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CONTROL JOHNSONGRASS

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Johnsongrass is found in every county of Virginia and is continuing to spread. At least 200,000 acres of productive cropland are infested with johnsongrass. It is a persistent, difficult, and costly weed to control. There is no single, practical method of eliminating this weed. However, economical corn and soybean production is possible by using suggested control procedures. Continued effort must be expended to prevent heavy re-infestation from occurring on cropland.

Johnsongrass is a very competitive weed, causing severe yield reductions in all crops. Its presence lowers the value of land. It also acts as an overwintering host for viruses which cause the maize dwarf mosaic complex disease in corn.

Johnsongrass plants look somewhat like corn plants, but have narrower leaves and white, fleshy rootstock (rhizomes). It is usually introduced into an area, or from one field to another, by seeds. The moving of rhizomes by tillage equipment also occurs. One plant can produce a pound or more of seed and up to 100 feet of rhizomes in one year. Seeds germinate about the same time as corn. Seeds are capable of remaining viable in the soil up to 10 years. The rhizomes live through two growing seasons, the year produced and the following season. New seedlings may develop and create problems even after all the rhizomes are killed. Continued effort must be expended each year to prevent land returning to severely infested conditions.

PREVENT THE INTRODUCTION AND SPREAD OF JOHNSONGRASS

Preventing an infestation of johnsongrass is far easier than trying to eradicate one already established. Suggestions for checking the spread of this weed are:

1. Use certified seed that is free of johnsongrass seed.
2. Clean combines, corn pickers, and other farm machinery of all seeds and/or rhizomes before moving them from infested to clean fields.
3. Do not let johnsongrass go to seed, particularly in waste areas such as fence rows and road banks.
4. Do not use hay, straw, or feed grains containing johnsongrass seed.
5. Do not spread manure from animals fed hay containing johnsongrass on a field having no johnsongrass.

I. Johnsongrass Control Programs for Cropland

With all of these programs, *follow each step carefully as outlined or poor control may result.*

A. Preplant incorporated herbicide use in corn and soybeans:

1. Basic procedures for most effective control--
 - a. Mold-board plow in the fall (preferred) or in the spring. During the winter, use a spring-toothed harrow or field-cultivate to move rhizomes to the surface where freezing and drying will aid in control.
 - b. Disk to cut rhizomes into short sections prior to treatment. Have the soil well worked (clods broken-up), dry enough to permit thorough mixing of herbicides, and in condition to plant.

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- c. Wait until the soil temperature permits some growth of johnsongrass.
 - d. Apply the correct rate of the suggested herbicide for your soil and crop. (See below).
 - e. Incorporate the herbicide immediately, or within the time suggested on the label. Use the equipment suggested and at the depth suggested on the label of the particular herbicide. Whenever possible, application and incorporation should be in one operation. If a tandem disk is used, set it to cut 4-6" deep and operate it at 4-6 mph, and cross disk for thorough incorporation. The tandem disk should be followed with a spike-toothed harrow or other leveling device which extends beyond the end of the disk. Usually requires two annual applications for effective control.
 - f. Crop may be planted immediately at the depth suggested for the specific crop.
 - g. Plan to shallow-cultivate to enhance control, or spot-treat with glyphosate (Roundup)*.
 - h. Use an effective seedling control herbicide on the crop in the succeeding year.
 - i. Follow directions on the herbicide label as to rotational crops that may be safely grown.
2. Corn herbicides for johnsongrass control--
- a. EPTC + safener 6.0 lb/A (Eradicane 7.3 pt/A)* or butylate 6.0 lb/A (Sutan + 7.3 pts/A)*.
 - b. Incorporate immediately after application.
 - c. Plant corn no deeper than 2 inches, immediately or within 2 weeks.
 - d. Early-maturing varieties are more susceptible to injury by these chemicals. Ascertain safe varieties from your seed dealer. Also, use maize-dwarf-mosaic-tolerant varieties.
 - e. Small grains may be seeded in September if EPTC is used.
 - f. For added broadleaf weed control, atrazine 1.0 - 1.6 lb ai or cyanazine 1.6 - 2.0 lb ai may be used tank-mixed; or make postemergence use of 2,4-D 0.5 lb ai.
3. Soybean herbicides for johnsongrass control, use one of the following--
- a. Fluchloralin 1.5 - 2.0 lb/A (Basalin 3.0 - 4.0 pt/A)*
 1. Incorporate within 8 hours of application.
 2. Do not graze treated fields and do not feed treated plant parts to livestock.
 3. Cover crops may be rotated if plowed-under and not grazed.
 - b. Profluralin 1.5 - 3.0 lb/A (Tolban 4E 3.0 - 6.0 pt/A)*
 1. Incorporate within 4 hours of application.
 2. Land treated with profluralin may be rotated to other crops in the fall when no more than 1.5 lb ai/A are used, and any crop can be planted the following spring if 2.0 lb ai/A are used.
 - c. Trifluralin 1.5 - 2.0 lb/A (Treflan EC 3.0 - 4.0 pt/A)*
 1. Incorporate within 24 hours of application.
 2. Do not plant soybeans deeper than 2 inches.
 3. Crop injury (delayed growth) may occur under adverse cool, wet weather conditions early in the season.
 4. In the season following either 1 or 2 years of treatment, plant only those crops for which trifluralin has been registered as a pre-plant treatment or injury may result.
 - d. Trifluralin 0.5 lb + vernolate 2.6 lb/A (Treflan EC 1.0 pt + Vernam 7E 3.0 pt/A)*
 1. This tank mix has been effective for johnsongrass rhizome suppression in test-plots for 4 years.
 2. Incorporate immediately after application.
 3. Do not plant soybeans deeper than 2 inches.

