Influence of Birth type and Sex on the Growth performance of Dorper lambs

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Abstract
Nowadays, South-African Dorper sheep is reputed for its outstanding lamb production and adaptability. The Dorper ewe can breed out of season and the lambs are proven to gain well on both pasture and in feedlot as well. The objective of the present study was to evaluate the growth performance of suckling purebred Dorper lambs under Hungarian rearing conditions. Lamb birth weight (BW), body weight at the age of 30 (BWT(30)) and 60 days (BWT(60)) and average daily gain (ADG) was estimated between birth and 30 days and the age of 30 to 60 days. The average birth weight for Dorper lambs was 3.80±0.09 kg and singles were significantly (P<0.001) heavier than twins with an average 4.36±0.10 kg and 3.54±0.11 kg respectively, but sex did not affect birth weight. From the age of 30 days body weight increased till weaning (P<0.05) when male lambs reached an average 20.87±0.74 kg and female lambs 18.85±0.55 kg. Daily weight gain was affected by birth type between the age of 0-30 days. The average weaning weight was 19.87±0.47 kg and singles were 22.36±0.64 kg significantly (P<0.001) heavier than twins 18.27±0.48 kg. Based on the weaning weight results in can be concluded that by the age of 60 days Dorper lambs could reach a desired weight that fits to the demand of the Italian and Spanish market, therefore Dorper breed is suitable for light lamb production.

Keywords: Dorper, growth performance, lamb, sheep, weaning

1. Introduction
Nowadays lamb and live sheep export has the most determining importance on the Hungarian sheep sector, recently more than 90% of the Hungarian sheep meat export goes to Italy as lightweight lamb [1]. The quality of lamb meat for the market and consumer is defined by its colour, juiciness, tenderness and flavour. The physicochemical and organoleptic characteristics are preliminary affected by genotype and slaughter weight, therefore breed selection is a key decision that each breeder has to make, because the wise use of a sheep breed is the prerequisite of profitable lamb production [2]. Among the Northern and Central-European countries heavy carcasses of 16-23 kg are preferred, while in Italy, Spain the product called „light lamb” (the lambs with lower carcass weights than 13 kg) is being in demand [3, 4], but only few breeds or cross-breds, are suitable for light lamb production. Good mothering ability, easy lambing, high twinning rate is required from the ewes, nevertheless the mothers should be able to produce milk of sufficient quantity and quality, in order to achieve good lamb growth. The rams used as terminal sires should produce vigorous lambs having high growth rates [5].

South-African Doper is a synthetic breed, a cross between Dorset Horn and Persian Blackheaded. As a single purpose, wool-shedding meat sheep it is selected for lamb production [6]. Dorper ewes are regarded as early maturing and capable of year around breeding and they are also reputed for their good mothering abilities. A lambing percentage of
150% can frequently be achieved with a low lamb mortality rate, resulting in 91% weaning [7]. Doper rams are used as terminal sires to produce lambs with intensive growth rate, good post-weaning feed efficiency and carcass traits [8]. Lambs grow rapidly and can attain a high weaning weight of 28-30 kg in a 100 day period, which is an economically important characteristic in the breeding of mutton type sheep.

Little information on the growth performance of suckling Dorper-sired lambs is presented in the scientific literature therefore this study was conducted to evaluate the lamb growth of purebred Dorper lambs raised with their dams, under conventional conditions in Hungary.

2. Materials and methods

The experiment was performed at the Experimental Farm of Debrecen University between January and May 2013. In 2012 after a 2 week flushing period a mixed group of primiparous and multiparous Dorper ewes (25 ewe/group) were assigned into single ram mating groups. The joining period lasted six weeks from mid August. During gestation the ewes were group penned in a straw bedded shed and feed bunk management was used.

Lambing occurred from 17th of January till the 13th February. At lambing time the ewes were removed with their lambs to a lambing jug for a 1-3 days period. After the ewes laboured, lamb birth weight (BW) was measured using an electronic scale (Tru-test AG500) and newborns were ear tagged soon after birth. Till weaning (60 days of age) the lambs were kept together with their dams and were group penned. In post-lambing period ewes were fed with ad libitum hay and cereal based loose mix concentrate (whole corn, oat, barley in a 50:25:25 ratio), water from wall mounted drinkers and mineral licks were ad libitum available. Till weaning lambs were kept together with their dams without receiving any feed supplementation.

At the age of 30 days (BWT_{30}) and 60 days (BWT_{60}) lambs body weight was measured. Average daily gain (ADG) was estimated between birth and the age of 30 days and from the age of 30 days to 60 days, the time of weaning. Birth weight, 30 days weight, 60 days weight data were analyzed by using General Linear Model (GLM) procedure of SPSS 13.0 to establish the effect of birth type and sex on the performance parameters.

3. Results and discussion

Average birth weight and growth performance of the lambs are presented in Table 1. Birth weight of lambs is an early measurable trait which has a positive genetic correlation with further live weights. Estimates of direct heritability (h^2) for birth weight ranged from 0.09 to 0.62, when different mutton sheep breeds (Hungarian Merino, Ile de France, Charollais, Texel, Suffolk, German Mutton Merino, German Blackheaded) were compared, raised under Hungarian rearing conditions [9].

The average birth weight for Dorper lambs was 3.80±0.09 kg. Singles were significantly (P<0.001) heavier than twins with an average 4.36±0.10 kg and 3.54±0.11 kg respectively, but sex did not affect birth weight. Kakuk (2012) [10] reported similar findings of 3.5 kg and Inyagala et al. (1991) [11] 3.7 kg average birth weight. Birth weight of Dorper lambs was lower compared to the findings of Neser et al. (2001) [12] 4.0 kg and Inyagala et al. (1992) [13] 4.1 kg and higher in a comparison with 3.1 kg (Burke and Apple, 2007) [14]. The study results obtained in Zimbabwe by Assan and Makuza (2005) [15] reported an average 4.26±0.04 kg birth weight for male lambs and 3.66±0.09 kg for female lambs. Mean birth weights for single Doper lambs was 4.41±0.04 kg and 4.39±0.04 kg for twins, while birth status had non- significant affect on birth weight. Gavojdian et al. (2012) [16] compared the growth rate of Romanian indigenous Turcana and F1 Turcana x Dorper F1 crossbred lambs. Single born Turcana x Dorper lambs were heavier 4.20±0.006 kg than multiples 3.43±0.107 kg.

The differences between the reported birth weights in single lambs could be due to the different nutrition that pregnant ewes received during gestation and also ram should be expected to affect lamb birth weights.

At the age of 30 days the average weight of Dorper lambs was 10.96±0.31 kg, when birth type had a significant (P<0.001) effect on body weight. Singleton lambs were heavier 12.82±0.45 kg than twins 9.80±0.26 kg. Male lambs reached a weight of 11.35±0.49 kg while female lambs were lighter with an average 10.43±0.34 kg, but there was no significant difference between the results.
Schoeman (2000) [17] reported unpublished data from Synman and Jackson-Moss compared the 42 days live weight of hair and wool line Dorper rams and ewes. There was no significant difference between hair and wool lines, even though ram lambs were 1.0 kg heavier (16.3 kg, 16.2 kg) than ewes (15.2 kg, 15.2 kg) in both lines.

Weaning weight is of great interest for breeders as determining the economic returns from sheep. At the age of 60 days Dorper lambs had an average weaning weight of 19.87±0.47 kg. Weaning weight results of singles were 22.36±0.64 kg significantly (P<0.001) heavier than twins 18.27±0.48 kg. At the age of 90 days Dorper lambs reached 14.3 kg, 19.4 kg, 18.4 kg of weaning weight [18]. From the age of 30 days body weight increased to weaning (P<0.05) when rams reached an average 20.87±0.74 kg and ewes 18.85±0.55 kg.

The average daily gain of Dorper lambs from birth to the age of 30 days was 237.20±8.46 g/day. The effect a birth type was significant (P<0.001) on average daily gain from 0 to 30 days when single lambs gained better 281.80±13.70 g/day than twins 209.16±7.65 g/day. There was no significant difference in the growth performance of ram 280.60±11.10 g/day and ewe 268.10±21.00 g/day lambs. In the experiment of Gavojdian et al. (2012) [16] single born Turcana x Dorper lambs had higher average daily gain results 234±0.002 g/day than multiples 208±0.003 g/day from birth to 90 days period. From 30 days of age to weaning the daily weight gain of Dorper lambs was 296.80±8.99 g/day lower than reported by Snowder and Duckett (2003) [19] 313 ± 9.6 g/day from birth till 77 days of age. Birth type had no effect on the performance results of singleton 318.20±16.40 g/day and twin 282.96±9.83 g/day lambs.

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<th>BW (kg)</th>
<th>BWT (30)</th>
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<th>ADG (0-30d)</th>
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<td>X±SEM</td>
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<td>Lambs</td>
<td>61</td>
<td>3.80±0.09</td>
<td>57</td>
<td>10.96±0.31</td>
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<td>19.87±0.47</td>
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<td>296.80±8.99</td>
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<td>Singles [A]</td>
<td>25</td>
<td>4.36±0.10</td>
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<td>12.82±0.45</td>
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<td>318.20±16.40</td>
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<td>Twins [B]</td>
<td>36</td>
<td>3.54±0.11</td>
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<td>209.16±7.65</td>
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<td>Rams [a]</td>
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<td>11.35±0.49</td>
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<td>280.60±11.10</td>
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<td>Ewes [b]</td>
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<td>268.10±21.00</td>
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[A] vs [B] *** *** *** *** ns
[a] vs [b] ns ns * ns *
ns-Not significant *Significant (P<0.05) *** Significant (P<0.001)

4. Conclusions

Dorper breed can be used to produce lamb with high growth rate. Single lambs performed better than multiples and male lambs also performed considerably better than their female counterparts. Therefore proper nutrition should be used for ewes having twins in order the lambs could be able to express their full genetic potential.

Based on the weaning weight results in can be concluded that by the age of 60 days Dorper lambs could reach a desired weight that fits to the demand of the Italian and Spanish market, therefore Dorper breed is suitable for light lamb production.

Acknowledgements

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