

Management Guide for Waterhemp Species

Monsanto is committed to providing the information and product recommendations necessary to minimize the risk of developing weed resistance. The information below is targeted at increasing awareness of important weeds and helping preserve glyphosate efficacy.

Waterhemp Biology

- While waterhemp is native to the U.S., it was not considered a major agronomic problem until the 1980s. Historically waterhemp is divided into two species: common waterhemp and tall waterhemp.
- Once waterhemp seedlings become established, they have a rapid growth rate relative to other annual weeds. The relative growth rate of waterhemp is 50-70 percent greater than that of many other annual weed species.¹
- Tall waterhemp has a smooth, erect stem that can grow to more than 8 feet tall. The flowers are small and green. Male and female flowers are found on separate plants.
- Common waterhemp also has smooth leaves and stems, but does not grow as tall. The stem color can range from yellowish-green to red to reddish-purple.
- Waterhemp can produce more than 300,000 seeds per plant.²
- Waterhemp is readily transported when equipment is moved from field to field. The prolific seed production also increases the likelihood of seed being dispersed over long distances.¹

Weed Environment

- ✓ The native habitat of waterhemp is flood plains and other wet, low-lying areas, but is also well adapted to reduced or conservation tillage and no-till.²
- ✓ Waterhemp can germinate over a relatively long time period and grow rapidly, thus making management programs challenging.
- ✓ Waxy, narrow leaves make herbicide interception and uptake a challenge.
- ✓ Widespread resistance to some herbicide chemistries has been documented. Waterhemp populations have evolved resistance to triazines, ALS- and PPO-inhibiting herbicides.
- ✓ Waterhemp populations have been confirmed to be resistant to glyphosate and also ALS-inhibiting herbicides in Western Missouri.³

¹ Iowa State University (ISU): 2004 Weed Science Society of America – North America Weed Management Plant Species Workshop

² ISU: Weed Science. *Managing Waterhemp in Today's Cropping System*

³ Heap, I. The International Survey of Herbicide Resistant Weeds. Online. Internet. November, 2006. Available www.weedscience.com

Management for Waterhemp Species

Treatment Recommendations¹

Scout fields and control weeds throughout the season. Proper application timing protects yields, ensures correct use rate for weed size and considers the impact of environmental conditions on performance.

Roundup Ready[®] Corn 2

- ✓ Start clean with a burndown herbicide or tillage. Early-season weed control is critical in corn to maximize yield potential.
- ✓ Apply a preemergence residual herbicide such as Harness[®] Xtra, Degree Xtra[®], or other residual herbicides at the recommended rate.
- ✓ Or apply a preemergence residual herbicide at the recommended rate tank mixed with Roundup WeatherMAX[®] at a minimum of 22 oz/A in-crop before waterhemp exceeds 4 inches in height.
- ✓ Follow both programs with a postemergence in-crop application of Roundup WeatherMAX at a minimum of 22 oz/A for additional waterhemp flushes before they exceed 4 inches in height.
- ✓ Tank mix other herbicides such as 2,4-D or dicamba (Clarity[®], Banvel[®] or Distinct[®]) with Roundup WeatherMAX if necessary for enhanced postemergence waterhemp control.

Roundup Ready Flex Cotton and Roundup Ready Cotton

- ✓ Start clean with a burndown herbicide or tillage. Tank mix Roundup WeatherMAX with dicamba (Clarity) or 2,4-D (consult label for plant back timing).
- ✓ A soil residual herbicide should be applied as either a preemergence (such as pendimethalin, fomesafen, or flumioxazin) or early postemergence (metolachlor or pyriithiobac).
- ✓ In crop, apply Roundup WeatherMAX at a minimum of 22 oz/A before waterhemp exceed 4 inches in height.
- ✓ At lay-by, a postdirected application of Roundup WeatherMAX can be tank mixed with a residual such as diuron or Valor[®].

Roundup Ready Soybeans

- ✓ Scout fields before and after each burndown and in-crop application.
- ✓ Start clean with a burndown herbicide or tillage. Tank mix with 2,4-D for tough-to-control weeds such as waterhemp.
- ✓ If you have dense stands of waterhemp or glyphosate-resistant waterhemp preemergence or are in a continuous Roundup Ready Soybean rotation, use a residual herbicide such as flumioxazin (Valor) or alachlor (INTRRO[®]).
- ✓ In-crop, apply Roundup WeatherMAX at a minimum of 22 oz/A before waterhemp exceeds 6 inches in height.
- ✓ If an additional flush of waterhemp occurs, observe maximum annual application rates.
- ✓ Roundup WeatherMAX may be tank mixed with other herbicides, including lactofen (Cobra[®]) or fomesafen (Flexstar[®]) if additional postemergence waterhemp control is needed.

Minimize the Risk of Weed Resistance

- **Start clean and control weeds early.**
- **Use Roundup Ready Technology as your foundation.**
- **Add other herbicides and cultural practices where appropriate as part of the Roundup Ready System.**
- **Use the right rate at the right time.**
- **Control weeds throughout the season and reduce the weed seed bank.**

Report incidents of repeated non-performance of any Monsanto branded herbicide to your local Monsanto retailer or call 1-800-ROUNDUP.

This is not a product label. Always read and follow label directions for all products used in tank mixtures. Always predetermine the compatibility of tank mixtures by mixing small proportional quantities in advance. Monsanto has not tested all recommended tank mix product formulations for compatibility or performance.

¹This fact sheet is issued to clearly describe use recommendations permitted under FIFRA Section 2(ee) as not being inconsistent with product labeling, or is issued to highlight an approved use from the product labeling. It is a violation of federal law to use any registered pesticide product in a manner inconsistent with its labeling. Read and follow all precautions and use instructions contained within the labeling. The applicable labeling for all products must be in the possession of the user at the time of application. Some recommended pesticide products are not registered in all states. Check with the product manufacturer or your dealer for products registered in your state. The distribution, sale or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited.

These recommendations are for all states except Texas.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS: Roundup Ready[®] crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup[®] agricultural herbicides. Roundup agricultural herbicides will kill crops that are not tolerant to glyphosate. Harness[®] brands, Degree Xtra[®] and INTRRO[®] are restricted use pesticides and are not registered in all states. The distribution, sale or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Check with your local Monsanto dealer or Monsanto representative for the product registration in your state. Harness[®], Degree Xtra[®], INTRRO[®], Roundup[®], Roundup Ready[®], and Roundup WeatherMAX[®] are trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners.