MANAGING HERBICIDE-RESISTANT WEEDS

Marestail

Glyphosate-resistant (GR) marestail is one of the more serious GR weed pests throughout the US soybean production region.

This compilation of the best measures for control of GR marestail is from the below sources.

Strategies for spring marestail management, by Loux, Ohio State Univ. ;

Postemergence control of GR marestail in corn and soybeans by Sandell and Bernards, Univ. of Nebraska;

Options for burndown of marestail in no-till soybeans by Loux and Johnson, Ohio State Univ. and Purdue Univ.;

Residual control of marestail in no-till soybeans, by Loux, Ohio State Univ.;

Fall herbicide treatments–Focus on marestail management by Loux, Ohio State Univ.;

Weed Control Guidelines for Mississippi, Mississippi State Univ.

The following tenets apply to management systems for control of GR marestail. Herbicide options for the various control protocols appear at the end of this article.

Marestail is a winter annual weed that germinates in the fall and spring and completes its life cycle in late spring/early summer. It is especially adapted to a no-till crop production system.

Fall-germinated marestail overwinters in the rosette stage and bolts (starts stem elongation) in the spring. Marestail is most susceptible to herbicide control when it is still in the rosette stage of development, or before bolting. Once the weed starts to bolt (4-6 in. tall), it becomes difficult to kill with most herbicides.

Because of its capacity to germinate during the fall through late spring/early summer, a single herbicide application will not be sufficient for season-long control of marestail, particularly in no-till systems where its control is totally dependent on herbicides.

Many populations of marestail are now GR, and some populations are also resistant to ALS-inhibiting herbicides. Any weed management program for either continuous soybeans or for crops that are grown in rotation with soybeans should include aggressive measures to control GR marestail so that the amount of seed production is drastically reduced.

Burndown herbicide applications made in the fall or early spring for marestail control will be enhanced by mixing with residual herbicides. This will also delay the development of other GR weeds. If applying glyphosate in a burndown mix, include at least two other MOAs in the mix.

A fall burndown plus residual herbicide treatment is used to control fall-emerged plants. It is not a substitute for a spring application of burndown and preemergent (PRE) residual herbicides because fall-applied residual herbicides will not control marestail that emerges in May and June. The majority of the residual herbicide should be applied in the spring.

In Roundup Ready soybeans, the best marestail control is achieved with a combination of fall- and spring-applied burndown and residual herbicides. Again, the majority of the residual herbicide should be applied in the spring.

Since GR marestail cannot be visually detected prior to the application of control measures, the best management approach is to tank-mix glyphosate with herbicide(s) that have a second mode of action. The second mode of action will control GR marestail if present; if GR marestail is not present, the selection pressure for GR marestail will be lowered.

All herbicides that are applied in the fall and early spring should be applied to actively growing marestail during periods of mild temperatures. Glyphosate can be added to the fall mix to control grasses and other broadleaf weeds. However, if a winter vegetation cover is desired, this may not be preferable.

If a fall treatment is not applied, spring herbicide treatments for marestail control should start when the weed is in the rosette stage, which will occur early. If 2,4-D or dicamba treatments are applied in the spring, the preplant interval must be observed to avoid soybean injury.

If burndown has been delayed until near planting and marestail has bolted, tank mixes of glyphosate with FirstRate, Classic, Gramoxone, Sharpen, Optill, or 2,4-D should be considered.

Liberty herbicide can also be used to control the larger marestail. Liberty can be used PRE on any soybean variety.

The integration of both residual and non-residual herbicides in a marestail management program is necessary to control both the GR-marestail that is present and to prevent subsequent emergence of marestail during the growing season. Ensuring a weed-free start at planting is more important than having 100% control of later-emerging marestail.

To maximize control of marestail that will emerge in May and June, the majority of any residual herbicide should be applied in the spring. Herbicide mixes such as Envive, Valor XLT, Gangster, Sonic, and Canopy contain two MOAs, and this will ensure effectiveness on ALS-resistant marestail.

There are two approaches to marestail control in the spring.

- Application of burndown plus residual herbicides in early spring followed by additional burndown and residual herbicides to control small marestail that are present at planting or prior to soybean emergence; and

- Application of burndown plus residual herbicides close to planting time. This option may be enhanced by a fall control program that provides effective control through winter and early spring.

Tradeoffs to these two approaches are:

- Applying the combination burndown + residual herbicides early in the spring (weeks ahead of planting) gives more consistent control of emerged plants, but can result in less persistence of the residual herbicide into the growing season when marestail is still emerging.

- Applying later in the spring (near planting time) will result in the opposite effect; i.e., increased risk of ineffective burndown of

emerged plants that may be past the size for optimum control, but lengthened residual effectiveness.

Control of GR marestail postemergence (POST) is difficult because POST herbicide options for control of GR marestail after soybeans have emerged are limited. Those that are available should be applied before marestail exceeds 2 to 3 in. in height. They can be combined with glyphosate on RR soybeans to control GR marestail.

With widespread resistance of marestail to glyphosate and ALS-inhibitor herbicides, growing Liberty Link soybeans in conjunction with applications of burndown and residual herbicides followed by application of POST Liberty herbicide is the most effective system for controlling and/or managing GR marestail. In fact, Liberty herbicide applied to Liberty Link soybeans is the only consistently effective POST herbicide for marestail control. This option should be rotated with non-Liberty herbicides to reduce selection pressure for resistance to glufosinate.

