Weight development and growth intensity of lambs from the Middle Rhodopean and Karakachan breeds

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Abstract


Subject of the study were 130 ewes at second lactation from the Middle Rhodopean and Karakachan breeds, with their offspring reared in the Middle Rhodopean region. The aim of the present study was to investigate weight development and growth intensity of lambs from both breeds by periods from birth to weaning. The research was conducted in two farms with Karakachan sheep and Middle Rhodopean sheep in 2020. The weight development of lambs at birth, at 10, at 30 and at 70 days and the achieved growth for the respective periods was monitored. It was found that the average live birth weight of female lambs from the Karakachan breed was 2.801 kg, and that of males was 3.009 kg. The highest average live weight of 3.834 kg was found in male lambs from the Karakachan breed, reared at the farm of the Research Centre of Stockbreeding and Agriculture. The average live weight at birth of female lambs from the Middle Rhodopean breed was 3.739 kg, and of males – 3.968 kg. The highest average live weight of 4.266 kg was found in male lambs from the Middle Rhodopean breed in the farm in Borino village. Male and female lambs from the Middle Rhodopean breed were born with a significantly higher live weight, compared to lambs from the Karakachan breed. Male lambs from the Karakachan breed in the period up to 30 days had the greatest average daily gain – 0.246 kg. The highest average daily gain (0.339 kg) was achieved by female lambs from the Middle Rhodopean breed in the period up to 30 days.

Keywords: Karakachan sheep breed; Middle Rhodopean sheep breed; live weight; average daily gain; growth intensity

Introduction

In recent years, there has been a heightened interest in local breeds in animal husbandry. The possibilities to preserve the existing genetic resources in line with the European trends in the sector and increased demand for ecologically clean and healthy production are the main reasons for this.

The study and analysis of productive characteristics of lambs from the aboriginal breeds will give us important guidelines for their breeding. The local breeds are distinguished by relatively low productivity, but the realized production is clean, of high quality and unique taste.

The Middle Rhodopean sheep breed is a typical representative of the local breeds with a combined purpose (meat, milk and wool), reared extensively in the highland pastures and foothills of the Rhodopes. The first information about these sheep comes from Dechev (1905), who established the average live weight of ewes – 25 kg, rams – 40 kg, 1-year-old ewes – 23 kg., wool production – 1850 g from rams and 950 g from ewes. Marinov (1973), in his scientific works made extensive studies on the growth, body forms and meat-producing qualities of the Middle Rhodopean sheep. Odjakova (2014), Odjakova et al. (2019), Vasilev et al. (2000), studied growth intensity, milk yield and exterior
weight development and growth intensity of lambs from the Middle Rhodopean and Karakachan breeds

measurements in Middle Rhodopean sheep.

The Karakachan sheep breed is reared mainly in the mountainous and semi-mountainous regions of Bulgaria, mainly in the southwestern and southern regions of the country (Staykova et al., 2015).

Live weight is the main productive characteristic, an indicator of their development and physiological status. The dynamics of live weight determines the possibilities for realizing a certain level of productivity. The weight of sheep depends on a number of factors, including breed, sex, age, year of birth and production, type of birth, breeding technology, etc. (Odjakova et al., 2010; Odzakova et al., 2020, 2021; Staikova & Stancheva, 2009; Vuchuov et al., 2008; 2020).

Popova et al. (2007a, 2015), Slavova & Staykova (2021), found that from 40% to 80% of the income in sheep farming in the different productive areas is from the sale of lambs. In meat and indigenous sheep farming, the main income is generated from the sale of lambs for meat. Staikova (2005) found that 69.34% of the relative share of income of a farm with Karakachan sheep was derived from meat income. The sale of lambs immediately after weaning is a traditional practice, and opportunities to create growth during this period are important for the economic survival of farms.

The aim of the present study was to investigate the weight development and growth intensity of lambs from the Middle Rhodopean and Karakachan breeds, reared in the Rhodope region.

Material and Methods

The study was carried out in 2020. Subject of the study were 67 ewes from the Karakachan breed and 63 ewes of the Middle Rhodopean breed in their second lactation, clinically healthy and in good general condition. Sheep were reared extensively from May to September, and in barns from October to April. The offspring from both breeds was 112. The weight development of male and female lambs at birth at 10, 30 and 70 days, and the achieved growth for the respective periods until weaning were monitored.

