

Effect of New Regime of Nutritional Flushing on Reproductive Performances of Egyptian Barki Ewes

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Abstract: The present study aimed to improve the reproductive performances and lamb crop of Barki ewes by a new regime of nutritional flushing. At the beginning of the breeding season (Autumn and Spring) the ewes were flushed by balanced mixture of crushed yellow corn 58%, crushed soy bean 41%, mineralized trace element 0.01% and sodium chloride salt 1% for one month before breeding. This regime of flushing increased the incidence of oestrus (85 vs 66.66%), shortened the oestrous cycle length (16.35 vs 19.85 days) and increased the lambing percentage (120.84 vs 106.25%) and increased the lamb birth weight (3.04 vs 2.43 Kg) significantly than the non flushed group. It also, improved the blood concentrations of calcium, phosphorus, magnesium, total protein, albumin and globulins in addition to progesterone level and it was concluded that application of flushing for Egyptian Barki ewes can overcome the nutritional deficiencies and increase lamb crop.

Key words: Barki ewes • flushing • oestrous cycle • lambing • minerals

INTRODUCTION

Reproduction in sheep had received much attention in Egypt owing to its high value as a source of animal protein.

It was reported that the plane of nutrition in sheep affect conception rate, lambing rate, lamb birth weight and lamb mortality. Also, it significantly affected blood concentrations of minerals, proteins and hormones [1-4].

Attempts have been made to formulate a nutritional strategy to improve fertility of local sheep breeds, but no practical success has been consistently achieved [5]. However, some of the evidences presented in the literature shows that proteins and energy supplementations of grazing animals improve fertility [6]. Moreover flushing of sheep with lupin grains increased plasma estrogen and progesterone levels as well as ovulation rate [4].

Fat supplementation improved ovulation rate and embryo production [7] and reduced post lambing period [8] of local Egyptian ewes as well as improved the reproductive performances of local Egyptian goats [9], sheep [10] and buffaloes [11].

Barki breed have great potentials for the harsh socioeconomic conditions prevailing in the new reclaimed areas depending on free grazing in poor pastures which lead to nutritional deficiencies, poor body condition, low

fertility and decreased lamb crop. Therefore, the present investigation aimed to improve the reproductive performances of Barki ewes and its blood concentrations of some minerals, proteins and hormones which will be positively reflected on the reproductive performance, especially the lamb crop.

MATERIALS AND METHODS

The present investigation was carried out on 20 healthy, mature Barki ewes of 3-4 years old raised under Nile valley conditions for one year. Ewes were fed on maintenance ration of concentrated mixture (400 g/ewe daily) beside rice straw (*ad. Lib*) during summer and barseem, (*Trifolium alexandrinum ad. Lib.*) during winter.

Ewes were divided into 2 similar groups. One group was flushed for one month at the beginning of the breeding season (autumn and spring) by additional 200 g/ewe daily of balanced supplement mixture composed of crushed yellow corn, 58%; crushed soy bean, 41%; mineralized trace elements, 0.1% (iron, manganese, copper, iodine, selenium and zinc) and sodium chloride salt 1% (18.5% total protein and 2.8% Mcal/kg L.B.W digestible energy). The supplement was calculated according to [12]. The other group was kept without supplementation to serve as control.

The incidence of oestrus was detected by using 2 vasectomized rams fitted on the brisket with marking material and allowed to run with ewes all-over the day (one ram for each group). During the last month of the breeding season 2 active rams (5 years old and 50 Kg body weight) were introduced (one for each group) for mating. Oestrous percentage, oestrous cycle length, gestation period, lambing percentage and lamb birth weight were recorded [13].

Blood samples were collected from ewes during oestrus (marking day); dioestrus (one week post oestrous day); early pregnancy (1st 50 days of gestation); midpregnancy (2nd 50 days of gestation) and late pregnancy (last month of gestation).

Blood samples were centrifuged and plasma was aspirated and kept frozen at -20°C till the time of progesterone assay using kits from diagnostic product corporation, USA [14]. Calcium inorganic phosphorus, magnesium, total protein and albumin were determined calorimetrically [15] using specific chemical kits (Bio-Merieux, France). Globulins were calculated by subtraction of albumin from total proteins values of each sample.

Statistical analysis were carried out to evaluate the difference in results between experimented and control animals using student "t" test [16].

RESULTS

Table 1 reveals that flushing of Barki ewes with 200g/ewe daily of a balanced mixture composed of 58% crushed yellow corn, 41% crushed soy bean, 0.1% trace elements and 1% sodium chloride salt for one month

prebreeding increase oestrous incidence, shortend the oestrous cycle length and increased the lambing percentage and lamb birth weight significantly.

Table 2 reveals that the used system of flushing improved the mineral status during oestrus and gestation and prevent mineral deficiency.

Table 3 shows significant increase in plasma total proteins, albumins, globulins and albumins/globulins in flushed ewes than in non flushed ones.

Figure 1 shows that flushed ewes had higher progesterone level during oestrous cycle and allover the gestation period

DISCUSSION

In the present study it is clear that flushing of Barki ewes with the present mixture for one month prebreeding improve the reproductive performance of Barki ewes indicated by the increase oestrous incidence, shortend the oestrous cycle length and increased the lambing percentage and lamb birth weight significantly. Moreover, the flushed ewes showed higher progesterone level during oestrous cycle and allover the gestation period which reflect significant development of corpus luteum

Table 1: Effect of flushing on some reproductive performances of Barki ewes.

Parameter	Non flushed ewes	Flushed ewes
Incidence of oestrus (%)	66.066	85
Oestrous cycle length (days)	19.85±1.87	16.35±1.50**
Gestation length (days)	150.46±2.44	149.14±3.13
Lambing rate (%)	106.25	120.84
Lamb birth weight (kg)	2.43±0.23	3.04±0.25*

* P < 0.05 ** P < 0.01

Table 2: Effect of flushing on some plasma minerals concentrations (µg/ml) of cyclic and pregnant Barki ewes

	Non flushed ewes				Flushed ewes			
	Ca	Ca	Pi	Ca/Pi	Mg	Pi	Ca/Pi	Mg
Oestrus	11.96±1.66	12.57±1.04	9.38±2.19	1.50±0.33	3.94*±0.45	9.19±1.12	1.30±1.06	2.63±0.44
Dioestrus	11.03±2.02	12.53±2.29	7.89±1.64	1.70±0.29	3.63±0.60	8.18±1.33	1.37±0.29	3.13±0.66
pregnancy	9.92±1.43	12.40±1.63	6.51±0.80	1.91**±0.16	3.16±0.56	7.76±0.92	1.28±0.15	2.04±0.33

Ca (calcium) . pi (inorganic phosphorus) . ca/pi(ratio) . Mg (magnesium). * P < 0.05 ** P < 0.01

Table 3: Effect of flushing on plasma proteins (g %) of cyclic and pregnant ewes

	Non flushed ewes				Flushed ewes			
	Tp	Tp	A	G	A/G	A	G	A/G
Oestrus	4.83±0.54	7.00**±0.47	2.04±0.54	4.96**±0.42	0.42*±0.13	2.06±0.28	2.77±0.31	0.75±0.08
Dioestrus	5.49±0.71	7.09*±0.69	3.31*±0.48	3.77±0.48	0.88±0.14	2.13±0.44	3.37±0.48	0.64±0.15
pregnancy	6.86±1.20	7.19±0.71	2.90±0.60	4.29±0.57	0.69±0.18	2.84±0.64	3.69±0.71	0.72±0.15

Tp (total proteins); A (albumin); G (globulins) * P < 0.05 ** P < 0.01

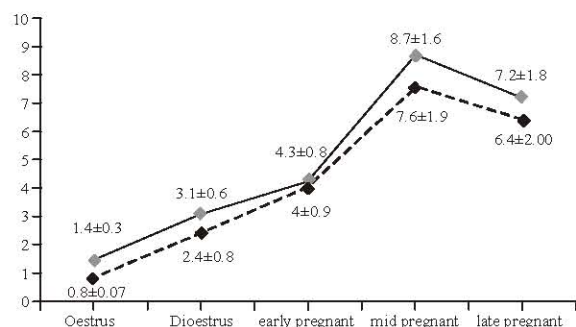


Fig. 1: Effect of flushing on progesterone concentration (ng/ml) of cyclic and pregnant Barki ewes

(Fig. 1). In this respect, it was established that energetic substances act as metabolic signals to the reproductive system [17], involved within the hypothalamic pituitary axis and increase the releasing rate of GnRH [18]. Energy intake increases blood glucose and insulin which increase the pulsatile LH secretion and improve ovarian response to LH stimulation [19]. On the other hand the positive energy balance increases the plasma level of insulin growth factor-1 which is critical to ovarian follicular development [20-21].

The present system of flushing improved the mineral status during oestrus and gestation and prevent mineral deficiency which lead to reproductive disorders and weak lambing [2]. Moreover, it was postulated that minerals influence reproductive potential of farm animals through the direct effect of some of them on the gonads, while, others produce similar effect indirectly via the hypophyseal- pituitary- gonadal axis [22].

Concerning the effect of the present supplementation on plasma protein, it is clear that flushed animals showed significant increase in plasma total proteins, albumins, globulins and albumins/globulins than non flushed animals. This increase may be due to the protein content of supplement mixture. These results confirm the results of ovarian activity. However, it was postulated that protein supplement act directly as a neurotransmitters or indirectly following metabolism to increase GnRH and LH secretion [23-24] or directly on the ovarian function [25].

It could be concluded that application of flushing for local Egyptian sheep is essential particularly for free grazing ewes flocks in order to increase the reproductive activity and lamb crop and to overcome the poor nutritional system and poor body condition score. Flushing with oil bearing grains (crushed soy bean and yellow corn) is available and has economic values.

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