UNIVERSITY OF DELAWARE | Cooperative Extension
COLLEGE OF AGRICULTURE & NATURAL RESOURCES

Weed Facts WF-5

Johnsongrass Control in Field Crops and Commercial Vegetables

Drawing from WEEDS OF THE NORTH CENTRAL STATES, University of Illinois Urbana-Champaign, Bulletin 773

Johnsongrass (*Sorghum halepense*) is an extremely competitive perennial grass that commonly reaches heights of 7 to 9 feet and forms thick, dense patches in fields and roadsides. Johnsongrass reproduces by seed and by its scaly, jointed rhizomes. Johnsongrass was introduced into the United States in the 1780s from the Mediterranean region.

Many biotypes of johnsongrass vary in morphology. Also, johnsongrass can cross with other *Sorghum* species, resulting in plants that are difficult to identify accurately.

Emerging johnsongrass seedlings often have a purplish tint and the first leaf is 1 inch long. Johnsongrass ligules are membranous, measuring 0.25 inch long, and have ragged hairy upper edges. The first true leaf is smooth and green, 0.5 to 0.75 inch long and 0.25 inch wide. The leaf blades are creased, and the leaf mid-rib on older leaves is quite prominent.

The ribbed leaf sheath, conspicuous mid-rib, a large purplish seed head, and the extensively creeping rhizomes are distinguishing characteristics of johnsongrass.

The principal means through which johnsongrass is spread from field to field is by seed. Spread within a field is accomplished through both seed and rhizome production. A johnsongrass plant produces 100 to 400 seeds per seedhead. The seeds can remain viable in the soil for as long as three years. Up to 10% of the seeds can withstand ensilage and passage through an animal's digestive system. Seeds can germinate and seedlings emerge from a depth of 6 inches, but most arise from a depth of 2 to 3 inches or less.

Johnsongrass plants developing from seed begin to emerge when soil temperature approaches 57°F and the optimum germination temperature is 75°F. Plants that emerge when the soil temperature is 75°F can flower in six weeks and have viable seeds two to three weeks later. Seedling johnsongrass can produce rhizomes as early as three weeks after emergence. Johnsongrass produces 90% of its rhizomes after flowering. When johnsongrass plants reach the boot stage, rhizomes can comprise

25% of the plant's weight. With this rapid growth, a single plant can produce more than 100 stems, several thousand seeds, and over 100 feet of rhizomes in a five to six month growing season.

Most of the rhizomes are found in the top 8 inches of soil. Rhizomes are thick and scaly. The vast rhizome system largely accounts for the difficulty in controlling johnsongrass. In addition, johnsongrass has a fibrous root system and can develop roots at nodes on lower stems that come into contact with the soil.

Decaying johnsongrass rhizomes release chemicals that can inhibit the growth of other plants. Rhizomes will die if exposed to freezing temperatures for a few hours or become dehydrated. Small rhizome segments are more susceptible to dehydration than larger segments. Also, johnsongrass harbors several dozen crop pests including viruses, bacteria, fungi, nematodes, and insects.

Pursuant to the provisions of Title 3, Chapter 24 of Delaware Code, the Delaware Department of Agriculture under its Rules and Regulations has declared johnsongrass a noxious weed. Designation as a noxious weed requires that johnsongrass must be controlled.

A noxious weed is a plant that has adverse effects on or threatens agricultural production. A plant is designated as "noxious" by the U.S. or Delaware Departments of Agriculture. An attribute of a noxious weed is that it is difficult to control with many 'standard' weed control programs. Often fields infested with a noxious weed need special attention and require different management than non-infested fields.

Growers who have noxious weeds can call Todd Davis, noxious weed specialist, at Delaware Department of Agriculture to sign a compliance agreement. Failure to control this weed can result in fines of $25 per acre ($100 minimum).

Noxious weeds can be reported to Mr. Davis at 1-800-282-8685. He will contact the owner or agency to work on developing a control program. Noxious weeds also must be controlled on right-of-ways, lots and undeveloped lands as well as farmland.

