

Is soybean inoculation really necessary?

DEKALB, IL. — Inoculating soybean seed with nitrogen fixing bacteria used to be considered cheap insurance for optimum yields. With today's economy, cost conscious farmers are asking if inoculation is really necessary.

Soybean plants get about half of the nitrogen they need from decaying organic material and residual soil nitrogen. The rest comes from the air through symbiotic nitrogen fixation. The term "symbiotic" refers to a mutually beneficial relationship that exists between soybean plants and bacteria called rhizobia. Rhizobia form nodules on soybean roots and derive their energy from carbohydrates produced by the soybean plant. In return the rhizobia fix atmospheric nitrogen into forms that the plant can use. Neither the soybeans nor the rhizobia can fix nitrogen without the other. For this reason, inoculating soybean seed with rhizobia to assure their presence is a common practice.

Rhizobia are host-specific. The species of rhizobia used for soybeans, *Rhizobium japonicum*, is different from those used for alfalfa or other legume species.

Thus, the bacterial inoculums used for various legumes are not interchangeable. There are many strains of *Rhizobium japonicum* and commercial inoculums are usually a mixture of superior ones.

The use of commercial inoculums has established a tremendous natural population of rhizobia in Corn Belt soils. These naturalized rhizobia are well adapted to existing soil conditions and persist in the soil for a indefinite period, reproducing on organic matter. Research evidence indicates that naturalized rhizobia vary greatly in their ability to fix nitrogen; but they are highly competitive with commercial inoculum strains. Thus, even in fields of commercially inoculated soybeans, most of the nodules formed result from the native soil rhizobia.

While some university research shows no advantage for soybean inoculation there are situations where inoculation may be

beneficial. The following guidelines may be helpful:

1. Always inoculate when planting fields where soybeans are being grown for the first time.

2. Inoculate for insurance on fields where soybeans have not been grown in the previous 3 to 5 years. Most research indicates that nodulation is adequate without inoculation for even longer periods.

3. Inoculate on fields where previously grown soybeans were poorly nodulated. A well nodulated plant should have around 100 nodules. The best time to check nodulation is late July and early August. Dig a few plants and count the nodules. Pulling plants will strip some nodules and give a false indication of inadequate nodulation. Effective nodules will be pinkish-red color inside. Long periods of dry weather and high levels of soil nitrogen can reduce the number of nodules, giving the

impression that rhizobia population is inadequate.

4. When inoculum is used, it should be applied to the seed immediately ahead of planting. Commercial inoculums supply an insignificant amount of rhizobia compared to the number already in soils and they are extremely sensitive to sunlight, high temperatures and severe drying conditions.

5. Granular implant inoculums, applied in the row through insecticide boxes, supply significantly more viable rhizobia than seed-applied inoculums. However, the cost of these new implant materials is several dollars per acre.

Check your soybeans for proper nodulation. Chances are you can stop worrying about inoculation.

Breeding report available

A new management report on the economic benefits of breeding dairy heifers at the proper age, and the value of striving for a 12-13 month calving interval in lactating dairy cows is now available from The Upjohn Company.

The report explains the importance of getting dairy heifers bred by 15 months and how grouping their breeding with

Lutalyse can help accomplish that goal. The report also covers the merit of diagnosing lactating dairy cows with pyometra or silent heat so that they can be treated with Lutalyse and bred to enter the milk string at the appropriate time.

For a single copy of the report, or for more information, write: Lutalyse Management Report 20, The Upjohn Company, P.O. Box 5087, Kalamazoo, MI 49003.

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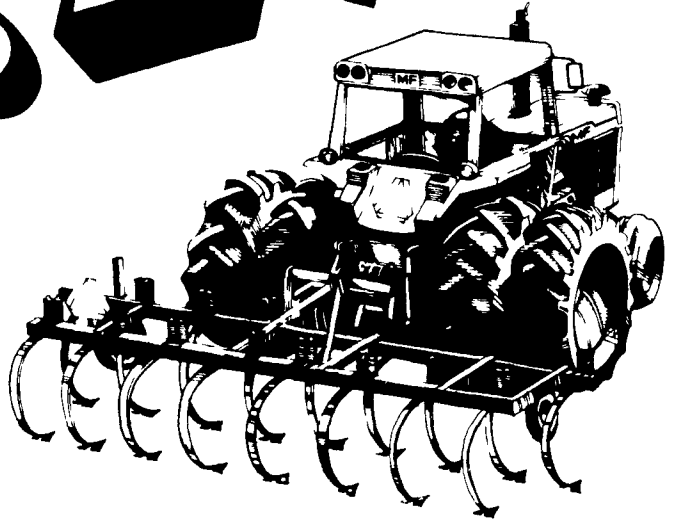
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