

Evaluation of In-Furrow Products on Peanut Seedling Emergence and Root Nodulation. 2021 crop season. R.S. Tubbs, and W.S. Monfort

Farmers have many options for in-furrow products that can be included at-planting. One of the most inexpensive “insurance policies” for a grower is use of a *Bradyrhizobia* inoculant to ensure adequate nodulation for season-long N-fixation. In the event of nodulation failure, yield reductions up to 50% have been observed in Georgia within the last 5 years. Some fertilizer products applied in-furrow can burn the seed, causing reduced plant stands, and others may slow or reduce the development of nodules, causing late-season N deficiencies. The inclusion of additional products for in-furrow application with the seed is often marketed without appropriate data showing whether it works or if it interferes with the benefits provided by other necessary beneficial products.

An experiment was conducted in the greenhouse and another in the field to evaluate *Bradyrhizobia* inoculant formulations for peanut for early season growth factors including emergence, root and vegetative growth, and nodulation. The field component added an in-furrow fertilizer (Riser) at-planting either alone or in combination with a liquid inoculant.

In the greenhouse, emergence was uniform and took approximately 7 days. Nodule formation began around 28 days after planting. Nodules formed rapidly from that point with the liquid and granular inoculant formulations, but remained at 0 or 1 nodule/plant for the non-treated and sterile peat formulations through 40 days after planting. Root growth was similar for all treatments throughout the duration.

For the field experiment, emergence of peanut plants was initially delayed by including the in-furrow fertilizer product compared to the untreated plants. At 12 days after planting, the plots with in-furrow fertilizer had reduced stands compared to all inoculant treatments. The plant stands recovered where there was no difference in plant stand at time of harvest. Regarding nodule formation, the liquid (with or without added fertilizer product) and granular inoculants formed nodules more rapidly and more abundantly than the treatments that did not include an inoculant or the sterile peat formulation. Nodules started forming around 16 days after planting. There was more rapid vegetative growth when the fertilizer was included with the liquid inoculant up through 42 days after planting compared to the treatments that didn't include any liquid products, but was not more than using the liquid inoculant alone. Ultimately, yield was greater using the liquid inoculant than the untreated or the sterile peat formulation. The in-furrow fertilizer did not significantly reduce yield compared to the liquid inoculant, nor did it significantly increase yield compared to the untreated check.

The in-furrow fertilizer failed to provide any benefit to peanut compared to simply using an inoculant, which also costs substantially less. A liquid inoculant continues to provide the best overall results, although the granular formulation is a satisfactory alternative if liquid application is unavailable. These continue to be a low-cost input that often pays for itself no matter the conditions, but especially can provide an exponential return on investment when circumstances are favorable (no native rhizobia present in the soil).