

ASSESSMENT OF THE EXTERIOR OF FIRST-CALF HEIFERS OF HOLSTEIN BREED

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Abstract

These are the results of studies on the assessment of the exterior of first-calf heifers of Holstein breed under the conditions of the Republic of Moldova. The aim of the presented scientific paper is the study of exterior features and morphological and functional indicators of the udder of Holstein breed in the herd of Holstein cattle of the breed of LLC "DokSanCom", v. Tomay, ATU Gagauzia. Exterior features were studied at 91 of first-calf heifers. As a result of the research, it was established that the first-calf heifers of Holstein breed were well-defined type of dairy cattle, which is confirmed by their proportional body shape, the development of the middle part of the trunk, and strong bone structure. The first-calf heifers in the herd of SLL "DokSanCom" were quite tall – 139.1 cm height at the withers and 146.6 cm – in the sacrum. The slanting length of the trunk is 198 cm on average. The prolidity index was 117.0%, which is by 2.5% less than compared to the standard for breeds of dairy direction of productivity. A compact physique with a consistency index of 122.1% characterizes the estimated first-calf heifers. Measurements of the udder along the girth, length and width were on the average 137.1; 45.9 and 32.6 cm respectively.

Key words: *Holstein breed, the first-calf heifers, exterior, body indexes, udder.*

INTRODUCTION

Exterior assessment of animals, in spite of its subjectivity and conventionality, occupies an important place in dairy cattle breeding (Servakh et al., 2008; Basonov et al., 2010). Kudryashov (1950) notes that the evaluation of the exterior is necessary for judging the strength of the animal's constitution and the conformity of this body to the conditions in which the animal exists and the productivity for which it is bred. He points out that such an assessment is necessary for proper selection and selection of animals in order to prevent a gap between their health and productivity. Currently, the best specialized dairy breed in the world is Holstein, which, together with high milk productivity, is characterized by excellent qualities of the exterior. Holsteins have the highest genetic potential for milk productivity, a strong constitution and an excellent form of the udder (Prokhorenko, 2013). Since the exterior is closely related to dairy productivity,

when selecting animals by the exterior, take place an indirect selection of them and by productivity (De Jong Gerben, 2014; Abylkasimov et al., 2011; Prakhov et al., 2010; Lyashenko, 2003; Novikov et al., 2011).

The shape and morphological properties of the udder are one of the important exteriors of high milk yield and cows' technological ability, (Kotenji et al., 1996; VonKeyserlingk and Weary, 2012).

The purpose of the work- to study the exterior features, morphological and functional parameters of the udder of the first-calf heifers of the Holstein breed in the herd LLC "DokSanCom".

MATERIALS AND METHODS

The material for research were the first-calf heifers of Holstein breed of Dutch breeding (n=91) in the herd Limited Liability Company (LLC) "DokSanCom", v. Tomay, Administrative and Territorial Unit (ATU)

Gagauzia. For evaluating the exterior indicators, the sampling technique was used, since it is the most objective. The exterior of the researched animals was studied by the development of the main physique state: height at withers, height at the sacrum, chest depth, chest width behind the shoulder blades, width of the croup, width of the hip joints, slanting body length, girth of the chest behind the shoulder blades, girth of the pastern.

Measurements were taken by measuring instruments for 2–3 months after calving (Basovskii, 1983; Belozertsova, 2011). On the base of measurements, the body build indices were calculated: long-legged, prolixity, pelvic thoracic, thoracic, consistency, outgrown, osseous according to the standard method (Kostomakhin et al., 2007). Important indicators that characterize the quality of the udder are its shape and size. They are determined by its girth and the relationship of length, width and depth. Morphological assessment of the udder was carried out for 2-3 months of lactation for 0.5 – 1.0 hours before milking by the method (Garkavoy, 1974).

Udder capacity is a very important breeding attribute, especially in transfer of cows to double milking. The difference in milk yield with three and double milking depends on the capacity of the udder. At cows with a well-developed udder, the difference is only 2-3% and has no practical value. At cows with a small udder capacity, transfer of cows to double milking reduces the yield by 8-10%.

Important indicators that characterize the quality of the udder are its shape and size. They are determined by its girth and ratios of length, width and depth. On the basis of the taken measurements, an assessment of udder was performed in accordance with the requirements (Table 1).

