AGRISCIENCE AND TECHNOLOGY
Armenian National Agrarian University
ԱԳՐՈԳԻՏՈՒԹՅՈՒՆ ԵՎ ՏԵԽՆՈԼՈԳԻԱ АГРОНАУКА И ТЕХНОЛОГИЯ
International Scientific Journal
ISSN 2579-2822

Journal homepage: anau.am/hy/teghekagir

UDC 636.22/28.082.4

Results of Raising Repair Young Animals with the Latest Technologies at the Age of 0-6 Months

G.H. Giloyan, N.A. Kasumyan, G.A. Poghosyan
Armenian National Agrarian University
garnikgiloyan1937@mail.ru, naz3@mail.ru, gayanepoghosyan76@gmail.com

ARTICLE INFO

Keywords:
genotype,
raising,
development,
exterior,
body parts

ABSTRACT

The research was carried out in 2019 at the "Balahovit" teaching-experimental farm of the Armenian National Agrarian University on the three-breed heifers with the ratio of 1/4 Caucasian brown, 1/4 Jersey and 1/2 Holstein genotypes.

The growing and development indices of the experimental heifers have been much higher than those of the control group. Feeding profitability for 1 kg weight growth has made 10.8 MJ and 394 g digestible protein, while the same indicators in the control group are 29.4 MJ and 623.6 g.

So, it is recommended to apply the feed ration developed, tested and currently used at the "Balahovit" teaching-experimental farm in the livestock farms of Armenia for raising neonatal heifers.

Introduction

High level of milk productivity is currently ensured by raising animals with proportional exterior and solid constitution. Breeding animals with the best genotypes through customized mating and their targeted growing is of high importance in the selection activities.

The breeder not only creates a new genotype, but also develops such technologies which promote breeding of animals with high productivity and those of well adapted to the specific keeping conditions, which also differ from other animals both in the exterior uniformity and the development of their properties and characteristics.

Thus, since 1963 we have managed to implement complicated and reproductive cross-breeding and to get hereditary animals with the the combined blood content of 25 % Caucasian brown, 25 % Jersey and 50 % Holstein breed. In the recent 30 years the latter have been bred "within themselves" (without crossbreeding) and have demonstrated 4500 kg - 5000 kg milk productivity with 4.2 % fat content and 3.4 % protein content (Giloyan, 1986).

However, after the collapse of the Soviet Union, the entire livestock was transferred to the rural collective farms, where the animal breeding and caring terms were violated as a consequence of applying traditional cattle-breeding technologies; the live weight of cows dropped to 400 kg on average, and this is mainly because of repair youngs' malnutrition.

Materials and methods

Scientific-research experiment was conducted in 2019 on the cattle-breeding farm of Balahovit at the Armenian National Agrarian University.

Three-breed neonatal heifers with the ratio of 1/4 Caucasian brown, 1/4 Jersey and 1/2 Holstein (1/4 CB + 1/4 J + 1/2 H) genotypes were selected for the study. Experimental group involved 7 stocks of animals and 5 stocks were in the control group. The groups were formed on the principle of uniformity.

At the age of 0-6 months each heifer stock of the experimental group was fed with 200 kg whole milk, 355 liters of whole milk substitute (WMS) or 35.5 kg dry milk, 260 kg hay, 100 kg silage made from mountainous meadow greenery, 90 kg condensed forage prepared according to our recipe the nutritional value of which per 1 kg was as follows: 9.9 MJ exchangeable energy, 16.6 % raw protein, 2.8 % raw fat, 8.1 % cellulose, 0.8 % calcium, 0.7 % phosphorus, 1 % edible salt, 15 kg wheat and 22 kg barley. The nutritional value of the forage fed per each stock from the age of 0 to 6 months in the experimental group made up to 1288.3 MJ exchangeable energy and 46.79 kg digestible protein. The calves of the control group were fed in accordance of standardized diet and at the age of 0 - 6 months each stock head was fed with 280 kg whole milk, 60 kg wheat, 120 kg barley, 261 kg hay, 100 kg silage, 2500 kg salt. The total nutritional value of the feedstuff made up to1269.7 MJ exchangeable energy and 45.77 kg of digestible protein.

Weight and linear growth of the heifers in experimental and control groups was studied through livestock methods; weighing and body measurements were performed at the neonatal (starting from the 3rd day) and 6-month age; data were processed through biometric methods. (Merkuryeva, 1970).

Absolute weight growth has been determined through the following formula:

$$A = \frac{W_1 - W_0}{t_1 - t_0}$$

Relative weight growth has been determined through Brody's formula

$$B = \frac{(W_1 - W_0)}{(W_1 + W_0) \cdot 0.5} \times 100 .$$

The specific growing rate - through the following formula:

$$C = \frac{(\log W_1 - \log W_0)}{t \log e},$$

where $t=t_1-t_0$ $\log e=0.4343$

Results and discussions

The biometric data on the live weight of the heifers at neonatal and 6-month age for both the experimental and control groups are introduced. From the data analysis it becomes evident that the selected heifers of the mentioned groups are homogenous and uniform regarding the live weight and biometric values.

