

Managing Volunteer Cotton in Grain Crops

(Corn, Sorghum, Soybean, and Wheat)



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The overwhelming adoption of cotton varieties that have single- and double-stacked herbicide-tolerant traits—including Roundup ReadyFlex®, LibertyLink®, GlyTol®, and GlyTol®/LibertyLink®—has revolutionized cotton production in the past 10 to 15 years, and it offers some excellent weed management options to cotton producers. In Texas, over 90 percent of the cotton acres are planted to cotton varieties that include one or more of these herbicide-tolerant traits.

Despite the many opportunities that these traits provide for farmers, they do create challenges. For example, consecutive plantings of herbicide-tolerant crops can lead to herbicide-tolerant volunteer cotton, corn, or soybean plants; these volunteers meet the definition of a weed (an unwanted plant).

These volunteer plants can create problems for growers:

- They compete with the crop for essential nutrients, water, and light.
- They can cause harvest issues.
- Volunteer cotton plants can be difficult to manage in other crops such as corn, sorghum, soybeans, or wheat, depending on the herbicide-tolerant genes they contain.
- Volunteer cotton can serve as hosts for boll weevils (*Anthonomus grandis* L.) in grain crops and hinder the Texas Boll Weevil Eradication Program.

2011 and beyond

Between 2011 and 2013, stacked herbicide-tolerant varieties are expected to be widely available to cotton producers, including glyphosate + glufosinate-tolerant cotton varieties. Within the next 4 to 5 years, cotton varieties resistant to 2,4-D and dicamba are

expected to be registered for use in the United States and available to producers as triple-stacked herbicide-tolerance traits.

This next generation of herbicide-tolerant cotton varieties will provide many weed management options as well as the flexibility to combat and retard the development of herbicide-resistant weeds. However, they will further complicate the issue of managing volunteer cotton in cotton-production regions.

The problem

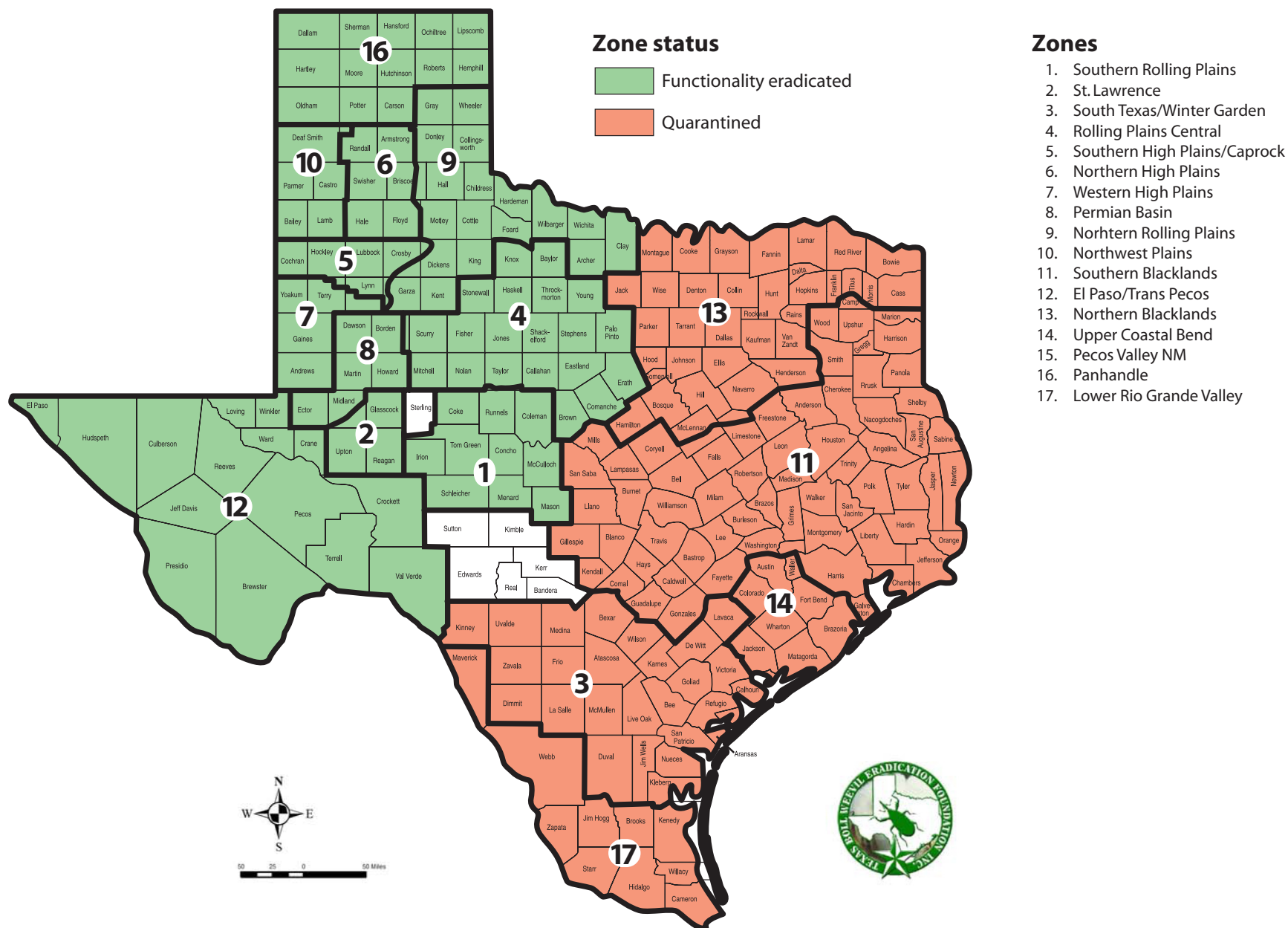
Two major factors contribute to the need to remove volunteer cotton from Texas crops:

