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Reproductive Performance of Akkaraman and Awassi Sheep Flocks in The State Farm of Tigem Gözlü

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ABSRACT

In this study, 3581 Akkaraman and Awassi ewes were used in order to determine the effects of age, year and breed on the conception rate, prolificacy, viability and productivity. The least-squares means for these parameters of all flock were found as follows; 91.65±0.80 %, 127.74±1.26 %, 95.56±0.48 % and 110±1.57 %, respectively. In addition, the effects of sex of lamb and birth type on viability were also studied. Except for conception rate, effects of the age on these parameters were found to be statistically significant (P<0.01). The maximum productivity was obtained with 5-years old ewes. Effect of breed was significant only on the prolificacy (P<0.05). With regard to prolificacy, Awassi ewes were superior to Akkaraman (129.27 % vs. 126.21 %). The year factor had a significant effect on all parameters (P<0.01). Sex effect on the viability was not significant, but birth type effected viability significantly; single lambs being superior to twin ones.

1. Introduction

Akkaraman and Awassi are native breeds and together constituted nearly half of the present sheep population of Turkey. They are fat-tailed sheep and their reproductive yields are low. In this study the effects of some environmental factors and genotype on reproductive performance was investigated in Awassi and Akkaraman sheep under the conditions of Gözlü State Farm, Konya province, Turkey.

2. Material and Methods

Data were collected at the State Farm of Gözlü in Konya Province (Turkey) during the years 1987-1991. The records of 3581 Akkaraman (1820 head) and Awassi (1761 head) ewes were used in order to determine the effects of age, year and breed (genotype) on the conception rate (pregnant ewes / ewes put into breeding), prolificacy (lambs born/ewes lambing x 100), productivity (live lambs at weaning / ewes put into breeding) and viability (live lambs at weaning/lambs born). In addition, the effects of sex of lamb and birth type on viability were also studied.

The flock was grazed on a dry land pastures and in the summer an additional feed of alfalfa (*Medicago sativa*) and sainfoin (*Onobrychis sativa*) was given in the evening in an open shed. The animals were kept in an open shed throughout the 3 months (December, January and February) of winter and were fed with rations composed of sainfoin hays, and barley, wheat and concentrated feed.

The flocks were hand-mated in September and October. No supplementary feeding for ewes or rams before or during the mating.The dates of mating and parturition were recorded for each ewe. Lambing occurred from mid-February until mid-April. The number of lambs born and their sex and birth type were recorded.

The data were analyzed by mixed models with a least-squares and maximum likelihood computer program developed by Harvey (1987). The mathematical model used for the least-squares analysis of variance of reproduction traits was:

$$Y_{ijkl(mn)} = \mu + a_i + b_j + c_k + d_l + s_m + e_{ijklmn}$$

Were μ is the overall mean,

a_i: effect of dam ages, i=1, …5 (2-6.),

b_j: effect of year, j=1, …4 (1987-91),

c_k: effect ofbreed, k=1,2 (Akkaraman, Awassi),

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d_l: effect of birth type, l=1,2 (Single, Twin),

s_m: effect of sex of lamb, m=1,2 (Male, Female),

$e_{ijkl(mn)}$= random error.

Comparisons among the subclass means were carried out using Duncan's multiple range test using MSTAT-C Range Program (1989).

3. Results and Discussion

The least-squares means with their standard errors and test of significance for conception rate, prolificacy, productivity and viability of Akkaraman and Awassi sheep are shown in Table 1.

3.1. The Measures of Reproductive Performance

The least-squares mean for conception rate was 91.65±0.80 %. This rate was similar to 92.06 % for Awassi x Akkaraman (AG_1) cross breeds reported by Güney and Pekel (1986).However, this conception rate was higher than reported by Vanlı et al. (1984a) for Awassi, Gabina (1989) for the Rasa Aragonesa breed, and Vanlı et al. (1990) for Merino, Morkaraman, Awassi, Karakul and Tuj in a flock of sheep(respectively 88.8, 87.33 and 84.77 %) and was lower than 94.67 % obtained by Gürsoy and Özcan (1983) for the Awassi. The reasons for these differences are both genetic and environmental and genotype xenvironment interactions.

