

Managing Herbicide Resistant Common Ragweed

Common ragweed (*Ambrosia artemisiifolia*) is a native summer annual weed of many cropping systems in the mid-Atlantic. It is often encountered in agronomic crops as well as vegetables, orchards, roadsides, and abandoned fields. Common ragweed can thrive in lower fertility soils and due to its early emergence and upright growth, can compete well with most crops.

In Maryland, populations of glyphosate-resistant common ragweed were first confirmed in 2014. Scientists also confirmed resistance to acetolactate synthase (ALS Group 2) herbicides the same year. In 2017, pockets of three-way resistant common ragweed plants (Protoporphyrinogen Oxidase (PPO Group 14), ALS and glyphosate) were confirmed in parts of Delaware and the Eastern Shore of Maryland. Herbicide-resistant common ragweed can be very difficult to control, particularly in soybean and vegetable systems. Herbicide resistance in conjunction with its growth characteristics has resulted in common ragweed becoming a major weed for many Maryland crop producers.

Common Ragweed Emerges in the Early Spring Following a Complex Germination Process

Seeds must go through a cold period to initiate germination which is controlled by light and temperature. Most ragweed plants emerge from seeds in the top layer of soil (Figures 1 and 2). The early emergence pattern of ragweed allows it to grow to heights that can be difficult to control when crops are planted. The majority of common ragweed plants will emerge in early spring. After emergence, plants will grow through spring and begin flowering when day length begins to shorten after the summer solstice.



Figure 1. Common ragweed seeds must go through a cold period to initiate germination.

Ken Chamberlain, The Ohio State University, Bugwood.org



Figure 2. Light and temperature determine germination of common ragweed Ohio State Weed Lab, The Ohio State University, Bugwood.org



Figure 3. Ragweed has deeply lobed or divided leaves. Bruce Ackley, The Ohio State University, Bugwood.org

Ragweed has deeply lobed or divided leaves (Figure 3). The base of the ragweed leaf is normally wider than the tips. Ragweed has male and female flowers on the same plant, with the male flower located near the top and female seed heads at the base of upper leaves.

Ragweed has Deeply Lobed or Divided Leaves

The base of the leaf is normally wider than the tips. Plants will often grow to 2-4 feet in height with many branches. Ragweed stems are green to pinkish-red and typically very hairy. Young plants often have hair on the undersides of leaves which tends to disappear on older plants. Flower heads are short cylindrical spikelets around 1-3 inches long containing small green flowers (Figure 4). Male flowers will turn yellow with pollen.

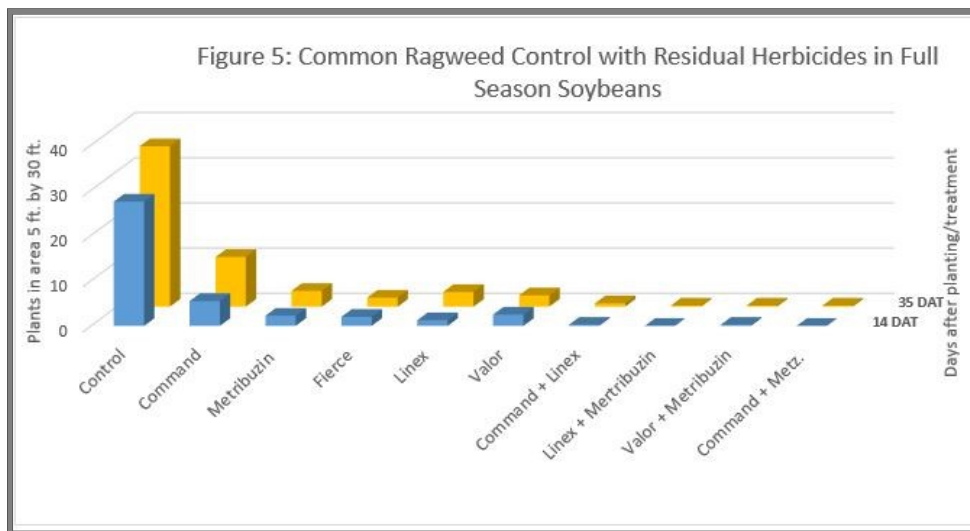
Integrated Weed Management is Critical for Long Term Control of Herbicide Resistant Weeds

Three-way resistance to PPO, ALS and glyphosate is expected to spread, leaving very few effective postemergence herbicide choices. In order to delay the onset of resistance and to create a more effective weed control program, researchers strongly encourage growers to integrate several weed control tactics (cultural, biological, mechanical, chemical) into their management plan.



