PROJECT:UGA471920

Project Title: Evaluation of ALS resistant yellow nutsedge (*Cyperus esculentus*) in GA peanut

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Report Summary:
A biotype of resistant yellow nutsedge was screened for resistance to Cadre. Tubers were dug using a peanut digger on August 2nd, 2019. Tubers were returned to UGA Athens campus for screening. Suspected resistant and susceptible biotypes were soaked for 24 hours in water prior to seeding to aide in germination. The resistant biotype (12 replications) tended to have a lower germination rate and germinated more slowly and over a greater period of time than did the susceptible biotype (15 replications). At approximately 5 weeks after planting nutsedge was at 3-4 true leaves at which time they were sprayed with either Cadre or Permit. Plants were rated at 7, 14 and 28 days after treatment (DAT). Data suggests that the average injury of the resistant population for a 256 oz/A (64 times normal field rate) application was 75% (Figure 1). Additional doses will need to be added in subsequent runs to reach a rate at which all treated plants die. In 2020 an additional rate of 512 oz/A will be added. Similar responses were seen with nutsedge biomass (Figure 2) where plants receiving a 256 oz/A rate were still growing at the time of biomass harvest (28 days after treatment).

In addition to screening the population for resistance to Cadre, the population was screened for cross resistance to Permit by applying 8 rates to both susceptible and resistant biotypes. Biomass and injury data were collected. Data suggests that the resistant biotype is not cross resistant to Permit. The resistant biotype was controlled at the same rate as the susceptible biotype. Therefore, growers should rotate Permit or other halosulfuron containing products in rotation for crops following peanut. The resistant biotype has not been assessed to resistance to other imidazolanone herbicides such as Pursuit (imazethapyr), but resistance to this herbicide is likely due to the class of chemistry.

Assuming funding for 2020 screening will be extended to other fields across peanut producing counties to assess the breadth of the resistance issue. To improve the efficiency of screening multiple sites, screening for cross resistance to Pursuit and Permit will only occur at 2 rates (1x and 4x). Surviving plants of both rates will be screened further for resistance to the chemistries.

If funded for a second year, the PI's will continue to seek out a student to work on this project as part of their degree program and continue to seek out additional funding sources to support the student. If additional funding cannot be acquired or a suitable student not found, the PI's will conduct the research and will utilize the labor funds to hire hourly student workers to aide in the collection and screening of tubers from across the state. This project will be the main focus of these students' efforts.

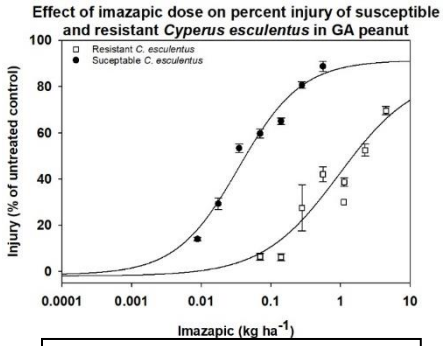

Figure 1: Injury of yellow nutsedge response to increasing dose of Cadre herbicide.

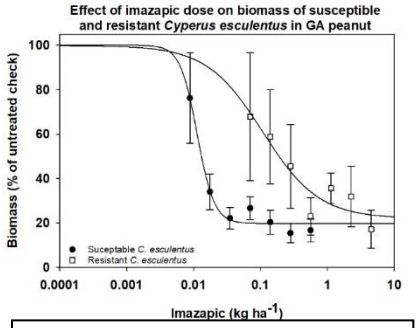

Figure 2: Biomass response of yellow nutsedge response to increasing dose of Cadre herbicide.

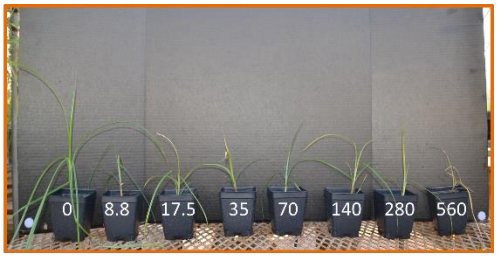

Figure 3. Response of known susceptible *C. esculentus* (28 DAT) to applications of imazapic. Numbers shown indicate rate of imazapic (g ai ha^{-1}).

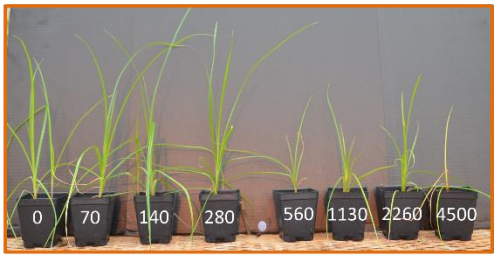

Figure 4. Response of suspected resistant *C. esculentus* (28 DAT) to applications of imazapic. Numbers shown indicate rate of imazapic (g ai ha^{-1}).