PREVENTION

Moving equipment, primarily tillage equipment, can spread johnsongrass rhizomes within a field or from field to field. Johnsongrass is a prolific seed producer and these seeds can be spread by many means. Of particular importance is its spread by seeds carried in crop-harvesting equipment. Proper cleaning of equipment requires use of an air compressor, pressure hose, or sweeping. Letting the equipment run to clean itself out is not adequate.

Another important means of infestation is the planting of soybean seed from infested fields. Growers should always buy certified seed. Or if saving seed or buying from a neighbor, they should be familiar with the fields where the seed was grown. Be sure the soybean seed is not contaminated with johnsongrass seed. Johnsongrass in field edges and roadsides can be a source of seed. Make sure weeds in areas outside the field are controlled.

Seedlings vs. Rhizomes

Management of johnsongrass requires control of both plants originating from seeds (seedlings) and plants originating from rhizomes (rhizome johnsongrass). Rhizome johnsongrass is more difficult to control in the early growth stages than seedling johnsongrass and often requires repeated treatments for adequate control. Seedling johnsongrass becomes perennial in nature by the time it reaches 12 to

18 inches in height and should be treated as a perennial at this stage. Conventional tillage systems break the rhizome system into small pieces, making it easier to control. Conventional tillage systems also allow for soil-incorporated herbicides, which are more effective for rhizome johnsongrass control then surface applied herbicides.

CONTROL IN CORN

Effective johnsongrass control can now be achieved in field and silage corn production. Control of both seedling and rhizome johnsongrass can be expected in corn when sprayed with products containing glyphosate or Accent Q. These products are applied postemergence.

Conventional tillage systems offer more opportunities for effective rhizome control. Breaking up the rhizome system with tillage makes the johnsongrass more susceptible to soil-applied herbicides. If no-till planting of corn is the only option, then split applications of postemergence herbicides may be required to achieve satisfactory control. A high clearance sprayer may be needed to employ a split application method in corn.

Preplant or Preemergence Control

Johnsongrass emerged in no-till fields prior to planting should be sprayed with glyphosate at 1 to 2 qt/A depending on johnsongrass size. Johnsongrass control requires postemergence herbicides.

Postemergence Control

The table on the following page lists herbicides that can be used at labeled rates and according to label directions to control emerged johnsongrass plants. Complete johnsongrass control may require multiple or split applications of some products or follow-up applications with other products. See labels for details.

Rhizome johnsongrass control with Accent Q is often improved when applied as sequential treatments. Accent Q is very effective for seedling johnsongrass control with single applications.

Always consult herbicide labels for the proper adjuvants to use. When tank-mixing products, different adjuvants may be required. Consider whether tank-mixes, split applications or follow-up applications that are recommended on the label would be preferred to using a single product or timing. Other important considerations are crop variety, soil insecticide interactions, environmental conditions, herbicide volatility or drift to sensitive crops, crop health and stage, crop rotation, and grazing and feeding intervals. All of this information is available on the herbicide label.

		Corn growth stage maximum size or range		**Maximum size-johnsongrass**			**Efficacy rating[a]**	
Herbicide	**Herbicide Group**	**Broadcast**	**Directed**	**Sdlng.**	**Rhizo.**	**Rate/A**	**Sdlng.**	**Rhizo.**
Accent Q[b]	2	V6 or 20 in	V10 or 36 in	12 in	18 in	0.67 oz	E	G-E
Steadfast Q[b]	2 + 2	V5 or 20 in	n/a	12 in	12 in	0.75 oz	E	G-E
Stout[b]	2 + 2	V5 or 16 in	n/a	12 in	18 in	0.75 oz	E	G-E