Table 1. Requirements for assessment of udder of heifers

Measurements, cm	Points			
	5	4	3	2
Udder width	29 and >	25-28	21-24	16-20
Udder Length	32 and >	29-32	25-28	21-24
Udder Girth	110 and >	95-109	80-94	65-79
Front Quarter Depth	27 and >	23-26	19-22	16-18
The length of the front nipples	6-8	6-8	4-5	4 and < 5 and >
The diameter of the front nipples	2.2-2.6	2.7-3.0	3.1-3.5	3.6-4.0 1.7-2.1

The obtained results of scientific research were processed using variation statistics methods (Merkurev and Shangin-Berezovsky, 1983; Plohinsky, 1969) using the Excel program, the reliability of the indicators was estimated by Student.

RESULTS AND DISCUSSIONS

The analysis of the physique measurements of the first-calf heifers of Holstein breed in the herd of LLC "DokSanCom" showed that they have a well-defined type of dairy cattle, which is confirmed by their proportional body shape, mid-body development, strong bone (Table 2).

Table 2. Measurements of the body of the first-calf heifers

Measurements	M± m, cm	Cv, %
Height at withers	139.1±0.25	1.72
Height at the croup	146.6±0.25	2.78
The depth of the thorax	68.9±0.43	4.8
The width of the thorax	42.2±0.16	3.65
The width of the croup	51.5±0.1	1.94
The width of the croup at Ischia	32.6±0.17	5.01
Length of the body	162.8±0.32	1.88
The thorax perimeter	198.8±0.85	4.08
The whistle perimeter	20.4±0.09	4.22

Thus, the first-calf heifers in the herd of LLC "DokSanCom" were tall enough – 139.1 cm in height at the withers and 146.6 cm in the sacrum. They have a well-developed depth of the thorax - 68.9 cm, width – 42.2 cm, girth – 198.8 cm, and the width of the croup – 51.5 cm, respectively. The thorax perimeter of the first-calf heifers of the herd is 198.8 cm.

It should be noted that the use of physique indexes allows us to obtain the relative numerical values that characterize the exterior type of dairy cattle in the relative harmony of all physique articles.

The indexes of the constitution of the first-calf heifers of Holstein breed of the animals under study are presented in Table 3.

The received high index of long-legged at animals of Holstein breed of the herd LLC "DokSanCom" averaged 50.5%, which characterizes the good development of the organism in the postnatal ontogenesis of animals.

Table 3. Indexes of the constitution of the first-calf heifers (%)

Index	Values	The breed standard of various productivity directions		
		dairy	meat	dairy - meat
Long-legged	50.5	45.2	42.2	48.2
Prolixity	117.0	120	122	118.4
Pelvic-thoracic	81.9	80.2	83.5	85.5
Thoracic	61.2	61.8	79.6	68.8
Consistency	122.1	118	132.5	121.3
Overgrowth	105.4	100.9	103.2	102.5
Osseous	14.7	14.6	13.9	15.4

The lower level of the proluxity index or format is inherent to dairy cattle with the best quality characteristic of the exterior type. As evidenced by the values of the indicators of our research, at the first-calf heifers of the Holstein breed of the herd of LLC "DokSanCom" the index of lengthiness is correspondingly 117.0%, which is by 8.6% less in comparison with the standard for dairy breeds, which characterizes them by their good quality of the exterior.

The chest index averaged 61.2%, which is by 0.9% lower than the standard for dairy breeds, and speaks of the "narrow-chest" of the estimated heifers. On the overall development of the body and body weight it can be judged by the index of consistency or compactness. It should be noted that the estimated heifers of Holstein breed characterizes a compact physique with an index of consistency of 122.1%, which is characteristic to them in the studied period of development.

The ratio of height in the sacrum to the height at the withers is characterized by an index of overgrowth, which is a good indicator of growth and development of the organism in the postembryonic period. The average index of our studies on this index was 105.4%, which indicates a good development of the physique of the animals of the analyzed herd (Kibkalo et al., 2015).

The index of osseous was at the level of the standard for breeds of dairy direction of productivity (14.7%), while the proportions of the physique of the animals of the analyzed breed are preserved.

Thus, the results of visual and index assessment showed that the heifers of Holstein breed in the herd of LLC "DokSanCom" had a pronounced milky body type (Adushinov et al., 2011; Shatalov et al., 2013). They are characterized

by a good form of build and strong constitution, on which the level of milk productivity, health status and duration of productive operation largely depends.

The shape and morphological properties of the udder is one of the important exterior features, since the positive relationship between milk production and the size of the udder allows for effective selection aimed at increasing milk production.

The parameters of the measurements, which are shown in Figures 1-3, characterize the development of the morphological features of the udder at the assessed the first-calf heifers.

