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LAMB PRODUCTION OF FALL VS SPRING MATING OF FOUR FAT-TAILED IRANIAN BREEDS OF SHEEP UNDER FARM CONDITIONS[1]

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Abstract — Eighty-seven ewes of four fat-tailed Iranian breeds of sheep, Karakul, Mehraban, Naeini and Bakhtiari were randomized into two groups within each breed. One group (in each breed) was bred in the spring (45 head) and the other in the fall (42 head), by the same method.

In both seasons of lambing, the lambs had access to the same creep ration for 60 days and then weaned. The data were analyzed using least-squares procedures. There was a non-significant increase in favor of spring-lambing ewes for conception rate (0.94 vs 0.89), number of lambs born (1.01 vs 0.89), kg lamb born (4.39 vs 3.91), number of lambs weaned (0.92 vs 0.83), kg lamb weaned (17.46 vs 15.20) per ewe exposed. The same trends for the above characteristics were observed on the basis of per ewe lambing, but kg lamb born per ewe lambing was significantly higher ($p < 0.05$) in spring-lambing (4.69 vs 4.39). Considering kg lambs weaned per ewe which raised a lamb to weaning, spring-born lambs were heavier ($p < 0.01$) than fall-born lambs (20.77 vs 17.55 kg). The average weaning weight of spring-born lambs was higher ($p < 0.01$) when the records of three pairs of twins were excluded, and the effect of sex was removed (19.81 vs 17.37 kg).

No significant breed X season of lambing interaction was found for the traits studied in this trial, and there was no significant difference between breeds with respect to the number of lambs born. The conception rate and number of lambs weaned were higher ($p < 0.05$) in Karakul and Mehraban as compared to Naeini and Bakhtiari breeds.

INTRODUCTION

Time of breeding is important in flock management, because it exerts a major influence on the lambing percentage [2], as well as on birth weight and gain to weaning [1, 5]. However, the choice of suitable breeding time may not be simple. A large number of factors, together with specific problem of certain areas, should be considered in a decision on the time of breeding.

In many sheep flocks in the Fars province, rams are kept with the ewes all the year

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round and as a consequence scattered lambing is generally observed during the fall, winter and spring, in decreasing order. In some of the flocks maintained on farms around Shiraz, rams are kept with ewes from the middle of spring until late fall. A low level of fertility is common due to low reproductive activity during the early part of this period, which results in relatively closer lambing dates than the previous method, but it also produces management problems. Despite the disadvantages of the spring mating, sheep producers usually prefer fall-lambing. They believe that spring-lambing is not suitable for this area, due to the sudden rise in environmental temperature and the scarcity of rainfall, which result in a shortage of green feed and the prevalence of pneumonia.

Since there is evidence of district and breed variation in certain components of the fertility complex, such as incidence of estrus, ovulation and semen quality, the complete problem of a given breed or breeds in a particular environment needed study. One simple approach was to compare the lambing performance of ewes mated at different times of the year in different districts. This approach for different sheep-raising districts of the country would enable suitable recommendations on mating time to be made.

This study was conducted to compare the lambing performance of spring and fall-mating ewes of four fat-tailed Iranian breeds of sheep; Karakul, Mehraban, Naeini and Bakhtiari, under farm conditions with supplemental feeding in the Fars province.

MATERIALS AND METHODS

In 1973, 87 ewes (31 Karakul, 20 Mehraban, 19 Naeini and 17 Bakhtiari) 2–4 years of age were used. They were randomized within breed into two groups, one group being bred in spring (45 head) and the other in fall (42 head). Although the age distribution of ewes was not the same in different breeds, there were balanced age groups in spring- and fall-breeding groups. The ewes were checked for the incidence of estrus by an aproned entire ram. Those which showed estrus were kept in a separate box and had access to a fertile ram of the same breed for about 24 hr. Using this procedure, 38 ewes lambing between 16 October and 9 December were used for the fall-lambing, and 38 ewes lambing between 4 April and 29 April for the spring-lambing.

The management practices for the spring- and fall-born lambs were similar. All lambs had access to a creep ration consisting of 50% barley, 20% wheat bran, 18% dried beet pulp with molasses, 10% sunflower seed meal, 1% bone meal and 1% salt from lambing to weaning, at approx. 60 days after birth. The ration consisted of 12.4% crude protein, 3.1% crude fat, 6.7% ash, 9.9% crude fiber and 92.9% dry matter. The creep ration had been ground and mixed. The ewes were maintained under open shed conditions on a balanced ration from about two weeks before lambing till the end of the lactation period. At all other times they were pastured on poor range and wheat and corn stubble, which were occasionally supplemented if it was considered necessary. The weights of lambs and ewes at lambing and weaning were recorded.

The data were analyzed using least-squares procedures as described by Harvey [6]. Constants were fitted for the effects of breed, season of lambing and their interactions. The constants of breed of sheep, season of lambing, sex of lamb and interaction between breed and season were also used in analyzing the data on birth weight and weaning weight.

