

OL = on list of pesticides available
 NOL = Not on list

COTTON: COTTON INSECT CONTROL

Phillip M. Roberts, Extension Entomologist and Mike Toews, Research Entomologist

PEST	INSECTICIDE	MOA	FORMULATION PER ACRE	LBS. ACTIVE PER ACRE	RE-ENTRY (Hours or Days)	REMARKS
Aphid (Cotton) NOL -OL NOL OL NOL	acetamiprid Assail 30SG Strafer Max 70 WP	4A	1.5-2.5 oz 0.6-1.3 oz	0.028-0.047	12 H/ 28 D	Apply when aphids are abundant and seedling leaves are severely curled, or when "honeydew" is present in older cotton. A naturally occurring fungal disease often eliminates the need for sprays, but this epidemic occurs only after aphid populations reach high levels and tends to be less effective late in the season.
	diclorophos Bidrin 8 Dicromax 8	1B	4-8 oz 4-8 oz	0.25-0.5	6 H/ 30 D	
	flonicamid Carbine 50WG	9C	1.4-2.8 oz	0.044-0.088	12 H/ 30 D	
	imidacloprid Admire Pro 4.6	4A	0.9-1.7 oz	0.032-0.061	12 H/ 14 D	
	thiamethoxam Centric 40 WG	4A	1.25-2.0 oz	0.031-0.05	12 H/ 21 D	
Beet Armyworm Not Concern	diflubenzuron Dimilin 2L	15	4-8 oz	0.0625-0.125	12 H/ 14 D	Apply when 10% of squares or terminals are damaged, 10% of blooms are damaged and/or infested, or when 10 active "hits" are observed per 300 row feet. Beet armyworms may infest Palmer amaranth and move to cotton as larvae develop. Bt cottons will not control large beet armyworms moving from Palmer amaranth.
	indoxacarb Steward 1.25EC	22	9.2-11.3 oz	0.09-0.11	12 H/ 14 D	
	methoxyfenozide Intrepid 2F	18	4 oz	0.0625	4 H/ 14 D	
	novaluron Diamond 0.83EC	15	6-12 oz	0.039-0.077	12 H/ 30 D	
	chlorantraniliprole Prevathon 0.43	28	14-27 oz	0.047-0.09	4 H/ 21 D	
	spinosad Blackhawk	5	2.4-3.2 oz	0.054-0.072	4 H/ 28 D	
Bollworm/ Tobacco Budworm NOL Concern	NON-PYRETHROIDS					On non-Bt cotton apply when 8 small larvae are found per 100 terminals prior to first insecticide treatment, or when 5 larvae are found after first spray. Due to the threat of pyrethroid resistance, non-pyrethroid insecticides are recommended for control of tobacco budworm. Resistance management: Do not treat successive generations with insecticides that have the same mode of action. Bt cotton containing Bt genes are effective tools for use in bollworm and tobacco budworm management programs. Apply insecticide on Bt cotton when 8 larvae (1/4" or greater in length) are found per 100 plants.
	indoxacarb Steward 1.25EC	22	11.3 oz	0.11	12 H/ 14 D	
	methomyl Lannate LV 2.4	1A	1.5-2 pt	0.45-0.6	72 H/ 15 D	
	spinetoram Radiant 1 SC	5	4.25-8 oz	0.0332-0.0625	4 H/ 28 D	
	chlorantraniliprole Prevathon 0.43	28	14-27 oz	0.047-0.09	4 H/ 21 D	
	spinosad Blackhawk	5	2.4-3.2 oz	0.054-0.072	4 H/ 28 D	

COTTON INSECT CONTROL

PEST	INSECTICIDE	MOA	FORMULATION PER ACRE	EST. ACTIVE PER ACRE	RE-ENTRY (Hours of Day)	REMARKS
Bollworm/ Tobacco Budworm <i>(continued)</i> <i>Nota</i> <i>Concern</i> <i>NC</i>	PYRETHROIDS					
	<i>alpha-cypermethrin</i> Fastac 0.83	3A	2.6-3.6 oz	0.017-0.023	12 H/ 14 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1	3A	1.6-2.6 oz	0.0125-0.02	12 H/ 0 D	Tobacco budworm is resistant to pyrethroid insecticides. Pyrethroids should not be used for control of tobacco budworm.
	<i>bifenthrin</i> Brigade 2EC Discipline 2EC Fanfare 2EC	3A	2.6-6.4 oz 2.6-6.4 oz 2.6-6.4 oz	0.04-0.1	12 H/ 14 D	
	<i>cypermethrin</i> Up-Cyde 2.5EC	3A	2-5 oz	0.04-0.1	12 H/ 14 D	
	<i>esfenvalerate</i> Asana XL 0.66	3A	5.8-9.6 oz	0.03-0.0495	12 H/ 21 D	
	<i>gamma-cyhalothrin</i> Prolex 1.25 Declare 1.25	3A	1.28-2.05 oz 1.28-2.05 oz	0.0125-0.02	24 H/ 21 D	
	<i>lambda-cyhalothrin</i> Warrior II Zeon 2.08 Silencer I	3A	1.6-2.56 oz 3.2-5.12 oz	0.025-0.04	24 H/ 21 D	
Cutworm (seedling cotton) <i>NC</i>	<i>acephate</i> Orthene 97 Acephate 97	1B	0.75 lb 0.75 lb	0.72	24 H/ 21 D	Apply when stand is threatened. Spot treatment is often adequate. Pyrethroids provide good control of cutworms at low rates. See insecticide label for use rate.
	<i>chlorpyrifos</i> Lorsban 4E Chlorpyrifos 4E	1B	1.5-2 pt 1.5-2 pt	0.75-1	24 H/ 14 D	
	<i>pyrethroids</i>	3A	See Remarks			

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PEST	INSECTICIDE	MOA	FORMULATION PER ACRE	LBS. ACTIVE PER ACRE	REI PHU (Hours of Day)	REMARKS
NC Fall Armyworm	<i>chlorantraniliprole</i> Prevathon 0.43	28	14-27 oz	0.047-0.09	4 H/ 21 D	Apply when 15 larvae are found per 100 plants. Control of large larvae (>1/2" in length) is difficult; higher rates should be used.
	<i>diflubenzuron</i> Dimilin 2L	15	4-8 oz	0.0625-0.125	12 H/ 14 D	
	<i>indoxacarb</i> Steward 1.25EC	22	9.2-11.3 oz	0.09-0.11	12 H/ 14 D	
	<i>methomyl</i> Lannate LV 2.4	1A	1.5-2 pt	0.45-0.6	72 H/ 15 D	
	<i>methoxyfenozide</i> Intrepid 2F	18	4-10 oz	0.0625-0.156	4 H/ 14 D	
	<i>novaluron</i> Diamond 0.83EC	15	6-12 oz	0.039-0.077	12 H/ 30 D	
	<i>pyrethroid</i>	3A	See Remarks			
	<i>spinosad</i> Blackhawk	5	2.4-3.2 oz	0.054-0.072	4 H/ 28 D	
NC Plant Bugs and Fleahoppers	<i>acephate</i> Orthene 97 Acephate 97	1B	0.25-0.50 lb 0.25-0.50 lb	0.24-0.49	24 H/ 21 D	Apply insecticide when plants are retaining less than 80% of pinhead squares and numerous plant bugs are observed. Sweep nets and drop cloths may also be used to monitor plant bugs. Sweep nets (15" in diameter) are an effective tool for monitoring adult plant bug populations. Drop cloths are more effective for monitoring immatures. Thresholds: First 2 weeks of squaring: Sweep Net: 8 plant bugs/100 sweeps. Drop Cloth: 1 plant bug/6 row feet. Third week of squaring through bloom: Sweep Net: 15 plant bugs/100 sweeps. Drop Cloth: 3 plant bugs/6 row feet. Diamond is an insect-growth regulator and will not control adults.
	<i>dicrotophos</i> Bidrin 8 Dieromax 8	1B	4-8 oz 4-8 oz	0.25-0.5	6 H/ 30 D	
	<i>imidacloprid</i> Admire Pro 4.6	4A	0.9-1.7 oz	0.032-0.061	12 H/ 14 D	
	<i>novaluron</i> Diamond 0.83EC	15	9-12 oz	0.058-0.077	12 H/ 30 D	
	<i>oxamyl</i> Vydate C-LV 3.77	1A	8.5-17 oz	0.25-0.50	48 H/ 14 D	
	<i>thiamethoxam</i> Centric 40 WG	4A	2 oz	0.05	12 H/ 21 D	

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Soybean Looper NC	<i>indoxacarb</i> Steward 1.25EC	22	6.7-9.2 oz	0.065-0.09	12 H/ 14 D	Treatment is necessary when soybean loopers threaten to defoliate cotton with immature bolls.
	<i>methoxyfenozide</i> Intrepid 2F	18	4-10 oz	0.0625-0.156	4 H/ 14 D	
	<i>novahuron</i> Diamond 0.83EC	15	6-12 oz	0.039-0.077	12 H/ 30 D	
	<i>spinosad</i> Blackhawk	5	2.4-3.2 oz	0.052-0.072	4 H/ 28 D	
Spider Mites NC	<i>abamectin</i> Abba 0.15 Agri-Mek 0.75C	6	8-16 oz 1.75-3.5 oz	0.009-0.018	12 H/ 20 D	Apply when 50 percent of plants are symptomatic and populations are increasing. Spot treatment may be adequate. Thorough coverage is essential; a second application may be necessary.
	<i>etoxazole</i> Zeal 72 WSP	10B	0.66-1 oz	0.03-0.045	12 H/ 28 D	In fields where mites are observed, conservation of beneficial insects should be a priority; insecticides prone to flare mites should be avoided when targeting other pests. *Bifenthrin may provide suppression of mites.
	<i>fepyrroximate</i> Portal 0.4	21A	16-32 oz	0.05-0.1	12 H/ 14 D	
	<i>propargite</i> Comite II 6	12C	1.25-2.25 pt	0.937-1.687	6 D/ 50 D	
	<i>spiromesifen</i> Oberon 25C	23	8-16 oz	0.125-0.25	12 H/ 30 D	
Stink Bugs	ORGANOPHOSPHATES					The boll injury threshold should be adjusted up or down based on the number of susceptible bolls present. Use a 10-15% boll injury threshold during weeks 3-5 of bloom (numerous susceptible bolls present), 20% during weeks 2-6, and 30%(+) during weeks 7+ of bloom (fewer susceptible bolls present). Detection of 1 stink bug/6 row feet would also justify treatment.
	<i>acephate</i> Orthene 97 Acephate 97 NOL	1B	0.75 lb 0.75 lb	0.72	24 H/ 21 D	
on list	<i>diclorofos</i> Bidion 8 Dicromax 8 will get brown stink bug	1B	4-8 oz 4-8 oz	0.25-0.5	6 H/ 30 D	Higher stink bug populations are typically observed on late-planted cotton compared with early-planted cotton. Organophosphates should be used for control of brown stink bugs.

