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Relationship between the time of separation and the growth performance of artifially reared Awassi lambs

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ABSTRACT

Twenty-one artificially housed Awassi lambs' growth performance (body weights – BW; average daily gain – AVG) was investigated in the first 4 weeks. Animals were divided into three groups (seven lambs in each group) depending on the time of separation. Lambs in the first group were separated immediately after lambing (IW – immediately weaned). Seven lambs were removed 6 hours (6H) and other seven animals were removed 12 hours (12H) from dams after parturition. From the first week, live weight of IW lambs were significantly higher than 12H lambs ($P<0.05$ at 1 wk age; $P<0.001$ at 2, 3 and 4 wk age). The same tendency was found evaluating the ADGs. IW lambs had the highest ADG at 1, 2, 3 and 4 wk of age and the differences were significant compared to the values of 12H lambs ($P<0.001$). Regarding to the differences of body weights and ADGs of IW and 6H groups, no distinctions were found during the whole experiment. On the other hand, 6H lambs had higher body weights than 12H lamb from the 2nd wk (2 wk age: $P<0.01$; 3 wk age: $P<0.001$; 4 wk age: $P<0.01$) and it was the same regarding to ADGs, too (1 wk age: $P<0.001$; 2 wk age: $P<0.01$; 3 wk age: $P<0.001$; 4 wk age: $P<0.01$). IW lambs showed the highest average ADG (app. 230 g/4wk) and BW (9.98 ± 2.57 kg) at the end of the experiment.
(Keywords: Awassi sheep, artificial lamb rearing, growth performance)

INTRODUCTION

Mutton has traditionally very important role in the food supply of the Mediterranean and Middle-East countries. Awassi is a widespread fat-tailed sheep breed of these regions, with relatively high milk productivity (*Epstein*, 1987). Production of this breed is mainly based on semi-intensive systems with low prolificacy and high milk production (*Emsen et al.*, 2004). Whereas, intensive milk producing systems has become widespread in many countries to increase the milk productivity. As it is well-known from literature, Awassi sheep is able to accommodate to the conditions of intensive keeping system (*Pollott* and *Gootwine*, 2001). In addition, artificial lamb rearing is a common keeping method in intensive milk-production systems (*Napolitano et al.*, 1995; *Martin*, 1999), which forces lamb separation from dams as soon as it possible. This technology based on early weaning and artificial rearing of lambs on milk replacer and it has an important impact on increasing flock productivity. One of the main factors which have effect on the early development of lambs is the time of weaning. The first 10–12 hours post-partum is a critical, sensitive period during which suckling plays a key role for the establishment of the mother-lamb bond (*Alexander et al.*, 1986; *Napolitano et al.*, 1995; *Nowak et al.*, 1997; *Fisher* and *Matthews*, 2001). It is known that lambs permanently nursed by their dam do not accept being bottle-fed and do not socialise to humans at a young age, despite regular short sessions of human petting (*Boivin et al.*, 2001).

As expected from literature, lambs separated early from their mother, readily accepted additional human contact including drinking from a bottle or a bucket of milk (*Markowitz et al.*, 1998; *Boivin et al.*, 2001). Awassi sheep has recently been introduced in Hungary as well (by Bakonszeg Awassi Ltd.), based on an Israeli flock imported in 1989. This breed indicates favourable results in Hungary, primarily in intensive milk production. Whereas, technological difficulties arose, related to the handling of a few lambs. These lambs were not removed from dam immediately after parturition (birth at late-night or early dawn) and were not accept bottle-feeding and artificial teats. Therefore, the aim of this experiment was to investigate the effect of weaning time on early development and growth performance of lambs, considering to the different separation moments during the sensitive period (10–12 h postpartum).

MATERIALS AND METHODS

Twenty-one artificially reared Awassi lambs were divided into three groups with seven animals in each group. IW (immediately weaned) lambs were separated from dams immediately after parturition. These animals were bottle-fed by colostrums three-times a day and were trained to accept the artificial nipple in the first two days postpartum. Other two groups (6H and 12H) were moved from dams 6 and 12 h after parturition and were allowed to suck their mother until that time. After that, 6H and 12H lambs were also trained by the stockpersons to accept the artificial teats. All the lambs were fed with colostrums in the first two days and each group was kept in a 4 m×2 m straw bedded pen. From the 3rd life day, lambs had got also milk powder and its percentage was continuously increased until the 6th life day. From the 14th day of their life, all the lambs had ad libitum access to commercial lamb starter diet and alfalfa hay. Milk replacer was mixed and portioned by ALFA-LAVAL milk equipments which were cleaned and disinfected daily. Used straw of the pens was cleaned and changed; the fence of pens was cleaned and disinfected each morning. Body weights (BW) were measured daily in the first week, than weekly for 4 weeks. Average daily gains (ADG) were calculated from the differences of weights. Data were evaluated by variance analysis (ANOVA) using linear statistical model.