RESULTS AND DISCUSSION

The results of lambing during fall and spring for the four breeds are presented in Tables 1 and 2, the former giving production per ewe exposed in each group and the latter per ewe lambing in each group.

In Table 1, there was a non-significant increase in favor of spring-lambing ewes for all the characteristics listed: for conception rate, 0.89 vs 0.94; for number of lambs born, 0.89 vs 1.01; for kg lamb born, 3.91 vs 4.39; for number of lambs weaned, 0.83 vs 0.92; and for kg lamb weaned, 15.20 vs 17.46. Trends in Table 2 were the same, but in this case the difference in kg lamb born per ewe lambing was significant (4.39 vs 4.69).

Considering kg lamb weaned per ewe which raised a lamb to weaning, as shown in Table 3, spring-born lambs were heavier ($p < 0.01$) as compared to fall-born lambs (20.77 vs 17.55). The average weaning weight of spring-born lambs was higher ($p < 0.01$) when 3 pairs of twins were excluded and the effect of sex was removed as shown in Table 4.

The results of this study are in agreement with the reports of Blackwell and Henderson [1] where spring-born lambs were heavier at birth and had faster gain than fall-born lambs from Dorset dams. They also confirm the data reported by Dun *et al.* [2] and those of Gould and Whiteman [5]. Gould and Whiteman [5] also studied the influence of variables such as breed of dam, type of birth, condition at birth, type of rearing and lamb sex on the birth weights and nursing rate of gain of fall and spring-born lambs. In most cases they did not find any association approaching statistical significance. They concluded that the relationships of most variables associated with lamb's birth weight and growth performance are similar in case of spring-born or fall-born lambs, in spite of the fact that the season of lambing apparently does affect the average birth weight and rate of gain to weaning.

No significant breed X season of lambing interactions were found for the traits in this study. There were some significant breed differences related to ewe and/or lamb weight at parturition or weaning. Breed differences related to ewe body weight at lambing are in agreement with the results reported by Farid and Makarechian [4] on these breeds in the same location (Badjgah near Shiraz). They reported that Bakhtiari was the heaviest and Naeini the lightest. Breed differences for lamb weight at parturition to some extent show the same trend as reported by Farid and Makarechian [3] whose report shows birth weight, in decreasing order of Karakul, Bakhtiari, Mehraban and Naeini, while in this experiment Bakhtiari weighed the same as Karakul. As regards the number of lambs born, there were no significant differences between breeds. The conception rate and the number of lambs weaned were higher ($p < 0.05$) in Karakul and Mehraban as compared to Naeini and Bakhtiari. Season of lambing is probably more reliable than breed comparisons due to presence of relatively small numbers in each breed and unbalanced age groups among breeds. Therefore, it may be concluded that under farm flock conditions in which supplemental feeding is economically feasible, spring-lambing produces more kg lamb born and weaned per ewe lambing. Spring-lambing also results in less scattered lambing than fall-lambing. Thus, better feeding and management practices could be applied on spring-born lambs which would lead to better lamb performance.

Table 1. Least-squares means and standard errors by breed and season of lambing for conception rate, number of lambs born, number of lambs weaned and weight of lamb weaned per ewe exposed to rams

Classification		No. of ewes	Conception rate	No. of lambs born	Lambs at birth (kg)	No. of lambs weaned	Lambs weaned (kg)
Overall mean		87	0.91 ± 0.03	0.95 ± 0.03	4.15 ± 0.15	0.88 ± 0.04	16.33 ± 0.77
Breed							
	Karakul	31(17)†	1.00 ± 0.04^{a*}	1.07 ± 0.05^{a}	4.99 ± 0.24^{a}	1.07 ± 0.06^{a}	20.02 ± 1.26^{a}
	Mehraban	20(10)	1.00 ± 0.05^{a}	1.00 ± 0.07^{a}	4.17 ± 0.29^{b}	0.95 ± 0.08^{a,b,c}	18.13 ± 1.56^{a,b}
	Naeini	19(9)	0.84 ± 0.05^{b}	0.84 ± 0.07^{a}	3.08 ± 0.30^{c}	0.73 ± 0.08^{c}	12.45 ± 1.60^{c}
	Bakhtiari	17(9)	0.83 ± 0.06^{b}	0.89 ± 0.07^{a}	4.36 ± 0.32^{a,b}	0.76 ± 0.09^{b,c}	14.73 ± 1.70^{b,c}
Season of lambing –							
	Fall	45	0.89 ± 0.04^{a}	0.89 ± 0.05^{a}	3.91 ± 0.20^{a}	0.83 ± 0.05^{a}	15.20 ± 1.08^{a}
	Spring	42	0.94 ± 0.04^{a}	1.01 ± 0.05^{a}	4.39 ± 0.21^{a}	0.92 ± 0.05^{a}	17.46 ± 1.10^{a}

*All means within a particular sub-class differ significantly ($p < 0.05$) except those followed by the same letter.

