

THE EFFECT OF SUPPLEMENTATION WITH LUPIN GRAIN ON OVULATION RATE
AND PLASMA GONADOTROPHIN LEVELS IN ADULT MERINO EWES

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The feeding of sweet lupin grain to ewes can lead to significant increases in ovulation rate (Lindsay 1976; Brien et al. 1976). The underlying mechanism of this response is unknown. The present study was done to determine the ovulatory response and to measure gonadotrophin secretion in Merino ewes supplemented with lupin grain at different times of the breeding season.

Merino ewes were fed either wheaten chaff alone (c.750 g/head/day) or wheaten chaff supplemented with 500-700 g/head/day of lupin grain (*Lupinus angustifolius* cv. Unicrop) during the period from January to May 1979. The ewes were confined in four pens indoors, 23 ewes per pen. Two of these groups received lupin grain for periods of 2 to 6 weeks twice during the experimental period while the other two groups received the grain during only one period of 3 or 6 weeks. The ewes were weighed weekly. The ovaries of all ewes were examined at endoscopy during and/or at the ends of the periods of lupin supplementation. In March, 12 ewes, six of which were receiving the supplement, were bled at 15-minute intervals for three hours during the late progestational phase of the oestrous cycle. In May, 20 ewes were bled at 15-minute intervals for 60 hours after removal of progesterone implants (Silestrus: Abbott) which had been inserted two weeks earlier. Eight of these ewes were receiving the lupin supplement. Plasma samples were assayed for luteinizing hormone (LH) and follicle-stimulating hormone (FSH).

It was possible to make nine individual between-group tests of the effect of lupin supplementation. In each case ovulation rate increased although in only five was the difference significant statistically ($p < 0.05$, Fisher's exact test). Over the whole experimental period multiple ovulation occurred on 64 of 195 occasions in lupin-fed ewes but on only 20 of 198 occasions in those fed wheaten chaff alone ($\chi^2 = 30.18$, $p < 0.0001$).

The patterns of release and concentrations of FSH or LH were not related to supplementation or the number of eggs shed. FSH release was not episodic; concentrations ranged from 30 to > 200 ng/ml, and there was no significant difference between values obtained at the two periods of sampling. LH was released episodically throughout both periods. During the progestational phase the pulse frequency was low, approximately one pulse/three hours, while during the post-progestational period it was high, approximately one pulse/ $\frac{1}{2}$ - $1\frac{1}{2}$ hours. These endocrine findings suggest that the increased ovulation rate which arises from lupin supplementation results from changed ovarian responsiveness to circulatory gonadotrophins rather than to changes in concentrations of the gonadotrophins themselves.

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