The average prolificacy for the flock of Akkaraman and Awassi was calculated as 127.74±1.26%. This value was nearly the same to 127.66% for Awassi sheep reported by Gürsoy and Özcan (1983), but was lower than the prolificacy of Anatolian Merino (Yalçın et al., 1980) and Finnish Landrace x Rambouillet crossbred ewes (Notter and Copenhaver,1980), 144.0 and 217.0%, respectively. Whereas, higher than 113.9% and 122.0% values reported by Vanlı and Özsoy (1988) for Awassi.

The productivity was found as 110.06±1.57 % in the present study.This value is higher than the findings of Güney et al., (1982);(101.35 %), Vanlı et al.,(1984b); (89.0 %) and Vanlı and Özsoy (1988); (83.4 %) for the Awassi breed. In contrast, this value was lower thanfor productivity of Konya Merino (126 %) and Anatolian Merino (118.9 %) reported by Yalçın (1972) and Yalçın et al., (1980), respectively.

The lambs were weaned from milk at 75th days and the average viability was 95.56±0.48%. This rate was similar to 95.42% for Awassi sheep raised in Adana province, reported by Güney et al. (1982). Pekel and Güney (1974), the viabilities of Awassi and Anatolian Merino lambs was found as 96.39 % and 98.44 % respectively, in the state farm of Tigem Gözlü. These rates were higher than the present study's finding. On the other hand, our finding about viability was lower than for viability of Akkaraman lambs (88.64 %), reported by Pekel and Güney (1974).

3.2. The Effect ofthe Studied Factors

Age of Ewe's Dam

The age of dam (ewe) had a significant effect on prolificacy, productivity and viability of lambs in the present study (P<0.01), but did not affect conception rate. The averages and standard errors of age groups and differences between groups were presented in Table 1. The finding of this study about conception rate is in agreement with the reports of Köprücü (1975) and Baş et al. (1989). In contrast, Notter and Copenhaver (1980) and El-Karim and Owen (1987) were reported as significant. The prolificacy was affected by dam age. Similar findings have been reported by Yalçın (1972), Köprücü (1975), Eliçin (1985), El-Karim and Owen (1987) and Gates (1990). According to Yalçın (1972) and Köprücü (1975) the effect of dam age on productivity was significant. These findings were similar to the present study's result. But, Vanlı and Özsoy (1988) reported that no significant effect on productivity for Awassi sheep. The dam age's effect on viability was reported as significant (Köprücü,1975 and Vanlı and Özsoy, 1988).

Year

The factor "year" includes climatic, management, nutrition and husbandry elements, and it affects all the measures(conception rate, prolificacy, productivity and viability) in the present study (P<0.01).Similar findings have been reported by Köprücü (1975), Lightfoot (1988, Vanlı et al. (1990) and Gates (1990).

Breed

As seen in the Table 1, it is concluded that Awassi ewes were superior in terms of Prolificacy than Akkaraman, but there was no difference between the breeds in terms of the other criteria (conception rate, productivity and viability). Similar finding has been reported by El-Karim and Owen (1987) for Shugor and Watish sheep in Sudan. Prolificacy the most appropriate measure for comparison in terms of reproductive performance in sheep breeds have been reported (Köprücü,1975). According to this result it can be said that Awassi has a higher reproductive efficiency than Akkaraman in conditions of Gözlü State Farm. This confirms the findings of Pekel and Güney (1976). The differences among sheep breeds in respect of reproductive performance can be caused by the various environmental conditions, different selection purposes and also may be depended on changes of additive genes frequencies by chance andisolations.

Type of Birth

The average viability of 2362 single and 1517 twin lams were 96.66±0.55 % and 94.46±0.59 %, respectively. The 2.2 % difference in favor of singletons is very important (P<0.01). This result is consistent with the literature in general (Çelikkale 1974; Köprücü 1975; Alfranca 1983). However, some researchers have reported identical to the viability of the singleton and twin

(Thrift and Dutt 1975; Kassem 1988). The effect of lamb birth type on viability is related to the mother's milk production ability and maternity. It is also related to the birth weight of the lamb.

Sex of Lamb

The viabilities of 911 male and 1968 female lambs were 95.62±0.58 % and 95.50±0.56 %, respectively. The difference between the averages is insignificant. This result was in agreement with the results reported by Pekel et al. (1973) for Anatolian Merino and by Vanlı et al. (1984a) for Awassi lambs. Pekel (1973) reported that male lambs had higher viability than females for Akkaraman and Awassi sheep. However, in favor of the viability of females reported by Çelikkale (1974), Köprücü(1975) and Vanlı and Özsoy (1988).

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