UNIVERSITY OF DELAWARE
COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
COOPERATIVE EXTENSION

Lima Bean Fields Infested with ALS-resistant Pigweed in Delaware

Weed Facts
WF-20

How Problems with ALS-Resistant Pigweeds Developed

Pigweed is one of the most wide-spread weed species in Delaware and the region, infesting vegetable crops as well as grain crops. Pigweed is capable of quickly becoming the dominant species in a field due to its high seed output, producing over 100,000 seeds per plant.

A number of herbicides are effective on pigweed species if applied in a timely fashion. However, there are pigweed biotypes that are resistant to some of the most commonly used herbicides in commercial agriculture. One such group of herbicides is Group 2 (ALS-inhibiting) herbicides. This group includes the SU and IMI herbicides. SU and IMI herbicides refer to the class of herbicides, sulfonylurea and imidazolinone herbicides, respectively. ALS stands for acetolactate synthase inhibiting herbicide, since these herbicides inhibit the function of this plant enzyme. Herbicides in this group include: Pursuit, Raptor, Sandea, Accent, Matrix (or Resolve), FirstRate, and others. In lima beans, Pursuit, Raptor, and Sandea are labeled and have been extensively used for broadleaf weed control.

Preliminary surveys conducted by UD have found that many lima bean fields infested with pigweed at harvest often are infested with Group 2 resistant pigweed.

A number of inter-related issues have resulted in the development and spread of Group 2 resistant pigweed in Delaware:

- ALS herbicides were commercialized in the mid-80's, and therefore have been used for over 20 years.
- ALS herbicides have been used extensively in soybeans. Prior to the development of Roundup Ready soybeans, Group 2 herbicides were the most widely used soybean herbicides. Also, they were commonly used as postemergence herbicides in corn. Use of these herbicides is again on the increase in Roundup Ready soybeans for control of glyphosate-resistant marestail.
- Research in vegetables showed good crop safety and improved weed control, resulting in herbicide registrations for vegetables in mid-90's. Group 2 herbicides soon became the preferred option for broadleaf weed control in labeled vegetables.
- The use of cultivation has been reduced in the last 10 to 15 years with weed control relying more on herbicides.

- In fields with poor pigweed control, the fields were often re-treated with applications of group 2's which did little to reduce seed production. In addition, there are no labeled postemergence herbicides in other herbicide groups that control pigweeds in lima beans.
- Fields with Group 2 resistant pigweeds produced seeds that were spread from field to field with equipment.

Soil-applied herbicides currently labeled for lima beans do not provide full-season control of ALS-herbicide resistant pigweed. Dual, Treflan, and Prowl will provide some early-season control of resistant pigweed, but do not provide full-season control (control will last 4 to 6 weeks). Basagran is very inconsistent on pigweed, having activity only on plants less than 1 inch tall.

Control Strategies for Group 2 Herbicide Resistant Pigweed in Lima Beans

1) AVOID ALS-RESISTANT PIGWEED WITH CAREFUL FIELD SELECTION. If possible, do not plant lima beans in fields known to be infested with ALS-resistant pigweed. Sandea, Pursuit, or Raptor will not control ALS-resistant pigweed populations. Keep records of fields where ALS-resistant pigweed has been a problem.

2) DEVELOP ROTATIONS WHERE PIGWEED CAN BE EFFECTIVELY CONTROLLED. This is best done with corn or soybeans. Limit use of Group 2 herbicides in rotational crops and plan pigweed control programs around other herbicide groups. Plan rotations carefully since many vegetable crops do not have herbicides available to control ALS-resistant pigweed. While pigweed seeds remain viable in the soil for a number of years, the vast majority of the weed seeds will germinate within the first year.

3) USE RESIDUAL HERBICIDES WITH PIGWEED ACTIVITY. For lima beans, Treflan, Prowl, and Dual Magnum are labeled and have pigweed activity. While they may not provide full-season control, they will suppress pigweed growth and improve the effectiveness of cultivation.

4) PLAN TO CULTIVATE IN FIELDS KNOWN TO HAVE ALS-RESISTANT PIGWEED. Cultivate early, probably twice. Do not set cultivator too deep so that you minimize disruption of the herbicide layer.

5) REDUCE OR ELIMINATE SPREADING SEEDS WITH EQUIPMENT. If you suspect ALS-resistant pigweed (or any other hard to control weed) is present in a field, limit seed production. Mowing, tillage, or non-selective herbicides should be used immediately after harvest to stop additional seed production. Be sure to clean the equipment before it moves from suspected field so that the infestation remains contained.

Harvest Aids

In fields with ALS-resistant pigweed escapes, one tool that is available is a wiper bar that applies glyphosate over top of the lima bean crop as a harvest aid to reduce weed biomass going through harvest equipment and reduce seed production.

How effective is rope-wicking? Rope wicking (or wiper bars) is a harvest aid, not a viable weed control option. Rope wicking will only kill large weeds, those plants that do not come in contact with the wick will not be controlled. And those that are controlled will have already impacted yields. To improve the effectiveness of rope wicking, be sure to wipe in opposite directions and travel no faster than 2.5 mph for heavy weed densities.

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