

GRAIN SORGHUM: GRAIN SORGHUM INSECT CONTROL

David Buntin, Research/Extension Entomologist

PEST	INSECTICIDE	MOA	AMOUNT OF FORMULATION PER ACRE	LB ACTIVE INGREDIENT PER ACRE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
DO NOT USE <i>methomyl</i> (Lannate Annihilate) or <i>chlorpyrifos</i> (Lorsban and similar products) on sweet sorghum varieties. Many products are not labeled for use on sweet sorghum for syrup production. Also see the section for temporary summer grazing insect control.						
Soil Insects: White grubs, wireworms, seed maggots, rootworms, fire ants	SEED TREATMENTS					
	<i>imidacloprid</i> Gaucho 600, Attendant 600, Axxess, Senator, other brands	4A	6.4 fl oz/100 lb of seed	0.25/100 lb	12 H/ 45 D grazing	Apply Counter granules in a 7" band over the row at planting and lightly incorporate. DO NOT APPLY COUNTER GRANULES IN DIRECT CONTACT WITH THE SEED. Control of white grubs may be variable.
	<i>thiamethoxam</i> Cruiser 5FS	4A	5.1-7.6 oz/100 lb seed	0.2/100 lb	12 H/ 45 D	Commercial seed treatment. Generally effective against wireworms, seed maggots, and fire ants. Seed treatments may not provide effective control of white grubs.
	<i>clothianidin</i> Poncho 600, NipsIt Inside 5	4A	5.1-6.4 fl oz/100 lb seed	0.2-0.25/100 lb	12 H/ –	NOTE: <i>Chlorpyrifos</i> (Lorsban, others) 15G as listed for cutworms and lesser cornstalk borer is also available.
	AT-PLANTING TREATMENT					
<i>terbufos</i> Counter Lock n' Load 20 G	1B	5.2 oz/1000 ft row	varies with row width	48 H/ 100 D		
Cutworms, Lesser cornstalk borer	AT-PLANTING TREATMENT					
	<i>alpha-cypermethrin</i> Fastac, other brands 0.83 (Cutworm only)	3A	2.6-3.6 oz	0.017-0.023	12 H/ 14 D	Lorsban 15G for cutworms and lesser cornstalk borer: Apply Lorsban 15G at-planting in a T-band and cover lightly with soil. DO NOT APPLY LORSBAN 15G OR SIMILAR PRODUCTS IN-FURROW WITH THE SEED.
	<i>beta-cyfluthrin</i> Baythroid XL 1EC (Cutworm only)	3A	1.3 fl oz	0.01	12 H/ 0 D	CUTWORMS: Lorsban 4E, Asana. Adjourn, Baythroid, Delta Gold, and <i>cyhalothrin</i> products also can be applied broadcast at or immediately before planting or applied in a narrow band over the row at planting. Use full rate for broadcast applications or concentrate lower labeled dosage rate in the treated band.
	<i>chlorpyrifos</i> Lorsban 15G	1B	6.6 lb/A or 8 oz/1000 ft row	0.97	24 H/ Not listed	LESSER CORNSTALK BORER: Apply liquid formulations in a band over the row at planting and lightly incorporate. Broadcast application is not effective. Seed treatments as listed for soil insects may provide suppression of lesser cornstalk borer.
	<i>deltamethrin</i> Delta Gold 1.5EC	3A	1.8 fl oz	0.025	12 H/ 7 D	NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos on sweet sorghum varieties
	<i>esfenvalerate</i> Asana XL, Adjourn 0.6 6EC	3A	5.8-9.6 fl oz	0.03-0.05	12 H/ 21 D	
	<i>gamma cyhalothrin</i> Declare 1.25 Proaxis 0.5	3A	1.02-1.54 fl oz 2.56-3.84 fl oz	0.01-0.015	24 H/ 7 D	
	<i>lambda cyhalothrin</i> Warrior II Zeon 2.08 Silencer, Lambda, others 1	3A	1.28-1.92 fl oz 2.56-3.84 fl oz	0.02-0.03	12 H/ 7 D	
	POST-EMERGENCE TREATMENTS					
	<i>chlorpyrifos</i> Lorsban, Nufos, Chlorpyrifos 4E		2pt	1	24 H/ 30 D	NOTE: Apply <i>chlorpyrifos</i> products post-emergence at base of plants in 8-12" band with adequate water. Concentrate full rate in the treated band. Post-emergence control of lesser cornstalk borer is difficult.

