

Herbicide-resistant horseweed (marestalk) in Michigan

Keys to management in no-till soybean

Christy Sprague, Extension Weed Science

www.MSUweeds.com

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Horseweed (*Conyza canadensis*), also known as marestalk, is an annual weed that can follow a winter or summer annual life cycle. While horseweed can emerge in the fall, we have recently been observing more and more horseweed emergence from early spring through the summer (March through August) in Michigan. Unlike other winter annuals, horseweed does not mature until late summer, allowing for greater competition with crops compared with other winter annual weeds. Horseweed plants start out as a rosette, generally bolt in April/May, flower in July, and set and disperse seed from August to October. These plants not only reduce soybean yield, but large mature plants can interfere with soybean harvest. Each plant can produce up to 200,000 seeds that travel long distances in the wind. Up to 86% of seeds produced can germinate right off the plant. Of fall emerging seedlings 59 to 91% can survive the winter, causing problems in the next spring's crop.



Michigan no-till soybean field infested with horseweed

Herbicide resistance in horseweed:

Horseweed populations in Michigan range from being resistant only to glyphosate (Group 9) or ALS-inhibiting (Group 2) herbicides to being **resistant to multiple herbicides** including **glyphosate** and **ALS-inhibitors**. These resistance profiles make it difficult to manage horseweed, since glyphosate will not control horseweed in the burndown application or postemergence in Roundup Ready soybean. If ALS-resistance is present the use of PRE or POST applications of Classic (*chlorimuron*), FirstRate (*cloransulam*), or other ALS-inhibitors will not effectively control horseweed. Horseweed management strategies will need to rely heavily on effective burndown treatments that include 6 to 8 weeks of residual control from PRE herbicides and the use of soybean with other herbicide-resistant traits (i.e., LibertyLink soybean) for POST herbicide options.



Fall emerging horseweed

Spring/summer (June) emerging horseweed

Horseweed bolting in spring

Seedhead prior to seed dispersal

Herbicide-resistant horseweed (marestalk) in Michigan

Consider planting LibertyLink soybean.

LibertyLink soybeans are one of the most effective strategies for managing high populations of horseweed. *Glufosinate* (Liberty) applications in LibertyLink soybean are one of the only effective postemergence options for control of multiple-resistant horseweed, without several restrictions. However, the following recommendations need to be followed.

- Effective burndown and residual herbicides outlined below will be needed for horseweed control prior to planting LibertyLink soybean.
- Apply Liberty (32-43 oz) POST prior to horseweed exceeding 6-inches in height. Use the higher rate to control taller plants or plants that have escaped initial control. Follow with a second POST applications of Liberty as needed.

Steps for successful horseweed management in soybean

Step 1: Control emerged horseweed prior to planting!!

Tillage or effective burndown herbicide applications are the only two methods available to control emerged horseweed prior to planting soybean. For tillage to be effective it needs to be close to the time of planting thoroughly mixing the top few inches of soil to uproot any existing horseweed plants. Vertical tillage tools are not effective. However, due to horseweed being mostly a problem in no-till or reduced till fields most growers will need to use effective burndown treatments for horseweed control. In some cases, in fields with historical horseweed problems two applications may be needed (fall followed by spring applications).

Effective burndown treatments (Fall):

- Best applied when horseweed is in the rosette stage, prior to 4-inches tall.
- Fall treatments should be used to control emerged horseweed, but a spring burndown treatment will still be needed. These treatments reduce variability from spring only treatments.
 - Use 2,4-D, dicamba, or Sharpen as the base herbicides in fall treatments to control emerged horseweed. Tank-mixtures with other herbicides (i.e., glyphosate) will be needed to control other winter annual and perennial weeds.

Effective burndown treatments (Spring prior to soybean planting):

- Horseweed needs to be managed prior to planting.
- Preplant herbicide treatments should be applied when horseweed plants are less than 4-inches tall.
- Options for control include:
 - 2,4-D ester (1 pt) + glyphosate (7 days or more prior to planting)
 - 2,4-D ester + Gramoxone + *metribuzin* (7 days or more prior to planting)
 - 2,4-D ester (1 pt) + Sharpen (1 oz) + glyphosate + MSO (7 days or more prior to planting)
 - Liberty (32 to 43 oz) + *metribuzin*
 - Sharpen (1 oz) or Sharpen products (OpTill, OpTill PRO, Zidua PRO, or Verdict) + MSO + glyphosate or Liberty
 - Gramoxone + *metribuzin* (8 oz) + COC
 - XtendiMax, FeXapan (22 or 44 oz), or Engenia (12.8 oz) in **Roundup Ready 2 Xtend (dicamba-resistant) soybean only**. Several precautions and restrictions need to be followed, consult Table 2G in the MSU Weed Control Guide (E0434) and label.

Step 2: Include effective residual (PRE) herbicides with burndown treatment.

The use of effective residual herbicides with the burndown treatment is essential for horseweed control until the soybean canopy develops.

- Group 5 herbicides: *metribuzin* (at least 8 oz) and *metribuzin* premixes (i.e., Boundary, Canopy) can be applied with any of the burndown treatments. DO NOT exceed the recommended rate for the soil type.
- Group 14 herbicides can be applied with any of the burndown treatments, except Sharpen (*safinopyr*) products unless applied 14 days prior to planting soybean. Group 14 herbicides include:
 - Valor/Rowel (*flumioxazin*) or *flumioxazin* products: Envive, Fierce, Rowel FX, Surveil, Trivence or Valor XLT
 - Spartan (*sulfentrazone*) or *sulfentrazone* products: Authority Assist/First/MAXX/MTZ/XL or Sonic
 - Sharpen (1.5 oz) can be applied, but only if applied 14 d prior to planting and soil O.M. >2%, see label.
- Best residual control of multiple-resistant horseweed will be from tank-mixtures or premixtures that contain two non-ALS (Group 2) herbicides (i.e., *metribuzin* + *flumioxazin* or *sulfentrazone*, Authority MTZ, Trivence, etc.)