

MANAGEMENT GUIDE FOR KOCHIA

This document is intended to provide information about this weed and guidelines for control. As a tough-to-control weed, knowledge about the biology and weed control programs will help in management.

Kochia Biology

- ▶ Kochia is found in cropland, dry pastures and rangeland, where it is considered a serious weed, and is also commonly found in roadsides, ditch banks and waste lands. Kochia is also commonly known as Mexican fireweed.¹
- ▶ In the Great Plains, kochia is widespread and considered a serious pest of crops like sorghum, soybeans and sugarbeets, and in the fallow portion of the cereal-fallow cropping systems.²
- ▶ Kochia is an annual plant that reproduces from seeds. It has a deep taproot, an erect, much-branched stem that ranges from 3 to 7 feet long with alternate, simple leaves. Small green flowers lack petals and are found in clusters in the axils of the upper leaves and in terminal spikes. Brown, flattened seeds are oval and are about 1/16 inch long and grooved on each side.^{1, 2}
- ▶ Kochia effectively competes for light, nutrients and soil moisture. The flowering time among populations of kochia is highly varied. Early populations can become a problem in cool-season cereal crops.²

1 http://www.ag.uiuc.edu/~vista/html_pubs/WEEDS/40.html

2 http://www.nwcb.wa.gov/weed_info/Kochia_scoparia.html

3 Heap, I. The International Survey of Herbicide Resistant Weeds. Online. Internet. May 15, 2008. Available www.weedscience.com.



Weed Environment

- ▶ Kochia is highly adaptable. It is very drought tolerant and can spread rapidly in dry conditions and has a wide tolerance of soil types.²
- ▶ Kochia reproduces by seed only. Kochia seeds germinate very early in the spring, because of their frost tolerance, and plants grow very rapidly through spring and summer sending their taproots down up to 16 feet. Kochia flowers in late summer and sets seed, typically producing up to 14,600 seeds per plant.²
- ▶ Kochia spreads long distances very rapidly. Seeds are dispersed in the fall when the plants become tumbleweeds, dropping seeds as they blow about. Seed in the soil has five percent viability after one year and limited to no viability after two years.²
- ▶ Kochia resistance to many modes of action have been documented in the U.S. Triazine-resistant kochia has been found in more than 10 states. Biotypes resistant to 2,4-D or dicamba have also been found. Rotating herbicides reduces the possibility of an increase in the proportion of herbicide-resistant plants.²
- ▶ No glyphosate-resistant populations of kochia have been confirmed to date.³

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 crucial in corn to maximize yield potential.
- ▶ Apply a preemergence residual herbicide containing atrazine such as Harness® Xtra or Degree Xtra®, or other residual herbicides at the recommended rate. Other preemergence herbicides that will help to control kochia contain Isoxaflutole (Balance® PRO, Radius®) and Hornet®.
- ▶ Or apply a preemergence residual herbicide at the recommended rate tank mixed with Roundup WeatherMAX® at a minimum of 22 oz/A in-crop.
- ▶ Follow either program with a postemergence in-crop application of Roundup WeatherMAX at a minimum rate of 22 oz/A.
- ▶ Tank mix other herbicides such as Impact® or dicamba-based products to control emerged kochia if you suspect it is resistant to glyphosate.

* Includes corn with Roundup Ready 2 Technology

Roundup Ready Soybeans

- ▶ Start clean with a burndown herbicide or tillage. Tank mixing with 2,4-D will help provide more effective burndown control.
- ▶ An application of a residual herbicide such as flumioxazin (Valor®) or chloransulam (FirstRate®) will provide control of kochia preemergence and reduce the potential for resistance.

- ▶ In-crop, apply Roundup WeatherMAX at a minimum of 22 oz/A, and follow with a second application of Roundup WeatherMAX if an additional flush of annual weeds occurs.
- ▶ Roundup WeatherMAX may be tank mixed with products such as lactofen (Cobra®) or fomesafen (Flexstar®) if you suspect the kochia is resistant to glyphosate.

Roundup Ready Flex Cotton and Roundup Ready Cotton

- ▶ Start clean with a burndown herbicide or tillage. Tank mix Roundup WeatherMAX with dicamba or 2,4-D (consult label for plant back timing). Kochia germinates early in the season and tillage can be a very effective tool for control.
- ▶ Apply a preemergence residual herbicide, such as flumeturon (Cotoran®) or diuron (Direx®), at the recommended rate.
- ▶ In-crop, apply Roundup WeatherMAX at a minimum of 22 oz/A tank mixed with PARRLAY™ for residual control of some grass and broadleaf weeds.

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 Cropping System.
- ▶ Use the right rate at the right time.
- ▶ Control weeds throughout the season and reduce the weed seed bank.

Rate Your Risk, Know Your Options. www.weedtool.com

- ▶ Answer 10 field-related questions
- ▶ Get your risk rating score
- ▶ Discover how to lower your risk
- ▶ Learn best practices for reducing general weed resistance risks

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

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 the 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 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. Balance® PRO, Radius®, Harness® brands and Degree Xtra® 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®, Roundup®, Roundup Ready®, PARRLAY™ and Roundup WeatherMAX® are registered trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners.

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