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PHOSPHATE APPLICATIONS AFFECT THE COUMESTROL LEVEL OF MEDICS

Western Australia has a million acres of medics including various cultivars of barrel medic, Medicago truncatula, and strand medic, M. littoralis. Both species contain coumestrol, a chemical thought to have caused delayed conception and reduced twinning rates among grazing ewes in New Zealand.

No infertility has been reported among ewes grazing medic pastures in Western Australia, but coumestrol levels in both species have often been high enough to suggest the possibility of oestrogenic responses among sheep grazing them.

Medics normally contain very low levels of oestrogenic substances while green, but their coumestrol content rises markedly in the dry state. High levels can thus be found in dry stems and pods, in contrast to the subterranean clovers which are oestrogenic only while green. This means that sheep grazing medic pastures are likely to take in large quantities of coumestrol during the summer mating period.

As recent field trials indicated a relationship between low superphosphate rates and increased oestrogenic levels in subterranean clover, this experiment was analysed to examine the relationship between phosphate and coumestrol in medics.

Method
Plots of strand medic, M. littoralis cv. Harbinger, were sown on a yellow sand site at Tenindewa in the north-eastern wheatbelt during 1964. The site had been cleared for three years and had grown two cereal crops before pasture establishment. Super applications up to 1964 totalled 270 lb. per acre.

Five levels of super—nil, 60, 120, 180 and 240 lb. per acre—were used with the medic and there were four replications of each treatment. The experiment was repeated in 1965, 1966 and 1967.

The plots were lightly grazed each year and samples of dry burr and stem were analysed for coumestrol content during the summers of 1966-67 and 1967-68.

Results
Results of the analyses are summarised in the figure. The levels represent the average coumestrol content of each super treatment plot.

Coumestrol in Harbinger medic

Discussion
The variation in coumestrol levels between 1966-67 and 1967-68 is difficult to explain. As the coumestrol levels of all treatments fell by similar amounts from 1966-67, the variation cannot have resulted from a super build up. Also, as variations in coumestrol levels have been found from year to year in other studies, it appears that coumestrol levels are not affected by the age of the pasture.

The results of this trial however, clearly indicate a fall in the coumestrol content of the medic with higher rates of super.

Research has indicated that sheep grazing pasture containing about 100 p.p.m. coumestrol take in the equivalent of eight microgrammes per day of stilboestrol (a synthetic oestrogen). When injected daily beginning three weeks before and continuing during the mating period, this level of stilboestrol is sufficient to cause infertility in ewes.

As the coumestrol levels found in the low super plots in 1966-67 were greater than 100 p.p.m., they might therefore be expected to cause infertility in ewes.

Because this State has large numbers of ewes which graze dry medic pastures during mating, the results suggest that such pastures should be supered adequately to avoid the risk of grazing pastures of high coumestrol level. This risk is low where pastures are topdressed at the recommended rate, or where there is a bank of previously applied super.

Acknowledgments
Grateful acknowledgment is made to the Institute of Agriculture, University of W.A., for the coumestrol analyses.