Journal of Animal and Veterinary Advances 12 (13): 1156-1161, 2013
ISSN: 1680-5593


# Growth and Survival Ability Characteristics in Awassi Lambs Weaned at Different Periods

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**Abstract:** This study was conducted to investigate the effects of various ages of weaning on growth rate, survival ability and body measurements of Awassi lambs. Also, present study aims to determine advantages and disadvantages of weaning in early ages in terms of observed parameters and offer a direction to the growers. The material of this research was composed of 90 Awassi lambs which separated into three groups including 30 lambs in each group. It was paid attention to the closeness averages of birth weights among groups and equable of male and female specimens in each group when the groups created. During the research, every 15 days, various body sizes and live weights of lambs were determined in same day and time. Lambs of first, second and third groups were weaned on 30, 60 and 90th days of ages, respectively. Average birth weights were 4.59, 4.37 and 4.42 kg; average live weights of 30th day were 10.93, 10.35 and 9.82 kg ($p<0.05$); average live weights of 60th day were 17.82, 14.35 and 17.40 kg ($p<0.01$); average live body weights of 90th day were 25.97, 22.17 and 23.59 kg ($p<0.01$) and survival ability rates of 90th day were 100, 90 and 86.67% in lambs of first, second and third groups, respectively. According to the results of this research, can say that; through early weaning, will increased through the production of marketable milk in sheep and early weaning, investigated terms of features can be said to outweigh the positive aspects of Awassi lambs.

**Key words:** Awassi, lamb, growth, survival ability, positive

## INTRODUCTION

The sheep constitute a significant place within the agricultural structure of the country by virtue of being one of the earliest domesticated animal species in addition to providing economical support to the mankind which in turn enabled the expansion of this particular species (Karakus, 2007; Isik, 2010; Ceyhan *et al*., 2009; Paksoy *et al*., 2006; Esen, 1997; Alcicek and Yurtman, 2009). Sheep breeding is a traditional form of living for rural family-enterprises. Besides it is one of the husbandry branches that possesses a vital role by virtue of its advantages such as lamb breeding, mutton, sheep milk, fertilizer and wool (Paksoy *et al*., 2006; Alcicek and Yurtman, 2009; Karabacak *et al*., 2010; Sahin and Akmaz, 2004; Koycegiz, 2003). The most salient element in the achievement of a successful sheep breeding is to detect the most proper method and style corresponding to the features of geographical and economical conditions in the specific region and selecting the best sheep type or sheep race according to the breeding objectives (Isik, 2010; Esen, 1997).

Weaning process of the lamb lasts approximately 4-16 weeks according to breeding systems, performance of the animal and breeding style of the lamb. In cases when sheep milk matters greatly, it covers a period of 5-6 weeks; in cases when suckling lamb is cut, it covers an entire period of breeding that extends to 5-6 weeks or in cases when the babies are bred together with their mothers on the grazing land, this period is likely to last longer than 100 days. In Turkey, the sheep are milked 2-3 months after giving birth and during this period all milk is suckled by the baby sheep. It has been reported that 30-35 kg of milk is sufficient for suckling period. Suckling period corresponds to the time when milk production is at its peak during lactation. Depending on the milk yield of races, the quantity of produced milk differs during this period. A variety of researchers have reported that weaning can be done between 4-6 weeks which causes no retardation in their development (Orskov, 1987; Mavrogenis, 1996; Taskin, 1999). Aside from age there are some other criteria that determine exact timing of weaning for the lamb. When the lamb reach 12-13 k or become 3-4 times heavier compared to their birth weight then they can be weaned (Altin *et al*., 2003).

It has been reported that size and weight increase that can be witnessed following birth is low from the period of zygote till birth; high from birth till sexual

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maturity then starts to descend and until adolescence it stays in a fixed level (Ozbey and Akcan, 2001; Tekin, 1991). Additionally the connection between the quantity of suckled milk and rate of growth is quite high and significant during the 1st 1 month. In the passing of time this close connection wanes and becomes insignificant during 8-10th weeks (Odabasioglu *et al*., 1996). Birth weight which also gives hints about fertility of mother is likewise a major indicator of postnatal growth (Koycegiz, 2003; Odabasioglu, 1990; Esen and Yildiz, 2000). Birth weight is an effective determinant of postnatal growth (Odabasioglu, 1990). Weaning which is a salient criterion in the development of lamb is also affected by a variety of factors such as weight, genotype, sex, type of delivery, birth weight, birth season and year, age of the lamb and breeding method (Karakus, 2007).

