SUPPLEMENTATION OF YOUNG SHEEP WITH OATS, LUPINS OR SULPHUR ADHERED TO LUPINS

P.T. DOYLE and K.M.S. CURTIS

ASheep Industries Branch, Dept of Agriculture, Albany, W.A. 6330
BSheep Industries Branch, Dept of Agriculture, South Perth, W.A. 6151

SUMMARY
In 3 separate experiments carried out in 3 years, supplementation with lupins (100 g/day), oats (120 g/day) or a lupin/oat mix (114 g/day) generally resulted in no significant differences in wool free liveweight change or clean wool growth rate of young sheep grazing annual pastures. There were also no significant differences between these supplements for wool production, fibre diameter, staple length or strength of the wool grown. Addition of gypsum to lupins had no significant effects on any of the production parameters measured when compared to the other supplements. However, compared to unsupplemented controls, supplemented animals had higher (P < 0.05-0.01) wool growth rates through parts of the feeding period, and produced more (P < 0.01) clean wool with longer (P < 0.05) staples of higher (P < 0.01) strength. Differences between years in wool production and staple strength were highly significant (P < 0.01).

Keywords: lupins, oats, sulphur, wool characteristics.

INTRODUCTION
On the south coast of Western Australia, young sheep are usually given grain supplements during late summer and autumn. Lupins have some advantages over cereal grains as they are easier to handle, are better prehended by sheep and can be spread across the pasture, and are less likely to cause digestive upsets. It is also considered that their higher protein content may be advantageous early in the dry period, when compared to high starch cereal grains (Gardner et al. 1993).

In sheep fed lupins, addition of sulphur to a loose lick (Peter et al. 1987) or provision of Siromin® (White et al. 1992) have increased liveweight and wool growth rates. Such responses may not occur when green pasture is available in summer-autumn (Doyle et al. 1992a, 1992b) or even during a long dry season (Doyle et al. 1992b).

The 3 experiments reported here form part of a larger program which investigated the effects of sulphur and multi-element mineral licks on liveweight and wool production by young sheep. These experiments compared sheep performance when lupins, lupins + gypsum, oats or a lupin/oat mix were given as supplements.

MATERIALS AND METHODS
The experiments were conducted at the Manurup annex, Mount Barker Research Station (34°34’S, 117°31’E) between 1989 and 1992. The supplementary feeding treatments were: controls (C), supplemented only when necessary for survival; lupins at 100 g/sheep.day, fed in troughs (L, experiments 2 and 3) or spread across the pasture (LS, experiments 1 and 3); lupins + gypsum (LG) at 100 g/sheep.day, spread across the pasture in experiment 1 and fed in troughs in experiments 2 and 3; oats (O) at 120 g/sheep.day, fed in troughs; and lupins/oats mix (LO) at 114 g/sheep.day, fed in troughs. Supplements offered in troughs were given twice weekly and residues were collected when they occurred. Where lupins were spread across the pasture they were fed once weekly. There were 3 plots (1 ha each) of each treatment in a completely randomised design.

Merino wether lambs, average starting liveweight 27-30 kg and born in July-August, were used in each experiment. They were stratified on the basis of liveweight and then allocated to plots (12 sheep/plot). Two summer drenches were given in accordance with recommendations for the area and additional drenches were given as necessary based on faecal egg counts. Prior to experiments 1 and 2, the lambs were exposed to lupins pre-weaning.

Supplementary feeding commenced (day 0) on 15 December 1989, 27 November 1990 and 19 November 1991, and continued for 153, 217 and 213 days in experiments 1, 2 and 3, respectively. The control sheep were fed lupins and hay from day 185 in experiment 2. Water was available from a trough in each plot. After supplementary feeding finished, the sheep grazed as 1 flock until shearing.

The average nutritive characteristics in experiments 1, 2 and 3, respectively were: lupins, dry matter digestibility (DMD, %) 82, 89 and 92, nitrogen (N, g/kg DM) 50.5, 57.6 and 60.5, and sulphur (S, g/kg 206
DM) 2.3, 2.7 and 2.5; oats, DMD 67, 78 and 76, N 12.5, 17.7 and 18.4, and S 1.3, 1.7 and 1.5. Adding gypsum at 15-20 g/kg lupins (Doyle et al., 1992b) increased the S content to 7.5, 4.2 and 5.5 g/kg DM.

The sheep were weighed every 2 weeks and dyebands were inserted in mid side wool at 1 to 2 month intervals. Liveweight changes were estimated by regression analysis over periods when changes were linear. The sheep were not shorn as lambs and the hogget shearing was on days 228, 259 and 253 in experiments 1, 2 and 3, respectively. Total wool (fleece, belly, locks) removed from each sheep was recorded at shearing. Analysis of mid side fleece samples and dyebanded staples was carried out by the procedures listed by Gardner et al. (1993) and Thompson et al. (1994).

Treatment effects within experiments were examined by analysis of variance, and effects on wool production and characteristics were examined by split plot analysis across experiments (years).

RESULTS

For sheep fed in troughs, there were no residues after day 21 in experiment 1. In experiment 2, 1 replicate of 0 and LG did not consume grain until days 37 and 42, respectively. In experiment 3, most plots left some residues until day 21. After this, 0 and LO sheep (average of 3 plots) did not consume full rations until day 49, while 1 replicate of L and LG did not consume full rations until day 35.

There were significant (P <0.05-0.01) differences between supplemented and C sheep in wool free liveweight gain, clean wool growth rate, total wool production and characteristics of mid side wool were rare. Hence, statistical comparisons have been made between control and supplemented sheep.

DISCUSSION

Under the conditions of these experiments there were no differences between lupins, oats or a mixture of the 2 grains. The amounts of digestible DM provided by the supplements were similar, the protein content of the oats was always high for this grain and they were fed in troughs where wastage would be very low.

Adding gypsum did not improve production of sheep fed lupins. This may be because there was sufficient S in other components of the diet or because it was not the primary limiting nutrient in the lupins or total diet (Doyle et al., 1992a)

Although supplementation increased total wool production in this environment, there were no significant effects on fibre diameter. This is consistent with the findings of Gardner et al. (1993) for areas with a relatively long pasture growing season. However, in areas with a shorter pasture growing season there may be effects on fibre diameter (Rowe et al., 1989).
Figure 1. Wool free liveweight of control (circles) and supplemented (pooled data for lupins, lupins + gypsum, oats and lupins/oats) (triangles) sheep in experiments 1 (a), 2 (b) and 3 (c). Vertical bars are s.e.m.
Staple strength did not exceed 30 N/ktex in any experiment and was markedly influenced by year. The effects of years were also large for wool production and other wool characteristics. This was due in part to differences between seasons as indicated by the different wool free liveweight patterns and wool growth rates measured, but also to differences in the timing of the hogget shearing. The practice of giving set amounts of supplement did not prevent weight loss in any of the experiments, and it would be necessary to increase the rates of supplementary feeding through autumn to maintain body weight. Regular adjustments to the amounts fed may be necessary if sound wool is to be produced from young sheep shorn in late winter or spring (Doyle et al., 1992a).

ACKNOWLEDGMENTS
We acknowledge support from the Wool Research and Development Corporation and technical inputs from S. Grylls, T. Plaisted, B. Love, J. Davies, L. Pearce, J. Sharpe and C. Hambley.

REFERENCES