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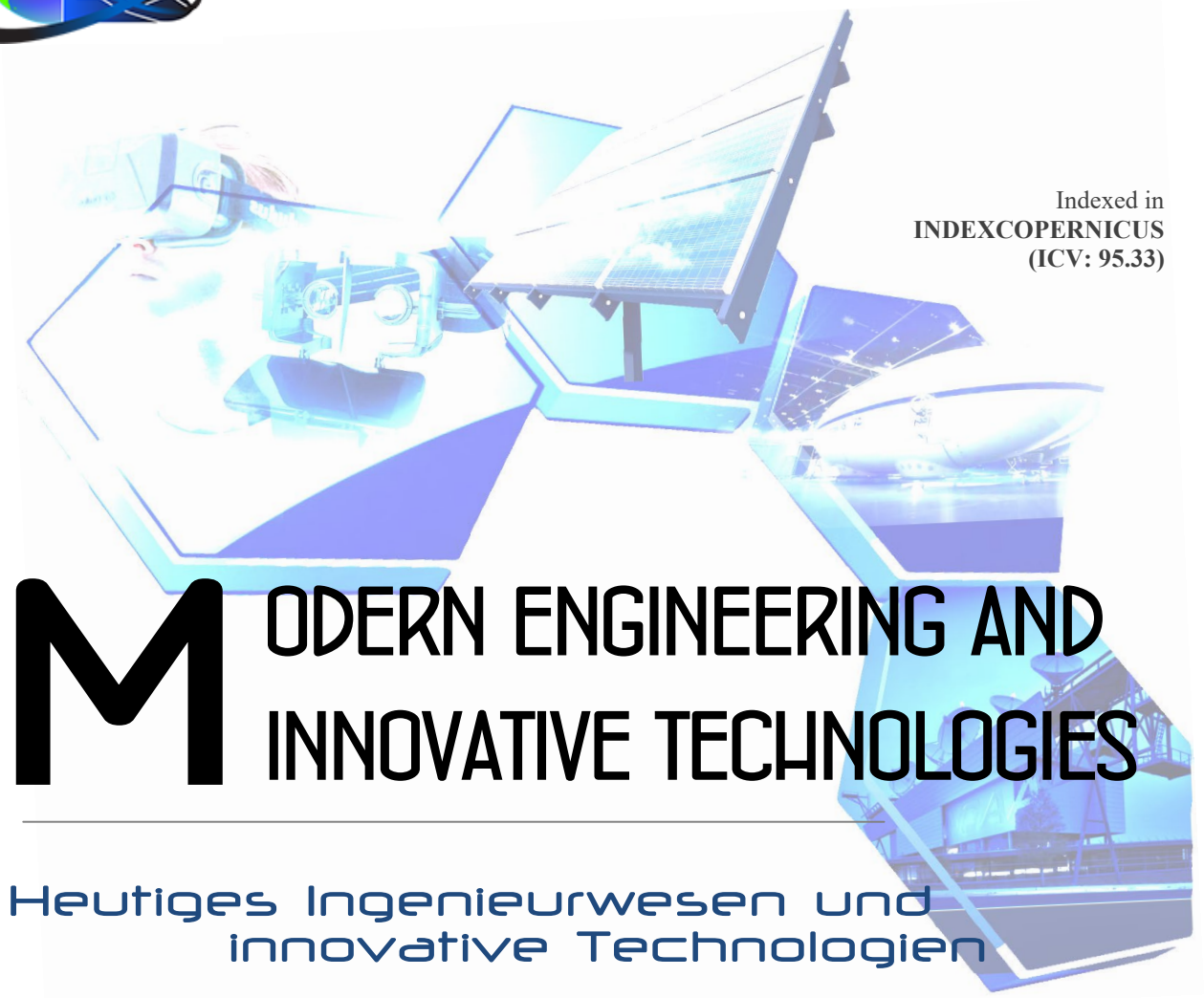

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Periodicity of publication: Quarterly

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- Broadcasting young researchers and scholars outcomes to wide scientific audience
- Fostering knowledge exchange in scientific community
- Promotion of the unification in scientific approach
- Creation of basis for innovation and new scientific approaches as well as discoveries in unknown domains

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BEHAVIORAL REACTIONS OF BODIES UNDER ATTACHED DETENTION IN A MODULAR-GROUP CAGE

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Abstract. *It is recommended an improved loose-box method of keeping repair heifers and heifers using the developed modular group cage for animal recreation at low-capacity milk production enterprises and farms, which will allow the use of developed devices and elements of internal equipment and reduce breeding costs. one animal on average by UAH 440, to reduce by 9 days the term of heifers to reach a live weight of 400 kg, to increase the milk productivity of first-born cows by 1.7-2.2 kg of milk, to improve the reproductive capacity of cattle and maintain their health.*

Keywords: *behavior, heifers, animals, group, cage, content, reaction, productivity, stress.*

Introduction.

In tethered livestock, special attention is paid to the behavior of animals and exercise, which affects the consumption of feed, water, metabolic processes in tissues, skeletal muscle tone and milk productivity of cows. they do not always allow to use production areas effectively, to comply with sanitary and hygienic requirements for the maintenance of repair heifers and heifers, to apply modern methods of feeding and watering animals, waste removal and storage, to provide sanitary and hygienic requirements for milk.

Review of literature sources. According to M.V. Chorny [11], O.V. Kozenko and others. [5], O.S. Yaremchuk and others. [12], exercise is an important element of milk production technologies, animal health, and viable offspring.

According to M.V. Demchuk [2], the motor activity of cattle has a positive effect on the functioning of the cerebral cortex, which promotes the synthesis and release into the blood of hormones of the hypothalamus and pituitary gland. Their action enhances the functional activity of the endocrine glands, cardiovascular system, respiratory system, kidneys, liver, digestive tract. development and productivity of livestock, including heifers and first-born cows. Providing animals with active exercise promotes a protective barrier in the body to the action of adverse environmental factors, changes behavioral responses, relieves stress [7].

This measure promotes better formation of glandular epithelium in animals, proportional to the development of all parts of the udder. Udder massage in heifers is recommended for 1-3 months before calving by manual, mechanical and vacuum methods [4].

Therefore, active exercise, hardening, skin care and prevention of hooves are important elements of the guarantee health of repair heifers, heifers and first-born cows for their tethered maintenance.

Ethological research makes it possible to identify factors influencing animals and adjust the conditions of their maintenance and care, to develop measures to improve methods of rearing young animals and increase the efficiency of livestock production [10].

The behavior of cattle is assessed by observing the manifestation of the herd reflex, the reaction to the presence or absence of food, its quality and duration of consumption, choice of rest, duration of rest lying down and standing, the need for active movement, urination and defecation, body surface care , state of hunting, duration of lactation, reaction to the milking process.

The transition of animals from winter to summer keeping not only changes their natural resistance of their body, but also affects their behavior and productivity. At the same time, lactating cows spent less time eating and resting, and their average daily milk yield decreased by an average of 1.9 kg.

It is established that about 80% of stress in animals is associated with violations of feeding and housing conditions and only 20% are due to other factors [8].

Reducing the natural resistance of animals, violation of the conditions of their detention indoors leads to significant changes in metabolic processes, which is the beginning of a decrease in adaptability and immunological reactivity of the organism.

Thus, the behavior of animals, their response to various factors, including stress factors, largely depend on the conditions of keeping and feeding , compliance with production processes [1]. Therefore, control over the behavior and physiological condition and metabolic status of animals in different ways of keeping repair heifers and heifers can answer the question of establishing the best option for their maintenance on low-capacity dairy farms.

The purpose and objectives of the study. The purpose of the study is sanitary and hygienic assessment and improvement of breeding heifers and heifers based on studies of animal behavior and productivity using modular group cages.

The research program provided for the following tasks:

- to study the behavior of heifers in different ways of rest and milk productivity of first-born cows using modular group cages,
- to determine the clinical condition of heifers and first-born cows. and loose methods of detention in modular group cages.

Research methodology.

All experiments were performed on animals of the Ukrainian black-spotted dairy breed. Selection of animals into experimental groups was carried out on the principle of analogues, taking into account the breed, sex, age and live weight [6]. For the experiment, 40 heads of repair heifers with an average live weight of 380-400 kg were selected and divided into four experimental groups.

Animals were kept in modular group cages for 10 heads each. Heifers of the first group were kept in stalls tethered with grazing, the second - loosely on a deep litter (straw), the third - loosely-combi-boxing, the fourth - loosely with rest in the boxes. For this purpose, the developed modular-group cages were used, which were equipped with stalls when tethered, and with combiboxes or boxes when tethered.

Feed was distributed to repair heifers and heifers of experimental groups by a mobile feeder. Manure was removed from the room with a manure conveyor. The animals were watered with water using individual and group watering cans.

