Velvetleaf Management in Soybeans

Take ACTION
Herbicide-Resistance Management

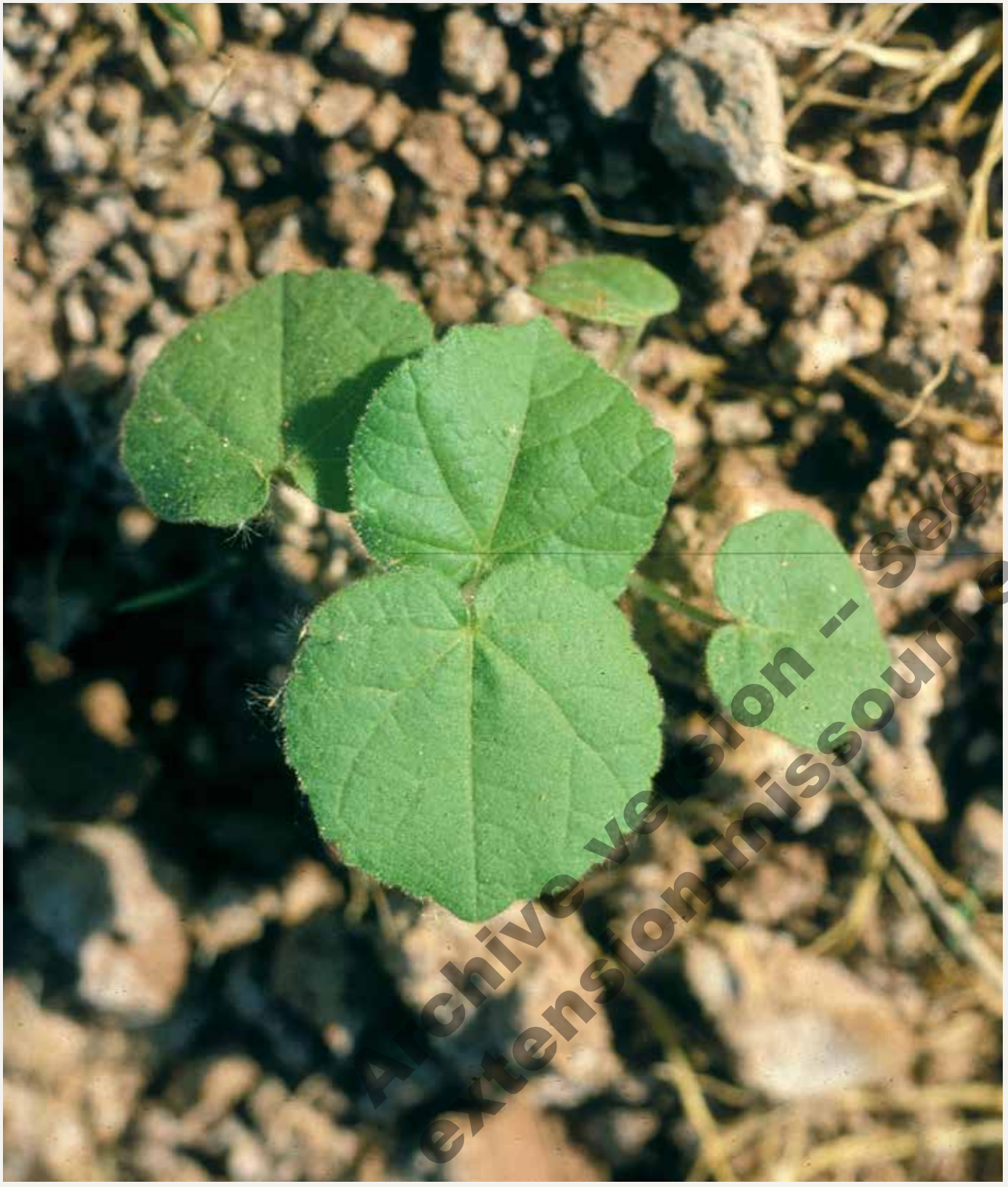

Photo Credit: Steve Dewey, Utah State University, Bugwood.org

Controlling velvetleaf in soybeans is important to a farmer's bottom line – this summer annual can reduce yields by 25 to 40 percent.

Velvetleaf Distribution and Biology

- Velvetleaf is a common weed species found in most fields throughout the soybean belt. It is also known as elephant ear, buttonweed and butterprint.
- Velvetleaf emerges in early May through late June. This prolonged window can make it difficult to control with soil-applied herbicides alone.
- Velvetleaf can be extremely competitive with soybeans. Soybean yields are typically reduced 25 to 40 percent with as few as 3-6 plants per square yard. Velvetleaf can also be a hindrance at harvest due to sturdy stems that become woody at maturity.
- As one of the taller weed species found in cultivated fields, velvetleaf can grow to 8 feet but usually ranges 2 to 4 feet tall in soybean fields.
- The plant gets the name velvetleaf from the characteristic velvety appearance and feel of the leaves and stems. The leaves are large and heart-shaped.
- One velvetleaf plant can produce up to 9,000 seeds, and its hard seed coat and ability to emerge from soil depths of up to 2 inches contribute to its persistence and longevity in the soil seedbank.

Herbicide Resistance in Velvetleaf

- Velvetleaf has evolved resistance to only one herbicide, atrazine.
  - *Even though atrazine (Group 5) resistance in velvetleaf is not widespread (confirmed in only four states), atrazine-resistant velvetleaf populations can be difficult to control in corn-soybean rotations.*
- Although no confirmed populations of glyphosate-resistant velvetleaf have been documented, the prevalence of velvetleaf in Roundup Ready® soybean fields and anecdotal observations suggest velvetleaf populations are not always effectively controlled with glyphosate.
  - *Glyphosate activity on velvetleaf can be reduced because of high concentrations of calcium on the leaf surfaces that can affect glyphosate. This can be overcome by tank-mixing ammonium sulfate at 8.5-17 lbs. per 100 gallons of spray solution with glyphosate.*
- Though populations of herbicide-resistant velvetleaf are currently minimal, continued use of just one herbicide site of action will likely lead to more control failures and more examples of resistance.