Statistical processing of the data was performed using the variational statistics method with Excel 2016.

Results and Discussion

The live weight data of Karakachan lambs at birth, at 10, at 30 and at 70 days is presented in Table 1.

Male lambs of the Karakachan breed were born with a higher live weight than females (by 7.4%), but the difference was not statistically significant. The obtained data on live weight at birth were analogous to the results obtained by Kafedjiev (1997) – 3.03 kg. The values of the coefficient of variation for the live weight index of female lambs ranged from 15.03% to 22.70%, and for males from 13.50% to 23.05%, which indicates a high degree of uniformity in the studied sample.

The average daily gain of male lambs on the 10th day was 0.246 kg and was not significantly different from that of female lambs – 0.223 kg. The difference between the two groups in terms of live weight at 30 days was 1.057 kg and represents 12.5%, at P ≤ 0.05. The difference between the two groups at 30 days in terms of average daily gain was 13.5%, and the same was not mathematically proven. Highly significant differences were found between live weights and average daily gain at 70 days (P ≤ 0.001) in males versus female Karakachan lambs.

The growth intensity can be traced by means of the changes in the average daily gain of the offspring during the individual periods (Figure 1).

Male lambs from the Karakachan breed had a higher average daily gain, compared to females during all studied periods. The obtained data corresponds with that of Genkovski (2002) - 7.89% higher growth intensity of male Karakachan

Table 1. Live weight of Karakachan lambs at birth, at 10, 30 and 70 days

<table>
<thead>
<tr>
<th>Traits</th>
<th>Breed/Group</th>
<th>Karakachan females</th>
<th>Karakachan males</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>(\bar{x})</td>
<td>± Sx</td>
<td>C</td>
</tr>
<tr>
<td>Live weight at birth, kg</td>
<td>26</td>
<td>2.801</td>
<td>0.116</td>
<td>21.11</td>
</tr>
<tr>
<td>Live weight at 10 days, kg</td>
<td>26</td>
<td>5.031</td>
<td>0.224</td>
<td>22.70</td>
</tr>
<tr>
<td>Average daily gain up to the 10th day, kg/day</td>
<td>26</td>
<td>0.223</td>
<td>0.026</td>
<td>59.38</td>
</tr>
<tr>
<td>Live weight at 30 days, kg</td>
<td>26</td>
<td>8.392</td>
<td>0.358</td>
<td>21.73</td>
</tr>
<tr>
<td>Average daily gain from birth to 30th day, kg/day</td>
<td>26</td>
<td>0.186</td>
<td>0.015</td>
<td>40.16</td>
</tr>
<tr>
<td>Live weight at 70 days, kg</td>
<td>26</td>
<td>15.546</td>
<td>0.458</td>
<td>15.03</td>
</tr>
<tr>
<td>Average daily gain from birth to 70th day, kg/day</td>
<td>26</td>
<td>0.182</td>
<td>0.007</td>
<td>19.36</td>
</tr>
</tbody>
</table>

* – P ≤ 0.05, ** – P ≤ 0.01, ***- P ≤ 0.001
lams, compared to that of females. The obtained data on growth intensity corresponds to the data obtained by Staykov (2005) – 0.216 kg/day and are higher than the data, obtained by Nedelchev & Stoyanov (2004) – 0.180 kg/day.

Live weight data of lambs from the Middle Rhodopean breed during the study period are shown in Table 2. Male lambs were born with 0.229 kg higher live weight than female lambs, the difference of 5.77% was not statistically significant. Odjakova (2014) obtained similar results for live weight of lambs in a study of three farms in the middle Rhodopes and found average live weights for female lambs at birth ranging from 2.860 – 3.760 kg and for males from 3.590 – 4.130 kg. The obtained data were higher in value than the results, established by Marinov (1973) and Vasilev et al. (2000), 2.694 kg and 3.034 kg respectively, which was due to the improved feeding and rearing conditions of the animals.