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Stink Bugs (continued)	PYRETHROIDS					Will not get Brown Stink bug
	alpha-cypermethrin Fastac 0.83	3A	2.6-3.6 oz	0.017-0.023	12 H/ 14 D	
	beta-cyfluthrin Baythroid XL 1	3A	1.6-2.6 oz	0.0125-0.0205	12 H/ 0 D	
	hi fen thrin Brigade 2EC Discipline 2EC Fanfare 2EC	3A	2.6-6.4 oz 2.6-6.4 oz 2.6-6.4 oz	0.04-0.1	12 H/ 14 D	
	esfenvalerate Asana XL 0.66	3A	5.8-9.6 oz	0.03-0.0495	12 H/ 21 D	
	gamma-cyhalothrin Prolex 1.25 Declare 1.25	3A	1.28-2.05 oz 1.28-2.05 oz	0.0125-0.02	24 H/ 21 D	
	lambda-cyhalothrin Warrior II Zeon 2.08 Silencer 1	3A	1.6-2.56 oz 3.2-5.12 oz	0.025-0.04	24 H/ 21 D	
	zeta-cypermethrin Mustang Max 0.8	3A	2.64-3.6 oz	0.0165-0.0225	12 H/ 14 D	
Thrips (seedling cotton), At-Plant Treatments	acephate Orthene 97ST Orthene 97 Acephate 97	1B	Commercial Seed Treatment 1 lb 0.97 1 lb 0.97		24 H/ 21 D	Apply acephate as a spray into the seed furrow at planting.
	imidacloprid Admire Pro 4.6	4A	9.2 oz	0.33	12 H/ 14 D	Apply Admire Pro as an in-furrow spray during planting directed on or below seed.
	thiamethoxam Cruiser	4A	Commercial Seed Treatment		12 H/ -	Thrips populations in some areas of the US have shown reduced susceptibility to neonicotinoid seed treatments (IRAC Group 4A). Neonicotinoid seed treatments are active for 14-21 days but may need a supplemental foliar insecticide application if thrips populations are high.
	imidacloprid Gaucho 600	4A	Commercial Seed Treatment		12 H/ -	
Thrips (seedling cotton), Foliar Spray	acephate Orthene 97 Acephate 97	1B	3 oz 3 oz	0.18	24 H/ 21 D	Apply when 2-3 thrips per plant are counted and immatures are present. Expect higher thrips populations on early planted cotton. Seedlings are most susceptible to thrips during early growth stages; economic damage rarely occurs once seedlings reach the 4-leaf stage and are growing rapidly. Thrips injury is more severe when seedlings are not growing rapidly (i.e. stress from cool temperatures or PRE herbicides). Rapidly growing seedlings can better tolerate thrips feeding.
	dicrotophos Bidrin 8 Dicromax 8	1B	1.6-3.2 oz 1.6-3.2 oz	0.1-0.2	6 H/ 30 D	
	dimethoate Dimethoate 4	1B	0.25-0.5 pt	0.125-0.25	48 H/ 14 D	

COTTON INSECT CONTROL

PEST	INSECTICIDE	MOA	FORMULATION PER ACRE	EST. ACTIVE PER ACRE	RETHP (Hours or Days)	REMARKS
Whitefly (banded winged) NOL	acephate Orthene 97 Acephate 97	1B	0.5-1 lb 0.5-1 lb	0.49-0.97	24 H/ 21 D	Apply when 50% of terminals in rapidly growing cotton are infested, or when honeydew is found on foliage or lint of older cotton with open bolls.
	thiamethoxam Centric 40 WG	4A	2 ozs	0.05	12 H/ 21 D	
Whitefly (silverleaf) NOL	acetamiprid Assail 30 SG Strafer Max 70 WP	4A	4-5.3 oz 1.7-2.3 oz	0.075-0.1	12 H/ 28 D	Apply when 50% of sampled leaves (sample 5th expanded leaf below the terminal) are infested with multiple immatures. Silverleaf whitefly is difficult to control with insecticides. Early detection and conservation of natural controls are important. Hairy leaf cottons are preferred by silverleaf whiteflies compared with smooth leaf varieties.
	dinotefuron Venom 70WDG	4A	1-3 oz	0.045-0.134	12 H/ 14 D	
	flupyradifurone Sivanto Prime 1.67	4D	10.5-14 oz	0.1369-0.1826	4 H/ 14 D	
	pyriproxyfen Knack 0.86	7C	8 oz 5 oz fb 5 oz	0.05375 0.033 fb 0.033	12 H/ 28 D	Vegetative cotton; 5 oz followed by 5 oz. See Label.
	spiromesifen Oberon 2	23	8-16 oz	0.125-0.25	12 H/ 30 D	
	buprofezin Courier 3.6SC	16	9-12.5 oz	0.25-0.35	12 H/ 14 D	

Premixed or Co-Packaged Insecticide Products:

Products listed below are available as premixes or co-packages of 2 insecticidal active ingredients. When using premixed or co-packaged products, be sure the use of all active ingredients is necessary. Unnecessary applications or use of reduced rates of an active ingredient may lead to or intensify insecticide resistance. Labeled rates are listed with product names. However, see label for specific rates for target pests.

<i>bifenthrin, avermectin B1</i> (Athena: 7-17 oz) <i>bifenthrin, imidacloprid</i> (Brigadier: 3.8-7.7 oz) <i>dicrotophos, bifenthrin</i> (Bidrin XP II: 8-12.8 oz) <i>imidacloprid, cyfluthrin</i> (Leverage: 2.8-3.2 oz) <i>lambda-cyhalothrin, chlorantraniliprole</i> (Besiege: 5-12.5 oz) <i>lambda-cyhalothrin, thiamethoxam</i> (Endigo: 4.5-6 oz) <i>methoxyfenozide, spinetoram</i> (Intrepid Edge: 4-8 oz)	<i>spinosad, gamma-cyhalothrin</i> (Consero: See label) <i>zeta-cypermethrin, bifenthrin</i> (Hero: 3.6-10.3 oz) <i>chlorpyrifos, lambda-cyhalothrin</i> (Cobalt Advanced: 11-42 oz) <i>zeta-cypermethrin, chlorpyrifos</i> (Stallion: 3.75-11.75 oz) <i>chlorpyrifos, bifenthrin</i> (Tundra Supreme: 5.6-16.8 oz) <i>fluopyram, imidacloprid</i> (Velum Total: 14-18 oz)
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INSECT PEST RESPONSE TO INSECTICIDES USED IN COTTON

INSECTICIDE	SOUTHERN GREEN STINK BUG	BROWN STINK BUG	CORN EARWORM	TOBACCO BUDWORM**	FALL ARMYWORM	BEE T ARMYWORM	SOYBEAN LOOPER	PLANT BUGS	APHIDS	SPIDER MITES	SILVERLEAF WHITEFLY	CUTWORMS	THRIPS	PREDATORS***	PARASITES***	CHEMICAL CLASS (MOA)	REI (Hours)
<i>abamectin</i> Agri-Mek 0.15	-	-	-	-	-	-	-	-	-	1	-	-	-	M	M	6	12
<i>acephate</i> Orthene 97	2	2	5	4	4	5	4	1	5	5	5	2	1	H	H	1B	24
<i>acetamiprid</i> Assail 30SG	4	4	5	5	5	5	5	3	1	5	1	5	3	E	E	4A	12
<i>alpha-cypermethrin</i> Fastac 0.83	2	4	1	3	4	5	4	3	4	5	5	2	4	H	M	3A	12
<i>beta-cyfluthrin</i> Baythroid XL 1	1	3	1	3	3	5	4	2	4	5	5	2	4	H	M	3A	12
<i>bifenthrin</i> Brigade 2, Discipline 2, Fanfare 2	1	2	1	3	3	5	4	2	3	3	4	2	4	H	M	3A	12
<i>buprofezin</i> Courier 40 SC	-	-	-	-	-	-	-	-	-	-	1	-	-	E	E	16	12
<i>chlorantraniliprole</i> Prevathon 0.43	5	5	1	1	2	1	2	5	5	5	4	4	5	E	E	28	4
<i>chlorpyrifos</i> Lorsban 4	4	4	4	4	3	3	4	3	4	3	5	1	3	H	H	1B	24
<i>cypermethrin</i> Up-Cyde 2.5EC	2	4	1	3	4	5	4	3	4	5	5	2	4	H	M	3A	12
<i>dicrotophos</i> Bidrin 8	1	1	5	5	5	5	5	1	3	4	5	5	1	H	H	1B	6 days

Efficacy Ratings:

1 – Very Effective
5 – Not Effective

* Read and follow label directions.

** Pyrethroid resistant tobacco budworm has been observed in Georgia, efficacy may be improved if resistance levels are low.

*** Effects on beneficial insects: E – Easy; M – Moderate, and H – Hard

Effects of some insecticides are highly rate sensitive.

Insecticide ratings found in this table are based on research across the Cotton Belt and on field experiences and observations by entomologists. Ratings assume standard rates of insecticides applied at proper times. Ratings should be considered only as general guidelines for comparison purposes.

INSECT PEST RESPONSE TO INSECTICIDES USED IN COTTON

INSECTICIDE	SOUTHERN GREEN STINK BUG	BROWN STINK BUG	CORN EARWORM	TOBACCO BUDWORM**	FALL ARMYWORM	BEE T ARMYWORM	SOYBEAN LOOPER	PLANT BUGS	APHIDS	SPIDER MITES	SILVERLEAF WHITEFLY	CUTWORMS	THRIPS	PREDATORS***	PARASITES**	CHEMICAL CLASS (MOA)	REI (Hours)
<i>diflubenzuron</i> Dimilin 2L	5	5	5	5	3	3	4	5	5	5	5	5	5	E	E	15	12
<i>dimethoate</i> Dimethoate 4	4	4	5	5	5	5	5	3	3	3	5	5	2	M	H	1B	48
<i>dinotefuron</i> Venom 70 WDG	—	—	—	—	—	—	—	—	—	—	2	—	—	M	M	4A	12
<i>esfenvalerate</i> Asana XL 0.66	2	4	1	3	4	5	4	3	4	5	5	2	4	H	M	3A	12
<i>etoxazole</i> Zeal 72 WSP	—	—	—	—	—	—	—	—	—	—	1	—	—	E	E	10B	12
<i>fepraximate</i> Portal 0.4	—	—	—	—	—	—	—	—	—	1	3	—	—	E	E	21A	12
<i>flonicamid</i> Carbine 50 WG	4	4	5	5	5	5	5	3	1	5	5	5	3	E	E	9C	12
<i>gamma-cyhalothrin</i> Declare 1.25, Prolex 1.25	1	3	1	3	3	5	4	2	4	5	5	2	4	H	M	3A	24
<i>imidacloprid</i> Admire Pro 4.6	4	4	5	5	5	5	5	3	2	5	4	5	3	M	M	4A	12
<i>indoxacarb</i> Steward 1.25	4	4	2	1	2	1	1	4	5	5	5	4	5	M	E	22A	12
<i>lambda-cyhalothrin</i> Warrior II Z 2.08, Silencer 1	1	3	1	3	3	5	4	2	4	5	5	2	4	H	M	3A	24