* Trade name - read and follow label instructions for safe and effective use.

B. Spot treatment of johnsongrass in corn and soybeans:

1. Glyphosate (Roundup)* is cleared for use in both crops--

- a. Use glyphosate 2.0 - 3.0 lb/A (Roundup 2.0 - 3.0 qt/A)* or 1-2% solution.
- b. Apply to actively growing foliage when most has reached the boot stage (seed heads emerging from leaf sheaths).
- c. Rainfall within 6 hours of application may reduce effectiveness.
- d. Avoid drift to prevent excessive crop kill and contact with desirable plants.
- e. Do not feed or forage treated foliage within 8 weeks.
- f. Do not plant subsequent crops other than those on the label (corn, soybeans, small grains, and sorghum) for 1 year following application.
- g. Do not apply after initial soybean pod set or after silking of corn.
- h. Application equipment -
 1. Hand sprayers - Roundup* 3-6 tbsp/one gallon of water.
 2. Power sprayer; hand guns - Roundup* 1-2 gal/100 gal of water.
 3. Rope wick applicators - Roundup* 1 gal to 2 gal of water. Useful in soybeans where the johnsongrass will be taller than the crop and infestation is not heavy.
 4. Recirculating sprayers - Useful where there is a differential in height. Ascertain the rate of water delivered per acre, assume all of solution is delivered to the weeds and use Roundup* 2.0 - 3.0 qts/A.

2. Ethylene glycol bis (trichloroacetate) (Glytac)* for use in soybeans only--

- a. Use Glytac* 1 qt to 5 gal of herbicide oil, #2 fuel oil, or diesel fuel.
- b. Apply when johnsongrass is about 12 inches tall, and spray lower stems of plants to run-off.
- c. Soybean plants that are sprayed will be killed.
- d. Do not apply after soybean seed pods have formed.
- e. Do not graze or feed seed from treated fields to livestock.

C. Johnsongrass control after corn harvest:

1. Glyphosate

- a. Remove corn stalks as ensilage or bush-hog all plant debris after corn harvest.
- b. Permit johnsongrass to reach 12-24 inches, at which time it will be at the early boot stage.
- c. Apply glyphosate 2.0 - 3.0 lb/A (Roundup 2.0 - 3.0 qts/A)* in 20-60 gal of clean water.
- d. Apply at least 2 weeks before frost.
- e. Do not till for 7 days after treatment.
- f. Rainfall within 6 hours may reduce effectiveness.
- g. Oats, wheat, or barley could be planted immediately after tillage.

* Trade name - read and follow label instructions for safe and effective use.

2. Dalapon for preplant control of johnsongrass rhizomes:

- a. In late spring, wait until johnsongrass reaches 8 to 12 inches in height and is vigorously growing.
- b. Use dalapon 5.2 lb ai (Dowpon, Basfapon 7 lb)* plus 0.5 pt of a nonionic wetting agent mixed in 40 gal of water per acre.
- c. Wait at least 3 days, then plow.
- d. After plowing, wait 18 days before planting sorghum and 5 or more days before planting corn or soybeans. If soil remains dry after plowing, delay planting for the times specified above after 0.5 inches of rainfall. Do not use on corn grown for seed.
- e. Disk 1 or 2 times during this waiting period.
- f. Do not graze livestock on treated areas during application season.
- g. Use a herbicide on the crop that will control johnsongrass seedlings.

