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Growth Performance and Survival Rate of Southern Anatolian Red Calves

Research Article

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ABSTRACT

The aim of this study was to evaluated body weights and survival rates at birth, 3 and 6 months of age and to determine effects of calving year, season and sex on those traits in Southern Anatolian Red calves. The animals were raised in Adana East Mediterranean Agricultural Research Institute's Dogankent location between 2000 and 2007 years. Duncan test statistic for estimating the differences between groups were used to determine the year, season and gender effects of birth, living weights measured at the 3rd and 6th months of age. Body weights of calves at birth, 3 and 6 months of age were 23.50; 68.30 and 112.76 kg, respectively. The effects of calving year, season and sex were not significant on birth weight. Calving year and season on 3 months age weight were significant (P<0.05). The effects of calving year was significant on 6 months of weigth of calves (P<0.05) but season and sex was not. It was found that survival rates of calves at 3 and 6 months of age were 99.63% and 99.25%.

INTRODUCTION

The sustainability of food supply with the increasing population in the world (and our country) is perceived as increasing the per unit production aimed to increase the per unit yield. As a result, breeders have been raising our indigenous races, which have been raising for many years with unconsciously aiming to increase the yield, to breed culture races and to deteriorate the purity of our indigenous races. However, ensuring the sustainability of animal production in various production environments and meeting the increasing demand for national and global animal food are only possible by cultivating species and races of different qualities and yield levels in accordance with the specified circles (Pollot *et al.* 2014). Over time, in terms of both herbal and animal species and irregularities, every country has begun to look for ways to preserve its genetic resources. In our country, the Ministry of Food, Agriculture

and Livestock, has assigned General Directorate of Agricultural Research affiliated Institutes has been commissioned for this purpose in breeds and races raised within their respective areas of responsibility. Thus, the Eastern Mediterranean Agricultural Research Institute, formerly the Cukurova Agricultural Research Institute, began its work in 1995 with the aim of "Protecting Pets Genetic Resources" and Kilis (GAK) cattle (Akın, 2014).

Kilis cattle are the largest and have the highest milk yield (2000 kg) of native breed of the country which is a harmonious region of Mediterranean and South Anatolia (Uğur, 2014). Maternal instinct is developed and does not give a bullet (Türkhaygen-1, 2014). Birth weight, but also survival rate; farm, period, year of calving and season, age and so on factors were affected.

In Turkey, studies are carried out in research institutes, gene banks and people in order to protect animal genetic resources by existing methods. The project first informed

by Ünalan (2007). Official Newspaper (2004) reported that the birth weight of male calves was 18.5-30 kg (mean 25.64 kg); And that the birth weight of female calves was 16-27.5 kg (average 22.95 kg). Cankaya *et al.* (2005) and Öztabak *et al.* (2010) were carried out to determine some features of South African Red cattle. Ünalan (2016) reported that South Anatolian Red and Native Southern Yellow cattle were widely reared in the Southern region of Turkey and these native cattle types are now just becoming as an important genetic resource for that region.

This study was carried out at the Eastern Mediterranean Agricultural Research Institute in 2000 and 2007 in the scope of the "Ex situ *in vivo* Preservation of Domestic Genetic Resources Project" to figure out the effects of the calving year, season and sex of the Southern Anatolian Red calves on Birth, 3rd and 6th months and survival.

MATERIALS AND METHODS

In this study, totally 268 Southern Anatolian Red calves borned between 2000-2007 were used: 267 calves aged three month and 266 calves aged sixth month. The calves were weighed in the first 3 days after the birth and received breast milk until 90 days of age. After they were placed in the calf compartments, they were allowed *ad libitum* water, concentrated feed and good quality roughage (alfalfa). The composition of the diet was 2800 kcal/kg metabolizable energy (ME), and 18% of crude protein (in the first 3 months) and 2700 kcal/kg ME, and 17% of crude protein (between 4 and 6 months). After leaving the cattle slaughter, the animals were placed in a separate compartment and live weights at 3 and 6 were taken. When survival rate was calculated, the ratio of the number of live calves to the total number of calves born was taken into consideration (Ayasan *et al.* 2016).

