**Research conducted**

The National Agricultural Genotyping Center (NAGC) has expanded its genetic panel for Palmer amaranth and waterhemp surveillance in North Dakota. Specifically, NAGC validated two genetic tests to detect markers linked to glyphosate and PPO-inhibitor resistances in submitted pigweed samples. Together with NAGC’s pigweed species ID test, this genetic panel can identify important traits in pigweeds found in North Dakota fields.

**Why the research is important to ND soybean farmers**

Late-season pigweeds that escaped herbicide applications are threats to present and future soybean production. Unfortunately, herbicide resistant (HR) populations of Palmer amaranth and waterhemp are increasing across the soybean belt. In North Dakota, Palmer amaranth has begun expanding its distribution and there are increasing reports of waterhemp escaping herbicides. Both pigweed species are known to carry resistance to multiple herbicide groups in other states, but little is known about North Dakota populations. Genetic tests provide a first look into the HR potential of pigweeds and help pre-select seed stock for greenhouse herbicide trials that are limited by both space and time.

**Final findings of the research**

The two HR tests were successfully validated on leaf tissue and seed samples, and are available at NAGC for all soybean farmers across the US. Confirming pigweed species is important prior to HR tests because the PPO-inhibitor (PPO-210) and glyphosate (EPSPS copies) resistance markers have only been found in Palmer amaranth and waterhemp. Research to find genetic markers for HR in other pigweed species (Powell amaranth) are currently underway.

A blinded study showed 90% agreement between the HR test (EPSPS copies) and glyphosate outcomes from greenhouse trials. Additionally, the PPO-210 genotype that carries resistance in Palmer amaranth was found in plants collected in North Dakota. Thus, these two HR tests have indicated the presence of these markers in North Dakota pigweeds and will be used in an upcoming statewide survey.

**Benefits/Recommendations to North Dakota soybean farmers and industry**

Palmer amaranth infestations are relatively low in North Dakota, in part, to its recent arrival. Slowing its spread requires diligence in monitoring and finding effective methods to manage newly discovered populations. NAGC’s genetic panel can quickly confirm the pigweed species and which herbicides to avoid if broad-scale chemical treatment is necessary. These tests will help limit the overuse of ineffective herbicides as well as inform farmers about the HR potential of local weed populations throughout the growing season.