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INSECT PEST RESPONSE TO INSECTICIDES USED IN COTTON

INSECTICIDE	SOUTHERN GREEN STINK BUG	BROWN STINK BUG	CORN EARWORM	TOBACCO BUDWORM**	FALL ARMYWORM	BEE T ARMYWORM	SOYBEAN LOOPER	PLANT BUGS	APHIDS	SPIDER MITES	SILVERLEAF WHITEFLY	CUTWORMS	THRIPS	PREDATORS***	PARASITES***	CHEMICAL CLASS (MOA)	REI (Hours)
<i>methomyl</i> Lannate LV 2.4	4	4	3	3	3	4	3	3	4	5	5	3	5	H	M	1A	72
<i>methoxyfenozide</i> Intrepid 2F	5	5	4	4	2	1	2	5	5	5	5	4	5	E	E	18	4
<i>novaluron</i> Diamond 0.83EC	3	3	4	4	1	2	2	3	5	5	4	5	5	M	3	15	12
<i>oxamyl</i> Vydate C-LV 3.77	3	3	5	5	5	5	5	2	5	5	5	5	3	M	M	1A	48
<i>propargite</i> Comite II 6	5	5	5	5	5	5	5	5	5	1	5	5	5	M	E	12C	6 days
<i>pyriproxyfen</i> Knack 0.86	5	5	5	5	5	5	5	5	5	5	1	5	5	E	E	7C	12
<i>spinosad</i> Blackhawk	5	5	2	1	2	2	2	5	5	5	5	4	4	E	M	5	4
<i>spiromesifen</i> Oberon 2 SC	–	–	–	–	–	–	–	–	–	1	2	–	–	E	E	23	12
<i>thiamethoxam</i> Centric 40 WG	3	4	5	5	5	5	5	1	1	5	3	5	3	M	M	4A	12
<i>zeta-cypermethrin</i> Mustang Max 0.8	1	3	1	3	3	5	4	2	4	5	5	2	4	H	M	3A	12

Efficacy Ratings:

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5 – Not Effective

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*** Effects on beneficial insects: E – Easy; M – Moderate; and H – Hard

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COTTON NEMATODE CONTROL

Bob Kemmerait, Extension Plant Pathologist

NEMATOCIDE TREATMENT	RATE ACRE	oz 1000 ft of row (38" row basis)	REI PHI (Hours/Days)	REMARKS AND PRECAUTIONS
<i>abamectin</i> + <i>thiamethoxam</i> AVICTA Duo Cotton	seed treatment	NOL	48 H/ -	
AERIS Seed-Applied System NOL	seed treatment			AERIS Seed-Applied System is a combination of thiodicarb (nematode control) and imidacloprid (thrips control) with the option of adding the TRILEX Advanced Seed-Applied System for additional control of seedling diseases. AERIS Seed-Applied System should only be considered for use in fields with low-to-moderate populations of plant parasitic nematodes. Maximum rate of 25.6 fl oz/100 lb of seed (delinted seed only).
<i>fluopyram</i> COPeO Prime NOL	seed treatment			COPeO Prime contains fluopyram for the management of nematodes affecting cotton.
<i>thiazafen</i> Acceleron NemaStrike ST	NOL			Acceleron NemaStrike ST is a seed treatment nematocide for use on cotton.
<i>aldicarb</i> AgLogic 15G NOL	3.5-7 lb/A			Apply granules in seed furrow and immediately cover with soil by mechanical means. OR Apply granules in a 4-6" band (T-Band) over open seed furrow and immediately cover with soil by mechanical means. In the States of AL, FL, GA and SC, if a vulnerable soil is present and the water table is less than 25 feet below ground surface, do not apply within 700 feet of a drinking water well unless it is known or reasonably believed based upon authoritative sources that such wells are either cased to 100 feet below the ground level or a minimum of 30 feet below the water table. If it is not known whether the water table is greater than 25 feet below ground surface, assume that the water table is less than 25 feet below ground surface.
<i>aldicarb</i> AgLogic 15G sidedress application	5 lb/A NOL			Side Dress Application: From 3 weeks after planting through first squaring. Side dress granules in a furrow that is 6-10" to one or both sides of plant row to a depth of 2-3". Adjust applications to minimize root pruning.
<i>fluopyram</i> + <i>imidacloprid</i> Velum Total NOL	14-18 fl oz		12 H/ 30 D	Apply specified dosage in the following methods: 1) <u>In-furrow spray</u> during planting directed on or below seed; 2) Chemigation into the root-zone through low pressure drip or trickle irrigation. DO not apply more than 19 fl oz/A of Velum Total per year. Do not apply Velum Total within 30 days of harvest. Regardless of formulation or method of application, apply no more than 0.5 lb imidacloprid or 0.45 lb fluopyram active ingredient per acre per year/A/year, including seed treatment, soil and foliar uses.
Telone II ¹ NOL	3 gal	30 fl oz	5 D Post Application/ -	Apply Telone II at least 7 days prior to planting by injecting 12" below final soil surface. Temik may be used at planting or as a side-dress following the use of Telone II. NOTE: Telone II is now labeled for at-plant application in Georgia for nematode control on cotton. Growers who choose to apply Telone II at plant must ensure that soil conditions are correct (see label) otherwise the at-plant fumigation may result in poor germination and plant stand.
Vydate C-LV NOL	17 fl oz	1.24 fl oz	48 H/ 14 D	Make one application between 2nd and 5th true leaf stage. Alternatively, sequential applications of Vydate C-LV may be made at 8.5-11 fl oz/A beginning at 2nd-5th leaf stage of growth followed by a second 8.5-11 fl oz/A applied 10-14 days later. Applications of Vydate C-LV typically follow use of Telone II or nematocide seed treatments. Vydate C-LV is a supplemental application. Maximum rate is 102 fl oz/A/season.

¹ If Telone II is used for nematode control, you must use an additional chemical for thrips control.

² Temik applied at 3.5 lb/A is often recommended for insect management, but 3.5 lb/A will not provide sufficient nematode control in Georgia.

COTTON WEED CONTROL

A. Stanley Culpepper, Extension Agronomist – Weed Science

WEED	HERBICIDE	MOA	BROADCAST RATE (ACR)		RETHP (Resistance D.)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	lbs active (A of A)		
PREPLANT BURNDOWN – ANY VARIETY						
Emerged primrose, wild radish, spiderwort, very small horseweed.	2,4-D amine 4 S 4.7 S 5 S NOL	4	12-24 fl oz 10-20 fl oz 9-18 fl oz	0.38-0.75	48 H/ N/A	The MOST CONSISTENT and effective burndown program for winter weeds in Georgia is a 2,4-D application in February when weeds are small and herbicide coverage is adequate followed by glyphosate or paraquat mixtures at or near planting. Most, but not all brands, may be applied 30 days prior to planting. PRIMROSE: Apply 0.24-0.38 lb ai/A RADISH: Apply 0.5-0.75 lb ai/A HORSEWEED: Apply 0.75+ lb ai/A GLYPHOSATE-RESISTANT HORSEWEED: Apply 0.95 + lb ai/A
	2,4-D choline Enlist One 3.8 L NOL	9	1.5-2 pt	0.7-0.95	48 H/ N/A	Apply at least 30 days ahead of planting any variety not containing the Enlist trait. For cotton with the Enlist trait, the label allows application any time prior to planting; see Enlist section below. Current labeling allows mixtures with several products including numerous glyphosate formulations, Valor, and Liberty. Data suggests the choline formulation of 2,4-D has reduced volatility potential when compared to other 2,4-D formulations; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, ground speeds, spray tip requirements, and boom heights. User also must review website Enlisttankmix.com for approved adjuvants, drift reduction agents, and other tank mixtures.
Burndown of mature primrose and morningglory. Inadequate control of immature radish, pigweeds over 3" or grain cover crops.	glyphosate Liberty 2.34S Can't use as temperatures are not warm enough at the time of this preplant burndown	10	29-43 fl oz	0.53-0.79	12 H/ N/A	Application can be made prior to cotton emergence. To maximize control: >15 GPA water volume, medium spray droplet, <u>warm</u> temperatures, high humidity, bright sunlight, good soil moisture, and do not spray within 1.5 hours of sunrise or 1 hour of sunset. For Palmer amaranth, apply 29 oz/A when less than 3"; 32 oz/A when 3"; 36 oz/A when 4"; and 43 oz/A when taller than 4". Cheetah and Interline have been tested and performed similarly to Liberty, see labels. Other brands are available.
Burndown of emerged annual weeds, but does not adequately control primrose, geranium, large radish, field pansy, resistant horseweed, or resistant Palmer amaranth.	glyphosate 4 S (3 lb ac) 5.4 S (4 lb ac) 5 S (4.17 lb ac) 5.5 S (4.5 lb ac) 6 S (5 lb ac) All Resistant weeds	9	32-48 fl oz 24-36 fl oz 23-34 fl oz 22-32 fl oz 19-29 fl oz	0.75-1.13 (lb ac)	4 H/ N/A	Apply any time prior to planting; adjuvant needs vary by brand. Control of cover crops: Wheat < 12": 0.56 lb ac Wheat > 12": 0.75 lb ac Rye < 12": 0.56 lb ac Rye > 12" (no seed head): 0.75 lb ac Rye with seed head: 0.56 lb ac

*Mode of Action (MOA) code can be used to delay weed resistance by increasing herbicide diversity in a management program.

