

Relative roles of photoperiodic and nutritional cues in modulating ovarian activity in goats

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SUMMARY

The objective of the current study was to evaluate the influence of nutrition and its interaction with the photoperiod on the ovarian activity of Criollo goats. In early February (22° NL, anestrus season) goats were randomly assigned to the two experimental groups: high (HN; n=10) and low (LN; n=10) nutrition goats. The HN group was fed in mixed prairies with grass and clover (17.3±7.5% of crude protein, CP; 66.3±5.7% dry organic matter, DOM) and received 150 g of concentrate (12% CP) per goat and day. The LN group received only corn stubble (6.2±0.7% CP, 53.7±1.9% DOM). Serum progesterone (P₄) and triiodothyronine (T₃) concentrations were

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measured (RIA) at three selected periods of seasonal anestrus: early (8-24th March), mid (13th April- 3rd May) and late (26th May- 14th June) anestrus. Body weight, body condition and body condition index were determined at the beginning of the study and every 14 days. Body weight was positively correlated with serum T₃ ($r=0.704$; $p<0.05$). The percentage of cycling does during the three examined periods was higher ($p<0.05$) in the HN group than in the LN group (80 vs. 30%, 80 vs. 20%, and 60 vs. 10%, respectively). The high nutrition level increased reproductive activity of Criollo goats during all three periods of the anestrus season including deep anestrus. *Reproductive Biology 2009 9 3: 283-294.*

Key words: goats, seasonality, nutrition, ovarian activity, metabolic status

INTRODUCTION

Goats are seasonal breeders in which fertile reproductive cycles occur when the photoperiod is decreasing [6] i.e. during autumn and winter. The photoperiod's influence on reproductive activity is significantly modulated by latitude; especially in goats from regions located above the tropics where a daylight-hour difference between the shortest and longest day is more evident. Animals located in areas near the equator, where the difference is barely noticeable, are able to express estrous cycles throughout the year [5, 6].

Seasonal variations in the photoperiod are the major factor driving reproductive activity of female goats [4]. However, nutrition is also important as a direct or proximate regulator of seasonal reproduction [9]. Under tropical conditions, with genotypes that are probably non-photoresponsive, nutrition may be the main cue driving reproductive activity [6]. However, there is little information concerning the effects of nutrition and its interactions with seasonality on reproductive activity in goats reared in temperate and subtropical areas.

Some studies evaluating the effects of subnutrition in sheep have reported a reduction in the cyclicity of females with low body condition [10, 19]. Similar responses were reported in goats [20]. Nonetheless, the information about the effect of nutritional supplementation during ane-

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