

DIFFICULT TO CONTROL WEEDS IN CORN, SOYBEAN, AND ALFALFA

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Abstract:

A number of problem weeds continue to limit row crop production. Shifts or changes in the abundance and types of weeds within agricultural systems are commonplace. These shifts can occur for a number of reasons and may result from cultural, mechanical, or chemical weed management strategies. The right combination of weeds and relying too heavily on any one practice is often the most common cause of these shifts. The adoption of Roundup Ready soybeans has helped manage numerous weeds, but a number of problem annuals and perennials still demand our attention. Some of the weeds discussed in this paper will include the annual broadleaves burcucumber, common lambsquarters, and glyphosate-resistant horseweed (or marestalk). Burcucumber and common lambsquarters continue to cause problems each year, while glyphosate-resistant horseweed is a new problem weed to watch for. Large crabgrass, smooth crabgrass, and yellow foxtail, are more prevalent in some regions. The later season of these annual grasses or prolonged emergence periods make them special problems. Finally, perennial weeds including horsenettle, mugwort, yellow nutsedge, and wirestem muhly, earn some attention. These weeds are either new problems or continue to present a challenge to many grain and forage producers. This presentation will attempt to focus on these weeds and perhaps others that continue to be challenging and will draw attention to specific management opportunities.

Biology and control of selected problem weeds

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Annual broadleaves

Burcucumber (*Sicyos angulatus*) is becoming a serious weed problem in agronomic crops throughout the Northeast. Originally found along stream banks and other damp, shady areas, burcucumber has invaded river bottoms and upland fields. Burcucumber control is challenging since its germination and growth habits are not fully understood. Burcucumber is a summer annual dicot with vine-like, branched stems that can grow several meters long. Burcucumber seeds germinate from mid-May through September. Because burcucumber germinates throughout the season, it is difficult to control with herbicides that lack residual activity. Unfortunately, few soil residual herbicides available for use in corn or soybeans provide effective burcucumber control.

Glyphosate-resistant horseweed (marestalk — *Conyza canadensis*) is classified as a winter or summer annual and has typically been a problem weed in no-till crop production. Horseweed is similar to fleabanes in appearance and is often one of

the first species to invade abandoned fields. The leaves on immature plants form a basal rosette, which eventually elongates and bolts, producing a dense panicle-like flowering structure. Numerous small flowers make up the floral structure and each flower produces numerous seeds or achenes that are wind dispersed. Glyphosate resistant horseweed has been identified in several areas of the U.S. and appears to be increasing in prevalence. Thus far, most of the problem areas for this resistant strain use no-till production and Roundup Ready crops. In no-till, alternative burndown strategies that rely on products other than glyphosate are necessary to control glyphosate resistant horseweed. Optimum application timing and herbicide mixtures are critical for successful control.

Triazine-resistant (TR) common lambsquarters (*Chenopodium album*) drives weed control in corn in the Northeast. In a recent survey, 80 percent of livestock farmers in Pennsylvania had TR common lambsquarters on their farm. Common lambsquarters occurs across tillage systems and continues to thrive in numerous production systems. Common lambsquarters is a summer annual that grows rapidly and can adapt to many environmental conditions. High seed production and seed longevity ensure the continued presence of seedlings for years after a population is controlled. Like most annuals, the best control method is to prevent infestation and spread by minimizing seed production. Fortunately, a number of effective herbicides are available for lambsquarters control in corn and soybeans.

Annual grasses

Smooth and large crabgrass (*Digitaria* species) are increasingly common annual grasses in northeastern row crops. In corn, ALS-based postemergence programs may have helped shift fields away from the

foxtails to more problems with crabgrass. Postemergence control of crabgrass in corn is very difficult. Crabgrass seeds can germinate from mid-spring to late summer, but often emerge after other summer annual weeds have been controlled. Crabgrass control requires several years of conscientious adherence to an effective management program. The basic principle is to prevent reinfestation by seed. Several of the preemergence grass herbicides are fairly effective, but may require supplemental postemergence control.

Yellow foxtail (*Setaria glauca*) appears to be increasing in prevalence in many areas of the Northeast. Originally from Europe, yellow foxtail is found throughout the U.S. and Canada. Of the three foxtails (yellow, green, and giant), yellow is probably the easiest to identify because of the prominent white hairs near the base of the leaf blade. The rest of the blade is hairless. The seed head has prominent yellow awns that distinguish it from giant and green foxtail. In the Northeast, yellow foxtail is escaping control in corn a way similar to crabgrass, especially in some of the postemergence ALS-based herbicide programs. Yellow foxtail seems to emerge later and for a longer period than the other foxtails. Also, yellow foxtail seed is larger than the other foxtails, which may provide earlier season vigor and reduce the effectiveness of some preemergence herbicides. Like other annual grasses, the basic principle is to prevent reinfestation by seed. Several of the preemergence grass herbicides are fairly effective, but may require supplemental control postemergence.

Perennials

Horsenettle (*Solanum carolinense*) is a member of the nightshade family that reproduces by both vegetative means and through seed production. Horsenettle tolerates many commonly used herbicides in both corn and soybeans and is increasingly

prevalent in Roundup Ready soybeans in some areas. Although not considered extremely competitive, severe infestations can rob crop yields and cause harvesting difficulties in soybeans. Like many other members of the nightshade family, horsenettle is poisonous to livestock and can be a problem in silage or hay crops. Like most herbaceous perennials, a well-timed, effective, systemic herbicide in combination cultural and mechanical controls can reduce the incidence of horsenettle.

