

THE EFFECT OF SERVICE RAM ON REPRODUCTIVE PERFORMANCES AND BIRTH WEIGHT OF LAMBS

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Abstract: The investigation was conducted in population of Mis breed of sheep, divided into three groups. For reproduction had use rams of Ile de France breed. Induction and synchronization of oestrus was done off-season in October. The percentage of lambing sheep, sheep fertility, and number of lambs acquired per father, sex and birth type of lambs were observed. Ram 1 had a highest number of ewes lambled with an excellent percentage of mating success and highest fertility rate of ewes with differences on fertility rate of 17% (between group of ewes in ram 1 and ram 2), 36% (group of ewes in ram 1 and ram 3) and 19% (group of ewes in ram 2 and ram 3). The highest birth weight were on lambs born single from ram 3, born twins from ram1, triplets of ram 3. For the lambs born quadruplets (unfortunately only in rams 1 and 2 with one lamb of each was alive) the lamb of ram 2 was higher in birth weight. The male and female lambs of ram 3 got the highest birth weight while the female lambs of ram 1 acquired the lowest birth weight. The highest average birth weight of lambs was born single, male; born triplets' male from lambs of ram 3 having an average birth weight of 6.36kg and 4.0 kg but got the lowest for lambs born twins on female lambs 3.66 kg. The male lambs of ram 1 got the highest average birth weight on lambs born twins with an average birth weight of 4.38 kg but the lowest on triplets born 3.3kg. Unfortunately only one each of the two ram with lambs born quadruplets alive both male and the higher was that lamb of ram 2 with a birth weight of 3.3 kg. Result showed the influence of ram on number of lambs born and lambs' birth weight. Between subject effects Father* birth type showed a significant effect on birth weight of lambs.

Key words: ram, reproductive performances, lambs, birth weight

Introduction

The most important factor determining the success of sheep production is reproductive efficiency which includes successful lambing (*Kutluca Korkmaz and Emsen, 2016*). The type and continuation of production and the majority of the sheep breeds differ in reproductive behavior depending on the changes in season latitude/longitude, the length of the photoperiod and other factors (*Dogan and Nur, 2006; Abu Gazal, 2010, Laleva et al., 2014*). Most of the characteristics of domestic animals are quantitative-measurable. The animal's production properties are controlled by hundreds, perhaps a thousand genes (*Falconer and MacKay, 1996*). The main criteria used to evaluate, and thus the selection of the individuals to be used for breeding, is their breeding value for properties of interest (*Petrovic et al., 2011*).

In order for genetic progress to be more effective for features that are difficult to measure or have low heritability, a more complex and expensive process is needed which is not desirable from the point of production economics at the farm. The success of genetic improvement is based on expectations that the descendants by their phenotypic values will be above the average values of parents. Expected genetic progress - selection success, it is valued depending on the value of heritability for the given property and the selection differential. Since the degree of inheritance that we call heritability is the ratio of genetic and total phenotypic variance, which means that it is not a biological constant, its value can be different in populations, (*Hill, 2014; Petrović and Pantelić, 2015*).

Bearing in mind that in sheep production, the number and quality of offspring in a much larger extent depends on the genetic potential of ram, it is of particular scientific and practical importance to test the fathers. Mis breed of sheep is a new Serbian population and widely experimental research are very important for its future use in farms.

The aim of this paper was to determine the impact of ram on some reproductive performances, body weight of lambs at birth and test the interaction between subject effects.

Material and Methods

The research was carried out at the experimental farm of the Institute for Animal Husbandry, Belgrade. The material for testing was 142 Mis breed of sheep, divided into three groups. Each group is assigned a ram of Ile de France for insemination. Induction and synchronization of oestrus was done off-season in October. Vaginal sponges with flugestone acetate (Syncro-Part 30mg) are used to induce estrus and stays in place for 14 days. To achieve optimal synchronization of

ovulation, after the removal of vaginal sponge, injection of PMSG with a dosage of 600 IU is administered intramuscularly for each sheep. The resulting lambs of the F1 generation are recorded and measured at birth. It has observed the percentage of lambing sheep, sheep fertility, and number of lambs acquired per father, sex and litter size (birth type) of lambs. The statistical processing of data was performed using the SPSS software version 20.

Results and Discussion

The ewes mated with the assigned ram and the percentages of mating success are shown in table 1. It indicated that ram 1 had a highest number of ewes lambd with an excellent percentage of mating success while the ram 3 got the lowest number of ewes lambd and the poorest percentage of mating success.