NOL = not on list provided

COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RETHI (Days after Dr.)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (lb ae)		
PREPLANT BURNDOWN - ANY VARIETY (continued)						
Burndown of most emerged weeds, except Carolina geranium. Alternatively, Enlist One (2,4-D choline) can be used in mixture with several glyphosate brands, see above.	glyphosate + 2,4-D choline Enlist Duo <i>on the list</i>	9 + 4	3.5-4.75 pt	0.74-1 (lb ae) + 0.7-0.95	48 H/ N/A	Apply at least 30 days ahead of planting any variety not containing the Enlist trait. For cotton with the Enlist trait, the label allows application any time prior to planting; see Enlist section below. Data suggests the choline formulation of 2,4-D has reduced volatility potential when compared to other 2,4-D formulations; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, tractor speeds, spray tip requirements, and boom heights. Users also must review website Enlisttankmix.com for approved adjuvants, drift reduction agents, and other tank mixtures.
Burndown of most emerged weeds, 2,4-D rates are too low to control glyphosate-resistant horseweed. 2,4-D is more effective than dicamba on primrose, less effective on horseweed. Mixture may not control Carolina geranium.	glyphosate + 2,4-D amine 4 S 4.7 S 5 S <i>Resistant Weeds NOL</i>	9 + 4	see glyphosate + 8-32 fl oz 6-24 fl oz 6-22 fl oz	0.75-1.13 (lb ae) + 0.24-0.95	48 H/ N/A	Most, but not all, brands of 2,4-D may be applied at least 30 days ahead of planting. For primrose, 2,4-D at 0.24 lb ae/A will provide control. For glyphosate-resistant horseweed 0.95 lb ae/A will control small plants. Choline formulations of 2,4-D offer the lowest potential of volatility followed by amine formulations; do not use ester formulations. <i>2,4-D volatility occurs and is influenced by the environment, soil conditions, and formulations used; avoid off-target issues.</i>
Aim improves control of emerged morningglory, tropical spiderwort, and very small (<1") glyphosate-resistant Palmer amaranth.	glyphosate + carfentrazone Aim 2 EC <i>NOL</i>	9 + 14	see glyphosate + 0.5-1 fl oz	0.75-1.13 (lb ae) + 0.008-0.016	12 H/ N/A	May be applied as a burndown treatment anytime prior to planting. Aim does not provide residual weed control.
Burndown of most weeds. Suppresses geranium and curly dock. 2,4-D is more effective on primrose; dicamba is more effective on horseweed. At this rate, likely will not control Palmer amaranth larger than 1".	glyphosate + dicamba Clarity, other 4S or Engenia 5S or XtendiMax 2.9S <i>must</i>	9 + 4	see glyphosate + 8 fl oz or 6.4 fl oz or 11 fl oz	0.75-1.13 (lb ae) + 0.25	24 H/ N/A	In 2018, all applicators must be trained prior to spraying Engenia, FeXapan or XtendiMax. For cotton not containing the XtendFlex trait: Following application of dicamba and a minimum of 1" of rainfall, a waiting period of at least 21 days is required before planting. Dicamba can be applied alone with little to no effect on the small grain cover crop. For cotton with the XtendFlex trait: Higher rates without plant-back concerns are an option; see XtendFlex section below. Data suggests Engenia, FeXapan, and XtendiMax are the least volatile formulations of dicamba currently available; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, ground speeds, spray tip requirements, sprayer speeds, and boom heights. Also, one must review each product's website (Xtendimax.applicationrequirements.com or Engeniatankmix.com) for approved adjuvants, drift reduction agents and other tank mixtures. Dicamba volatility occurs and is influenced by environmental conditions, soil types, and formulations selected; avoid off-target issues!

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RETHP (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (AI or AI-E)		
PRE-PLANT BURNDOWN - ANY VARIETY (continued)						
Diuron improves control of emerged Palmer amaranth and offers residual control if activated on the soil. The addition of 2,4-D or Valor will likely improve weed control; follow most restrictive plant-back interval.	glyphosate + diuron Direx 4F	9 + 7	see glyphosate + 1-1.5 pt	0.75-1.13 (lb ae) + 0.5-0.75	12 H/ N/A	A Georgia 24 C Direx label allows applications up to the day ahead of planting if strip tillage implement is run between application and planting. If no tillage occurs between application and planting then wait at least 10 days prior to planting. Do not apply on sand or loamy sand soils. If following shortened plant-back interval, suggest avoid using diuron again PRE. Many diuron formulations are available but have longer plant-back intervals, see labels.
Valor improves emerged primrose and radish control; also provides residual control of pigweed, pusley, and other sensitive weeds for up to 6-8 weeks if activated on soil. The addition of 2,4-D (8-16 oz/A of 3.8 lb ai material) improves control of radish and primrose; follow most restrictive plant-back interval. For PPO-resistance management, make only 3 applications of Reflex or Valor (including generics) on a field in 3 years.	glyphosate + flumioxazin Valor SX 51 WDG	9 + 14	see glyphosate + 2 oz	0.75-1.13 (lb ae) + 0.063	12 H/ N/A	A Georgia 24c Valor label allows reduced plant-back intervals. Outflank, Panther, and Rowel have been tested and perform similarly to Valor but do not have the state label allowing the following use patterns: In strip-till cotton, Valor can be applied 10 days ahead of planting as long as the strip-till operation occurs between applying Valor and planting. In no-tillage production or when the strip is implemented prior to application, Valor plant-back interval should be as follows: 1) <30% ground cover wait 28 days PLUS 1" of rain; 2) >30% ground cover wait 21 days PLUS 1" of rain. If Reflex (or generic) will be applied PRE; suggest adding an additional 7 days to no-tillage and 4 days to strip-tillage planting intervals. Add a non-ionic surfactant or crop oil concentrate (preferred), regardless of glyphosate brand. Carefully follow label directions for cleaning sprayer after each use!
ET improves control of emerged morningglory and small (< 1") glyphosate-resistant Palmer amaranth.	glyphosate + pyraflufen ethyl ET 0.208 EC	9 + 14	see glyphosate + 0.5-2 fl oz	0.75-1.13 (lb ae) + 0.0008-0.003	12 H/ N/A	May be applied as a burndown treatment anytime prior to planting. ET does not provide residual weed control.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		REUPH (Hours - Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (A/GAL)		
PRE-PLANT BURNDOWN - ANY VARIETY (continued)						
Improved control of henbit, chickweed, Carolina geranium, and wild radish compared to glyphosate alone. Use Harmony Extra or Nimble to improve control of curly dock.	glyphosate + thifensulfuron + tribenuron FirstShot SG 50 SG NOL	9 + 14	see glyphosate + 0.5-0.8 oz	0.75-1.13 (lb ae) + 0.008-0.013 + 0.008-0.013	12 H/ N/A	Apply at least 14 days prior to planting. Include nonionic surfactant at 1-2 qt/100 gal spray or crop oil concentrate at 1-2 gal/100 gal spray.
	glyphosate + thifensulfuron + tribenuron Harmony Extra SG with TotalSol 50 SG or Harmony Extra, Nimble 75WDG NOL	9 + 2 + 2	see glyphosate + 0.75 oz 0.5 oz	0.75-1.13 (lb ae) + 0.0156 + 0.0078	12 H/ N/A	
Burndown of emerged annual weeds 3" or less. Does not control immature primrose, large horseweed, curly dock, swinecress, immature radish, or large grasses. Mixtures with diuron are usually far more effective.	paraquat Gramoxone 2S Firestorm, Parazone 3S NOL	22	2.5-4 pt 1.7-2.7 pt	0.63-1	24 H/ N/A	Apply any time prior to planting. Add nonionic surfactant at 2 pt/100 gal of spray mix or crop oil concentrate at 1 gal/100 gal spray mix. Apply 0.63 lb ai for wheat and 0.5 lb ai for rye cover crop; cover crops must be mature (seedheads present) for adequate control. Gramoxone, Firestorm, and Parazone have been tested. Numerous other brands of paraquat are also available, see labels.
Burndown of emerged annual weeds and provides residual control if diuron is activated on soil. Effective on mature primrose and wild radish. BY FAR the most effective option for emerged pigweed. If extended residual control is desired, consider adding Valor to the mixture but follow appropriate plant back.	paraquat Gramoxone 2S Firestorm, Parazone 3S + diuron Direx 4F NOL	22 + 7	2.5-4 pt 1.7-2.7 pt + 1.5-2 pt	0.63-1 + 0.75-1	24 H/ N/A	A Georgia 24(c) Direx label allows applications up to the day ahead of planting if a strip-tillage implement is run between Direx application and planting. If no tillage occurs between Direx application and planting then one should wait at least 10 days prior to planting. Do not apply on sand or loamy sand soil. If following shortened plant-back interval, suggest avoid using diuron again PRE. Add crop oil concentrate at 1 gal/100 gal spray mix. Applications in May to mature weeds are much more effective than to immature weeds.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		REPH (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (L OF AFE)		
PRE-PLANT BURNDOWN - ANY VARIETY (continued)						
Paraquat mixtures with diuron are more effective on emerged Palmer amaranth; however, Valor is more effective in providing residual pigweed control. The addition of diuron is suggested if pigweed is larger than 3". For PPO-resistance management, make only 3 applications of Valor or Reflex (including generics) on a field in 3 years.	paraquat Gramoxone 2 SL Firestorm, Parazone 3 SL + flumioxazin Valor SX 51 WDG NOL	22 + 14	2.5-4 pt 1.7-2.7 pt + 2 oz	0.63-1 + 0.063	12 H/ N/A	A Georgia 24 c Valor label allows reduced plant-back intervals. Outflank, Panther, and Rowel have been tested and perform similarly to Valor but do not have the state label allowing the following use patterns: In strip-till cotton, Valor can be applied 10 days ahead of planting as long as the strip-till operation occurs between applying Valor and planting. In no-tillage production or when the strip is implemented prior to application, Valor plant-back interval should be as follows: 1) <30% ground cover wait 28 days PLUS 1" of rain; 2) >30% ground cover wait 21 days PLUS 1" of rain. If Reflex (or generic) will be applied PRE; suggest an additional 7 days to no-tillage and 4 days to strip-till planting intervals. Add a non-ionic surfactant or crop oil concentrate (preferred). Carefully follow label directions for cleaning sprayer after each use!
Winter annual broadleaf weeds such as henbit, chickweed, small wild radish, and curly dock. DO NOT anticipate residual control for Palmer amaranth.	rimsulfuron + thifensulfuron Leadoff 33 SG NOL	2 + 2	1.5 oz	0.0156 + 0.0156	4 H/ N/A	Apply at least 30 days prior to planting. Can increase rate to 2 oz/A if applying at least 60 days prior to planting. Also suggest at least 1 inch of rain accumulation prior to planting. Adding 2,4-D will improve control of problematic weeds such as radish, primrose, and horseweed. May also mix with glyphosate for improved control of numerous weed species.
PRE-PLANT BURNDOWN - ENLIST VARIETIES						
Most weeds but not effective on Carolina geranium, and Palmer amaranth should be less than 3 inches. Off-target movement of 2,4-D poses the greatest threat to the survival of this technology; steward these herbicides with the utmost level of respect or use alternative control methods.	2,4-D choline Enlist One 3.8L NOL glyphosate + 2,4-D choline Enlist Duo on list	4 9 + 4	1.5-2 pt 3.5-4.75 pt	0.7-0.95 0.74-1 (lb ae) + 0.7-0.95	48 H/ N/A 48 H/ N/A	Enlist Varieties Only: Label allows application any time prior to planting or behind planter. Regardless of labeling, all winter weeds and cover crops (exception could be cereal grains) should be killed at least 10 days prior to planting. Currently, Enlist One allows tank mixtures with numerous herbicides, while Enlist Duo currently does not, visit Enlisttankmix.com for the latest. If making an in-season application, the person responsible for the application must have attended the Using Pesticides Wisely classroom training; visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Data suggests the choline formulation of 2,4-D has reduced volatility potential when compared to other 2,4-D formulations; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, and boom heights. Also one must review the website for approved adjuvants, drift reduction agents, and other tank mixtures.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RUPH (lb/acre) / (oz/acre)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	lbs active (lb/acre)		
PRE-PLANT BURNDOWN - XTENDFLEX VARIETY						
Most weeds but Palmer amaranth should be less than 3". Off-target movement of dicamba poses the greatest threat to the survival of this technology; steward these herbicides with the utmost level of respect or use alternative control methods.	dicamba Engenia or XtendiMax	4	12.8 fl oz or 22 fl oz	0.5	12 H/ N/A	XtendFlex Varieties ONLY: In 2018, all applicators must be trained prior to spraying Engenia, FeXapan or XtendiMax. If making an in-season application, the person responsible for the application must have attended the Using Pesticides Wisely classroom training; visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Engenia, FeXapan, and XtendiMax are the only brands of dicamba currently approved for this rate and timing. Can apply any time prior to planting or behind the planter. Regardless of labeling, all winter weeds and cover crops (exception could be cereal grains) should be killed at least 10 days prior to planting. Data suggests Engenia, FeXapan, and XtendiMax are the least volatile formulations of dicamba currently available; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, sprayer speeds, and boom heights. Also, review the website for approved adjuvants, drift reduction agents, and other tank mixtures (Xtendimaxapplicationrequirements.com or Engeniatankmix.com)
BURNDOWN OF GLYPHOSATE-RESISTANT HORSEWEED - ANY VARIETY						
Glyphosate-resistant horseweed is common across Georgia. Glyphosate + 2,4-D + Valor SX or glyphosate + dicamba + Valor are the preferred treatments.	glyphosate + 2,4-D amine numerous brands + flumioxazin Valor SX, other 51 WDG	9 + 4 + 14	see glyphosate + see label + 2 oz	0.75-1.13 (lb ac) + 0.95 (lb ac) + 0.063	48 H/ N/A	New formulations of 2,4-D and dicamba are available with less volatility potential, see Enlist or XtendFlex varieties below. Other brands of flumioxazin are also available including Outflank, Panther, and Rowel; however, these products do not have the same plant-back intervals as Valor, see label.
The 2,4-D or dicamba is needed in the mixture to control emerged resistant horseweed while the Valor provides residual control for seeds that may germinate after the application. See sections above on plant-back intervals for each product addressed in this section.	glyphosate + dicamba Clarity, other 4 SL + flumioxazin Valor SX, other 51 WDG	9 + 4 + 14	see glyphosate + 8 fl oz + 2 oz	0.75-1.13 (lb ac) + 0.25 + 0.063	24 H/ N/A	Carefully clean sprayers, see labels. 2,4-D and dicamba volatility occurs and is influenced by soil type and moisture, environmental conditions, and formulations selected.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RETHLH (hours or days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	EST. ACTIVE (a.i. or a.e.)		
BURNDOWN OF GLYPHOSATE-RESISTANT HORSEWEED - ANY VARIETY (continued)						
Glyphosate-resistant horseweed (continued)	paraquat Gramoxone 2S Firestorm, Parazone 3S + diuron Direx 4F	22 + 7	4 pt 2.7 pt + 1.5-2 pt	1 + 0.75-1	24 H/ N/A	Spray when daytime temps exceed 70° F. Add 1 gal of crop oil concentrate/100 gal of spray mix. May add 2,4-D or dicamba to improve control of emerged plants; follow proper plant-back intervals.
	NOL					
	glyphosate Liberty 2.34S	10	29-43 fl oz	0.53-0.79	12 H/ N/A	Recommended for fields where growers have failed to control glyphosate-resistant horseweed and it is too late for 2,4-D or dicamba. If greater than 29 oz/A is applied preplant, the season total applied cannot exceed 72 fl oz/A. To maximize control: >15 GPA water volume, medium spray droplet, warm temperatures, high humidity, bright sunlight, good soil moisture, and do not spray within 1.5 hours of sunrise or 1 hour of sunset. Cheetah and Interline have been tested and performed similarly to Liberty, see labels. Other brands are available.
On list but limited by amount per season if use post-emergence so not for burndown						
BURNDOWN OF GLYPHOSATE-RESISTANT HORSEWEED - ENLIST VARIETY ONLY						
Glyphosate-resistant horseweed is common. Glyphosate + 2,4-D + Valor SX is the preferred treatment in Enlist cotton. 2,4-D is needed to control emerged plants while Valor provides residual control. See sections above on plant-back intervals for all products. 2,4-D volatility occurs and is influenced by soil types and moisture, environmental conditions, and formulations selected.	2,4-D choline Enlist One 3.8 L	4	1.5-2 pt	0.7-0.95	48 H/ N/A	Enlist Varieties Only: Label allows application any time prior to planting or behind planter. Regardless of labeling, all winter weeds and cover crops (exception could be cereal grains) should be killed at least 10 days prior to planting. Currently, Enlist One allows tank mixtures with numerous herbicides, while Enlist Duo currently does not; visit Enlisttankmix.com for the latest. If making an in-season application, the person responsible for the application must have attended the Using Pesticides Wisely classroom training; visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Data suggests the choline formulation of 2,4-D has reduced volatility potential when compared to other 2,4-D formulations; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, and boom heights. Also one must review the website for approved adjuvants, drift reduction agents, and other tank mixtures.
	+	+	+	+	+	
	glyphosate	9	see glyphosate	0.75-1.13		
	+	+	+	+	+	
	flumioxazin Valor SX 51 WDG	14	2 oz	0.063		
NOL						

