Feeding capacity and meat productivity of sheep of different breeds in the Republic of Buryatia

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Abstract. In this article, we studied the feeding and meat productivity of young coarse sheep (Buryat, Mongolian, Tuva, Edilbaev breeds) raised in 4 sheep farms of the Republic of Buryatia. In addition, the paper analyzes the economic efficiency of different breeds.

1. Introduction
Sheep breeding for the Republic of Buryatia is a traditional branch of animal husbandry, providing the population with ecologically clean mutton and also supplying wool and fur raw materials for the processing industry. The increase in the production of young lamb, high quality coarse wool and fur coat sheepskin is important for the economy of the republic.

Currently, the sheep population in the republic is mostly represented by the Buryat, Tuva, Mongolian, and Edilbaev coarse-wool sheep (300 thousand heads). In this regard, research on the study of productive and biological features of these breeds is a very topical issue.

According to the results of research, the best of the compared breeds for feeding and meat productivity were identified, which would improve the efficiency of production of environmentally friendly mutton in conditions of a year-round sheep in the Baikal region. More than that, it would help solve the problem of providing the population with food.

The results obtained during the research and production experiments and laboratory studies will be part of a larger scientific material on the identification of adaptive properties of domestic and imported breeds. They will be also used for further analysis and theoretical justification on the feasibility of using their gene pool in the Republic of Buryatia.

2. Research Methods
The purpose of the research is to study the feeding and meat productivity of young coarse wool sheep of different breeds bred in the Republic of Buryatia.

The research objectives include the following:

- To conduct a study on the growth and development of young stock in the lactation and after lactation periods;
- To study the slaughter and meat qualities at the age of 7 months, including the possibility of their use for the production of cheap and environmentally friendly mutton in the Republic of Buryatia;
To determine the economic efficiency of coarse-wool breeding in the conditions of the Republic of Buryatia.

In order to identify the feeding and meat productivity of the wethers in different breeds, we conducted an experiment in the farm “Dorzhiev I. F.” of the Selenginsky district. To do this, after pawning from different farms at the age of 4 months, a total of 4 groups of animals (30 animals in each) were formed, depending on the average body weight in the herd. Group I included the Buryat coarse wool wethers. The Group II: Tuva short-fat-tail wethers. The Group III: Mongolian coarse wool wethers. Group IV: Edilbaev wethers. These animals were put on the field for 90 days (September-November).

The live weight was measured in the experimental animals aged 4 and 7 months; it was determined by individual weighing with an accuracy of 0.5 kg.

Meat productivity of the castrated coarse-wool wethers was studied by controlling slaughter at the age of 7 months according to the VIZh technique (1970, 1978). Cutting carcasses was carried out in accordance with GOST 7596-81. The organoleptic evaluation of the qualities of animals meat and broth being compared was carried out according to GOST 9959-2015 ("General conditions for conducting organoleptic evaluation") on a 9-point scale.

The economic efficiency was determined by calculation based on the analysis of total costs and revenues according to the statistical reporting of an enterprise.

The digital material is processed biometrically according to the method developed by E. K. Merkurieva (1970) and N. A. Plokhinsky (1969), using the “Excel” computer program.

3. Research Results
The high growth rate of young coarse-wool sheep is one of the main conditions for increasing the profitability of lamb production. The growth rate of lambs was the highest during the lactation period, when mother’s milk was the main food for them [2].

The most intensive growth at the age from 4 to 7 months was observed in the young animals of the Tuvan short-fat-tail sheep. They had an advantage in the average daily gain over their peers of the Buryat and Mongolian coarse-wool sheep by 15.3 and 8.4 g, with Edilbaev – by 16.7 g or 5.8; 7.06 and 15.1% (Table 1).

