



**Vince Wertman - Tech Services**  
2445 SE Marshall St. Albert Lea MN 56007  
Phone: 507-402-6078  
vincewertman@ABM1st.com

## **Use of Inoculants in Adverse Conditions or on New “Virgin” Ground**

A soybean inoculant product should be used when planting soil conditions are such that you believe the soil populations of Bradyrhizobia are low, or you have reservations about adequate levels of native rhizobia to provide sufficient numbers to nodulate the soybean plant.

Legume inoculants should be used if one or more of the following soil conditions exist:

- Soil that has not hosted the specific legume.
- Soil that has not hosted the specific legume for more than 3 years (CRP land, for example).
- Soil pH of less than 5.8 (The pH should be adjusted by liming prior to inoculation).
- Soil pH of more than 8.5.
- Soil organic matter of less than 1%.
- Drought or flooding.
- Topsoil conditions exceeding 80° F.
- Soil erosion.
- Use of soil treatments and chemicals injurious to soil bacteria and inoculants.

As technology and genetic selection of Bradyrhizobia strains improve, new, more efficient strains of Bradyrhizobia should be used to replace native strains which may be residing in the soil. It has been suggested that Bradyrhizobia become less effective as they reside in the soil for extended periods. Thus, there is the potential benefit of adding high levels of newly selected strains of Bradyrhizobia each time a legume is planted by using commercial inoculant products. It is important to note that the presence of a nodule does not assure nitrogen fixation. Native rhizobia become ineffective over time but will still nodulate the legume. You can evaluate nodules by examining the color at different times during the growing season. Active nitrogen fixation is indicated a pink to beef-steak red color in the nodule tissue.

### **It is important to remember that inoculants are LIVE product and Fragile**

- Store product under 77 degrees F
- Do not allow product to freeze
- Do not expose treated seed to direct sunlight – use tarps
- Store product out of sunlight and direct heat
- Do not apply product with an atomization applicator (rupture of cells)
- Read and follow the labels

### **Environmental factors can cause poor nodulation:**

Non-optimal soil pH; Floods and droughts; Increasing number of years since soybeans were last planted; Compaction; Deep Planting

### **Floods and droughts**

Fields flooded for more than one week decrease nitrogen fixation and decrease survival of bacteria because bacteria need oxygen. Sandy soils and droughts in years when soybeans are not being grown also can lower populations. Flooded ground is dependent on various factors: CEC, OM, Tile, Rotation, Amount of rainfall during season. Flooded ground can displace rhizobia from the zone where seed is placed in the soil by leaching, making the upper levels in the soil devoid of populations of rhizobia.



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**Recommendations for Adverse Conditions or New “Virgin” Soybean Fields.**

ADVERSE CONDITIONS/VIRGIN SOYBEAN LANDS: When any of these conditions are present, ABM highly recommends at least a double (2x) rate of inoculants. ABI Sterile Peat is highly recommended to be used as a second inoculant to achieve at least a double rate; • Soil has not hosted the specific legume for more than three (3) years • Soil pH is less than 5.8 (the pH should be adjusted by liming prior to inoculation) • Soil pH is more than 8.5 • Organic matter is less than 1.5 • Drought or flooding has occurred • Topsoil exceeds 80° F • Soil erosion • Use of soil treatments and chemicals injurious to soil bacteria and inoculants

**How to Maximizing soybean yield potential:** When planting soybeans under the conditions listed above ABM recommends additional rates of inoculant.

For best results follow these recommendations:

1. If using a preapplied product, achieve an increased inoculant rate as follows:
  - a. Apply at least 1X rate of the preapplied inoculant (Marauder, Excalibre SA) no more than 30 days prior to planting on the seed.
  - b. Additionally, apply at planting a 1X rate of an America’s Best Inoculant formulation: ABI Sterile Peat in the planter box
2. Similarly, an additional rate of other formulations may be best achieved by using 2 different forms, for example:
  - 1X rate of ABI Sterile Peat plus at least an 1X rate of ABI 10L on the seed at planting
  - 1X rate of ABI Sterile Peat plus at least one 1X rate of Graphex or Graphex SARates may be increased assure maximum nodulation and yield response.
3. In addition to above to improve performance, use a liquid product ABI 10L or ABI 3.1L liquid infurrow at planting to maximize response if infurrow liquid application is an option on the planter. Apply with non chlorinated water only.
4. In all situations follow product label recommendations closely.

For further information contact: Vince Wertman,  
call 507 402 6078,  
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