Herbicide	Herbicide Group	Corn growth stage maximum size or range		Maximum size-johnsongrass		Rate/A	Efficacy rating[a]	
		Broadcast	Directed	Sdlng.	Rhizo.		Sdlng.	Rhizo.
Basis Blend[b]	2 + 2	V2 or 6 in	n/a	✱✱	✱	0.33 oz	F-G	F
Northstar[b]	2 + 4	V6 or 4-20 in	20-30 in	12 in	16 in	5 oz	E	G
Glyphosate products[c]	9	V8 or 30 in	n/a	18 in	head	1 qt	E	G
Liberty[d]	10	through V5	n/a	3 in	not specified	22 to 32 oz	F-G	N
Impact or Armezon	27	up to 45 days pre-harvest	as needed	4 in	n/a	0.75 to 1 oz	P-F	N
Laudis	27	up to V8	n/a	5 in	n/a	3 oz	P-F	N
Capreno[b]	2 + 27	V6	n/a			3 oz	F	F

✱ Experience in the Mid-Atlantic region indicates activity with this herbicide on up to 6-inch tall johnsongrass, although rhizome johnsongrass is not listed on the label.

✱✱ Experience in the Mid-Atlantic region indicates activity with this herbicide on up to 4-inch tall johnsongrass, although seedling johnsongrass is not listed on the label.

[a]E = Excellent (>90% control) G-E = Good to Excellent G = Good (80-90% control)
F-G = Fair to Good F = Fair (60-80% control) N = None (<20% control)

[b]Accent Q, Basis Blend, Capreno, NorthStar, and Steadfast labels all contain restrictions concerning soil insecticide use. Follow label restrictions carefully or serious crop injury may occur.

[c]Glyphosate is the active ingredient in all Roundup formulations. Glyphosate is also available under many other names and as part of numerous prepackaged mixtures. The rate given in the table is for glyphosate with a formulation of 4 lb ai (3 lb ae) per gallon. Adjust the rate for other formulations. All glyphosate products require the use of glyphosate-resistant corn hybrids. Using these products on corn hybrids that are not glyphosate resistant will seriously injure or kill the crop.

[d]Liberty requires the use of glufosinate-resistant corn hybrids. Using this product on corn hybrids that are not glufosinate resistant will seriously injure or kill the corn crop.

When a postemergence treatment is expected for johnsongrass control, select corn hybrids that are resistant to maize dwarf mosaic virus (MDMV) and maize chlorotic dwarf virus (MCDV).

CONTROL IN SOYBEANS

Effective options exist for johnsongrass control in soybeans. One option is the use of a soil-incorporated residual grass herbicide followed by a postemergence grass herbicide. Another option is to apply one of the postemergence grass herbicides 18 to 21 days after planting and repeat if needed. This is a cost-effective program but timing is critical.

Preplant incorporated herbicides

The following herbicides can be used at labeled rates and according to label directions.

Herbicide	Rate/A	Efficacy rating[a]	
		Sdlng.	Rhizo.
Prowl[b]	1.2 to 3.6 pt	G	P
Prowl H_2O[b]	1.5 to 3.0 pt	G	P
Treflan[b]	1 to 2 pt	G	P

[a]G = Good (80-90% control) F = Fair (60-80% control) P = Poor (20-60% control)
N = None (<20% control)
[b]Prowl, Prowl H_2O, and Treflan will need the addition of a broadleaf herbicide for broad-spectrum control.

Postemergence Control

There are several highly effective postemergence herbicides available for control of both seedling and rhizome johnsongrass. The following herbicides can be used at labeled rates and according to label directions to control emerged johnsongrass plants. Sequential or follow-up applications are often needed to provide adequate johnsongrass control.

