

## WEED CONTROL

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### Roundup Ready Flex Cotton

Roundup Ready Flex cotton became commercially available in 2006. In Virginia, we included Roundup Ready Flex varieties (See Cotton Variety Trials section) in the 2006-2007 variety trials and examined crop tolerance and herbicide efficacy in 2004-2007. The advantage of this technology is that it will expand the window of opportunity for applying glyphosate past the four-leaf stage (current Roundup Ready technology limitation). A consideration for producers who adopt this technology is weed resistance. This system will increase the overall amount of glyphosate utilized in the cotton production system and thus increase the selection pressure for weed resistance. Resistance has been documented in several weed species including Palmer pigweed (*Amaranthus palmeri*), horseweed (*Conyza canadensis*), and common ragweed (*Ambrosia artemisiifolia*). In 2006, we documented the presence of Palmer pigweed in several cotton fields in Virginia. It would be negligent to assume that Virginia will not see weed tolerance in the upcoming years and it is critical that producers growing Roundup Ready Flex cotton utilize resistance management strategies (See Resistance Management section). For this publication, rates will be referred to utilizing the Roundup WeatherMax rates. Please refer to the label for rate conversions.

The current labeling for Roundup WeatherMax on Roundup Ready Flex cotton allows for a maximum of 5.3 quarts per season and a maximum rate for a single application at 32 ounces per acre. Preplant, preemergence, and at planting applications can total to a maximum of 3.3 quarts per acre. From ground cracking to 60 percent open boll, the maximum is 4 quarts per acre and from 60% open until 7 days prior to harvest, a maximum of 44 fluid ounces is permissible.

For effective weed control, glyphosate will need to be applied near the 1-, 6-, and 12-leaf stages. It is important to eliminate weeds when small, not holding off application to allow for greater emergence. Withholding application will result in 1) more difficult to control weeds and 2) potential yield losses due to competition. The timing of glyphosate applications can vary depending upon several factors including crop growth, use of other herbicide chemistries in combination with glyphosate, and weed emergence. Residual herbicides (See below) are recommended.

### Resistance management

In trials at Virginia Tech, the Roundup Ready Flex system has achieved exceptional weed control and there are several steps that should be taken to protect the value of this technology. First, growers should use effective burndown strategies, starting the season with clean fields. Residual herbicides should be utilized preemergence to aid in the control of glyphosate-tolerant species. The first in-season glyphosate application should occur around the first true-leaf stage to maintain clean fields. This will coincide with foliar insecticide applications for thrips control. Second applications applied prior to cutout should incorporate other chemistries if

problem weeds are present that glyphosate does not adequately control. At layby, a residual herbicide should be included where difficult to control weeds are present or if canopy closure is delayed. Do not apply glyphosate below the labeled rates. Other considerations for delaying weed resistance include proper crop rotations to eliminate suspected weeds and alternating herbicide-tolerance technologies (Liberty Link).

## Glyphosate Resistant Horseweed

Glyphosate resistant horseweed (marestail) has been reported in numerous Virginia cotton fields. Horseweed emergence occurs both in the fall and the spring. It should be controlled during the rosette stage (early spring). A burndown treatment applied in early March of glyphosate mixed with either 1.5-2.0 pt of 2,4-D (3.8 a.e./gal formulation) or 0.5 pt Clarity should be used to control glyphosate resistant horseweed. Applications of 2,4-D must occur 30 days before planting. Clarity should be applied 21 days before planting and one inch of rainfall must accumulate prior to planting. To reduce spring emergence, the preemergence residual herbicide Valor can be applied with the burndown treatment in early March. Research has demonstrated that Cotoran applied preemergence is an effective means of controlling late emerging horseweed.

Gramoxone and Direx with crop oil concentrate can provide fair to good control of glyphosate-resistant horseweed if applied under warm temperatures (greater than 70 degrees). This mixture should be applied at least 45 days before planting.

Ignite 280 will provide burndown control of spring emerged glyphosate-resistant horseweed and can be applied up to planting. It should be applied at a minimum rate of 30 oz when temperatures are at least a minimum of 75°.

Table 21. Preplant incorporated.

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Pendimethalin 0.5-0.75 lb/A	Prowl 3.3EC 1.2-1.8 pt or Prowl H <sub>2</sub> O 1.1-1.6 pt	Apply and incorporate 1-2 inches deep within 7 days after application. Follow label for proper soil incorporation procedures. Lower rate is safest to cotton.
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Trifluralin 0.5-0.75 lb/A	Treflan 4EC 1.0-1.5 pt and others such as Trilin 4EC	Incorporate within 24 hours after application. Follow label for proper soil incorporation procedures. Lower rate is safest to cotton.

Table 22. Preplant incorporated or split application.

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, prickly sida, spurred anoda, tropic croton, nutsedge suppression	Norflurazon 1.0-1.2 lb/A	Zorial 80DF 1.25-1.5 lb	See label for specific rates on various soils. Incorporate 2-3 inches deep. The full rate of Zorial may be incorporated or a half rate incorporated and a half rate applied preemergence. Rotate only to cotton, soybeans, or peanuts within 16 months of application. Do not rotate to corn or vegetable crops within 16 months of application. Provides suppression of yellow and purple nutsedges. May be tank mixed with trifluralin or pendimethalin. On light, sandy soils, low in organic matter, use the lower rate.

**Table 23. Preemergence: Band application.**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Velvetleaf, spurred anoda, lambsquarters, and suppression of jimsonweed, spurge, prickly sida, common ragweed	Clomazone 0.5 lb/A	Command 3ME 21 oz	Command 3ME may be applied either banded at 7 oz/A (comparable to 21 oz/A broadcast) or broadcast at 21 oz/A. Use disulfoton or phorate organophosphate insecticides at 0.75 lb ai/A in furrow to protect against Command injury to cotton. Follow the Command label closely to prevent damage to desirable plants as a result of off-site movement. Observe buffer restrictions and do not apply within 1,500 feet of towns or housing developments, commercial fruit/nut or vegetable production, greenhouses, or nurseries. Fluometuron is generally still needed for improved control of annual weeds including pigweed species, common ragweed, common lambsquarters, and others, but should be applied at low labeled rates.

**Table 24. Preemergence.**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Fair control of cocklebur, morningglories, jimsonweed, sicklepod, and tropic croton; good control of lambsquarters, pigweed species, prickly sida, ragweed	Fluometuron 1.0-2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 80DF 1.18-2.35 lb	Apply to soil surface after planting, before crop and weeds emerge. On light, sandy soils, low in organic matter, use no more than 1 lb ai/A. Not labeled for use on sandy or loamy sand soils. May be tank mixed with Zorial. Plant only cotton within 6 months of last application. See previous Zorial remarks.

