THE USE OF BULK INOCULUM FOR PEAS IN WESTERN WASHINGTON

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The production of peas for freezing and canning is an important agricultural enterprise in western Washington. Pea growing, started in the early twenties, was confined to production for canning, and very few reports of poor stands caused by seed decay and damping-off were reported. A few fields planted to peas for the first time were inoculated with soil obtained from areas that had grown peas previously, but many of the plantings were artificially inoculated.

In the early thirties the production of varieties for processing by freezing was undertaken. The incidence of seed decay and damping-off became common for the freezing varieties, but also occurred to some extent among the canning varieties. Two factors probably contributed to this trouble; first, the greater susceptibility of the freezing varieties to the attack of the organisms causing seed decay and damping off, and second, the lack of any semblance of crop rotations which might prevent a build-up of the population of these organisms.

The conclusion was reached, after considerable study, that the logical control of the seed decay and damping-off problem was to treat the seed with copper or mercurials available at that time. This program was widely accepted with the result that at present nearly all the seed of the freezing varieties, but also occurred to some extent among the canning varieties. The assumption is that during the short storage period before the planting, inoculum along the bottom of the furrows was applied through the fertilizer distributor of the ordinary grain or pea drill.

Excellent nodulation was obtained by pease inoculated by these methods. From the standpoint of nodule distribution, total number of nodules and weight of the above ground portions of the plants, bulk inoculation was superior to seed inoculation. The best nodule development was obtained with the muck and the sandy loam bulking mediums. The assumption was made that during the short storage period bulk inoculums were used a sufficient increase in population of nodule bacteria was realized in the native soil bulking materials to increase their efficiency in nodule production.

FIELD STUDIES WITH BULK INOCULUM

In the field studies the bulk inoculum, for Lauren sandy loam was used as a bulking material, was applied at the rate of approximately 100 pounds per acre. The bulk inoculum was placed in the furrows with the seed by running it through the attachment of the grain drill. The recommended fertilizer was drilled into the soil before planting. Unless otherwise stated, all peas planted in these studies were treated with fungicides. The nodule studies are given in Table 1.

The most striking response to inoculation was obtained on the Buckley loam. No nodules were present on the uninoculated plants on this soil. Nodules were present on the peas grown on the uninoculated Puget silt loam at both the Schuler and the Smith locations. Nodulation was very heavy on Puget sandy loam in both the inoculated and uninoculated treatments.

METHODS

Bulk inoculums were prepared by thoroughly mixing two 4-bushel cans of a commercial moist peat culture of *Rhizobium leguminosarum* with 100 pounds of several experimental carriers or bulking materials. The carriers used were Lauren sandy loam (pH 5.6), muck (pH 5.8), steamed bone meal, calcium carbonate (Tamworth), and hay slash. These pease cultures were thoroughly mixed with them, and the mixtures were stored in paper bags until needed.

EXPERIMENTAL

GREENHOUSE STUDIES WITH BULK INOCULUM

A preliminary study was made in the greenhouse to compare the effects of regular seed inoculation with those obtained by bulk inoculums. Furrows 1½ inches deep were made in sterilized Lauren loam and Buckley loam in greenhouse flats inoculated and uninoculated pea seeds were placed at intervals of 1½ inches in the bottom of the furrows. The un inoculated seeds were sprinkled with bulk inoculum along the bottom of the furrow at the rate of 100 pounds per acre based on a drill of 7 inches. This was done so as to simulate an application that would result if the inoculum was applied through the fertilizer distributor of a ordinary grain or pea drill.

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FIELD STUDIES WITH BULK INOCULUM

In the field studies the bulk inoculum, for Lauren sandy loam was used as a bulking material, was applied at the rate of approximately 100 pounds per acre. The bulk inoculum was placed in the furrows with the seed by running it through the attachment of the grain drill. The recommended fertilizer was drilled into the soil before planting. Unless otherwise stated, all peas planted in these studies were treated with fungicides. The results of the 1940 studies are given in Table 1.

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