Herbicide (Group Num.)	Maximum johnsongrass size or range and Rate/Acre: Seedling johnsongrass Size	Seedling johnsongrass Rate	Rhizome johnsongrass Size	Rhizome johnsongrass Rate	Sequential applic. to rhizome Size	Sequential applic. to rhizome Rate	Efficacy rating[a] Sdlng.	Efficacy rating[a] Rhizo.
Fusilade DX (1)	2-8 in	6 oz	8-18 in	16-24 oz	6-12 in	12-24 oz	E	G-E
Select (1)	4-10 in	6-8 oz	12-24 in	8-16 oz	6-18 in	6-8 oz	E	G-E
Select Max (1)	4-10 in	12-16 oz	12-24 in	16-24 oz	6-18 in	12-16 oz	E	G-E
Targa or Assure II (1)	2-8 in	5-8 oz	10-24 in	10-12 oz	6-10 in	7 oz	E	G-E
Poast (1)	8 in	16 oz	25 in[b]	24 oz	12 in	16 oz	E	G
Glyphosate products[c] (9)	18 in	2 pt	boot to head	2-3 pt	boot to head	1-2 pt	E	G
Liberty[e] (10)	5	29-36 fl oz	not specified	29-36 fl oz	not specified	29-36 fl oz	F-G	P[d]

[a]E = Excellent (>90% control) G-E = Good to Excellent G = Good (80-90% control)
F-G = Fair to Good F = Fair (60-80% control) P-F = Poor to Fair P = Poor (20-60% control)
[b]Maximum height in no-till is 20 inches.
[c]Glyphosate products require the use of glyphosate-resistant soybean varieties. The rate given in the table is for glyphosate with a formulation of 4 lb ai (3 lb ae) per gallon. Adjust the rate for other formulations. Using these products on soybean varieties that are not glyphosate resistant will seriously injure or kill the soybean crop.
[d]Suppression only.
[e]Liberty requires the use of glufosinate-resistant soybeans. Two postemergence applications of Liberty can be used; max rate per application is 36 fl oz and total application cannot exceed 65 fl oz.

Assure II, Targa, Fusilade DX, Select, Select Max, and Poast, are very safe to soybeans, but do not provide any broadleaf weed control. If broadleaf weeds are present, consult the grass herbicide's

label for the best procedures to follow. Tank-mixing broadleaf herbicides with the postemergence grass herbicides can result in antagonism (lack of control).

Always consult herbicide labels for the proper adjuvants to use. When tank-mixing products, different adjuvants may be required. Other important considerations that are addressed on the herbicide label are crop variety, environmental conditions, crop health and stage, and crop rotation.

Rescue Treatment

A 33% solution of glyphosate can be applied to johnsongrass plants through a wiper applicator when the johnsongrass plants are at least 12 inches taller than the crop.

Cultivation

Cultivation in combination with herbicide application can increase the overall level of control. Do not cultivate 7 days before treatment or until 7 days after treatment. When cultivating, care must be taken to avoid bringing soil not treated with an herbicide near the soil surface, thereby reducing the opportunity for seeds to germinate and seedlings to emerge. If johnsongrass is localized in the field, check cultivator tines when leaving a johnsongrass patch to be sure that rhizomes are not being spread to other parts of the field.

CONTROL IN GRAIN SORGHUM

Because johnsongrass and sorghum are so closely related, there are no satisfactory broadcast treatments currently available for controlling johnsongrass in grain sorghum. The only alternative available for rhizome johnsongrass control is spot spraying (see spot spray control below). Grain sorghum should not be planted in fields where johnsongrass infestations are too heavy to control with spot treatments, or in fields where johnsongrass has produced seed in recent years.

CONTROL IN PASTURE AND FORAGE

An excellent opportunity to control johnsongrass is during pasture renovation. Apply glyphosate at 2 qt/A. Thorough coverage of foliage is essential. Higher rates of glyphosate may be required to control other weeds or sod present.

There are no satisfactory broadcast treatments currently available for controlling johnsongrass in permanent pasture. The only alternative available for rhizome johnsongrass control is spot spraying (see spot spray control below). Mowing may be an appropriate alternative to chemical control. Allowing the plants to regrow between mowing helps to deplete the root reserves, and mowing should take place before the plants produce seed. To deplete root reserves enough to reduce johnsongrass stands, mowing should take place every three weeks.