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PEST	INSECTICIDE	MOA	AMOUNT OF FORMULATION PER ACRE	LB ACTIVE INGREDIENT PER ACRE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Aphids (Sugarcane Aphid, Greenbug and Corn Leaf Aphid)	SEED TREATMENTS					Greenbug and corn leaf aphid seldom require control on sorghum in Georgia. Sugarcane aphid is new to Georgia and can cause devastating losses to sorghum if not controlled. Seed Treatments: Products listed will provide 25-40 day control of aphids. For sugarcane aphid use <i>thiamethoxam</i> or <i>clothianidin</i> products at the highest rate listed. <i>Imidacloprid</i> products are not specifically listed for sugarcane aphid control. NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos on sweet sorghum varieties.
	<i>imidacloprid</i> Gaucho 600, Attendant 600, Access, Senator, other brands	4A	6.4 fl oz/ 100 lb of seed	0.25-100 lb	12 H/ 45 D Grazing	
	<i>thiamethoxam</i> Cruiser 5FS	4A	5.1-7.6 fl oz/ 100 lb seed	0.062-0.093 mg/seed	12 H/ 45 D	
	<i>clothianidin</i> Poncho 600, NipsIt Inside 5	4A	5.1-6.4 fl oz/ 100 lb seed	0.2-0.25/100 lb	12 H/ –	Post-emergence application: Greenbug: Treat when greenbugs are present and killing 3 leaves/plant before boot stage. Corn leaf aphid: Treat when a large population occurs and leaves are dying. Sugarcane aphid: Consult with local county Extension office for the latest recommendations. In general treat when infestations reach 50 aphids/leaf OR when pre-boot stage 25% of plants are infested and large numbers are present. Good spray coverage is critical, minimum of 10 GPA by ground and 5 GPA by air. <i>Chlorpyrifos</i> and <i>dimethoate</i> products may not provide more than 7 days control. <i>Malathion</i> may give partial control of sugarcane aphid on the head at the end of the season.
	POST-EMERGENCE TREATMENTS					
	<i>chlorpyrifos</i> Lorsban, Nufos, others 4E Chlorpyrifos 4EC Lorsban 75WG	1B	1-2 pt 0.67 lb	0.5-1 0.5	24 H/ 30 D at 1 pt 60 D at 2 pt	
	<i>dimethoate</i> Dimethoate 400, 4EC	1B	0.5-1.0 pt	0.25-0.5	48 H/ 28 D	
	<i>flupyradifurone</i> Sivanto Prime	4D	4-10 fl oz	0.052-0.13	4 H/ 21 D	
	<i>malathion</i> Malathion, 57%, other brands	1B	1.5 pt	0.93	12 H/ 7 D	
	<i>sufloxaflo</i> Transform WG	4C	1.0-1.5 oz	0.031 – 0.047	24 H/ 7 D	
Chinch bug and False chinch bug (on seedlings), Billbugs, Sugarcane beetles	SEED TREATMENTS					CHINCH BUG, FALSE CHINCH BUG: In seedlings up to 6" tall, treat when 2 or more adults are found on 20% of seedlings. On taller plants, treat when 75% of the plants are infested, OR 5 or more chinch bugs/plant are present. For post-emergence applications, use at least 20 gal/A as a band directed at the base of plants. At planting, treatments generally are effective for 20-30 days after planting. Control after the boot stage is rarely effective. BILLBUGS, SUGARCANE BEETLES: Adult beetles burrow into stems at or below soil line killing main stems. Treat when 10% of plants are damaged and beetles are present. For post-emergence applications, use at least 20 gal/A as a band directed at the base of plants. Rescue treatments for sugarcane beetle are not effective. NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos on sweet sorghum varieties. Apply <i>chlorpyrifos</i> products post-emergence at base of seedling plants in 8-12" band with adequate water. Concentrate full rate in the treated band.
	<i>imidacloprid</i> Gaucho 600, Attendant 600, Access, Senator, other brands	4A	6.4 fl oz/ 100 lb of seed	0.25-100 lb	12 H/ 45 D grazing	
	<i>thiamethoxam</i> Cruiser 5FS	4A	5.1-7.6 fl oz/ 100 lb seed	0.25-100 lb	12 H/ 45 D	
	<i>clothianidin</i> Poncho 600, NipsIt Inside 5	4A	5.1-6.4 fl oz/ 100 lb seed	0.2-0.25/100 lb	12 H/ –	NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos on sweet sorghum varieties. Apply <i>chlorpyrifos</i> products post-emergence at base of seedling plants in 8-12" band with adequate water. Concentrate full rate in the treated band.
	POST-EMERGENCE TREATMENTS					
	<i>alpha-cypermethrin</i> Fastac, other brands 0.83	3A	2.6-3.6 oz	0.017-0.023	12 H/ 14 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3A	2.8 fl oz	0.022	12 H/ 14 D	
	<i>chlorpyrifos</i> Lorsban, Nufos, others 4E Chlorpyrifos 4EC Lorsban 75WG	3A	1.5 pt 2 pt 1.33 lb	0.75 1 1	24 H/ 30 D at 1 pt 60 D at 2 pt	
	<i>cyfluthrin</i> Tombstone 2	3A	2.8 fl oz	0.044	12 H/ 21 D	

