

Managing Volunteer Cotton in Cotton



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Introduction:

The widespread adoption of cotton varieties with single and double stacked herbicide tolerant traits, such as Roundup ReadyFlex®, LibertyLink®, GlyTol® and GlyTol®/LibertyLink® provides cotton producers with excellent weed management options and has revolutionized cotton production in the past 10 to 15 years. In Texas, over 90% of the cotton acres are planted to cotton varieties that include herbicide tolerant traits. Despite the many opportunities these herbicide tolerant traits provide to farmers, these traits do create some challenges. For example, consecutive plantings of glyphosate tolerant cotton can lead to management problems with volunteer glyphosate tolerant crops. These volunteer cotton plants are unwanted plants that should be considered weeds. Like weeds, they compete for essential nutrients, water, and light with the crop and can cause harvest problems. Additionally, in South and Central Texas, these volunteer cotton plants serve as a host for the boll weevil (*Anthonomus grandis* L.) within the grain crops, in fence rows, around module storage areas, near feeding areas, and other areas.

Cotton varieties with double and triple stacked herbicide tolerant traits are currently being developed, including glyphosate + glufosinate tolerant cotton varieties. Around 2015 or so, the 2,4-D and dicamba resistant cotton varieties are expected to be available in the U.S. as triple-stacked herbicide tolerance. This next generation of herbicide tolerant cotton varieties will provide new weed management options for producers and will provide the flexibility to combat and retard the development of herbicide resistant weeds. However, these stack herbicide traits will also further complicate the issue of managing volunteer cotton in Texas and other cotton production regions.

There are two primary methods for removing volunteer cotton in cotton fields, tillage and/or herbicide options. In conventional tillage systems, cultivation is a very viable option. In reduced tillage systems or where herbicides may be more economical, herbicide control of volunteer cotton is feasible. However, special attention must be paid to the herbicide selection, application equipment and timing, and the herbicide tolerant traits in the volunteer cotton.

Tillage considerations for removing volunteer cotton:

Tillage is one of the most effective tools for managing volunteer cotton and weeds in fallow or prior to planting. Tillage can also be a valuable tool during the season and cultivation is estimated to remove over 90% of the volunteer cotton between planted rows, depending on the size of the volunteer cotton and cultivation method. Cultivation is more effective on small cotton plants (1 to 3 leaf stage) than larger plants.

Herbicide options:

When tillage is not a viable option, numerous herbicides are available to control volunteer cotton. However, it is important to pay close attention to the application methods, herbicide tolerant technologies, product rates, and need for spray additives. The herbicides currently labeled for managing volunteer cotton in a cotton crop are provided in **Tables 1 and 2**.

Preplant burndown applications:

When possible, destroying volunteer cotton plants and emerged weeds prior to planting cotton crop is preferred and provides the best management options. Numerous efficacious herbicides are labeled for controlling volunteer cotton at the preplant timing. However, special attention must be paid to application timing and planting restrictions, including days prior to planting, soil type, and precipitation/irrigation requirement. Specifically, products like Clarity (dicamba) are not labeled in areas with less than 25 inches of annual rainfall and in higher rainfall areas 21 days are required and 1 inch of rainfall or irrigation before planting cotton.

Broadcast postemergence applications:

The only option for broadcast applications to control volunteer cotton in a cotton crop is rotating different herbicide tolerant traits, such as glyphosate tolerant varieties (RoudupReady Flex® and GlyTol® with glufosinate tolerant varieties (LibertyLink®). Rotating to non-herbicide tolerant varieties will also provide some alternative options. Recently, cotton varieties with double stacked herbicide traits (glyphosate and glufosinate) were made available to producers, including GlyTol/LL and Phytogen WRF varieties. Of course these double stacked varieties provide some weed management options, but decrease the management options for volunteer cotton. In 2015 or 2016, triple herbicide stacked varieties should be available and will present more challenges in managing volunteer cotton.

Hooded, directed, and layby applications:

Aside from the options listed in the above paragraphs, selective removal of volunteer cotton can only occur through target application methods, including hooded sprayer, postemergence-directed, and layby application. In **Table 2**, the application method listed on the product label is included. Proper height, nozzle placement, spray pressure, and timing are critically important to minimize crop injury. Improper use of hooded sprayers can lead to stem girdling, which can lead to crop lodging and death. In general, smaller volunteer cotton plants are more susceptible to herbicide control than larger plants. However, larger, non-stressed volunteer plants may be more easily controlled than smaller, stressed plants. Therefore, plant size and health should both be considered when trying to maximize the effectiveness of control by herbicides.

Herbicide Resistance Management

Weed resistance to several classes of herbicides is occurring in Texas. Individual resistant weed species have appeared for a number of reasons, but largely due to the over-reliance or repeated use of a herbicide with the same mechanism of action. Usually this has resulted from planting the same crop continuously and using the same herbicide(s) or planting different crops that are tolerant to the same herbicide(s). Whatever the case, the foremost resistant weed management strategy is to employ programs that don't rely on a single practice or herbicide family. Therefore, we have included the "mechanism of action" for each herbicide recommended in the following tables. Use this information to rotate herbicide use, if possible, to either manage or prevent the occurrence of resistant weeds on your farm and to help manage volunteer cotton.