The female lambs of the Middle Rhodopean breed grew intensively and reached the live weight of the males in the period up to 30 days. Marinov (1973) and Vasilev et al. (2000), obtained the following results for live weight of 30 day-old lambs of the same breed – 6.899 kg and 7.820 kg, respectively, which was 50.4% and 43.72% lower live weight, compared to the results obtained for lambs from the Middle Rhodopean breed. The high weight at 30 days in the examined female and male lambs of the Middle Rhodopean breed was due to the application of improved breeding technology and feeding conditions. The results, obtained at 70th day at weaning of the lambs from the Middle Rhodopean breed were close to the results, obtained by Odjakova (2014), who found that the live weight after weaning varied from 19.390 to 21.110 kg. Marinov (1973) and Vasilev et al. (2000), established 12.950 and 15.430 kg live weight at weaning of Middle Rhodopean lambs, respectively. The values of the coefficient of variation for the live weight trait of female lambs ranged from 11.02% to 26.11%, and for males from 7.37% to 17.83%.

Average daily gain (Figure 2) of lambs from the Middle Rhodopean breed increased from birth to the 30th day in both groups, then decreased in the final period until weaning. The obtained data on the average daily gain on the 70th day (0.218 kg) were higher than the results, obtained by Marinov (1973) – 0.160 kg and were close to those, obtained by Odjakova (2014).

The values for the average daily gain trait in female lambs from the Middle Rhodopean breed until weaning ranged from 0.195 – 0.212 kg/day, and in males ranged from 0.228 – 0.244 kg/day.

Table 2. Live weight of Middle Rhodopean lambs at birth, at 10, 30 and 70 days

<table>
<thead>
<tr>
<th>Traits</th>
<th>Breed / Group</th>
<th>Middle Rhodopean females</th>
<th>Middle Rhodopean males</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>( \bar{x} ) ± Sx</td>
<td>C</td>
<td>n</td>
</tr>
<tr>
<td>Live weight at birth, kg</td>
<td>23</td>
<td>3.739 ± 0.086</td>
<td>11.02</td>
<td>28</td>
</tr>
<tr>
<td>Live weight at 10 days., kg</td>
<td>23</td>
<td>6.013 ± 0.327</td>
<td>26.11</td>
<td>28</td>
</tr>
<tr>
<td>Average daily gain up to the 10th day, kg/day</td>
<td>23</td>
<td>0.227 ± 0.031</td>
<td>65.59</td>
<td>28</td>
</tr>
<tr>
<td>Live weight at 30 days. kg</td>
<td>23</td>
<td>13.896 ± 0.636</td>
<td>21.96</td>
<td>28</td>
</tr>
<tr>
<td>Average daily gain from birth to 30th day, kg/day</td>
<td>23</td>
<td>0.339 ± 0.021</td>
<td>29.13</td>
<td>28</td>
</tr>
<tr>
<td>Live weight at 70 days, kg</td>
<td>23</td>
<td>18.761 ± 0.491</td>
<td>12.56</td>
<td>28</td>
</tr>
<tr>
<td>Average daily gain from birth to 70th day, kg/day</td>
<td>23</td>
<td>0.215 ± 0.007</td>
<td>15.54</td>
<td>28</td>
</tr>
</tbody>
</table>
Conclusions

The average live weight at birth of female lambs from the Karakachan breed was 2.801 kg, and of males – 3.009 kg. The highest average live weight (3.834 kg) was established in male lambs from the Karakachan breed in the farm in the Research Center for Stockbreeding and Agriculture.

Average live weight at birth of female lambs from the Middle Rhodopean breed was 3.739 kg, and of male lambs – 3.968 kg. The highest average live weight (4.266 kg) was established in male lambs of the Middle Rhodopean breed in the farm in Borino village.

Male and female lambs from the Middle Rhodopean breed were born with significantly higher live weight, compared to the lambs from the Karakachan breed.

The highest average daily gain of 0.246 kg was established in male lambs from the Karakachan breed in period up to 30 days. The highest average daily gain (0.339 kg) was established in female lambs from the Middle Rhodopean breed during the 30-day period.

References

Dechev, V. (1905). Pasturage in the Middle Rhodopeans. Oralo, 21, (Bg).


Odzhakova, Ts., Staikova, G. & Todorov, P. (2021). Character-
istics of Karakachan sheep breed reared under different conditions. Scientific Papers. Series D. Animal Science, 64 (1), 63-68.


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