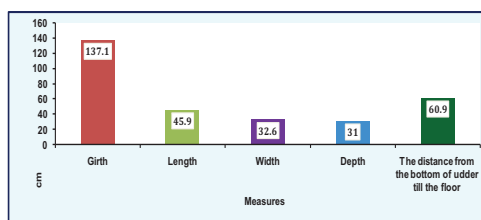


Figure 1. The size of the udder of the first-calf heifers

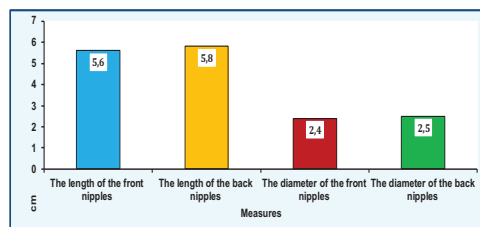


Figure 2. The size of nipples

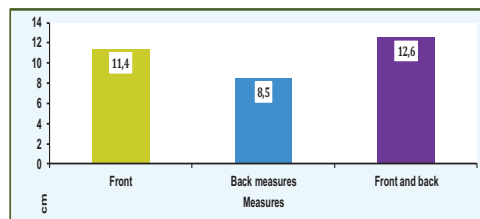


Figure 3. Distance between nipples

It follows from the figures that the measurements of the girth, length and width of the udder at the first-calf heifers averaged 137.1 ± 0.61 cm, 45.9 ± 0.33 cm and 32.6 ± 0.22 cm, respectively which is characteristic to animals of Holstein breed.

Evaluation of the morphological properties of the udder of the estimated the first-calf heifers are given in Table 4.

From the materials of Table 4 it follows that the estimated animals had the desired shape of the udder - bath-shaped. Evaluation by udder

measurements - girth, length, width and depth had five points - the maximum score. The size of the nipples - the length and diameter of the front nipples, their assessment had 4 and 5 points respectively.

Table 4. The expressiveness of morphological signs of udder of the first-calf heifers

Signs	Indicators		Points
	M±m (cm)	Cv	
<i>Udder size, measurement:</i>			
Girth	137.14±0.61	4.24	5
Length	45.9±0.33	6.92	5
Width	32.6±0.22	6.42	5
Depth	31.0±0.18	5.5	5
Distance from the bottom of the udder to the ground	60.9±0.21	3.23	-
<i>The size of the nipples:</i>			
The length of the front nipples	5.6±0.06	10.25	4
The length of back nipples	5.8±0.05	9.36	5
Diameter of the front nipples	2.42±0.01	4.13	5
Diameter of back nipples	2.5±0.01	4.07	5
<i>Distance between nipples:</i>			
Front	11.4±0.18	15.3	-
Back	8.5±0.15	17.47	-
Front and back	12.6±0.19	14.29	-
<i>Udder Form:</i>			
Bath-shaped - 100%			

The location, length and diameter of the nipples of the heifers corresponded to the standard arrangement, convenient for milking at high-performance milking installations.

The distance from the bottom of the udder to the floor averaged 60.9 ± 0.21 cm, which indicates a large depth of the udder at these animals. It is considered that the distance from the bottom of the udder to the floor should be 45-50 cm, since a too hanging udder interferes with the free movement of the cow.

All the estimated the first-calf heifers of the Holstein breed had the desired bath-like shape of the udder, the development of the udder quarters is symmetrical, uniform, the attachment to the trunk is dense, the udder's bottom is horizontal, and the shape of the nipples is cylindrical (Lyashenko, 2013.)

Thus, the udder of the Holsteins breeds is bulky, with developed lobes, mostly densely attached. Organoleptic, the outer structure of the udder of these animals differs by more extensive length of the belly and with a sufficient depth.



Figure 4. Herd of cattle of a Dairy Farm LLC „DokSanCom”

For further breeding in the breeding kernel of the herd of LLC "DokSanCom" 79 of the evaluated the first-calf heifers were selected.

CONCLUSIONS

At the estimated Holstein breed heifers, the chest depth is well developed - 68.9 cm, width - 42.2 cm, girth - 198.8 cm, and the width of the croup - 51.5 cm, respectively.

At the first-calf heifers of Holstein breed, the stretch index is respectively 117.0%, which is by 8.6% less compared with the standard for dairy breeds productivity.

The measurements of the girth, length and width of the udder averaged 137.1 ± 0.61 , 45.9 ± 0.33 and 32.6 ± 0.22 cm, respectively, which is characteristic to Holstein animals.

The location, length and diameter of the nipples at the first-calf heifers corresponded to a standard arrangement convenient for milking on high-performed milking machines.

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