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE (ACR)		RUPH (Hours + Days)	REMARKS AND PRECAUTIONS	
			AMOUNT OF FORMULATION	LB ACTIVE (AL) (AL)			
BURNDOWN OF GLYPHOSATE-RESISTANT HORSEWEED - XTENDFLEX VARIETY ONLY							
Glyphosate-resistant horseweed is common. Glyphosate + dicamba + Valor SX is the preferred treatment in XtendFlex cotton. Dicamba is needed to control emerged resistant horseweed while the Valor provides residual control. See sections above on plant-back intervals for all products. <i>Dicamba volatility occurs and is influenced by soil types and moisture, environmental conditions, and formulations selected.</i>	dicamba	4	12.8 or 22 fl oz	0.5	24 H/ N/A	XtendFlex Varieties ONLY: Engenia, FeXapan, and XtendiMax are the only brands of dicamba currently approved for this rate and timing. Label allows Engenia or XtendiMax application any time prior to planting or behind the planter; however, follow standard plant-back interval for Valor. Regardless of labeling, all winter weeds and cover crops (exception could be cereal grains) should be killed at least 10 days prior to planting. In 2018, all applicators must be trained prior to spraying Engenia, FeXapan or XtendiMax. If making an in-season application, the person responsible for the application must have attended the Using Pesticides Wisely classroom training; visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Data suggests Engenia, FeXapan, and XtendiMax are the least volatile formulations of dicamba currently available; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, sprayer speeds, and boom heights. Also, review the website for approved adjuvants, drift reduction agents, and other tank mixtures (Xtendimaxapplicationrequirements.com or Engeniatankmix.com).	
	Engenia or XtendiMax	+	+	+			
	glyphosate	9	see glyphosate	0.75-1.13			
	flumicvazin	+	+	+			
	Valor SX 51 WDG	14	2 oz	0.063			
PRE-PLANT INCORPORATED - ANY VARIETY							
Annual grasses, pigweeds and Florida pusley. Controls glyphosate-resistant Palmer amaranth much more effectively than when applied preemergence.	pendimethalin Prowl 3.3 EC Prowl H ₂ O 3.8 AS	3	1.2-2.4 pt 2 pt	0.5-1 0.95	24 H/ N/A	Soil incorporate in top 2" of the soil within 24 hours of application; consider mixing with Reflex. Application and incorporation within a week of planting is preferred. Pendimethalin is less volatile than trifluralin and is a better option if incorporation is delayed, although delayed incorporation will reduce control. For Treflan 4 L, rate should not exceed 1.5 pt/A for most fields. The need for a PRE herbicide as noted with the split program below is critical in controlling Palmer amaranth.	
	trifluralin Treflan, others 4 EC	3	1-2 pt	0.5-1	12 H/ N/A		
Glyphosate-resistant Palmer amaranth and yellow nutsedge For PPO-resistance management, make only 3 applications of Valor or Reflex (including generics) on a field in 3 years.	fomesafen Reflex 2S	14	12-16 fl oz	0.19-0.25	24 H/ N/A	A Georgia Section 2 (ee) Reflex label allows a preplant application by incorporating Reflex to a SHALLOW (2" or less) depth while the soil is moist; suggest including pendimethalin or trifluralin. The need for a PRE herbicide as noted with the split program below is critical: reduce Reflex rate accordingly if implementing split PPI and PRE program. For Palmer amaranth, less control is noted with Reflex alone incorporated when compared to preemergence applications if activated immediately by rainfall or irrigation; less injury potential is also noted with incorporated application. Thus the split program, below, is usually the best option.	