II. Johnsongrass Control by Tillage and/or Chemicals

With all of these procedures, *follow each step carefully as outlined or poor control may result.* When row crops are returned to the field, use a herbicide that will selectively control johnsongrass seedlings, or be prepared to cultivate and hand-remove them.

A. Tillage:

1. Fall or winter tillage --

- a. Plow the johnsongrass in infested areas in the fall or early winter.
- b. Whenever the soil is dry enough to permit, use a spring-toothed harrow or cultivator to bring additional rhizomes to the surface. This will provide partial control of rhizomes by freezing and drying action. Seldom do we have sufficient cold to penetrate deep enough to kill all rhizomes.

2. Summer Fallow --

- a. In the spring or early summer, plow infested areas before johnsongrass growth reaches 9 inches in height.
- b. Disc, spring-tooth harrow, or field cultivate thoroughly at about 9 to 14 day intervals so that all top growth is killed and rhizomes are worked to the surface where they are killed by drying. Tillage should occur before new growth reaches 8 inches in height.
- c. If desired, grow a crop of winter small grain and then repeat the same treatment through the second year after the grain is harvested. Small grain competition in the early summer has been beneficial to the control of johnsongrass.
- d. If soil becomes too wet for proper tillage, it is advisable to apply dalapon as suggested in B.
- e. Do not give johnsongrass a chance to restore the food supply in its underground stems or to develop new ones.

* Trade name - read and follow label instructions for safe and effective use.

B. Chemical Plus Tillage:

Chemicals often give better control of the johnsongrass rhizomes and add little to the cost of tillage alone.

1. Dalapon --

- a. Allow the johnsongrass to grow in the spring or early summer until it reaches about 8 to 10 inches in height. This could be after the harvest of small grains and removal of straw.
- b. Spray with dalapon 3.7 - 5.2 lb/A ai (Dowpon, Basfapon 5 - 7 lb/A)* plus 0.5 pt of nonionic wetting agent in 40 gal of water per acre. Poor results occur when the johnsongrass is not actively growing, suffering from drought or cold, or is over mature.
- c. Repeat the application 10 to 14 days later. Apply at right angle to the first treatment.
- d. Plow the area about 3 weeks after the last treatment.
- e. Disk if any johnsongrass foliage grows more than 8 inches tall before killing frost.
- f. Follow use precautions on the label as to time that crops may be seeded after dalapon use.
- g. Observe the field closely in the early summer to ascertain the need for repeating the procedure the second year.
- h. Do not graze livestock on treated areas during application season.
- i. Use tillage the following spring prior to planting corn, cotton, sorghum, or soybeans.
- j. Use a preplant or preemergence herbicide for seedling grass control.

2. Glyphosate (may be used after small grain harvest or on non-crop land) --

- a. Maintain johnsongrass in vegetative stage until mid August by periodic chopping before 12-15" tall.
- b. Permit johnsongrass to reach boot to head stage in early September.
- c. Apply glyphosate 2-3 lb/A (Roundup 2-3 qts)*, mixed in 10-60 gal of clean water, to actively growing foliage.
- d. Allow 7 or more days after application before tillage.
- e. See section IB1.
- f. Do not permit new seedlings to grow over 8" before frost.

III. Suggested Rotations for Johnsongrass Control Programs

A. Continuous Corn:

<u>Year</u>	<u>Herbicide - (refer to above section)</u>
1	Eradicane* (IA 1,2) or Roundup* (IC)
2	Eradicane* (IA 1,2), spot treat with Roundup* (IB1)
3	Butylate + safener (Sutan +)* or Eradicane* at reduced rates for seedling johnsongrass control, and continue for 2-3 years. Look for any escaped plants, and spot treat with Roundup* (IB1)

* Trade name - read and follow label instructions for safe and effective use.

B. Small grains, soybeans, corn --

<u>Year</u>	<u>Herbicide - (refer to above section)</u>
1	For small grains after harvest, see chemical plus tillage, sections IIB1 or IIB2.
2	Soybeans (do not plant no-till soybeans). Basalin* (IA3a), Tolban* (IA3b), or Treflan + Vernam* (IA3d) and spot treat (IB1).
3	Corn - Eradicane* (IA1,2) and spot treat (IB1). Small grains may be seeded after September.

C. Continuous soybeans

<u>Year</u>	<u>Herbicide - (refer to above section)</u>
1	Treflan* (IA3C) Basalin* (IA3a), Tolban* (IA3b) or Treflan* + Vernam* (IA3d) followed by spot treatment.
2	Repeat.
3	Use 1-x rate of one above herbicides for johnsongrass seedling control.

