



Research Article

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# DEVELOPMENT OF AKKARAMAN LAMBS IN ÇANKIRI REGION FROM BIRTH TO 120 DAYS

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## Abstract

The aim of this study is to determine the development of the Akkaraman lambs grown in the Cankırı province until the age of four months by weighing them at different periods and prepare the growth curve. The animal material of this study was formed a total of 281 heads of Akkaraman breed lamb from 7 farms, born in 2018, grown in Cankırı province. In this study, average birth, 60, 90 and 120 days weight average were found 4.264 kg, 22.114 kg, 30.147 kg, and 34.950 kg, respectively. In the study, the gender effect on birth weight was not statistically significant ( $p>0.05$ ), while the effect of type of birth was found statistically significant ( $p<0.001$ ). The effect of birth type was statistically significant ( $p<0.05$ ) on 2, 3 and 4 months of age, body weight; the farm conditions had significant effect on birth weight ( $p<0.001$ ). The determination coefficient ( $R^2$ ) in the improvement of the lambs from birth to 4th month age was found 0.918.

**Keywords:** Akkaraman, Lamb weight, Growth curve

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## 1. Introduction

Turkey is a suitable country for sheep farming with some reason like consumer preferences, besides geographic structure, pasture presence and grasslands that is more suitable for sheep grazing (Boztepe, 2015). Turkey has been among the most important countries in terms of sheep presence (Aksoy et al., 2018). Although there has been a decline in the presence of sheep in recent years, because of the incentives of sheep farming for the past few years it has entered recovery process (Boztepe, 2015). According to TÜİK 2017 data, presence of sheep in Turkey was 33.677.636 heads while in the Cankırı province where the research was carried out was 105.847 heads.

The most important criterion determining the profitability in sheep and goat breeding is the weight of lamb or kid produced per maternal when weaned. An important feature of this criterion is that it is the main indicator of fertility. The type of birth, birth weight, sex of the offspring and maternal age effects the weight of the offspring produced per maternal when weaned. Therefore, it is necessary to investigate the effects of the factors mentioned above on live weights of the 30th day or weaned day and on birth weight of the kids or lambs (Duman and Demirören, 2002).

Growth and development occur in two phases as pre-natal and post-natal. Growth curve is defined as the alteration that any feature examined shows in a particular period. This alteration shows differences in species, races,

lines and mainly in the feature being examined. (Akbas et al., 1999). Considering the sheep breeding in Turkey there is a quite wide variation in terms of race and type. The determination of the parameters related to growth at various periods in the mentioned genetic resources will provide benefits for future breeding investigations and for the applications related maintenance and feeding (Aytekin et al., 2009).

Akkaramans that assets approximately 40-45 % of the the presence of sheep Turkey are scattered more in Central Anatolia. It is a durable breed that adapts to the harsh climatic conditions of the region. For feeding, they usually take advantage of from the pastures in the spring and autumn and from stubbles in the summer (Boztepe, 2015).

In this study, the data obtained from "Cankırı Province Akkaraman Breed Sub-Project 1" within the scope of "The National Project of Animal Breeding in Public" conducted by General Directorate of Agricultural Research and Policies (TAGEM) was used. In the mentioned project, it is aimed to obtain yield values of sheeps at farmer conditions. In the light of the obtained data a selection program has been implemented in order to make the breed more efficient with a breeding program. It is aimed to increase especially yield and live weight gain of lambs with the selection of studs in the frame of scientific programs.

The aim of this study is prepare the growth curve and determine the development of the Akkaraman lambs raised in the Cankırı province until the four months of age at different periods.

