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Effect of Flushing with Energy or Protein Sources on the Reproductive Performance in Ossimi Ewes

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Abstract

This study aimed to investigate the effectiveness of flushing with corn (energizing source) and soybean (protein source) on the reproductive performance in Ossimi ewes. Thirty ewes, two to four years old (39 ± 1.44 kg) and five rams, three to four years old (58.6 ± 4.75 kg) were enrolled in this study. The ewes were assigned into three groups (10 ewes per group). Ewes in group A received 500gm of corn grains, group B received 500gm of soybean, while group C served as a control (maintenance ration only). The ewes received the flushing ration for two weeks before and two weeks after mating. The results from this study demonstrated that group B had higher conception, lambing, and prolificacy rates (80%, 80%, and 125%) than group A (70%, 70%, and 114.28%) and group C (70%, 70%, and 100%) respectively. The difference was not significant. Also, the birth weight of lambs was the highest in group B (1.95 ± 0.03 kg) followed by group C (1.83 ± 0.05 kg) and group A (1.76 ± 0.11 kg), but the difference was not significant. In conclusion, the obtained data revealed that flushing of Ossimi ewes with soybean as a source of protein improved conception, lambing and prolificacy rates and birth weight of their lambs but was not different than flushing ewes with corn grains.

Keywords

Corn, Flushing, Ossimi Ewes, Prolificacy, Soybean

1. Introduction

Sheep breeds raised in Egypt are used for meat production primarily. However, they are classified as low-prolific breeds **(Marai et al., 2009),** the low prolificacy of Egyptian ewes may be due to low ovulation rate **(Hashem and El-Zarkouny, 2014; Ali et al., 2006).** Ossimi sheep is one of the most popular breeds in Egypt which are considered small to medium sized breed **(Elshennawy, 1995).** Improving the reproductive performance of ewes will increase the number of lambs born which is considered an important demand in the development of sheep production in Egypt. Moreover, nutrition level is one of the most important factors which can influence reproductive performance of sheep and goat **(Scaramuzzi et al., 2006; Shahneh et al., 2008).** Furthermore, feed supplementation just before ovulation for a short-term period or long-term period could improve the reproductive performance of ewes **(Senosy et al., 2013; Habibizad et al., 2015).** Also, dietary supplementation with energy and protein sources before mating improves reproductive efficiency and ovulation rate in sheep **(Robinson et al., 2002; Keisler and Buckrell, 1997).** Flushing is a practice that aims to increase the number of ovulations and improve the fertility in the herd by obtaining a larger number of multiple births **(Chagas et al., 2007);** it is a known management program for increasing sheep reproductive performance during the breeding season **(El-Ella, 2006; Godfrey et al., 2003; Nottle et al., 1997).** Conversely, flushing does not always improve the lambing performance **(Croker et al., 1985).** Delayed estrus activity and ovulation **(Gunn et al., 1979),** failure of fertilization **(Restall et al., 1978)** and death of embryos **(Rhind et al., 1989)** perhaps the consequences of failure of flushing the ewes. The current study aims to investigate the reproductive performance of ewes through flushing with corn and soybean as an energy and protein sources respectively.

2. Materials and Methods

2.1 Animals and Management

This study was carried out at agricultural research center belonging to Minia University, Shosha village, Samalut city, El-Minia, Egypt throughout the period from November 2017 till July 2018.Thirty ewes (39 ± 1.44 kg), two to four years

old were housed in 5 x 8m pen and five rams (58.6 ± 4.75 kg) were used for breeding of the ewes, three to four years old were enrolled in this study. The ewes were grazing in early morning then returned to open yard till night and housed at pens at night. Ewes were fed according to their body weight requirements. Well balanced ration containing sugar beet meal (10%), soyabean meal (10%), yellow corn (48%), bran (18%), salt (1%) and vitamin- mineral mixture (1%) was offered to sheep all the study period in addition to the Egyptian barseem in winter and hay for the rest of the year. Clean fresh potable water was offered to animals as a free choice. All sheep were clinically normal with a healthy appearance. They were vaccinated against foot and mouth disease, sheep pox, clostridial diseases and pasteurellosis as recommended. They were drenched against internal parasites with broad spectrum anthelmintics and sprayed against ectoparasites with suitable insecticide every 3 months.

Ewes were randomly selected and assigned to three groups (each group consist of 10 ewes), group (A) in which ewes were flushed with corn (energy source) 500 gm/ewe/day above maintenance ration starting two weeks before mating and lasted for two weeks after mating, group (B); ewes were flushed with soyabean (protein source) 500 gm/ewe/day above maintenance ration starting two weeks before mating and lasted for two weeks after mating and group (C); ewes were fed a maintenance ration only (control). All ewes were synchronized with two injections of 1 ml of prostaglandin F2 alpha (PGF2-alpha) (Ovuprost, Bayer Company, New Zealand) 11 days apart. After synchronization of estrus, ewes were introduced to the rams separately in a mating pen (5x8 m) designed especially for this purpose. After mating, the ewes were returned to their pens. The ewes rejoined the main flock after two weeks from the mating day.

