



Katummy Breed is a New Russian Sheep Breed

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CrossMark

THE article is a review of new sheep breed for the regions with not friendly weather conditions like in the North-Western District of Russian Federation. The economic development of such region needs new resolves, and in agriculture are too. The represented breed had been created for increasing meat resources, to born a local economically advantageous meat-productive sheep breed. So it was made an improvement of the exterior and productive qualities of aboriginal Romanov sheep breed due to imported American Katahdin meat breeding muttons. It was applied the absorption cross-method at the first breeding stage. The next was a rigorous selection and drafting of the animal's desired type, identifying outstanding rams. Katummy sheep-breed was got up of reproductive breeding of the factory lines. New created-in sheep breed has a lot of advantages such as excellent fertility and meat increment, good herd instinct, and milkiness. All of these make Katummy sheep breed the best choice for agriculture in regions with severe conditions for manufacture and cattle breeding. It becomes possible to make breeding not only successful but faster and economically advantaged. Rams of Katummy meat-breed in the elite group have an average live weight of 105.53 kg; ewes were little lesser – 70.03 kg. The ewes of the first and second classes have weight growth up to 63.05 kg and 50.05 kg, respectively. Constitutional and productive features demonstrated in Katummy meat breed sheep had characterized by a large size, a strong and harmonious constitution with pronounced meaty forms. All of these represented facts give a possibility to rise and have a stable development of economically depressed regions.

Keywords: Sheep breeding, Katummy sheep breed, Meat-line breed, ram, ewe.

Introduction

Breeding of the sheep is a very important mission for many Russian regions. Sheep have a few advantages. They consume pasturage, which is cheap to produce. Sheep breeding can be a job-giving in rural. So it gives economic development for a village region [1-6]. Nowadays, the development of mutton production becomes a way to make farm manufacture competitive [7-12]. Romanov sheep breed is a single to successfully keeping in Russian North-Western region conditions [10,13,14]. This sheep-breed has good adaptability to a local temperate continental climate with unstable weather in

summer and high humidity. Such weather feature has a negative influence on hooves condition and to feed quality [10]. Aboriginal breeds have advantages in Russia's extreme conditions, like an ability to give consistent yield [4,9,10,14-19].

The North-Western District territory in Russia is positive to increase sheep breeding and especially to get dairy-lamb meat and dietary mutton production. The prerequisite advantage factors for this kind of agricultural manufacture development are abandoned farms and free arable land of North-Western District [3,10,15,20,21]. The conditions of this Russian district are not useful for cattle breeding. It is hard to produce and

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accumulate forage. But this area is attractive for sheep breeding because of its forest pastures and hilly areas, which are excellent for sheep grazing [1,6,13,21].

So, the conditions of North-Western District can breed just sheep of Romanov breed, which is a Russian coarse-haired breed and has the direction of fur coat productivity [10,21]. Sheep of Romanov breed could be a source of mutton and above all sheepskin. It is the most native and economically advantageous for this region breed and is resistant to hoof diseases [10,13,14,21].

The rising productivity of aboriginal breeds is the usual task of each dilution. There were many experiments carried out on breeding and maintenance of highly productive foreign breeds in Russia. But the differences in natural-economic conditions did the most experiments to introduce and fully display the genetic potential of high-productive breeds failed. And sometimes there were observed even negative results [2,4,22-28]. So many researchers have an opinion to use a genetic pool of aboriginal individuals with subsequent improved it by foreign genes of high-productive sheep. It is showed as a single effective and possible way to increase up meat, meat-wool, and wool productivity of sheep breeding in Russia [2,4-6,8-10,15-17,22,23,26,29-31].

Materials and Methods

The studies were made under the Agricultural Development Program of Leningrad Region in support of the Committee of Agricultural and Fisheries Complex of Leningrad Region. The experiment was provided at "Katumy" LLC. It is an agricultural enterprise in the Vsevolozhsk district of the Leningrad Region. This farm has been engaged in sheep breeding at Russian North-West District conditions for more than 20 years.

