



# **Managing Volunteer Cotton in Grain Crops**

**(Corn, Sorghum, Soybean, and Wheat)**

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## **Introduction:**

The overwhelming adoption of cotton varieties with double and triple stacked herbicide tolerant traits (GlyTol®/LibertyLink®, XtendFlex®, and Enlist™) provides cotton producers with some excellent weed management options, and has provided growers with new herbicide options for controlling glyphosate resistant weeds and other difficult to control weeds. In Texas, over 98% of the cotton acres are planted to cotton varieties that include one or more of these herbicide tolerant traits. Despite the many opportunities these traits provide to farmers, they do create some challenges in off-target movement into sensitive crops, chemical stalk destruction and managing volunteer cotton. For example, consecutive plantings of herbicide tolerant crops can lead to herbicide tolerant volunteer cotton, corn, or soybean plants; therefore, these volunteers meet the definition of a weed (an unwanted plant). Volunteer crop plants compete for essential nutrients, water, and light with the crop and can cause harvest issues. Additionally, volunteer cotton plants can be very challenging to manage in other crops such as corn, sorghum, soybeans, or wheat, depending on the herbicide tolerant genes they contain. Volunteer cotton plants can be quite problematic because they can serve as a host for the boll weevil (*Anthonomus grandis* L.) within the grain crops and negatively influence the Texas Boll Weevil Eradication Program (TBWEP) and create added expenses in the eradication program.

## **2019 and beyond:**

Over the next couple of years, over 90% of the cotton planted in Texas will likely be either XtendFlex® (glyphosate, glufosinate, and dicamba tolerant) or Enlist™ (glyphosate, glufosinate, and 2,4-D tolerant) varieties. Additionally, in the next few years the HPPD inhibitor resistant cotton trait will likely be stacked with current herbicide traits, making cotton varieties tolerant to 4 modes-of-action.

## **The problem:**

There are two major factors that contribute to the need to remove volunteer cotton from various crops in all the crop production regions of the state. First, the yield loss associated with the competition that volunteer cotton can cause. Second, the hindrance to the success of the TBWEP (primarily a problem for South and Eastern Texas where the TBWEP is still active) due to volunteers serving as hostable plants for the boll weevil both in cropland and non-cropland. From the crop competition perspective, 80 to 90% control by any herbicide would be considered acceptable by most producers. However, in quarantined zones of the TBWEP (Figure 1), there is a zero tolerance for volunteer cotton in non-cotton fields, also referred to as non-commercial cotton. In these quarantined zones, the legal requirement set by the Texas Department of Agriculture is a zero tolerance for hostable non-commercial cotton plants (6-8 leaf plants or larger). Essentially, non-cotton fields must be kept completely void of hostable cotton plants for the entire year. Complete control is a challenge but can be accomplished with timely herbicide applications and appropriate herbicide selection. Assisting with these decisions is the primary objective of this publication.



- Lower Rio Grande Valley Zone – non-commercial hostable plants should be prevented or destroyed.
- East Texas Maintenance Area.
- West Texas Maintenance Area.

**Figure 1. Map of the Texas Boll Weevil Eradication zones for Texas.**

## **Management options:**

There are five key times during the year for managing volunteer cotton, including fallow, preplant, preemergence, within season, and post-harvest. The best management strategy(s) will depend on local weather patterns, crop rotation, tillage regime, and other factors. The information in this publication primarily focuses on herbicide management options in corn, sorghum, soybean, and wheat because these are the most difficult decisions. However, tillage (disking or cultivation) should also be considered as a management tool in the decision-making process both prior to planting, within season, and post-harvest.

**Tillage:** Tillage is probably one of the most effective tools for managing volunteer cotton in fallow situations or prior to planting any crops. However, in-season crop cultivation will leave approximately 15-25% of the area undisturbed where cotton plants can survive. Although the 75 to 85% control obtained with cultivation should suffice for minimizing crop competition, this level of control is not acceptable to the TBWEP.

**Herbicides:** Various herbicides will provide excellent volunteer cotton control during either the fallow period or growing season. However, only a few herbicides specifically list management of volunteer cotton on their label. For optimum results, it is always important to follow the herbicide label for rate, application timing, additives, carrier volume, etc.