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE (ACR)		RETT (hours or days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	ES ACTIVE (AI or AE)		
SPILL PROGRAM WITH PREPLANT INCORPORATED (PPI) FOLLOWED BY PRE-EMERGENCE (PRE) APPLICATIONS - ANY VARIETY						
The SINGLE MOST effective approach for the control of Palmer amaranth while also offering the least injury potential from fomesafen. Very beneficial on dryland production. For PPO-resistance management, make only 3 applications of Valor or Reflex (including generics) on a field in 3 years.	PPI:					PPI: Shallow (2") incorporation is required. Plant within 1 week of application and incorporation if possible. Numerous formulations of fomesafen are available; however, they may not support this use pattern, see label. PRE: 1. Be sure to include paraquat PRE if glyphosate-resistant Palmer amaranth is emerged. 2. Warrant offers greater residual control when compared to diuron while diuron offers greater control of emerged weeds. 3. If mixing Reflex + Warrant + diuron, the rate of diuron for most fields should not exceed 10 oz/A. Numerous formulations of fomesafen and diuron are available; see label.
	trifluralin or pendimethalin + fomesafen Reflex 2S	3 + 14	See rates in preplant incorporated + 10-12 fl oz	See rates in preplant incorporated + 0.16-0.19	24 H/ N/A	
	PRE:					
	fomesafen Reflex 2S	14	8-10 fl oz	0.125-0.16	24 H/ N/A	
	acetochlor Warrant 3ME	15	32 fl oz	0.75		
OR	OR	OR	OR			
diuron Direx, diuron 4F	7	10-20 fl oz	0.31-0.63			
PRE-EMERGENCE WEED CONTROL - ANY VARIETY						
Residual control of annual grasses, Palmer amaranth, and tropical spiderwort.	acetochlor Warrant 3 ME	15	2-3 pt	0.75-1.125	12 H/ N/A	Warrant should be applied in combination with fomesafen (Reflex, others), diuron, or Cotoran depending on Palmer population and technology grown; add paraquat and adjuvant if Palmer is up. Apply within 24 hr of planting. A rate of 2-2.5 pt/A is in order when 1) tank mixing with another effective residual herbicide, 2) applying on light soil textures, and/or 3) using intense irrigation during the first 2 wk of planting.
Residual control of many annual grasses and broadleaves including Palmer amaranth and tropical spiderwort; suppression of yellow nutsedge.	acetochlor + fomesafen Warrant Ultra 3.45 CS	15 + 14	2.24 pt	0.77 + 0.175	24 H/ N/A	Apply within 24 hr of planting; add paraquat plus adjuvant if Palmer is up. Warrant Ultra at 2.24 pt/A provides 2 pt of Warrant and 0.175 lb ai of fomesafen (equivalent to 11 oz/A of Reflex). This rate is ideal for lighter soil textures, under intense irrigation, and when used in dicamba- or 2,4-D-based programs. On heavier soils when implementing Roundup- or Liberty-based programs, the addition of Warrant at 0.5-1 pt/A may be in order.
Residual suppression of annual broadleaf weeds and grasses. More effective than Cotoran on pigweed, less effective on most other weeds.	diuron Direx, others 80 DF Direx, others 4L	7	0.38-0.78 lb 10-20 oz	0.31-0.62	12 H/ N/A	Diuron should be applied in combination with fomesafen (Reflex, others) or Warrant depending on Palmer population and technology grown; add paraquat and adjuvant if Palmer is up. Apply within 24 hr of planting. See label for specific rate on soils but in general lower rate on sandier soils and/or intense irrigation. Label restricts use on sands or soils with ≤ 1% organic matter. Numerous generic formulations are available, see label.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE (ACR)		REFLEX (lb ai/acre)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	PBS ACTIVE (lb ai/acre)		
PRE-EMERGENCE WEED CONTROL - ANY VARIETY (continued)						
Residual suppression of annual broadleaf weeds and annual grasses. The most effective single residual material for sicklepod, cocklebur, and morningglory control. Less effective than diuron on Palmer amaranth.	fluometuron Cotoran 4F <i>on list</i>	7	2-3 pt	1-1.5	12 H/ N/A	Cotoran should be applied in combination with fomesafen (Reflex, others) or Warrant depending on Palmer population and technology grown; add paraquat and adjuvant if Palmer is up. Apply within 24 hr of planting. See label for specific rate on soils; in general use lower rate on sandier soils and/or with intense irrigation. <i>A maximum of 2 pt/A is ideal for many GA soils.</i>
Excellent residual control of Palmer amaranth once activated. New herbicide chemistry for cotton growers.	fluridone Brake 1.2 F <i>NOL</i>	12	16-32 fl oz	0.15-0.3	48 H/ N/A	Label specifies to tank mix Brake with another residual herbicide when Brake is applied at less than 21 oz/A. Data shows that if one does not mix Brake with another effective herbicide, Palmer amaranth will often emerge prior to Brake activation. Do not apply a product with fluridone more than 2 years in a row in a field. See label for carryover restrictions, make special note of rotations if using 2 years in a row.
Excellent residual control of Palmer amaranth once activated. New herbicide chemistry for cotton growers.	fluridone + fomesafen Brake F16 2.7F <i>NOL</i>	12 + 14	16 fl oz	0.15 + 0.1875	24 H/ N/A	Contains fluridone plus the equivalent of 0.1875 lbs of fomesafen, which would equal 12 oz of Reflex. Although fomesafen requires around 0.3" rainfall/irrigation for activation, fluridone requires a minimum of 0.5" rainfall/irrigation. Carryover to small grains and soybeans 8 months; sorghum, peanut, corn 10 months; tobacco and most veggies at least 18 months.
Excellent residual for glyphosate-resistant Palmer amaranth; good control of poinsettia and suppression of yellow nutsedge. For PPO resistance management, make only 3 applications of fomesafen or Valor (including generics) on a field in 3 years.	fomesafen Reflex, Dawn 2S <i>on list</i>	14	10-16 fl oz	0.16-0.25	24 H/ N/A	Reflex or generics should be applied in combination with Warrant, diuron, or Cotoran depending on Palmer population and technology grown; add paraquat and adjuvant if Palmer is up. Apply within 24 hr of planting. <i>Research suggests 12 oz/A is an appropriate rate when mixed with Warrant or diuron on most soils; lower rates on lighter, low organic-matter soil and/or when using intense irrigation.</i> Injury more often occurs when initial rains or irrigation occurs as cotton is emerging. Good residual pigweed control even if the first rain does not occur until 15 days after treatment. Pigweed that emerges before activation will not be controlled. Reflex and Dawn have been tested intensely; other brands are available.
Annual grasses and Florida pusley; suppression of Palmer amaranth only. Irrigation or rainfall needed within 24 hours.	pendimethalin Prowl 3.3 EC Prowl H20 3.8 AS <i>NOL</i>	3	1.8-3.6 pt 2-3 pt	0.75-1.5 0.95-1.42	24 H/ N/A	Preemergence applications are far less consistent than incorporated treatments; tank mixtures are needed. Wet/moist conditions during emergence (rainfall or irrigation) can cause significant plant stunting, leaf/stem malformation, and stem swelling with eventual breaking; especially if used in combination with Reflex (or generic). Apply within 24 hours of planting.
Controls non-ALS resistant pigweeds, lambsquarters, prickly sida, spurge, and smartweed. Suppresses morningglory, except tall.	pyrithiobac Staple LX, Pyrimax 3.2S <i>NOL</i>	2	1.7-2.1 fl oz	0.0425-0.053	4 H/ N/A	Staple or Pyrimax are excellent residual herbicides but cotton injury, especially on irrigated light textured soils is a serious concern. Thus, a delayed PRE or early POST use of Staple is recommended. Do not apply on soils with less than 0.5% organic matter. Can tank mix with diuron, fluometuron, pendimethalin, or Reflex, apply within 24 hr of planting. Include paraquat or glyphosate if weeds are emerged.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RETHP (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	ES ACTIVE (AL or ALS)		
POST-EMERGENCE OVERTOP WEED CONTROL - ANY VARIETY						
Non-ALS resistant pigweed less than 1", morningglory (excluding tall mg), coffee senna, and redweed. At most, suppresses sicklepod. Provides good residual control of many species if it reaches the ground and is activated.	<i>pyrithiobac</i> Staple LX, Pyrimax 3.2S NOL	2	2.7-3 fl oz	0.06-0.07	4 H/ 60 D	Apply overtop of cotton from cotyledonary stage up to 60 days of harvest. Avoid applying during periods of cool, wet weather. Include nonionic surfactant at 1 qt/100 gal spray mix. Label allows 2 applications per year, not exceeding a total of 5.1 fl oz. Label also allows increasing rate of an application to 3.8 fl oz but injury is a concern. Residual control of non-ALS resistant Palmer has been good even if the first activating rain does not occur for 15 days after application, plants emerging before activation will not be controlled. Do not mix with grass control herbicides. May mix with most insecticides, but do not tank mix with any product containing malathion. Do not mix with any Dual product or Warrant. Separate Staple and Dual/Warrant applications by 5 or more days. See label for rotational restrictions.
Annual broadleaf weeds including sicklepod, Ipomoea morningglory, and nutsedge. Will not control smallflower morningglory or ALS-resistant pigweed, jimsonweed, copperleaf, or prickly sida.	<i>trifloxysulfuron</i> Envoke 75 WDG NOL	2	0.1 oz	0.0047	12 H/ 60 D	Directed application strongly encouraged for less injury and improved weed coverage on larger cotton, however, label allows overtop application after cotton has at least 6 (prefer 7) true leaves up until 60 days of harvest. Add nonionic surfactant at 1 qt/100 gal; do not use other types of adjuvants. Do not mix with other pesticides including plant growth regulators. In an attempt to avoid injury, do not apply to cotton under stress, such as very dry, wet, or cool conditions. Envoke may be directed to cotton 6" or larger at rates of 0.1-0.25 oz/A. See label for details and rotational restrictions. Rain fast in 3 hr. Provides residual control of sensitive weeds if contacts soil and is activated.
Most broadleaf weeds. Poor control of tropic croton, copperleaf and ALS-resistant pigweed. Good residual if contacts soil and is activated.	<i>trifloxysulfuron</i> Envoke 75 WDG + <i>pyrithiobac</i> Staple LX 3.2 SL NOL	2 + 2	0.1 oz + 1.3-1.9 fl oz	0.0047 + 0.03-0.05	12 H/ 60 D	Apply overtop or directed after cotton has at least 6 (prefer 7) true leaves up until 60 days of harvest. Add non-ionic surfactant at 1 qt/100 gal spray mix. See comments and restrictions for each product applied alone.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RETHP (H/D)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	TES ACTIVE (AI or AI)		
POST-EMERGENCE OVER-TOP WEED CONTROL FOR ENLIST, GLYTOL LIBERTYLINK, or XTENDFLEX VARIETIES ONLY						
An at-plant residual herbicide should always be used in a Liberty system. Control of pusley, spiderwort, and goosegrass are not consistent. In general, broadleaf weeds should be <3" and grasses <2". Excellent control of morningglory including moonflower. For Palmer amaranth, apply 29 oz/A when less than 3"; 32 oz/A when 3"; 36 oz/A when 4"; and 43 oz/A when taller than 4". <i>For resistance management, do not make more than 2 applications per year on a field; include two herbicides PRE, residual mixtures POST, and a directed layby.</i>	glufosinate Liberty 2.34S 3" weeds = 32 g/A on list	10 29-43 fl oz	0.53-0.79	12 H/ 70 D	Enlist, Glytol LibertyLink, or XtendFlex variety Label allows application from full cotyledonary cotton through early bloom; however, UGA recommends applications after 8 leaf cotton be sloppy directed to reduce injury potential while improving weed control. Do not exceed 43 fl oz/A per application. Also, do not exceed 87 fl oz/A per season with individual applications of 29 fl oz/A or less, and do not exceed 72 oz/A per season if any individual application greater than 29 oz/A is made. <i>To maximize control:</i> >15 GPA water volume, medium spray droplet, warm temperatures, high humidity, bright sunlight, good soil moisture, and do not spray within 1.5 hours of sunrise or 1 hour of sunset. Mixtures with residual herbicides are usually needed to assist in the control of grasses, pusley, spiderwort, and pigweed. Cheetah and Interline are formulations of glufosinate that have been tested; other brands are available. Research has shown in some environments, especially saturated soils, injury from Liberty is greatest in XtendFlex cotton followed by Enlist cotton and least with Glytol LibertyLink cotton. Rain fast within 4 hours. Do not tank mix with grass herbicides.	
Mixing glyphosate with Liberty will not influence control by Liberty; however, grass control will often be more than Liberty alone but less than that by glyphosate alone.	glufosinate Liberty 2.34 S + glyphosate numerous brands Combo NOL	10 + 9 32 fl oz + see glyphosate	0.59 + 0.75	12 H/ 70 D	Enlist, Glytol LibertyLink, and XtendFlex variety See comments for Liberty and glyphosate alone. Injury on Glytol LibertyLink is almost always negligible; injury on Enlist and XtendFlex is often increased slightly above glufosinate applied alone. Some leaf speckling/burn will likely occur. Injury may be enhanced if applied to cotton with dew, under extremely high temperatures, during times of saturated soils, or when mixed with insecticides or adjuvants.	
Staple may improve emerged pigweed control (non ALS-resistant) and provides residual activity on sensitive weeds if spray contacts soil and is activated. <i>For resistance management, do not make more than 2 applications of glufosinate per year in a field; include 2 herbicides PRE and a directed layby.</i>	glufosinate Liberty 2.34S + pyrithiobac Staple LX 3.2 SL NOL	10 + 2 29 fl oz + 1.9 fl oz	0.53-0.58 + 0.03-0.05	12 H/ 70 D	Enlist, Glytol LibertyLink, or XtendFlex variety See information for glufosinate alone just above. Leaf speckling/burn/chlorosis will occur. Avoid dew, extremely high temperatures, saturated soils, and mixtures with other pesticides or adjuvants to reduce injury potential. Do not mix with any metolachlor (Dual) product or Warrant. Research has shown in some environments, especially saturated soils, that injury from Liberty is greatest on XtendFlex cotton followed by Enlist cotton and least on Glytol LibertyLink cotton.	

