Managing Volunteer Cotton in Various Production Areas of Texas

G.D. Morgan[1], D.A. Mott[1], R. Minzenmayer[2], D. Drake[2], P. Halfmann[2], P.A. Baumann[1], and M. Matocha[1]
Texas AgriLife Extension Service –College Station[1] and San Angelo[2]

Volunteer or non-commercial cotton is a problem in many cotton production regions of the Cotton Belt. With the overwhelming adoption of herbicide tolerant varieties, both glyphosate and glufosinate, managing volunteer cotton is a major challenge for many producers. The volunteer cotton is consistently a problem in the Southwestern cotton production regions due to high seed survival from one season to the next, especially when dry falls and winters occur (**Figure 1**).

In South and Central Texas, the primary impetus for managing volunteer cotton is to continue the progress of eradicating the boll weevil and meeting the laws required by the boll weevil eradication program. Under this scenario, 100% control of volunteer cotton is expected and necessary to prevent boll weevil hostable cotton plants in the grain crop fields. Additionally, as development of 2,4-D and dicamba resistant cotton varieties approach the market, volunteer cotton will become much more difficult to manage and alternative chemistries need to be identified.

Figure 1. Volunteer cotton following corn harvest.

Objective:
Evaluate the chemical management options (Preemergence and Postemergence) for controlling volunteer cotton at various growth stages.

Methods: Four trials were initiated to evaluate chemical management of volunteer cotton. At the Burleson County trials, the small plot trials were planted at the same time in a summer fallow field. The seeding rate was 65,000 seeds/a, to insure an adequate quantity of plants for efficacy ratings. Herbicides were applied perpendicular to the cotton row direction. The preemergence herbicides were applied 3 days after planting and one inch of irrigation was applied immediately following the herbicide application. The soil type was Weswood Silt Loam. In the postemergence trials, only NIS (0.25%v/v) was added to the treatments at the Burleson County location. The trial in Tom Green County was initiated following sorghum harvest in a producer's field. All trials were visually rated for herbicide efficacy (% control), regrowth, and boll weevil hostability. Data were analyzed in ARM. **Table 1** describes additional details for each trial.

Table 1. Volunteer Cotton Trial Details for 2009.

Location (County)	Application timing	Treatments (quantify)	Variety	GPA
Burleson	Preemergence	8	Phytogen 485 WRF	11
Burleson	5 leaf	25	Phytogen 485 WRF	11
Burleson	10 leaf	25	Phytogen 485 WRF	11
Tom Green	10-12 day old bolls	7	FiberMax 1740 B2F	15

Results:
At the Burleson County location several of the preemergence herbicides, Balance Flex, Corvus, Integrity, and Basis, provided over 50% reduction in plant stands at 17 days after treatment (**Table 2**). However, the surviving plants in these treatments were only slightly suppressed (<30%) at 39 DAT and became hostable with 7 days of the untreated check. Integrity was the only preemergence treatment that virtually prevented (99%) cotton emergence at 17 and through 39 DAT.

Numerous contact-type herbicides and harvest-aid compounds were moderately effective (>75%) at desiccating the 5 and the 10 leaf cotton plants at 14 DAT; however, regrowth quickly occurred. Only Gramoxone (24 and 48 oz/a) exceeded the 90% control at both ratings and had minimal regrowth on 5 and 10 leaf cotton (**Table 3 and 4**). However, hostable plants were present in these treatments at six weeks and beyond. Liberty only provided suppression of the volunteer cotton due to the inherent tolerance of the Phytogen cotton variety to Liberty. The most effective sulfonylurea herbicide on 5 and 10 leaf cotton at a labeled rate was Affinity Broadspec (1 oz/a). The 2,4-D and Starane were the most effective and consistent treatments, and were the only treatments that prevented hostable plants at 63 and 42 DAT for both the 5 and 10 leaf cotton, respectively.

At the Tom Green County location, several row crop and pasture herbicides were evaluated for managing mature cotton plants with 10-12 day old bolls (**Table 5**). Similar to the other location, the contact-type herbicides provided decent (>75%) initial control of the large cotton plants. However, conditions were favorable for regrowth and hostable plants were present in these treatments by 37 DAT. The hormone-type herbicides (Milestone and Chaparral) provided poor initial control, but did cause the cotton plants to abort current fruit and prevented new fruit development.

Table 2. Preemergence Herbicide Efficacy Ratings on Phytogen 485 WF Variety in Burleson County, TX.