The breeding work to create sheep breed with good meat qualities was spent over the past ten years. The animals must have stable weight gain and high preservation in any climatic conditions. We wished to have such new meat qualities as low-fat compose, dietary characteristics, and without a specific mutton odour.

All experiments were created according to the International Animal Ethics Committee of Institutional ethics committee and by local laws and regulations.

To improve aboriginal breed were attracted purebred representatives of Katahdin breed. Purebred rams were brought from America. Their economic and biological characteristics are distinguished by high meat productivity, early maturity, and short hair, which does not require shearing.

Local Romanov sheep are excellent adaptive to any climatic conditions of Russia. It was improved with preserving high fertility and year-round sexual activity of ewes, and rams.

Application of the Absorption Cross Method

It was applied a few stages during the genetic improvement of the local sheep breed. The first step was a rigorous selection, and drafting the sheep persons with the desired type, identifying outstanding rams. The next one was followed by reproductive breeding on factory lines. So sheep of meat direction Katumy breed were obtained. The final stage of the breed creation was breeding in itself. It was carefully carried out the selection and drafting of the sheep with the desired type. And of a cause, the lamb growing was conducted maximum correctly.

For faster creation, the new modern sheep breed with the desired type was applied the system of the compacted lambing, a method with hormonal stimulation for fertilization in order to increase fertility and synchronization of fertilization. It means getting three lambs in a time of two years. It helped us to reduce the breeding of a new Katumy sheep breed (to two to three years).

Results

The qualitative characteristic parameters of Katumy sheep breed

The meat productivity of the Leningrad region was evaluated by us before Katumy sheep breed became created. We assessed the growing and development of meat manufacture. And the meat quantitative and qualitative was evaluated. So we made a rate of lamb's weight. The representative of sheep's weight changing month to month is shown in Table 1.

So, we see a positive weight increase dynamics of male and female lambs. It is an important characteristic of the lambs' meat-line breed. The Katumy sheep breed has been characterized by precocity: the average daily weight growth about 300-450 g, and the maximum weight-index was by 500-600 g (Table 2).

TABLE 1. Dynamics of the weight changing of Katumy breed sheep at a different age time.

| Age | Gender, age group and class of sheep | | | |
|--------------------------|--------------------------------------|-----------------|---------------|----------------|
| | Ram-lamb | | Ewe-lamb | |
| | Elite (n=100) | Class I (n=100) | Elite (n=100) | Class I(n=100) |
| Weight at birth-time(kg) | 5.25±0.6 | 4.72±0.46 | 4.6±0.34 | 3.79±0.2 |
| 1 month | 20.01±1.56 | 16.42±1.02 | 15.19±0.82 | 13.18±0.57 |
| 2 months | 28.6±0.87 | 25.98±0.6 | 23.76±0.39 | 21.14±0.6 |
| 3 months | 37.34±0.86 | 32.01±0.31 | 29.82±0.87 | 25.04±0.31 |
| 4 months | 52.67±1.51 | 45.4±3.25 | 40.14±1.09 | 29.85±1.12 |
| 6 months | 54.45±0.85 | 44.4±0.59 | 44.1±0.53 | 34.29±0.64 |
| 10 months | 76.89±3.18 | 65.2±1.09 | 49.63±0.79 | 44.88±0.47 |
| 15 months | 86.42±2.16 | 78.73±1.81 | 59.07±0.99 | 49.75±0.99 |

p < 0.01

TABLE 2. Dynamics of the Katumy breed sheep's growth.

| The sheep group | The parameters | The age period | | | | |
|-----------------|-----------------------|----------------|---------|----------|--------|-----------|
| | | New born | 1 month | 4 months | 1 year | 2-3 years |
| Ram | Live weight, kg | 4-6.5 | 20-30 | 40-55 | 85-100 | 110-130 |
| | Height at withers, cm | 35-45 | 45-55 | 55-68 | 70-75 | 80-90 |
| Ewe | Live weight, kg | 3.5-5 | 18-25 | 35-45 | 50-60 | 70-80 |
| | Height at withers, cm | 31-41 | 45-50 | 50-58 | 68-72 | 70-80 |

The Katumy breed rams' average live weight became amounted to 105.53 kg in time of two years. 30% of all tested two-year rams had weight up to 100 kg; 23.3% tested rams had the weight of 100-110 kg; 20% had the weight of 110-115 kg and 26.7% was of more than 115 kg.

