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INFLUENCE OF THE CONSTABILITY OF THE COMPOSITION OF TECHNOLOGICAL GROUPS OF HEIFERS UNDER 6 MONTHS OF AGE ON THEIR BEHAVIOR, GROWTH AND DEVELOPMENT

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In animal husbandry, there are several types of animal grouping that allow for more efficient organization of their maintenance, breeding and use. Grouping can be carried out according to various criteria, including age, sex, physiological state, productivity and intended purpose. Depending on the type of animal, conditions of keeping and goals of the farm, various combinations of these grouping criteria can be used. In addition, there is a concept of hierarchy in animal groups, where animals occupy certain places in the group, which also affects their maintenance and behavior. Grouping of young animals in animal husbandry is the process of uniting animals of a certain species, age and sex into separate groups for more efficient management. This allows you to optimize the processes of feeding, keeping and caring for animals, and also facilitates control over their development.

The article presents the results of studying the effect of the constant composition of heifers in technological groups aged 0-6 months on growth and development.

The live weight of heifers in the experimental group was higher in all three series of studies than in the control group. Heifers in the experimental group were also characterized by higher gains and, accordingly, more intensive growth dynamics during all three series of studies. Thus, a comparative assessment of the average daily live weight gain of heifers in the first series of studies indicates that in 1 month, experimental animals compared to the control had a greater value by 30 g or 4.0% ($p<0.05$); 2 months - by 97 g or 15.8% ($p<0.05$); 3 months - by 133 g or 14.8% ($p<0.001$); 4 months - by 32 g or 4.5% ($p<0.05$); 5 months - by 100 g or 12.0% ($p<0.001$); 6 months – by 451 g or 18.5% ($p<0.001$). A similar trend was observed in subsequent series of studies.

Heifers in the control group, compared to their experimental peers, spent more time on basic life activities (feed consumption, chewing gum while lying down, chewing gum while standing up, sleeping, resting in a lying position (passive), resting in a standing position (passive), moving around).

Behavioral elements such as lying down and standing up in the experimental groups were longer by 45.0 min and 10 min, respectively, or by 15.0%, than in the control group counterparts. These heifers also rested longer, their sleep was 55.0 min or 14.1%

longer compared to the control group counterparts. The experimental group animals rested longer lying down (laying passively) compared to the control group counterparts by 13 min or 32.5%. The control group heifers rested longer standing up (standing passively) than the experimental group animals by 4.8%. As evidenced by the data of timed observation, the control group animals moved 2.1 times more than the experimental group counterparts.

Keywords: heifers, live weight, average daily gains, exterior measurements, behavior.

ВПЛИВ СТАЛОСТІ СКЛАДУ ТЕХНОЛОГІЧНИХ ГРУП ТЕЛИЦЬ ВІКОМ ДО 6 МІСЯЦІВ НА ЇХ ПОВЕДІНКУ, РІСТ ТА РОЗВИТОК

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У тваринництві існує декілька типів групування тварин, які дозволяють більш ефективно організовувати їх утримання, розведення та використання. Групування може здійснюватися за різними критеріями, включаючи вік, стать, фізіологічний стан, продуктивність та цільове призначення. Залежно від виду тварин, умов утримання та цілей господарства, можуть використовуватись різні комбінації цих критеріїв групування. Крім того, існує поняття ієрархії у тваринних угрупованнях, де тварини займають певні місця у групі, що також впливає на їх утримання та поведінку. Групування молодняку тварин в тваринництві - це процес об'єднання тварин певного виду, віку та статі в окремі групи для більш ефективного ведення господарства. Це дозволяє оптимізувати процеси годівлі, утримання та догляду за тваринами, а також полегшує контроль за їхнім розвитком.

У статті викладено результати вивчення впливу постійного складу теличок в технологічних групах у віці 0-6 місяців на ріст і розвиток.

