

Response of Peanut to Inoculation with *Bradyrhizobia* and Nitrogen Rate

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Adequate nitrogen (N) fixation by peanut (*Arachis hypogaea* L.) is essential to optimize yield. In replicated trials in North Carolina, South Carolina, and Virginia from 1998-2017 in-furrow liquid or granular inoculant increased yield from 3,510 lbs/acre to 4,780 lbs/acre in new peanut fields (57 trials) and 4,280 lbs/acre to 4,450 lbs/acre in fields with a previous history of peanut plantings within the past 4 years (43 trials). The increase in economic value from inoculation treatment (\$8/acre) at a peanut price of \$535/ton was \$337/acre and \$41/acre in fields with these respective histories. In a second experiment, replicated trials were conducted from 2007-2017 in fields without a history of peanut production or fields not rotated to peanut in recent memory to determine peanut response to N rate. Economic return based on peanut prices described previously was determined to reflect cost of N applied as ammonium sulfate (\$0.28/lb) as a single application 40-60 days after planting when canopy foliage began to express N deficiency. A linear response to N rates of 0, 60, 90, 120, and 150 lbs/acre was noted in 5 of 10 experiments with no response to applied N observed in the remaining 5 trials. When these experiments were included with 4 other experiments where non-inoculated and inoculated controls were compared with N applied at one rate only (120 lbs/acre), yield and economic return were higher for inoculated peanut compared with peanut receiving N or the non-inoculated and non-fertilized control; response of both parameters to N was intermediate. Results from these experiments underscore the value of inoculation with *Bradyrhizobia* at planting regardless of field history and the limitations of applied N to correct N deficiencies in peanut.