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 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 number of environments and cotton growth stages, but not to evaluate crop injury. **Special attention should be paid to the application method (hoods, drop nozzles, postemergence-directed) and timing for each of these crops.**



TABLE 1. Preplant burndown herbicides for controlling volunteer cotton

Product	Rate/acre (active ingredient)	Rate/acre (product)	Planting Restrictions to Cotton	Additional Remarks	Effective on the following herbicide tolerant technologies	Mechanism-of-Action
2,4-D Amine	0.5-1.0 lb (ae)	1-2 pt	Apply 30 days prior to planting	Spray tanks should be thoroughly cleaned following 2,4-D applications.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	Synthetic Auxin
Clarity (dicamba)	0.25-1 lb (ae)	8-32 oz	Accumulation of 1 inch of rainfall/irrigation and 21 days per 8 oz/a applied	Not registered in areas that receive less than 25 inches of annual rainfall.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	Synthetic Auxin
Distinct (dicamba + diflufenzopyr)	0.025-0.05 lb	2-4 oz	Accumulation of 1 inch of rainfall/irrigation and 30 days	Not registered in areas that receive less than 25 inches of annual rainfall.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	Synthetic Auxin
ET (pyraflufen-ethyl)	0.0024 -0.003 lb	0.5-2.0 fl oz/a	0 days	Allow a minimum of 30 days between applications. Do not exceed 2 oz/a per season.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor
Glyphosate (glyphosate 3 ae)	0.375-3.75 lb (ae)	16 oz-5 qt	0 days	Will not control glyphosate tolerant cotton; Generic formulations contain 3 lb ae/gal.	LibertyLink and Widestrike	EPSP synthase inhibitor
Gramoxone Inteon (paraquat)	0.5-1 lb	2.5-4 pt	0 days	Better control on small cotton (1-4 leaf)	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	Photosystem I inhibitor
Ignite (glufosinate)	0.53-0.79 lb	29-43 oz	0 days	Do not exceed 72 oz/a for the season.	Roundup Ready Flex and GlyTol	Glutamine synthetase inhibitor
Reflex (fomesafen)	0.25-0.38 lb	1-1.5 pt	21 days + 0.5 inch of rain/irrigation is required prior to planting cotton	Some crinkling or spotting of cotton foliage may occur, but outgrow the effects.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor

TABLE 1. *continued*

Product	Rate/acre (active ingredient)	Rate/acre (product)	Planting Restrictions to Cotton	Additional Remarks	Effective on the following herbicide tolerant technologies	Mechanism-of-Action
Roundup (glyphosate 4.5 ae)	0.77-3.71 lb (ae)	22 oz-3.3 qt	0 days	Will not control glyphosate tolerant cotton; Generic formulations containing 3 lb ae/gal.	LibertyLink and Widestrike	EPSP synthase inhibitor
Sharpen (saflufenacil)	0.0223 lb	1.0	42 days and 1 inch rain	Do not apply to sandy soils with less than 1.5% organic matter.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor
Valor (flumioxazin)	0.51-1.53 oz	1-2 oz	30 days + 1 inch rain-fall/irrigation	Maximum application rate of 2 oz/a/application.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor

TABLE 2. Hooded, postemergence-directed, and layby applications and timing for controlling volunteer cotton

Product*	Rate/acre (active ingredient)	Rate/acre (product)	Remarks	Effective on the following herbicide tolerant technologies	Mechanism-of-Action
Aim (carfentrazone)	0.0156 lb	1 oz	<u>Hooded</u> applications to cotton over 6 inch tall <u>Layby</u> applications to cotton over 12 inch with sufficient bark.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor
Cobra (lactofen)	0.2 lb	12.5 oz	<u>Hooded</u> applications to cotton over 6 inch tall <u>Layby</u> applications to cotton over 12 inch with sufficient bark.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor
ET (pyraflufen-ethyl)	0.0016-0.003 lb	1-2 oz	<u>Hooded</u> applications to cotton over 6 inch tall <u>Layby</u> applications to cotton over 12 inch with sufficient bark.	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor
Glyphosate (4.5 ae)	0.77-1.1 lb	22-32 oz	<u>Hooded</u> applications in non-glyphosate tolerant varieties	LibertyLink and Widestrike	EPSP synthase inhibitor
Ignite (glufosinate)	0.40-0.53 lb	22-29 oz	<u>Hooded</u> applications only in non-glufosinate tolerant varieties	Roundup Ready Flex and GlyTol	Glutamine synthetase inhibitor
Layby Pro (linuron + diuron)	1 lb	2 pt	<u>Hooded</u> applications for 8-15 inch cotton. <u>Layby</u> application for cotton 15 inch or taller	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	Photosystem II inhibitors
Valor (flumioxazin)	0.51-1.53 oz	1-2 oz	<u>Hooded</u> application for cotton 6 inch or taller. <u>Layby</u> application for cotton 16 inch or taller	Roundup Ready Flex, GlyTol, LibertyLink, and Widestrike	PPG oxidase inhibitor

* For increased control and consistency, include the appropriate additives and surfactants according to the product label.

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