TESTING LEGUME BACTERIA CULTURES IN THE FIELD

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Introduction

The fundamental concern of inspecting agencies with commercial cultures of legume nodule bacteria is that these shall reach the farmer in a condition to give best results. This objective has many ramifications from the manufacturer's start of the cultures to their final application to the seed by the planter. Since it is not possible to discuss every phase of the subject it is preferred to take up some of the conditions brought out mainly by field tests which within recent years have apparently contributed to the delinquency or efficiency of inoculating materials in practical situations.

About ten years ago the first so-called dry inoculant appeared. It consisted of a carrier practically devoid of moisture and directions called for its application without water. Condemnatory articles (1) and (2) and wholesale failures hastened the discontinuance of the idea in the extreme. However, the strong appeal of this method of application prevented its complete eclipse. As recent as 1936 commercial cultures with ten different trade names contained directions for its application without water. Through informal representations it has been possible to have wet as well as dry directions printed on the packages but this does not seem to be enough and it is the purpose of this report to bring out evidence which indicates the dry method of application should be eliminated altogether and that the carriers now used in the manufacture of these dry applied materials should be thoroughly overhauled.

It is not the intention to state that poor results always follow when inoculants are applied without water. The present materials prepared for dry application presumably contain at the time of manufacture sufficient water to maintain the organisms in the package. In this respect they differ from their predecessors. If the proper living nodule organisms are available in these cultures in sufficient numbers at the time of planting and the seed fall into moist ground, the chances of success may be deemed good. If, on the other hand, the seed with the plant thereon is allowed to stand long to dry out before sowing, the result will be appreciably affected. Such a contingency often arises on the farm. In some sections it is the practice to broadcast the seed on the surface of the soil, to be later covered by harrowing or other means. If there is a delay in covering, results may be appreciably affected. Also, if the freshly treated seed is placed in dry soil which continues dry, the efficiency of the material may be impaired.

Regarding the water commonly used for applying inoculants to seed one may well ask what happens to it if adverse circumstances arise. The seed coats of some leguminous seeds possess the power of imbibing and holding water. When the water is usually put on the seed first, a certain amount is absorbed before the inoculant is applied. Some carriers, especially peat, have great water-holding capacities and, therefore, they may take up excess water from the seed when applied. The moisture in the seed and inoculant maintains the organisms in satisfactory condition over a greater period than if none were used.

Soil Conservation Service Experience

In the fall of 1936 the Soil Conservation Service purchased inoculants on contract for use on some of the southern soil erosion projects. This material was in a charcoal carrier and had directions for either wet or dry application. It is not known to what extent each set of directions was employed. Attention was called to unfavorable results obtained with this material on Austrian winter pea and vetch cover crops in the spring of 1937, at about the time for plowing under. At this time it was possible to see only some of the effects of this inoculant and to interview the agronomists concerned in its distribution. All were dissatisfied with the contract inoculant. Other materials in the same regions gave much better crop response.