In the after-lactation period, the largest decrease in the average daily weight gain (more than 2 times) was observed in the young Edilbaev breed, which was due to the reaction of their organism to the changing nature of their feeding. At the same time, over the entire feeding period, a relative weight gain was the smallest among the young Edilbaev breed (110.6%, or 8.3). In was 9.7 and 16.3% lower than that of the Mongolian, Buryat coarse-wool, and Tuva short-fat-tail peers. This circumstance can probably be explained by the late ripeness of this breed, which was formed in them under the influence of environmental conditions.

| Indicators                        | Group |  
|-----------------------------------|-------|
| Number of animals, heads          | I     |
| - when feeding                    | 30    |
| - when removed from feeding       | 30    |
| - Absolute increase, kg           | 6.36  |
| - Average daily gain, g           | 70.7  |
| Live weight, kg                   | 30    |
|                                     | 30    |
|                                     | 30    |
|                                     | 30    |
| Live weight, g                    | 30    |
|                                     | 30    |
|                                     | 30    |
|                                     | 30    |

Table 1. Live weight, young sheep of different breeds, kg.

The digital material is processed biometrically according to the method developed by E. K. Merkurieva (1970) and N. A. Plokhinsky (1969), using the “Excel” computer program.
semi-coarse-wool, Tuva short-fat-tail, and Edilbaev meat-greasy breeds (Table 2).

Table 2. Slaughter quality wethers of different breeds at the age of 7 months.

| Indicators                  | Group     |
|-----------------------------|-----------|
| Pre-slaughter weight, kg    | I         | II        | III        | IV         |
| Carcass weight, kg          | 38.12±0.39| 36.20±1.66| 32.45±0.85| 35.68±1.03|
| Mass of internal fat, kg    | 19.27±0.48| 16.63±0.62| 13.6±0.72 | 16.68±0.09|
| Slaughter weight, kg        | 0.62±0.10 | 0.98±0.11 | 0.46±0.01 | 0.33±0.05 |
| Slaughter yield, %          | 19.89±0.62| 17.61±0.77| 14.06±0.64| 17.02±0.11|
| Chilled carcass weight, kg  | 52.16±1.09| 48.74±1.79| 43.3±1.24 | 47.76±1.18|

Among the compared groups of animals, at the age of 7 months, the largest mass of carcass and slaughter yield were observed among the wethers sheep of the Buryat coarse-wool sheep, which by these indicators exceeded the Tuva short-fat-tail peers (by 1.92 kg and 3.42%), and Edilbaev (2.17 kg and 3.43%). The advantage of the Buryat coarse-wool wethers in these indicators was more significant over the Mongolian ones, with a significant difference of 5.67 kg and 8.86%.

In addition to the quantitative assessment of meat productivity, we need to know its quality characteristics. The meat of animals is determined not only by the ratio of live and carcass weight, but also by the proportion in the carcass of the most valuable cuts, by the correspondence in the carcass of edible and inedible parts [1]. The Buryat coarse-wool wethers surpassed other groups (II, III, and IV) by 5.54, 8.04, and 1.25 kg, according to the coefficient of meatiness – 1.1, 1.38, and 0.3 (Table 3).

Table 3. The morphological composition of wethers in different breeds.

| Indicator                     | Group     |
|-------------------------------|-----------|
| Chilled carcass weight, kg    | I         | II        | III        | IV         |
| Pulp yield, %                 | 19.27±0.48| 16.63±0.62| 13.6±0.72 | 16.68±0.09|
| Bone yield, %                 | 78.96     | 73.42     | 70.92     | 77.71     |
| Meat ratio                    | 21.04     | 26.58     | 29.08     | 22.29     |
| Meat ratio                    | 3.9       | 2.8       | 2.52      | 3.6       |

The presented research data on the morphological composition of carcasses of wethers in different breeds showed relatively low indices of the morphological composition of carcasses in young Mongolian coarse-wool sheep.

The efficiency of breeding sheep of different breeds in the Republic of Buryatia is also studied by us. An indicator of the adaptive qualities of sheep of different breeds to the conditions of breeding is the level and quality of products obtained from them, the cost of production and the cost of implementation. The imported and domestic breeds in the Republic of Buryatia, which were compared by us, were differed among themselves in the safety of lambs, an increase in the young live weight, as well as the trimmed wool (Table 4).

When calculating the efficiency of aforementioned breeds, we used the following results: lambing of ewes, safety of lambs; increase in live weight of young stock from birth to 7 months of age; cost price and selling price of 1 kg of growing the trimmed wool; cost price and purchase price of 1 kg of wool in the original wool; profitability of production at 1 structural head at the beginning of the year.