GRAIN SORGHUM INSECT CONTROL

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Chinch bug and False chinch bug (on seedlings), Billbugs, Sugarcane beetles (continued)	POST-EMERGENCE TREATMENTS (continued)					
	<i>deltamethrin</i> Delta Gold 1.5EC	3A	1.9 fl oz	0.022	12 H/ 14 day	
	<i>gamma cyhalothrin</i> Declare 1.25 Proaxis 0.5	3A	1.54 fl oz 3.84 fl oz	0.015	24 H/ 30 D	
	<i>lambda cyhalothrin</i> Warrior II Zeon 2.08 Silencer, Lambda, others 1	3A	1.92 fl oz 3.84 fl oz	0.03	24 H/ 30 D	
	<i>zeta-cypermethrin</i> Mustang Maxx, other brands	3A	4 fl oz	0.025	12 H/ 14 D	
European corn borer	Materials labeled for “foliage feeding larvae” will give helpful control.					
Foliage-feeding Larvae: armyworms, fall armyworm, corn earworm	<i>alpha-cypermethrin</i> Fastac 0.83 (Cutworm only)	3A	1.8-3.8 fl oz	0.12-0.025	12 H/ 14 D	<p>ARMYWORM, FALL ARMYWORM, CORN EARWORM IN WHORL:</p> <p>Seedling plants: treat when stand loss reaches 10%, OR 30% or more plants are infested.</p> <p>Whorl stage plants: do not initiate controls unless 40% or more of the plants in a field are infested. Economic losses probably do not occur unless population levels exceed 1 larvae per plant. Apply spray by ground directing spray into whorls using cone nozzles with large droplet size and at least 15 gal/A of spray. For large infestation use tank mix of OP insecticide (Lannate or Lorsban) plus pyrethroid (Asana/Adjourn, Baythroid, Delta Gold, <i>lambda/gamma cyhalothrin</i>, Mustang, Tombstone). Pyrethroid insecticides alone are usually not effective for fall armyworm.</p> <p>FALL ARMYWORM, CORN EARWORM, SORGHUM WEBWORM, FEEDING ON GRAIN HEADS: Treat when an average of 1 or more (1/2” or larger) corn earworms or fall armyworms are found per grain head. For sorghum webworm, treat when an average of 5 or more small (1/4”) larvae are found per grain head. Higher dosages within the rate range may be needed to effectively control corn earworm or fall armyworms. Pyrethroid insecticides may not be effective for sorghum webworm.</p> <p>NOTE: Tracer is most effective against smaller larvae.</p> <p>NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos or Lannate on sweet sorghum varieties.</p>
Headworms (larvae feeding on grain heads): fall armyworm, corn earworm, sorghum webworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3A	2.8 fl oz	0.022	12 H/ 14 D	
	<i>carbaryl</i> Sevin, other brands 4	1A	1-2 qt	1-2	12 H/ Grain = 21 D Grazing = 14 D	
	<i>chlorantraniliprole</i> Prevathon 0.43	28	14-20 fl oz	0.047-0.067	4 H/ 14 D	
	<i>chlorpyrifos</i> Lorsban, Nufos, others 4E Chlorpyrifos 4EC Lorsban 75WG	1B	1-2 pt 2 pt 1.33 lb	0.5-1 1 1	24 H/ 30 D at 1 pt 60 D at 2 pt	
	<i>deltamethrin</i> Delta Gold 1.5EC	3A	1.8 fl oz	0.025	12 H/ 14 D	
	<i>esfenvalerate</i> Asana XL, Adjourn 0.6 6EC (Earworms on heads only)	3A	9.6 fl oz	0.05	12 H/ 21 D	
	<i>gamma cyhalothrin</i> Declare 1.25	3A	1.54 fl oz 3.84 fl oz	0.015	24 H/ 30 D	
	<i>lambda cyhalothrin</i> Warrior II Zeon 2.08 Silencer, Lambda, others 1	3A	1.92 fl oz 3.84 fl oz	0.03	24 H/ 30 D	

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Foliage-feeding Larvae: armyworms, fall armyworm, corn earworm Headworms (larvae feeding on grain heads): fall armyworm, corn earworm, sorghum webworm (continued)	<i>methomyl</i> Lannate, Annihilate 2.4 LV	1A	0.75-1.5 pt	0.225-0.45	48 H/ 14 D	
	<i>methoxyfenozide</i> Intrepid 2F	18	4-12 fl oz	0.06-0.19	4 H/ 21 D	
	<i>spinosad</i> Blackhawk 36%	5	1.7-3.3 oz	0.038-0.075	4 H/ 21 D	
	<i>zeta-cypermethrin</i> Mustang Maxx, other brands	3A	4 fl oz	0.025	12 H/ 14 D	
Mites	<i>propargite</i> Comite II 6	12C	1.5-2.25 pt	1.125-1.6875	7 D/ 30 D	Mites seldom require control on grain sorghum in Georgia. Treat if infestations become widespread and leaf discoloration is evident. Control after the boot stage rarely is effective.
	<i>dimethoate</i> Dimethoate 4EC, 400 Dimethoate 2.67EC	1B	1 pt 1.5 pt	0.5	48 H/ 28 D	Comite II: Use minimum of 20 gal/A by ground application and 5 gal/A for aerial application. Only apply to dry foliage. Do not tank mix with other products. Do not use an oil-based surfactant. Due to large number of sorghum varieties, treating a small test plot is recommended to check for phytotoxicity before treating a large area.
Sorghum midge	<i>alpha-cypermethrin</i> Fastac, other brands 0.83	3A	1.3-3.8 fl oz	0.008-0.025	12 H/ 14 D	Treat when an average of 1 adult/head is observed after 25-30% of the heads are blooming. Treat again 5-10 days later if there are still many heads blooming and at least 1 midge/head is found. The susceptible period for midge damage is the bloom period; treatment for midge after this time is too late. Remember that insecticidal controls are directed at the adult midge. The eggs or larvae of the pest cannot be killed inside the glumes with insecticide applications. If a “borderline” economic infestation of sorghum midge exists and there is good yield potential, spray. When an economic infestation exists, spray immediately. A delay of a few days may result in considerable damage. NOTE: DO NOT USE Lorsban/Nufos/Chlorpyrifos or Lannate on sweet sorghum varieties. NOTE: Some brands of <i>dimethoate</i> do not allow application after heading. Pyrethroid insecticides are not effective against sugarcane aphid and may flare infestations. If sugarcane aphid is present tank mix the pyrethroid (3A) product for midge control with Sivanto Prime as listed in the aphid section.
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3A	1-1.3 fl oz	0.008-0.01	12 H/ 14 D	
	<i>chlorpyrifos</i> Lorsban, Nufos, others 4E Chlorpyrifos 4EC Lorsban 75WG	1B	0.5 pt 0.5 pt 0.33 lb	0.25	24 H/ 30 D at 1 pt	
	<i>cyfluthrin</i> Tombstone 2	3A	1-1.3 fl oz	0.016-0.020	12 H/ 14 D	
	<i>deltamethrin</i> Delta Gold 1.5 EC	3A	1.3-1.9 fl oz	0.015-0.025	12 H/ 14 D	
	<i>dimethoate</i> Dimethoate, Cygon 4 EC, 400 Dimethoate 2.67 EC	1B	0.25-0.5 pt 0.75 pt	0.125-0.25 0.25	48 H/ 28 D	
	<i>esfenvalerate</i> Asana XL, Adjourn 0.6 6 EC	3A	2.9-5.8 fl oz	0.015-0.03	12 H/ 21 D	
	<i>gamma cyhalothrin</i> Declare 1.25 Proaxis 0.5	3A	0.77-1.02 fl oz 1.90-2.56 fl oz	0.0075-0.01	24 H/ 30 D	
	<i>lambda cyhalothrin</i> Warrior II Zeon 2.08 Silencer, Lambda, others 1	3A	0.96-1.28 fl oz 1.9-2.56 fl oz	0.015-0.02	24 H/ 30 D	

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PEST	INSECTICIDE	MOA	AMOUNT OF FORMULATION PER ACRE	LB ACTIVE INGREDIENT PER ACRE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Sorghum midge (continued)	<i>methomyl</i> Lannate, Annihilate 2.4 LV	1A	0.75-1.5 pt	0.225-0.45	48 H/ 14 D	
	<i>zeta-cypermethrin</i> Mustang Maxx	3A	1.76-3.2 fl oz	0.011-0.02	12 H/ 14 D	
Stink bugs, Leaffooted bugs, False chinch bugs on grain heads	<i>alpha-cypermethrin</i> Fastac, other brands 0.83	3A	3.8 fl oz	0.025	12 H/ 14 D	STINK BUGS, LEAFFOOTED BUGS: Treat if combined numbers of adults and large nymphs exceed 3 bugs per head at milk stage or 6 bugs per head at soft dough stage. Damage not important during hard dough stage.
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3A	1.3-2.8 fl oz	0.01-0.022	12 H/ 14 D	
	<i>cyfluthrin</i> Tombstone 2	3A	1-1.3 fl oz	0.016-0.020	12 H/ 14 D	FALSE CHINCH BUG: For grain head infestations, treat if populations exceed 100 bugs per grain head at milk stage. Damage not important during medium to hard dough stages.
	<i>deltamethrin</i> Delta Gold 1.5EC	3A	1.5-1.8 fl oz	0.018-0.025	12 H/ 14 D	Pyrethroid insecticides are not effective against sugarcane aphid and may flare infestations. If sugarcane aphid is present tank mix the pyrethroid (3A) product with Sivanto Prime as listed in the aphid section.
	<i>gamma cyhalothrin</i> Declare 1.25 Proaxis 0.5	3A	1.28-1.54 fl oz 3.20-3.84 fl oz	0.0125-0.015	24 H/ 30 D	
	<i>lambda cyhalothrin</i> Warrior II Zeon 2.08 Silencer, Lambda, others 1	3A	1.6-1.92 fl oz 3.2-3.84 fl oz	0.25-0.03	24 H/ 30 D	
	<i>zeta-cypermethrin</i> Mustang Maxx, other brands	3A	1.76-3.2 fl oz	0.011-0.02	12 H/ 14 D	

Premixed or Co-Packed Insecticides: Products listed are available as premixes or co-packages of two insecticide active ingredients. User should check mixture labels for active ingredient, specific use rates, target pests, and precautions.

BRAND NAME (ACTIVE INGREDIENTS)	RANGE OF FORMULATION RATES
Besiege (<i>lambda cyhalothrin, chlorantraniliprole</i>)	5-10 fl oz/A
Hero (<i>zeta-cypermethrin, bifenthrin</i>)	2.6-5.5 fl oz/A
Stallion (<i>chlorpyrifos, zeta-cypermethrin</i>)	3.75-11.75 fl oz/A
Steed (<i>zeta-cypermethrin, bifenthrin</i>)	2.5-4.7 fl oz/A
Consero (<i>lambda cyhalothrin, spinosad</i>)	2-3 fl oz/A