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Can use Dual II or Warrant for Post 1 + 2 w/ Liberty

COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		REI PH Hours or Days	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (AI or ME)		
POST-EMERGENCE OVERTOP-WEED CONTROL FOR ENLIST, GLYTOL LIBERTYLINK, or XTENDFLEX VARIETIES ONLY (continued)						
Dual or Warrant provides residual control of grasses, spiderwort, and pigweeds if spray contacts soil and is activated. Outlook provides residual control of grasses and pigweeds, spiderwort has not been studied. Comparing Dual and Warrant, Dual activity begins more quickly with immediate activation while Warrant is more stable waiting on activation. For Palmer amaranth, apply Liberty at 29 oz/A when less than 3"; 32 oz/A when 3"; 36 oz/A when 4"; and 43 oz/A when taller than 4". For resistance management, do not make more than 2 applications of glufosinate per year in a field; include 2 herbicides PRE and a directed layby.	glufosinate Liberty 2.34S	10	29-43 fl oz	0.53-0.79	24 H/ 70 D	Enlist, Glytol LibertyLink, or XtendFlex variety Warrant mixture can be applied from cotton being fully emerged through early bloom. Dual Magnum mixture can be applied from cotton being fully emerged through 100 days before harvest if applied overtop, up to 80 days before harvest if directed or early bloom, whichever is more restrictive. Outlook mixture can be applied from 1-leaf cotton through second week of bloom. UGA research strongly encourages these mixtures to be directed after 8-leaf cotton for reduced injury and better weed control. Some leaf speckling/burn will likely occur. Injury may be enhanced if applied to cotton with dew, under extremely high temperatures, saturated soils, or when mixed with insecticides or adjuvants. Research has shown in some environments, especially saturated soils, that injury from Liberty is greatest on XtendFlex cotton followed by Enlist cotton and least on Glytol LibertyLink cotton. To maximize control: >15 GPA water volume, medium spray droplet, warm temperatures, high humidity, bright sunlight, good soil moisture, and do not spray within 1.5 hours of sunrise or 1 hour of sunset. Several products containing metolachlor (not S-metolachlor) are available. Metolachlor products are less effective per unit of formulated product than those with S-metolachlor. In general it takes 1.5 pt of a metolachlor product to give the activity one gets from 1 pt of S-metolachlor. Cheetah and Interline are available formulations of glufosinate that have been tested; other brands are available.
	+ acetochlor Warrant 3 ME	15	2-3 pt	0.75-1.125		
	glufosinate Liberty 2.34S	10	29-43 fl oz	0.53-0.79	24 H/ 80 D	
	+ S-metolachlor Dual Magnum 7.62 EC	15	1 pt	0.95		
	glufosinate Liberty 2.34S	10	29-43 fl oz	0.53-0.79	12 H/ N/A	
	+ dimethenamid-P Outlook 6 EC	15	12-16 fl oz	0.56-0.75		
POST-EMERGENCE OVERTOP-WEED CONTROL IN PHYTOGEN WIDESTRIKE COTTON VARIETIES						
Palmer amaranth in Widestrike cotton. For resistance management, do not make more than 2 applications per year in a field; include 2 herbicides PRE and a directed layby.	glufosinate Liberty 2.34S	10	29 fl oz	0.53	12 H/ 70 D	Phylogen cultivars with the Widestrike trait are tolerant to Liberty. Tolerance in these cultivars is not complete, and varying levels of crop injury are often noted. Greater injury can be expected when Liberty is mixed with AMS, mixed with other pesticides, or applied at higher rates. Grower assumes the liability of crop injury. Make no more than two topical applications with the second application being made no later than 8 leaf cotton. See above comments for use of Liberty in Liberty Link cotton, including statement on application time of day.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		REPHRASE (If any)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (a.i. or a.e.)		
POST-EMERGENCE OVERTOP WEED CONTROL FOR ENLIST, GYTOE, LIBERTY, NIK, ROUNDUP READY FLEX, or XTENDEEN VARIETIES						
Controls most annual weeds, exceptions include glyphosate-resistant Palmer amaranth, dayflower, Florida pusley, tropical spiderwort, doveweed and hemp sesbania. Timely applications critical for purslane and morningglory. <i>Never apply glyphosate alone. Obtain sound management programs from your Extension office or at gavweed.com.</i>	glyphosate 4S (3 lb ae) 5.4S (4 lb ae) 5S (4.17 lb ae) 5.5S (4.5 lb ae) 6S (5 lb ae)	9	32-48 oz 24-36 oz 23-34 oz 22-32 oz 19-29 oz	0.75-1.12 (lb ae)	4 H/ 7 D	WeatherMax or PowerMax (4.5 lb ae) may be applied overtop or directed to Flex cotton anytime from cotton emergence until 7 days prior to harvest. The maximum rate for any single application between emergence and 60% open bolls is 32 fl oz (1.12 lb ae). Do not exceed a total of 128 fl oz (4.5 lb ae) applied from emergence through 60% open bolls. Do not exceed a maximum of 44 fl oz (1.55 lb ae) applied between layby and 60% open bolls. Do not exceed a maximum of 44 fl oz between 60% open bolls and harvest. A glyphosate-based program should include: 1) no weeds emerged at planting; 2) two residual herbicides at planting; 3) residual herbicides with Roundup POST and a conventional directed layby.
Warrant provides residual control of grasses, pigweeds and tropical spiderwort, if the acetochlor contacts the soil and is activated.	glyphosate + acetochlor Warrant 3 ME	9 + 15	see glyphosate + 2-3 pts	0.75-1.12 + 0.075-1.125	12 H/ do not apply after bloom	See comments for glyphosate alone. Label allows a topical application once cotton is completely emerged until it reaches bloom, however, UGA research suggests making directed applications after the 8-leaf stage to reduce injury potential while improving weed control. A topical and directed application may be made as long as Warrant was not applied PRE; if Warrant was applied PRE then one POST application can be made. Use loaded glyphosate formulation; do not add adjuvants or other pesticides including Staple. Avoid heavy dew on cotton plant, saturated soils, and extreme, hot conditions.
Outlook provides residual control of annual grasses and pigweeds if it reaches the soil and is activated; no current data on spiderwort.	glyphosate + dimethenamid-P Outlook 6 EC	9 + 15	see glyphosate + 12-16 fl oz	0.75-1.12 + 0.56-0.75	12 H/ N/A	See comments for glyphosate alone. Label allows a topical application from 1-leaf cotton through 2nd week of bloom; however, UGA research suggests making directed applications after the 8-leaf stage to reduce injury potential while improving weed control. Only one application of Outlook per year. Suggested rate is 12 oz/A on coarse soils or under intense irrigation. Some leaf speckling/burn will likely occur. Avoid heavy dew on cotton plant, saturated soils, and extreme, hot conditions.
Staple improves control of hemp sesbania, morningglory, tropical spiderwort, and glyphosate-resistant Palmer amaranth. Staple will provide residual control of pigweeds, prickly sida, smartweed, spurred anoda, and velvetleaf if it contacts the soil and is activated. Will not control ALS + glyphosate resistant Palmer.	glyphosate + pyrithiobac Staple LX, Pyrimax 3.2SL	9 + 2	see glyphosate + 2-3 fl oz	0.75-1.12 + 0.05-0.07	4 H/ 60 D	See comments for glyphosate and Staple alone. Apply overtop from cotton cotyledonary stage until 60 days prior to harvest, however, UGA research suggests making directed applications after the 8-leaf stage to reduce injury potential while improving weed control. Some leaf speckling/burn will likely occur. Avoid heavy dew on cotton plant, saturated soils, and extreme, hot conditions. Do not mix with any Dual/metolachlor products or Warrant. For Palmer amaranth, apply Staple at 2.5-3 oz/A when Palmer is 2" or less; rate can be increased to 3.8 oz/A but injury is a concern. For residual control, a rate of 1.9-2.1 oz/A should perform very well.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		REF PH (Days on Post)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	PERCENTAGE OF ACTIVE		
POST-EMERGENCE OVERTOP WEED CONTROL FOR IN-SEASON GLYPHOSATE, GLYCOLIC ACID, ROUNDUP READY COTTON, or NITROGEN VARIETIES <i>See comments</i>						
Metolachlor controls annual grasses, pigweeds, doveweed, Florida pusley, tropical spiderwort and suppresses yellow nutsedge if it contacts the soil and is activated. Several products containing metolachlor (not S-metolachlor) are available and labeled. Metolachlor products are less effective per unit of formulated product than those with S-metolachlor. In general it takes 1.5 pt of a metolachlor product to give the activity one gets from 1 pt of S-metolachlor.	glyphosate + S-metolachlor Dual Magnum 7.62 EC Brawl 7.62 EC	9 + 15	see glyphosate + 1 pt 1 pt	0.75-1.12 + 0.95	24 H/ 100 D	See comments for glyphosate alone. Dual Magnum can be applied overtop of cotton until 100 days before harvest and directed until 80 days of harvest. UGA research suggests making directed applications after the 8-leaf stage to reduce injury potential and improve weed control. Some leaf speckling/burn will likely occur. Avoid heavy dew on cotton plant, saturated soils, and extreme, hot conditions. Do not mix with Staple or apply within 5 days of Staple.
	RU Resistant Weeds					
	glyphosate + S-metolachlor Sequence 5.25L	NOL	2.5 pt	0.7 + 0.94	24 H/ 100 D	Label allows application from cotyledon stage cotton to the 10 leaf stage (not to exceed 12" tall). Do not harvest within 100 days of application. See comments above for glyphosate + Dual Magnum.
Envoke improves Ipomoea morningglory and nutsedge control. Also provides some residual control of sensitive weeds if it reaches the soil and is activated. Will not control ALS + glyphosate resistant Palmer.	glyphosate + trifloxysulfuron Envoke 75 WDG	9 + 2	see glyphosate + 0.1 oz	0.75-1.12 + 0.0047	24 H/ 60 D	See comments for glyphosate and Envoke applied alone. Tank mix can be applied from 6 (prefer 7) leaf stage until 60 days of harvest; however, directed application strongly encouraged for improved weed control and much less injury. <i>Injury from topical applications is a concern.</i>
Volunteer Roundup Ready corn in Roundup Tolerant cotton	glyphosate + clethodim Select 2 EC Select Max 0.97EC	9 + NOL	see glyphosate + 4-8 fl oz 6-12 fl oz	0.75-1.12 + 0.06-0.09	24 H/ 60 D	See comments for glyphosate alone. Numerous generics available. Clethodim: For corn up to 12" tall, apply 4-6 oz of Select or 6 oz of Select Max; for corn up to 24" tall, apply 6-8 oz of Select or 9 oz of Select Max; for corn up to 36" tall, apply 12 oz of Select Max. Add 2.5 lb/A ammonium sulfate or equivalent and make sure glyphosate brand used contains adjuvant.
	glyphosate + fluroxypyr-p-butyl Fusilade DX 2 EC	9 + NOL	see glyphosate + 4-6 fl oz	0.75-1.12 + 0.06-0.09	12 H/ 90 D	Fusilade DX: Apply 4 oz Fusilade for corn less than 12". Increase rate to 6 oz for corn up to 24". Add 0.25% by volume of crop oil concentrate.
	glyphosate + quizalofop-p-ethyl Assure II 0.88 EC	9 + NOL	see glyphosate + 5-8 fl oz	0.75-1.12 + 0.03-0.05	12 H/ 80 D	Assure II: Apply Assure at 4 oz to corn up to 12", 5 oz for corn up to 18", and 8 oz to corn up to 30". Add 0.125% nonionic surfactant by volume.