**Preplant burndown herbicide:** A detailed list of herbicide products labeled in corn, sorghum, soybean, and wheat are included in **Table 1**. The estimated efficacy of these products can be extrapolated from **Table 5** for the postemergence herbicides. Plant back restrictions are an important consideration before making a pre-plant herbicide application.

**Preemergence herbicides:** See **Table 2** for herbicides labeled in corn, sorghum, and soybean. The most effective preemergence herbicides will likely only reduce cotton stands by about 65%, and 2 lb/a of atrazine only reduced stands by 30%. See **Table 4** for specific preemergence herbicide efficacy ratings. Preemergence herbicides can be used as another tool for managing volunteer cotton, but other tactics will likely have to be employed to obtain complete control. The efficacy of preemergence herbicides listed in this publication should not be impacted by the current herbicide tolerant traits in the market in 2019. However, when HPPD inhibitor resistance is commercially available this will impact the efficacy of multiple preemergence herbicides.

### **Postemergence herbicide:**

- **1-4 leaf cotton:** The postemergence herbicides labeled in corn, sorghum, soybean, and wheat are listed in Table 3. To provide good to excellent control and allow for the greatest number of herbicide options, volunteer cotton plants must be small (1-4 leaf stage). See efficacy ratings in **Table 5**.

- **Greater than 4 leaf cotton:** Once cotton is beyond the 5 leaf stage, it is very difficult to get complete kill of the cotton plant, due to its perennial nature. As a result, highly effective herbicide options decrease dramatically, and are virtually narrowed down to 2,4-D, dicamba, other auxin herbicides, and bromoxynil. See efficacy ratings in **Table 5**. If the volunteer cotton is XtendFlex® or Enlist™, the options for effective herbicides are even more limited. Note that none of the herbicides provided 100% volunteer cotton control when applied at the 5-6 leaf stage.

**Hostable Plants for Boll Weevil:** Any cotton at pin-head square stage or beyond is considered hostable for the boll weevil. Additionally, enforcement by Texas Department of Agriculture of volunteer cotton guidelines begins at the pin-head square stage. It is critical to prevent volunteer cotton plants from reaching this stage for the overall success of the Texas Boll Weevil Eradication Program (TBWEP) and to prevent the levying of any fees or fines for volunteer (non-commercial) cotton found in fields. To ensure the highest herbicide efficacy and eradicate boll weevil hostable plants, volunteer cotton should not exceed the 4 leaf stage at the time of herbicide application. Cotton plants at or beyond the 5 leaf stage have a high probability of surviving the herbicide application and becoming hostable plants in the future.

**Site-of-Action:** Knowing the site-of-action of an herbicide is necessary to effectively manage volunteer cotton plants, especially with numerous herbicide tolerant traits in most cotton varieties. Producers will have to consider the herbicide tolerant traits in their cotton variety and select an herbicide with an alternative site-of-action to control the volunteer cotton. For example, to adequately kill a cotton variety with XtendFlex® traits, an herbicide with a site-of-action other than an EPSP inhibitor, Glutamine synthetase inhibitor, or Dicamba must be selected, such as Gramoxone®, Atrazine, or 2,4-D.

**Reduced Herbicide Susceptibility:** Growers should also be aware that while Enlist™ and XtendFlex® cotton varieties are tolerant to 2,4-D and dicamba, respectively, those varieties will also have reduced susceptibility to other auxin herbicides. Enlist™ cotton is tolerant to labeled rates of 2,4-D but also has reduced susceptibility to other auxin herbicides, including triclopyr (common trade name of Remedy®), fluroxypyr (common trade name of Starane®), and MCPA. XtendFlex® cotton is tolerant to labeled rates of dicamba herbicides but has reduced susceptibility to MCPA.

**Cross Tolerance between 2,4-D and Dicamba:** Despite cotton being primarily a self-pollinated crop, some cross pollination does occur. In these situations, it is possible that some of the seed from last year's crop, and this year's volunteers, have tolerance or reduced susceptibility to glyphosate, glufosinate, 2,4-D, dicamba, fluroxypyr, triclopyr, and MCPA. This does not leave many herbicide options for controlling the volunteers, especially if they exceed the 4 leaf stage.

