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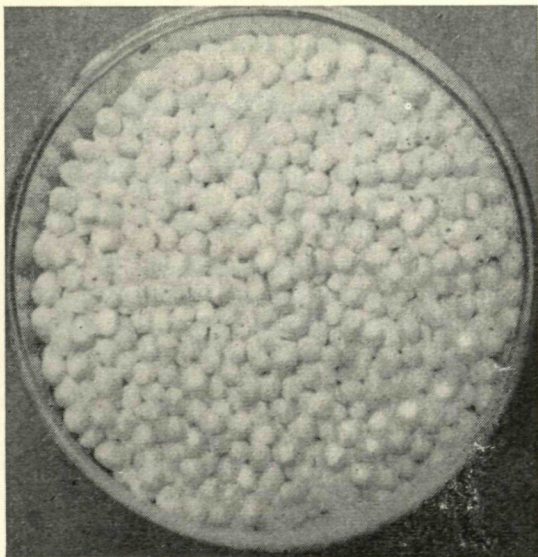
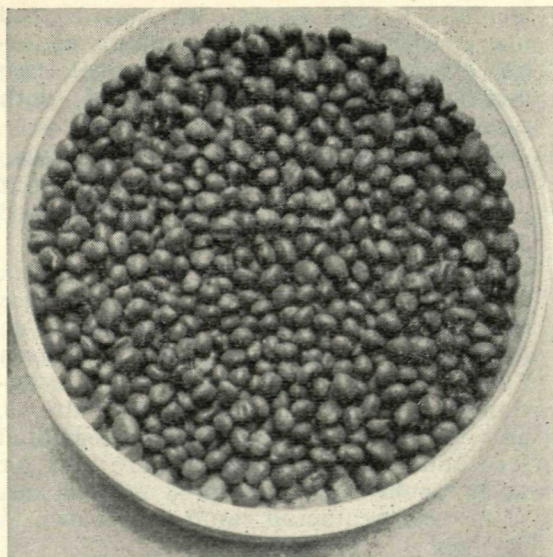
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Left—Untreated subterranean clover seed; Right—Seed pelleted with calcium carbonate

Technical Note

A METHOD OF INOCULATING AND LIME - PELLETING LEGUMINOUS SEEDS

By W. P. CASS SMITH, B.Sc. (Agric.), Government Plant Pathologist, and
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SINCE the report by Loneragan and co-workers (1), the use of lime-pelleted legume seeds has attracted considerable attention. Many queries have been received from farmers requesting information on the method of pelleting clover seed and its possible application to local conditions.

Seed pelleted by the Loneragan method is available commercially in the Eastern States, but none is produced locally. In view of this, an alternative method, developed and first tested by us in 1948 may be of interest, especially as it may be applied by farmers themselves when test quantities of pelleted seed are required. At that time, farmers in Western Australia, generally endeavoured to complete the sowing of barrel medic and subterranean clover pastures before commencing their cereal plantings and, as the seed after inoculation with rhizobial bacterial cultures, was frequently mixed with superphosphate (in the absence of small seeds attachments) and planted in

dry soil, poor nodulation and establishment frequently occurred. A method of protecting the bacteria from these adverse conditions was therefore sought.

Our experiments were all carried out with agar cultures but as similar tested rhizobial strains are now used in commercial peat cultures, there is no reason why results should not be comparable. The following method has been adapted from our original agar method to suit peat cultures of a size sufficient to inoculate 30 lb. of subterranean clover seed.

METHOD

1. Prepare 2 pints of a 5 per cent. water solution of methyl ethyl cellulose (sold

commercially as Cellofas A*) and leave to thicken by standing overnight in the refrigerator.

2. Thoroughly mix and wet the peat culture with $\frac{1}{2}$ pint of skim milk.

3. Thoroughly mix 1 and 2 and inoculate to 30 lb. of seed, stirring until all seeds are thoroughly wetted.†

4. Add immediately, about 10 lb. of finely ground calcium carbonate‡, and stir rapidly until no more will adhere, and the pelleted seeds are well separated. (Cal. carb. equal to approx. 25-30 per cent. of seed weight will adhere to subterranean clover.)

N.B.—When the pelleted seeds are to be mixed with the fertiliser before planting, we always hold them for a least 16-24 hours before mixing, to allow partial drying and setting of the pellet.

With this method, the peat culture is incorporated within the pellet which should therefore afford some protection for the rhizobia when the pelleted seed is mixed with toxic fertiliser, such as superphosphate.

The resulting pellets although relatively soft, will withstand mixing with fertiliser, and when planted at normal depth, are not carried above ground on the cotyledons to any extent.