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COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE (ACR)		REPH (lb/acre)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	lbs ACTIVE (lb/acre)		
POST-EMERGENCE OVER-TOP WEED CONTROL FOR ENLIST, GYTOX, LIBERTY, AND ROUNDUP READY FLEX, or XTEND FLEX VARIETIES (cotton only)						
Volunteer Roundup Ready soybean	glyphosate + trifloxysulfuron Envoke 75 WDG NOL	9 + 2	see glyphosate + 0.1 oz	0.75-1.12 + 0.0047	12 H/ 60 D	See comments above on glyphosate plus Envoke, especially regarding crop injury. Cotton should be 6 (prefer 7) leaves, and soybean should have no more than 4-5 trifoliate leaves. Not adequately effective on soybean with the STS trait. Consider Cotoran PRE at planting to help control soybean.
POST-EMERGENCE OVER-TOP WEED CONTROL FOR ENLIST VARIETIES						
2,4-D is extremely effective on many broadleaf weeds including spiderwort and morningglory; pigweed needs to be less than 3" and sequential applications are often needed. <i>Off-target movement of 2,4-D poses the greatest threat to the survival of this technology; steward these herbicides with the utmost level of respect or use alternative control methods.</i>	2,4-D choline Enlist One 3.8 L NOL	9	1.5-2 pt	0.7-0.95	48 H/ N/A	Enlist Varieties Only: The person responsible for the in-season application must have attended the Using Pesticides Wisely classroom training, visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Enlist One or Enlist Duo may be applied any time from cotton emergence to mid-bloom. May apply twice, allow 12 days between applications. For Enlist One, label currently allows tank mixtures with several herbicides including glyphosate products, Liberty, Warrant or Dual Magnum; visit Enlisttankmix.com for the latest. For Enlist Duo, there are no approved herbicide tank mixes at time of publication. Data suggests the choline formulation of 2,4-D has reduced volatility potential when compared to other 2,4-D formulations; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, and boom heights. Also, one must review the website for approved adjuvants, drift reduction agents, and other tank mixtures. <i>2,4-D volatility occurs and is influenced by soil conditions, environment, and formulations used; avoid off-target issues.</i>
	glyphosate + 2,4-D choline Enlist Duo RR Weeds Post	9 + 4	3.5-4.75 pt	0.74-1 (lb ae) + 0.7-0.95	48 H/ N/A	
POST-EMERGENCE OVER-TOP WEED CONTROL FOR XTEND FLEX VARIETIES						
Dicamba is extremely effective on many broadleaf weeds including morningglory, pigweed needs to be less than 3 inches and sequential applications are often needed. <i>Off-target movement of dicamba poses the greatest threat to the survival of this technology; steward these herbicides with the utmost level of respect or use alternative control methods.</i>	glyphosate + dicamba Engenia 5 S or XtendiMax 2.9 S Peterson only	9 + 4	see label + 12.8 fl oz or 22 fl oz	0.75-1.13 + 0.5	24H/ N/A	XtendFlex Varieties Only: All applicators must be trained prior to spraying Engenia, FeXapan or XtendiMax in 2018. Additionally, the person responsible for the application must have attended the Using Pesticides Wisely classroom training, visit http://www.agr.georgia.gov/24c.aspx to confirm certification. Engenia, FeXapan, and XtendiMax are the only brands of dicamba currently approved for this use. Apply any time from cotton emergence to 7 days prior to harvest. Can be applied multiple times postemergence, not to exceed a total of 51.2 oz/A of Engenia or 88 oz/A of XtendiMax. Only 2 topical applications are suggested and both applications should be prior to the 9-leaf stage; direct applications afterward for reduced injury potential and increased weed control. Separate applications by at least 7 days. Data suggests Engenia, FeXapan, and XtendiMax are the least volatile formulations of dicamba currently available; however, volatility can still occur. Be certain to study the label regarding requirements for buffers, wind speeds, spray tip requirements, sprayer speeds, and boom heights. Also, review the website for approved adjuvants, drift reduction agents, and other tank mixtures (Xtendimaxapplicationrequirements.com or Engeniatankmix.com). <i>Dicamba volatility occurs and is influenced by soil conditions, environment, and formulations used; avoid off-target issues.</i>

¹Mode of Action (MOA) code can be used to delay weed resistance by increasing herbicide diversity in a management program.

COTTON WEED CONTROL

WEED	HERBICIDE	MOA	BROADCAST RATE / ACRE		RE-TIME (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE (A or AE)		
POST-EMERGENCE OVER-TOP GRASS CONTROL FOR ANY VARIETY						
Annual grasses	<i>clethodim</i> Select, others 2 EC Select Max 0.97 EC Tapout 0.97 EC	1	6-8 fl oz 9-16 fl oz 9-16 fl oz	0.09-0.13 0.07-0.12 0.07-0.12	24 H/ 60 D	Apply to actively growing grasses not under stress. Mixtures with herbicides other than glyphosate will likely reduce grass control. Do not cultivate within 5 days of application. A 2nd application may be made. For Select: Add crop oil concentrate at 1 qt/A. For Select Max: Add nonionic surfactant at 1 qt/100 gal solution, crop oil concentrate at 1 gal/100 gal solution, or methylated seed oil at 1 gal/100 gal solution. For Fusilade: Apply with crop oil concentrate (preferred) at 1 gal/100 gal solution or nonionic surfactant at 1 qt/100 gal solution. For Assure: Apply with crop oil concentrate (preferred) at 1 gal/100 gal solution or nonionic surfactant at 1 qt/100 gal solution. For Poast: Add crop oil concentrate at 1 qt/A. Numerous generic formulations for each active ingredient are available.
	<i>fluroxypyr p-butyl</i> Fusilade DX 2 EC	1	8-12 fl oz	0.125-0.188	12 H/ 90 D	
	<i>quizalofop p-ethyl</i> Assure II 0.88 EC	1	7-8 fl oz	0.05-0.06	12 H/ 80 D	
	<i>sethoxydim</i> Poast 1.53 EC Poast Plus 1 EC	1	16 fl oz 24 fl oz	0.19	12 H/ 40 D	
Perennial grasses	<i>clethodim</i> Select, others 2 EC Select Max 0.97 EC Tapout 0.97 EC	1	8-16 fl oz 12-32 fl oz 12-32 fl oz	0.13-0.25 0.09-0.24 0.09-0.24	24 H/ 60 D	Apply to actively growing johnsongrass 12-24" tall or to bermudagrass with runners up to 6". A second application at the provided rates may be made to bermudagrass when regrowth is up to 6" or when johnsongrass has regrowth of 6-18". Add adjuvant as provided above in annual grass section. Do not mix with other herbicides. Do not cultivate within 7 days before or after application.
	<i>fluroxypyr p-butyl</i> Fusilade DX 2 EC	1	10-12 fl oz	0.156-0.188	12 H/ 90 D	Apply when johnsongrass is 8-18" or when bermudagrass runners are 4-8". If needed, make a second application of 8 fl oz/A when johnsongrass regrowth or new plants are 6-12" inches or when bermudagrass stolon (runner) regrowth or new plants are 3-6". Apply with crop oil concentrate (preferred) at 1 gal/100 gal solution or nonionic surfactant at 1 qt/100 gal solution. Do not mix with other herbicides. Do not cultivate within 5 days of application.
	<i>quizalofop p-ethyl</i> Assure II 0.88 EC	1	10 fl oz	0.07	12 H/ 80 D	Apply when johnsongrass is 10-24" or bermudagrass runners are 3-6". A second application for treating regrowth or new plants can be made with 7 fl oz/A when johnsongrass reaches 6-10" or bermudagrass reaches 3-6". Apply with crop oil concentrate (preferred) at 1 gal/100 gal solution or nonionic surfactant at 1 qt/100 gal solution. Do not mix with other herbicides. Do not cultivate within 5 days of application.
	<i>sethoxydim</i> Poast 1.53 EC Poast Plus 1 EC	1	24 fl oz 36 fl oz	0.28	12 H/ 40 D	Apply to johnsongrass up to 25" and before bermudagrass runners exceed 6". If regrowth occurs or new plants emerge, make a second application of 16 fl oz/A of Poast when johnsongrass reaches 6-10" and bermudagrass reaches 3-6". Add 1 qt of crop oil concentrate/A. Do not tank mix with other herbicides. Do not cultivate within 5 days of application.

¹Mode of Action (MOA) code can be used to delay weed resistance by increasing herbicide diversity in a management program.