Жива маса теличок дослідної групи була вищою, по всіх трьох серіях досліджень, ніж у контрольної групи. Також вищими приростами і, відповідно, більш інтенсивною динамікою росту характеризувались телички дослідної групи на протязі всіх трьох серій досліджень. Так, порівняльна оцінка середньодобового приросту живої маси теличок по І серії досліджень свідчить про те, що за 1 місяць дослідні тварини в порівнянні з контролем мали більшу його величину на 30 г або на 4,0 % ($p<0,05$); 2 міс. – на 97 г або на 15,8 % ($p<0,05$); 3 міс. – на 133 г або на 14,8 % ($p<0,001$); 4 міс. – на 32 г або на 4,5 % ($p<0,05$); 5 міс. – на 100 г або на 12,0 % ($p<0,001$); 6 міс. – на 451 г або на 18,5 % ($p<0,001$). Подібна тенденція спостерігалась і в наступних серіях досліджень.

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Телички контрольної групи порівняно з дослідними однолітками більше часу витрачали на основні життєві прояви (споживання корму, жування жуйки лежачи, жування жуйки стоячи, сон, відпочивання в положенні лежачи (пасивно), відпочивання в положенні стоячи (пасивно), пересувається).

Такі елементи поведінки як жуйка лежачи та жуйка стоячи в дослідних групах була триваліша на 45,0 хв та 10 хв відповідно, або на 15,0 %, ніж у аналогів контрольної групи. Також ці телички більше часу відпочивали, їх сон був на 55,0 хв або на 14,1 % більше в порівнянні з аналогами контрольної групи. Тварини дослідної групи більше часу відпочивали лежачи (лежить пасивно) порівняно з аналогами контрольної групи на 13 хв або на 32,5 %. Телички контрольної групи більше часу відпочивали стоячи (стоїть пасивно) ніж тварини дослідної групи в 4,8 %. Як свідчать дані хронометражного спостереження тварини контрольної групи більше пересувалися в 2,1 рази, ніж аналоги з дослідної групи.

Ключові слова: телички, жива маса, середньодобові прирости, екстер'єрні проміри, поведінка.

The formation of highly productive animals in dairy cattle breeding largely depends on obtaining a full-fledged offspring and the subsequent cultivation of replacement young animals, especially in the colostrum and milk periods of their life. For the healthy growth of newborn calves, it is important to provide them with proper feeding and maintenance (Stull, C., & Reynolds, J., 2008). The economic efficiency of the industry is based on replacing the herd with strong and healthy animals, which is ensured by the latest technologies for their cultivation, starting from birth. If calves grow healthy, then the mortality rate is reduced as much as possible, the cost of production is reduced (Pidpala, T. V., 2018).

Studying the influence of the constant composition of the technological group of animals on their further productivity is one of the urgent tasks that needs to be solved for the industrial technology of milk production. Despite the external simplicity, the formation of homogeneous and stable groups is one of the most complex issues of industrial technology. In animal husbandry, there are several types of grouping of animals that allow more effectively organizing their maintenance, breeding and use. Grouping can be carried out according to various criteria, including age, sex, physiological state, productivity and intended purpose.

Depending on the species of animal, the conditions of its keeping and the objectives of the farm, various combinations of these grouping criteria may be used. In addition, there is a concept of hierarchy in animal groups, where animals occupy certain positions in the group, which also affects their keeping and behavior.

The process of raising young cattle covers different age periods. each of them is characterized by certain growing technologies, which, based on the biological features of the organism's development, should contribute to the disclosure of genetically determined productive qualities of animals (Antonenko, S., Hreben, L., 2011).

There is a diversity of opinion regarding the management of calves during the dairy period. Published studies show that group housing can develop behavioral responses, shape calf personality, and allow animals to adapt to the herd (Takeda K, Sato S, & Sugawara K., 2003; Donadio J.P., De-Sousa,K.T., Torres R.N.S., Alves,T.C., Hötzel M.J., & Deniz M., 2025). Despite the importance of early group housing of calves, individual housing of young animals remains common in dairy calf rearing, with 63% of

calves in the United States being individually housed,[i] 60% in Europe (Bolt, S.L.; Boyland, N.K.; Mlynski, D.T.; James, R.; Croft, D.P. 2017). Some scientists (Rademann, A., Schneider, M.L., & Waiblinger, S., 2025) believe that group housing has a negative impact on calf welfare, but there are other studies (Duve, L. R., & Jensen, M., 2012; de Paula, V., de Passille, A., & Weary, D., 2012; Costa J., Keyserlingk M., & Weary D., 2016) that prove the effectiveness of group housing of calves. According to (Jensen, M., & Budde, M., 2006; Jensen, M., Larsen, L., 2014), isolation tends to make calves less active, more anxious, and therefore less responsive to new environmental stimuli compared to calves raised among their peers.