**Herbicide Options and Disclaimer:** The information provided within this publication is not a substitute for reading the label. It is meant to be a quick reference to identify some potential herbicide options for controlling volunteer cotton. The information contained in this publication is based on numerous research trials that have been conducted over the past several years by Texas AgriLife Extension and Research personnel. The objective in each of these trials has been to evaluate numerous herbicides over a broad spectrum of environments and cotton growth stages. **Herbicide injury to corn, sorghum, soybean, or wheat was not reported. Special attention should be paid to the application method (hoods, drop nozzles, post-directed) and timing for each of these crops**

**TABLE 1. Volunteer Cotton Control Options with Preplant Burndown and Residual Herbicides**

<b>Product</b>	<b>Rate/acre (product)</b>	<b>Crop Labeled</b>	<b>Remarks</b>	<b>Rotation Restrictions</b>	<b>Site of Action</b>
2,4-D Amine	1-2 pt	Corn, Sorghum, Soybean, Wheat	May cause injury to labeled crops if adequate time does not occur between application and planting. See label for details. Do not apply to sandy soils. <b>Will not control cotton with the Enlist trait.</b>	Cotton – Following spring Wheat – following year	Synthetic Auxin
Clarity (dicamba)	8-32 oz	Corn, Cotton, Sorghum, Soybean, Wheat	May cause injury to labeled crops if adequate time does not occur between application and planting. See label for details. Planting, cultivation and rotation restrictions. <b>Will not control cotton with the XtendFlex trait.</b>	Cotton – 21 days/8 fl oz + 1” rain Sorghum – 15 days/8 fl oz Wheat – 22 days/8 fl oz Soybean – 14 days/8 fl oz + 1” rain	Synthetic Auxin
Glyphosate (glyphosate 3 lb./gal ae)	16 oz-5 qt	Non-selective, use only on Roundup Ready Crops	Cultivation restrictions; some generic formulations contain 3 lb ae/gal. <b>Will not control cotton with the RoundupReady or GlyTol traits.</b>	None	EPSP inhibitor
Gramoxone SL (paraquat)	2-4 pt	Corn, Cotton, Sorghum, Soybeans, 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 electron diverter
Liberty or Cheetah (glufosinate)	29-43 oz	Non-selective, Liberty Link Crops	Reduced efficacy may occur under cool conditions and stressed weeds. <b>Will not control</b>	None	Glutamine synthetase inhibitor

			<b>cotton with LibertyLink, Enlist, or XtendFlex traits.</b>		
Reflex (fomesafen)	1-1.5 pt	Cotton, Soybeans	Rotation Restrictions; Labeled for use only East of Hwy 77 in Texas; <u>Cotton</u> : 70 day pre harvest interval (PHI); <u>Soybean</u> : 45 day PHI.	Cotton – 21 days + 0.5” rain Corn – 10 months Sorghum – 18 months Wheat – 4 month Soybean - None	PPO inhibitor
Roundup (glyphosate, 4.5 lb./ gal ae)	22 oz-3.3 qt	Non-selective, Roundup Ready Crops	See glyphosate description above	None	EPSP inhibitor
Sharpen (saflufenacil)	1.0-2.0 oz	Corn, Sorghum, Soybean, Wheat	Rotation restrictions for cotton & soybeans; Do not apply after corn, wheat or sorghum has emerged; <u>Sorghum</u> : 30 day planting interval; <u>Soybean</u> : Do not apply at cracking stage or after emergence	Cotton – Following spring Soybean – 1 month Sorghum – 0 month	PPO 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 may result in temporary crop injury; Rotation restrictions	Rate dependent – refer to label	PPO inhibitor

The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas AgriLife Extension Service is implied.