Table 1. Live weight of the heifers of experimental and control groups, kg*

Groups	Indicators				
	n	Lim	M ±m	σ	Cv
At neonatal age					
Experimental	7	28…31	29.71±0.42	1.11	3.7
Control	5	28…31	29.60±0.51	1.14	3.9
At the age of 6 months					
Experimental	7	146…151	148.3±0.61	1.60	1.1
Control	5	102…104	103.0±0.45	1.00	1.0

**Composed by the authors*

From the analysis of the table data, it becomes clear that the growth and development indices of the experimental heifers at the age of 0-6 months were as follows: absolute weight growth - 118.6 kg, average daily weight growth - 659 g, relative weight growth- 72.7 %, specific growing rate-0.3 and the growing coefficient-4.99; the same indices for the control group were 73.4 kg, 408 g, 62.3 %, 0.2, 3.48 respectively. The feeding profitability (return from cattle breeding) for 1 kg weight growth was the following: exchangeable energy - 10.8 MJ and digestible protein - 394 g, for the control group they were 29.4 MJ and 623.6 g, respectively. The provided data show that the weight growth advantages in case of raising animals with the recommended technology are obvious, thus, hereinafter the farms should feed the new-born calves according to the feeding diet recommended by us. As it is mentioned in the teaching manual (Giloyan, et. al, 2016), external conditions, in particular feeding level and balanced feed ration greatly influence animal growth and development causing various qualitative changes during physiological processes, which are confirmed upon the investigation of the linear growth of the heifers in the experimental and control groups (Giloyan, et. al, 2016).

The measuring values and coefficient of variation (CV) for each body part of the experimental heifers introduced in table 2 testify on the homogeneous and uniform development of the animals.

Table 2. Measurements of the body parts in the experimental and control heifers at the age of 6 months*

Groups	Experimental			Control		
Body parts measurements	Indicators					
	n	M ±m	Cv	n	M ±m	Cv
Wither height	7	104.0±1.15	3.0	5	89.4±0.93	2.5
Anus height	7	107.0±0.97	2.4	5	89.2±0.80	2.1
Ischium height	7	102.0±1.05	2.7	5	83.6±1.50	4.3
Chest depth	7	44.3±0.42	2.5	5	36.8±0.66	4.0
Chest width	7	32.7±0.56	4.6	5	27.6±0.51	4.1
Body oblique length	7	113.6±0.37	0.9	5	95.4±0.93	2.2
Shin circumference	7	15.4±0.57	9.8	5	15.0±0.71	10.5
Heart-girth	7	113.9±0.26	0.6	5	98.8±0.86	2.0
Head length	7	29.9±0.26	2.3	5	27.8±0.37	3.0
Forehead length	7	15.6±0.20	3.4	5	13.0±0.32	5.5
Head depth	7	22.1±0.46	5.5	5	21.0±0.37	4.9
Large width of the forehead	7	16.6±0.20	3.2	5	15.2±0.20	3.0
Small width of the forehead	7	13.4±0.30	5.9	5	11.6±0.51	9.8
Thurl width	7	25.7±0.28	3.0	5	22.2±0.37	3.8
Hip oblique length	7	30.4±0.30	2.6	5	26.2±0.37	3.2

* *Composed by the authors*

Table 3. Comparison of the body part measurements in the heifers of experimental and control groups at the age of 6 months*

Body parts measurements	Experimental	Control	Difference of measurements	
			Absolute	In percentages
Wither height	104.0	89.4	-14.6	-14.0
Anus height	107.0	89.2	-17.8	-16.6
Ischium height	102.0	83.5	-18.5	-18.1
Chest depth	44.3	36.8	-7.5	-16.9
Chest width	32.7	27.6	-5.1	-15.6
Body oblique length	113.6	95.4	-18.2	-16.0
Shin circumference	15.4	15.0	-0.4	-2.6
Heart-girth	113.9	98.8	-15.1	-13.3
Head length	29.9	27.8	-2.1	-7.0
Forehead length	15.6	13.0	-2.6	-16.7
Head depth	22.1	21.0	-1.1	-5.0
Large width of the forehead	16.6	15.2	-1.4	-8.4
Small width of the forehead	13.4	11.6	-1.8	-13.4
Thurl width	25.7	22.2	-3.5	-13.6
Hip oblique length	30.4	26.2	-4.2	-13.8

The heifers of the control group are characterized by the underdevelopment and uniformity disorders in the body parts at post-uterine part. The low index of variation coefficient (CV) is the result of growing disorders in the body parts and the fast growing body parts have lower values than the slower growing ones.

The measurements of the body parts of the control and experimental heifers at the age of 6 months are introduced in table 3.

By the comparative analysis of the data, it becomes evident that in the first 6 months of ontogeny the height measurements have grown more intensively as of the fast growing body parts in the calves (heifers) of the experimental group, while in the heifers of the control group the growth of the wither height, anus height, ischium height, the body oblique length and heart-girth has been retarded by 14.6 cm-18.4 cm or by 13.3 %- 18,0 %. The privilege of the body parts of experimental heifers over those of the control heifers is clearly illustrated in the diagram of the heifer's exterior (Figure).