Recent studies have put forth that when the lamb is fed with sufficient amount of mother's milk, breeding shall be more economical and productive. In particular, the breeding that is aimed towards lamb-meat production or milk-production, a suckling period of 45-60 days is deemed to be sufficient (Odabasioglu *et al*., 1996).

Vitality ratio which refers to live birth and survival till certain ages is analyzed under two periods namely prenatal and postnatal (Isik, 2010; Ozbey and Akcan, 2001, 2003; Tekin, 1991; Esen and Yildiz, 2000). Prenatal vitality indicates normal development of fetus and healthy and live birth of the baby and this period is directly affected by the number of babies in uterus and care and nutrition provided to the mother (Isik, 2010). Postnatal period is a determinant criterion that refers to the number of babies which in turn stands for a financial asset. This period is also under the impact of various factors such as birth weight, sex, type of delivery, care and nutrition, year and season of birth, mother's age and weight at birth, being an indigenous or mixedrace (Karakus, 2007; Ozbey and Akcan, 2001, 2003; Tekin, 1991; Esen and Yildiz, 2000).

Present research aims to determine the negative and positive aspects of early weaning in terms of the Awassi lamb and based on the obtained findings to light the way for sheep-breeders.

## MATERIALS AND METHODS

This research was conducted in Husbandry Department in Sanliurfa GAP (Southeastern Anatolia Project) Directorate of Agricultural Research Institute.

**Animal material:** As animal material, single-birth 90 lambs that were given birth by 3 elderly Awassi sheep in the research institute have been used. To avoid statistical incongruities while setting the groups particular care has been paid to select inter-group birth weights from approximate figures. Additionally the equal distribution of sexes amidst groups has also been prioritized.

**Feed material:** For the test procedures red lentil straw, wheat straw and lamb-breeding feed procured from the institute have been used as feeding stuff. Besides, throughout the research, the lamb have been set free on the grazing land every single day. The feeds utilized for the test have been analyzed in Diyarbakir Provincial Control Laboratory (Table 1).

In the measurement of birth weight and subsequent development of the sheep 10 g sensitive scale has been used. In measuring the size of lambs, measurement stick and tape measure have been employed.

In the next 6 h after birth, the lambs were numbered with double-ear rings, weighted on 10 g sensitive scale and their birth weights were detected. In the research, the lambs were separated into three diverse groups according to their weaning time. Particular care was paid to distribute the lambs according to their birth weights and equal distribution of male and female sexes between groups.

The weaning practices of lambs were conducted in gradual steps 1 week earlier than the actual day of weaning and at the end of this particular week lambs were thoroughly weaned.

Of the lambs separated into three groups; the 1st group was weaned when the babies were 30 days old, 2nd group when the babies were 60 days old and the third group when the babies were 90 days old. The differences amidst groups have been observed. The essential daily feeds and water were provided to the lamb regularly. Lamb feed was provided in the same quantity for all groups throughout the research.

Prior to weighing, the lambs were starved for 12 h. Towards the aim of detecting development-growth performance of the lambs, their birth weights and days 15, 30, 45, 60, 75 and 90 weights were corrected via linear interpolation method and then calculated (Mundahl, 1998).

Vitality ratio of the lamb was detected via registering the deceased ones till the 90th day after birth. Vitality ratios were indicated as percentage per lamb on the ratio of survival during days 15, 30, 45, 60, 75 and 90.