RESULTS AND DISCUSSION

Body weights (BW) of lambs at different ages are shown in *Figure 1*. Significant differences were not found between birth weights of the three groups. At the end of the 1st wk, IW lambs were heavier ($P<0.05$) than 12H lambs, but significantly difference was not found between IW and 6H lambs' body weights at that time.

From the 2nd wk until the end of investigation, very strong significance occurred between live weights of IW×12H and 6H×12H animals (occasionally: $P<0.01$ and $P<0.001$) but no differences were found at IW×6H groups during the whole experiment. From the end of the 1st wk, lambs from 12H group had the lowest live weights until the end of the experiment ($BW_{12H\ at\ 4wk}$= 5.35 ± 0.31 kg; $BW_{6H\ at\ 4wk}$=8.04 ± 1.73 kg; $BW_{IW\ at\ 4wk}$=9.98 ± 2.57 kg). The same tendency evolved at average daily gains (ADGs) which are shown at *Figure 2*. The ADGs of IW group had not varied significantly from 6H group during the experiment. Whereas, differences between IW×12H and 6H×12H groups were very strong, from the beginning to the end of the investigation (occasionally: $P<0.01$ and $P<0.001$). Mean of AVGs of the 4 wk was the lowest at group 12H (app. 60 g/4wk), while the same value was much higher at the other two groups (IW: app. 230 g/4wk; 6H: app. 180 g/4wk).

Figure 1

Body weights of lambs at different ages (IW: immediately weaned; 6H: separated 6 h post-partum; 12H: separated 12 h post-partum). Bars with different letters are significantly different (a-a: NS, non significant; a-b, a-c and b-c: P<0.05)

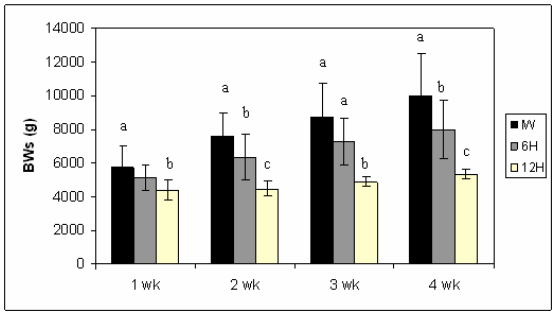
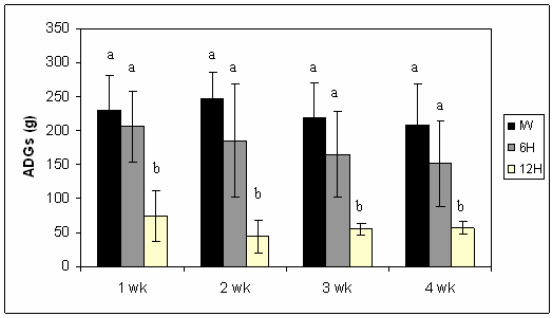


Figure 2

Changing of lambs' average daily gains (ADGs, means and standard deviations) during the investigation (IW: immediately weaned; 6H: separated 6 h post-partum; 12H: separated 12 h post-partum). Bars with different letters are significantly different (a-a: NS, non significant; a-b: P<0.05)



Two of 12H lambs passed away at 3 wk age, because of very strong leakage and low resistance against diseases. These animals were not able to accept bottle-feeding and the artificial nipples. Stockpersons tried to feed them by hypodermic syringe for 5 or 6 days but the amount of milk replacer what they accepted in this way was not enough to survive. As in this study found, it was very difficult to bottle-feed the animals which were able to suck the dam in the first 10–12 hours. Comparing the BWs and ADGs of the investigated groups, we can tell that the presence of dam in the first few hours has had very strong effect on the development of the animals. IW and 6H animals showed significantly higher results both in BWs and ADGs than the 12H lambs. It means that the time of separation influences the parameters of growth performance. The critical period of weaning is between 6th and 12th hour post-partum, as it is also known from previous literature. Additionally to this study, behavioural observations were also done on the artificially reared lambs and the evaluation of data is under process. It would be interesting to identify the effects of keeping method on the behaviour of lambs, with special regard on the meat production parameters.

CONCLUSIONS

Immediate separation after parturition and direct training can help the lambs to accept the artificial nipple and accommodate to the new rearing conditions. As the results show, that was more difficult to feed those lambs which had the chance to suck for a few hours, compared to the immediately separated animals. IW and 6H lambs accepted easier the artificial nipple then 12H lambs, and IW lambs showed the best growth performance in this study. Growth performances were significantly different between the selected groups, and it means that the presence of dam has had very strong effect on the development of the lambs.

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