- Volunteer cotton can compete with the crop and reduce yield.
- The boll weevil eradication program may become less successful—primarily in South and East Texas, where the program is still active—due to the presence of plants that can host boll weevils.

From the crop competition perspective, most producers would consider 80 to 90 percent control by any herbicide to be acceptable. However, in quarantined zones of the boll weevil program (Fig. 1), there is a zero tolerance for volunteer cotton in non-cotton fields, also referred to as noncommercial cotton. In these quarantined zones, the Texas Department of Agriculture maintains zero tolerance for hostable noncommercial cotton plants (6 to 8 leaf plants or larger). Essentially, non-cotton fields must be kept completely void of hostable cotton plants for the entire year.

Although complete control is a challenge, it can be accomplished by choosing the appropriate herbicides and applying them at the proper time. This publication aims to help producers make decisions on herbicide use for volunteer cotton.

Figure 1. Texas Boll Weevil Eradication zones.



Management options

There are five key times during the year for managing volunteer cotton: fallow, preplant, preemergence, within season, and post-harvest. The management strategies that are best for a specific site will depend on local weather patterns, crop rotation, tillage regime, and other factors. Although this publication focuses primarily on the herbicide options, growers should also consider tillage (disking or cultivation) to manage volunteer cotton.

Tillage: Tillage is one of the most effective tools for managing volunteer cotton in fallow situations or before planting any crop. However, in-season crop cultivation will leave about 15 to 25 percent of the area undisturbed, where cotton plants can survive. Although the 75 to 85 percent level of control should suffice for minimizing crop competition, it is unacceptable to the Texas boll weevil program.

Herbicides: Various herbicides can effectively control volunteer cotton during the fallow period and growing season. However, only a few herbicides specifically list management of volunteer cotton on their labels. For optimum results, follow the herbicide label instructions for rate, application timing, additives, carrier volume, and other factors.

Preplant burndown herbicides: Table 1 lists the herbicide products labeled for corn, sorghum, soybean, and wheat. Use Table 4 to estimate their effectiveness for postemergence.

Preemergence herbicides: See Table 2 for herbicides labeled in corn, sorghum, and soybean. The most effective preemergence herbicides will likely reduce volunteer cotton stands by only about 65 percent, and 2 pounds per acre of atrazine reduces stands by only 30 percent. See Table 5 for specific preemergence herbicide efficacy ratings. Although preemergence herbicides can help manage volunteer cotton, other tactics will likely be needed also.

