Improving the competitiveness of fine-wool sheep using local and world stud rams

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Abstract. The article compares merino sheep imported from Australian plants in 2004 and 2007 compared and domestic merinos of leading breeding plants of Russia and Stavropol. Australian merinos imported in 2004 did not have a positive effect when crossed with Manich merino ewes. At the same time, the 2007 importation of Australian rams by differentiated selection of Manich merinos depending on their live weight and age, increased meat productivity of their offspring but reduced the level and nature of their wool productivity and comprehensive assessment of animals. In the herds of the Stavropol and Caucasian breeds, the best results were obtained when using stud rams of domestic breeding plants.

1. Introduction
Breeding is a creative process that requires professionalism and patience. A breeding method is crucial for achieving planned indicators. For many years of fine-wool sheep improvement, Russian scientists and practitioners developed various methods and achieved good results having increased productivity of animals and improved quality (1-9, 16-18). In the fine-wool sheep breeding, Australian merino rams are used. A series of experimental studies carried out by scientists from different Russian regions allowed practitioners of sheep farmers to introduce the most effective methods of improving animals. As a result, wool in the washed fiber increased by 0.2-0.4 kg, its yield increased by 5-7%, the length of wool increased by 0.5-1.0 cm. Density of wool as well as equitability, crimpiness, quantity and quality of wool yolk increased. Following the recommendations of scientists, sheep farmers used imported Australian merino sheep for the live weight. As a result, most of the farms did not reduce this important feature. The type of improved breed was preserved. An important factor allowing us to obtain the best result is selection of wide-bodied type ewes produced from inter-plant and interline mating under improved feeding (10-15). At the same time, the improved indicators could be much more significant if managers of agricultural enterprises removed the lowest productive animals from their herds. However, the new economic policy and disparity of prices for industrial and livestock products did not allow them to do it. As a result, despite the number of herds reduced 9.8 times, their productivity decreased. There is a decrease in the number of herds in agricultural enterprises and no increase in their productivity.
Sheep practitioners tend to buy stud rams in Australia. However, even they use imported meat merino rams, productivity does not increase due to the fact that not all breeds give positive results. Scientists study various applications of stud rams of foreign and domestic selection offering practitioners the most effective options for selecting animals.

2. Material and research methods
The research material was Manich, Stavropol and Caucasian merino ewes and Australian meat, Manich, Stavropol and Soviet merino stud rams. The live weight of purebred and crossbred animals at different age periods was determined; costs of feed products and meat productivity were calculated. Young stock aged 13 and 14 months was tested following the Procedure and conditions for breeding fine-wool, semi-fine-wool and breed meat breeding sheep (2013). Cutting the unwashed wool was taken into account individually in experienced shines and sheep during the spring shearing of sheep, with an accuracy of 0.1 kg. The yield of pure fiber was determined by washing 20 gram samples of wool (10 g from the side and 10 g from the back) taken during the calibration. The shearing of washed wool was calculated taking into account the shearing of unwashed wool and the output of pure fiber individually for each ewe. The natural length of coat was determined individually, during grading, with a millimeter ruler with an accuracy of 0.5 cm. The wool fineness and its uniformity were established visually in all animals during grading. Wool fineness was assessed for 10 ewes of each experimental group in accordance with the “Method for comprehensive assessment of the runes of breeding sheep of different productivity areas (fine-wool and semi-fine-wool breeds).” The strength of wool was studied on 10 ewes of each experimental group using a dynamometer 2017d - 0.006 with a dosing clamp according to the ARIIK method. The digital material was processed by the method of variation statistics using computer programs.