Table 1: Utrition substance contents of forage and concentrated feed used in the trial

| Feeds | Dry material (%) | Raw oil (%) | Raw protein (%) | Raw cellulose (%) | Raw ash (%) | Organic material (%) | Metabolic energy (kcal $kg^{-1}$) |
|---|---|---|---|---|---|---|---|
| Lamb growing feed | 90.56 | 2.77 | 16.84 | 10.41 | 7.46 | 83.10 | 2743 |
| Lentil straw | 92.28 | 1.38 | 5.73 | 30.00 | 9.64 | 82.64 | 2026 |
| Wheat straw | 93.50 | 2.41 | 1.52 | 39.43 | 9.50 | 84.00 | 1590 |

**Statistical analysis:** On the analyzed features, the effects of dissimilar weaning periods were determined via Variance Analysis Method (SPSS, 1999). To the ends of comparing sub-group averages amidst the features deemed to be significant Duncan multiple comparison test was applied. To detect significance control of the difference amidst vitality ratio values of lamb groups till weaning period, $\chi^2$-test has been employed (Yildiz and Bircan, 1993).

## RESULTS AND DISCUSSION

The objective of current study was to draw a comparison amidst lambs that have been weaned at different periods.

**Growth:** In order to designate growth ratios of the lamb birth weights, days 15, 30, 45, 60, 75 and 90 live weights and birthday 15, 15-30, 30-45, 45-60, 60-75, days 75-90, 30, 60 and birthday 90 weight increases, the average values have been determined. Average and variation measurements of live weights are presented in Table 2. Average and variation measurements of live weight increases are demonstrated in Table 3.

Table 2 demonstrates that on the 15th day, the statistical difference amidst groups with respect to live weight is insignificant. Inter-group differences have gained statistical meaning after the 30th day and this statistical meaning has been on force till the end of research ($p<0.05$). As regards male lambs, the average increase of daily live weight has reached its peak in group 1 and 2 between days 75-90. In group 3, between days 45-60 the number has been the highest. The detected values have been respectively 289.84±14.330, 330.88±20.554 and 274.81±22.035 g.

**Survival ability:** Data on the vitality ratio of lambs have been provided in Table 4. As can be seen male lambs in group 2 and 3 have higher ratios of vitality compared to female lambs.

As obtained data on the vitality ratio of lambs are analyzed it surfaces that the statistical difference amidst groups is insignificant.

The averages of birth weights which have played role in the growth of lambs are respectively 4.59, 4.37 and 4.42 kg. These figures are compatible with Yarkin and Elicin (1966)'s findings manifesting that in Awassi lambs, birth weights may vary between 3.0 and 6.1 kg.

As the findings obtained from all three groups are analyzed together it surfaces that average birth weights are similar to weights detected in certain indigenous races (Ceyhan *et al*., 2009; Esen, 1997; Ozbey and Akcan, 2001, 2003; Tekin, 1991. Esen and Yildiz, 2000).

An analysis of the average increase in daily live weight has unleashed that in all three groups, subsequent to weaning period there has been a rise in daily liveweight (Esen, 1997; Ozbey and Akcan, 2001, 2003; Tekin, 1991). Concerning all periods of the groups, the period when both male and female lambs had the lowest increase in daily live weight is between days 30-45 for the second group.