Proportional development of the body parts in experimental group is also approved by its individual indices. Thus, at the age of 6 months, the index of leg's height (latitude) was 61.8 %, the longitudinal index, which reflects the ratio of the body oblique length and wither's height was 109.2 %, the hip and chest index was up to 127.2 % and the chest index- 73.8 %.

The best indicator of body mass development is its fatness, which is the ratio of heart-girth and oblique body length (100.3 %). These indicators are in line with the same indices of intensively grown Caucasian brown x Holstein heifers at the age of 6 months (Poghosyan, 2012).

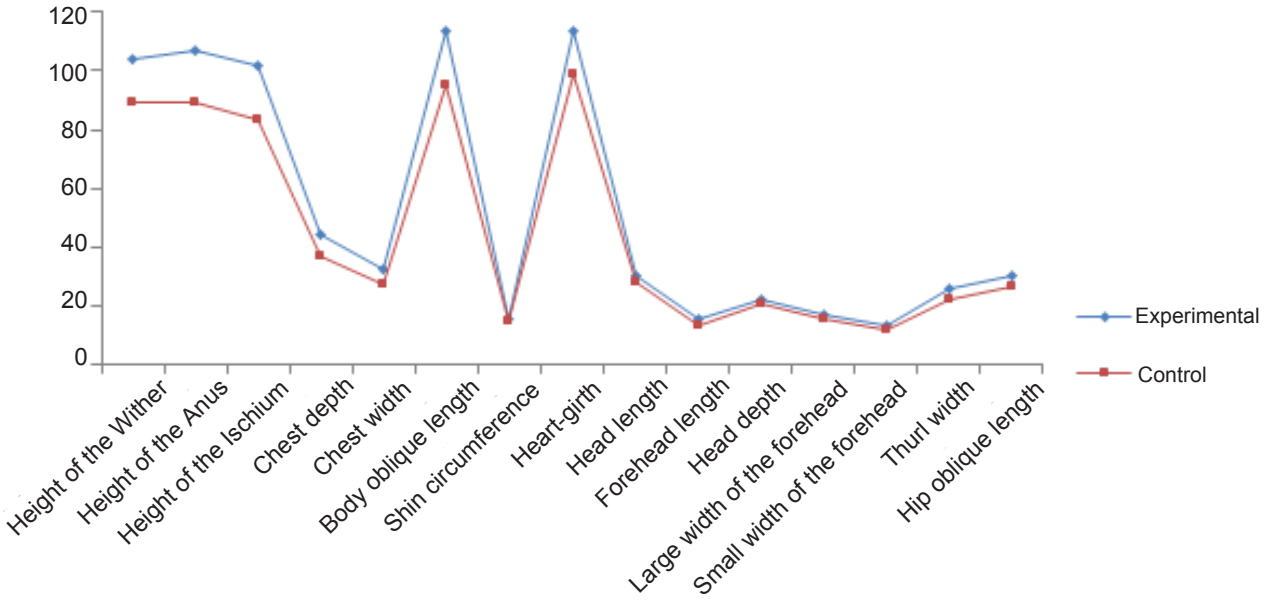

Figure. Diagram of animal's exterior (*composed by the authors).*

The overgrowing index is the ratio of anus and wither's height which makes 102.9%, the index of boniness is 14.8%, the index of mass density is the ratio of heart-girth and wither's height which makes 109.5%. These indicators state on the availability of the genotype with uniformly developed body parts in the heifers of the experimental group.

Conclusion

The reliable data of study results indicate on the high indices in the uniformity of body parts, derivative growing indices, absolute weight growth, growing rate, average daily and relative weight growth, as well as on the specific growing rate in the experimental heifers at the age of 6 months. Thus, the absolute weight growth has made 118.6 kg, the average daily weight growth - 659 g, the relative one- 72.7 % and the specific growing rate-0.3, the growing coefficient is 4.99, while in the control group these indicators are 73.4 kg, 408 g, 62.3 %, 0.2, 3.48 respectively.

As a result, 6-month-old heifers with proportional consistency are grown and this paves a way for raising high milk yield producing cows.

The heifers of the control group are characterized by the slow growing and development rate, non-uniform body parts, underdevelopment in some body zones and proportional disorders in body structure.

Thus, it is recommended to apply the feed ration developed, tested and currently used at the "Balahovit" teaching-experimental farm in the livestock farms of Armenia.

References

1. Giloyan, G.H. (1986). Recommendations for the production of dairy herds, - p. 30 (in Arminian).
2. Giloyan, G.H., Azizyan, A.V., Kasumyan, N.A. (2016). The growth and development of animals, - p. 30 (in Armenian).
3. Poghosyan, G.A. (2012). Influence of intensive growth of repair young of different genotypes on diet formation and first calving. Abstract, - p. 26 (in Armenian).
4. Merkuryeva, E.K.(1970). Biometrics in selection and genetics of farm animals. M., - p. 424 (in Russian).

Accepted on 29.10.2019
Reviewed on 08.11.2019