Comparative Study Regarding Body Weight in Turcana and R_1 German Blackheaded x Turcana yearling ewes

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Abstract
Researches were carried out in a commercial sheep farm from Arad county, situated in western Romania. Yearling ewes, with their age ranging from 12 to 13 months were included in the trial. Two genotypes were considered, purebred indigenous Turcana (TA, n = 18) and R_1 German Blackheaded 75% x Turcana 25 % (R_1GBT, n = 17) back-crosses. The aim of the current study was to evaluate the effects that crossbreeding local Turcana sheep with the meat specialized German Blackheaded breed have on the body development of maiden ewes. Results have shown that the R_1GBT back-cross gimmers had a significantly ($p \leq 0.001$) higher body weight, of 56.81 kg when compared with the TA purebreds, which had on average 45.0 kg. Wool production and the length of the wool-staple was significantly higher ($p \leq 0.001$) in TA yearling ewes when compared to their counterparts. Results of the current study outlined that the R_1GBT yearling ewes are more precocious when body weight is concerned, and this could lead to their introduction to reproduction starting with 12 months of age.

Keywords: crossbreeding, German Blackheaded, meat production, sheep, Turcana, wool traits.

1. Introduction

With a number of more than 10 million sheep, Romania is ranked among the top countries of the European Union [1]. Of all European Union countries, Romania ranks the 4th place in meat production and exports 50 – 60 thousands tones/year of sheep meat [1].
In every year, the best price in exports was obtained for the lambs born during the autumn and sold at the end of spring. With all advantages, the share of milk lambs delivered in autumn represents only 3-5% of total annual export volume.

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Among the local breeds, Turcana sheep are rustic and well adapted, found in every relief areas, holds a share of 70% of the breed structure in Romania. This breed has the reproduction period in autumn season and during our of season, the frequency of sheep's which exhibit oestrus is very low, only 10-20% of livestock intended for mating [2].
Sheep breeds specialized in meat production have the reproduction season almost all year round, with a lower frequency during the hot period of July and August, aside from some exceptions, such as Dorper breed. This breed performances and adaptability to housing conditions in our country were described by Budai el al 2013. Lamb-ewes gain weight quickly, mature early and may be mated at around 9 months of age, therefore running the rams with ewes continuously

all over the year can also be an option to increase the sale number of lambs born out of season.
Producing crossbreed lambs specialized for meat from autochthonous sheep breeds and breeds specialized for meat, for several years, is usual method for many Romanian sheep breeders.
Plenty of researchers have shown that results obtained depend on breeds used and the ability of finding the most favourable crossing combinations between autochthonous and specialized breeds [4].
In meat German Blackheaded ewe lambs F1 50% x Turcană 50% was revealed that body weight is significantly higher ($p<0.001$) compared with Turcana ewe lambs [5].
In present time it was questioned if crossing for returning to meat breed comes with an appropriate increase of body weight in order to have the first mating at age of one year and if it manifests oestrous with a high frequency in low season also.
The aim of this study was to evaluate the body weight, the quantity of sheared fleece and the length of staple in hybrid R_1 German Blackheaded 75% x Turcana 25% ewes, aged 12-13 months, by comparison with 100% Turcana ewes.

2. Materials and methods

The research was conducted in a sheep farm, placed in Arad county, in 2014, on ewes lambs aged 12-13 months, divided into two groups: one represented by 18 ewes lambs White Turcana 100% and a group of 17 ewes lambs, hybrid R_1 German Blackheaded 75% x Turcana 25%
The lambing takes place in February and March. During suckling, these ewes received maternal milk, and from 2 weeks aged until weaning (2.5 months) they got supplementing feeding with hay and concentrated with 16% crude protein. After weaning, throughout the pasture period, they consumed only green grass on a natural pasture. During winter, they ate ad libitum green grass from a culture of winter barley, supplemented with hay and concentrates during periods when due to weather conditions, they did not had access to pasture.
When the shearing took place, when the ewes were 12-13 months aged, it was registered the body weight, the sheared wool quantity and the length of staple. For body weight, it was used a DMI 610 platform scale with a deviation of 0,1 kg, and for wool, a Kern CH 50K hook scale with an error margin of 0.05 kg.
Based on primary data, it was calculated average and standard deviation, and testing the significance of differences was realized using Mann Whitney test [6].

3. Results and discussion

Body weight, correlated with the occurrence of oestrus is essential for having mating of young ewes at an early age (10-12 months). Generally, in autochthonous breeds of sheep, the ewes exhibit oestrous at 6-7 months. At the beginning of mating period, it is accepted for ewes to have at least 75% of an adult weight, which means 40-45 kg, in order not to have a negative influence on subsequent body development and on productions level.
At the shearing done at age 12-13 months, it was registered the body weight on hybrid R_1 German Blackheaded 75% and White Turcana 100% ewes. The data obtained are shown in Table 1.
Analysing the tabled information, it is found that ewes lambs TA 100% had at shearing an average body weight of 45,0 kg, very high for this rustic and late breed, the variability between individuals being very low (CV = 8.22 %).
In same housing conditions and same age, body weight in hybrid lamb ewes R_1 GBM x TA was 11.76 kg higher, average value being 56.81 kg, with a slightly higher variability among individuals (CV % = 10.57 %).
The difference in body weight of 11.76 kg ($p<0.001$), in favour for crossbred lamb ewes R_1 GBM x TA is highly significant.