## 2. Material and Methods

**Table 1.** Mean values of birth weight and other live weights (Mean±SEM)

Factors	n	Birth Weight (kg)	60th day (kg)	90th day (kg)	120th day (kg)	
General	281	4.264±0.6	22.114±0.2	30.147±0.2	34.950±0.3	
Gender	Female	163	4.088±0.1	21.894±0.2	29.827±0.3	34.564±0.3
	Male	118	4.093±0.1	21.835±0.2	29.847±0.3	34.627±0.4
	P-Value	-	0.958	0.838	0.953	0.888
Birth type	Single	210	4.468±0.1 <sup>a</sup>	22.278±0.2 <sup>a</sup>	30.266±0.2 <sup>a</sup>	35.130±0.3 <sup>a</sup>
	Twin	71	3.714±0.1 <sup>b</sup>	21.450±0.3 <sup>b</sup>	29.407±0.4 <sup>b</sup>	34.062±0.5 <sup>b</sup>
	P-Value	-	0.001	0.018	0.040	0.048
Farm	1	40	3.918±0.1 <sup>b</sup>	20.656±0.4 <sup>b</sup>	27.032±0.5 <sup>d</sup>	31.879±0.6 <sup>de</sup>
	2	40	4.242±0.1 <sup>ab</sup>	21.165±0.4 <sup>b</sup>	26.570±0.5 <sup>d</sup>	31.679±0.6 <sup>e</sup>
	3	35	4.044±0.1 <sup>ab</sup>	20.681±0.4 <sup>b</sup>	28.454±0.5 <sup>cd</sup>	33.354±0.6 <sup>cde</sup>
	4	36	4.155±0.2 <sup>ab</sup>	21.924±0.4 <sup>ab</sup>	29.706±0.5 <sup>bc</sup>	34.013±0.7 <sup>cd</sup>
	5	46	3.270±0.1 <sup>c</sup>	21.753±0.3 <sup>b</sup>	31.049±0.4 <sup>b</sup>	35.568±0.5 <sup>bc</sup>
	6	43	4.377±0.1 <sup>ab</sup>	23.504±0.4 <sup>a</sup>	33.237±0.4 <sup>a</sup>	37.514±0.6 <sup>ab</sup>
	7	41	4.630±0.1 <sup>a</sup>	23.368±0.4 <sup>a</sup>	32.809±0.5 <sup>a</sup>	38.162±0.6 <sup>a</sup>
P-Value	-	0.001	0.001	0.001	0.001	

<sup>a,b,c,d,e</sup> The difference between same colum which has shown with different letters are statistically significant (p<0.05)

In this research carried out with Akkaraman lambs, the birth weight was found as 4.264±0.059 kg. When compared with the results reported in the studies

Animal material of this study was formed of Akkaraman breed lambs born in 2018 and grown in "Cankırı Province Akkaraman Breed Sub-Project 1" within the scope of "The National Project of Animal Breeding in Public" conducted by TAGEM. A total of 281 pieces of lambs were obtained from 7 farms. Sheep farms are selected among farms have similar environmental conditions that are registered in the breeding system and assist to extra weighting.

In the study, weights of lambs at birth, 60, 90 and 120. days were determined. Birth weights were determined with sensitive scales up to 10 gr. Other weights were determined with sensitive scales up to 100 gr. Body weights taken during certain periods (± 15 days) of lambs were loaded on a computer and 60, 90, and 120 days data were determined by interpolation method. In the study gender, type of birth and farm diversity were considered as environmental factors affecting the living weights.

"Minitab 16" package program was used for evaluation of data and statistical analysis. In the differences between the group averages Duncan's multiple comparison test was used to determine the significant in which the difference between two group averages (Düzgünes et al., 1983).

## 3. Results and Discussion

Mean values and standard error values for birth and other live weights are given in Table 1. The development chart of the lambs from birth to day 120 is shown in Figure 1. The development chart of lambs according to sex and type of birth is also shown in Figure 2 and Figure 3. Findings concerning to daily live weight gain (DLWG) in the lambs are given in Table 2. The DLWG chart of the lambs is also presented in Figure 4.

conducted with the same breed, the value found in this study was lower than the values reported by Colakoglu and Ozbeyaz (1999), Unal (2000), Sireli and Ertugrul

(2002) and Küçük and Eyduran (2009) while it was found close to the values reported by Unal et al. (2006).

In this study weight averages at 60, 90. and 120. days were found 22.114±0.152 kg, 30.147±0.220 kg and 34.950±0.256 kg respectively. When these values compared with the results reported in the studies conducted with the same breed, the datas belonged to 60th day were found close to the values reported by Sireli and Ertugrul (2002) as 21.30 kg while it was found higher

than the values reported by Küçük and Eyduran (2009) as 16.79 kg. The 90th day values were found higher than the values reported by Unal (2002) as 26.37 kg, by Sireli and Ertugrul (2005) as 27.53 kg, by Unal et al. (2006) as 21.10 kg and by Küçük and Eyduran (2009) as 21.66 kg. The 120th day values were found higher than the values reported by Sireli and Ertugrul (2002) as 31.55 kg and by Küçük and Eyduran (2009) as 25.51 kg.