GRAIN SORGHUM WEED CONTROL

Eric P. Prostko, Extension Agronomist – Weed Science

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT		
BURNDOWN (Reduced Tillage)					
<i>paraquat</i> 2 lb/gal 3 lb/gal	22	30-60 oz 20-40 oz	0.47-0.94	24 H/ Grain 48 D Forage 20 D	Apply before, at, or immediately after planting but before crop emergence. Use low rate of paraquat if emerged annual weeds are less than 4" tall and high rate if emerged annual weeds are 4-6" tall. Add non-ionic surfactant at 0.25% v/v. Paraquat usually will not suppress bermudagrass, johnsongrass or other perennial weeds well enough to permit high yields. Can be tank-mixed with Dual or Warrant (Concep treated seed only). **All applicators of paraquat must complete the EPA's training program before mixing, loading and applying. Refer to the following website for more information: https://www.epa.gov/pesticide-worker-safety/paraquat-dichloride-training-certified-applicators
<i>glyphosate</i> numerous trade names 3 lb ae/gal 3.73 lb ae/gal 4 lb ae/gal 4.17 lb ae/gal 4.50 lb ae/gal 5 lb ae/gal	9	32-64 oz 26-52 oz 24-48 oz 23-46 oz 21-42 oz 19-38 oz	0.75-1.50 ae	4 H/ 7 D	Apply before, at, or immediately after planting but before crop emergence. Use low rate of glyphosate to control emerged annual grass and broadleaf weeds; high rate for control of emerged johnsongrass and bermudagrass. Can be tank-mixed with Dual or Warrant (Concep treated seed only).
<i>dicamba</i> Banvel, Clarity, Sterling, Vision 4SL Engenia 5SL Fexapan + VG 2.9SL Xtendimax + VG 2.9SL	4	8 oz 6.4 oz 11 oz 11 oz	0.25	24 H/ 30 D	Tank-mix with <i>glyphosate</i> or <i>paraquat</i> to improve burndown control of broadleaf weeds in reduced tillage system, especially where marestalk/horseweed is a problem. Must be applied at least 14 days before planting sorghum. Rain-free period is 4 hours. The newer formulations of <i>dicamba</i> require the use of nozzles/pressure that produce a specific droplet size: Engenia = extremely coarse to ultra coarse; Fexapan = very coarse to ultra coarse; Xtendimax = very coarse to ultra coarse. <i>Dicamba</i> should not be applied during temperature inversions. Newer <i>dicamba</i> formulations must be applied in 15 GPA (depending on formulation) and boom heights cannot exceed 24 inches. Refer to newest product labels for additional application requirements.
PRE-EMERGENCE¹					
<i>metolachlor</i> Stalwart, Parallel PCS, Me-Too-Lachlor 8EC	15	16 oz	1.0	24 H/ 75 D	<u><i>Use only with sorghum seed that has been treated by the seed company with Concep.</i></u> If sorghum seed are not properly treated, <i>metolachlor</i> will severely injure sorghum. Apply after planting before weeds and sorghum emerge. <i>Metolachlor</i> can be applied with fluid fertilizer. Can also be applied POST for residual weed control. The generic formulations of <i>metolachlor</i> (Parallel, Stalwart, Me-Too-Lachlor) have not provided the same length of residual control of certain weeds as similar rates of Dual Magnum formulations in some UGA field trials.
<i>S-metolachlor</i> Dual Magnum 7.62EC Cinch 7.64EC (various trade names)		16 oz	0.96		

¹ Nitrogen solutions or complete fluid fertilizers may replace all or part of the water as a carrier for some pre-emergence herbicides. Proper agitation is necessary. Follow label instructions concerning tests for potential compatibility problems. Do not use fluid fertilizers with post-emergence herbicides since possible crop injury may occur from the use of the fluid fertilizer.

GRAIN SORGHUM WEED CONTROL

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT		
PRE-EMERGENCE¹ (continued)					
<i>acetochlor</i> Warrant 3ME	15	48 oz	1.13	12 H/ Forage 60 D	<i>Use only with sorghum seed that has been treated by the seed company with Concep.</i> Can be applied pre-emergence up to 11" tall sorghum. Will provide residual control of many annual grass weeds and certain annual broadleaf weeds, especially crabgrass, Florida pusley, and Palmer amaranth. Weed control will be similar to Dual Magnum, or Intro. Can be tank-mixed with <i>glyphosate</i> or <i>paraquat</i> for use as a burndown in minimum tillage systems. Warrant does not control emerged weeds. For the following soil types, do not apply Warrant within 50 feet of any well where the depth to groundwater is 30 feet or less : sands < 3% OM; loamy sands < 2% OM; sandy loams < 1% OM. These restrictions do not apply for areas more than 50 feet from a well or if groundwater is more than 30 feet below land surface.
CENTER PIVOT IRRIGATION APPLICATION					
<i>metolachlor</i> Stalwart, Parallel PCS Me-To-Lachlor 8EC	15	16 oz	1.03		May be applied by injection through center pivot irrigation systems. Apply in maximum of 1/2" water/A on coarse textured soils. Apply after planting but before sorghum and weeds emerge. Equipment must have appropriate check valves or other suitable devices in the system to ensure that the herbicide solution cannot siphon back into water supply. Use Dual only with Concep treated sorghum seed. The generic formulations of <i>metolachlor</i> (Parallel, Stalwart, Me-Too-Lachlor) have not provided the same length of residual control of certain weeds as similar rates of Dual Magnum formulations in some UGA field trials.
<i>S-metolachlor</i> Dual Magnum 7.62EC Cinch 7.64EC (various trade names)	15	16 oz	0.96		
POST-EMERGENCE					
<i>atrazine</i> numerous trade names 80W 90DG 4L	5	24 oz 21 oz 38 oz	1.2	12 H/ Forage 45 D	Generally, sorghum is less tolerant of <i>atrazine</i> than corn. Apply with crop oil concentrate (1% V/V) after sorghum reaches the three-leaf stage but before it reaches 12" tall . Controls broadleaf weeds 2-3" tall and newly emerged (1-leaf) annual grasses. DO NOT use on sands or loamy sands. DO NOT apply with fluid fertilizers or crop injury may occur. DO NOT apply when sorghum is under stress from cold wet weather, poor fertility, or other factors, or when crop is wet and tender from recent rainfall. Follow label directions for crop rotation. Rain-free period is 2 hours.
<i>atrazine + S-metolachlor</i> Bicep II Magnum 5.5SC	5 + 15	42 - 51 oz	1.04-1.24 + 0.77-0.96	24 H/ -	Apply to sorghum from the 3 leaf stage (3 visible collars) up to 12" in height. Add a COC at 1% v/v (1 gal/100 gal). Some transient leaf burn is likely but will not affect yield. Do not apply with fluid fertilizer.
<i>2,4-D amine</i> numerous trade names 3.8 lb/gal	4	16 oz	0.48	48 H/ 30 D	Sorghum is not as tolerant to <i>2,4-D</i> as corn. Apply over-the-top for control of annual broadleaf weeds when sorghum is 6-8" tall. Arrange nozzles to keep spray out of crop whorl. If sorghum is 8-15" tall, apply as directed spray-see recommendation under POST-EMERGENCE (Directed Spray). Sorghum is most subject to <i>2,4-D</i> injury from over-the-top treatments, use of high rates or applications made during high soil moisture and high air temperatures. DO NOT (a) apply during boot, bloom, or early dough stages, or (b) apply in fluid fertilizers. Use only the <i>amine</i> formulation to help prevent drift to susceptible crops. DO NOT use with adjuvants.
<i>bentazon</i> Basagran/Broadloom 4 lb/gal	6	24-32 oz	0.75-1	48 H/ Forage 12 D	Apply over-the-top when sorghum has 1-5 leaves. Grain sorghum is tolerant at all stages of growth up to, and including the early boot stage. Can be tank-mixed with <i>atrazine</i> if necessary. DO NOT apply to grain sorghum that is heading or blooming. Add oil concentrate (1% v/v) according to label directions for the weed species present. DO NOT apply more than 2 pt/A of <i>bentazon</i> per season. DO NOT apply with fluid fertilizers. Rain-free period is 4 hours.