Dairy calves are usually separated from their mothers after birth and raised separately in individual cages until weaning, usually up to 2 months. (Cantor M., Neave,H., & Costa, J. C.2019). This method of rearing differs from natural conditions (Whalin, L., Weary D.M., & van Keyserlingk M.A.G., 2021), and scientists have a negative opinion about this method (Placzek M., Christoph-Schulz I., & Barth, K., 2021). In addition, individual housing has a negative impact on the development of calves. Stress caused by social isolation makes calves more timid than those in contact with other animals (Gaillard C., Meagher R.K., Von Keyserlingk M.A.G., & Weary D.M., 2014). Calves can be kept with peers or in groups with their mothers (Mandel R., Whay H.R., Klement E., Nicol C.J., 2016). Pair and small group housing are the most studied systems for dairy calves due to their simple organization. While cow-to-cow housing is more difficult to manage, it provides maternal care and a more natural social dynamic for the calves (Foske Johnsen J., Grumo Kischel S., Sætervik Rognskog, M.,VagleI., Engelien Johanssen J.R., Ruud L.E., Ferneborg S., 2021). Although some researchers generally consider group housing to be better than individual housing (Perttu R.K., Ventura B.A., Endres M.I., 2020; Sirovica L.V., Ritter C., Hendricks J., Weary D.M., Gulati S., Von Keyserlingk M.A.G., 2022), farmers believe that individually housed calves are easier to manage and that these calves are less susceptible to disease (Mahendran S.A., Wathes D.C., Booth R.E., Blackie N., 2022). However, some studies have found improved growth in calves housed in pairs or groups compared to individually housed calves (Costa J.H.C., Meagher, R.K., Von Keyserlingk M.A.G., Weary D.M., 2015; Mahendran S.A., Wathes D.C., Booth R.E., Baker N., Blackie N., 2023), while others have found no difference (Wormsbecher L., Bergeron R., Haley D., DePassillé A.M., Rushen J., Vasseur E., 2017).

Many factors can interact with calf performance, health, and behavior, including temperament, milk yield, and farm management (Neave H.W., Costa J.H.C., Weary D.M., von Keyserlingk M.A.G., 2018; Hyde R.M., Green M.J., Hudson C., Down P.M. (2021). Social isolation is a hot topic in the dairy industry (Nikkhah A., Alimirzaei M., 2022; Miller-Cushon E.K., 2024).

Substantiation of the issue of the constancy of the composition of heifers in the technological group and the study of its impact on growth, development, sexual maturation and milk production is practically absent in the literature.

Research objective. To study the effect of the constant composition of heifers in technological groups aged 0-6 months on growth and development.

Materials and methods of research. The research was conducted on heifers of the Ukrainian black-and-white dairy breed in the conditions of the breeding plant of the experimental farm "Kutuzivka" of the Kharkiv district of the Kharkiv region.

[i] *United States Department of Agriculture. *Dairy 2014, Part 1: Dairy Cattle Management Practices in the United States*; USDA: Fort Collins, CO, USA, 2016.

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In order to study the influence of the constant composition of heifers in the technological group on the peculiarities of their growth and development in the period from 0 to 6 months of age, two groups of 10-day-old animals were formed, 15 animals in each group: Group I (experimental) with a constant composition of heifers in the technological group, which did not move in the sections of the premises throughout the experiment, Group II (control) with a non-constant composition of heifers, which moved between sections. Groups of heifers were formed taking into account the date of birth and live weight. The duration of the series was 6 months (183 days). The study was carried out over three series of studies.

When determining the behavioral indicators of calves, the study was conducted in a group manner, observing the vital signs of the animals throughout the day.

The main method used in ethological studies was direct observation and timing of the main vital signs of animals: consuming food, chewing gum while lying down, chewing gum while standing up, sleeping, resting in a lying position (passive), resting in a standing position (passive), moving, other (feces, urine)..