Table 2: Live weight averages (kg) of lambs at different periods

| | | Group 1 | | Group 2 | | Group 3 | | |
|---|---|---|---|---|---|---|---|---|
| Periods | Gender | n | $\bar{X}\pm S_{\bar{X}}$ | n | $\bar{X}\pm S_{\bar{X}}$ | n | $\bar{X}\pm S_{\bar{X}}$ | p-value |
| Birth | Male | 16 | 4.84±0.121 | 15 | 4.44±0.212 | 17 | 4.56±0.227 | 0.340 |
| | Female | 14 | 4.30±0.177 | 15 | 4.29±0.162 | 13 | 4.24±0.225 | 0.969 |
| | Common | 30 | 4.59±0.114 | 30 | 4.37±0.132 | 30 | 4.42±0.161 | 0.493 |
| 15th day | Male | 16 | 8.20±0.260 | 15 | 8.01±0.343 | 17 | 7.67±0.367 | 0.508 |
| | Female | 14 | 7.92±0.280 | 15 | 7.61± 0.311 | 13 | 7.40±0.356 | 0.514 |
| | Common | 30 | 8.07±0.189 | 30 | 7.81±0.230 | 30 | 7.55±0.256 | 0.277 |
| 30th day | Male | 16 | 10.93±0.406 | 15 | 10.57±0.494 | 17 | 10.26±0.453 | 0.569 |
| | Female | 14 | 10.94±0.424$^{a}$ | 15 | 10.13±0.387$^{ab}$ | 13 | 9.24±0.342$^{b}$ | 0.016 |
| | Common | 30 | 10.93±0.288$^{a}$ | 30 | 10.35±0.311$^{ab}$ | 30 | 9.82±0.306$^{b}$ | 0.037 |
| 45th day | Male | 16 | 13.99±0.552 | 15 | 12.47±0.608 | 16 | 13.69±0.635 | 0.184 |
| | Female | 14 | 14.33±0.545$^{a}$ | 14 | 11.98±0.512$^{b}$ | 11 | 12.66±0.218$^{b}$ | 0.003 |
| | Common | 30 | 14.15±0.384$^{a}$ | 29 | 12.23±0.396$^{b}$ | 27 | 13.27±0.394$^{ab}$ | 0.003 |
| 60th day | Male | 16 | 17.57±0.731$^{a}$ | 15 | 14.52±0.709$^{b}$ | 15 | 18.16±0.762$^{a}$ | 0.002 |
| | Female | 14 | 18.10±0.657$^{a}$ | 13 | 14.15±0.726$^{b}$ | 11 | 16.36±0.241$^{a}$ | 0.000 |
| | Common | 30 | 17.82±0.490$^{a}$ | 28 | 14.35±0.500$^{b}$ | 26 | 17.40±0.479$^{a}$ | 0.000 |
| 75th day | Male | 16 | 21.64±0.814$^{a}$ | 14 | 17.81 ± 0.876$^{b}$ | 15 | 21.72±0.934$^{a}$ | 0.004 |
| | Female | 14 | 22.33±0.792$^{a}$ | 13 | 17.36±0.696$^{c}$ | 11 | 19.47±0.357$^{b}$ | 0.000 |
| | Common | 30 | 21.97±0.564$^{a}$ | 27 | 17.59±0.555$^{b}$ | 26 | 20.77±0.594$^{a}$ | 0.000 |
| 90th day | Male | 16 | 25.99±0.930$^{a}$ | 14 | 22.77±0.904$^{b}$ | 15 | 24.98±1.094$^{ab}$ | 0.074 |
| | Female | 14 | 25.95±0.861$^{a}$ | 13 | 21.53±0.842$^{b}$ | 11 | 21.70±0.391$^{b}$ | 0.000 |
| | Common | 30 | 25.97±0.627$^{a}$ | 27 | 22.17±0.620$^{b}$ | 26 | 23.59±0.720$^{b}$ | 0.000 |

$^{a-c}$Differences between the average values marked with different letters on the same lines are significant ($p<0.05$)

Table 3: Averages (g) of daily live weight increase of lambs at different periods

