



Mississippi Corn Promotion Board 2019 Progress Report

Project Title: Investigation of Palmer Amaranth Resistance to Glufosinate in Mississippi

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Project Summary (Issue/Response)



One of the most critical issues for weed scientists today is the management of herbicide-resistant weeds. Herbicide-resistant Palmer amaranth (pigweed) is the greatest pest problem for corn, cotton, and soybean producers. A greenhouse research was conducted at the Delta Research and Extension Center in 2019, to investigate (to detect) possible Palmer amaranth resistance to glufosinate and its distribution in Mississippi. The data obtained will facilitate the solution of current weed problems and will help preserve the existing and new technologies for as long as possible. Results will be communicated to stakeholders. Palmer amaranth from various counties of Mississippi were sampled in 2017. Seedheads from about 50 plants were processed to obtain clean seed. Seeds were planted (September 12) in a tray and emerged on September 15. Seedlings were thinned to about 100 plants per population and sprayed at 2- to 4-leaf stage (September 27) with the field use rate of glufosinate (32 fl oz/A). Palmer injury/control was scored visually on a scale of 0-100% (0 = no injury or control and 100 = dead), using the corresponding nontreated check for each population as reference. The percentage of Palmer amaranth that survived the glufosinate application was calculated based on the number of plants sprayed. The survivors were transplanted to bigger pots for to produce enough seeds for verification if these were truly resistant (for future research).



Project Results/Outcomes

In 2019 screening (step one of this project), some Palmer amaranth populations out of 52 tested had survivors (ranging from 2 to 20 survivors) from 1X rate of glufosinate application. At this points, we cannot say with certainty that these survivors are resistant because past screenings from other States also had survivors, but which produced susceptible offspring. We can say that fields with survivors have difficult to control populations. These fields are identified and growers will be advised to manage these fields intensively to control Palmer amaranth escaping herbicide applications. More research (including physiological and molecular studies) need to be done to confirm if the offspring of survivors are indeed resistant. An efficient weed management program should focus on eliminating crop-weed interference and sustain this result for as long as possible by preventing/delaying the occurrence of herbicide-resistant weeds.

Project Results



Figure 1. Palmer amaranth populations with no-survivors (A) and a population (B) with survivors from glufosinate application.

Project Impacts/Benefits

Weed management programs, as integral part of corn production systems, should eliminate weed interference, reduce the weed soil seedbank, and prevent the evolution of herbicide resistance while ensuring high yield and crop safety. This research proposal aims to help weed management programs in corn to combat the suspected glufosinate-resistant Palmer amaranth in order to facilitate the solution of current weed problems.

Project Deliverables

End products will include dissemination of findings through scientific presentation (oral/poster presentation) at state, regional, and national weed science meetings as well as local and statewide grower meetings. Appropriate results (data) will be used in refereed journal articles, extension bulletins, and online articles.