IV. Johnsongrass Seedling Control in Crops

After a practice has effectively controlled rhizomes, plants developing from seed could cause heavy infestation within one year. An important part of any program is the prevention of this occurring by using a good seedling control material in subsequent years. The preplant incorporated herbicides are usually more reliable than the preemergence herbicides.

CROP	HERBICIDES LISTING SEEDLING CONTROL ON LABEL	
	<u>Preplant Incorporated</u>	<u>Preemergence</u>
alfalfa	benefin (Balan)*	none
	EPTC (Eptam)*	
	profuralin (Tolban)*	
corn	EPTC + safener (Eradicane)*	alachlor (Lasso)*
	butylate + safener (Sutan)*	metolachlor (Dual)*
		pendimethalin (Prowl)*
peanuts	benefin (Balan)*	alachlor (Lasso)*
	vernolate (Vernam)*	diphenamid (Enide)*
sorghum	none	none - dalapon as pre-pow only
soybeans	fluchoralin (Basalin)*	chloramben (Amiben)*
	pendimethalin (Prowl)*	chlorbromuron (Maloran)*
	profluralin (Tolban)*	oryzalin (Surflan)*
	trifluralin (Treflan)*	metribuzin (Lexone, Sencor)*
tobacco	benefin (Balan)*	diphenamid (Enide)*
	vernolate (Vernam)*	
	isopropalin (Paarlan)*	

* Trade name - read and follow label instructions for safe and effective use.

V. Scattered Clumps or Small Patches in Non-Crop Areas

- A. Dalapon (Dowpon, Basfapon)*: Use 1 lb of product plus 2 tbsp of a nonionic wetting agent to 10 gallons of water. Apply when actively growing. Wet all of the foliage when the johnson-grass first reaches 8 to 10 inches in height in the early summer or after repeat clipping and mowing. Apply a second treatment 10 to 14 days later. Dalapon acts mainly through the foliage. It has limited soil persistence. Repeat each time any new growth from seed or rhizomes occurs, or use appropriate tillage equipment to turn all of the green growth under. Do not graze meat or dairy animals on vegetation treated with dalapon.
- B. Sodium trichloroacetate (TCA): Use 1 to 1.5 lbs of TCA (Product) per gal of water to each 400 sq ft (20 ft by 20 ft). Thoroughly wet the foliage with the solution. The effectiveness of TCA is dependent upon rainfall to move it into the root zone. On sandy soils, heavy rainfall may carry TCA down below the rhizomes where it will result in poor control. Plowing or working the soil before application has given better results. The best time to apply is late fall or early spring. The soil will be sterilized for 2 to 6 months. Don't allow animals to graze treated land for at least 24 hours after treatment. Be prepared to control johnsongrass coming from seed.
- C. Sodium chlorate + fire retardant: (Monobor Chlorate, Ureabor, etc)* Use 1 lb of granular chlorate mixture to each 40 to 50 sq ft. Extend the treatment to cover an area 3 to 4 feet beyond the johnsongrass. This will permit the chemical to kill rhizomes extending under the soil surface. Keep animals off the treated area. It will persist in the soil for 1 year or more after treatment. Be prepared to control johnsongrass coming from seed the next growing season.
- D. Prometon, simazine, sodium chlorate, sodium metaborate mixture (Pramitol 5PS)*: Use 2 lb of product per 100 sq ft. Extend the treatment to cover an area 3 to 4 feet beyond the johnsongrass. Keep animals off the treated area. Keep area out of crop production for 6 or more years. Do not use within root zone of desirable trees or other plants or where the chemical may be washed or moved into contact with their roots.
- E. Glyphosate (Roundup)*: Use Roundup 2 - 3 qt in 20 - 30 gal of clean water per acre. It must be applied to actively growing foliage at the proper stage of growth. The most successful results have occurred with applications made from boot stage (seed heads just emerging from leaf sheaf) through seed maturity stage. Spray coverage of foliage should be uniform and complete. If area to be sprayed has been mowed or clipped during summer, allow regrowth to reach 12-24 inches before treating. Rainfall within a 6-hour period may decrease effectiveness. Unemerged leaf surface arising from seed or rhizomes after treatment will not be affected. The addition of surfactant will not enhance control. Avoid drift. Spray drift may injure or kill desirable plants and crops. Do not use this herbicide in galvanized (zinc coated) spray equipment.

Prevention is the most effective and cheapest way to control johnsongrass. Plan johnsongrass control into your cropping system. None of the above suggestions is a one-shot program. A combination of 2 or more of the above suggestions may be needed. Consider your cropping system and adapt the procedures to fit your system.

* Trade name - read and follow label instructions for safe and effective use.

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KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES.