

## Crop-specific Rhizobial Inoculants for Your Texas Bean & Pea Crops

Dr. Calvin Trostle, Professor & AgriLife Extension Agronomist, TAMU Dept. of Soil & Crop Sciences, Lubbock, (806) 746-6101, [ctrostle@ag.tamu.edu](mailto:ctrostle@ag.tamu.edu)

Kristie Keys, AgriLife Extension Agronomy Agent, Hale-Lamb-Castro Counties, (325) 665-8790, [kristie.keys@ag.tamu.edu](mailto:kristie.keys@ag.tamu.edu)

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Legume growers and industry staff are often unclear about which **crop-specific** *Rhizobium* or *Bradyrhizobium* inoculant to use. A recent chat with a Texas contractor for **black-eyed peas** (cowpea family) is relevant to any Texas pea, bean, or other legume grower.

The key is varied species of nitrogen-fixing bacteria inoculants are optimized for different legumes. Soybean inoculant will not work on mungbean. The right inoculant for peanut won't work on chickpea.

*Specifically for this update, the correct inoculant for black-eyed pea is the same as peanuts.* Unfortunately, most manufacturers don't list these other crops on their peanut product labels.

Your legume crop is a valuable asset in any Texas crop rotation. Though often incorrectly assumed, legumes offer significant potential nitrogen (N) fixation to the current crop. And there is potential improved soil N status for the next crop. **There is one important caveat:** legume and N-fixation benefits occur only IF roots are infected by a crop-specific rhizobial strain which either you apply or was already present in the soil.

This bacterial infection of the root leads to nodulation (Fig. 1A). The bacteria survive and thrive inside these root nodules, visibly showing a pink or red color (Fig. 1B). That means fixation of nitrogen (an N<sub>2</sub> molecule, which is 78% of the air) is converted into a form plants can use. This is the least costly form of nitrogen you can "apply" to your legume crop.



**Figure 1.** A) Comparison of root nodulation on uninoculated plants (top) vs. early (~5 weeks) cluster of nodules from an applied crop-specific rhizobial inoculant product. B) Pink interior of nodules signifies active fixation of nitrogen to the legume for plant growth.

There are four main manufacturers of legume rhizobial products in the U.S. These are Visjon, Verdesian, BASF, and Novozymes. Most have a "What inoculant for which legume?" document on their website.

Two examples are (no endorsement implied):

[https://www.visjonbiologics.com/files/ugd/8bccab\\_1e12fcc0e29d402ba2b9b640237dace1.pdf](https://www.visjonbiologics.com/files/ugd/8bccab_1e12fcc0e29d402ba2b9b640237dace1.pdf)  
[https://vlsci.salescyler.com/assets/doc\\_rep/resources/21.0541\\_which\\_inoculant\\_what\\_legume.pdf](https://vlsci.salescyler.com/assets/doc_rep/resources/21.0541_which_inoculant_what_legume.pdf)

### Cowpea Family Beans/Peas and *Bradyrhizobium* Peanut Inoculants for Fixing Nitrogen.

High Plains Extension surveys years ago found fields never in black-eye production before had low *Bradyrhizobium* root nodule counts (only 4 per plant). This was ~75% less than inoculated BEP. Thus, we recommend all cowpea fields be inoculated. This is especially important for long rotations from previous pea or bean crops. As noted above the same strain of inoculant *Bradyrhizobium sp.* (Vigna) inoculates both peanuts, black-eyed peas/cowpeas, and other legumes. But producers have expanded options to apply an inoculant especially if they can use in-furrow liquid (planter is equipped with tank, pump, and a liquid line to each furrow) or also peanut granular inoculants. The liquid can also be applied on seeds.

Past AgriLife work on several legumes in Texas found higher nodulation is achieved when liquid inoculants are applied in-furrow vs. seed applied. When possible, in-furrow liquid is the preferred means of applying inoculant for any Texas legume. In West Texas some farmers have the inoculation equipment on their peanut planters to do the same for black-eyed peas. You might even lease a planter from a peanut farmer with in-furrow application equipment.

Previous observations on black-eyed peas and inoculants were only for seedbox powder materials. These powders have much lower microbial counts. Liquid inoculant products can deliver up to 20X the number of bacteria to the seed. Seedbox products have been inconsistent if unsuccessful in increasing nodulation let alone yield in many Texas fields.

In-furrow liquid products cost \$10-15/acre, similar to good granular products. Don't let the cheap price of a seedbox powder inoculant sway you. If seedbox powders are your only option, use a sterile peat inoculant (with a sticker already in the inoculant). It has a higher bacterial count. It will also adhere to the seed better than conventional seedbox powders. (These can blow off in an air-vacuum planter). Moistening the seed will improve sticking of the inoculant. This may be impractical for BEP seeding rates if you are planting many acres.

### **Further Information**

Please consult a 2019 Texas A&M AgriLife Row Crops Newsletter at <https://agrilife.org/texasrowcrops/2019/06/13/mid-season-assessment-of-rhizobium-nodulation-in-texas-peanuts-and-other-legumes/> This document was originally written for inoculation of Texas peanut crops. It includes "after planting" tips and topics.

- How to assess nodulation in your field crop.
- Is my nodulation adequate? (mid-season and end of season)
- What if I did not apply a rhizobial inoculant to my legume crop?
- Factors that contribute to poor nodulation.

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