**Table 2.** Mean values of lambs daily live weight gain (DLWG) (g/day)

Factors	n	Until the 60th day	Until the 90th day	Until the 120th day	
General	281	297.5±2.6	287.5±2.5	255.7±2.1	
Gender	Female	163	296.8±3.7	286.0±2.9	254.0±2.8
	Male	118	295.7±4.0	286.1±3.2	254.4±3.0
	P-Value	-	0.833	0.968	0.901
Birth type	Single	210	296.8±2.9	286.7±2.3	255.5±2.2
	Twin	71	295.6±5.2	285.5±4.2	252.9±3.9
	P-Value	-	0.841	0.813	0.574
Farm	1	40	279.0±6.7 <sup>c</sup>	256.8±5.3 <sup>cd</sup>	233.0±5.0 <sup>c</sup>
	2	40	282.1±6.8 <sup>bc</sup>	248.1±5.5 <sup>d</sup>	228.6±5.2 <sup>c</sup>
	3	35	277.3±7.3 <sup>c</sup>	271.2±5.8 <sup>bc</sup>	244.2±5.5 <sup>c</sup>
	4	36	296.2±7.5 <sup>abc</sup>	283.9±6.0 <sup>b</sup>	248.8±5.7 <sup>bc</sup>
	5	46	308.1±6.1 <sup>ab</sup>	308.7±4.9 <sup>a</sup>	269.2±4.6 <sup>ab</sup>
	6	43	318.8±6.3 <sup>a</sup>	320.7±5.0 <sup>a</sup>	276.1±4.7 <sup>a</sup>
	7	41	312.3±6.7 <sup>a</sup>	313.1±5.4 <sup>a</sup>	279.4±5.1 <sup>a</sup>
P-Value	-	0.001	0.001	0.001	

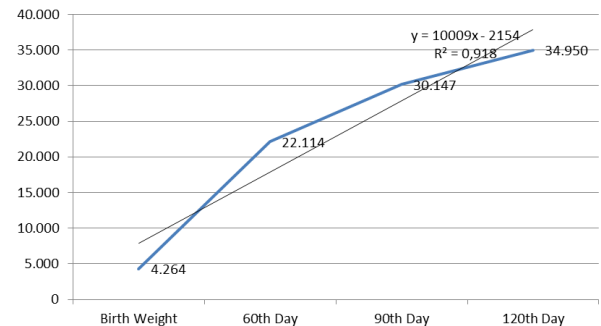
<sup>a,b,c,d,e</sup> The difference between same column which has shown with different letters are statistically significant (p<0.05)

When the data in Table 1 is examined, there is little difference in favor of male lambs at birth, at 90 and 120 days weights, and at 60 days, in female lambs. As shown in Figure 2, there is no statistically significant difference between male and female lambs in all weights calculated. Therefore, the difference between female and male lambs was not found statistically significant (p>0.05) at all weight data. When the literature reporting the effect of sex on birth and other weights was examined; it was found statistically significant (p<0.01) in birth and 105th day weight by Colakoglu and Ozbeyaz (1999). It was found by Unal (2002) statistically significant (p<0.01) in birth and 45th day weights and statistically significant (p<0.001) in 120th day weight. It was found statistically significant (p<0.05) in full of birth, 1, 2, 3 and 4th months weights by Sireli and Ertugrul (2005) and found statistically significant (p<0.001) in birth and 90th day weights by Unal et al. (2006).

As seen in Figure 3, single lambs were heavier than twin lambs in all weights measured. It was determined that, the difference of this weights was statistically significant (p<0.001) in birth weight and statistically significant (p<0.05) in 2, 3 and 4th months weights. These values were found coherent with the values in various periods from birth to 4th month reported by Colakoglu and Ozbeyaz (1999), Unal (2002), Sireli and Ertugrul (2005) and Unal et al. (2006).