Table 24. Preemergence. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Annual grasses, yellow-nutsedge suppression	s-Metolachlor 0.71-0.95 lb ai	Dual Magnum 7.62EC 0.75-1 pt or Dual II Magnum 7.64EC 0.75-1.0 pt	Apply to soil surface at planting or after planting, but before weeds or crop emerge. <b>Do not incorporate.</b> Crop injury has been observed, especially when heavy rainfall is received shortly after planting or shortly after cotton emergence. Rates should be kept at the minimum for various soil types. Do not apply to sandy or loamy sand soils. May be most useful in no-till cotton and for suppression of yellow nutsedge.
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many weeds including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails, yellow-nutsedge suppression	Glyphosate 0.703-0.984 lb ae + s-Metolachlor 0.938-1.31 lb ai	Sequence 2.5-3.5 pt	Apply to soil surface at planting or after planting, but before crop emerges. <b>Do not incorporate.</b> Crop injury has been observed, especially when heavy rainfall is received shortly after planting or shortly after cotton emergence. Do not exceed 2.5 pt/A of Sequence on sandy-loam soils or 3.5 pt/A of Sequence on medium- or fine-textured soils. Do not apply to sandy or loamy-sand soils. May be useful in no-till cotton and for suppression of yellow nutsedge.
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Pendimethalin 0.5-0.75 lb ai	Prowl 3.3EC 1.2-1.8 pt or Prowl H <sub>2</sub> O 1.1-1.6 pt	Apply at planting or up to 2 days following planting to a firm seedbed.

Table 24. Preemergence. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Redroot pigweed, smooth pigweed, prickly sida, spotted spurge, spurred anoda, velvetleaf, and suppresses jimsonweed, ladythumb smartweed, Pennsylvania smart, several morningglory species	Pyriithiobac 0.031-0.042 lb ai	Staple LX 1.25-1.7 oz	Use the higher rate for harder to control weeds but do not exceed 0.8 oz/A and do not use on soils with less than 0.5% organic matter. Staple may be mixed with several other preemergence herbicides (Cotoran, Direx, Karmex, or Cotton Pro), taking care not to exceed recommended rates of these herbicides for soil types. Do not apply more than 2.4 oz Staple/A/year.
Early control of Palmer amaranth and suppression of yellow nutsedge	Fomesafen 0.25-0.31 lb ai	Reflex ZE 1.0-1.25 pt	Can mix with Cotoran, Direx, Prowl, and Staple. Apply only to coarse texture soils.

Table 25. Postemergence over-the-top: Annual grasses.

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Barnyardgrass, broadleaf signalgrass, fall panicum, foxtails, johnsongrass seedlings, crabgrass, shattercane, Texas panicum, volunteer corn	Clethodim 0.094-0.125 lb ai + crop-oil concentrate	Select 2EC 6.0-8.0 oz or SelectMax 0.97EC 12.0- 16.0 oz + COC 2.0 pt	Apply to actively growing grasses at the rate and size range indicated on the label for the individual grass species. Apply with 10-20 gal of water/A and 30-60 psi. Do not use flood type nozzles. Always add 2 pt/A crop-oil concentrate to Select. For SelectMax, add 0.25% nonionic surfactant, 1% crop-oil concentrate or 1% methylated seed oil. May be weak on goosegrass.
Barnyardgrass, broadleaf signalgrass, fall panicum, foxtails, johnsongrass, crabgrass, shattercane, Texas panicum, and volunteer corn	Sethoxydim 0.19-0.28 lb ai + crop-oil concentrate	Poast 1.5EC 1.0-1.5 pt or Poast Plus 1.5-2.25 pt + COC 2.0 pt	Apply to actively growing grasses at the rate and size range indicated on the label for the individual grass species with 10-20 gal of water/A and 40 psi. Do not use flood type nozzles. Always add 2 pt/A crop-oil concentrate.

Table 25. Postemergence over-the-top: Annual grasses. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Barnyardgrass, broadleaf signalgrass, fall panicum, crabgrass, foxtails, johnsongrass seedlings, Texas panicum, goosegrass, shattercane and volunteer corn	Fluazifop-P 0.19 lb ai + crop-oil concentrate or nonionic surfactant	Fusilade DX 2EC 12.0 oz + COC 0.5-1.0% v/v or NIS 0.25% v/v	Apply to actively growing grasses at the rate and growth stage indicated on the label. Apply with a minimum of 10 gal of water/A and 30-60 psi. Do not use flood-type nozzles. Add 0.5-1.0% v/v crop-oil concentrate or 0.25% v/v nonionic surfactant to the spray mixture.
Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, field sandbur, seedling johnsongrass, shattercane, Texas panicum, volunteer small grains	Fluazifop-P + fenoxaprop-P 0.12-0.16 lb ai + crop-oil concentrate or nonionic surfactant	Fusion 2EC 8.0-10.0 oz + COC 0.5-1.0% v/v or NIS 0.25-0.5% v/v	Apply to actively growing grasses at the rate and growth stage listed on the label in 5-20 gal water/A at 30-60 psi. Do not apply Fusion with recirculating sprayers, rope-wick applicators, controlled droplet applicators, or any similar devices. Add 0.5-1.0% v/v crop-oil concentrate or 0.25-0.5% v/v nonionic surfactant to the spray mixture.
Barnyardgrass, broadleaf, signalgrass, fall panicum, field sandbur, seedling johnsongrass, shattercane, Texas panicum	Quizalofop 0.034-0.055 lb ai + crop-oil concentrate or nonionic surfactant	Assure II 0.88EC/Targa 5.0-8.0 oz + COC 1.0% v/v or NIS 0.25% v/v	Apply to actively growing grasses at the rate and growth stage listed on the label. Apply with a minimum of 10 gal water/A and 25-60 psi. May be weak on crabgrass.

Table 26. Postemergence over-the-top: Perennial grasses.

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Bermudagrass (wiregrass)	Clethodim 0.125-0.25 lb ai + crop-oil concentrate + (sequential trt on regrowth) Clethodim 0.125-0.25 lb ai + crop-oil concentrate	Select 2EC 8.0-16.0 oz or SelectMax 0.97EC 16.0-32.0 oz + COC 2 pt + (sequential trt on regrowth) Select 2EC 8.0-16.0 oz or SelectMax 0.97EC 16.0-32.0 oz + COC 2 pt	Apply to actively growing bermudagrass at the rate and stage indicated on the label. Apply the first application to bermudagrass with 3- to 6-inch runners. Apply regrowth treatments to bermudagrass with 3- to 6-inch runners. Always add 2 pt/A crop-oil concentrate to Select. For SelectMax, add 0.25 nonionic surfactant, 1% crop-oil concentrate, or 1% methylated seed oil.
	Fluazifop-P + fenoxaprop-ethyl 0.19 lb ai + crop-oil concentrate  or nonionic surfactant  + (sequential trt on regrowth) Flazifop-P + fenoxaprop-ethyl 0.12 lb ai + crop-oil concentrate  or nonionic surfactant	Fusion 2EC 2.0 oz  + COC 0.5-1.0% v/v or NIS 0.25-0.5% v/v + (sequential trt on regrowth) Fusion 2EC 8.0 oz  + COC 0.5-1.0% v/v or NIS 0.25-0.5% v/v	