3. Research results and discussion
For the experimental studies, stud rams imported from the Collinsville, Roseville Park and Wardry breeding plants of Australia were used. They did not improve the productivity. Research and production experiments conducted at the Manich breeding plant of Apanasenkov district showed that the use of nonlinear sheep of the Manich merino breed improved and increased meat production and wool productivity of their offspring. If crossbreeds from imported sheep of the Collinsville and Roseville Park plants and ewes of the Manich merino breed aged 4, 13 and 18 months had a live weight of 26.1 ± 0.38 and 25.4 ± 0.28; 39.5 ± 0.45 and 39.3 ± 0.37; 44.8 ± 0.33 and 44.4 ± 0.31, their peers from non-linear stud rams of domestic breeding had a live weight that was unreliable (P ≥ 0.05), but higher and amounted to 26.5± 0.36 kg at the age of 4 months, 40.1 ± 0.40 at the age of 13 months, and 45.1 ± 0.37 kg at the age of 18 months.

The experiment on the costs of feed made it possible to establish the most significant advantages of the Manich merino over crossbred peers from the Australian plants. The average daily gain for 52 days for the stud rams imported from the Collinsville and Roseville Park plants was 173.1 and 169.2 g, respectively, and for the Manich merino –186.5 g (9.3%). At the same time, the cost of feed for the gain in live weight and wool was lower for purebred rams by 6.8 feed units, whereas for imported stud rams, they were 7.28 and 7.39 feed units, respectively. These data suggest that the gain in fattening and earliness indicators should be studied using intrabreeding selection methods.

The control slaughter showed even more significant differences in favor of the purebred breeding of the Manich merino. The selection of experimental animals for slaughter on the basis of the average live weight of purebred and cross-sheep sheep indicates that the pre-slaughter mass of sheep hybrids from the Collinsville and Roseville Park plants was 37.8±1.36 and 37.4±2.31 kg, respectively, while in the offspring of the Manich merino rams, this indicator was significantly higher and amounted to 41.3±3.04 kg (P<0.05). At the same time, purebred descendants exceeded the crossbred by their slaughter weight by 11.2 and 11.8% (P<0.001). The same pattern was observed for the slaughter yield and the mass of the hot carcass. If the last indicator for crossbred rams from Australian stud rams was 15.47±0.39 and 15.40±0.40 kg, for pure breed, it was 17.42 kg. i.e. it was higher by 12.6 and 13.1%. (P<0.001). The
same pattern was observed for varietal cuttings and the morphological composition of carcasses. The advantage of purebred peers over crossbreds from imported sheep by the pulp output was 1.5 and 2.3 absolute %, and the ratio of meat was 7.7 and 11.1%. The observed patterns were confirmed by many interior indicators. In particular, purebred animals had an advantage in the mass of all internal organs and the total length of the intestine. Despite the fact that non-linear Manich merino rams were used for insemination in the control variant, the purebred rams had better maturity and meat productivity indicators than the offspring from the Australian merino rams. Therefore, importation of Australian merino stud rams aimed at improving meat productivity indicators of fine-wool sheep of the Manich merino breed was not effective. As for wool productivity of purebred and crossbred offspring, no significant differences were established. If the shearing of washed wool for the Australian breeds was 2.67±0.08 and 2.60±0.07 kg, for purebred rams, it was 2.61±0.09 kg. The same trend was observed for other indicators characterizing the level and nature of wool productivity. The exception is thicker wool in crossbreds imported from the Collinsville plant. This indicator was 84.1±6.61 pcs. In the ewes from the Roseville Park plant, density was 80.7±3.70; in purebreds, it was 71.6±6.03. However, these differences did not have a significant impact on the shearing of wool of purebred and crossbred animals.

The calculation of indicators of economic efficiency indicates that the largest amount of profit was obtained from purebred ewes. It increased by 3.9 and 6.1%; the level of profitability was higher by 1.7 and 2.7%.

