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Successful and profitable production of legumes requires nodulation by Rhizobium bacteria which supply the crop with fixed N. The appropriate strains of bacteria are often absent from soils, since they do not persist without a suitable host plant. Under these conditions, that is when the specific legume crop has not been planted in the field for more than 3 or 4 years, it is necessary to inoculate the seed (or sometimes the soil) with Rhizobium.

Successful inoculation demands suitable soil conditions, proper inoculation techniques (see AGR-80 for soybeans, AGR-90 for alfalfa and clover) appropriate handling and storage of inoculant, and a reliable inoculant product containing live and effective Rhizobium. It is only the last factor, a reliable inoculant, over which farmers have little control. During the past several years growers have questioned the quality of inoculants available to them. A group of researchers from several Southeast and Midwest states, including Kentucky, have responded with various inoculant testing programs. The results of these tests will be summarized here.

Soybeans Inoculants

Inoculants for soybeans and other legumes are most often sold in a peat-based form. The Rhizobium are adsorbed onto fine, neutralized peat. This greatly increases survival of the bacteria after packaging. This form of inoculant is inexpensive and relatively easy to handle. It also is a reliable, high-quality inoculant source. In Kentucky we determined this by collecting about 50 samples from retail stores in 1980 and '81. We then counted the number of live bacteria capable of nodulating soybeans. All samples conatined at least 10 million Rhizobium per gram of peat. This is believed adequate to nodulate the soybeans under suitable soil conditions. Ten different brands of peat-based inoculants were tested, but there were no consistent differences among them.

Occassionally new types of inoculants are marketed. These include inoculants with additives such as fungicides or molybdenum, or inoculants in which the bacteria are carried in something other than peat. Inoculants with clay, oil, or ground plant material

as carriers have been available in the last few years. Sometimes they are considerably more expensive than simple peat-based inoculants. Yet, the quality of these new inoculant types may not be as reliable. Testing suggested that survival of Rhizobium is reduced in these products.

Clover-Alfalfa Inoculants

As was the case with soybeans, a survey of inoculant quality in Kentucky indicated that simple peat-based inoculants provide a reliable source of Rhizobium. Most samples tested contained about 100 million rhizobia per gram of peat. If handled and used properly (particularly if used with a sticker, like sugar water), and if soil conditions permit, this concentraton of rhizobia should be adequate for good nodulation. We have not encountered other types of packaged inoculants for clover and alfalfa in Kentucky.

Preinoculated Seed

A significant percentage of the clover and alfalfa seed now sold in Kentucky is preinoculated. This saves the grower some time, but the survival of the Rhizobium on the seed during storage is open to question. Sixty-two retail samples of preinoculated alfalfa and clover seed were tested for ability to form nodules under greenhouse conditions. Lime-coated preinoculated alfalfa performed about as well as packaged peat inoculant, although occasional samples were poorly nodulated. Preinoculated alfalfa without a lime coating nodulated poorly. Well over half of the plants had no nodules at all. On red clover seed there was a similar trend but the differences between lime-coated and uncoated seed were not statistically significant.

The results suggest that at least some of the preinoculated seed available to Kentucky farmers does not carry enough rhizobia to ensure satisfactory inoculation in the field.