The structure of the diet during the period of experiments in the first series was as follows: dairy feed - 28%; roughage - 34%; concentrates - 23%; juicy - 15%; in the second, respectively - 20%; 34%; 22%; 15%; and in the third - 27%; 29%; 26%; 18%.

Per 1 kg of live weight gain, heifers consumed feed during the period of the first series of studies: experimental – 4.75 feed units, control – 5.20 feed units and digestible protein – 125–126 g, respectively; in the second – 3.31 and 3.89 feed units; 125 and 126 g; and in the third – 4.08 and 4.96 feed units and 125–126 g.

Linear measurements of animals were carried out by height at the withers and sacrum, body length, chest girth, depth and width of the chest, width at the withers, and girth of the pastern. Linear measurements were determined using a measuring stick and tape. Height at the withers was determined from the highest point of the withers to the floor - using a measuring stick; oblique length of the body - from the shoulder-scapular joint to the posterior protrusion of the ischial tuberosity (with a measuring stick); chest girth - behind the shoulder blades along a circle passing tangentially to the posterior angle of the shoulder blade (with a measuring tape); chest depth - from the withers to the sternum along a vertical line tangential to the posterior angle of the shoulder blade (with a measuring stick); chest width - at the widest point along a vertical line tangential to the posterior angle of the shoulder blade (with a measuring stick); height at the sacrum - from the highest point of the sacrum to the ground (with a measuring stick); width in the maclocks – at the outer corners of the maclocks (with a measuring stick); width of the metatarsus – at the lower end of the upper third of the metatarsus (with a measuring tape).

Research results. Targeted rearing of heifers in the milking period from 10 days to 6 months of age to a large extent shapes future milk productivity. As a result of conducting research on the evaluation of two methods of forming technological groups of heifers: with a constant and non-constant composition at the same level of rearing, their influence on their growth and development was studied, starting from 10 days of age to 6 months. Thus, during three series of experiments (Table 1), all animals grew well, but some differences between them were found.

It was found that the live weight at birth in both groups differed slightly in all three series of studies. Thus, heifers of the experimental group (series I of studies) in 1 month of growing exceeded their counterparts of the control group in live weight - by 1.0 kg or 1.8% ($p<0.05$); 2 months - by 6.0 kg or 8.3% ($p<0.05$); 3 months - by 8.0 kg or 7.9% ($p<0.05$); 4 months - by 9.0 kg or 7.3% ($p<0.05$); 5 months - by 12.0 kg or 8.1% ($p<0.05$); 6 months - by 26.0 kg or 15.1% ($p<0.001$).

Table 1

Dynamics of live weight of heifers with constant composition of technological group, kg, (M±m)

Group of animals	Age, month						
	Live weight at birth, kg	1	2	3	4	5	6
		30 days	31 days	30 days	31 days	30 days	31 days
The first series of studies (n=15)							
Experimental	32,6± 0,79	56,0± 0,83*	78,0± 0,87**	109,0± 1,45**	132,0± 1,79***	160,0± 2,0***	198,0± 2,55***
Control	32,5± 0,88	55,0± 0,95	72,0± 0,89	101,0± 1,35	123,0± 1,85	148,0± 2,15	172,0± 2,65
Second series of studies (n=15)							
Experimental	30,40± 0,46	54,0± 1,27*	76,0± 1,50***	103,0± 2,00***	129,0± 2,15***	162,0± 2,50***	191,0± 2,68***
Control	30,25± 0,60	52,0± 1,30	65,0± 1,46	90,0± 2,10	113,0± 2,30	144,0± 2,46	165,0± 2,55
Third series of studies (n=15)							
Control	32,8± 0,87	55,0± 1,03*	77,0± 1,53**	106,0± 1,69**	131,0± 2,00***	167,0± 2,20***	193,0± 2,30***
Control	32,6± 0,90	51,0± 1,00	72,0± 1,63	100,0± 1,73	120,0± 2,13	141,0± 2,40	163,0± 2,60

*Note: the probability of the data is calculated for the control group: * – corresponds – p<0,05; ** – p<0,01;*** –p<0,001.*

According to the results of the II series of studies, a similar trend is observed as in the I series of studies. Thus, the advantage of the experimental group in terms of live weight in the 1st month of the study was 2.0 kg or 3.8% (p<0.05); 2 months - 11.0 kg or 16.9% (p<0.05); 3 months - 13.0 kg or 14.4% (p<0.001); 4 months - 16.0 kg or 14.2% (p<0.001); 5 months - 18.0 kg or 12.5% (p<0.001); 6 months - 26.0 kg or 15.8% (p<0.001) compared to the control group.

Analyzing the results of the III series of studies, we see that the experimental group of heifers also outperforms their peers in the control group. Thus, in 1 month of research, the advantage of the experimental group of heifers was at the level of 4.0 kg or 7.8% (p<0.05); 2 months - 5.0 kg or 6.9% (p<0.05); 3 months - 6.0 kg or 6.9% (p<0.05); 4 months - 9.0 kg or 9.2% (p<0.05); 5 months - 26.0 kg or 18.4% (p<0.001) and 6 months - 30.0 kg or 18.4% (p<0.001) compared to the control group counterparts.

It should be noted that the highest intensity of growth and development is observed in heifers with a constant composition. The results of studies that characterize the intensity of growth of replacement young animals through average daily live weight gains are given in Table 2.

Heifers of the experimental group were characterized by higher gains and, accordingly, more intensive growth dynamics throughout all three series of studies. Thus, a comparative assessment of the average daily gain in live weight of heifers in the I series of studies indicates that in 1 month, experimental animals compared to the control had a greater value by 30 g or 4.0% (p<0.05); 2 months - by 97 g or 15.8% (p<0.05); 3 months - by 133 g or 14.8% (p<0.001); 4 months - by 32 g or 4.5% (p<0.05); 5 months - by 100 g or 12.0% (p<0.001); 6 months - by 451 g or 18.5% (p<0.001).

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Table 2

Dynamics of average daily gain of heifers at constant technological group, g, (M±m)

Group of animals	Age, month						On average, 183 days
	1	2	3	4	5	6	
	30 days	31 days	30 days	31 days	30 days	31 days	
The first series of studies (n=15)							
Experimental	780± 23*	709± 31*	1033± 35***	741± 43***	933± 41***	1225± 35***	903± 38***
Control	750± 30	612± 35	900± 43	709± 46	833± 43	774± 36	762± 39
Second series of studies (n=15)							
Experimental	786± 26*	709± 30***	900± 34**	838± 42***	1100± 43**	935± 39***	877± 40***
Control	725± 28	419± 32	833± 35	741± 41	1033± 44	677± 42	736± 41
Third series of studies (n=15)							
Experimental	740± 25*	709± 37*	1033± 41***	741± 43***	1200± 40***	838± 35***	875±39***
Control	613± 29	677± 35	933± 38	645± 41	700± 39	709± 38	712± 37

*Note: the probability of the data is calculated for the control group: * – corresponds – p<0,05; ** – p<0,01;*** –p<0,001.*

It should be noted that in the II series of studies, the average daily weight gain of experimental heifers was greater than that of control counterparts for 1 month by 61 g or 8.4% ($p<0.05$); 2 months – by 290 g or 69.2% ($p<0.001$); 3 months – by 67 g or 8.0% ($p<0.05$); 4 months – by 97 g or 13.1% ($p<0.001$); 5 months – by 67 g or 6.4% ($p<0.05$); 6 months – by 258 g or 38.1% ($p<0.001$).

The results of the III series of studies confirm the pattern of the I and II series. Thus, the difference in favor of the experimental group in 1 month was 127 g or 20.7% ($p<0.05$); 2 months - 32 g or 4.7% ($p<0.05$); 3 months - 100 g or 10.7% ($p<0.05$); 4 months - 96 g or 14.9% ($p<0.05$); 5 months - 500 g or 71.4% ($p<0.001$); 6 months – 129 g or 18.2% ($p<0.001$) compared to the control group counterparts..

Thus, the results of the studies indicate that the average daily gain of the experimental animals was higher than that of the control group counterparts throughout all three series of the experiment.