Table 26. Postemergence over-the-top: Perennial grasses. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Bermudagrass (wiregrass) (cont.)	Sethoxydim 0.28 lb ai	Poast 1.5 pt or Poast Plus 2.25 pt	Apply to actively growing grass. Apply first treatment to bermudagrass plants with runners less than 6 inches in length. Apply regrowth treatments to bermudagrass plants with runners less than 4 inches in length. Add 2 pt/A crop-oil concentrate per acre.
	+ crop-oil concentrate	+ COC 2.0 pt	
	+ (sequential trt on regrowth) Sethoxydim 0.19 lb ai	+ (sequential trt on regrowth) Poast 1.0 pt or Poast Plus 1.5 pt	
	+ crop-oil concentrate	+ COC 2.0 pt	
Bermudagrass (wiregrass), rhizome johnsongrass	Fluazifop-P 0.19 lb ai	Fusilade DX 2EC 12.0 oz	Apply to actively growing johnsongrass 8-18 inches high. Apply regrowth treatments when johnsongrass is 6-12 inches high. Add 0.5-1.0% v/v crop-oil concentrate or 0.25-0.5% v/v nonionic surfactant to the spray mixture.
	+ crop-oil concentrate	+ COC 0.5-1.0% v/v	
	or nonionic surfactant	or NIS 0.25-0.5% v/v	
	+ (sequential trt on regrowth) Fluazifop-P 0.125 lb ai	+ (sequential trt on regrowth) Fusilade DX 2EC 8.0 oz	
	+ crop-oil concentrate	+ COC 0.5-1.0% v/v	OR Apply to actively growing bermudagrass with 4- to 8-inch runners. Apply regrowth treatments to bermudagrass with a runner length of 4-8 inches. Add 0.5-1.0% v/v crop-oil concentrate or 0.26-0.5% v/v nonionic surfactant to the spray mixture.
	or nonionic surfactant	or NIS 0.25-0.5% v/v	

**Table 26. Postemergence over-the-top: Perennial grasses. (cont.)**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Bermudagrass (wiregrass), rhizome johnsongrass (cont.)	Quizalofop 0.07 lb ai + crop-oil concentrate or nonionic surfactant + (sequential trt on regrowth) Quizalofop 0.05 lb ai + crop-oil concentrate or nonionic surfactant	Assure II/Targa 0.88EC 10.0 oz + COC 1.0% v/v or NIS 0.25% v/v + (sequential trt on regrowth) Assure II 0.88EC 7.0 oz + COC 1.0% v/v or NIS 0.25% v/v	Apply to actively growing johnsongrass when 10 to 24 inches tall or bermudagrass with up to 6-inch runners. Apply regrowth treatments to 6 to 10-inch johnsongrass, or bermudagrass with 3 to 6-inch runners. Add 0.5-1.0% v/v crop-oil concentrate or 0.25-0.5% v/v nonionic surfactant to the spray mixture.
Rhizome johnsongrass	Clethodim 0.125-0.25 lb ai + crop-oil concentrate + (sequential trt on regrowth) Clethodim 0.094-0.16 lb ai + crop-oil concentrate	Select 2EC 8.0-16.0 oz or SelectMax 0.97EC 16.0-32.0 oz + COC 2.0 pt + (sequential trt on regrowth) Select 2EC 6.0-8.0 oz or SelectMax 0.97EC 12.0-16.0 oz + COC 2.0 pt	Apply to actively growing johnsongrass at the rate and stage indicated on the label. Apply the first application when johnsongrass is 12-24 inches high. Apply regrowth treatment to 6- to 18-inch johnsongrass. Always add 2 pt/A crop-oil concentrate to Select. For SelectMax, add 0.25 nonionic surfactant, 1% crop-oil concentrate, or 1% methylated seed oil.

Table 26. Postemergence over-the-top: Perennial grasses. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Rhizome johnsongrass (cont.)	Fluazifop-P + fenoxaprop-ethyl 0.16-0.19 lb ai	Fusion 2EC 10.0-12 oz	Make first application to actively growing johnsongrass before the boot stage and a second application when regrowth is 4-6 inches tall. Add 0.5-1.0 % v/v crop-oil concentrate or 0.25-0.5 % v/v nonionic surfactant to the spray mixture.
	+ crop-oil concentrate	+ COC 0.5-1.0% v/v	
	or nonionic surfactant	or NIS 0.25-0.5% v/v	
	+ (sequential trt on regrowth)	+ (sequential trt on regrowth)	
	Fluazifop-P + Fenoxaprop 0.12 lb ai	Fusion 2EC 8.0 oz	
	+ crop-oil concentrate	+ COC 0.5-1.0% v/v	
	or nonionic surfactant	or NIS 0.25-0.5% v/v	
	Sethoxydim 0.28 lb ai	Poast 1.5 pt or Poast Plus 2.25 pt	
	+ crop-oil concentrate	+ COC 2.0 pt/A	
	+ (sequential trt on regrowth)	+ (sequential trt on regrowth)	
	Sethoxydim 0.19 lb ai	Poast 1.0 pt or Poast Plus 1.5 pt	Apply to actively growing johnsongrass. Apply first treatment to johnsongrass 15-20 inches high. Apply regrowth treatments to 6- to 10-inch johnsongrass.
	+ crop-oil concentrate	+ COC 2.0 pt	

Table 27. Early postemergence: Over-the-top.

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many perennial weeds including bermudagrass, hemp dogbane, horsenettle, nutsedges, rhizome johnsongrass, trumpet creeper.	Glyphosate 0.75-1.0 lb ai	Numerous brands and formulations	<b>FOR USE ONLY ON COTTON VARIETIES DESIGNATED ROUNDUP READY OR ROUNDUP READY FLEX.</b> Some brands of glyphosate are not registered for use on these varieties (see labels). For Roundup Ready cotton, glyphosate may be applied over-the-top from emergence to the four true leaf stage. For Roundup Ready Flex cotton, glyphosate may be applied throughout the season over-the-top although there are maximum allowable rates set for various stages of cotton development (see label). Separate all over-the-top applications by at least 10 days. Glyphosate will be most effective as a component of a program that includes use of standard preplant incorporated, preemergence, and postemergence herbicides. Adjuvant recommendations vary by glyphosate products. See labels for specification. Observe all labels regarding seasonal maximums and <b>take extreme caution to avoid drift to adjacent vegetation.</b>

Table 27. Early postemergence: Over-the-top. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Controls many annual broadleaf weeds and suppresses annual grasses in conventional and reduced tillage production systems. Suppression may be expected of pigweed spp. and most grasses after just a single glufosinate application.	Glufosinate 0.42-0.71 lb ai	Ignite 280 23.0-39.0 oz	<b>FOR USE ONLY ON COTTON VARIETIES DESIGNATED LIBERTY LINK.</b> Apply postemergence over-the-top to cotton at emergence until the early bloom stage of cotton development. Most weeds require an initial Ignite 280 application of no less than 23 oz, and some perennial biennial weeds may require an initial rate of 39 oz. Ignite 280 can be applied up to a maximum of 3 applications at 29 oz each or one application of up to 43 oz/A followed by a single application of 23 oz/A with a seasonal maximum of 87 oz. The rotational restriction for small grains is 70 days. Over-the-top postemergence applications should not be made 70 days prior to harvest. Ignite may be tank mixed with Dual or Staple herbicides for postemergence over-the-top applications to enhance weed control and/or provide residual control. These tank-mix options can be beneficial in filling the pigweed and/or grass voids left by Ignite. A compatibility test must be conducted to confirm tank-mix compatibility with Ignite if other pesticide products that are labeled for use in cotton and are to be tank mixed with Ignite. <b>USE EXTREME CARE TO AVOID DRIFT TO ADJACENT CROPS OR OTHER DESIRABLE VEGETATION. Do not graze or feed treated cotton.</b>