GRAIN SORGHUM WEED CONTROL

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT		
POST-EMERGENCE (continued)					
<i>bromoxynil</i> Buctril 2E	6	16-24 oz	0.25-0.38	24 H/ Forage 45 D	Apply over-the-top when sorghum has 3 leaves (up to pre-boot stage). Controls cocklebur, bristly starbur, smartweed and certain other broadleaf weeds less than 3" tall. DO NOT add spray additives or mix with fluid fertilizers. Spray when sorghum foliage is dry to decrease risk of sorghum leaf burn. Temporary sorghum leaf burn may occur.
<i>pyrasulfotole + bromoxynil</i> Huskie 2.06EC	6 + 27	12.8-16 oz	0.03-0.04 + 0.18-0.22	24 H/ Grain 60 D Forage 7 D	For broadleaf weed control including annual morningglory and Palmer amaranth. Especially useful where <i>atrazine</i> / <i>ALS</i> / <i>glyphosate</i> resistant pigweed are present. Apply from 3 leaf stage up to 30" tall and/or prior to flag leaf emergence, whichever comes first. Huskie will cause temporary crop stunting, leaf burn, and chlorosis (bleaching/whitening). Tank-mix with <i>atrazine</i> 4L (16 to 32 oz/A) to improve broadleaf control (up to 12" tall sorghum) and reduce initial sorghum injury. Include a NIS at 0.25% v/v (1 qt/100 gals) Do not tank-mix with Lorsban. Crop rotation restrictions for Huskie alone: wheat, barley, oats, annual ryegrass – 1 month; soybean, grain sorghum – 4 months; canola, corn – 9 months; cotton, peanut – field bioassay. Refer to <i>atrazine</i> crop rotation restrictions if used in a tank-mix. Rain-free period is 1 hour.
<i>halosulfuron</i> Profine, Sandea 75DF	2	0.67 oz	0.032	12 H/ Forage 30 D	Controls many annual broadleaf weeds and suppression of nutsedge. Can be applied over-the-top from the 2 leaf stage through layby stage of grain sorghum (before grain head emergence). Can be tank-mixed with <i>dicamba</i> , <i>2,4-D</i> , Buctril, or <i>atrazine</i> . The use of NIS (0.25% v/v) or COC (1% v/v) is recommended. Rotational restrictions include the following: barley, oats, rye, wheat – 2 months; cotton – 4 months; peanuts – 6 months; soybeans – 9 months; onions – 18 months. Refer to product label for additional crop rotation information. Rain-free period is 4 hours.
<i>dicamba</i> Banvel, Clarity, Sterling, Vision 4 lb/gal Engenia 5SL Fexapan + VG 2.9SL Xtendimax + VG 2.9SL	4	8 oz 6.4 oz 11 oz 11 oz	0.25	24 H/ 30 D	Apply over-the-top when sorghum is in the 3 leaf stage to 8" tall. If sorghum is 8-15" tall, apply only as a directed spray—see recommendation under POST-EMERGENCE (Directed Spray). DO NOT apply to sorghum grown for seed production. Make only one POST application per season. Prevent drift to susceptible crops. Do not graze or feed treated sorghum forage or silage prior to mature grain stage. Do not use adjuvants. If <i>dicamba</i> is applied during periods of rapid growth, temporary leaf rolling and plant leaning may occur. Rain-free period is 4 hours. The newer formulations of <i>dicamba</i> require the use of nozzles/pressure that produce a specific droplet size: Engenia = extremely coarse to ultra coarse; Fexapan = very coarse to ultra coarse; Xtendimax = very coarse to ultra coarse. <i>Dicamba</i> should not be applied during temperature inversions. Newer <i>dicamba</i> formulations must be applied in 15 GPA (depending on formulation) and boom heights cannot exceed 24 inches. Refer to latest product labels for additional application requirements.
<i>nicosulfuron</i> Zest 75WDG	2	0.67 oz	0.031	4 H/ Forage/Grazing: soft dough stage 7 Grain/Stover: mature grain stage 9	ONLY FOR USE ON INZEN™ GRAIN SORGHUM VARIETIES. Can be applied up to 20" tall grain sorghum. Tank-mix with <i>atrazine</i> . If tank-mixed with <i>atrazine</i> , can only be applied up to 12" tall grain sorghum. Use in combination with a COC (1% v/v) and liquid UAN (2 qt/A). Zest works best when following a PRE application of Dual Magnum or Warrant (Concep -treated seed). If tank-mixed with <i>2,4-D</i> or <i>dicamba</i> , use a NIS (0.25% v/v). In UGA research, Zest has caused temporary crop injury (stunting, chlorosis). Crop rotation restrictions: corn – 0 months; soybean – 15 days; wheat/barley/oats – 4 months; cotton/peanut – 10 months; sorghum – 18 months. Rain-free period is 4 hours. **Limited INZEN™ grain sorghum variety performance data for the SE are available.