Management of Velvetleaf in Soybeans

1. **Consider cultural practices.** Cultural practices, such as the ones listed below, can help make soybeans more competitive with velvetleaf and improve the consistency of any herbicide program.
   - *These practices include altering planting date relative to weed emergence, planting soybeans in narrow rows and using higher seeding rates for greater crop competition. Implementing crop rotations with small grains also disrupts the life cycle of velvetleaf, limiting its future success.*

The plant gets the name velvetleaf from the characteristic velvety appearance and feel of the leaves and stems. The leaves are large and heart-shaped.

Photo Credit: Purdue University

Continued

Table 1. Soil-applied herbicides for good control of velvetleaf.

Herbicide	Group #
Authority® Assist/First/MAXX/XL	2 & 14
Authority® MTZ	5* & 14
Boundary®	5* & 15
Canopy®/Canopy Blend	2 & 5*
Canopy® EX	2 & 2
Command®	13
Envive®, Enlite®	2 & 2 & 14
Fierce® XLT	2 & 14 & 15
FirstRate®	2
Metribuzin	5*
Pursuit®, OpTill®, OpTill® PRO	2, 2 & 15, 2 & 15 & 14
Python®	2
Scepter®	2
Surveil®	2 & 14
Sonic®	2 & 14
Synchrony® XP	2 & 2
Trivence®	2 & 5* & 14
Valor® XLT/Rowel® FX	2 & 14

*Atrazine resistance in velvetleaf is metabolism-based, therefore cross-resistance has not been found to other Group 5 herbicides.

2. **Control existing weeds at planting.** Velvetleaf plants present at soybean planting must be managed with tillage or effective burndown herbicide(s). Do not plant into existing stands of velvetleaf.
   - *The consistency of velvetleaf control is improved with the addition of 2,4-D ester at 1 pt./A., Sharpen® at 1 fl. oz./A. or Aim® at 1 fl. oz./A.to either glyphosate or Gramoxone® in the burndown application.*
   - *Note: A minimum of seven days is required between 2,4-D ester application and soybean planting.*
   - *Effective soil-applied, residual herbicides can be included with the burndown herbicide application.*
3. **Apply an effective soil-applied, pre-emergence herbicide.** Many soil-applied herbicides provide good to excellent control of velvetleaf.
   - *Apply the full rate of an effective soil-applied herbicide prior to or soon after soybean planting (Table 1).*
4. **Make timely postemergence herbicide applications.** Postemergence herbicide applications following a soil-applied treatment are generally the most effective for velvetleaf control. Table 2 (see reverse side) lists postemergence herbicide options and use rates for effective velvetleaf control.
   - *The effectiveness of postemergence herbicides is often determined by velvetleaf size.*
   - *Velvetleaf can be difficult to control with glyphosate and other postemergence herbicides when applications are made between late evening and early morning. Velvetleaf leaves drop to a nearly vertical position during this time, making herbicide leaf coverage not as effective.*
   - *Environmental stresses, such as drought, flooding and cold, can also affect herbicide efficacy in velvetleaf as these stresses cause velvetleaf leaves to angle downward.*
5. **Scout fields 10 to 14 days later for effectiveness.** If velvetleaf escapes initial control, a second postemergence application of herbicide can be applied. However, these are "rescue" treatments and will increase the selection pressure for the evolution of herbicide resistance.

- *Weeds not controlled with a second application of the same active ingredient should be tested for herbicide resistance.*

Continued ▶

Table 2. Postemergence herbicide options for velvetleaf control based on size.

Herbicide	Group #	Product rates based on velvetleaf size		
		less than 4 inches	less than 6 inches	greater than 6 inches
Anthem®	14 & 15	6 fl. oz.	6 fl. oz.	6 fl. oz.
Basagran® 4L	6	2 pt.	2 pt.	–
Cadet®	14	0.6 fl. oz	0.6 fl. oz	0.6 fl. oz
Classic®	2	0.75 oz.	0.75 oz.	–
FirstRate®	2	0.3 oz.	0.3 oz.	–
Harmony® SG	2	0.12 oz.	0.12 oz.	–
Marvel®	14 & 14	7.25 fl. oz.	7.25 fl. oz.	7.25 fl. oz.
Raptor®	2	5 oz.	–	–
Resource®	14	4 fl. oz.	6 fl. oz.	6 fl. oz.
Synchrony® XP	2 & 2	0.5 oz.	0.5 oz.	–
LibertyLink® soybeans				
Liberty®*	10	29 fl. oz.	36 fl. oz.	–
Roundup Ready® soybeans				
Glyphosate*	9	0.75 lb. ae**	1.5 lb. ae	1.5 lb. ae

*Ammonium sulfate should be added to the spray mixture for effective control.
**Acid equivalent.

For more information and links to additional resources, visit ***www.IWillTakeAction.com.***

Technical editing for this publication was led by Christy Sprague, Ph.D., Michigan State University, in partnership with researchers from other universities in the soybean-growing regions of the United States. Take Action is supported by BASF, Bayer, Dow, DuPont, FMC, Monsanto, Syngenta, Valent and corn, cotton, sorghum, soy and wheat organizations. The United Soybean Board and all Take Action partners, including the companies mentioned above, neither recommend nor discourage the implementation of any advice contained herein, and are not liable for the use or misuse of the information provided.

Brought to you by the soy checkoff.

Take ACTION Herbicide-Resistance Management