Postemergence herbicides: See Table 3 for postemergence herbicides labeled in corn, sorghum, soybean, and wheat. The volunteer cotton plants must be small (1- to 4-leaf stage) for good to excellent control of volunteer cotton and for the most herbicide options. See the efficacy ratings in Table 4.

Once cotton reaches the 5- to 6-leaf stage or beyond, the number of highly effective herbicide options plummets because the cotton becomes much harder to kill. Also, none of the herbicides provide 100 percent volunteer cotton control when applied at the 5- to 6-leaf stage.

Hostable plants for boll weevil: Any cotton at pinhead square stage or beyond is considered hostable for boll weevils. This stage is when the Texas Department of Agriculture begins enforcing volunteer cotton guidelines. Volunteer cotton plants must be prevented from reaching this stage for the overall success of the Texas Boll Weevil Eradication Program and for growers to avoid fees or fines for volunteer (noncommercial) cotton found in fields.

To ensure that the herbicide is as effective as possible and to eradicate the plants that host boll weevils, volunteer cotton should not exceed the 5-leaf stage when the herbicide is applied. Cotton plants at or beyond the 5-leaf stage are very likely to survive the herbicide application and become hostable plants

Mechanism of action: To manage volunteer cotton plants, growers must know the herbicide's mechanism of action, because most cotton varieties have herbicide-tolerant traits. This information will be even more important as double and triple herbicide-tolerant traits are integrated into cotton varieties. Producers will have to consider the herbicide-tolerance traits in their cotton variety and select a herbicide with an alternative mechanism of action to control the volunteer cotton. For example, to adequately kill a cotton variety with glyphosate tolerance (Roundup Ready® or GlyTol®), it will need to be treated with a herbicide with a mechanism of action other than an EPSP inhibitor, such as a Liberty®, Gramoxone®, or others.

Herbicide options and disclaimer: The information in this publication is not a substitute for reading the label. It is meant to be a quick reference to identify potential herbicide options for controlling volunteer cotton. The information contained in this publication is based on many research trials conducted over the past several years by Texas AgriLife Extension and Research personnel. The trials evaluated many herbicides over a broad spectrum of environments and cotton growth stages.

Herbicide injury to corn, sorghum, soybean, or wheat from the herbicides listed in this publication was not evaluated and is not reported. Therefore, pay special attention to the application method (hoods, drop nozzles, post-directed) and timing for each crop.

For more information

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Table 1. Volunteer cotton control options with preplant burndown and residual herbicides

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
2,4-D Amine	1–2 pt	Corn, sorghum, soybean, wheat	May injure labeled crops if too little time passes between application and planting; see label for details; do not apply to sandy soils	Cotton: Following spring Wheat: Following year	Synthetic auxin
Clarity (dicamba)	8–32 oz	Corn, cotton, sorghum, soybean, wheat	May injure labeled crops if too little time passes between application and planting; see label for details; planting, cultivation, and rotation restrictions	Cotton: 21 days/8 oz + 1 in. rain Sorghum: 15 days/8 oz Wheat: 22 days/8 oz Soybean: 14 days/8 oz + 1 in. rain	Synthetic auxin
Glyphosate (glyphosate 3 lb/gal ae ²)	16 oz–5 qt	Nonselective, use only on Roundup Ready crops	Cultivation restrictions; some generic formulations contain 3 lb ae/gal	None	EPSP inhibitor
Gramoxone SL (paraquat)	2–4 pt	Corn, cotton, sorghum, soybean, wheat	Spray coverage is critical; apply in a minimum of 10 GPA carrier volume via ground or 5 GPA for aerial applications; always use a surfactant	None	Photosystem I inhibitor
Liberty (glufosinate)	29–43 oz	Nonselective, Liberty Link crops	Efficacy may be reduced in cool conditions and on stressed weeds	None	Glutamine synthetase inhibitor
Reflex (fomesafen)	1–1.5 pt	Cotton, soybean	Rotation restrictions; labeled for use only east of Texas Hwy 77 Cotton: 70 day PHI ³ Soybean: 45 day PHI	Cotton: 21 days + 0.5 in. rain Corn: 10 mo Sorghum: 18 mo Wheat: 4 mo Soybean: None	PPG inhibitor
Roundup (glyphosate, 4.5 lb/gal ae)	22 oz–3.3 qt	Nonselective, Roundup Ready crops	See glyphosate description above	None	EPSP inhibitor

