

Conference Paper

Features Exterior of Cattle of Breed Limousian in the Period of Their Acclimation in the Conditions of the Northern Trans-Ural

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Abstract

The paper presents a characteristic of the exterior features of the specialized limousin meat breed bred in the conditions of the Tyumen region. Studies were conducted on first-calf cows of different generations of animals. At the same time, the introduced animals belong to the zero generation, their descendants to the 1st generation, and the grandchildren belong to the 2nd genetic-ecological generation. In the process of research, it was that the acclimatization process left its mark on the manifestation of the main breeding and productive qualities of the studied livestock generations. One of the manifestations of which was a certain grinding of cows of the first generation. The obtained results of the exterior assessment of cows of different generations showed that the best exterior development was observed in cows of the second and zero generation. So, in cows of the first and second generations there was a decrease in measurements of the chest, estimated by the chest index by 1.1–3.1 % ($P > 0.999$), with an increase in the proportions characterizing the development of meat qualities of animals by 6.2–6.6 % ($P > 0.999$). Adaptation to new conditions confirms the development of such indices as the typical physique and severity of type, which, when changing generations, had an increase dynamic.

Keywords: Beef cattle, breed limousine, exterior, body measurements, generations of animals.

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1. Introduction

Every year, many cattle are imported into Russia from abroad, while the problem of adaptation and acclimatization of imported animals to new environmental, climatic and economic conditions is of particular relevance [1–3].

Until recently, beef cattle breeding was aimed at the use of precocious, compact animals raised on high-energy diets with a high proportion of concentrated feed. But at present, the production requirements in relation to the economically useful qualities of

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beef cattle have changed towards large animals that are able to add live weight for a long time due to the intensive growth of muscle tissue with low fat deposition [4, 5].

Limousine animal breeds, which differ in rather high productive qualities with good acclimatization abilities [6], are more likely to meet these requirements.

2. Methods and Equipment

In our studies, we analyzed changes in the exterior features of limousin cattle in the process of their acclimatization in the context of several generations (three genetic and environmental generations). Moreover, imported animals belong to the zero generation, their descendants to the 1st generation, and grandchildren belong to the 2nd genetic-ecological generation [7].

3. Results

Assessment of the exterior features of animals was studied based on taking measurements from the corresponding articles of the exterior according to generally accepted methods. Measurements of measurements were made during the scoring of livestock in cows after the first calving at the age of 3 years (table 1).

TABLE 1: Body measurements of cows of the first lactation of the Limousin breed ($\bar{X} \pm S\bar{x}$), cm.

Survey	Genetic and ecological generation		
	zero	first	second
Number of animals, head	138	189	45
Height at the withers	127,1 ± 0,41	124,8 ± 0,37***	125,2 ± 0,85*
Sacral height	133,3 ± 0,40	131,7 ± 0,39**	132,4 ± 1,25
Chest depth	63,3 ± 0,38	62,3 ± 0,32*	63,1 ± 0,81
Chest width	41,6 ± 0,36	39,6 ± 0,31***	40,8 ± 0,90
Macloc width	46,5 ± 0,29	45,7 ± 0,36	47,1 ± 0,98
Width in ischial tubercles	34,8 ± 0,17	34,6 ± 0,17	35,8 ± 0,46*
Oblique body length	148,3 ± 0,80	147,6 ± 0,68	148,5 ± 1,57
Oblique back length	48,1 ± 0,28	46,9 ± 0,25**	49,5 ± 0,55*
Chest circumference	194,8 ± 0,78	191,6 ± 0,66**	192,5 ± 1,99
Back half-girth	115,3 ± 0,33	118,7 ± 0,48***	121,3 ± 0,41***
Skin thickness	0,59 ± 0,01	0,62 ± 0,01*	0,68 ± 0,01***

Note: hereinafter, where * $P > 0.95$; ** $P > 0.99$; *** $P > 0.999$ in comparison to cows of zero G.E.

Exterior performance in cows after the first calving, in the context of several generations, shows the wave-like dynamics of changes in the general proportions of the physique during generational change. This was manifested in a certain decrease in altitude, latitude, and chest measurements, with an increase in the proportions characterizing the development of the back of the trunk and the thickness of the skin. At the same time, it was noted that the cows of the first generation in almost all the analyzed parameters of the exterior were inferior to their peers of zero generation.