2.2. Parameters Measurement

Conception Rate (Number of ewes conceived on day 35/ number of exposed ewes) x 100

Lambing Rate (Number of ewes lambed/ number of exposed ewes) x100

Prolificacy Rate (Number of born lambs/ number of lambed ewes) x 100

Birth Weight of Lambs (Newborn lambs were weighed immediately after parturition).

2.3. Statistical Analysis

Statistical analysis was carried out using SPSS software (version 23). ANOVA test was performed to examine the differences among treatments. Duncan multiple range test was used to compare different means of the studied parameters.

3. Results

The reproductive parameters of ewes are summarized in **Table (1)** and **Fig. (1).**

3.1. Conception, Lambing and Prolificacy Rates

Soyabean group was higher in conception rate, lambing rate and prolificacy rate (80%, 80%, 125%) than corn group (70%, 70%, 114.28%) and control group (70%, 70%, 100%) respectively. However, the difference was not significant (P > 0.05) as illustrated in **Table (1)** and **Fig. (1).**

Table (1). Effect of flushing with energy or protein sources on the reproductive performance of Ossimi ewes.

Parameters	Groups		
	Corn	Soybeans	Control
Conception rate (%)	70[a]	80[a]	70[a]
Lambing rate (%)	70[a]	80[a]	70[a]
Prolificacy rate (%)	114.8[a]	125[a]	100[a]

Means within a row with same letters represent non-significant difference among the groups (P > 0.05).

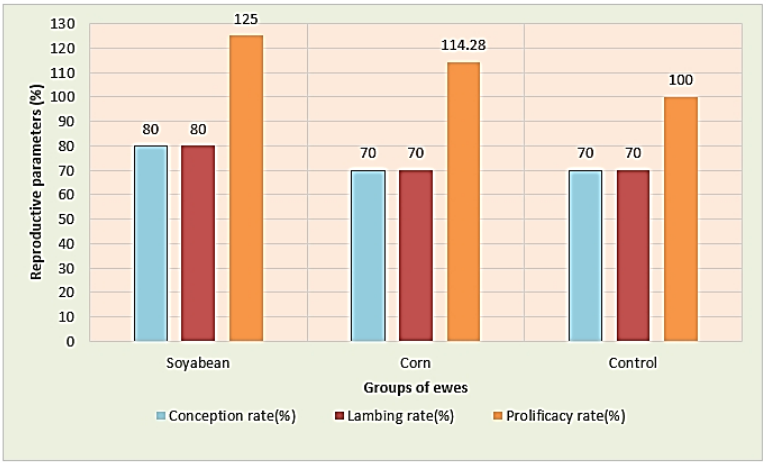

Fig. (1). Effect of flushing with energy or protein sources on the reproductive performance in Ossimi ewes

3.2. Birth Weight of Lambs

Soyabean group was higher in birth weight of lambs (1.95 ± 0.03kg) than corn group (1.76 ± 0.11kg) and control group (1.83 ± 0.05kg). However, the difference was not significant (P >0.05) as illustrated in **Table (2)** and **Fig. (2).**

Table (2). Effect of flushing of ewes with energy and protein sources on the birth weight of their lambs.

Groups	Number of ewes	Ewes lambed	Number of lambs	Birth weight of lambs (kg)
Corn	10	7	8	1.76 ± 0.11[a]
Soyabean	10	8	10	1.95 ±0.03[a]
Control	10	7	7	1.83 ± 0.05[a]

Means in the same column under the same factor followed by the same superscript (a) are not significantly different (P > 0.05).

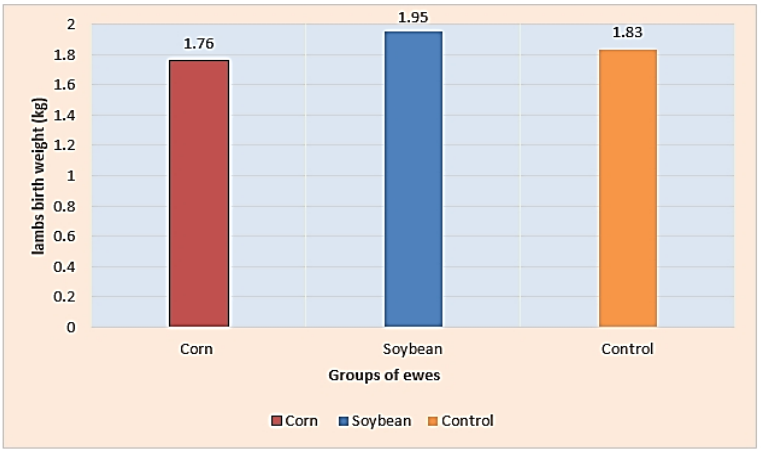

Fig. (2). Effect of flushing of ewes with energy or protein sources on the lambs' birth weight.

