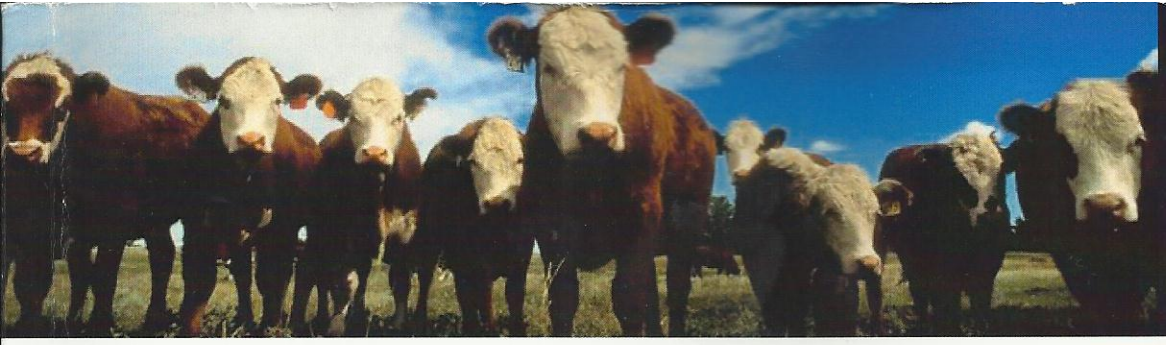

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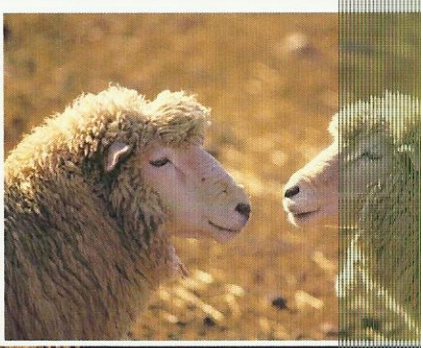

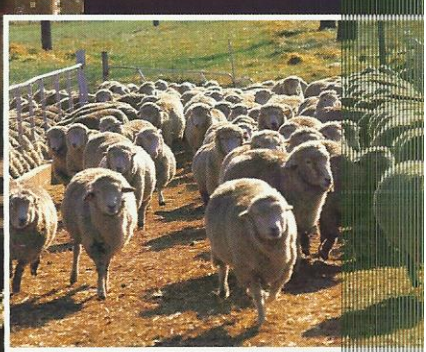

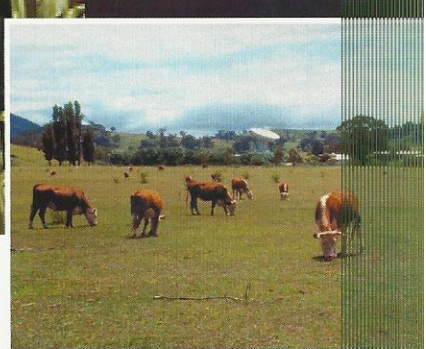

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The Effect of Hormonal Treatment and Energy Supplementation on Reproductive Performance in Rangeland Goats During the Non-breeding Season: Preliminary Results

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Seasonality of reproduction can limit productivity in goats. Recent evidence suggests that the stimulatory effects of short-term supplementation are mediated directly at an ovarian level. Glucose, fatty acids and several metabolic hormones have all been shown to affect the growth and function of ovarian follicles (Scaramuzzi *et al* 2011). This study aimed to evaluate the reproductive response of seasonally anoestrus rangeland goats that were either hormonally treated and/or short-term supplemented with maize to determine which treatment combination was the most effective for inducing oestrus and ovulation, and enhancing ovulation rate.

The experiment was carried out at James Cook University (19°19'48" S; 146°46'12" E), using 28 female Australian rangeland goats. All does were nulliparous and non-pregnant. Does were allocated into four groups of seven animals each. Group 1: Non-synchronization+Non-maize diet, Group 2: Non-synchronization+Maize diet, Group 3: Synchronization+Non-maize diet, and Group 4: Synchronization+Maize diet. Does in Groups 3 and 4 were treated for 9 days with an intravaginal progesterone releasing device (CIDR). Two days prior to the device removal (Day 7), does were injected intramuscularly with 250 IU equine chorionic gonadotropin. All goats were fed daily with 820 g of lucerne pellets and 150 g of lucerne hay, a combination that satisfied nutritional requirements for maintenance (6.6 MJ ME/day) for a goat of 40 kg live weight. In addition, Groups 2 and 4 were supplemented with 220 g of cracked maize per day, providing a total of 1.5 times the requirements for maintenance (10.5 MJ ME/day). The supplementation started on the day of insertion of the CIDR devices (Day 0) and continued until Day 9. During the experimental period, goats were kept in metabolic pens to control feed intake. Does were tested for behavioural signs of oestrus with a buck twice a day (9 am and 5 pm), starting from 16 h after CIDR removal. Ovulation was detected using transrectal ultrasonography every third day for 24 days, after CIDR removal. Ovulation was recorded when a corpus luteum (CL) was visualised in the ovary with the aid of ultrasonography. The total number of CL observed in the ovaries of each doe was recorded as the ovulation rate for each doe.

Oestrus was detected in every doe that was subjected to the synchronization treatment, but in none that were not synchronized, within 24 days after CIDR removal ($P<0.05$; Table 1). Comparing the Synchronization+Non-maize and the Synchronization+Maize groups, the differences in number of ovulations and ovulation rate were not significant ($P>0.05$). Only one Non-synchronized doe showed a single ovulation, but was not detected in oestrus. Supplementation with maize did not decrease the interval to first ovulation.

Table 1. Percentage of does in oestrus, mean (±SEM) interval to onset of oestrus and ovulation rate of rangeland goats treated with a combination of either synchronization of oestrus and /or maize supplementation

Variable	Treatments			
	Non-synch + Non-maize	Non-synch + Maize	Synch + Non-maize	Synch + Maize
Oestrous detection rate (%)	0.0^{b}	0.0^{b}	100.0^{a}	100.0^{a}
Interval to oestrus (h)	-	-	22.9 ± 3.2^{a}	22.9 ± 3.2^{a}
Total number of ovulations (n)	0^{b}	1^{b}	16^{a}	24^{a}
Ovulation rate/doe	0^{b}	0.1^{b}	2.3 ± 0.3^{a}	3.4 ± 0.6^{a}

Values with different letters in the same row are significantly different ($P<0.05$).

The findings of this study show that hormonal treatment was a highly effective method of inducing oestrus and ovulation in seasonally anoestrus goats. Nutritional supplementation in combination with hormonal treatment did not significantly increase the ovarian responses to treatment. Hormonal synchronization is therefore a powerful strategy to induce oestrus behavior and ovulation in goats during the non-breeding season. Numerical differences in ovulation rates suggest that energy supplementation in combination with the synchronization of oestrus requires further investigation as a mechanism of potentially increasing ovulation rate in seasonally anoestrus rangeland goats, with larger groups of animals.

Scaramuzzi, R.J., Baird, D.T., Campbell, B.K., Driancourt, M.A., Dupont, J., Fortune, J.E., Gilchrist, R.B., Martin, G.B., McNatty, K.P., McNeilly, A.S., Monget, P., Monniaux, D., Viñoles, C. and Webb, R. (2011). *Reprod. Fertil. Dev.* **23**: 444.

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