**TABLE 2. Volunteer Cotton Control Options with Preemergence Herbicides in Grain Crops (Corn, Sorghum, Soybeans, and Wheat)**

<b>Product</b>	<b>Rate/acre (product)</b>	<b>Crop Labeled</b>	<b>Remarks</b>	<b>Rotation Restrictions</b>	<b>Site of Action</b>
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” deep.	Cotton – 10 months Sorghum – 6 months Soybean – 6 months Wheat – 4 months	HPPD Inhibitor
Basis (rimsulfuron + thifensulfuron)	0.33-0.5 oz	Corn	Rotation restrictions.	Cotton – 10 months Sorghum – 10 months Soybean – 10 months Wheat – 3-9 months	ALS inhibitors
Boundary 6.5 EC (S-metolachlor + metribuzin)	1.2-3.0 pt	Soybeans	Rotation restrictions; do not use on sandy soils.	Cotton - 8 months Corn – 8 months Sorghum – 12 months Wheat – 4.5 months	Mitosis inhibitor+ Photosystem II inhibitor
Callisto (mesotrione)	6-7.7 oz	Corn	Rotation restrictions.	Cotton – 10 months Wheat – 4 months Soybeans – 10 months Sorghum – immediately	HPPD inhibitor
Callisto Xtra (mesotrione + atrazine)	20-24 oz	Corn	Rotation & cultivation restrictions; 60 day pre harvest interval.	Cotton – Following spring Soybean – Following spring Sorghum – Immediately Wheat – Following spring	HPPD inhibitor + Photosystem II inhibitor
Command 3ME (clomazone)	1.33-3.33 pt	Soybean	Rotation restrictions.	Rate dependent – refer to label	DOXP synthase inhibitor
Corvus (thiencarbazone + isoxaflutole)	3.33-5.6 oz	Corn	Crop must be planted at least 1.5” deep; rotation restrictions.	Cotton – 17 months Sorghum 17 months Wheat – 4 months Soybean – 9 months	ALS inhibitor + HPPD inhibitor

Product	Rate/acre (product)	Crop Labeled	Remarks	Rotation Restrictions	Site of Action
Lumax (S-metolachlor + atrazine + mesotrione)	2.5 qt/a	Corn and Sorghum	<u>Corn</u> : Do not apply more than 14 days prior to planting. <u>Sorghum</u> : must be Concept treated seed. Application within 7 days of planting may cause injury.	Cotton – Following spring Wheat – 4.5 months Soybean – Following spring	Mitosis inhibitor + Photosystem II inhibitor + HPPD inhibitor
Pursuit (imazethapyr)	4 oz	Corn, Soybeans	Apply only to Clearfield® corn; Rotation restrictions.	Cotton – 18 months Corn – refer to label Sorghum – 18 months Wheat – 4 months	ALS inhibitor
Python WDG (flumetsulam)	0.8-1.33 oz	Corn, Soybeans	Rotation restrictions; <u>Corn</u> must be planted at least 1.5” deep; use the low end of the application rate on sand or loamy sand textured soils.	Cotton – 26 months Sorghum - 12 months	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; <u>Corn</u> : 80 day pre harvest interval (PHI); <u>Sorghum</u> : 70 day PHI.	Cotton – Following spring	PPO 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” deep; 85 day pre harvest interval;	Cotton – 26 months Sorghum – 12 months	Mitosis inhibitor + ALS inhibitor + Synthetic auxin
Verdict (saflufenacil + dimethenamid)	10-18 oz	Corn	Preplant restrictions.	Cotton – 6 to 9 months Sorghum – 0 to 1 month Soybean – 4 to 6 months Wheat – 4 months	PPO inhibitor + Mitosis inhibitor

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**TABLE 3. Volunteer Cotton Control Options with Early Postemergence Herbicides in Grain Crops**

<b>Product</b>	<b>Rate/acre (product)</b>	<b>Crop Labeled</b>	<b>Remarks</b>	<b>Rotation Restrictions</b>	<b>Site of Action</b>
2,4-D Amine	0.5-1.5 pt of <u>4 lb/gal</u>  0.33-66 pt/a of <u>6 lb/gal</u>	Corn, Sorghum, Wheat	Maximum rate and timing varies by crop. Refer to label for specifics. <u>Corn</u> : Apply when crop is less than 8” tall; use drop nozzles for corn over 8” tall <u>Sorghum</u> : Apply when crop is 6-15” tall; <u>Wheat</u> : Apply to crop after tillering but before boot stage. <b>Will not control cotton with the Enlist trait.</b>	Cotton – Following spring Wheat – following year	Synthetic auxin
Aatrex 4L (atrazine)	2.4 pt	Corn, Sorghum	Rotation restrictions; Apply before crops are 12” 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 inhibitors
Aim (carfentrazone)	0.5-1 oz	Corn, Sorghum, Soybeans, Wheat	<u>Corn</u> : Apply from planting to 8 leaf collar stage; <u>Sorghum</u> : Apply from planting to 6 leaf stage; <u>Soybeans</u> : Apply from 30 days prior to planting up to third trifoliolate; <u>Wheat</u> : Apply from planting to jointing stage.	None	PPO inhibitor
Axiom (flufenacet+ metribuzin)	4-10 oz	Wheat	Apply to crop from spiking to 2 leaf stage; Crop must be planted 1-2” deep.	Cotton – 8 months Corn – None Soybean – None	Mitosis inhibitor + Photosystem II inhibitor
Broclean, Maestro 2 EC (bromoxynil)	1-1.5 pt	Corn, Sorghum, Wheat	Cultivation & rotation restrictions: <u>Corn</u> : Apply to crop from 3 leaf to before tasseling stage; <u>Sorghum</u> : Apply to crop between 3 leaf and preboot stage; <u>Wheat</u> : Apply to crop from emergence to prior to boot stage.	Cotton – 1 month Corn – 1 month Sorghum – 1 month Soybean – 1 month Wheat – 1 month	Photosystem II inhibitor

Cadet (fluthiacet- methyl)	0.6-0.9 oz	Corn, Soybeans	Cultivation restrictions; Corn: Apply to crop preplant to 48" tall but before tasseling stage, 30 day pre harvest interval (PHI); Soybean: Apply from preplant to full flowering stage; 60 day PHI.	None	PPO inhibitor
Callisto (mesotrione)	3 oz	Corn	Cultivation & rotation restrictions; Apply to crop up to 30" or 8 leaf stage; 45 day pre harvest interval.	Cotton – 10 months Wheat – 4 months Soybeans – 10 months Sorghum – immediately	HPPD Inhibitor
Capreno (thiencarbazono + tembotrione)	3 oz	Corn	Cultivation & rotation restrictions; Apply to crop from 1 leaf collar (V1) to V6 stage.	Cotton - 10 months Sorghum - 10 months Wheat – 4 months	ALS inhibitor + HPPD inhibitor
Clarity (dicamba)	2-16 oz	Corn, Sorghum, Wheat	Rate dependent on crop. <u>Corn</u> : Apply to crop from emergence to 5 leaf stage or 8" tall; <u>Sorghum</u> : Apply to crop from spike stage to 15" tall, 30 day pre harvest interval (PHI); <u>Wheat</u> : Apply to crop from emergence to prior to joint stage (fall), 7day PHI, Apply to crop from emergence to prior to 6 leaf stage (spring). <b>Will not control cotton with the XtendFlex trait.</b>	Cotton – 21 days/8 oz + 1" rain Sorghum – 15 days/8 oz Wheat – 22 days/8 oz Soybean – 14 days/8 oz + 1" rain	Synthetic auxin
CleanWave (aminopyralid + fluroxypyr)	14 oz	Wheat	Rotation restrictions.	Cotton – 24 months Corn – 4 months Sorghum – 4 months Soybean – 18 months	Synthetic auxins
ET (pyraflufen- ethyl)	0.5-2 oz	Corn, Soybeans, Wheat	<u>Corn</u> : Apply to crop from emergence to V4 stage; 7 day pre harvest interval (PHI); <u>Soybean</u> : Apply to crop from emergence to V6 stage, 70 day PHI; <u>Wheat</u> : 60 day PHI.	Cotton – None Corn – None Sorghum – 1 month Soybean – None Wheat - None	PPO inhibitor