Ewes of the elite group had an average live weight amounted by 70.03 kg, and at class I, their weight was by 63.05 kg at the ending of the second year's growth. So ewes of this age group had such weight parameters: the mass of 13.6% was up to 69 kg; 64% had the mass of 70 kg; 19.2% had a live weight of 71-75 kg, and more than 75 kg was marked in 3.2%. So we have got excellent lambs with a pronounced growth and development potential.

We made an evaluation of sheep breed Katumy meat to have total imagination of its characteristics quality. The meat has desired composition of fatty acids and easily digestible proteins, contains a huge amount of vitamins (B₁, B₂, Z₃, B₆, B₁₂, E, D, K) and minerals such as Potassium – 222 mg, Calcium – 16 mg, Magnesium – 21 mg, Sodium

– 69 mg, Phosphorus – 157 mg, Ferum – 1.55 mg per a kg. The cholesterol contained in it is low. And we can resume, meat has a special unique mild flavour, without a specific musky flavour, is lean, similar to veal. So it can be eaten hot or cold after cooking. It is very important that meat's taste hasn't be changed with the animal's age and does not depend on sexual activity. It can be interesting for gourmets who want to eat and sell top-grade mutton with a mild taste.

We can highlight such physical features of the created Katumy sheep breed as important practical industrial marks.

1. Harmonic and a strong constitution: its body is barrel-shaped due to wide back and coupling.
2. Hornless: the sheep of this breed are hornless. This cause significantly reduces the injuries percentage.
3. Meat constitution: has a high meat yield (more than 50%).
4. Smooth coat.

The physical characteristics of the created-in new breed are representative in Table 3.

TABLE 3. Physical characteristics of the Katumy sheep breed .

| Ord. No. | Parameters | Lambs' age, month | Degree of expression |
|----------|--|-------------------|----------------------|
| 1 | The coat type | 12-18 | Hard-coat |
| 2 | Tail: length | 12-18 | Short-coat |
| 3 | Tail: fat deposition | 12-18 | Absent |
| 4 | Fleece: primary coloring | 30 and older | Fulvous |
| 5 | Fleece: additional coloring | 30 and older | Present |
| 6 | Outer coat fibers: primary coloring | 30 and older | Fulvous |
| 7 | Outer coat fibers: additional coloring | 30 and older | Present |
| 8 | Outer coat fibers: additional color location | 30 and older | Ears, neb, and legs |
| 9 | Head: fleece fur coat | 12-18 | Absent |
| 10 | Front and hind legs: fleece fur coat | 12-18 | Absent |
| 11 | Back: fleece fur coat | 12-18 | Weak |
| 12 | Belly: fleece fur coat | 12-18 | Absent |
| 13 | Ram: size | 30 and older | Big |
| 14 | Ewe: size | 30 and older | Big |
| 15 | Head: profile | 12-18 | Straight |
| 16 | Ears: position | 12-18 | Erectopatient |
| 17 | Young ram and ewe: horns | 12-18 | Absent |
| 18 | Barrel: form | 12-18 | Barrel-form |
| 19 | Legs: leg length index | 12-18 | Long |
| 20 | Back: width | 12-18 | Average |
| 21 | Ewe: fertility | 30 and older | High |
| 22 | Ewe: milkiness | 30 and older | High |

It was evaluated the sheep Katume breed psychical qualities to test the character of the created new animals breed in future breeding. So animals are sociability with the lively temperament and have excellent herd instinct and good maternal qualities of ewes (capability of feeding triplets without human assistance). Show good adaptive abilities to various conditions of housing and feeding. Learn easily and remember the feeding schedule and other activities, and they return from pastures to sheep-houses at the specified time themselves.