In our studies, the largest absolute increase in live weight per structural head, taking into account the safety of the young animals, was obtained from the Buryat coarse-wool sheep (19.67 kg), and the smallest one was from Edilbaev meat-greasy (16.97 kg). According to this indicator, the Tuva short-fat-tailed sheep were inferior to the Buryat coarse-wool sheep by 0.98 kg, exceeding the Mongolian by 1.13 kg and the Edilbaev meat-greasy by 1.72 kg. In terms of wool productivity, the best indicator of 2.1 kg was provided by the Edilbaev meat-greasy animals, surpassing the Tuva short-fat-tailed by 0.8 kg, and outperforming the Buryat and Mongolian coarse-wool by 0.9 and 0.5 kg. The cost of 1 kg increase in live weight and collection of dirty wool in sheep of comparable breeds were the same (73.5 and 33.7 rubles), because they did not differ in costs incurred for their year-round pasture maintenance. The cost of their products was also the same, amounting to 91.0 and 12.0 rubles.
Table 4. The efficiency of sheep from different breeds in the Republic of Buryatia, per 1 head.

| Indicator                                      | Buryat coarse-wool | Tuva short-wool | Mongolian coarse-wool | Edilbaev |
|------------------------------------------------|--------------------|-----------------|-----------------------|----------|
| Ewes seeded, heads                            | 450                | 325             | 514                   | 170      |
| Ewes given birth, heads                       | 450                | 316             | 510                   | 137      |
| Live lambs received, heads                    | 441                | 309             | 503                   | 137      |
| Ewes in the herd structure, %                 | 60.7               | 62.3            | 63.7                  | 68.0     |
| Saved lambs:                                  |                    |                 |                       |          |
| heads                                          | 419                | 290             | 492                   | 113      |
| %                                              | 95                 | 93.8            | 96.3                  | 82.5     |
| Increase in live weight of young stock, kg:   |                    |                 |                       |          |
| from birth to 7 months                        | 34.12              | 31.99           | 28.63                 | 30.24    |
| an inseminated ewe                            | 32.41              | 30.01           | 27.57                 | 24.95    |
| a structural head                             | 19.67              | 18.69           | 17.56                 | 16.97    |
| Cut wool on 1 head, kg                        | 1.2                | 1.3             | 1.6                   | 2.1      |
| The cost of 1 kg, rubles:                     |                    |                 |                       |          |
| increase in live weight                       | 73.5               | 73.5            | 73.5                  | 73.5     |
| cutting wool in physical mass                 | 33.37              | 33.37           | 33.37                 | 33.37    |
| Total cost per head, rub.                     | 1485.79            | 1417.09         | 1344.05               | 1317.37  |
| The cost of 1 kg, rub:                        |                    |                 |                       |          |
| increase in live weight                       | 91                 | 91              | 91                    | 91       |
| wool                                           | 12.0               | 12.0            | 12.0                  | 12.0     |
| The cost of sales of 1 head, total, rubles including: | 1804.37         | 1716.39         | 1617.16               | 1569.47  |
| increase in live weight                       | 1789.97            | 1700.79         | 1597.96               | 1544.27  |
| wool                                           | 14.4               | 15.6            | 19.2                  | 25.2     |
| Profit from sales, rubles                     | 318.59             | 299.3           | 273.11                | 252.1    |
| increase in live weight                       | 344.23             | 327.07          | 307.3                 | 296.97   |
| wool                                           | -25.64             | -27.77          | -34.19                | -44.87   |
| Profitability level, %                        | 23.17              | 23.08           | 22.86                 | 19.1     |

The sales value of the total production of the Buryat coarse-wool sheep per head amounted to 1,804.37 rubles, at a cost of 1,485.79 rubles. Profits from selling the products amounted to 318.59 rubles, the level of profitability of production amounted to 23.17%, or 0.09, 0.31, and 4.07, which was more than the Tuvan short-fat-tailed, Mongolian coarse-wool, and Edilbaev meat-greasy sheep breeds.

4. Conclusion
The sheep form different coarse-wool breeds differ in the intensity of growth of lambs in the lactation and after-lactation periods, slaughter and meat qualities and in the effectiveness of breeding them in the Republic of Buryatia. The lowest level of profitability is 19.1%.

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