Figure 4. Common ragweed flower heads are one to three inches long. Ohio State Weed Lab, The Ohio State University, Bugwood.org

Strategies which are particularly effective for common ragweed include crop rotation (for example corn or wheat double-crop soybeans), delaying planting to avoid the primary emergence period, tillage, seed bank management, cultivation (particularly for vegetables), preventing seed movement, use of cover crops (delaying termination will improve control), using a residual herbicide program with at least two effective sites of action and use of timely postemergence herbicide applications.



Keep in Mind These Important Management Considerations:

1. Understand the history of the field and status of herbicide resistance on your farm.
2. Start with fields clean of all emerged common ragweed plants at the time of planting the crop. Scout fields and apply burn-down herbicide treatments before ragweed is more than 3-4 inches tall. In some years, you may need to apply a burndown herbicide twice before planting, especially in years when planting is delayed.

Tillage can also be very effective at eliminating emerged ragweed. Paraquat is an effective burn down treatment for smaller plants provided it is applied with adequate water and coverage is good. Other burndown programs include dicamba, saflufenacil (Sharpen) or 2,4-D. A good strategy is using Sharpen, 2,4-D or dicamba plus glyphosate in April to kill marestail, emerged common ragweed, and winter annuals followed by paraquat at planting. Sharpen, dicamba and 2,4-D have plant back restrictions so refer to the label to avoid crop injury. Atrazine, simazine or metribuzin can increase the effectiveness of paraquat treatments as well and provide some residual control until planting. Regardless of the treatment, scout fields after application to ensure that all plants are killed.

3. Keep fields clean by using the right herbicide at the right rate. A preemergence residual herbicide program with at least two effective sites of action will reduce ragweed population until the crop canopies. Residual herbicides reduce the number of common ragweed plants present and provide for a wider window to apply postemergence herbicides. Most herbicides control germinating common ragweed for 3-5 weeks. Apply residual herbicides as close to planting as possible so that herbicide activity extends further into the season. Herbicide trials conducted in Maryland on soybeans during the 2017 and 2018

season showed significantly better control of common ragweed with the use of any residual product compared to a non-treated control (Figure 5). Treatments that utilized more than one effective site of action provided better control than single site of action treatments. Products containing the active ingredients linuron (Linex), metribuzin, clomazone (Command) and flumioxazin (Valor) performed best.

4. Apply an effective postemergence herbicide before common ragweed plants reach 3-4 inches in height. In RoundUp Ready® soybeans, for populations that are glyphosate and ALS resistant, the choices are limited to PPO herbicides such as Reflex® or Flexstar GT® (Reflex + glyphosate). These products require good coverage with at least 20 gallons of water and the proper adjuvant for effective weed control. There are no effective post-emergent choices for RoundUp Ready® soybeans that are PPO-, Glyphosate- and ALS-resistant.
5. Consider using an alternative herbicide tolerant crop technology. There are three major herbicide tolerant traits available besides Roundup Ready® that can provide control of small common ragweed in soybeans. These include varieties with tolerance to glufosinate (Liberty Link® or Liberty Link GT27®), dicamba (RoundUp Ready 2 Xtend®), and 2,4-D (Enlist E3®). Each of these comes with specific usage instructions and label restrictions. Herbicide-tolerant crops provide another option for ragweed control. However, they still need to be applied when ragweed plants are small for satisfactory control. In some cases, fields may need two postemergence applications timed 7-10 days apart.
6. Scout your fields frequently for any emerged common ragweed plants. It is critical to apply products before common ragweed is too large.
7. Finally, limit the movement of common ragweed seeds by isolating infested fields, harvesting those areas last, and cleaning equipment before moving from one farm to the next.

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