4. Discussion

Soyabean group was non-significantly higher in conception, lambing and prolificacy rates than corn and control groups **(Table 1 and Fig. 1).** It was reported that flushing ewes with energy and protein sources improved their reproductive performance **(Ahmad, 2014; Daghigh et al., 2016).** Also, flushing ration has no effect on lambing rate in the low prolific Queue Fine de l'Ouest (QFO) breed and intermediately prolific D'Man × Queue Fine de l'Ouest (QFO) crossbreed but there was a significant effect in the high prolific D'Man breed **(Lassoued et al., 2004).** In this study, high prolific breed had high lambing rate and low prolific breed had low lambing rate. This result revealed that reproductive performance of ewes influenced by genetics more than by improving nutritional level. Moreover, the prolificacy was significantly influenced (P<0.01) by the level of nutrition before breeding season in Karagouniko ewes and was not affected by dietary supplementation in Manchega ewes **(Molina et al., 1994),** this study referred that breed difference influenced the response of ewes to flushing ration. Therefore, the variety in response of different breeds of ewes to dietary supplementation may be due to the difference in its genetic constitution. In addition, the prolificacy was higher for mature ewes (4-5 years) that received flushing ration before breeding season than the control group, however there was no effect on the prolificacy in yearling and older (7-8 years) Finnish Landrace ewes which received the same treatment **(Sormunen-Cristian and Jauhiainen, 2002);** this result referred to presence of effect of age of ewes on its response to the flushing ration. Consequently, it is concluded that it is not necessary that improving nutritional level to ewes before breeding season results in an improvement in its reproductive performance because there are other factors affecting its response to dietary supplementation such as breed, age, and genetics.

Our results revealed that flushing had non-significant effect on conception, lambing and prolificacy rates that supported with **Ambreen et al., (2014)** who found that the difference between Corriedale ewes flushed with corn and non-flushed ewes in conception and prolificacy rates was not significant. Moreover, there was no effect of flushing ration on conception and lambing rate in Merino ewes **(Venter and Greyling, 1994).** In addition, flushing ration did not improve the lambing rate in yearling Targhee ewes **(Ragen et al., 2015).** Furthermore, the effect of flushing ration on prolificacy rate in Fulbe ewes flushed with protein source and Ile de France ewes was not significant **(Njoya et al., 2005, Alves Cirne et al., 2016).**

On the contrary, improving nutrition before breeding season resulted in higher conception rate in Malpura ewes **(Chaturvedi et al., 2006)** and Egyptian Barki ewes **(Sabra and Hassan, 2008).** Also, Rahmani ewes had received flushing ration had higher conception and lambing rates than non-flushed ewes **(Hashem and El-Zarkouny, 2014).** Moreover, prolificacy was improved by flushing in Sarda ewes supplemented with soybean-meal **(Molle et al., 1997).** The difference from our results may be attributed to difference in breed used or method of flushing.

Birth weight of lambs was higher in soyabean group than control and corn groups, but the difference was not significant (P>0.05). Also, it was demonstrated that flushing of ewes

with protein sources did not influence the birth weight of their lambs significantly **(Webb et al., 2012).**

The obtained birth weight results run in agreement with **Mirzaei-Alamouti et al., (2018)** who reported a non-significant difference between ewes flushed before breeding season and control group in birth weight of their lambs in fat-tailed Iranian Afshari ewes, in Rahmani, Barki and Awassi x Barki ewes **(Hashem and El-Zarkouny, 2014),** in Malpura ewes **(Chaturvedi et al., 2006),** in St. Croix White hair sheep ewes **(Godfrey et al., 2003),** and in Ile de France ewes **(Alves Cirne et al., 2016).**

Conversely, it was illustrated that higher birth weight of lambs could be obtained by improving nutrition before breeding season in Ghezel sheep **(Ahmad, 2014).** Similar results were found in Egyptian Barki ewes **(Sabra and Hassan, 2008)** which may be returned to use of other breeds rather than that used in our study.

5. Conclusion

The reproductive performance of Egyptian Ossimi ewes could be improved by using corn and soybeans as a flushing ration. But the effect was limited, and this may be attributed to the fact that Ossimi ewes are low prolific breed. Moreover, the effect of corn and soybean are not different from each other. Therefore, using corn grains as a flushing ration for Ossimi ewes would be a better choice because it is much cheaper than soybean.

6. Authors Contributions

All authors contributed equally to study design methodology, interpretation of results and preparing of the manuscript.

7. Conflict of Interest

The authors declare no conflict of interest.

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