The 2007 importation of Australian stud rams and their use for fine-wool sheep of Stavropol showed mixed results. The heads and specialists of breeding plants gave conflicting answers. At the Manich breeding plant of Apanasenkov district of Stavropol Territory, we conducted a series of experiments on the differentiated use of Australian meat merino for the Manch merino breed of different live weight and ages. Half-blood and quarter-blood offspring was produced. Based on the comprehensive assessment of young stock of different age and sex groups, the following results were obtained. The selection of Manich merino for ewes with a live weight of over 52 kg allows you to get ram descendants with a higher average daily gain (6.6%), lower feed costs for weight gain and wool (9.8%). At the same time, in the half-blooded ewes, the shearing of washed wool is less 14.8%. Profitability of breeding cross-bred animals was higher by 5.3 percent. At the same time, individual assessment showed that the largest number of elite ewes was produced from stud rams of 815 Manich merino breed lines, regardless of the live weight of their mothers. Ewes with a body weight of up to 52 and more than 52 kg and rams of the 815 Manich merino line gave 69.2 and 81.8% of elite animals, while their peers of the same groups and Australian merino rams gave 64.3 and 66.7% of elite animals. In the group of crossbreds, the share of second-class animals was more by 15.4%. The reason for this pattern was a poor wool cover of cross-bred animal bellies, uneven wool fineness, and large heterogeneity of animals in the group of crossbreds from Australian meat merino rams.

Imported Australian meat merino rams were distributed by breeding and commercial herds. Out of 43 rams, four rams (PP060391, PP060372 and PP060365) were purchased from the Roseville Park plant and one ram (UD060786) – from the Wardry plant. Fresh sperm of rams located at the experimental station STNIIZK was supplied to the farm Novomaryevskoye of Shpakov district. During the mating period, we accounted for the results of insemination of ewes with purebred rams of the Australian breed. For control, the Soviet merino and the Stavropol ewe regularly imported from Arzgir and Ipatov districts were used. The study of sperm quantity and quality showed that it had a normal consistency and a light cream color. The activity and concentration of spermatozoids was similar in all merino rams. However, by the volume of ejaculate, there were significant differences. If Australian merino rams produced 1.05 ml of ejaculate per day, Soviet ones – 1.45 ml, and Stavropol ones – 1.25 ml. Daily recording of the results of insemination and careful analysis of lambing results identified higher fecundity and better safety in young animals produced from Soviet and Stavropol merino rams (110.5 and 109.2; 92.6 and 90.4%, respectively), which is 2.5 and 2.0% and 3.1 and 2.0% more in comparison with the young stock obtained from Australian sheep. In ewes produced from imported rams, the bactericidal and lysozyme activity of the blood serum was less by 2.29% and 1.24%; and by 3.92% and 1.81%, respectively, compared with peers produced from Stavropol and Soviet merino rams.
The average daily gain in live weight of ewes from local rams was higher by 4.4% and 7.6%. Crossbreds from local stud rams required less feed for gaining live weight and wool.

During the fattening period, the average daily gain in live weight was larger by 6.9% and 10.9% in the offspring from ST and SM rams. The same pattern was observed for the slaughter mass, slaughter yield, meat ratio and calorie content of meat.

By wool indicators, the female lambs born from ST and SM rams had higher by 7.8% and 10.5%.

In ewes born from Stavropol and Soviet rams, wool was rougher by 0.61 and 0.97 microns. The descendents of the Australian merino rams had a wool fineness of 21.5 microns. In ewes born from local rams, wool was longer by 0.4 and 0.7 cm, or 4.5 and 7.2%. In crossbreds from imported sheep, this value was 9.9 cm. In animals from local rams, the wool durability value was larger by 2.9% and 4.3%. Profitability of breeding ewes from Stavropol and Soviet merino rams was higher by 6.5% and 12.8%.

4. Conclusion

Thus, long-term target improvement of fine-wool breeds of the Russian Federation, including using Australian merino stud rams imported before 1990, contributed to production of highly productive animals and selection of new breeds with productive features. The use of Australian merino rams in breeding and commercial herds of Stavropol Territory in 2004 and 2007 did not have a positive effect. To improve the breeding and commercial herds of fine-wool sheep of Stavropol, local merino rams should be used.

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