Mugwort (*Artemisia vulgaris*) is increasingly prevalent in row and ornamental crops. Mugwort is a creeping herbaceous perennial that primarily reproduces through vegetative means. Mugwort growth begins in late April or early May in Pennsylvania, and can grow to 4 or 5 feet by mid-summer. Mugwort tolerates most systemic herbicides typically used in row crop production. Several products, including glyphosate, can effectively reduce above-ground growth, but underground control of vegetative structures remains difficult. An integrated approach that combines herbicides, tillage, and cultural controls is necessary to suppress mugwort growth and reproduction.

Wirestem muhly (*Muhlenbergia frondosa*) is a perennial grass species that can be a problem in conservation tillage production systems. It is a particular problem in no-till corn and soybean crops, but can also be troublesome in orchards, nursery and vegetable crops, roadsides, and

other areas. Wirestem muhly is a warm-season grass that begins growth in late spring and goes dormant in early fall. Wirestem muhly stems are branched and stiff, giving the plant a wiry appearance. Wirestem muhly produces abundant viable seed and has an extensive root system of short, thick, and scaly rhizomes. With few exceptions, corn herbicides are not effective wirestem muhly control. However, glyphosate and several of the post-graminicides (ACCase), effectively kill wirestem muhly. A well-timed application of an effective systemic herbicide can reduce wirestem muhly infestations for several years.

Yellow nutsedge (*Cyperus esculentus*) is member of the sedge family that reproduces vegetatively through rhizomes, tubers, and seed. Vegetative reproduction is considered the most important avenue for yellow nutsedge's spread within a field. One plant can produce several hundred to several thousand tubers during a single growing season. The chloroacetamide herbicides have been widely used over the last 10 years to help manage this weed in corn and soybeans, but with the widespread adoption of Roundup Ready soybeans and more frequent use of postemergence strategies in corn, nutsedge populations have increased in some fields. Effective management of yellow nutsedge requires an effective pre- or postemergence herbicide treatment generally combined with mechanical and cultural controls.

Table 1. Life cycle, brief description, and control for selected problem weeds.

Life cycle	Weed	Scientific name	Description	Control
Annual grasses	Crabgrass, large	<i>Digitaria sanguinalis</i>	Leaf sheath and blade densely hairy with membranous ligule. Leaf blade short and stout compared to other grasses.	Should be controlled preemergence in Corn. Prowl helps control. In soybeans, most post-grass herbicides effective.
	Foxtail, Yellow	<i>Setaria glauca</i>	Leaf blade with long hairs near base of collar, otherwise hairless. Hair-like ligule.	Later germinating. May need higher rate of preemergence herbicide application. Apply most post-grass products a little earlier than normal.
Perennial grasses	Wirestem muhly	<i>Muhlenbergia frondosa</i>	Membranous ligule, smooth flat leaf blade. Close internodes and smooth leaf blades. Scaly rhizomes.	No good preemergence herbicides[[?]] available. Products containing Accent will suppress weed in corn. Roundup very good in RR corn. Post-grass soybean products good.
	Nutsedge, yellow	<i>Cyperus esculentus</i>	Grass-like stem is triangular, leaves are smooth, hairless and deeply keeled. Whole plant is yellowish to pale green. Tubers or nutlets on tips of rhizomes	Chloroacetamides good for suppression with adequate rainfall. Sutan or Eradicane good. Mesotrione also good applied preemergence or postemergence. Permit postemergence in corn or Classic or Basagran in soybeans.

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				Roundup fair in RR crops.
Annual broadleaves	Burcucumber	<i>Sicyos angulatus</i>	Club-shaped cotlydons and five pointed leaves, alternate. Vining. Seed or burs in clusters.	No good preemergence treatments available. Balance and mesotrione (Callisto) suppress and keep atrazine rates as high as possible. Exceed, Spirit, or Beacon in corn. Classic or Roundup in soybeans.
	Horseweed (marestail)	<i>Conyza canadensis</i>	Similar to fleabane. May act like a winter or summer annual. Typically emerges from fall to early spring. Bolts and produces numerous small seeds that are dispersed by wind	Problem weed of no-till. Apply burndown herbicides to small rosettes for most effective control. Include 2,4-D or Banvel in the tank-mix. Amplify or FirstRate preemergence or early postemergence in soybeans. Glyphosate resistant horseweed increasing in prevalence.
	Lambsquarters, common	<i>Chenopodium album</i>	First true leaves appear opposite, later alternate. Leaves covered with mealy-like substance. Plants produce numerous viable seeds.	Problem in tilled and no-till systems. Use effective soil applied program or control postemergence when in seedling stage. More difficult to kill with maturity and following periods of stress (heat/drought).

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Perennial broadleaves	Horsenettle	<i>Solanum carolinense</i>	Leaves are opposite, stem and petioles have spines or thorns. Flowers have white petals and berries.	Spray in the fall following wheat with Banvel. Include fall tillage where possible. Spray with Roundup+Banvel in RR corn, or include suppressive treatment in corn or soybeans.
	Mugwort	<i>Artemisia vulgaris</i>	Clump forming perennial. Aromatic. Young leaves are opposite, then alternate with white, wooly hairsbeneath. Seed production is rare.	Spray in the fall following wheat with Roundup, Banvel, etc. Include fall tillage where possible. Spray RR crops with Roundup, or include suppressive treatment in corn or soybeans.