| | | Group 1 | | Group 2 | | Group 3 | | |
|---|---|---|---|---|---|---|---|---|
| Periods (days) | Gender | n | $\bar{X}\pm S_{\bar{X}}$ | n | $\bar{X}\pm S_{\bar{X}}$ | n | $\bar{X}\pm S_{\bar{X}}$ | p-value |
| 0-15th | Male | 16 | 223.77±12.721 | 15 | 237.40±13.548 | 17 | 207.00±14.753 | 0.304 |
| | Female | 14 | 241.23±14.415 | 15 | 221.26±13.021 | 13 | 210.72±13.864 | 0.302 |
| | Common | 30 | 231.92±9.5250 | 30 | 229.33±9.3530 | 30 | 208.61±10.131 | 0.181 |
| 15-30th | Male | 16 | 181.92±13.115 | 15 | 170.88±14.074 | 17 | 172.50±10.125 | 0.796 |
| | Female | 14 | 201.21±11.198$^{a}$ | 15 | 168.03±9.7370$^{b}$ | 13 | 123.10±12.153$^{c}$ | 0.000 |
| | Common | 30 | 190.93±8.7680$^{a}$ | 30 | 169.46±8.4130$^{ab}$ | 30 | 151.10±8.8990$^{b}$ | 0.007 |
| 30-45th | Male | 16 | 204.26±12.660$^{a}$ | 15 | 127.05±11.087$^{b}$ | 16 | 215.54±10.705$^{a}$ | 0.001 |
| | Female | 14 | 226.26±8.9260$^{a}$ | 14 | 126.57±10.406$^{b}$ | 11 | 200.69±9.8930$^{a}$ | 0.000 |
| | Common | 30 | 214.52±8.0650$^{a}$ | 29 | 126.82±7.4880$^{b}$ | 27 | 209.49±13.320$^{a}$ | 0.000 |
| 45-60th | Male | 16 | 238.38±15.998$^{a}$ | 15 | 136.47±10.986$^{b}$ | 16 | 274.81±22.035$^{a}$ | 0.000 |
| | Female | 14 | 251.30±9.7630$^{a}$ | 14 | 144.55±15.909$^{b}$ | 11 | 246.82±12.340$^{a}$ | 0.000 |
| | Common | 30 | 244.41±9.5900$^{a}$ | 29 | 140.22±9.2930$^{b}$ | 27 | 262.97±13.795$^{a}$ | 0.000 |
| 60-75th | Male | 16 | 271.68±11.475$^{a}$ | 14 | 222.24±17.508$^{b}$ | 15 | 237.16±18.075$^{ab}$ | 0.084 |
| | Female | 14 | 281.98±12.756$^{a}$ | 13 | 223.08±26.631$^{b}$ | 11 | 207.51±16.344$^{b}$ | 0.025 |
| | Common | 30 | 276.49±8.4430$^{a}$ | 27 | 222.65±15.397$^{b}$ | 26 | 224.62±12.623$^{b}$ | 0.003 |
| 75-90th | Male | 16 | 289.84±14.330$^{a}$ | 14 | 330.88±20.554$^{a}$ | 15 | 217.61±12.349$^{b}$ | 0.000 |
| | Female | 14 | 241.45±12.373$^{a}$ | 13 | 270.24±28.872$^{a}$ | 11 | 148.07±9.3930$^{b}$ | 0.000 |
| | Common | 30 | 267.26±10.429$^{a}$ | 27 | 301.68±18.168$^{a}$ | 26 | 188.19±10.555$^{b}$ | 0.000 |
| 0-30th | Male | 16 | 202.85±11.857 | 14 | 204.14±12.817 | 15 | 189.75±9.6720 | 0.610 |
| | Female | 14 | 221.22±12.247$^{a}$ | 13 | 194.64±9.5040$^{ab}$ | 11 | 166.91±8.9220$^{b}$ | 0.003 |
| | Common | 30 | 211.42±8.5470$^{a}$ | 27 | 199.39±7.8890$^{ab}$ | 26 | 179.85±6.9240$^{b}$ | 0.019 |
| 0-60th | Male | 16 | 212.08±11.621$^{a}$ | 15 | 167.95±10.448$^{b}$ | 15 | 223.80±11.165$^{a}$ | 0.003 |
| | Female | 14 | 230.00±10.287$^{a}$ | 13 | 164.68±10.027$^{c}$ | 11 | 198.54±35570$^{b}$ | 0.000 |
| | Common | 30 | 220.44±7.8830$^{a}$ | 28 | 166.43±7.1530$^{b}$ | 26 | 213.11±6.9740$^{a}$ | 0.000 |
| 0-90th | Male | 16 | 234.98±10.116$^{a}$ | 14 | 203.66±8.8910$^{b}$ | 15 | 224.99±11.334$^{ab}$ | 0.103 |
| | Female | 14 | 240.57±8.9310$^{a}$ | 13 | 192.00±7.8370$^{b}$ | 11 | 191.63±4.3900$^{b}$ | 0.000 |
| | Common | 30 | 237.59±6.7220$^{a}$ | 27 | 198.05±5.9540$^{b}$ | 26 | 210.88±7.4590$^{b}$ | 0.000 |