Table 27. Early postemergence: Over-the-top. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many weeds including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails, and the suppression of yellow-nutsedge.	Glyphosate 0.703-0.984 lb ae + s-Metolachlor 0.938-1.31 lb ai	Sequence 2.5-3.5 pt	<b>FOR USE ONLY ON COTTON VARIETIES DESIGNATED ROUNDUP READY.</b> Apply postemergence over-the-top to cotton that is 3 inches tall to the four-leaf stage of cotton development. Do not apply later or severe crop injury will occur, including yield loss. Do not exceed 2.5 pt/A of Sequence per application or 3.5 pt/A of Sequence per growing season. In Roundup Ready Flex cotton, glyphosate can be applied throughout the season with maximums from ground cracking to 60% open boll at 4 quarts (Roundup Weathermax) If tank mixing or applications follow other s-Metolachlor products, do not exceed 1.9 lb ai/A s-Metolachlor per season on coarse-textured soils. Over-the-top postemergence applications should not be made later than 100 days before harvest. At least 1/2 inch of rainfall is required within 10 days after application to activate the s-Metolachlor. Do not add additional spray adjuvants, surfactants, or fertilizers to Sequence when applied postemergence over-the-top, or unacceptable cotton injury may occur. <b>USE EXTREME CARE TO AVOID DRIFT TO ADJACENT CROPS OR OTHER DESIRABLE VEGETATION. Do not graze or feed treated cotton.</b>
Cocklebur	MSMA 0.75-1.0 lb ai	MSMA Plus 1.0-1.25 pt MSMA 6Plus 1.0-1.25 pt MSMA 6.6 Plus 1.0-1.25 pt Weed-Hoe 108 1.0-1.25 pt	May be applied over-the-top of crop and weeds when cotton is 3 to 6 inches tall. Crop response may include stunting, stem reddening, and delay of maturity. Check label for surfactant recommendations.

Table 27. Early postemergence: Over-the-top. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Cocklebur, jimsonweed, pigweed	Fluometuron 1.0 lb ai	Cotoran 4L 1.0 qt or Cotoran 80DF 1.25 lb	May be applied over-the-top of crop and weeds when cotton is 3 to 6 inches tall. For use only where crop loss due to weeds is likely. Moderate to severe crop injury may occur and may include maturity delay and yield reduction.
Large crabgrass, goosegrass, fall panicum, foxtails and suppression of yellow nutsedge	s-metolachlor 0.96-1.25 lb ai	Dual Magnum 1.0-1.3 pt or Dual II Magnum 1.0-1.3 pt	Apply over-the-top postemergence or directed to the soil surface to cotton at least 3 inches tall. Applications should be prior to weed emergence or after clean cultivation since Dual Magnum does not control emerged weeds. At least 1/2 inch of rainfall is required within 10 days after application. If rainfall does not occur, a shallow, uniform incorporation will improve control. Over-the-top postemergence applications should be made no later than 100 days before harvest and directed postemergence applications may be made no later than 80 days before harvest. TANK MIXTURES WITH TOUCHDOWN OR ROUNDUP CAN BE APPLIED TO ROUNDUP READY COTTON ONLY. Apply Dual Magnum as a tank mixture with Touchdown or Roundup in water postemergence directed according to Touchdown or Roundup labels for control of emerged weeds and for residual preemergence control of weeds listed on the Dual Magnum label. Do not add additional spray adjuvants, surfactants, fertilizers, or their additives to these tank mixtures if applied over-the-top, or unacceptable cotton injury may occur. Follow Dual Magnum instructions on the Dual Touchdown or Roundup labels for rates, application methods, and application timing restrictions.

Table 27. Early postemergence: Over-the-top. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Pigweed species, Pennsylvania smartweed, spurred anoda, velvetleaf, jimsonweed. May be weak against tall morningglory, common cocklebur, and prickly sida.	Pyrethiobac 0.062 lb ai + nonionic surfactant 0.25% v/v	Staple LX 2.50 oz + NIS 1.0 qt/100 gal	Apply Staple with 0.25% v/v (1 qt/100 gal) nonionic surfactant to control small annual broadleaf weeds. Staple may be applied postemergence broadcast over-the-top of cotton, in a band over-the-top of cotton, or post-directed to cotton but over-the-top of weeds. Make applications to small, actively growing weeds after cotton has a true leaf. Cotton may be injured from Staple applied under cool, wet conditions. For best control, rainfall should not occur for 4 hours. See label.
Bristly starbur, common cocklebur, coffee senna, volunteer corn (non-IT/ IR), Florida beggarweed, hemp sesbania, common lambsquarters, morningglory spp., common ragweed, redweed, sicklepod, velvetleaf, volunteer soybean (non-STs), wild poinsettia, yellow nutsedge	Trifloxy- sulfuron- sodium 0.0047-0.0070 lb ai + nonionic surfactant 0.25% v/v	Envoke 0.10-0.15 oz   + NIS 1 qt/100 gal	Apply 0.10-0.15 oz/A Envoke with 0.25% v/v (1 qt/100 gal) non-ionic surfactant to control small annual broadleaf weeds listed. Envoke may be applied postemergence broadcast over-the-top of cotton, or post-directed to cotton but over-the-top of weeds. Make applications to small, actively growing weeds after cotton has a minimum of 5 true leaves. Cotton may be injured from Envoke applied under cool, wet conditions and if cotton is less than in the 5-leaf stage of growth. For best control, rainfall should not occur for 3 hours. The higher rates of Envoke may be required to adequately control yellow nutsedge and velvetleaf. Envoke tank mixed with glyphosate on Roundup Ready cotton can cause injury by way of boll loss, delayed maturity, and/or loss of yield. Sequential Envoke applications must be 14 days apart.



Table 27. Early postemergence: Over-the-top. (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Postemergence overtop of cotton with at least 5 true leaves. Compared to Envoke alone, mix is better on jimsonweed and spurred anoda. Compared to Staple alone, mixture is better on common ragweed, common lambsquarter, tall morning glory, and sicklepod.	Pyrethiobac 0.032-0.043 lb/A + Trifloxysulfuron- Sodium 0.0047 lb ai + nonionic surfactant 0.25 % v/v	Staple LX 3.2lb/gal at 1.3-1.9 fl oz + Envoke 0.1 oz + NIS 1 qt/100 gal	Use a minimum of 10.0 gal water/A and apply to cotton with at least 5 true leaves. Occasional yellowing of cotton leaves can occur but yields are not affected.