Survival rate (%)= (number of live calves/number of calves at birth) × 100

Statistical analysis
The least squares method with the $Y_{ijkl}= \mu + a_i + b_j + c_k + e_{ijkl}$ mathematical model and the Duncan test statistic for estimating the differences between groups were used to determine the effects of the year, season and gender of birth, live weights measured at the 3rd and 6th months of age (SPSS, 2007). It is assumed that there are no significant interactions among the factors examined in the model. In the model, Y_{ijkl} = i sex, j year, k born in the season l the live weight of the calving in the measured period. μ= the population average in terms of live weight, a_i= the deviation of the mean of the average of the population of the i gender calve (i=1, 2) or the share of sex effect, b_j= devia-

tion from the average of the population of the average of the calves born in j (j=1, .., 8) or share of the year effect, c_k= the deviation of the average of the calves born during the k season from the average population (k=1, ..., 4) or share of the season effect, e_{ijkl}= the effect of the incidental environmental factor affecting the l calf born in i sex, j year, k season or chance-related error.

RESULTS AND DISCUSSION

In this study, the calving weights were found as 22.75-24.94 kg (Table 1). The mean live weights of the births, 3rd and 6th months weights of calves were determined as 23.50, 68.30 and 112.76 kg, respectively. It was observed that the birth weights (22.75-24.94 kg) determined for Kilis calves were lower than some literature reporting values (Eker and Tuncel, 1971; Şekerden and Pekel, 1982). Eker and Tuncel (1971) reported the birth weight for Kilis as 28 kg; Şekerden and Pekel (1982) reported between 24 and 28 kg. The birth weight of male calves was 25-27 kg; and the birth weight of the female calf was 23-25 kg (Yılmaz *et al.* (2012). Differences in calving birth weight among the literatures may be due to differences in prenatal care and feeding of cows.

Altınalan (2005) reported that these two cattle types were different cattle breeds in a Ph D Thesis made in 2005. In another study, phenotypic correlations among the body measurements of South Anatolian Red cows were higher (ranged from 2.5% to 39.3%) than the correlations of Native Southern Yellow cows (Ünalan, 2016).

In this study the effect of the year of calving, season and sex on birth weight was not statistically significant (P>0.05) and birth weights ranged from 22.75 to 24.94 kg.

Seasonal effect on the birth weight was statistically insignificant (P>0.05). Birth weight was 24.01 kg in summer, 23.64 kg in winter, 23.30 kg in autumn and 23.06 kg in spring. The birth weights (24.01 kg) of the calves born during the summer season were higher than the other seasons (P> 0.05).

Sex effects on the birth weight of the birds were statistically insignificant (P>0.05). The average birth weight of 163 female calves in the study was 22.41 kg; the average birth weights of 105 male calves were also found to be 25.18 kg. Official Newspaper (2004) reported that the birth weight of male calves was 18.5-30 kg (mean 25.64 kg); and the birth weight of female calves was 16-27.5 kg (mean 22.95 kg). In another study done, the birth weights of the females were 16-27.5 kg; and the male was 18.5-35 kg (Anonim, 2013). Male calves were found to be heavier than female calves, and this difference may be related to the high concentration of androgens in the male fetus (Bakir *et al.* 2004).

Table 1 The effects on growth performance the live weight of the year of calving, season, sex and birth, 3th and 6th months in Southern Anatolian Red calves

Calving year	n	Birth weight ± SE (kg)	n	3rd month weight ± SE (kg)	n	6th month weight ± SE (kg)
2000	36	23.15±0.57	36	57.42±2.17^c	35	100.63±2.51^d
2001	36	23.19±0.65	36	59.42±1.55^c	36	109.44±3.38^c
2002	31	23.55±0.76	30	68.8±1.91^{ab}	30	125.60±4.00^a
2003	32	22.75±0.64	32	75.59±3.24^a	32	114.47±1.81^{bc}
2004	31	23.24±0.60	31	72.26±2.38^{ab}	31	110.35±2.44^c
2005	32	24.94±0.76	32	74.06±2.33^a	32	120.75±2.67^{ab}
2006	38	24.22±0.74	38	66.82±2.34^b	38	109.84±2.44^c
2007	32	22.92±0.75	32	74.94±1.08^a	32	113.84±1.64^{bc}
Total	268	23.50±0.68	267	68.30±2.13	266	112.76±1.04
Season		**Insignificant**		**		**Insignificant**
Winter	98	23.64±0.42	98	71.22±1.27^a	98	114.16±1.52
Spring	94	23.06±0.42	93	63.31±1.31^b	92	111.21±2.14
Summer	50	24.01±0.54	50	73.62±2.44^a	50	112.48±2.09
Fall	26	23.30±0.58	26	64.88±2.62^b	26	113.54±2.57
Total	268	23.50±0.24	267	68.30±0.87	266	112.76±1.04
Sex		**Insignificant**		**Insignificant**		**Insignificant**
Female	163	22.41±0.28	162	65.60±1.14	161	107.66±1.23
Male	105	25.18±0.39	105	71.00±1.26	105	120.58±1.56
Total	268	23.50±0.24	267	68.30±0.87	266	112.76±1.04