$^{a-c}$Differences between the average values marked with different letters on the same lines are significant ($p<0.05$)

Table 4: Rates (%) of survival ability of lambs at different periods

| | | Group 1 | | Group 2 | | Group 3 | | |
|---|---|---|---|---|---|---|---|---|
| Periods (days) | Gender | n | Survival ability (%) | n | Survival ability (%) | n | Survival ability (%) | p-value |
| 15th | Male | 16 | 100 | 15 | 100.00 | 17 | 100.00 | - |
| | Female | 14 | 100 | 15 | 100.00 | 13 | 100.00 | - |
| | Common | 30 | 100 | 30 | 100.00 | 30 | 100.00 | - |
| 30th | Male | 16 | 100 | 15 | 100.00 | 17 | 100.00 | - |
| | Female | 14 | 100 | 15 | 100.00 | 13 | 100.00 | - |
| | Common | 30 | 100 | 30 | 100.00 | 30 | 100.00 | - |
| 45th | Male | 16 | 100 | 15 | 100.00 | 16 | 94.12 | - |
| | Female | 14 | 100 | 14 | 93.33 | 11 | 84.62 | - |
| | Common | 30 | 100 | 29 | 96.67 | 27 | 90.00 | - |
| 60th | Male | 16 | 100 | 15 | 100.00 | 15 | 88.24 | - |
| | Female | 14 | 100 | 13 | 86.67 | 11 | 84.62 | - |
| | Common | 30 | 100 | 28 | 93.33 | 26 | 86.67 | - |
| 75th | Male | 16 | 100 | 14 | 93.33 | 15 | 88.24 | - |
| | Female | 14 | 100 | 13 | 86.67 | 11 | 84.62 | - |
| | Common | 30 | 100 | 27 | 90.00 | 26 | 86.67 | - |
| 90th | Male | 16 | 100 | 14 | 93.33 | 15 | 88.24 | - |
| | Female | 14 | 100 | 13 | 86.67 | 11 | 84.62 | - |
| | Common | 30 | 100 | 27 | 90.00 | 26 | 86.67 | |

'-': $p>0.05$

The similarities and differences on the averages of live weight increases, daily increases in live weight and birth weights obtained from different researches may be attributed to the differences of methods in conducted researches, differences in the numbers of materials employed and dissimilarities in care and feeding conditions.

Ratios of vitality obtained in this research have manifested that on the contrary to some researchers claiming that female lambs have higher vitality ratios than males (Isik, 2010; Tekin, 1991; Esen and Yildiz, 2000) male animals overall possess greater vitality ratios. On the last day of research each three groups have been contrasted and the ratios of vitality for each group

has been detected respectively as 100 and 2% in the 1st group, 90% in the 2nd group and 86.67% in the 3rd group. A comparison between vitality ratios of the 2nd and 3rd groups has demonstrated that the figures are close to the values given by Ozbey and Akcan (2001) for Red Karaman, White Karaman and Awassi lambs.

## CONCLUSION

One of the practices that should be followed in enhancing milk-production and profit which constitute a significant portion of sheep-breeding incomes is early weaning of lambs and milking with no delay. This practice gains even further importance in places where sheep milk can be marketed at higher prices. In research region area, Southeastern Anatolia likewise, sheep milk products such as cheese and fat are highly valued. That is why, it is remarkably important to procure as much milk as possible during one single lactation period.

In current study, lambs in groups 1-3 have been weaned alternately on days 30, 60 and 90 and their mothers have been milked. The research has verified that through early weaning it is possible to increase marketable milk production in sheep. Besides it has also been confirmed that early weaning of the lamb triggers no growth or development retardation in lambs. It has thus been concluded in this research that provided that in certain institutions which focus on milk production the care and feeding conditions of lambs are prioritized, the lambs can be weaned on day 30 which triggers no adverse effects with respect to analyzed features of the lamb.

Furthermore, it can be asserted that it would be even further beneficial if future studies on similar topics focused on an analysis of economical aspect by considering the quantity of feed that lambs eat up.

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