**Table 28. Early postemergence directed: Cotton 3-6 inches tall (Post-directed recommendations are based on broadcast rates).**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Cocklebur, yellow nutsedge, purple nutsedge	*MSMA 2.0 lb ai	Various brands and formulations  MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as a directed spray to cotton at least 3 inches tall. Do not apply MSMA after first blooms appear. Refer to the product label to determine if surfactant should be added. Two applications/season may be made. May be tank mixed with fluometuron.
Cocklebur, jimsonweed, lambsquarters, morningglory, pigweed, ragweed	Fluometuron 1.0-2.0 lb ai  + *MSMA 2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 80DF 1.2-2.4 lb + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as a directed spray to cotton at least 3 inches tall. Best results are obtained if applied to weeds 2 inches tall or less. Refer to the MSMA product label to determine if surfactant should be added.

*\*Do not apply MSMA tank mix after first bloom. Some brands of MSMA contain surfactant while others do not. Refer to product labels for information on surfactant use.*

**Table 29. Late postemergence directed: Cotton 6-8 inches or larger (Post-directed recommendations are based on broadcast rates).**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Cocklebur, yellow nutsedge, purple nutsedge	*MSMA 2.0 lb ai	Various brands and formulations  MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as a directed spray. Do not apply MSMA after first blooms appear. Refer to the product label to determine if a surfactant should be added. Two applications/season may be made. Primarily controls nutsedge and cocklebur. May be tank mixed with dimethipin, fluometuron, lactofen, or oxyfluorfen to broaden the control spectrum.
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, morningglory (suppression)	Fluometuron 1.0-2.0 lb ai  +  *MSMA 2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 85DF 1.2-2.4 lb + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as directed spray. Use 1-1.5 lb ai/A fluometuron for weeds up to 3 inches tall.
Ragweed, lambsquarters, pigweed, cocklebur, morningglory (suppression)	Linuron 0.5-1.5 lb ai	Linex 1.0-3.0 pt	Apply as a directed spray, at 1 pt/A when cotton is at least 6 inches tall and emerged weeds do not exceed 2 inches in height. Add 1 pt surfactant/25 gal spray mixture. If needed, a second application of same rate may be made 1 week or later after initial treatment. Alternatively, after cotton is 20 inches tall, make a single application of 2-3 pt/A following last cultivation; if emerged weeds are present, add surfactant as directed. Do not plant rotational crops other than corn, soybeans, or potatoes within 4 months after application.

*\* Do not apply MSMA tank mix after first bloom. Some brands of MSMA contain surfactant while others do not. Refer to product labels for information on surfactant use.*

**Table 29. Late postemergence directed: Cotton 6-8 inches or larger (Post-directed recommendations are based on broadcast rates). (cont.)**

<b>Problem Weeds</b>	<b>Chemical rate per acre</b>	<b>Product per acre</b>	<b>Remarks &amp; Precautions</b>
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, tropic croton, velvetleaf, morningglory (suppression)	Oxyfluorfen 0.25-0.5 lb ai + *MSMA 2.0 lb ai	Goal 2.0E 1.0-2.0 pt + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply to cotton at least 6 inches tall (preferably 8-10 inches tall). Make 2 applications/season. Apply only with precision directed spray equipment. Do not exceed 0.5 lb ai/A oxyfluorfen per year.
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, tropic croton, velvetleaf	Lactofen 0.2 lb ai + *MSMA 2.0 lb ai	Cobra 2EC 12.5 oz + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply to cotton at least 6 inches tall. Apply with nonionic surfactant (2 pt/100 gal spray mix) or crop-oil concentrate (0.5 to 1 pt/A). Apply only with precision directed spray equipment. Make only one application of Cobra/season.
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, tropic croton, morningglory (suppression)	Prometryn 0.5-0.65 lb ai  + *MSMA 2.0 lb ai	Caparol 4L 1.0-1.3 pt or Cotton-Pro 4L 1.0-1.3 pt + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply to cotton at least 6 inches tall. Apply only with precision directed spray equipment.

*\* Do not apply MSMA tank mix after first bloom. Some brands of MSMA contain surfactant while others do not. Refer to product labels for information on surfactant use.*

Table 29. Late postemergence directed: Cotton 6-8 inches or larger (Post-directed recommendations are based on broadcast rates). (cont.)

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Bristly starbur, common cocklebur, coffee senna, volunteer corn (non-IT/IR), Florida beggarweed, hemp sesbania, johnsongrass (seedling), morningglory spp., smooth pigweed, redroot pigweed, common ragweed, redweed, sicklepod, velvetleaf, volunteer soybean (non-STS), wild poinsettia, yellow nutsedge	Prometryn 0.790-1.185 lb ai + Trifloxy-sulfuron-sodium 0.007-0.0105 lb ai + nonionic surfactant 0.25% v/v	Suprend 1.0-1.5 lb	Apply 1.0-1.5 lb/A Suprend to control small annual broadleaf weeds listed and provide some residual control of these weeds. Suprend must be applied post-directed to cotton but over-the-top of weeds. Apply to cotton at least 6 inches tall and only with precision-directed spray equipment. Sequential Suprend applications must be at least 14 days apart. <b>Do not exceed 2.7 lbs/A of Suprend per growing season from all applications. Do not exceed a total of 0.0188 lb ai/A of trifloxysulfuron-sodium per growing season resulting from all applications of Suprend or Envoke. Do not exceed a total of 5.15 lb ai/A of prometryn per growing season resulting from all applications of Suprend, Caparol 4L, or Cotton-Pro 4L.</b> If these totals for trifloxysulfuron-sodium and/or prometryn are exceeded, injury to cotton may result in addition to alternations in crop rotation restriction intervals. With Suprend's limited activity on grass weeds, MSMA may be tank mixed with Suprend to improve the control of the grasses.

\* Do not apply MSMA tank mix after first bloom. Some brands of MSMA contain surfactant while others do not. Refer to product labels for information on surfactant use.

Table 29. Late postemergence directed: Cotton 6-8 inches or larger (Post-directed recommendations are based on broadcast rates). (cont.)			
Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Cocklebur, jimsonweed, lambsquarters, morningglory, pigweed, ragweed, sicklepod	Dimethipin 0.23-0.54 lb ai + *MSMA 2.0 lb ai	Harvade 5F 6.0-14.0 oz + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as a directed spray to cotton at least 10 inches tall for control of weeds less than 4 inches tall. Do not apply more than 14 oz/A/year for combined post-directed and defoliation applications. Apply with 1 pt/A crop-oil concentrate.
	+ crop-oil concentrate	+ COC 1 pt	
* Do not apply MSMA tank mix after first bloom. Some brands of MSMA contain surfactant while others do not. Refer to product labels for information on surfactant use.			

Table 30. Layby: Cotton at least 12 inches tall (Post-directed recommendations are based on broadcast rates).			
Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Cocklebur, jimsonweed, lambsquarters, morningglory, pigweed, ragweed, tropic croton	Flumeturon 1.0 lb ai	Cotoran 4L 1.0 qt or Cotoran 85DF 1.2 lb	Apply as a directed spray. Apply with a nonionic surfactant at 2 qt/100 gal spray solution. Do not apply within 60 days of harvest. Do not plant to rotation crops within 6 months of the last flumeturon application.