Table 1. Variability indices and significance of differences for body weight in ewes TA and R_1GBM x TA aged 12-13 months (kg)

Specification	n	x ± Sx	s	CV %
Turcana - A	18	45.0 ± 0.87	3.70	8.22
R_1 GBM x TA - B	17	56.81 ± 1.60	6.57	11.57
Differences: A vs B	- 11.76 (26.1 %)***			

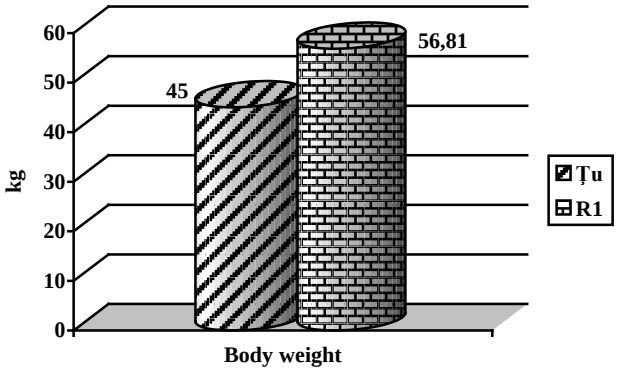

Figure 1. Graphic representation of body weight in ewe lambs TA and R_1 GBM x TA aged 12 – 13 months

Palas Constanta Research and Development Institute for Sheep and Goat Housing recommends that young sheep to be sent to breeding at a minimum body weight of 38-40 kg.

Our study reveals that lamb ewes evaluated at 12-13 months age have gained a body weight much higher, and so they can have the first mating 4 months sooner compared to traditional system, if we use the reference weight of 40 kg.

Table 2 presents the variability indices and significance of differences for wool quantity in ewes lambs evaluated through the experiment.

Average quantity of wool sheared of 3.94 kg in 100% WT ewes, is significantly higher ($p<0.001$) with 1.04 kg in crossbred lamb ewes R_1 GBM x TA (2.9 kg).

At a visual inspection of wool fleece, it was observed that in hybrid ewes lambs, the wool was cleaner, with high lustre, undulations well marked and specific features for German Blockheaded breed.

Table 2. Variability indices and significance of differences for quantity of wool sheared (kg)

Specification	n	x ± Sx	s	CV %
TurcanA - A	18	3.94 ± 0.12	0.51	12.93
Hybrids R_1 GBM x TA - B	17	2.90 ± 0.10	0.43	14.68
Differences: A vs B		+ 1.04 (26.39 %)***		

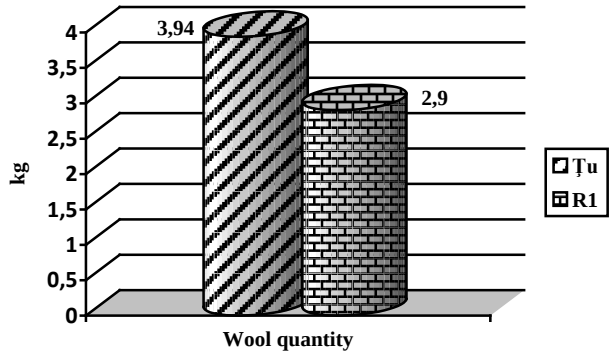

Figure 2. Graphic representation of wool sheared quantity in ewes lambs TA and R_1 GBM x TA, aged 12-13 months

Variability indices and significance of differences for length of staple in ewes lambs studied are presented in table 3.

The length of staple, a highly important feature in textile industry in order to establish the fibre destination, is significantly higher ($p<0.001$) in ewe TA lambs (30.89 cm), with 4.54 cm, compared with crossbred ewes lambs R_1 GBM x TA (31.45 cm).

Table 3. Variability indices and significance of differences for length of staple (cm)

Specification	n	x ± Sx	s	CV %
Turcana - A	18	30.89 ± 0.56	2.37	9.17
Crossbred R_1 GBM x TA - B	17	26.35 ± 0.38	1.58	5.99
Differences: A vs B	+ 4.54 (17.22 %)***			

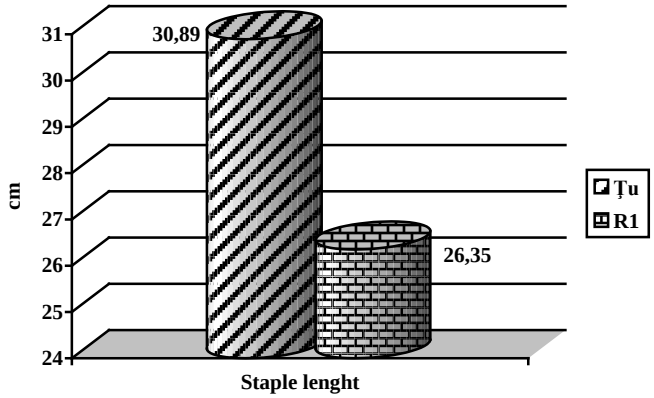

Figure 3. Graphic representation of staple length in ewes lambs TA and R_1 GBM x TA, aged 12-13 months

Individual variability for staple length is small to medium in ta (9.17%) and small in R_1 GBM x TA crossbreeds (5.99%).

4. Conclusions

Body weight in crossbred ewes lambs R_1 GBM x TA is significantly higher ($p<0.001$), with 26.1% compared to 100% Turcana ewes lambs.

Ewes lambs R_1 GBM x TA can have the first mating when aged 8-9 months;

Quantity of wool sheared in ewes TA lamb is 26.39 % significantly higher ($p<0.001$) than crossbred ewes lambs R_1 GBM x TA.

The length of staple is significantly lower ($p<0.001$) in hybrid ewes lambs R_1 GBM x TA with 17.22 % compared with Turcana ewes lambs.

Acknowledgements

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