Tests with this pelleting technique, using agar cultures, in Western Australia, have been confined to barrel medic and subterranean clover and the main results can be summarised briefly as follows.

RESULTS WITH BARREL MEDIC

Better nodulation and establishment are generally obtained from inoculated pelleted seed, than from inoculated seed, when the seeds are mixed with superphosphate fertiliser for planting.

When basic superphosphate is used however, pelleting of barrel medic seed appears to be unnecessary. On lighter soil types, where satisfactory nodulation

is difficult to assure, inoculated seed mixed with basic superphosphate generally gives much better establishment than inoculated pelleted seed mixed with superphosphate.

The utility of seed pelleting is likely to be restricted to heavier soil types where it is intended to mix the inoculated seed with superphosphate for sowing.

Good survival of barrel medic rhizobia on seed pelleted with our technique was obtained in an experiment conducted on light acid soil at Merredin Research Station in 1948. The experiment was designed to simulate dry sowing conditions, and for this purpose, certain inoculated seed and fertiliser mixtures were held for three weeks before planting in wet soil. Main treatments and results are shown in the table.

Seed and Fertiliser Mixtures held 3 weeks before planting	Plant numbers	Yield (Dry wt. Gms)
Inoc. barrel medic seed + super	46.4	21.2
Inoc. pelleted barrel medic seed + super	78.2	43.2
Inoc. barrel medic seed + basic super*	190.6	94.4
Difference for significance		
= .05	± 38	± 17
= .01	± 52	± 23

* Basic super was prepared by thoroughly mixing 15 lb. fresh hydrated lime with 85 lb. superphosphate, and matured for 6 weeks before use

These results could be correlated with the nodulation present. With basic super, good nodulation occurred, mostly on the tap roots; with superphosphate it was either lacking or very poor and present on the deeper laterals, and with pelleted seed it was intermediate. Uninoculated seed planted in this area showed no nodulation and the plants were a failure.

RESULTS WITH SUBTERRANEAN CLOVER

Seed pelleting in conjunction with either superphosphate or basic superphosphate, has generally given disappointing results.

In some instances, slightly better first-year establishment has been obtained from pelleted seed, but the improvement has not been maintained in subsequent years.

* Available locally at a cost of 13s. lb.—sufficient for 30 lb. of seed would therefore cost 1s. 7½d.

† A large clean container such as a tub or wash trough is convenient for carrying out the pelleting.

‡ Very finely ground calcium carbonate is essential for successful pelleting. It is understood that a suitable grade is available locally at a cost of approx. 3s. per 56-lb. bag. The total current cost of pelleting 30 lb. of seed would therefore be approximately 2s. 3d.

However, with subterranean clover, our pelleting tests have been confined to unfallowed newly-cleared scrub plain soils, where, despite the use of tested rhizobial strains and different fertiliser treatments, good nodulation in first-year plantings is the exception rather than rule.

CONCLUSION

Although seed pelleting is apparently giving outstanding results in the Eastern States in some areas, it appears from work conducted here, that, in Western

Australia, the method will be restricted in its usefulness. It is therefore suggested that farmers test small amounts of pelleted seed only until benefit is proved under their particular conditions.

Information regarding the results of any such tests would be of interest to the Department of Agriculture.

REFERENCE

Loneragan *et al.* Lime pelleted clover seed for nodulation on acid soils. J. Aust. Inst. Agric., Sci. V21, p. 264.

RABBIT POPULATION INCREASING

The Minister for Agriculture (Mr. L. F. Kelly), said recently that rabbits have at least doubled their numbers during the past 12 months.

This alarming situation had been revealed following a survey of the position by officers of the Agriculture Protection Board. Possibly the estimate was conservative as in some places the increase was much greater, and trappers were operating once again.

An illustration of the remarkable capacity of rabbits to increase was the five successive litters, each averaging five young rabbits, observed in the Lower South-West last year. Even allowing for a high natural death rate each pair of rabbits would increase by at least 800 per cent. Some of the earlier litters would be breeding also, so that the increase was probably 1,000 per cent.

Mr. Kelly added that it is two years since the great plague of rabbits in this State was reduced to the lowest number since they became properly established here. The population is still comparatively low, but the present increase gives a clear warning of what is happening, despite the fact that myxomatosis is still actively assisting in control measures. The same situation has developed in the Eastern States.

While rabbits were still relatively few was the easiest and most economical time to control them, said Mr. Kelly, and farmers are urged to co-operate fully with the Agriculture Protection Board in the organised poisoning programmes which have proved so successful where carefully carried out.

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