Treatment	Rate/A	Timing	% Control 17 DAT	% Control 39 DAT
Aatrex	4 pt.	PRE	40 d	7 de
Balance Flex	6 fl. oz.	PRE	67 c	10 cde
Corvus	5 fl. oz.	PRE	85 b	30 b
Integrity	25 fl. oz.	PRE	99 a	99 a
Callisto	6 fl. oz.	PRE	10 e	0 e
Callisto + Aatrex	6 fl. oz.+ 24 fl. oz.	PRE	32 d	20 bc
Basis	0.66 oz.	PRE	67 b	17 cd

Table 3. Top Six Herbicide Treatments (>90% Efficacy) for Managing 5 Leaf Volunteer Cotton Plants in Burleson County, TX.

Treatments[1,2]	Rate/A	Timing	% Control 28 DAT	% Control 49 DAT	% Plots with Hostable[3] 63 DAT
2,4-D Amine	16 fl. oz.	5 leaf	95 ab	87 ab	33
2,4-D Amine	32 fl. oz.	5 leaf	97 ab	84 ab	0
Starane	10.6 fl. oz.	5 leaf	97 ab	85 ab	0
Gramoxone Inteon	24 fl. oz.	5 leaf	95 ab	94 a	100
Gramoxone Inteon	48 fl. oz.	5 leaf	99 a	97 a	67
Affinity Broadspec	1 oz.	5 leaf	92 a-c	70 bcd	33

[1] All treatments received only NIS at 0.25%v/v.
[2] Other treatments included: Aim, Autumn, Buctril, Cadet, Capreno, Clarity, Huskie, Ignite, Peak, Stinger, Laudis, Ginstar, Dropp, and ET.
[3] A percentage of the plots with at least one hostable plant.

Table 4. Top Seven Herbicide Treatments (>80% Efficacy) for Managing 10 Leaf Volunteer Cotton Plants in Burleson County, TX.

Treatments[1,2]	Rate/A	Timing	% Control 28 DAT	% Control 42 DAT	% Plots Hostable[3] 42 DAT
2,4-D Amine	16 fl. oz.	10 leaf	93 a	83 a-c	0
2,4-D Amine	32 fl. oz.	10 leaf	98 a	83 a-c	0
Aim	2 fl. oz.	10 leaf	86 a-d	75 b-d	100
Affinty Broadspec	1 oz.	10 leaf	88 a-c	65 c-e	100
Starane	10.6 fl.oz.	10 leaf	96 a	75 b-d	0
Gramoxone Inteon	24 fl. oz.	10 leaf	94 a	93 ab	67
Gramoxone Inteon	48 fl. oz.	10 leaf	99 a	97 a	33

[1] All treatments received only NIS at 0.25%v/v.
[2] Other treatments included: Aim, Autumn, Buctril, Cadet, Capreno, Clarity, Huskie, Ignite, Peak, Stinger, Laudis, Ginstar, Dropp, and ET.
[3] A percentage of the plots with at least one hostable plant.

Table 5. Chemical Treatments for Managing Cotton (½ Grown Boll stage) in Tom Green County, TX.

Treatment	Rate/A	% Control 21 DAT	% Hostable[2] 37 DAT
Chaparral[1] + NIS	3.3 oz.	20	0
Buctril + COC	16 fl. oz.	76	100
Ignite + AMS	32 fl. oz.	81	100
Autumn + COC	0.3 oz.	20	75
Milestone[1] + NIS	5 fl.oz.	5	30
Huskie + AMS	16 fl.oz.	88	90

[1] Not currently labeled for row crops.
[2] Hostable plants for boll weevil.

Conclusions:
- Few herbicides are currently labeled in corn, sorghum, or wheat that provide excellent control of small and larger cotton and prevent boll weevil hostable plants beyond 40 days after treatment.

- The 2,4-D and Starane were the only selective herbicides labeled in corn and sorghum that provided over 90% control of 5 and 10 leaf volunteer cotton. Although 2,4-D is economical and effective, it has crop safety, drift, and restrictive laws that prevent it from being a viable option for many production regions in Texas.

- Gramoxone was the most effective contact herbicide for managing volunteer cotton, but its non-selectivity and within-season application requirements limit its usefulness within corn or sorghum.

- Affinity Broadspec, a sulfonylurea herbicide, as a pre-plant burndown or within wheat appears to be a viable option for suppressing volunteer cotton and delaying hostable plants.

- Additional herbicides need to be identified to provide more options for managing herbicide tolerant cotton varieties and to insure the success of the boll weevil eradication program in Texas.

Future Research:
- Continue to screen chemical management options, including Sharpen by BASF, and tankmixtures of various herbicides.

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