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Table 1 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Sharpen (saflufenacil)	1.0–2.0 oz	Corn, sorghum, soybean, wheat	Rotation restrictions for cotton and soybeans; do not apply after corn, wheat, or sorghum has emerged Sorghum: 30 day planting interval Soybean: Do not apply at cracking stage or after emergence	Cotton: Following spring Soybean: 1 mo Sorghum: 0 mo	PPG inhibitor
Valor (flumioxazin)	1–3 oz	Corn, cotton, soybean	Apply within 3 days of planting but before crop emerges; treated soil contacting newly emerged crops can temporarily injure crop; rotation restrictions	Rate dependent—refer to the label	PPG inhibitor

¹ Herbicide mechanism of action—see page 4 for more information

² ae = acid equivalent

³ PHI = preharvest interval

Table 2. Volunteer cotton control options with preemergence herbicides in grain crops (corn, sorghum, soybeans, and wheat)

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Aatrex 4L (atrazine)	4 pt	Corn, sorghum	Rotation restrictions to planting cotton and wheat	Cotton: Following spring Wheat: Following year	Photosystem II inhibitor
Balance Flexx (isoxaflutole)	6 oz	Corn	Rotation restrictions; corn must be planted at least 1.5 in. deep	Cotton: 18 mo Sorghum: 6 mo	Carotenoid inhibitor
Basis (rimsulfuron + thifensulfuron)	0.33–0.5 oz	Corn	Rotation restrictions	Cotton: 10 mo Sorghum: 10 mo Soybean: 10 mo Wheat: 1 mo	ALS inhibitors
Boundary (S-metolachlor + metribuzin)	1.2–3.0 pt	Soybean	Rotation restrictions; do not use on sandy soils	Cotton: 8 mo Corn: 8 mo Sorghum: 12 mo Wheat: 4.5 mo	Mitosis inhibitor + Photosystem II inhibitor
Callisto (mesotrione)	6–7.7 oz	Corn	Rotation restrictions	Cotton: 10 mo Wheat: 4 mo Soybean: 10 mo Sorghum: Immediately	Carotenoid inhibitor
Callisto Xtra (mesotrione + atrazine)	20–24 oz	Corn	Rotation and cultivation restrictions; 60 day PHI ²	Cotton: Following spring Soybean: Following spring Sorghum: Immediately	Carotenoid inhibitor + Photosystem II inhibitor
Command (clomazone)	1.33–3.33 pt	Soybean	Rotation restrictions	Rate dependent—refer to label	Carotenoid inhibitor
Corvus (thiencarbazone + isoxaflutole)	3.33–5.6 oz	Corn	Crop must be planted at least 1.5 in. deep; rotation restrictions	Cotton: 17 mo Sorghum: 17 mo Wheat: 4 mo Soybean: 9 mo	ALS inhibitor + Carotenoid inhibitor
Integrity (saflufenacil + dimethenamid)	10–16 oz	Corn	Preplant restrictions	Cotton: Following spring	PPG inhibitor

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Table 2 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Pursuit (imazethapyr)	4 oz	Corn, soybean	Apply only to Clearfield corn; rotation restrictions	Cotton: 18 mo Corn: refer to label Sorghum: 18 mo Wheat: 4 mo	ALS inhibitor
Lumax (S-metolachlor + atrazine + mesotrione)	2.5 qt/a	Corn, sorghum	Corn: Do not apply more than 14 days before planting Sorghum: must be Concept treated seed; application within 7 days of planting may cause injury	Cotton: Following spring Wheat: 4.5 mo Soybean: Following spring	Mitosis inhibitor + photosystem II inhibitor + carotenoid inhibitor
Python (flumetsulam)	0.8–1.33 oz	Corn, soybean	Rotation restrictions; corn must be planted at least 1.5 in. deep; on sand or loamy sand textured soils, use the low end of the application rate	Cotton: 26 mo Sorghum: 12 mo	ALS inhibitor
Sharpen (saflufenacil) + G-max Lite (dimethenamid + atrazine)	1–3 oz Sharpen + 2–3.5 pt G-max Lite	Corn, sorghum	Rotation restrictions; planting interval	Cotton: Following spring Corn: 80 day PHI ² Sorghum: 70 day PHI	PPG inhibitor + mitosis inhibitor + photosystem II inhibitor
SureStart (acetochlor + flumetsulam + clopyralid)	1.5–2 pt	Corn	Rotation restrictions; crop must be planted at least 1.5 in. deep; 85 day PHI	Cotton: 26 mo Sorghum: 12 mo	Mitosis inhibitor + ALS inhibitor + synthetic auxin