A more complete picture of animal growth can be obtained by supplementing data on the live weight of heifers with measurements, since a growing organism can increase in height, length, width and depth without changing the size of its live weight during temporary underfeeding. Data from systematic weighing and measurements characterize the growth rate, which is of great economic importance, because animals that grow more intensively consume less nutrients per unit of growth than those that grow slowly. Therefore, in order to learn more about the growth and development of heifers when kept loose, we studied changes in the exterior measurements of the experimental and control groups at the beginning and end of the experiment in all three series of studies (Table 3).

According to exterior development indicators, heifers of the experimental and control groups at the beginning of the experiment had the same indicators.

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Table 3

Exterior measurements of the main sexes of heifers (1-6 months., n=15)

Body measurements, cm	Group I (control)	Group II (experimental)	Group I (control)	Group II (experimental)	Group I (control)	Group II (experimental)
	The first series of experiments		The second series of experiments		The third series of experiments	
At the beginning of the experiment (at birth)						
Height at the withers	60 ±1,56	60 ±1,57	56,0±1,30	56,0±1,35	60,0±1,0	60,0±1,0
Height in the back	62 ± 1,75	62 ± 1,76	58,0±1,25	58,0±1,30	62,1±0,9	62,5±0,5
Height at the sacrum	64 ± 1,85	64 ± 1,70	60,0±1,00	60,0±0,89	64,4±0,6	64,8±0,6
Chest depth	23,9 ± 1,73	23,8 ± 1,74	22,0±0,60	22,0±0,65	23,3±0,36	23,4±0,35
Chest width	12,4 ± 1,69	12,4 ± 1,69	12,0±0,90	12,0±0,45	12,4±0,40	12,5±0,40
Width in maclocks	13,2 ± 1,70	13,2 ± 1,69	12,2±0,45	12,3±0,35	13,2±0,4	13,3±0,3
Width in hips	17,1 ± 1,43	17,2 ± 1,46	15,9±0,35	15,9±0,37	17,1±0,3	17,2±0,3
Width at the gluteal tubercles	9,3 ± 1,50	9,3 ± 1,48	8,6±0,23	8,6±0,25	9,3±0,2	9,3±0,2
Oblique torso length	58,2 ± 1,60	56,2 ± 1,59	54,02±0,25	54,29±0,30	58,2±0,3	58,6±0,2
Oblique back length	18,6 ± 1,50	18,6 ± 1,50	12,3±0,29	17,4±0,30	18,6±0,60	18,7±0,63
Chest circumference	62,1 ± 1,45	62,1 ± 1,45	57,60±0,35	57,91±0,35	62,1±0,29	62,4±0,20
Metatarsal circumference	8,5 ± 0,8	8,5 ± 0,8	7,93±0,25	7,97±0,30	8,6±0,30	8,6±0,30
At the end of the experiment (6 months)						
Height at the withers	93,4 ±1,15	107,5 ±1,20***	89,6±0,30	103,7±0,75***	88,5±0,20	105,0±0,25***
Height in the back	96,2 ± 1,29	110,7 ± 1,30***	32,3±0,75	106,8±0,85***	108,0±0,31	110,1±0,28***
Height at the sacrum	98,9 ± 1,23	113,9 ± 1,25***	94,9±0,95	109,8±0,96***	93,8±0,29	111,0±0,30***
Chest depth	45,3 ± 1,13	52,1 ± 1,19***	43,5±0,60	50,3±0,60**	42,9±0,22	50,8±0,23***
Chest width	23,1 ± 1,15	26,6 ± 1,16***	22,1±0,40	26,0±0,45**	21,9±0,30	25,9±0,40**
Width in maclocks	26,8 ± 1,12	30,8 ± 1,10***	25,7±0,55	29,8±0,80**	29,4±0,26	30,1±0,26*
Width in hips	29,6 ± 1,15	34,1 ± 1,16***	28,4±0,58	32,9±0,60**	28,8±0,18	33,20±0,19**
Width at the gluteal tubercles	18,9 ± 1,05	21,3 ± 1,06***	17,7±0,43	20,5±0,49**	10,5±0,15	12,6±0,20**
Oblique torso length	82,4±0,48	87,2 ± 0,69***	97,6±0,45	112,9±0,49***	96,4±0,25	114,1±0,20***
Oblique back length	31,4 ± 1,10	36,2 ± 1,15***	30,2±0,10	34,9±0,10**	29,8±0,15	35,3±2,16
Chest circumference	113,7 ± 1,00	123,05 ± 1,00***	126,3±0,30	129,1±0,28**	107,8±0,18	127,6±0,20***
Metatarsal circumference	12,86 ± 0,34	14,8 ± 0,33**	12,6±0,25	11,3±0,25**	12,1±0,29	14,4±0,30**