GRAIN SORGHUM WEED CONTROL

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT		
POST-EMERGENCE (Directed Spray)					
<i>2,4-D amine</i> numerous trade names 3.8 lb/gal	4	8-16 oz	0.24-0.48	48 H/ 30 D	Apply as a directed spray to sorghum 8-15" tall. Use low rate if applications are made under conditions of high soil moisture and high air temperatures. DO NOT (a) apply during boot, bloom, or early dough stages, or (b) apply in fluid fertilizers. Use only the <i>amine</i> formulation and prevent drift to susceptible crops.
<i>dicamba</i> Banvel, Clarity, Sterling, Vision 4 lb/gal Engenia 5SL Fexapan + VG 2.9SL Xtendimax + VG 2.9SL	4	8 oz 6.4 oz 11 oz 11 oz	0.25	24 H/ 30 D	If sorghum is 8-15" tall, apply only as a directed spray. DO NOT apply to sorghum grown for seed production. Make only one POST application per season. Prevent drift to susceptible crops. Do not graze or feed treated sorghum forage or silage prior to mature grain stage. Do not use adjuvants. If <i>dicamba</i> is applied during periods of rapid growth, temporary leaf rolling and plant leaning may occur. Rain-free period is 4 hours. The newer formulations of <i>dicamba</i> require the use of nozzles/pressure that produce a specific droplet size. <i>Dicamba</i> should not be applied during temperature inversions. Newer <i>dicamba</i> formulations must be applied in 15 GPA and boom heights cannot exceed 24". Refer to latest product labels for additional application requirements.
<i>linuron</i> 4L 50DF (various trade names)	7	16-32 oz 1-2 lb	0.5-1	24 H/ 75 D	Apply as a directed spray after sorghum is 12" tall. Use low rate when sorghum is 12-15" tall, and a sprayer equipped with skids, shoes, or shields. Use the high rate when sorghum is 15" tall and weeds are up to 4" in height. Make only one application per season. Add nonionic surfactant (0.5 % v/v).
<i>paraquat</i> 2SL 3SL (various trade names)	22	16-32 oz 11-21 oz	0.25-0.50	24 H/ Grain 48 D Forage 20 D	Apply with a nonionic surfactant (1 qt/100 gals. spray solution) when sorghum is at least 12" tall. Use low rate for weeds less than 2" tall; high rate for weeds 2-3" tall. DO NOT apply with (a) drop nozzles mounted on a boom or (b) fluid fertilizers. Use 20-40 gals of water/A and do not exceed 30 psi pressure. Do not spray higher than 3" on the sorghum stalks. Can also be used with hooded-sprayer. **All applicators of paraquat must complete the EPA's training program before mixing, loading and applying. Refer to the following website for more information: https://www.epa.gov/pesticide-worker-safety/paraquat-dichloride-training-certified-applicators
<i>carfentrazone</i> Aim 2EC	14	0.5-1 oz	0.08-0.016	12 H/ Leaf Collars 6 D	Use Aim for the post-directed control of annual morningglory (except smallflower), pigweed, and tropical spiderwort. Add NIS at 0.25% v/v (1 qt/100 gals). Use drop nozzles or other spray methods to minimize the amount of Aim deposited on sorghum leaves or in whorl. Aim provides no residual control. Rain-free period for Aim is 6-8 hours.

GRAIN SORGHUM WEED CONTROL

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT		
POST-EMERGENCE - INCORPORATED (Culti-Spray)					
<i>pendimethalin</i> Prowl/Pendimax 3.3EC Prowl H ₂ O 3.8 ACS	3	19-29 oz 24 oz	0.50-0.75 0.71		<p>These treatments will provide residual control of annual grasses, including Texas panicum. They will not control existing grasses. They should be used to augment other weed control tactics. When using either of the treatments, the following steps must be followed:</p> <ol style="list-style-type: none"> 1. The herbicides must be applied to weed free soil. 2. Sorghum brace roots must be protected by soil thrown to the base of the stalk with a sweep or rolling cultivator prior to application. 3. The herbicides can be applied over-the-top or with drop nozzles, depending on sorghum size. <i>Pendimethalin</i> can be applied from the 4" growth stage up until layby. <i>Trifluralin</i> can be applied when the sorghum is 8-24" tall. 4. A shallow follow-up cultivation is required after application to minimize herbicide loss. Rainfall or irrigation amounts of 0.5-1" can be used instead of mechanical cultivation.
<i>trifluralin</i> (various trade names) 4EC	3	16 oz	0.50		
HARVEST AID					
<i>carfentrazone</i> Aim 2EC	14	1 oz	0.016	12 H/ 3 D	For the pre-harvest desiccation of pigweed and morningglories (<i>Ipomoea sp.</i>). Can be applied by ground or air. Use with a crop oil concentrate at 1% v/v (1 gal/100 gal). Can be tank-mixed with <i>glyphosate</i> to improve the spectrum of control.
<i>glyphosate</i> (various trade names) 3 lb ae/gal 3.73 lb ae/gal 4 lb ae/gal 4.17 lb ae/gal 4.50 lb ae/gal 5 lb ae/gal	9	32-64 oz 26-52 oz 24-48 oz 23-46 oz 21-42 oz 19-38 oz	0.75-1.50 ae	4 H/ 7 D	Apply when grain moisture is 30% or less. Do not use on sorghum grown for seed because a reduction in seed germination or vigor may occur. Not all formulations of <i>glyphosate</i> may be labeled for this use. Refer to specific product label.