An important index for created breed became fertility. It was observed in excellent marks. So the fertility of first lambing ewes was by 140-160%, and 200-220% to the adult animals. More to this was observed early puberty time (from 6 months' age) and multiple fetuses: twins make up 65-80%, triplets — 15-25%, one lamb — 5-15%. Ewes have not sexual cycle which was expressed to a season.

The technological cards of LLC "Katumy" were created in such a position to provide natural mating in April and September. So lambing occurs in September and February. One ram is using for insemination ewes' group of 50-80 animals in time of a month.

The ultrasound diagnostics has been carried for pregnancy determination in a 1-1.5 month after insemination. The sperm is collected from valuable rams in time of sheep's reproduction season (from late August to mid-October). The sperm bank has been established at LLC "Katumy," and the equipment for ewes' laparoscopic insemination has been purchased and tested.

The main Katumy sheep breed features which are economically tempting

Sheep of the Katumy breed has a low rate of maintenance and care costs in its breeding because of good adaptability to different climatic conditions (sharply continental, continental, marine, subtropical climate). The pasture kipping

can be used all year. Sheep-houses have to be used just in the cold season to organize a maternity ward. Lambs can be kept on pasture with ewes already at one-month age. Katumy breed sheep have an excellent herd instinct and high milkiness (the average figure is 104.32). That is why farm staff is needed in fewer numbers.

The sheep do not need obligatory shearing because of their natural molt once a year. It optimizes the item of expenditure on the maintenance of these animals. Sheep are good regulators of heat transfer processes due to the undercoat's active growing in a cold season (thick winter coat) and active molt before the warm season (smooth hair). Smooth wool caused resistance to ectoparasites due to structural features of skin and hair. And veterinary treatment is easily provided in case of contact with sick animals.

Katumy breed sheep are selective in food eating; that is why they are resistant to entozoan and require only prophylactic treatment.

The most common is birthing of twins, and rarely - one or three lambs. So, the well-selected and managed herd should give a 200% lamb yield. More to this, sheep are polycyclic (unexpressed sexual season). So the reproductive period can be technologically created as the farm will be needed. And the sperm bank can be created.

Discussion

Russia has great agricultural potential to develop. It has about 9% of the world's arable land. But the development of agriculture manufacture in some territories is limited by severe climate conditions, geographic terrain, or water supply deficiency [32]. The unfavorable weather conditions of the Russian North-Western District made agriculture too difficult. This territory is unsuitable for cattle breeding because of difficult forage accumulation and a lot of forest pastures in this region [1,6,15,22]. This region is characterized by high unemployment point and high migration level of adult men inhabitants. So the economic development of the rural territories is the one way to get this area out of depression [33]. The sheep breeding becomes excellent for meat production on this occasion [1,6,10]. It can give not only additional workplaces but to develop the infrastructure of this region.

It was created a new sheep breed at the base of Romanov sheep breed. The new created-in breed has a connection of the best adaptive abilities of

Romanov sheep breed [5,13,21] and better meat qualities and smooth fleece of the introduced breed. It makes newly created breed economic tempting not only for Leningrad Region.

The agreement for using the Katumy sheep breed took on March 30, 2018, after the application had been asked to a meeting of an expert committee on testing and protection of breeding achievements in sheep breeding. The Katumy sheep breed was patented (a patent for selection achievement No. 9722 to the application No. 8261508). So on July 10, 2018, this sheep breed has been registered in a register of protected breeding achievements. And Taisiya Olegovna Dmitrieva got the copyright certificate on it (No. 73238) [34]. So the Katumy sheep breed can become a chance to get up level the agriculture manufacture not only in Russia but in many areas with severe conditions for agriculture.

Conclusions

Katumy sheep breed is a new sheep breed of meat direction, which has been created in the Leningrad region.

Katumy sheep breed can become the base of a commercial, economic engaging herd because of good immunological reactivity, high fertility and maternal qualities of the new created-in animals, and low maintenance costs.

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Conflict of interest

The author declares no conflict of interest.

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