¹ Herbicide mechanism of action—see page 4 for more information

² PHI = preharvest interval

Table 3. Volunteer cotton control options with early postemergence herbicides in grain crops

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
2,4-D Amine	0.5–1.5 pt or 4 lb/gal 0.33–66 pt/a or 6 lb/gal	Corn, sorghum, wheat	Maximum rate and timing varies by crop; refer to label for specifics Corn: Apply when crop is less than 8 in. tall; use drop nozzles for corn over 8 in. tall Sorghum: Apply when crop is 6–15 in. tall Wheat: Apply to crop after tilling but before boot stage	Cotton: Following spring Wheat: Following year	Synthetic auxin
Aatrex 4L (atrazine)	2.4 pt	Corn, sorghum	Rotation restrictions; apply before crops are 12 in. tall	Cotton: Following spring	Photosystem II inhibitor
Affinity Broadspec (thifensulfuron + tribenuron)	0.4–1 oz	Wheat	Apply from 2 leaf stage to before the flag leaf emerges	Cotton: 14 days Corn: 14 days Sorghum: 14 days	ALS inhibitor
Aim (carfentrazone)	0.5–1 oz	Corn, sorghum, soybean, wheat	Corn: Apply from planting to 8 leaf collar stage Sorghum: Apply from planting to 6 leaf stage Soybean: Apply from 30 days before planting up to third trifoliate Wheat: Apply from planting to jointing stage	None	PPG inhibitor
Autumn (iodosulfuron)	0.3 oz	Corn, soybean	Planting and rotation restrictions	Cotton: 9–18 mo—refer to label Corn: 1 mo Soybean: 3 mo Sorghum: 9 mo Wheat: 4 mo	ALS inhibitor
Axiom (flufenacet + metribuzin)	4–10 oz	Wheat	Apply to crop from spiking to 2 leaf stage; crop must be planted 1–2 in. deep	Cotton: 8 mo Corn: None Soybean: None	Mitosis inhibitor + Photosystem II inhibitor

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Table 3 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Buctril (bromoxynil)	1–1.5 pt	Corn, sorghum, wheat	Cultivation and rotation restrictions Corn: Apply to crop from 3 leaf to before tasseling stage Sorghum: Apply to crop between 3 leaf and preboot stage Wheat: Apply to crop from emergence to before boot stage	Cotton: 1 mo Corn: 1 mo Sorghum: 1 mo Soybean: 1 mo Wheat: 1 mo	Photosystem II inhibitor
Cadet (fluthiacet-methyl)	0.6–0.9 oz	Corn, soybean	Cultivation restrictions Corn: Apply to crop preplant to 48 in. tall but before tasseling stage; 30 day PHI Soybean: Apply from preplant to full flowering stage; 60 day PHI	None	PPG inhibitor
Callisto (mesotrione)	3 oz	Corn	Cultivation and rotation restrictions; apply to crop up to 30 in. or 8 leaf stage; 45 day PHI	Cotton: 10 mo Wheat: 4 mo Soybean: 10 mo Sorghum: Immediately	Carotenoid inhibitor
Capreno (thiencarbazone + tembotrione)	3 oz	Corn	Cultivation and rotation restrictions; apply to crop from 1 leaf collar (V1) to V6 stage	Cotton: 10 mo Sorghum: 10 mo Wheat: 4 mo	ALS inhibitor + carotenoid inhibitor
Clarity (dicamba)	2–16 oz	Corn, sorghum, wheat	Rate depends on crop Corn: Apply to crop from emergence to 5 leaf stage or 8 in. tall Sorghum: Apply to crop from spike stage to 15 in. tall, 30 day PHI Wheat: Apply to crop from emergence to before joint stage (fall), 7 day PHI; apply to crop from emergence to before 6 leaf stage (spring)	Cotton: 21 days/8 oz + 1 in. rain Sorghum: 15 days/8 oz Wheat: 22 days/8 oz Soybean: 14 days/8 oz + 1 in. rain	Synthetic auxin