HERBICIDE PROGRAMS FOR MANAGING HERBICIDE-RESISTANT PALMER AMARANTH IN GRAIN SORGHUM

PRE-EMERGENCE ¹	POST-EMERGENCE ² (OVER THE TOP)	POST-EMERGENCE ³ (DIRECTED SPRAY IF NEEDED)	HOODED SPRAYER
Dual Magnum or Warrant	Atrazine or Huskie + Atrazine	2,4-D or dicamba ⁴	Paraquat (various trade names)

¹ Must use **Concep**-treated seed. ² 3-leaf sorghum up until 12" in height. ³ 8-15" tall sorghum. ⁴ Various formulations of 2,4-D and dicamba are available. Refer to specific product label for rates, timings, and application requirements (nozzles, GPA, wind speed, ground speed, etc.).

GRAIN SORGHUM WEED RESPONSE TO HERBICIDES

Eric P. Prostko, Extension Agronomist – Weed Science

	Dual Magnum*1	Outlook Propel*	Warrant*	Atrazine	Linex/ Lorox	Paraquat**	2,4-D	Dicamba	Zest	Buctril	Huskie	Sandea/ Profine	Basagran
	PRE	PRE	PRE	POST	PDS	PDS	POST/ PDS	POST/ PDS	POST	POST	POST	POST	POST
PERENNIAL WEEDS													
johnsongrass, rhizome	P	P	P	P	P	P	P	P	G-E	P	P	P	P
nutsedge, purple	P	P	P	P	P-F	P	P	P	P-F	P	P	F-G	P
nutsedge, yellow	F-G	F-G	F	P	P-F	P	P	P		P	P	F-G	F-G
ANNUAL GRASSES													
crabgrass	E	E	E	P-F	G	G	P	P	P	P	P	P	P
crowfootgrass	E	E	E	P	E	G	P	P	G-E	P	P	P	P
goosegrass	E	E	E	P	E	G	P	P	G-E	P	P	P	P
fall panicum	G	G	G	P	E	G	P	P	G-E	P	P	P	P
johnsongrass (seedling)	P	P	P	P	G	G	P	P	G-E	P	P	P	P
sandbur	F-G	F-G	F-G	F	E	G	P	P	G-E	P	P	P	P
signalgrass, broadleaf	F-G	F-G	F-G	P	G	G	P	P	G	P	P	P	P
Texas panicum	P-F	P-F	P-F	P	G	E	P	P	G-E	P	P	P	P
BROADLEAF WEEDS													
bristly starbur	P	P	P	E	G	G	G	E		G	G	G	E
citronmelon	P	P	P	G	E	F	E	E				P-F	P
cocklebur	P	P	P	E	E	G	E	E	P-F	E	G-E	G	E
cowpea	P	P	P	G	G	G	E	E					P
crotalaria	P	P	P	G	E	G	G	G					P
croton, tropic	P	P	P	G	G	G	G	G					P
Florida beggarweed	F	F	F	G	E	G	P	G	G	G	G	P	P
Florida pusley	G-E	G-E	G-E	G	G	F-G	G	G	P-F	G-E	G-E		P
jimsonweed	P	P	P	E	E	G	E	E	F-G		G		E
lambsquarters	F	F-G	F-G	E	E	F-G	E	E	F-G	G	G	F	P

GRAIN SORGHUM WEED RESPONSE TO HERBICIDES

	Dual Magnum* ¹	Outlook Propel*	Warrant*	Atrazine	Linex/ Lorox	Paraquat**	2,4-D	Dicamba	Zest	Buctril	Huskie	Sanda/ Profine	Basagran Broadloom
	PRE	PRE	PRE	POST	PDS	PDS	POST/ PDS	POST/ PDS	POST	POST	POST	POST	POST
BROADLEAF WEEDS (continued)													
morningglories	P	P	P	E	G	G	G	E	F-G	G	G-F	P	F
Pigweed	G	G	G	E	E	G	G-E	G-E	G-E	G	G	F-G	P
ALS-resistant	G	G	G	E	E	G	G-E	G-E	P	G	G	P	P
Atrazine-resistant	G	G	G	P	E	G	G-E	G-E	G-E	G	G	F-G	P
prickly sida	F	F		E	G	F-G	E	E	P	G	G	F	F-G
purslane	G	G		E	G	G	G	E					P
ragweed, common	F	F	F	E	E	G	E	E	P-F	G	G	G	F
sesbania, hemp	P	P		F-G	G	P-F	G	E	P-F	G	G	F-G	P
sicklepod	P	P	P	G	E	G	E	E	P-F	P	P	P	P

Key to response symbols:

E – Excellent control, weed kill 90% or above

G – Good control, weed kill 80% or above

F – Fair control, weed kill 70% or above

P – Poor control, less than 70% control

If no symbol is given, weed response is unknown.

Ratings are based on average to good soil and weather conditions for herbicide performance.

¹ The generic formulations of *metolachlor* (Parallel, Stalwart, Me-Too Lachlor) have not provided the same length of residual control of certain weeds as similar rates of Dual Magnum formulations in some UGA field trials.

* Use only where **Concep**-treated grain sorghum seed is planted.

** Commercially available as Helmquat, Gramoxone, Parazone, or Firestorm.

PRE = Pre-emergence

POST = Post-emergence over-the-top

PDS = Post-emergence directed spray.