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NATIONAL PEANUT BOARD/SOUTHEAST PEANUT
RESEARCH INITIATIVE
FINAL REPORT FOR WORK
DONE UNDER RESEARCH AGREEMENT

Final Report

INSTITUTION: University of Georgia

PROJECT TITLE: The interaction effects of herbicide and temperature on germination of peanut seed

RES. AGR. NO.: PROJECT LEADER: Grey

EXPIRATION DATE: June 30, 2015 NPB CONTACT: Bob Parker/Maria Mehok
NPB Control NO.:

FINAL REPORT:

Flumioxazin is now used in multiple crops in Georgia including cotton, peanut, and soybean for pre-emergence (PRE) weed control. While flumioxazin provides excellent PRE weed control, it also can injure the emerging crop due to absorption during germination and emergence of the seed radicle. Flumioxazin herbicidal activation occurs by sunlight as the emerging seedling breaks through the soil. Diclosulam solubility increases with increasing pH, but the exact reason peanut injury occurred in Texas and other western states were never defined. Herbicide injury to other crops has occurred due to prolonged exposure because of cool soil temperature and slow seedling emergence. In order to investigate the effects of flumioxazin and diclosulam herbicides, a series of field and laboratory experiments were conducted to evaluate the following concerns:

1. Do diclosulam and flumioxazin affect peanut seedling development as related to varying temperature and cultivars in laboratory experiments?
2. By planting in April vs. May, do growers risk having herbicides negatively impact stand establishment and early season injury that can negatively impact peanut the entire growing season in field trials?

Wet weather in April 2014 (10" at Ponder farm) delayed planting until May in 2014. Early, mid, and late planted GA06G occurred on May 7, 19, and 29. 2015 plant dates were April 1, 15, and May 4. For each planting date, a nontreated control was included with Valor (3 oz/ac) and Strongarm (0.45 oz/ac). University of Georgia production practices as recommended by the Extension Service for pest management (weed, insect, and disease control), irrigation, pH, and fertility were utilized throughout each growing season. Peanut was dug and inverted based on mosocarp pod color to determine optimum maturity. Field plots were then mechanically harvested 5 to 10 days later.

Overall plant stands for the early planting were similar for all three treatments. Valor did show negative effects but was not detrimental to stand establishment. Valor showed adverse effects on peanut diameter in early April plantings. This was also seen in May plantings, but widths improved later in the season. Overall there were no negative effects on yield for any herbicide treatment as compared to the nontreated control. Only delaying the planting date resulted in yield differences. All three treatments from the late May plant date in 2014 showed a significant decrease in yield while all three treatments from the early May plant date in 2015 showed on average an increased yield compared to early and mid-April plantings.

For the temperature by herbicide interaction study, Valor showed adverse effects on radicle length but not on percent germination or final biomass. Lower temperatures resulted in overall reduced germination, radicle length, and final kernel biomass. In the future we would like to evaluate multiple cultivars as well as evaluate germination longer than seven days. Since we only had one plant date in the two years that resulted in soil temperatures of less than 70 degrees Fahrenheit, further testing should be conducted to have more data to compare at these lower soil temperatures.