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INOCULATION AND PELLETTING OF LUPIN AND SERRADELLA SEED

By W. A. SHIPTON1, Ph.D. and C. A. PARKER2, Ph.D.

LUPINS AND SERRADELLA are not as extensively grown in Western Australia as some other legumes, but they are useful pasture species, particularly on poorer sandy soils. Virgin soils may contain rhizobial bacteria capable of nodulating some members of the lupin group, but none of these bacteria have been found to nodulate serradella (Lange, 1961). The use of inoculated seed is imperative except where lupins have been grown before.

The use of lime pelleted legume seed has been recommended generally in this State (Cass Smith and Goss, 1964), but a recent report indicated that this may not be advisable for lupins and serradella (Parker and Oakley, 1965). It was therefore decided to further investigate the effects of lime coating these legume seeds on seedling nodulation, and this was done in field experiments at Badgingarra Research Station in 1965. The experiments were conducted on newly cleared land using lupins (Lupinus luteus L.) and “W.A. serradella” (Ornithopus compressus L.).

In the main experiment some seed lots were inoculated and lime pelleted as recommended to farmers; other seed lots were treated similarly except that no lime was added to the sticky seed which was allowed to dry before the seed was sown. A direct comparison of nodulation could thus be made between seed coated with lime and seed left uncoated. Other pelleting treatments included in the experiment are not reported here.

The seed was sown so that it did not come into contact with the superphosphate, thus achieving similar conditions to those applying in the experiments of Parker and Oakley. Under the conditions of the experiment the following results of some practical significance were obtained:

- Inoculation greatly improved the nodulation of both lupins and serradella.
- Lime pelleting of lupin seed did not significantly affect nodulation when peat culture was used as the inoculum.
- Lime was shown to have a very adverse effect on the nodulation of lupins and serradella when the bacteria were applied as agar cultures. However, peat, in which the bacteria are located in commercial cultures, appeared to protect the bacteria from the effects of the lime.
- Coating serradella seeds with lime surprisingly improved seedling nodulation significantly when peat culture was used: 90.5 per cent. nodulated when seed was lime pelleted whereas 77.8 per cent. nodulated when no lime was used. Commercial seed was used and this differed from that used by Parker and Oakley in that each seed is encased in a segment of the seed pod. This pod is very porous and may have given protection against the lime.

In another experiment serradella seed was inoculated with a peat slurry made with skim milk, and other seed lots were inoculated and lime pelleted. The treated seed was sown with or without contact

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with various fertilisers. This experiment showed that:

- Inoculation and lime pelleting of seed is preferable to applying the bacteria to the seed with skim milk whether or not the seed is to be sown in contact with fertiliser. The results showed that nodulation of un-pelleted seed could be 17 to 20 per cent lower (significant at the 0.1 per cent level) than pelleted seed. The value of lime pelleting is thought to be due both to the protection against desiccation given by the adhesive agent, and to the neutralising effect of the lime on the acid fertiliser in direct contact with the seed.

It is considered advisable to inoculate lupins and serradella immediately before sowing, in view of the difficulty of producing commercial peat cultures with high numbers of viable bacteria.

Details regarding the pelleting procedures to be adopted for lupins and serradella are given in an article in the December, 1965, issue of the Journal of Agriculture (Goss and Shipton, 1965).

Note: Improved germination of serradella seed can be obtained if the seed is bought early and stored over the summer months in a location where the temperature alternates between high and low values (Barrett-Lennard and Gladstones, 1964).

REFERENCES