Feeding of animals of experimental groups was normalized, uniform according to the diet: corn silage - 20%, haylage (weeds) - 32%, hay of cereals and legumes - 24%, concentrated feed - 21%, premix - 2, 6% and table salt - 0.4%. The total

nutritional value of the diet ration was 10 feeds. from with a dry matter content of 12.7 kg, digestible protein - 1320 g, sugar - 538 g, starch - 946 g, calcium - 78 g, phosphorus - 36 g.

Heifer behavioral responses to resting places, animals lying down, lying down, animals getting up from rest, were investigated by observing the duration of a single element 20 numbers.

Animal behavior was monitored by the method [1, 3, 9] by measuring time for feed consumption, rest standing in a section or group cage, or lying in a stall, combi box, box or deep litter. The motor activity of the animals was also monitored during free-range keeping with rest in combi boxes, boxes or on deep litter, as well as on the walking area during tethered keeping. The duration of chewing was also determined in animals.

Research results. Studies have shown that the response of heifers to tethered boxing content to the size of the box structure is different.

With increasing boxing depth from 1.2 to 1.4; 1.6 and 1.8 m, this figure increased by 0.15, respectively; 0.69; 0.90 and 1.05 minutes, compared with the length of the structure 1.0 m (Table 1).

Table 1

Duration of behavioral reactions of rest of heifers at different sizes of boxing, min., M ± m; n = 32

Boxing depth, mm	Behavioral reactions of rest			
	place review	torso side choice	lying down	getting up
The first experiment				
1200	2,52 ± 0,01*	3,27 ± 0,04	1,42 ± 0,03	1,12 ± 0,02
1400	2,89 ± 0,02*	3,14 ± 0,04	1,18 ± 0,03	1,23 ± 0,02
1600	3,27 ± 0,04*	3,42 ± 0,05	1,15 ± 0,03	1,12 ± 0,03
1800	3,42 ± 0,01*	3,17 ± 0,04*	2,05 ± 0,02*	1,31 ± 0,03*
Second experiment				
1200	3,14 ± 0,02*	2,86 ± 0,04	1,16 ± 0,02	1,47 ± 0,03
1400	2,72 ± 0,03*	3,12 ± 0,04	1,11 ± 0,03	1,26 ± 0,03
1600	3,33 ± 0,05*	3,14 ± 0,05	1,05 ± 0,03	1,41 ± 0,04
1800	3,22 ± 0,02*	3,20 ± 0,04*	1,05 ± 0,04	1,82 ± 0,03
Third experiment				
1200	2,44 ± 0,02*	2,76 ± 0,03*	1,05 ± 0,03	0,72 ± 0,03*
1400	2,88 ± 0,02*	2,35 ± 0,02*	1,10 ± 0,03	0,82 ± 0,04*
1600	2,93 ± 0,03*	2,25 ± 0,02*	1,08 ± 0,03	0,83 ± 0,04*
1800	3,07 ± 0,04*	3,11 ± 0,03*	1,32 ± 0,03*	1,15 ± 0,04

*Note: * marked significant difference (p≤0.05) compared to the box size of 1000 mm. boxing.*

The animals' choice of torso side before lying down, getting up from rest and going to bed also depended on the depth of the box. As an exception, the size of the box was 1.8 m deep, for which heifers spent less time resting by 0.27 minutes. to choose the side of the torso before rest, but more than 0.17 minutes to get up and for 0.83 minutes lying down compared to the smallest size of the submitted structural element.

A similar pattern in the reaction of heifers to the size of the box was determined in a second experiment conducted on other animals.

It is established that the depth of the box affects the time of inspection of the resting place by heifers, this is due to its size. Moreover, with the increase in the size of the box increases the duration of this factor of animal behavior.

That is, the longer the structural element, the more time the animals need to inspect it. After the animals adapted to the specified size of the box, they spent almost the same amount of time choosing the side of the body before going to bed and getting up from rest. As in the first experiment, heifers at a box depth of 1.8 m spent different amounts of time not only to inspect the structure, but also to choose the position of the torso for rest and getting up from rest (see Table 1).

Time , which heifers spent on the above actions at a depth of boxing 1.8 m, compared with a size of 1.0 m, increased by 0.78, respectively; 0.24 and 0.59 minutes Differences in the time spent by animals on going to bed in the second experiment at different depths of the boxes were not found.

Because the first and second experiments performed on heifers in different years yielded opposite results in different cases regarding the dependence of animal behavior at different boxing depths, a third experiment was performed to determine the most optimal dimensions of this structural element for heifers at 24 months.

The third experiment showed that the time the animals spent inspecting the box increased slightly with increasing depth, except for 1.2 m, when this figure was lower compared to similar data for the size of the structure 1.0 m. The time to choose the side of the body by animals for rest at a depth of 1.2 m also increased by 0.18 minutes, and then with increasing size decreased by 0.19 and 0.29 minutes, respectively, compared to a depth of 1.0 m.