Thus, the grinding of cattle in the first generation with respect to zero generation in height at the withers was 2.3 cm (1.8 %, $P > 0.999$), and already the second-generation cows reduced this difference to 1.9 kg (1.5 %, $P > 0.95$). The height in the sacrum of cows of the first generation was also already minimal and amounted to 131.7 cm, giving way to zero generation by 1.6 cm (1.2 %, $P > 0.99$), and animals of the second generation in this indicator were almost at the level with representatives of imported animals. For breast measurements, a significant difference was noted between the first and zero generations in favor of the latter with a difference of 1.0–3.2 cm (1.6–4.8 %, $P > 0.95$ – 0.999).

An important feature in the adaptation of livestock to new conditions was an increase in latitudinal measurements characterizing the development of the pelvis in cows of the second generation. In width in maclocs, differences were noted between the second and first generation by 1.4 cm (3.1 %, $P > 0.95$), and in width in the ischial tubercles, cows of the second generation exceeded the zero and the first generation by 1.0 –1.2 cm (2.9–3.5 %, $P > 0.95$). The indicator characterizing the length of the pelvis was also on the side of the second-generation cows with a similar difference of 1.4–2.6 cm (2.9–5.5 %, $P > 0.95$ –0.99).

The meat advantages of animals during life in absolute terms can be estimated by measuring the half-girth of the rear, which was less pronounced in imported cows 115.3 cm, significantly inferior to the first and second generation cows by 3.4 cm (2.9 %) and 6 cm (5.2 %), respectively, $P > 0.999$. With the change of generations in the process of acclimatization, cows developed a protective mechanism of adaptation against cold exposure, which is estimated by the thickness of the skin. This indicator had a higher value in the second- and first-generation cows of 0.68 and 0.62 cm, while the zero generation cows were 15.2 % ($P > 0.999$) and 5.1 % ($P > 0, 95$).

The results can be explained by the fact that in the first generation the development of heifers when moving to new conditions was delayed by stress factors and adaptation. The offspring received from them was more adapted to new conditions and restored the exterior parameters characteristic of this breed.

When comparing the correspondence of the exterior parameters of cows with standard values, based on the methodology for testing for distinctness, uniformity and stability [8], some inconsistency of the exterior indicators in the analyzed generations was noted (Fig. 1).

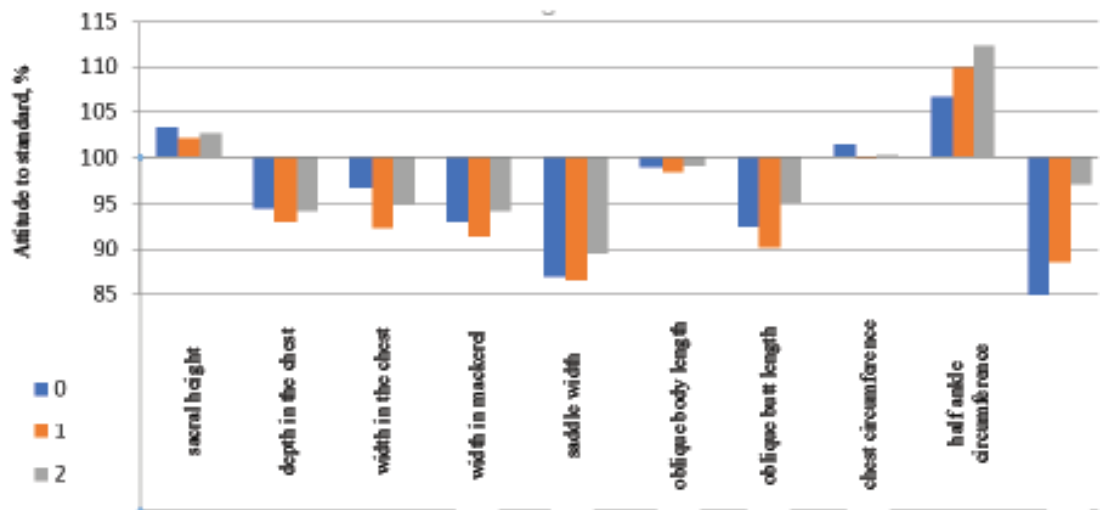


Figure 1: Correspondence diagram of body parameters of Limousin cows with average recommended by breed.