Evik (ametryn)	2.0 lb/a	Corn	Directed spray to corn 12" or taller. Apply a minimum of 20 GPA carrier volume.	Cotton – 11 months Sorghum – 11 months Soybean – 11 months Wheat – 3 months	Photosystem II inhibitor
Glyphosate, 4.5 lb./ gal ae	16- 32 oz	Non-selective, use over Roundup Ready® crops only	Shielded sprayer applications to sorghum over 12 inches tall. <b>Will not control cotton with RoundupReady/GlyTol traits.</b>	None	EPSP inhibitor
Gramoxone SL 2.0 (paraquat)	1-2 pt	Corn, Cotton, Sorghum, Soybeans	Shielded sprayer applications only. <u>Corn</u> : Apply before crop is 10" tall; <u>Sorghum</u> : Apply before crop is 12" tall, 48 day pre harvest interval.	None	Photosystem I electron diverter
Huskie (pyrasulfotole + bromoxynil)	Wheat: 11-15 oz Sorghum: 12.8-16 oz	Wheat, Sorghum	<u>Wheat</u> : Apply from 1 leaf to flag leaf emergence; <u>Sorghum</u> : Apply from 3 leaf stage of growth up 12 inches tall. Add 1 lb/a AMS. Note rotation restrictions.	Cotton – bioassay Corn – 4 months Sorghum – 7 days Soybean – 4 months	HPPD inhibitor + Photosystem II inhibitor
Liberty or Cheetah (glufosinate)	22-29 oz	Non-selective, Liberty Link® Corn and Liberty Link® Soybean	Cultivation restrictions; 70 day pre harvest interval for corn, cotton & soybeans; <u>Corn</u> : Apply from emerge to 36"; Do not exceed 22 oz in a single application; <u>Soybeans</u> : Apply from emergence to before bloom; <u>Wheat</u> : 70 day planting interval. <b>Will not control cotton with LibertyLink, Enlist, or XtendFlex traits.</b>	None	Glutamine synthetase inhibitor
Laudis (tembotrione)	3 oz	Corn	Rotation restrictions; May be applied from emergence to V8 stage.	Cotton – 10 months Sorghum – 10 months Soybean – 8 months	HPPD Inhibitor

Lumax (S-metolachlor + atrazine + mesotrione)	2.5 qt/a	Corn, Sorghum	Do not apply corn greater than 12” tall.	Cotton – Following spring Soybean – Following spring Wheat – 4.5 months	Mitosis inhibitor + Photosystem II inhibitor + HPPD inhibitor
Peak (prosulfuron)	0.38-1 oz	Corn, Sorghum, Wheat,	Rotation, cultivation & planting restrictions; 60 day pre harvest interval; <u>Corn</u> : Apply when crop is between 4-30” tall; <u>Sorghum</u> : Apply when crop is between 5-30” tall or before head emergence.	Cotton – 10-18 months Corn – 1 month Sorghum – 1 month Soybean – 10-18 months Wheat – 1 month	ALS inhibitor
Python WDG (flumetsulam)	0.8-1.33 oz	Corn, Soybean	85 day pre harvest interval; Rotation restrictions; plant corn at least 1.5” deep.	Cotton – 18 months Sorghum - 12 months Wheat - none	ALS inhibitor
Spirit (prosulfuron + primisulfuron)	1 oz	Corn	Apply when crop is between 4-24” tall; Cultivation restrictions; Do not make application after June 30 when rotating to a Spirit-sensitive crop.	For soil pH below 7.8 Cotton – 10 months Soybean – 10 months Sorghum – 10 months Wheat – 3 months	ALS inhibitors
Starane Ultra (fluroxypyr)	0.4 pt	Corn, Sorghum, Wheat	<u>Corn</u> : Apply up to V5 stage, 90 day pre-harvest interval (PHI); <u>Sorghum</u> - apply between 3-7 leaf stage, 70 day PHI; <u>Wheat</u> : Apply between 2 leaf and flag leaf stages, 40 day PHI. <b>Will have little or no activity on cotton with the Enlist trait.</b>	Not stated on label	Synthetic auxin
Status (diflufenzopyr + dicamba)	5-10 oz	Corn	Do not apply to corn more than 36” tall, or V10 stage, or within 15 days before tassel emergence, whichever comes first; 72 day pre-harvest interval; Crop rotation restrictions.	Cotton – 4 months Sorghum – 4 months Soybean – 4 months Wheat – 4 months	Auxin Transport inhibitor + Synthetic auxin