Table 1. Rams with their corresponding number of ewes

Ram	Number of ewes mated	Number of ewes lambd	Percentage of mating success, %
1	48	45	93.75
2	47	30	63.83
3	47	22	46.81

As seen in table 2, the highest fertility rate of ewes was on the group of ram 1 with differences on fertility rate of 17% (between group of ewes in ram 1 and ram 2), 36% (group of ewes in ram 1 and ram 3) and 19% (group of ewes in ram 2 and ram 3).

Table 2. Number of lambs acquired by ram with the designated ewes lambd

Ram	Number of lambs born	Fertility, %
1	80	177
2	48	160
3	31	141

Table 3. Average Body weight of lambs at birth (kg.), according to ram

Ram	Mean	N	Std. Deviation	Minimum	Maximum	Std. Error of Mean
1	4.12	80	.84	2.60	6.70	.09
2	4.33	48	.88	3.00	6.70	.13
3	4.92	31	1.27	2.10	6.70	.23
Total	4.34	159	.99	2.10	6.70	.08

The lambs of ram 3 got the highest average birth weight while the lowest average birth weight was in lambs of ram 1 (Table 3). The analysis of variance showed significant effect of father on lambs' birth weight ($P < 0.05$).

The lambs' average body weight at birth according to birth type per ram in table 4, it represented that the highest weight were on lambs born single from ram 3, born twins from ram1, triplets of ram 3. For the lambs born quadruplets (acquired both in rams 1 and 2 but only 1 lamb of each was alive) higher lamb birth weight from lamb of ram 2.

The test of between subject effects Father* birth type showed significant effect on birth weight of lambs ($P < 0.05$).

Table 4. Average birth weight of lambs (kg.), according to ram and litter size

Ram	BT	Number of lambs	Mean	Std. Deviation
1	single	8	5.31	.78
	twins	48	4.30	.66
	triplets	23	3.36	.34
	quadruplets	1	2.60	-
	TOTAL	80	4.11	.84
2	single	8	5.71	.81
	twins	22	4.23	.52
	triplets	17	3.88	.63
	quadruplets	1	3.30	-
	TOTAL	48	4.33	.88
3	single	16	5.85	.92
	twins	13	3.91	.74
	triplets	2	4.00	.56
	quadruplets	-	-	-
	TOTAL	31	4.92	1.27

The sex of lambs born and their average birth weight per father (table 5). The male and female lambs of ram 3 got the highest birth weight while the male lambs of rams 1 and 2 had the same average birth weight. The female lambs of ram 1 acquired the lowest birth weight. The test of between – subjects effects Father* Sex of lambs showed no significant effect on lambs birth weight. ($P > 0.05$)

Table 5. Average birth weight of lambs (kg.), according to ram and sex of lambs

Ram	Sex	Number of lambs	Mean	Std. Deviation
1.0	Male	47	4.18	.86
	Female	33	4.02	.82
2.0	Male	25	4.18	.74
	Female	23	4.50	1.01
3.0	Male	15	5.00	1.25
	Female	16	4.84	1.33

Table 6. Average weight of lambs (kg) according to ram, litter size and sex of lambs

Ram	BT	Sex	Number of lambs	Mean	Std. Deviation
1.0	Single	Male	6	5.16	.86
		Female	2	5.75	.35
	Twins	Male	28	4.38	.66
		Female	20	4.20	.67
	Triplets	Male	13	3.30	.36
		Female	10	3.44	.32
	Quadruplets	Male	1	2.60	-
2.0	Single	Male	2	5.65	.64
		Female	6	5.73	.91
	Twins	Male	12	4.23	.46
		Female	10	4.22	.62
	Triplets	Male	10	3.92	.71
		Female	7	3.84	.55
	Quadruplets	Male	1	3.30	-
3.0	Single	Male	6	6.36	.81
		Female	10	5.55	1.04
	Twins	Male	7	4.11	.66
		Female	6	3.66	.81
	Triplets	Male	2	4.00	.56

The average birth weight of lambs depending on their birth type and sex of lambs per father (Table 6), it can noticed that the highest average birth weight of lambs born singles was the male lambs of ram 3 with an average weight of 6.36 kg and the lowest was 5.16 kg the male lambs of ram 1. The male lambs of ram 1

born twins was the highest 4.38 kg on the average birth weight while the lowest was the female lambs of ram 3 with an average birth weight of 3.66 kg. For the lambs born triplets the highest was 4.0 kg the male lambs of ram 3 and the lowest 3.3 kg the male lambs of ram 1. Unfortunately only one each of the two ram had quadruplets born alive both male and the higher was that lamb of ram 2 with a birth weight of 3.3 kg. The interaction between subject effects Father * BT * Sex showed no significant effect on lambs birth weight ($P > 0.05$).