*Note: the probability of the data is calculated for the control group: * – corresponds – $p<0,05$; ** –$p<0,01$; *** –$p<0,001$.*

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The best body measurements were observed in heifers with a constant composition of the technological group compared to analogues from the control group, in particular, in the I series: height at the withers by 8.0 cm or 13.9% ($p<0.05$), chest depth - by 6.0 cm or 9.6% ($p<0.05$), chest width behind the shoulder blades - by 5.0 cm or 12.3% ($p<0.05$), oblique body length - by 5.5 cm or 11.5% ($p<0.05$), chest girth behind the shoulder blades - by 10.0 cm or 8.5% ($p<0.05$), metatarsal girth - by 1.09 cm or 7.7% ($p<0.05$).

It is worth noting that in the II series, the advantage in body measurements of the experimental group over the control group was preserved: height at the withers by 9.0 cm or 8.9% ($p<0.05$), chest depth behind the shoulder blades – by 8.0 cm or 14.5% ($p<0.05$), chest width behind the shoulder blades – by 6.0 cm or 12.5% ($p<0.05$), oblique body length – by 6.0 cm or 6.9% ($p<0.05$), chest girth behind the shoulder blades – by 8.0 cm or 8.5% ($p<0.05$), metatarsal girth – by 0.60 cm or 7.3% ($p<0.05$).

In the third series of the experiment, a similar picture was established. Thus, the height at the withers of the heifers of the experimental group was greater by 8.5 cm or 9.2% ($p<0.05$), the depth of the chest behind the shoulder blades – by 6.5 cm or 8.6% ($p<0.05$), the width of the chest behind the shoulder blades – by 6.6 cm or 10.6% ($p<0.05$), the oblique length of the body – by 6.5 cm or 10.9% ($p<0.05$), the girth of the chest behind the shoulder blades – by 9.0 cm or 12.5% ($p<0.05$), the girth of the pastern – by 0.80 cm or 9.2% ($p<0.05$) compared to the control group.

The issue of animal behavior is extremely important, since they are not the same in terms of viability. Analysis of ethological features allows you to identify calves that are physiologically weak or poorly adapted to the given conditions of keeping. Studying the behavior of animals at an early age makes it possible to predict their future productivity, growth and development intensity, taking into account breed, age, etc. Studying the influence of keeping conditions on the behavior of replacement heifers allows you to optimize their breeding technology, obtaining highly productive cows in the future.

Observation of animals showed that in three series of studies of keeping calves in group cages, their ethological reactions were different. The features of the behavioral reactions of heifers are given in Table 4.

The data in the table show that the experimental animals, in comparison with the control heifers in all three series of experiments, did not have significant differences. Thus, in the first series of studies, such an element of behavior as feed consumption was 58.0 min or 15.3% longer in the experimental ones than in the control group analogues.

It should be noted that such behavioral elements as lying down and standing up in the experimental groups were longer by 45.0 min and 10 min, respectively, or by 15.0%, than in the control group counterparts. Also, these heifers rested longer, their sleep was 55.0 min or 14.1% longer compared to the control group counterparts. The experimental group animals rested longer lying down (laying passively) compared to the control group counterparts by 13 min or 32.5%. The control group heifers rested longer standing up (standing passively) than the experimental group animals by 4.8%. As evidenced by the data of timed observation, the control group animals moved 2.1 times more than the experimental group counterparts.