** (P<0.01).

Table 2 The effects on survival rate of the live weight, the year of calving, season, sex and birth, 3rd and 6th months in Southern Anatolian Red calves

Item	3rd month calve			χ^2	6th month calve		χ^2
	TN^1	Survival rate			Survival rate		
		N	%	Insignificant	N	%	Insignificant
Year of calving							
2000	36	36	100		35	97	
2001	36	36	100		36	100	
2002	31	30	97		30	97	
2003	32	32	100		32	100	
2004	31	31	100		31	100	
2005	32	32	100		32	100	
2006	38	38	100		38	100	
2007	32	32	100		32	100	
Season				**			**
Winter	98	98	100		98	100	
Spring	94	93	99		92	99	
Summer	50	50	100		50	100	
Fall	26	26	100		26	100	
Sex				**			**
Female	163	162	99		161	99	
Male	105	105	100		105	100	

^{1} Total numbers of the investigated calves.
** (P<0.01).

The 3rd month live weights varied according to the years of calving. The highest 3rd month live weight was found in 4th calving year of the cows (75.59 kg). Seasonal effect was found to be important in this phase. The highest 3rd month live weight was found in summer (73.62 kg); and the lowest one in the spring season (63.31 kg). At 3rd months live weight, only sex effect was found to be statistically insignificant (P>0.05). The live weights of the females and males were 65.60 and 71.00 kg, respectively.

The effect of the year of calving on the live weights of the 6th month was statistically significant (P<0.05), however, season and sex were insignificant (P>0.05). In this phase, weights varied between 100.63 and 125.60 kg (P<0.05). Calves born in Autumn (113.54 kg) and summer (112.48 kg) had higher live weights than other seasons (winter and spring) (P>0.05). In this phase, live weights of females and males were 107.66 kg and 120.58 kg (P>0.05), respectively.

Official Newspaper (2004) indicated that live weight of the female and male calves at six month of age were measured in order of 102.08 kg and 125.97 kg.

The effects on survival rate in Southern Anatolian Red Calves

In the study, survival rate between 2000 and 2007 varied and it was found as 99.63%; 6. Month the survival rate was 99.25% (Table 2). The effect of sex on survival rate was found to be statistically significant (P<0.01). The survival rate of female and male calves was 99% and 100%, respectively.

The effect of seasonal on survival rate was found to be statistically significant in the 3rd month (P<0.01). The lowest survival rate was in the spring season (99%). In Table 2, a chi-square (χ2) independence test was performed between calf birth weight and the 3rd weights of the calves to estimate the livelihood, and the season and sex were statistically significant at 3rd and 6th months of age (P<0.01). In Table 2, the number (n) of season and sex factors is 26 in the autumn and 98, 92, 50 in the other seasons. It seems that more calves were born in other seasons. In terms of sex, there are also differences between the numbers of 105 female and 105 male calves. As a result of the chi-square test was found to be statistically significant. The statistical test used can cause such a situation. In Table 2, however, when the survival rate is examined from the top to down, it was between 97% and 100% at the age of 3rd and 6th months.

The effect of 6th month of the year of calving on survival was statistically significant (P<0.01). The survival rate, which was 97% in 2000, has been 100% in 2008 due to the further improvement of care conditions. The effect of the season on the 6th month survival rate was statistically significant (P<0.01). At the 6th month, survival rate was found 100% in all seasons except spring and the effect of sex on survival rate was statistically significant (P<0.01). The average survival rate was 99.50%. The Official Newspaper (2004) reported that at least 92%, at most 100%, and average survival rate of 97.41% of their lives were living up to the 6th month.

CONCLUSION

As a result, in the current conditions, the corresponding calves were successfully cultivated and affected by environmental factors such as calving years, seasons and gender in the case of calf care.

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