The result acquired in the experiment indicated the influence of ram on number of lambs born and lambs' birth weight. Complying in our result was that by *Sánchez-Davila et al. (2015)* in Saint Croix hair sheep informed the effect of ram was significant ($P < 0.05$) on litter size and birth weight of lambs. Likewise agreeable with our result by *Schmidova et al. (2016)* informed that service rams in Suffolk sheep also have a clearly detectable influence on number of born. *Hagger (2002)* found out the effect of service ram on litter size was also in accordance with our result. *Freking et al. (2000)* stated the main effect of ram breed was significant for number born, litter birth weight, birth weight, of which it was absolutely compatible with ours. *Assan and Makusa (2005)* found the effect of sire was significant on birth weight in indigenous Sabi sheep and Mutton Merino, however a non-significant effect on birth weight in Dorper sheep.

Assan and Makusa, (2005) suggest that selection of rams should be given a priority in any sheep production system making it useful in the improvement of overall economic efficiency. *Yaqoob et al. (2004)* was concluded that breed of sire can affect the birth weight of lambs and this factor should require careful consideration in practical lamb husbandry. Our research result can confirmed their ideas that ram have very important role in sheep production.

Dakhlan et al. (2015) noted the contribution of sire by birth type interaction to the expression of birth weight was significant, also supported the result of our study.

Conclusion

Our research showed that effect of service ram on reproductive performances and birth weight of lambs is important for considering of sheep production and flock improvement programs. Each ram showed differently as in ram 3 in spite showed the poorest percentage of mating success the males' offspring single and triplets born are the heaviest on average birth weight. On the other hand, ram 1 showed the best in mating success with highest birth weight on male lambs born twins but the lowest on female lambs born triplets. Two rams had quadruplets born with only one lamb alive each both male and the higher was that

lamb of ram 2. Generally the ram have influence on number of lambs born and lambs' birth weight.

In this connection the ram therefore does not only contribute half of his genetics but its success as a breeder.

Uticaj priplodnih ovnova na reproduktivne performanse i težinu jagnjadi na rođenju

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Rezime

Ispitivanje je sprovedeno u populaciji ovaca rase Mis, podeljenoj u tri grupe. Za reprodukciju korišćeni su ovnovi Il de frans rase. Indukcija i sinhronizacija estrusa obavljena je u oktobru van sezone. Posmatrani su sledeći parametri: procenat jagnjenja, plodnost ovaca i broj potomaka po ocu, polu i tipu jagnjenja. Ovan 1 je imao najveći broj ovaca koje su se jagnjile sa visokim procentom uspeha parenja i najvišom stopom plodnosti ovaca sa razlikama u stopi plodnosti od 17% (između grupe ovaca ovna 1 i ovna 2), 36% (grupa ovaca ovna 1 i ovna 3) i 19%. Najveće težine na rođenju su utvrđene kod jagnjadi jedinaca od ovna 3, blizanaca od ovna 1, trojki ovna 3. Za jagnjad rođenu kao četvorke (nažalost samo kod ovnova 1 i 2 sa jednim jagnjetom od svakog koje je bilo živorođeno) jagnjad ovna 2 su bila najveća na rođenju. Muška i ženska jagnjad ovna 3 su imala najvišu težinu pri rođenju, dok su ženska jagnjad ovna 1 imala najnižu težinu na rođenju. Najviša prosečna težina pri rođenju jagnjadi rođene kao jedinci, muškog pola; rođeni kao trojke muškog pola ovna 3 imali su prosečnu težinu na rođenju od 6,36 kg i 4,0 kg, ali i najnižu za jagnjad blizance ženskog pola - 3,66 kg. Muška jagnjad ovna 1 su imali najveću prosečnu težinu na rođenju jagnjadi rođenih kao blizanci sa prosečnom telesnom težinom od 4,38 kg, a najmanju jagnjad trojke - 3,3 kg. Rezultat je pokazao uticaj ovna na broj rođene jagnjadi i težinu jagnjadi na rođenju. Između efekata otac * tip jagnjenja utvrđen je značajan uticaj na težinu jagnjadi na rođenju.

Ključne reči: ovan, reproduktivne performanse, jagnjad, težina na rođenju

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