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Table 3 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
CleanWave (aminopyralid + fluroxypyr)	14 oz	Wheat	Rotation restrictions	Cotton: 24 mo Corn: 4 mo Sorghum: 4 mo Soybean: 18 mo	Synthetic auxins
ET (pyraflufen-ethyl)	0.5–2 oz	Corn, soybean, wheat	Corn: Apply to crop from emergence to V4 stage; 7 day PHI Soybean: Apply to crop from emergence to V6 stage, 70 day PHI Wheat: 60 day PHI	Cotton: None Corn: None Sorghum: 1 mo Soybean: None Wheat: None	PPG inhibitor
Evik	2.0 lb/a	Corn	Directed spray to corn 12 in. or taller; apply at least 20 GPA carrier volume	Cotton: 11 mo Sorghum: 11 mo Soybean: 11 mo Wheat: 3 mo	Photosystem II inhibitor
Glyphosate, 4.5 lb/gal ae ³	16–32 oz	Nonselective, use over Roundup Ready® crops only	Shielded sprayer applications to sorghum over 12 inches tall	None	EPSP inhibitor
Gramoxone SL (paraquat)	1–2 pt	Corn, cotton, sorghum, soybean	Shielded sprayer applications only Corn: Apply before crop is 10 in. tall Sorghum: Apply before crop is 12 in. tall; 48 day PHI	None	Photosystem I inhibitor
Huskie (pyrasulfotole + bromoxynil)	11–15 oz 13–16 oz	Wheat Sorghum	Apply from 1 leaf to flag leaf emergence; rotation restrictions Sorghum: Apply from 3 leaf stage of growth up to 12 inches tall. Add 1 lb/a AMS	Cotton: Bioassay Corn: 9 mo Sorghum: 4 mo Soybean: 4 mo	Carotenoid inhibitor + Photosystem II inhibitor
Laudis (tembotrione)	3 oz	Corn	Rotation restrictions; may be applied from emergence to V8 stage	Cotton: 10 mo Sorghum: 10 mo	Carotenoid Inhibitor

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Table 3 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Liberty (glufosinate)	22–29 oz	Nonselective, Liberty Link [®] Corn and Liberty Link [®] Soybean	Cultivation restrictions; 70 day PHI for corn, cotton and soybeans Corn: Apply from emerge to 36 in.; do not exceed 22 oz in a single application Soybean: Apply from emergence to before bloom Wheat: 70 day planting interval	None	Glutamine synthetase inhibitor
Lumax (S-metolachlor + atrazine + mesotrione)	2.5 qt/a	Corn, sorghum	Do not apply corn taller than 12 in.	Cotton: Following spring Soybean: Following spring Wheat: 4.5 mo	Mitosis inhibitor + Photosystem II inhibitor + carotenoid inhibitor
Peak (prosulfuron)	0.38–1 oz	Corn, sorghum, wheat,	Rotation, cultivation, and planting restrictions; 60 day PHI Corn: Apply when crop is 4–30 in. tall Sorghum: Apply when crop is 5–30 in. tall or before head emergence	Cotton: 10–18 mo, depending on location Soybean: 10–18 mo, depending on location Wheat: 1 mo	ALS inhibitor
Python (flumetsulam)	0.8–1.33 oz	Corn, soybean	85 day PHI; rotation restrictions; plant corn at least 1.5 in. deep	Cotton: 26 mo Sorghum: 12 mo	ALS inhibitor
Spirit (prosulfuron + primisulfuron)	1 oz	Corn	Apply when crop is between 4–24 in. tall; cultivation restrictions; do not apply after June 30 when rotating to a Spirit-sensitive crop	For soil pH below 7.8 Cotton: 10 mo Soybean: 10 mo Sorghum: 10 mo Wheat: 3 mo	ALS inhibitor
Starane (fluroxypyr)	0.66 pt	Corn, sorghum, wheat	Corn: Apply up to V5 stage; 90 day PHI ² Sorghum: Apply between 3–7 leaf stage; 70 day PHI Wheat: Apply between 2 leaf and flag leaf stages; 40 day PHI	Not stated on label	Synthetic auxin