†Numbers in parentheses show the number of ewes of corresponding breed used in the fall-lambing out of total ewes of that particular breed for both seasons of lambing.

Table 2. Least-squares and standard errors by breed and season of lambing for ewe body weight at lambing, number and weight of lambs born, number of lambs weaned and weight of lambs weaned per ewe lambing

Classification		No. of ewes	Ewe body weight at lambing (kg)	No. of lambs born	Lambs at birth (kg)	No. of lambs weaned	Lambs weaned (kg)
Overall mean		76	53.07 ± 0.73	1.04 ± 0.02	4.54 ± 0.08	0.95 ± 0.04	17.36 ± 0.70
Breed							
	Karakul	28(16)†	56.66 ± 1.16^{a,b*}	1.08 ± 0.03^{a}	5.04 ± 0.13^{a}	1.08 ± 0.06^{a}	20.16 ± 1.11^{a}
	Mehraban	20(10)	54.14 ± 1.36^{b}	1.00 ± 0.04^{a}	4.17 ± 0.16^{b}	0.95 ± 0.07^{a}	18.13 ± 1.30^{a}
	Naeini	15(6)	41.01 ± 1.60^{c}	1.00 ± 0.05^{a}	3.77 ± 0.18^{b}	0.83 ± 0.08^{a}	13.48 ± 1.53^{b}
	Bakhtiari	13(6)	60.45 ± 1.69^{a}	1.07 ± 0.05^{a}	5.19 ± 0.19^{a}	0.93 ± 0.08^{a}	17.67 ± 1.62^{a,b}
Season of lambing							
	Fall	38	51.04 ± 1.07^{a}	1.00 ± 0.03^{a}	4.39 ± 0.12^{a}	0.91 ± 0.05^{a}	16.22 ± 1.02^{a}
	Spring	38	55.09 ± 1.01^{b}	1.07 ± 0.03^{a}	4.69 ± 0.11^{b}	0.98 ± 0.05^{a}	18.49 ± 0.96^{a}

*All means within a particular sub-class differ significantly ($p < 0.05$) except those followed by the same letter.

†Numbers in parentheses show the number of ewes of corresponding breed used in the fall-lambing out of total ewes of that particular breed for both seasons of lambing.

Table 3. Least-squares means and standard errors by breed and season of lambing for ewe body weight at weaning, and weight of lambs weaned per ewe which raised a lamb to weaning (including twins)

Classification		No. of ewes	Ewe at weaning (kg)	Lambs weaned (kg)
Overall mean		71	48.99 ± 0.77	19.16 ± 0.44
Breed				
	Karakul	28(16)†	52.30 ± 1.13^{a,b}*	20.16 ± 0.65^{a}
	Mehraban	19(10)	50.40 ± 1.36^{b}	19.15 ± 0.78^{a}
	Naeini	13(4)	37.88 ± 1.78^{c}	16.14 ± 1.02^{b}
	Bakhtiari	11(6)	55.38 ± 1.79^{a}	21.20 ± 1.03^{a}
Season of lambing				
	Fall	36	49.97 ± 1.13^{a}	17.55 ± 0.64^{a}
	Spring	35	48.01 ± 1.05^{a}	20.77 ± 0.60^{b}

*All means within a particular sub-class differ significantly ($p < 0.05$) except those followed by the same letter.

†Numbers in parentheses show the number of ewes of corresponding breed used in the fall-lambing out of total ewes of that particular breed for both seasons of lambing.

Table 4. Least-squares means and standard errors by breed, season of lambing and sex for birth weight and weaning weight per ewe lambing and per ewe raising a lamb to weaning (excluding twins)

Classification		No. of ewes	Birth wt (kg)	No. of ewes	Weaning weight (kg)
Overall mean		73	4.45 ± 0.07	68	18.60 ± 0.33
Breed					
	Karakul	26(16)†	4.99 ± 0.11^{a}*	26(16)†	19.60 ± 0.51^{a}
	Mehraban	20(10)	4.19 ± 0.12^{b}	19(10)	19.21 ± 0.57^{a}
	Naeini	15(6)	3.65 ± 0.15^{c}	13(4)	15.55 ± 0.77^{b}
	Bakhtiari	12(6)	4.98 ± 0.16^{a}	10(6)	20.01 ± 0.81^{a}
Season of lambing					
	Fall	38	4.36 ± 0.10^{a}	36	17.37 ± 0.48^{a}
	Spring	35	4.55 ± 0.10^{a}	32	19.81 ± 0.47^{b}
Sex					
	Female	36	4.24 ± 0.10^{a}	35	17.55 ± 0.48^{a}
	Male	37	4.67 ± 0.09^{b}	33	19.64 ± 0.45^{b}

*All means within a particular sub-class differ significantly ($p < 0.05$) except those followed by the same letter.

†Numbers in parentheses show the number of ewes of corresponding breed used in the fall-lambing out of total ewes of that particular breed for both seasons of lambing.

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