Below is a list of suggested control strategies using herbicides to manage GR marestail. For estimated levels of weed control normally expected with below herbicides, see Ark., Miss., and Tenn. Weed Control Guides.

Burndown herbicide alone–fall application (MOA Group):

- Glyphosate (9) + Sharpen (14)
- 2,4-D (4) or Dicamba (4) alone or + Gramoxone (22) or Glyphosate (9)

Burndown + residual herbicides–fall application (MOA Group):

- Gramoxone (22) + Metribuzin (5)
- Glyphosate (9) + Valor (14) or Envive (2 + 14)
- 2,4-D (4) or Dicamba (4) + Canopy (2 + 5) or Canopy EX (2) or Envive (2 + 14) or Gangster (2 + 14) or Metribuzin (5) or Valor (14) or Valor XLT (2 + 14)
- Glyphosate (9) or 2,4-D (4) or Liberty (10) + Fierce (14 + 15) or Zidua (15)

Burndown herbicide alone–early spring application (MOA Group):

- 2,4-D (4) or Dicamba (4) alone or + Gramoxone (22) or Glyphosate (9)

Burndown + residual herbicides–early spring application (MOA Group):

- Gramoxone (22) + Metribuzin (5)
- Glyphosate (9) + Valor (14) or Envive (2 + 14)
- 2,4-D (4) or Dicamba (4) + Authority XL (2 +14) or Canopy (2 + 5) or Canopy EX (2) or Envive (2 + 14) or FirstRate (2) or Gangster (2 + 14) or Metribuzin (5) or Surveil (2 + 14) or Valor (14) or Valor XLT (2 + 14) or Zidua (15)

- 2,4-D (4) + Trivence (2 + 5 +14) or Afforia (2 + 14) or Zidua (15)
- 2,4-D (4) or Dicamba (4) or Sharpen (14) + Authority Maxx (2 + 14)
- Glyphosate (9) or 2,4-D (4) or Liberty (10) + Fierce (14 + 15) or Zidua (15)

Burndown herbicide alone–applied near or at planting time (MOA Group):

- Liberty (10)–can be applied to all soybean varieties before emergence
- Sharpen (14) alone or + Glyphosate (9) or Gramoxone (22) or Liberty (10)
- Glyphosate (9) + FirstRate (2) or Gramoxone (22) or Optill (2 + 14) or Optill PRO (2 + 14 + 15) or Sharpen (14) or Synchrony XP (2)
- Glyphosate (9) or Liberty (10) + Fierce (14 + 15)

Burndown + residual herbicides–applied near or at planting (MOA Group):

- Glyphosate (9) + Gangster (2 + 14) or Metribuzin (5) or Envive (2 + 14) or Optill (2 + 14) or Optill PRO (2 + 14 + 15) or Valor XLT (2 + 14) or Zidua (15)
- Gramoxone (22) + Metribuzin (5)
- Liberty (10) + Metribuzin (5) or Sharpen (14) or Zidua (15)

POST Herbicide (MOA Group):

- Glyphosate (9) + FirstRate (2)–RR soybeans only
- FirstRate (2)
- Liberty (10)–Liberty Link soybeans only.

All herbicides listed above control weeds other than marestail. Therefore, they should be selected to manage other broadleaf and grass weed species that may be present in a particular field and that are listed as controlled by the chosen herbicide or mix.

When using metribuzin or a herbicide such as Canopy that contains metribuzin, check selected varieties to ensure tolerance to this herbicide.

Glyphosate + ALS-inhibiting herbicides such as Classic, FirstRate, and Synchrony should not be used where both GR and ALS-resistant marestail are present.

POST Glyphosate should only be applied to RR soybeans.

POST Liberty should only be applied to Liberty Link soybeans.

Single Component Herbicides: Trade Name–Active Ingredient–MOA Group
Banvel/Clarity–dicamba–Group 4; Classic–Chlorimuron Ethyl–Group 2;
FirstRate–Cloransulam-methyl–Group 2; Glyphosate–Group 9;
Gramoxone–Paraquat–Group 22; Liberty–Glufosinate–Group 10;
Metribuzin–Group 5; Sharpen–Saflufenacil–Group 14;
Valor–Flumioxazin–Group 14; Zidua—Pyroxasulfone—Group 15; 2,4-D–Group 4.
Premix Herbicides: Trade Names–Components–MOA Group
Afforia—FirstShot (thifensulfuron-methyl + tribenuron-methyl) + Valor—Group 2 + 14
Authority XL and Authority Maxx–Classic + Authority (Sulfentrazon)–Group 2 + 14
Canopy–Classic + Metribuzin–Group 2 + 5;
Canopy EX–Classic + Express (tribenuron-methyl)–Group 2
Envive–Classic + Express + Valor–Group 2 + 14
Fierce—Valor + Zidua—Group 14 + 15
Gangster–copack of Valor and FirstRate–Group 2 + 14
Optill–Pursuit + Sharpen–Group 2 + 14
Optill PRO—Pursuit (imazethapyr) + Sharpen + Outlook—Group 2 + 14 +15
Sonic–FirstRate + Authority–Group 2 + 14
Surveil—Valor and FirstRate–Group 2 + 14
Synchrony XP–Classic + Harmony (thifensulfuron-methyl)—Group 2
Trivence—Classic + Metribuzin + Valor—Group 2 + 5 + 14
Valor XLT–Classic + Valor–Group 2 + 14
Verdict—Sharpen + dimethenamid-P—Group 14 + 15

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