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Table 3 continued

Product	Rate/acre (product)	Crop labeled	Remarks	Rotation restrictions	Herbicide mechanism of action ¹
Status (diflufenzopyr + dicamba)	5–10 oz	Corn	Do not apply to corn more than 36 in. tall, V10 stage, or within 15 days before tassel emergence, whichever comes first; 72 day PHI; crop rotation restrictions	Cotton: 4 mo Sorghum: 4 mo Soybean: 4 mo Wheat: 4 mo	Auxin transport inhibitor + synthetic auxin
Stinger (clopyralid)	0.25–0.33 pt	Corn, wheat	Corn: Apply from emergence to 24 in. tall Wheat: Apply from 3 leaf to early boot stage	Cotton: 18 mo Sorghum: 10.5 mo Soybean: 18 mo	Synthetic auxin

¹ Herbicide mechanism of action—see page 4 for more information

² PHI = preharvest interval

³ ae = acid equivalent

Table 4. Postemergence herbicides and their expected efficacy when applied with appropriate additives and carrier volume.

Treatment	Rate (oz/A)	Efficacy rating	
		1-4 leaf cotton	5-8 leaf cotton
2,4-D	16	8	7
2,4-D	24	9	9
2,4-DB	12.8	8	—
Affinity Broadspec	1	7	7
Aim	1	9	6
Atrazine	16	3	2
Atrazine	32	7	2
Atrazine	64	9	5
Autumn Herbicide	0.3	5	3
Basagran	32	4	—
Buctril	8	7	6
Buctril	16	9	8
Cadet	0.6	7	3
Cadet	0.9	7	5
Callisto	3	7	5
Caperno	3	8	5
Classic	0.67	2	—
Clarity	8	8	7
Cleanwave	14	6	—
Cobra	12.5	2	—
ET	1.5	6	5
ET	2	8	6
Glyphosate (4.5 lb ae)	16	6	4
Glyphosate (4.5 lb ae)	32	9	8

Treatment	Rate (oz/A)	Efficacy rating	
		1-4 leaf cotton	5-8 leaf cotton
Gramoxone SL	24	9	3
Gramoxone SL	32	9	5
Halex + atrazine	58 + 32	9	8
Huskie	15	9	7
Laudis	3	8	5
Lay by Pro (linuron)	32	8	5
Liberty	29	9	7
Peak	0.75	6	4
Peak + atrazine	1 + 32	9	5
Pursuit	2	2	—
Pursuit	4	4	—
Python	1	8	6
Reflex	24	1	—
Sharpen	1.5	9	5
Sharpen	2	9	7
Spirit	1	4	3
Spirit	2	5	4
Starane	6.4	9	6
Starane	10	9	9
Status	5	9	8
Status	10	9	9
Stinger	5.3	6	5
Surestart	28	7	6
Ultra Blazer	24	1	—

*0 = no control and 9 = excellent control of volunteer cotton plants

Table 5. Preemergence herbicides and their expected efficacy when applied with appropriate additives and carrier volume

Treatment	Rate (oz/A)	Efficacy rating (0–9)*	Treatment	Rate (oz/A)	Efficacy rating (0–9)*
Atrazine	32	3	Corvus	5.6	4
Atrazine	64	5	Integrity	16	8
Axiom	20	6	Lumax	80	4
Balance Flex	6	4	Python	0.7	4
Basis	0.66	4	Python	1.3	5
Boundary	16	6	Pursuit	2	3
Boundary	32	8	Pursuit	4	4
Callisto	3	3	Sharpen + G-max	3 + 48	7
Callisto	6	5	SureStart	28	7
Callisto Xtra	24	4	Valor	2	2
Command	24	4	Valor	3	4
Command	48	5			

*0 = no control and 9 = excellent control of volunteer cotton plants

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