			<b>Will have reduced activity on cotton with the XtendFlex trait.</b>		
Stinger (clopyralid)	0.25-0.33 pt	Corn, Wheat	<u>Corn</u> : Apply from emergence to 24” tall; <u>Wheat</u> : Apply from 3 leaf to early boot stage.	Cotton – 18 months Sorghum – 10.5 months Soybean – 18 months	Synthetic auxin

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**TABLE 4. Preemergence herbicides and their expected efficacy when applied with appropriate additives and carrier volume.**

Treatment	Rate(oz/A)	Efficacy Rating (0-9)*
Atrazine	32	3
Atrazine	64	5
Axiom	20	6
Balance Flex	6	4
Basis	0.66	4
Boundary	16	6
Boundary	32	8
Callisto	3	3
Callisto	6	5
Callisto Xtra	24	4
Command	24	4
Command	48	5
Corvus	5.6	4

Treatment	Rate(oz/A)	Efficacy Rating (0-9)*
Integrity	16	8
Lumax	80	4
Python	0.7	4
Python	1.3	5
Pursuit	2	3
Pursuit	4	4
Sharpen + G-max	3+48	7
SureStart	28	7
Valor	2	2
Valor	3	4

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

**TABLE 5. Postemergence herbicides and their expected efficacy when applied with appropriate additives and carrier volume.**

Treatment	Rate (oz/A)	1-4 lf cotton	5-8 lf cotton
2,4-D <sup>&amp;</sup>	16	8	7
2,4-D <sup>&amp;</sup>	24	9	9
2,4-DB <sup>&amp;</sup>	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

Treatment	Rate (oz/A)	1-4 lf cotton	5-8 lf cotton
Capeno	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
Gramoxone SL	24	9	3
Gramoxone SL	32	9	5
Halex+Atrazine	58+32	9	8
Huskie	15	9	7
Liberty+	29	9	7
Laudis	3	8	5

Treatment	Rate (oz/A)	1-4 lf cotton	5-8 lf cotton
Lay by Pro (linuron)	32	8	5
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

Treatment	Rate (oz//A)	1-4 lf cotton	5-8 lf cotton
Spirit	2	5	4
Starane <sup>&amp;</sup>	10	9	9
Status#	5	9	8
Status#	10	9	9
Stinger	5.3	6	5
Surestart	28	7	6
Ultra Blazer	24	1	-

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

<sup>&</sup> indicates no or reduced efficacy on Enlist™ Cotton

# indicates no or reduced efficacy on XtendFlex® Cotton

+ indicates no efficacy on GlyTol LibertyLink Cotton, Enlist™ Cotton and XtendFlex® Cotton

**Herbicides to consider for managing volunteer cotton in gin yards and other non-field sites.** Refer to product label for specific label requirements. These herbicides are not restricted-use and do not require an applicator license to purchase, mix or apply when used according to the label.

Product (active ingredient)	Trade names*	Rate for Spot treatments	Notes**:
Imazapyr + Diuron	Sahara and Mojave	0.5-1.0 lb per gallon of water + surfactant at 0.25% rate.	<ul style="list-style-type: none"> <li>- For use in non-cropland areas;</li> <li>- Do not use around desirable plants or drip line of trees due to root uptake and potential injury or death;</li> <li>- Adjuvant required;</li> <li>- Do not use near irrigation ditches.</li> </ul>
Aminopyralid	Milestone and Milestone VM	7-14 fl oz per acre  See Table 2 below to calculate rate for spot spraying	<ul style="list-style-type: none"> <li>- For non-cropland, pasture, rangeland, etc.;</li> <li>- Do not allow product to come in direct contact with desirable plants, through misapplication or drift;</li> <li>- Injury can occur if applied around desirable trees, use special caution around roses and legume trees;</li> <li>- Adjuvant required;</li> <li>- At the 14 oz/a rate not more than 50% of an acre may be treated.</li> </ul>

\* This is not an encompassing list of Tradenames, but includes some of the more commonly recognized

\*\* Refer to product label for specific label requirements

For questions or additional information contact:

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The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas AgriLife Extension Service is implied.

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