Table *4*

Behavior of heifers in different technological group composition

Act of conduct	Group			
	experimental		control	
	minutes	%	minutes	%
The first series of studies (n=15)				
Feed consumption	438	30,4	380	26,3
Chewing gum (lying down)	345	23,9	300	20,8
Chewing gum (standing)	50	3,5	40	2,7
Sleep	445	30,9	390	27,1
Lying (passive)	53	3,7	40	2,8
Stand (passive)	34	2,3	165	11,4
Moving	45	3,1	95	6,6
Other (feces, urine)	30	2,2	30	2,3
Together	1440	100,0	1440	100,0
Second series of studies (n=15)				
Feed consumption	450	31,2	400	27,8
Chewing gum (lying down)	340	23,6	295	20,5
Chewing gum (standing)	60	4,2	75	5,2
Sleep	450	31,2	404	30,8
Lying (passive)	50	3,5	65	4,5
Stand (passive)	15	1,1	75	2,5
Moving	40	2,8	86	5,9
Other (feces, urine)	35	2,4	40	2,8
Together	1440	100,0	1440	100,0
Third series of studies (n=15)				
Feed consumption	445	30,9	395	27,4
Chewing gum (lying down)	350	24,3	330	22,9
Chewing gum (standing)	55	3,8	69	4,8
Sleep	447	31,0	405	29,5
Lying (passive)	58	3,8	57	3,9
Stand (passive)	20	1,5	60	2,8
Moving	30	2,1	89	6,2
Other (feces, urine)	35	2,6	35	2,5
Together	1440	100,0	1440	100,0

Discussion. Grouping of young animals in animal husbandry is the process of uniting animals of a certain species, age and sex into separate groups for more efficient management of the farm. This allows you to optimize the processes of feeding, keeping and caring for animals, and also facilitates control over their development. Depending on the type of animals, conditions of keeping and the goals of the farm, various combinations of these grouping criteria can be used. In addition, there is a concept of hierarchy in animal groups, where animals occupy certain places in the group, which also affects their maintenance and behavior (Antonenko, S., Hreben, L. 2011).

We studied the growth and development of heifers from 10 days of age to 6 months, their growth rate, exterior measurements and ethological behavior. Heifers were divided into two groups - an experimental group with a constant composition that did not

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move between sections of the room throughout the experiment, and a control group with a non-constant composition of heifers that moved between sections.

We have proven that heifers with a constant composition and not moving between sections had a higher live weight and growth rate. Ethological studies have shown that heifers in the experimental group are calmer and spend more time on basic life activities, such as: feed consumption, chewing gum lying down, chewing gum standing up, sleeping, resting in a lying position (passive), resting in a standing position (passive), moving. Linear measurements also had an advantage in the experimental group.

Livestock farmers always face the issue of determining the optimal values of the number and size of technological groups. On the one hand, high-performance equipment requires an increase in the number of animals in the group, and on the other hand, a small-sized group has smaller differences in productivity and physiological condition (Pidpala T., 2018). It has been proven by a number of scientists (Takeda K Sato S, & Sugawara K., 2003; Donadio J.P., De-Sousa K.T., Torres R.N.S., Alves T.C., Hötzel M.J., & Deniz M.,2025) that group housing can develop behavioral responses, shape the personality of calves and enable animals to adapt to the herd. Improved growth of calves kept in pairs or groups compared to individually kept calves has also been found (Costa J.H.C., Meagher R.K., Von Keyserlingk M.A.G., Weary D.M., 2015; Mahendran S.A., Wathes D.C., Booth R.E., Baker N., Blackie N., 2023), while others have found no difference (Wormsbecher L., Bergeron R., Haley D., De Passillé A.M., Rushen J., Vasseur E., 2017). Our studies have shown that the formation of technological groups of heifers with a constant composition during the lactation period has a positive effect on growth, development and other vital signs.

Conclusions:

1. Comparative assessment showed that the formation of technological groups of heifers with a constant composition has a positive effect on growth, development and payment for feed per unit of production.

2. Growing heifers with a constant composition of the technological group from 10 days to 6 months of age provides an increase in the live weight gain of one head by 26.0 kg or 15.1% ($P \leq 0.001$).

3. It was found that animals in the experimental group eat feed better, grow and develop faster and are more adapted to environmental conditions.

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