Table 31. Layby: Cotton at least 16 inches tall (Post-directed recommendations are based on broadcast rates).

Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Lambsquarters, morningglory species, nightshade species, pigweed species, velvetleaf, spurred anoda, purslane, hemp sesbania, prostrate spurge, Pennsylvania smartweed	Carfentrazone 0.016-0.025 lb ai	Aim EC 1.0-1.6 oz	Aim may be applied lay-by in tank mixtures to cotton that is 16 inches or taller with sufficient bark development and height differential between the bottom crop leaves and the soil. Direct spray to avoid contact with green-stem tissue or foliage while achieving maximum coverage of broadleaf weeds. Always use crop-oil concentrate at 1% v/v (1 gal/100 gal of spray). Do not apply more than 3.2 oz of Aim total/A for post-directed and lay-by applications. For best control, apply to weeds up to 4 inches tall. When applied with glyphosate or MSMA, the combination will control larger morningglories, annual grasses, and yellow nutsedge. See directions and precautions on Aim label relative to potential cotton injury and sprayer cleanout.
Lambsquarters, morningglory species, nightshade species, pigweed species, velvetleaf, spurred anoda, purslane, hemp sesbania, prostrate spurge, Pennsylvania smartweed	Flumioxazin 0.064 lb ai	Valor SX 2.0 oz	Valor should only be applied to cotton that is 16 inches in height or taller with sufficient bark development and height differential between bottom crop leaves and the soil. Avoid contact with green stem tissue or foliage. Use an approved nonionic surfactant at one quart per 100 gallon spray solution. Do not add crop oil, methylated seed oil, or organosilicone adjuvants to solution. When applied with MSMA, the combination will control larger morningglories, annual grasses, and yellow nutsedge. Follow sprayer cleanout directions closely after applying Valor.

Table 31. Layby: Cotton at least 16 inches tall (Post-directed recommendations are based on broadcast rates). (cont.)			
Problem Weeds	Chemical rate per acre	Product per acre	Remarks & Precautions
Common cocklebur, common dayflower, dogfennel, Florida beggarweed, Florida pusley, hemp sesbania, common lambsquarters, annual morningglory spp., pigweed spp., prickly sida, purslane, common ragweed, redweed, sicklepod, smartweed, velvetleaf, most annual grasses	Linuron 0.4-0.5 lb ai + Diuron 0.4-0.5 lb ai	Layby Pro 1.6-2.0 pt	Apply 1.6-2.0 pt/A Layby Pro to control small annual broadleaf and grass weeds listed that are up to 4 inches tall; Layby Pro will also provide residual control of these susceptible weeds following the application. Layby Pro must be applied post-directed to cotton but over-the-top of weeds. Apply to cotton at least 16 inches tall and only with precision-directed spray equipment. The use of a nonionic surfactant at 2 qt/100 gal or a crop-oil concentrate at 1 gal/100 gal is recommended for the control of emerged weeds. Layby Pro can be tank mixed with Aim or MSMA to enhance the control of emerged weeds. Do not exceed the following Layby Pro rates: 1.6 pt/A for coarse soils and 2 pt/A on medium soils. Do not use Layby Pro on sand or loamy-sand soils, on soils with less than 1% organic matter, or within 76 days of harvest. Only cotton, corn, and grain sorghum can be planted the spring following the Layby Pro post-directed application. No other crops can be planted in the treated area within 1 year after the last Layby Pro application, or severe injury to subsequent crops may occur.



Table 32. Relative effectiveness\* of grass-weed herbicides for cotton.

	Goosegrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Johnsongrass (seedling)	Johnsongrass (rhizome)	Texas panicum	Purple & Yellow nutsedge	Shattercane	Bermudagrass
<b>Preplant Incorporated</b>											
Prowl	G	G	E	G	E	G	P	G	N	G	P
Treflan	G	G	E	G	E	G	P	G	N	G	P
Zorial	F-G	G	E	G	E	G	P	F	P	G	P
<b>Preemergence</b>											
Cotoran	F-G	P	F-G	F	G	P	P	P	P	P	P
Dual	F-G	P-F	F-G	F-G	F-G	P	N	P	P-F	P	N
Sequence	F-G	P-F	F-G	G-F	G-F	P	N	P	P-F	P	N
Zorial	G	G	E	G	E	G	P	F	P-F	G	P-F
<b>Postemergence</b>											
Assure II	E	E	F	E	E	E	E	E	N	E	G
Caparol/ Cotton-Pro	P	P	P	P	P	P	P	P	P	P	P
Cobra	P	P	P	P	P	P	P	P	P	P	P
Cotoran	P	P	P	P	P	P	P	P	P	P	P
Dual	N	N	N	N	N	N	N	N	P-F	N	N
Envoke	P	P	P	P	P	P	N	P	P-G	P	N
Fusilade	E	G-E	G	E	E	E	G-E	G	N	E	G-E
Fusion	E	E	G	E	E	E	G	G	N	E	G
Goal	G	G	G	G	G	P	P	P	F-G	P	P
Harvade	P	P	P	P	P	P	P	P	P-F	P	P
Ignite	G	G	G	G	G	G	P-G	G	P-G	F	P
Layby Pro	G-E	G-E	G-E	G-E	G-E	P	P	G-E	N	P	N
Linex	P	P	P	P	P	P	P	P	N	P	N
MSMA/ DSMA	G	G	G	G	G	G	F	P-F	F-G	G	P
Poast	E	E	G	E	E	E	G	E	N	E	F-G
Glyphosate	E	E	E	E	E	E	G	E	F-G	E	F
SelectMax	F	E	G	E	E	E	G	E	N	E	G
Sequence	E	E	E	E	E	E	G	E	F-G	E	P-F
Staple	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-F	N-P	N-P
Suprend	P	P	P	P	P	F	P	P	P-G	P	P

\*E (Excellent) = 90% to 100% control, G (Good) = 80% to 90% control or better, F (Fair) = 60% to 80% control, P (Poor) = 20% to 60% control, N (None) = less than 20% control

Table 33. Relative effectiveness\* of broadleaf-weed herbicides for cotton.