The greatest deviation from the recommended parameters in the undesirable direction was noted for all latitudinal measurements, and the width in the ischial tubercles had a higher underdevelopment reaching up to 10.5–13.5 % of the norm. The development of the chest in the depth and length of the pelvis also did not correspond to the average standard indicators of about 5.5–9.8 %. However, if we compare the measurements with the lower boundary of the recommended indicator, the difference is about 1–3 cm, depending on the generation. So, for example, the thickness of the skin lags the average recommended range by 2.9–15.7 %, but fully corresponds to the lower limit of the norm.

All generations of the studied animals were characterized by high growth, which is confirmed by measuring the height in the sacrum, which was 2.1–3.3 % higher than the average, as well as the good development of the posterior third of the trunk, characterized by a half-circumference of the back with an excess of the norm of 6.8–12.3 %, but within the upper limit of the recommended range. The remaining exterior physique parameters were in line with the recommended norm.

The obtained results of the exterior assessment of cows of different generations showed that the best exterior development was observed in cows of the second and zero generation.

Body measurements in enough form do not allow to assess the growth and development of animals. A more detailed description of the physique of the animal and the proportionality of the development of the compared generations are given by the indices of the physique (Table 2).

TABLE 2: Body indices of first-calf cows of breed Limousine ($\bar{X} \pm S\bar{x}$), %.

Index	Genetic and ecological generation		
	zero	first	second
Leggy	50,2 ± 0,23	50,1 ± 0,21	49,6 ± 0,68
Stretch	116,7 ± 0,48	118,3 ± 0,50*	118,6 ± 1,34
Breast	65,8 ± 0,59	63,7 ± 0,39**	64,7 ± 1,18
Pelvic	89,5 ± 0,80	86,7 ± 0,73*	86,6 ± 1,47
Blockiness	131,4 ± 0,49	129,8 ± 0,53*	129,6 ± 1,66
Overgrown	104,9 ± 0,21	105,5 ± 0,17*	105,8 ± 0,70
Massiveness	153,3 ± 0,50	153,5 ± 0,58	153,8 ± 1,56
Broad bodies	21,4 ± 0,13	20,7 ± 0,16**	21,2 ± 0,41
Meatiness	90,7 ± 0,27	95,1 ± 0,33***	96,9 ± 0,85***
Body type	689,1 ± 2,47	689,0 ± 3,67	718,3 ± 9,12**
Type Expressions	112,6 ± 0,55	113,9 ± 0,62	114,7 ± 1,54

Animals of all analyzed generations were distinguished by long-leggedness, with the value of this index above the recommended up to 8 %, with a compact physique. Zero-generation cows had a less pronounced extension index of 116.7 %, yielding 1.6 % ($P > 0.95$) and 1.9 % behind the first and second generation. Indicators characterizing the development of breast proportions of the physique were on the side of the imported animals, with less pronounced values in the first generation, obtained under new conditions. So, the cows of the first generation were inferior to the imported animals by the chest index by 2.1 % ($P > 0.99$), the pelvic and pedigree by 2.8 % ($P > 0.95$) and the body by 0.7 % ($P > 0, 99$). The cows of the next generation (second generation), the indices of these indices were closer to zero generation. But it should be noted that cows of all generations in terms of severity of the thoracic index corresponded to cattle of the combined direction of productivity.

The incidence index, which characterizes the volume and length of the physique, was also on the side of zero generation, with a difference to the younger generations by 1.6-1.8 % ($P > 0.95$). But local generations had an advantage in such indices as overgrowing and meatiness, where cows of the second generation showed a more pronounced sign value.

The cows of the first generation in terms of meat index compared to the maternal generation improved their indicators by 4.4 % ($P > 0.999$), and the granddaughters of imported animals by 6.2 % ($P > 0.999$).

4. Conclusion

The research results showed that the acclimatization process has left its mark on the manifestation of the main breeding and productive qualities of the studied livestock generations. One of the manifestations of which was a certain grinding of cows of the first generation. Adaptation to new conditions confirms the development of such indices as the typical physique and severity of type, which, when changing generations, had an increase dynamic. Similar research results are consistent with studies obtained previously [9–12].

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Conflict of Interest

The authors have no conflict of interest to declare.

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