Title: Evaluating planting arrangement, herbicide persistence, and weed management using cereal rye cover crop in Georgia peanuts

REPORT OF PROGRESS:

Introduction:

Cover crops have proven effective for weed management in cotton, soybeans, and corn in the Southeast and other U.S. regions, but use in peanut production remains limited. Georgia produces 53% of United States peanuts (Arachis hypogaea), with lucrative markets driving consistent production and regular herbicide use to maximize yields. Unfortunately, continual herbicide use has led to 11 recorded cases of herbicide-resistant weeds in the state. To slow the development of resistance, growers are exploring cover crops for their weed suppression benefits and improved herbicide efficacy, despite risks like herbicide carryover injury to peanuts. This study aims to evaluate the influence of cereal grain cover crops on herbicide efficacy and weed control in Georgia peanut production. The objectives are to: 1) assess weed control, peanut growth habits, and yields in single and twin-row planting arrangements with and without cover crops using UGA-recommended herbicide program (Valor + Strongarm or Strongarm + Brake) and non-treated check. 2) Determine how cover crops affect the persistence of these herbicides in soil. Understanding these interactions will inform growers whether cover crops alter herbicide persistence and activation. 3) Share findings at field days hosted at SEGREC and Tifton, providing growers with practical insights into integrating cover crops into their weed management strategies.

Field trials at Midville and Tifton, Georgia in 2023 and 2024, evaluated integrated practices on weed control and herbicide efficacy using three strategies: cover crop (cereal rye cover crop and no cover crop), planting arrangement (twin row and single row), and pre-emergence herbicides (no herbicide, Paraquat + Prowl + Valor @ 3 oz/a + Strongarm @ 0.225 oz/a, and Paraquat + Prowl + Strongarm @ 0.225 oz/a + Brake @ 12 oz/a). Cereal rye was planted at 50 lb/a in Tifton 2023 and 2024, and Midville 2024. A cereal grain mix (70% cereal rye; 20% oat; 10% wheat) was planted at 70 lb/a in Midville 2023. Cover crop biomass, visual weed species control and presence, crop injury, height and width, and pod yield data were collected. In Midville 2023, pre-emergence herbicides controlled >93% of weeds 4 weeks after planting (WAP), increasing to 99% at 8 WAP with post-emergence applications. In 2024, weed control reached 83% at 4 WAP and improved by 7% by 8 WAP. In Tifton, weed control improved by 16% at 8 WAP with 89% control in 2023 and consistently achieved >90% weed control throughout the entire season in 2024. Across locations in 2024, cereal rye cover crops enhanced weed control by 22% at 4 WAP and 11% at 6 WAP, suppressing up to 96% of weeds compared to no cover crop. Planting arrangement did not affect overall weed control. Pod yields generally exceeded the state average (4,069 lb/a). Pre-emergence herbicide by cover crop choice affected yield for 2023 Tifton, where pod yields declined by 1,232 lb/a in the Valor + Strongarm + cover crop treatment. In Midville 2024, twin row planting arrangements achieved higher pod yields than single row. While pre-emergence herbicide programs are essential in mitigating weed suppression, cereal rye can be beneficial in providing additional control to troublesome weeds. Pre-emergence herbicide programs may also influence pod yields depending on the scenario and location. Producers may increase their chances of higher pod yields with a twin row planting arrangement.