MODULE 5: DEMONSTRATION 7

EVALUATING THE QUALITY AND EFFECTIVENESS OF INOCULANTS

Purpose

- To provide the extension agent with a simple method for evaluating the quality of inoculants.

Concepts of Demonstration

The quality of inoculants can vary greatly. A test lab for instance, reported that some producers in it's country did not even have rhizobia in their products. Frequently, the extension agent and also the inoculant user are uncertain about the quality of inoculants offered for sale. Without access to a quality control laboratory, the extension agent is at a loss unless he can perform a quality assessment himself.

Inoculants can be tested by assessing their ability to nodulate legumes effectively. This can be done by the "grow-out" test. In this test, the inoculants in question are used to inoculate their specific host.

Recommendations to Farmers from Results of this Demonstration

The extension agent can use the grow-out test to identify manufacturers of quality inoculants. He can then assure farmers that the inoculant they purchase is good quality.

Conducting the Demonstration

Pots; minimum size 2 liter capacity.

Soil must be free of rhizobia which will nodulate the legume of interest. If not available, another media such as silica sand can be used.

A protected facility to set up the pots. A greenhouse would be ideal. A bench in a nursery-type greenhouse would be second best. A bench in a wind protected area outside may also suffice.

A watering can or hose.

Clean water.

The inoculants to be tested.

Legume seeds compatible with the inoculant.

Sugar or other sticker material. Make the appropriate sticker solution.

Plastic bags.

Setting up the experiment (refer to **Module 7**, Demonstration 2, for some information on setting up a pot test with soil, and **Module 3**, Demonstration 1, for suggestions using sand or a growing media.)

Coat 50 g portions of seeds by the sticker method with each of the test inoculants.

Set up four pots for each inoculant to be tested. The soil used should usually have the fertilizer amendments already added (except nitrogen see **Module 7**, Demonstration 2). In addition, set up four pots for uninoculated control and another four pots as +N control. These pots should have the full fertilizer amendment including nitrogen.

If you use sand or a media, a complete nutrient (N-free) solution must be added. See *Methods in Legume-Rhizobium Technology* for a formula.

If, for instance, you have three inoculants to be tested you will have five treatments including one uninoculated control and one control to which nitrogen has been added; a total of 28 pots as shown below:

Inoculant Producer	Number of Pots (replications)			
1	■	■	■	■
2	■	■	■	■
3	■	■	■	■
Uninoculated	■	■	■	■
+ N uninoculated	■	■	■	■

First, plant the uninoculated seeds. Plant six seeds, well distributed, in each of the eight pots of your control treatments.

Similarly, sow the seeds of all your inoculated treatments; six seeds/pot. Avoid cross-contamination between pots. Wash your hands after each treatment. Water regularly.

After 10 days, thin plants to three per pot. Do not pull out the plants but cut them at the soil surface. The plants remaining should be the most uniform and healthy looking in each pot.

Evaluating the results

After 4 weeks inspect plants. Well nodulated plants should be green and have growth similar to the nitrogen control.

Carefully remove plants from the pots and inspect the root systems. Remove the tops and weigh, if possible. In the case of soybeans, a good inoculant should produce a healthy, well nodulated plant with approximately 20 or more nodules. When cut in half, the nodules should be red or pink inside. The weight of the tops should be similar to that of the nitrogen control. Count the nodules on the plants of each treatment and calculate the mean nodule number per treatment. Tabulate the results and compare the nodules obtained from each inoculant treatment.

The non-inoculated plants in the control treatments should be smaller and yellowish. Ideally, there should be no nodulation. Nodulation may occur if there are native rhizobia in the soil. Most often these nodules are ineffective and white on the inside when cut open.

If the non nodulated controls are healthy and well nodulated and do not differ much from the inoculant treatments, the soil chosen has effective native rhizobia and inoculation is not necessary.