	Cocklebur	Jimsonweed	Lambsquarters	Morningglory (annual spp)	Pigweed	Tropic Croton	Common Ragweed	Sicklepod	Smartweed	Spurred Anoda	Prickly sida or teaweed	Velvetleaf
<b>Preplant Incorporated</b>												
Prowl	N	N	G	P	G	P	N	N	P	N	N	P-F
Treflan	N	N	G	P	G	P	N	N	P	N	N	N
Zorial	F	P	G	F	F-G	G-E	G	P	F	G	G-E	F-G
<b>Preemergence</b>												
Command	P	G	G	P	P	F-G	F-G	N	F-G	G-E	F-G	E
Cotoran	F	F	E	F	G	F	G	F	F	F	F-G	F
Dual	N	N	P	N	G	N	P	N	P	G	N	P
Sequence	N	N	P	N	F	N	P	N	P	G	N	P
Zorial	F	F	G	F	F-G	G-E	G	P	G-E	G	G-E	F-G
<b>Postemergence</b>												
Aim	G	F	G	G	G	-	P	N-P	G	G	P	G
Assure II/ Targa	N	N	N	N	N	N	N	N	N	N	N	N
Buctril	G	G	G-E	F-G	F	P	F-G	P	G	G-E	F	G
Caparol/ Cotton-Pro	E	F-G	G	F	G	G	G-E	F	G	P	F-G	F
Cobra	E	G-E	P-F	P-F	E	F-G	G	P-F	F	F	E	G
Cotoran	E	F-G	G	F	G	P-F	G-E	F	G	P	F-G	P
Envoke	E	E	G-E	E	G-E	P-G	G-E	E	-	P-F	F-G	G
Fusilade	N	N	N	N	N	N	N	N	N	N	N	N
Fusion	N	N	N	N	N	N	N	N	N	N	N	N
Goal	E	E	G	G	E	E	G	G	E	F	E	E
Harvade	G	G	G	G-E	G	F-G	G	G	F-G	F-G	G	F-G
Ignite	E	E	G-E	E	F-G	E	E	E	E	G-E	E	G-E
Layby Pro	G-E	G	G-E	G-E	G-E	F-G	G-E	G-E	G-E	P-F	G-E	G-E
Linex	G	G	G	F-G	G-E	P-F	F-G	G	F	P	F-G	P-F
MSMA/ DSMA	E	F	P-F	P	P-F	P-F	F	P	P	P	P	P
Poast	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	E	E	F-G	F	G-E	G	F	G-E	F	G	F-G	G
SelectMax	N	N	N	N	N	N	N	N	N	N	N	N
Sequence	E	E	F-G	F	G-E	G	F	G-E	G	G	F-G	G
Staple	G-E	E	P	G	E	N	P	N-P	G-E	F-G	F-G	E
Suprend	E	E	G-E	E	G-E	P-G	G-E	E	G	G	F-G	G

Valor (ratings will be the same as Aim [see above])

\*E (Excellent) = 90% to 100% control, G (Good) = 80% to 90% control or better, F (Fair) = 60% to 80% control, P (Poor) = 20% to 60% control, N (None) = less than 20% control

**Table 34. Burndown herbicides for stale seedbed and conservation tillage cotton for application 30 to 40 days prior to planting.**

Weed Species/ Cover Crop	Herbicide & Rate per Acre				
	2-4,D <sup>1</sup> 1 pt	Gramoxone Max 1.66 pt	Glyphosate (see labels for rates)	Harmony Extra <sup>2</sup> 0.5 oz	Valor SX <sup>3</sup> 1.0-1.5 oz
Annual grasses	N	G-E	E	P	P
Carolina geranium	P-F	G-E	P-F	G	G
Chickweed, common	P	E	G	E	P
Curly dock	F-G	N	P-F	G	P
Cutleaf evening-primrose	G	P	P	E	G
Henbit	P	G	G	E	F-G
Horseweed (maretail)	P-F	P	G	G	P
Wheat/rye	N	E	E	P	P
Wild mustard	G-E	P-F	F	G	F
Wild radish	G-E	P-F	F	G	F

*E (Excellent) = 90% to 100% control G (Good) = 80% to 90% or better, F (Fair) = 60% to 80%, P (Poor) = 20% to 60%, N (None) = less than 20%.*

<sup>1</sup>*Apply at least 30 days prior to planting.*

<sup>2</sup>*Apply at least 45 days prior to planting.*

<sup>3</sup>*Apply at least 30 days prior to planting (tank mixed with glyphosate products).*

**Table 35. Burndown herbicides for stale seedbed and conservation tillage cotton for application 7 to 21 days prior to planting.**

Herbicide & Rate per Acre			
Weed Species/ Cover Crop	Clarity <sup>1</sup> 8 oz	BOA 2 pt or Gramoxone Max 1.66 pt	Glyphosate (see labels for rates)
Annual grasses	N	G-E	E
Carolina geranium	G	G-E	P-F
Chickweed, common	P-F	E	G
Curly dock	F-G	N	P-F
Cutleaf eveningprimrose	F-G	P	P
Henbit	F	G	G
Horseweed (marestail)	F	P	G
Wheat/rye	N	E	E
Wild mustard	F	P-F	F
Wild radish	F	P-F	F

*E (Excellent) = 90% to 100% control, G (Good) = 80% to 90% or better, F (Fair) = 60% to 80%, P (Poor) = 20% to 60%, N (None) = less than 20%.*

<sup>1</sup>*Following application of Clarity a minimum accumulation of 1-inch rainfall or irrigation water and a waiting interval of 21 days is required prior to planting cotton.*

**Table 36. Application rates and perennial grass sizes for treatment with Assure, Fusilade DX, Fusion, Poast, Poast Plus, and Select.<sup>a</sup>**

Herbicide <sup>b</sup>	Weed	Weed size and herbicide rate (oz/A)	
		First Application	Second Application <sup>c</sup>
Assure II/Targa	Rhizome johnsongrass	10-24 inches tall 10.0 oz	6-10 inches tall 7.0 oz
	Bermudagrass	up to 6-inch runners 10.0 oz	up to 6-inch runners 7.0 oz
Fusilade DX	Rhizome johnsongrass	8-18 inches tall 12.0 oz	6-12 inches tall 8.0 oz
	Bermudagrass	4- to 8-inch runners 12.0 oz	4- to 8-inch runners 8.0 oz
Fusion	Rhizome johnsongrass	8-18 inches tall 10.0-12.0 oz	6-12 inches tall 8.0 oz
	Bermudagrass	4- to 8-inch runners 12.0 oz	4- to 8-inch runners 8.0 oz
Poast	Rhizome johnsongrass	15-25 inches tall 24.0 oz	6-12 inches tall 16.0 oz
	Bermudagrass	6-inch runners 24.0 oz	4-inch runners 16.0 oz
Poast Plus	Rhizome johnsongrass	15-25 inches tall 36.0 oz	6-12 inches tall 24.0 oz
	Bermudagrass	6-inch or less runners 36.0 oz	4-inch runners 24.0 oz
Select	Rhizome johnsongrass	12-24 inches tall 8.0-16.0 oz	6-18 inches tall 6-8.0 oz
	Bermudagrass	3- to 6-inch runners 8.0-16.0 oz	3- to 6-inch runners 8.0-16.0 oz
SelectMax	Rhizome johnsongrass	12-24 inches tall 8.0-16.0 oz	6-18 inches tall 12.0-16.0 oz
	Bermudagrass	3- to 6-inch runners 16.0-32.0 oz	3-6 inches tall 16.0-32.0 oz

<sup>a</sup>Taken from product labels.<sup>b</sup>Rain-free period is 1 hour after application for each herbicide listed.<sup>c</sup>Make second application only if needed to control regrowth or new plants. Size refers to regrowth or new plants.

