



Texas Agricultural Extension Service

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Inoculant Rate and Nodulation on Peanut and Suggestions for Proper Handling and Application of *Rhizobium* Inoculants Texas South Plains, 2000

Calvin Trostle, Extension Agronomy, c-trostle@tamu.edu, (806) 746-6101

Timely evaluation of *Rhizobium* nodulation on peanuts should be part of a **comprehensive crop scouting program**. Effective *Rhizobium* inoculation and nodulation for peanuts is essential to approach yield potential. Successful nodulation for peanuts in West Texas is expected, but is not guaranteed.

General observations suggest that 20 to 25% of peanut fields in the Texas South Plains are undernodulated. Poor nodulation appears to be somewhat correlated with caliche soils, where pH > 8.0 may curtail *Rhizobium* effectiveness. Discovering poorly nodulated fields early in the season allows time for implementing or adjusting an N fertilizer program to compensate for loss of fixed N to the peanut.

In 2000, *Rhizobium* nodulation (see table) was evaluated at six different sites for 0X, 1X (standard), and 2X inoculant rates. Yields were measured. Only at one location was significant response to inoculant measured. At most other locations, mid-season N had been applied thus potentially masking possible response to *Rhizobium* nodulation in 2000, which was a low yielding year for most growers.

Rhiz. Inoc. Rate	Year 2000 Location					
	Western Peanut Growers	Gaines County	Cochran County	Lubbock County	Lamb1 County	Lamb 2 County
	<i>Nodules per plant</i>					
0X	11.6	4.2	8.9	0.6	20.8	59
1X*	21.3	9.5	31.4	31.9	45.1	--
2X	50.0	10.7	32.7	47.3	50.0	114
Inoculant Peanut Summer N? Significant yield.diff?	Gran Runner No Yes	Liquid Runner Yes No	Gran. Runner No No	Liquid Runner Yes No	Liquid Spanish Yes No	Liquid Runner Yes No

In 1999, I rarely observed more than one or two nodules on a volunteer peanut suggesting there was little carryover of the bacteria from one year to the next. In 2000, we did not expect but did observe in some cases increased nodulation with 2X rates vs. 1X. Also, nodule numbers were higher at 0X than expected, suggesting some *Rhizobium* carryover from either a previous crop (which cannot be assumed) or a strain of native soil bacteria that accomplished some nodulation.

A good time to evaluate *Rhizobium* nodulation on peanut fields is when most stands have been in the ground 4 to 5 weeks. In a couple areas of the field use a shovel to dig (don't pull) plants to evaluate nodulation. If desired, swirl roots in a bucket of water to remove soil. Nodule mass is more important than number of nodules. Slice open several nodules. Active nodules are pink to dark red inside. If nodules are white inside they are not yet active so check again in another week for reddish color. (Later season, older, inactive nodules will be gray or greenish inside.) If nodulation is judged poor, little can be done to increase nodulation. (Some inoculant companies have suggested that the new super concentrate 'frozen' liquid *Rhizobium* inoculants can be applied through the pivot, but no documentation exists whether this is effective.) Plugged drop tubes on granular inoculant or nozzles for liquid inoculant will eventually be evident in the field as peanuts yellow, even if high amounts of N have already been applied.

If no nodulation or poor nodulation is observed check the field again in ten days just to be sure. If poor nodulation persists, consider a modest N fertilizer program to address the crop N requirement. Also, to possibly pinpoint why that field may not have nodulated, ask yourself if any of the following may have occurred:

Common *Rhizobium* Inoculation Mistakes

- Inoculant exposure before planting to temperatures above 90 F. Do not store inoculant in a building where it can get hot in the afternoon. Do not keep inoculant in the pickup cab once in the field. This reduces *Rhizobium* numbers.
- If using a liquid inoculant, avoid chlorinated water which kills bacteria.
- Poor placement of in-furrow granular or liquid inoculant. Ensure that drop hoses in particular (many need to be lengthened a few inches) and nozzles direct inoculum to the seed rather than from 6" or more away. Be sure granular drop hoses are free of dirt, spider webs, etc.
- Low rates of inoculum; calibrate granular and liquid inoculants to ensure adequate rates.
- Using an inoculum not specific for peanuts; bacterial strains in *Rhizobium*
- Shallow planting on hot, dry soils if not irrigated quickly. If you can't water quickly, inoculant companies suggest you consider granular rather than liquid inoculant as the granules afford some protection to the bacteria.
- Very high pH soils (>8.0)—*Rhizobium* inoculant companies suggest that growers consider granular inoculants rather than liquid in this instance.
- Incompatibility with other seed, fertilizer, or chemical treatments (if unsure, consult your inoculant's company representative).
- Placing large amounts of N fertilizer near the seed will greatly curtail nodulation.
- Using old, expired inoculum.

Some growers routinely use a double *Rhizobium* inoculant rate. If you choose to do this, consider using two different products, like the frozen inoculant (delivered and stored in frozen form; thaw before use then apply like a liquid) along with a conventional liquid; or use both granular and a liquid.

Always keep in mind that *Rhizobium* inoculant is a live bacteria! We should do what is necessary to ensure that the integrity of the inoculant is not compromised in any way.

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