton, J.C., Santos, J.E.P., Chebel, R.C. (2008). Effect of breeding protocols and reproductive tract score on reproductive performance of dairy heifers and economic outcomes of breeding programs. *J. Dairy Sci.*, 91, 3424-3438.
- Penev, T., Vasiliev, N., Stankov, K., Mitev, J., Kirov, V. (2014). Impact of heifers' age at first breeding and first calving on some parameters of economic effectiveness at dairy cattle farms. *International Journal of Current Microbiology and Applied Sciences*, 3(11).