**Table 37. Application rates and annual grass sizes for treatment<sup>1</sup> with Assure II, Fusilade DX, Fusion, Poast, Poast Plus, and Select.<sup>2</sup>**

Species	POAST			POAST PLUS			FUSILADE DX			FUSION			ASSURE II/TARGA			SELECT		
	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)
Barnyardgrass	8	16	8	24	2-3	12	2-4	8	2-6	8	2-6	8	2-6	8	2-8	6-8	2-8	6-8
Broadleaf signalgrass	8	16	8	24	2-4	12	2-4	8-10	2-6	10	2-6	10	2-6	10	2-6	6-8	2-6	6-8
Crabgrass	6	16	6	24	1-2	12	1-4	8	2-6	10	2-6	10	2-6	10	2-6	6-8	2-6	6-8
Crowfootgrass	-	-	-	-	-	-	-	-	2-6	7-8	2-6	7-8	2-6	7-8	2-6	6-8	2-6	6-8
Fall panicum	8	16	8	24	2-6	12	2-6	8	2-6	7-8	2-6	7-8	2-6	7-8	2-8	6-8	2-8	6-8
Foxtails, giant	8	16	8	24	2-6	12	2-8	6	2-8	7-8	2-8	7-8	2-8	7-8	2-12	6-8	2-12	6-8
Foxtails, Green	8	16	8	24	2-4	12	2-4	6	2-4	7-8	2-4	7-8	2-4	7-8	2-8	6-8	2-8	6-8
Foxtails, Yellow	8	16	8	24	2-4	12	2-4	6	2-4	7-8	2-4	7-8	2-4	7-8	2-8	6-8	2-8	6-8
Goosegrass	6	16	6	24	2-4	8	2-4	8	2-6	7-8	2-6	7-8	2-6	7-8	2-6	6-8	2-6	6-8
Seedling johnsongrass	8	16	8	24	2-8	6	2-8	6	2-8	5-8	2-8	5-8	2-8	5-8	4-10	6-8	4-10	6-8
Sandbur	3	20	3	30	2-6	12	2-6	8	2-6	7-8	2-6	7-8	2-6	7-8	2-6	6-8	2-6	6-8
Shattercane	18	16	18	24	6-12	6	6-12	6	6-12	5-8	6-12	5-8	6-12	5-8	4-10	6-8	4-10	6-8
Texas panicum	8	16	8	24	2-8	12	2-8	8	2-4	8-10	2-4	8-10	2-4	8-10	2-6	6-8	2-6	6-8
Volunteer corn	20	16	20	24	12-24	6	12-24	6	6-18	5-8	6-18	5-8	6-18	5-8	4-12	4-6	4-12	4-6

<sup>1</sup>Rain-free period is 1 hour after application for each herbicide listed.<sup>2</sup>Taken from product labels; "-" control not claimed on label.

**Table 38. Rotational restrictions.**

<b>Herbicide<sup>1</sup></b>	<b>Rotation Restrictions</b>
Aim	Corn, sweet corn, popcorn, soybeans, grain sorghum, rice, wheat, barley, oats, buckwheat, pearl millet, proso millet, rye, teosinte, triticale, and wild rice may be planted any time following an application of Aim. Root and leafy vegetables may be planted after 30 days following application. All other crops may be planted after 12 months following application.
Assure II/Targa	Do not rotate to crops other than soybeans or cotton within 120 days of application.
Buctril	Do not plant rotational crops until the following use season.
Caparol/ Cotton-Pro	Do not plant rotational crops until the following year.
Cobra	No crop rotation restrictions.
Command	Rotate to crops as listed on label or crop injury may occur. Cover crops may be planted anytime but stand reductions may occur.
Cotoran	Do not plant crops other than cotton within 6 months of the last application of Cotoran/Meturon.
MSMA	No restrictive statements listed on label.
Dual	Barley, oats, rye, or wheat may be planted 4.5 months following application. Alfalfa may be planted 4 months after application and tomatoes may be planted 6 months after application. Any crop listed on the label may be planted 12 months after application.
Envoke	See label for specific crop restrictions.
Fusilade DX	Do not plant rotational grass crops such as corn, sorghum, and cereals within 60 days of last application.
Fusion	Do not plant rotational grass crops such as corn, sorghum, and cereals within 60 days of last application.
Glyphosate	No rotational restrictions.
Goal	Do not rotate to barley, corn, oats, sorghum, triticale, or wheat with 10 months following application. Do not direct seed any crops other than Goal-labeled crops, within 60 days of treatment. Do not transplant seedling crops, other than Goal-labeled crops within 30 days of treatment.
Harvade	Do not plant rotational crops within 6 months after application.

<sup>1</sup>The herbicides listed, when used in cotton, may have a negative impact on your ability to rotate crops in a normal fashion. The labeled rotational intervals discussed may be influenced by many factors, such as the addition of other residual herbicides, soil type, soil pH, etc. Do not use these herbicides unless you understand all rotational restrictions.

**Table 38. Rotational restrictions. (cont.)**

<b>Herbicide<sup>1</sup></b>	<b>Rotation Restrictions</b>
Ignite	Small grains may be planted 70 days after application.
Linex	Do not plant rotational crops other than corn, soybeans, or potatoes within 4 months after application.
Poast/Poast Plus	No rotational restrictions.
Prowl	Winter wheat or winter barley may be planted 120 days after application. Any crop other than sugar beets, red beets, or spinach may be planted the year following application.
Select	No rotational restrictions.
Sequence	Barley, oats, rye, or wheat may be planted 4.5 months following application. Alfalfa may be planted 4 months after application and tomatoes may be planted 6 months after application. Any crop listed on the label may be planted 12 months after application.
Staple	See label for specific crop restrictions.
Suprend	See label for specific crop restrictions.
Treflan	Sugar beets, red beets, or spinach should not be planted within 12 months of a spring applications. Vegetable crops other than those listed on the Treflan label should not be planted within 5 months of application.
Valor	Preplant burndown applications of Valor 51 WDG may injure cotton if planted too soon. Valor at 1.0 oz/A will give 2 to 4 weeks control of lambsquarters, pigweed, prickly side, spurge, and Florida pusley; and at 2.0 oz/A will give 6 to 8 weeks control of these species. Application to cover crop or dense weed stand may reduce residual control. Tillage after application will reduce or eliminate residual control. A minimum of 14 days or 1 inch rainfall must occur between Valor applications and cotton planting when Valor is applied at 1.0 oz/A; 21 days must pass and a 1 inch rainfall when applied at 1.5 to 2.0 oz/A. Valor 2.0 oz/A may be applied up to 14 days prior to planting strip-till cotton. A tillage application must occur between applications and cotton planting in order to prevent any potential injury to emerging cotton plants. Failure to conduct strip-tillage operation prior to planting may result in cotton injury. Strip-tillage operations must incorporate soil to a depth of 1 to 2 inches.
Zorial	Rotate only to cotton, soybeans, or peanuts within 16 months of application.

<sup>1</sup>The herbicides listed, when used in cotton, may have a negative impact on your ability to rotate crops in a normal fashion. The labeled rotational intervals discussed may be influenced by many factors, such as the addition of other residual herbicides, soil type, soil pH, etc. Do not use these herbicides unless you understand all rotational restrictions.