The most time for this element of animal behavior was spent at the depth of the box for rest 1.8 m. The period during which the heifers got up from rest, with increasing depth of the box from 1.0 to 1.6 m decreased, and at depths and 1.8 m returned to the value of the given indicator for the size of the box 1.0 m. Boxes with a depth of 1.8 m for resting heifers are less comfortable.

It was also important to study the reaction of heifers to the option of resting in different ways of keeping. From the table. 2 shows that heifers with different methods of restraint before resting lying down, spend a different amount of time inspecting the box, combo box or stall.

It was found that the most time heifers spend 7 months of pregnancy to inspect the box, which is 1.9 minutes. more than on the stall, for 0.8 minutes - to inspect the combibox and for 0.7 minutes, - to inspect the recreation area on deep bedding. This indicator is also associated with the time for heifers to rest. It was found that animals spent 2.0 times more time on this element of behavior in the leash-boxing method than in the leash, as well as 1.5 and 1.3 times, respectively, with rest in combi boxes and deep litter.

The duration of rest of animals is one of the main indicators in choosing the most optimal in terms of comfort for heifers way of keeping. It turned out that the longest rest lying in heifers for free-boxing in a modular group cage. This figure is slightly lower for loose and combi-box heifers, in deep bedding and in stalls. The

time for the heifers to get up with different methods of keeping and rest turned out to be almost the same. With such methods of free-range keeping, animals do not develop a state of anxiety, and their behavior corresponds to the physiological status of the organism.

Table 2

Duration of behavioral reactions of rest of heifers at different ways of keeping in modular-group cages, min., M ± m; n = 16

Behavioral reaction	Place of rest			
	in stalls	modular group cell		
		on deep litter	in combi boxes	in boxes
Heifers up to 7 months of gestation				
Place overview	1,4±0,52	2,1±0,63	2,2±0,52	3,3±0,52
Lying down	0,6±0,21	0,7±0,27	0,9±0,22	1,2±0,31
Lying down	27,8±4,32	31,7±5,24	32,4±5,32	35,4±5,41
Getting up	1,3±0,26	1,2±0,37	1,7±0,29	1,6±0,27
Heifers from 7 to 9 months of gestation				
Place overview	1,0±0,32	1,1±0,23	1,6±0,32	2,5±0,42
Lying down	0,6±0,21	0,5±0,17	0,8±0,18	1,1±0,14
Lying down	30,2±5,23	30,6±4,42	29,4±5,31	37,4±5,44
Getting up	1,3±0,24	1,2±0,37	1,9±0,29	2,0±0,38

This conclusion is confirmed by studies of the behavior of heifers 7-9 months of gestation in different ways of keeping.It was shown that the animals spent more time inspecting the place of rest, going to bed and getting up from rest, and especially for a one-time rest lying on a leash-boxing content, compared with rest in combi boxes, deep litter or stalls (see Table 2).

Thus, despite the physiological condition of heifers, namely the gestation period of 7-9 months, the most comfortable for them was loose housing with rest in the boxes.

One of the objectives of the study was to monitor behavior first-born cows during rest, obtained from heifers by different methods of keeping in the first days of lactation. Thus, first-born cows, which were kept in a group of heifers loosely-boxed, spent more time inspecting the place of rest, going to bed and getting up from rest, as well as lying down, compared to first-born cows obtained from heifers with tethered keeping. Similar in nature, the results were obtained on the first-born cows from heifers for free-range combi-boxing (Table 3).

Comparing the data obtained from the first-born cows from heifers in the tethered-combi-box method with similar results in animals in tethered housing, it should be noted that the former outweighed the latter in terms of time spent on inspecting the resting place by 0.7 minutes, Getting up from rest - for 0.6 min. and almost did not differ in terms of duration of rest.

First-born cows with long-term free-range keeping of heifers in deep litter, compared with similar data in animals with tethered animals, such as resting place inspection, bed rest time and getting up from rest, duration of rest lying down,

essential difference is not established (see tab. 3).

Table 3

Duration of behavioral reactions of rest of first-born cows with different ways of keeping heifers in modular group cages, min., M ± m; n = 16

Behavioral reaction	Place of rest			
	in stalls	modular group cell		
		on deep litter	on deep litter	on deep litter
Place overview	0,5±0,12	0,8±0,44	1,5±0,65	1,6±0,42
Lying down	0,6±0,16	0,7±0,26	1,4±0,18*	1,3±0,21*
Lying down	29,4±4,42	30,9±6,43	27,7±4,14	32,6±2,41
Getting up	0,7±0,21	0,8±0,19	1,4±0,14*	1,4±0,15*

*Note: * marked significant difference (p≤0.05), compared with rest in stalls.*

Thus, the comfort indicators of first-born cows are closely related to the way heifers are kept, which is probably due to the emergence of animals that have long been in modular group cages and rested in boxes, as well as methods of feeding and watering, a number of conditioned reflexes.

The above differences in some elements of the behavior of heifers in different variants of their rest, probably due to more comfortable conditions that were created for animals through the use of straw litter (Table 4).

Table 4

Duration of behavioral reactions of heifers at the untied way of the maintenance in a modular group cage, min., M ± m; n = 10

Method of holding	Behavioral reactions				
	consume food	chew gum	stand	move	lie
Loose on deep bedding	74,2± 0,59	48,5± 0,73	27,8± 0,69	314,8± 1,67	374,7± 1,84
Loose-boxing	78,7± 0,91*	47,6± 0,85	31,7± 0,67*	322,6± 2,05	259,4± 1,73*
Difference, min.	4,5	0,9	3,9	7,8	15,3
%	6,1	2,0	14,0	2,5	4,1

*Note: * the difference is significant (p≤0.05), compared with the indicators for free-range keeping of animals in deep litter.*

With loose housing in the deep litter, heifers spent the most time (14.6%) on rest lying down and (37.5%) on active movement and much less on eating food, chewing gum and standing rest.

With unleashed-boxing method of keeping in a modular group cage, the number of feed consumption by heifers per day was 3 times less, and water 1 time. They rest several times a day standing and chewing food, but rest standing and lying down and get up from rest lying down the same number of times (Table 5).

The detected changes in the frequency of individual behavioral reactions of heifers in loose housing with rest on the litter or in the boxes, probably due to the microclimate of the livestock, which was confirmed by further studies.

On the benefits of loose housing. heifers in different periods of pregnancy, compared with the tethered, also show the results of studies of some actions of their behavior, which are given in table. 6.

Yes, heifers 5-7 months of gestation with loose restraint in deep litter for more than 370 minutes. time was spent on active movement and 20 minutes. - to rest lying down, but for 30 minutes. less - for feed consumption, for 90 minutes. - for chewing gum and for 270 minutes.

Table 5

Frequency of manifestation of separate behavioral reactions of heifers at different ways of keeping in a modular-group cage, times a day, M ± m, n = 10

Indicator	Regulatory values	Content in a modular group cell	
		loose on deep bedding	loose and boxed
Food intake	8-12	10±0,59	7±1,12*
Water consumption	4-10	8±0,95	7±1,12
Chewing gum	14-20	7±1,12	8±0,96
Standing rest	8-15	9±0,85	11±0,65
Lying down and getting up	7-20	18±3,05	16±2,18

*Note: * a significant difference (p≤0.05), compared with the indicators of the loose method of keeping animals in deep litter.*

Yes, heifers in the tethered-combi-box method, compared to tethered restraint, moved much more, but spent less time feeding, resting standing and lying down and chewing feed.

It was found that, compared to the leash, heifers 5-7 months of gestation more than 200 minutes. time was spent on physical activity and less on food consumption, and on rest standing or lying down and chewing gum, respectively, 60; 40, 50 and 50 minutes

Thus, loose attachment of heifers 5-7 months of gestation, compared to tethered, has significant advantages because it promotes better motor activity of animals, which from a physiological point of view has a positive effect on fetal development. It also turned out to be natural that animals with loose housing spent much more time (25.7-28.5%) on active movement and much less on rest standing (12.5-13.9%) and lying down (30.6 -31.3%). for consumption and chewing of food, but more time they had a rest standing. Control over the duration of individual behavioral elements of heifers 8-9 months of gestation with loose restraint in deep litter showed that the motor activity of animals was 2.1% higher, and resting lying down - 6.3% more than with tethered housing. (see Table 6).

Untied-boxing of heifers for 8-9 months of gestation, compared to tethered, was also more comfortable, as indicated by an increase of 100 minutes. time that the animals spent on active movement, for 10 minutes for feed consumption and its reduction, for 20 minutes. on chewing gum, for 10 minutes. to rest standing and for 80 minutes.

Analysis of the duration of individual behavioral reactions of heifers 8-9 months of gestation showed that most of the time the animals spent in loose bedding, with rest in combi boxes and boxes spent on lying down and standing (about 50%), less on

movement and chewing gum (about 16-19%) and even less on feed consumption (11.1-12.5%).

Table 6

Duration of separate behavioral reactions of heifers at different ways of maintenance in modular group cages and the period of pregnancy, M ± m; n = 10

Method of retention	Behavioral reaction									
	move		eat		chew gum		Rest			
							standing		lying down	
	min.	%	min.	%	min.	%	min.	%	min.	%
Pregnancy 5-7 months										
Leashed with a walk	210± 0,63	14,6	180± 2,28	12,5	310± 5,35	21,5	240± 3,71	16,7	500± 4,38	34,7
Loose on a deep litter	390± 4,14*	27,1	150± 4,24	10,4	260± 16,03	18,0	180± 3,98	12,5	460± 7,10	32,0
Loose-combi-box	400± 2,40*	27,8	130± 4,55	9,0	260± 4,76	18,1	210± 4,94	14,6	440± 27,18	30,6
Loose-boxed	390± 2,87*	27,1	140± 1,89	9,7	270± 5,78	18,7	190± 4,54	13,2	450± 6,39	31,3
Pregnancy 8-9 months										
Leashed with a walk	170± 14,44	11,8	170± 3,94	11,8	290± 10,09	20,1	260± 8,41	18,1	550± 18,28	38,2
Loose on a deep litter	260± 38,84	18,1	160± 4,64	11,1	240± 9,03	16,7	200± 7,91	13,9	580± 21,51	40,3
Loose-combi-box	280± 42,39*	19,4	160± 10,71	11,1	280± 7,94	19,4	270± 21,33	18,8	450± 7,04	31,3
Loose-boxed	270± 49,32	18,8	180± 21,24	12,5	290± 4,57	20,1	230± 18,13	16,0	470± 8,56	32,6

*Note: * the difference is significant (p≤0.05), compared to the indicators for the tethered method of keeping animals.*

Thus, the most optimal in terms of both ethological and physiological indicators was the loose method of keeping heifers with rest in the boxes. Other variants of the free-range method of keeping heifers, namely in deep litter and with rest in combiboxes, are inferior in some elements of behavior to the above.

Despite some discrepancies, the latter did not affect the physiological parameters of animals. Thus, the pulse, respiration rate and body temperature of heifers in the first, second, third and fourth periods of research in different methods of loose restraint did not differ from the tethered in stalls with walking (Table 7).

All of the above indicators of the clinical condition of animals in the study groups were within the physiological norm.

Previous research has shown that the most promising way to keep heifers is a loose way to rest in boxes. This is evidenced by 11.1% more time that heifers spent on active movement in the tethered boxing method, compared to tethered content

(Table 8).

Table 7

Physiological parameters of heifers in different ways of keeping in modular group cages, M ± m; n = 10

Method of retention	Research periods			
	first	second	third	fourth
Pulse, beats / min.				
Leashed with a walk	66,8±1,2	66,8±0,9	66,7±0,9	66,8±0,8
Loose on a deep litter	66,7±1,3	66,4±1,1	66,8±1,0	68,1±1,3
Loose-combi-box	66,9±1,8	69,2±0,7	68,9±0,8	69,2±1,2
Loose-boxed	66,8±1,5	67,4±0,9	67,2±1,2	66,8±1,4
Respiration rate, times / min.				
Leashed with a walk	18,9±0,3	18,8±0,7	18,9±0,5	18,9±0,7
Loose on a deep litter	18,9±1,3	20,3±0,8	19,8±1,0	18,6±0,8
Loose-combi-box	19,1±0,2	19,2±0,7	19,0±1,1	19,8±1,2
Loose-boxed	18,6±0,7	18,8±0,6	19,1±0,4	19,3±0,5
Body temperature, °C				
Leashed with a walk	38,2±0,1	38,5±0,1	38,1±0,2	38,4±0,1
Loose on a deep litter	38,6±0,2	38,7±0,2	37,9±0,8	38,4±0,2
Loose-combi-box	38,5±0,2	38,7±0,3	38,6±0,4	38,6±0,4
Loose-boxed	38,4±0,1	38,2±0,2	38,4±0,1	38,1±0,2

Table 8

Behavioral reactions of heifers with tethered and untied methods of keeping in modular group cells, M ± m, n = 10

Method of retention	Behavioral reaction									
	move		eat		chew gum		Rest			
							standing		lying down	
	min.	%	min.	%	min.	%	min.	%	min.	%
Leashed with a walk	210± 1,46	14,6	180± 3,20	12,5	310± 6,96	21,5	240± 5,37	16,7	500± 4,66	34,7
Loose on a deep litter	410± 2,70*	28,5	120± 2,51*	8,3	260± 6,58*	18,0	207± 5,95*	14,4	443± 6,27*	30,8
Loose-combi-box	400± 6,31*	27,8	130± 5,16*	9,0	260± 5,34*	18,1	210± 6,34*	14,6	440± 14,5*	30,6
Loose-boxed	370± 5,17*	25,7	150± 3,97*	10,4	220± 17,1*	15,2	180± 3,89*	12,5	520± 7,26*	36,2

*Note. * marked significant difference (p≤0.05), compared with the indicators of the tethered method of keeping animals.*

According to the tethered-boxing method of keeping in a modular-group cage, in comparison with the tethered one, the calving lasted less than 30 minutes. spend time on food consumption, for 90 minutes, or 6.3% for chewing gum, rest more lying down than standing.

Untied-combi-boxing and keeping in deep litter, compared to tethered, also proved to be more promising in terms of keeping heifers.

Motor activity of heifers in loose bedding and loose-combi-boxing in modular group cages, compared to tethered housing, was 2.0 and 1.9 times higher. Heifers in these study groups spent less time on food intake and lying down, while chewing and resting in the same way as animals in tethered housing.

Uncomfortable keeping in deep litter and loose-combi-boxing, as well as tethered method in stalls, were less comfortable for animals.

In different ways of keeping heifers, the pulse rate, respiratory movements and body temperature of animals did not differ and corresponded to the physiological norm characteristic of this age group of cattle (Table 9).

Table 9

Clinical parameters of heifers by different methods of maintenance in modular group cells, M ± m; n = 10

Method of retention	Indexes		
	pulse, beats / min.	respiratory rate, times / min.	body temperature, ºC
Leashed with a walk	67,0±1,00	19,0±1,00	38,4±0,10
Loose on a deep litter	67,0±1,00	19,0±1,00	38,1±0,20
Loose-combi-box	69,0±1,00	20,0±1,00	38,6±0,40
Loose-boxed	68,0±1,00	19,0±1,00	38,4±0,20

Calving of heifers in tethered and different variants of tethered methods took place without complications, and the live weight of newborn calves ranged from 29 to 36 kg. All animals had an active sucking reflex, were lively and consumed from 0.7 to 1.0 kg of colostrum and milk per feeding.

The use of the loose and combi-box method for keeping heifers during double milking, compared to the tied one, slightly improved the average daily milk yield of first-born cows (Table 10).

Table 10

The average daily milk yield of first-born cows with different methods of keeping heifers in modular group cages (double milking), kg, M ± m; n = 10

Method of keeping heifers	Lactation days			
	first	second	third	fourth
Tied to walk	8,6±0,65	8,8±0,54	8,9±0,59	9,2±0,46
Tied to deep litter	7,1±0,83	6,9±0,81*	7,4±0,82	7,4±0,71*
Tied-combi-box	9,3±0,71*	9,7±0,72	9,6±0,64*	10,2±0,37*
Tied-boxed	10,3±0,85*	10,5±0,79*	11,1±0,61*	11,4±0,45*

*Note: * a significant difference (p≤0.05), compared with the indicators of the tethered method of keeping animals.*

Thus, on the first day, the average daily yield of colostrum of first-born cows during double milking and this method of keeping was higher, compared to keeping on deep litter, by 2.2 kg, on the third - by 2.2 and on the fourth - by 2.8 kg.

The highest average daily hopes of colostrum and milk of first-born cows turned out to be untethered-boxing of heifers in a modular-group cage, compared to tethered. Its value on the first day of the study was higher by 1.7 kg, on the second - by 1.7, on the third - by 2.2 and on the fourth - by 2.2 kg (see Table 10).

The obtained data indicate the influence of the method of keeping heifers on the future milk productivity of first-born cows, in particular on the average daily milk yield in the first days of lactation, which is also confirmed by studies and triple milking of animals (Table 11). milk of first-born cows with their previous free-range keeping as heifers in deep litter was slightly lower than with keeping in stalls on the first day after calving by 2.0 kg, on the third - by 2.6 and on the fourth - by 2.1 kg .

At the same time, the average daily milk yield of first-born cows after calving by heifers for loose and combi-box maintenance was higher than similar in animals with loose housing in deep litter on the first day of lactation 1.30 times, on the second - 1.27 times , on the third - in 1,26 and on the fourth - in 1,26 times.

Table 11

The average daily milk yield of first-born cows with different methods of keeping heifers in modular group cages (triple milking), kg, M ± m; n = 10

Method of keeping heifers	Lactation days			
	first	first	first	first
Tied to walk	10,8±0,67	10,8±0,61	11,9±0,75	11,6±0,68
Tied to deep litter	8,8±0,74*	9,1±0,73	9,3±0,95*	9,5±0,86*
Tied-combi-box	11,4±0,71**	11,5±0,67**	11,7±0,73**	11,9±0,64**
Tied-boxed	11,8±0,76**	11,6±0,85**	12,0±0,82**	12,5±0,45**

*Note: * significant difference (p≤0.05), compared with indicators for tethered animals.*
*** compared with indicators for tethered keeping in deep litter.*

The best for the future milk productivity of first-born cows, as well as for double milking, was the loose-box method of keeping heifers in a modular group cage, and for three-time milking.

In the first-born cows from heifers with loose and boxing content, compared with similar indicators in animals on deep litter, the average daily milk yield on the first day after calving was higher by 3.0 kg, on the second - by 2.5, on the third - by 2.7 and by the fourth - by 3.0 kg (see Table 11).

Thus, studies have confirmed the influence of the method of keeping heifers on the future milk productivity of first-born cows, and the most appropriate is free-range and boxing of animals. grazing, which, like heifers, were also kept on a leash, compared to animals on a loose bedding, spent less than 100 minutes. time for active movement on the playground and more for rest lying in the stall, while for food consumption, chewing gum and rest standing the same (Table 12).

The first-born cows, which were kept in a group of heifers in a group of heifers before calving, for more than 110 minutes. time was also spent on active movement, less than 100 minutes. to rest lying down and almost equally on the chewing gum,

compared to the first-born cows, which were kept on a leash as heifers.

Table 12

Behavioral reactions of first-born cows with tethered and untied methods of keeping heifers in modular group cages, M ± m, n = 10

The method of keeping heifers	Duration of behavioral reactions									
	move		consume food		chew gum		Rest			
							standing		lying down	
	min.	%	min.	%	min.	%	min.	%	min.	%
Tied to walk	170± 14,43	11,8	170± 3,94	11,8	290± 10,08	20,1	260± 8,41	18,1	550± 18,28	38,2
Tied to deep litter	270± 49,32	18,8	180± 21,24	12,5	270± 4,57	18,8	250± 18,13	17,4	470± 8,56*	32,6
Tied-combi-box	280± 42,39*	19,4	160± 4,64	11,1	280± 7,94	19,4	270± 21,33	18,8	450± 7,04*	31,3
Tied-boxed	260± 38,84*	18,1	160± 10,71	11,1	260± 9,03*	18,1	200± 7,91*	13,9	560± 21,51	38,8

*Note: * significant difference (p≤0.05), compared to the indicators of the tethered method of keeping animals.*

Thus, the untethered keeping of heifers in modular group cages on deep litter and the untethered-combi-box method only slightly change the behavior of the first-born cows obtained from them, compared with analogues transferred to the group of cows, which were previously kept as heifers in stalls. .

The behavior of the first-born cows, which were obtained from heifers kept unrestrained with rest in the boxes, turned out to be the most optimal. Animals of this group spent more than 40.3% of their time on rest lying down, less - on rest standing, which had a positive effect on the average daily milk yield.

Therefore, on the basis of the conducted researches it is possible to draw a conclusion that the way of keeping heifers considerably influences behavior of the first-born cows received from them.

Conclusions.

The positive effect of ensuring compliance with regulatory sanitary and hygienic conditions of the indoor air and methods of keeping livestock on the behavior of young animals, which is reflected in the following:

1. Heifers with loose restraints, compared with tethered spent more 1.8-1.9 times more time on active movement, less 1.2-1.5 times - on feed consumption, 1.2-1 , 4 - for chewing gum, 1.1-1.3 times - for standing rest, which indicates the comfort of rest and efficiency of the modular group cage, as well as more complete assimilation of food due to more intensive metabolism, which depends on the motor activity of animals .

2. It is established that the behavior of heifers at different sizes of the box for animal rest mostly depends on the depth of the structure, less - on its length and width. The most optimal boxing depth for heifers is 1.2-1.6 m. Boxing with a depth of 1.8 m is less comfortable for them.

3. Heifers in the tethered-boxed method compared to keeping in deep bedding, more often rested standing, fewer times consumed food, but did not differ in the number of times consumed water, chewing gum, lying down and getting up from rest. Compared to tethered restraint, the tethered-boxing method increases the motor activity of animals by an average of 7-14%, and does not affect chewing food, standing and lying down.

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