Glyphosate will control emerged seedling johnsongrass when applied prior to establishment of alfalfa, ladino clover, and red clover. Apply glyphosate at 1 qt/A. Thorough coverage of foliage is essential. Higher rates of glyphosate may be required to control other weeds or sod present. Eptam at 3.5 to 4.5

pt/A preplant incorporated will suppress seedling johnsongrass when establishing alfalfa, ladino clover, and red clover in conventional tillage systems.

Select (6 to 8 oz/A) or Poast (1.5 pt/A) will provide excellent postemergence control of seedling johnsongrass and good control of rhizome johnsongrass. Select is preferred for rhizome johnsongrass control.

Always consult herbicide labels for surfactants to use, appropriate weed and crop stages, grazing, feeding, haying, and slaughter intervals, and other restrictions.

CONTROL IN VEGETABLE CROPS

Successful johnsongrass control in vegetable crops can be obtained with timely management. It is important to recognize that control strategies for seedling and rhizome johnsongrass are often different, yet both can be equally important for a total control program.

Vegetable crops offer many opportunities to control johnsongrass either before planting, postemergence, or after harvest operations are complete. Many of the postemergence grass herbicides are labeled for various vegetable crops. Refer to the labels for those registered for use in your area.

The johnsongrass must be at the proper stage to obtain control with glyphosate. Johnsongrass should be 18 inches tall and in the boot to head stage of growth. Harvest operations will often cut the johnsongrass down to the soil level. It should be allowed to regrow to the proper height. Allow 7 days after application before any further tillage operations. One to three quarts of glyphosate (4 lb ai/gal) should be applied, depending on johnsongrass size and the amount of water applied.

SPOT-SPRAY CONTROL (Crop and Non-crop)

Spot treatment can be made in corn, soybeans, wheat, barley, oats, sorghum, forage, pasture, and non-crop areas. For small or localized areas, use the chart below and apply the recommended concentration on a spray-to-wet basis (1 gal/1000 ft^2) to provide thorough coverage. For larger areas, refer to the herbicide label for rates to apply on a per-acre basis. Mowing may be an appropriate alternative to chemical control, particularly in pastures and non-crop areas. Allowing the plants to regrow between mowing helps to deplete the root reserves, and mowing should take place before the plants produce seed. To deplete root reserves enough to reduce johnsongrass stands, mowing should take place every three weeks.

These products do not provide residual weed control; therefore, johnsongrass arising from seeds or unaffected rhizomes will continue to grow.

	Amount of herbicide to mix with various volumes of water[a]					
Gallons of water	Glyphosate[b]	Targa / Assure II	Fusilade DX	Poast	Select Max	Crop oil conc.[c]
100	2.5 qt	25 fl oz	30 fl oz	40 fl oz	40 fl oz	1 gal

Gallons of water	Amount of herbicide to mix with various volumes of water[a]					
	Glyphosate[b]	Targa / Assure II	Fusilade DX	Poast	Select Max	Crop oil conc.[c]
25	20 fl oz	6 fl oz	7.5 fl oz	10 fl oz	10 fl oz	1 qt
1	0.8 oz (1.6 Tbsp)	0.2 oz (1.4 tsp)	0.3 oz (1.8 tsp)	0.4 oz (2.4 tsp)	0.4 oz (2.4 tsp)	1⅓ oz (2½ Tbsp)

[a]Spot applications are based on spraying to wet leaves but not to the point of spray running off the leaves (estimated at 50 gal/A of spray volume).

[b]Add a surfactant as required by the label. Amount is based on a 4 lb ai (3 lb ae) formulation of glyphosate.

[c]Add a crop oil concentrate at 1% v/v to all the postemergence grass herbicides.

NOTE: Glyphosate will kill non-glyphosate resistant crops and the postemergence grass herbicides will kill any grass-like crops (corn, sorghum, pasture grasses, etc.) in the treated area. Take care to avoid drift outside the target area. These products do not provide residual weed control; therefore, johnsongrass arising from seeds or unaffected rhizomes will continue to grow.

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