As seen in Figure 3, the difference between farms are

compared. The highest birth weight was obtained from 7th farm, while the lowest was obtained from the 1st farm. The highest 60th day weight was obtained from 6th and 7th farms, while the lowest was obtained from the 1st, 2nd, 3rd and 5th farms. The highest 90th day weight was obtained from 6th and 7th farms, while the lowest was obtained from the 1st and 2nd farms. The highest 120th day weight was obtained from 7th farm, while the lowest was obtained from the 2nd farm. The difference between sheep farms was found statistically significant (p<0.001) in all weights calculated.



**Figure 1.** Chart of lambs growth (kg)

In the study, the DLWG from birth to 60th, 90th and 120th day was determined as 297.5 gr, 287.5 gr and 255.7 gr respectively. As shown in Figure 4, there was a tendency

to decrease in DLWG with the progress of the months. In this 3 values calculated the gender difference was not found statistically significant ( $p>0.05$ ). Likewise, also the birth type was not found statistically significant ( $p>0.05$ ). However, in DLWG, the difference between sheep farms was statistically significant ( $p<0.001$ ).

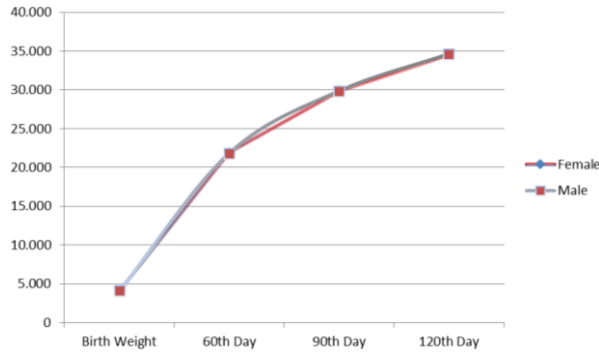


Figure 2. Chart of lambs growth on gender (kg)

In this study, the determination coefficient ( $R^2$ ) in the improvement of the lambs from birth to 4th month age was found 0.918. In other words, it can be said that the development of lambs from birth to fourth month is under the influence of gender, type of birth and farm factors by 91.8 %. It can be said that the remaining 8.2 % is determined by other unexamined factors. In the period up to the fourth month of lambs can be achieved improvement by arrangements in environmental factors which is effective on their development. Because of this reason determination of effective environmental factors in lamb development and make selection of breeder after their effects are reduced is important in terms of prevention of wrongs that will happen.

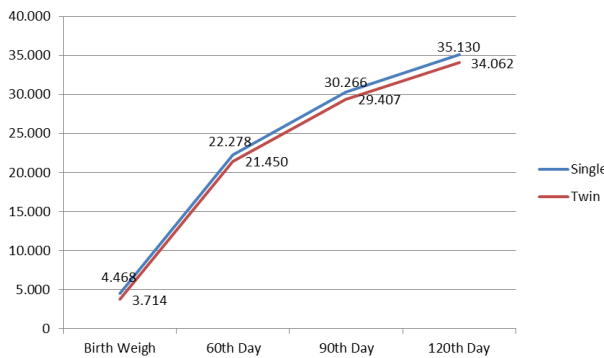


Figure 3. Chart of lambs growth on birth type (kg)

The birth weight obtained in this study is close to the literature reports in general. High birth weight is very undesirable to producers due to difficult birth. The fact that the 60, 90 and 120 days weights obtained in the study are higher than the literature reports is an indicator of the well-being of the caring and nutrition in the farms. It is thought that, the reason of differences between farms all calculated weights and DLWG could result from the condition of caring and feeding lambs before and after the birth.

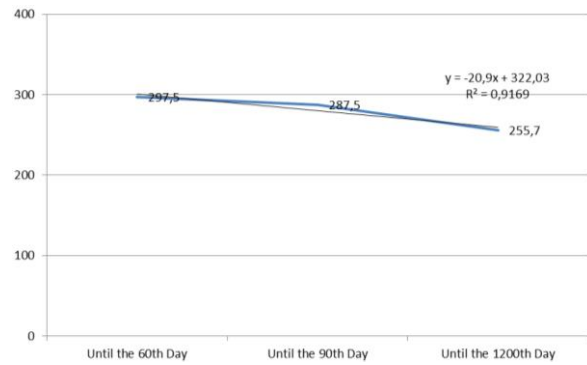


Figure 4. The chart of lambs daily live weight gain (DLWG) (g/day).

### Conflict of Interest

The authors declare that there is no conflict of interest.

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