

# GRAIN SORGHUM

## GRAIN SORGHUM INSECT CONTROL

David Buntin, Research/Extension Entomologist

PEST	INSECTICIDE <sup>1</sup>	AMOUNT OF FORMULATION PER ACRE	LB. ACTIVE INGREDIENT PER ACRE	REMARKS AND PRECAUTIONS
<b>Insecticides and products listed are for grain production, but most products also can be used for sorghum for grazing, forage and silage production; see remark table at end of this section for use restrictions. Also see the section in the Handbook for temporary summer grazing insect control. DO NOT USE methomyl (Lannate) or chlorpyrifos (Lorsban and similar products) on sweet sorghum varieties.</b>				
<u>At-Planting</u> <u>Treatments:</u> White grubs, wireworms, seed maggots, rootworms, fire ants	Counter 15G Counter 20G	7 oz./1000 ft of row 5.2 oz / 1000 ft of row	varies with row width	Apply Counter granules in a 7-inch 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.  Commercial seed treatment. Generally effective against wireworms, seed maggots and fire ants. Seed treatments may not provide effective control of white grubs.
	<u>Seed Treatments</u> Gaucho 600, Attendant 600, Axxess	6.4 fl oz./100 lb. seed	0.25 / 100 lb.	
	Cruiser 5FS	5.1 fl oz./100 lb. seed	0.2 / 100 lb.	
	Poncho 600, NipsIt Inside (5.0)	5.1 - 6.4 fl. oz./ 100 lb. seed	0.2 - 0.25 / 100 lb.	
At-planting Treatments: Cutworms, Lesser cornstalk borer	Asana XL, Adjourn (0.6 6EC) (cutworms only)	5.8 - 9.6 fl. oz.	0.03 - 0.05	<b>Lorsban 15G for cutworms and lesser cornstalk borer:</b> Apply Lorsban 15G at-planting in a band (6 to 8 inches) over the row in front of the press wheel and cover lightly with soil. <b>DO NOT APPLY LORSBAN 15G ON OR IN CONTACT WITH THE SEED.</b>  CUTWORMS: Lorsban 4E, Asana, Adjourn, Baythroid, Delta Gold, and cyhalothrin 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 broad cast applications or concentrate lower labeled dosage rate in the treated band.  LESSER CORNSTALK BORER: Apply liquid formulations in a band over the row at planting and lightly incorporate. Broadcast application usually is not effective. Dry conditions may limit efficacy of at-planting applications. Rescue treatments after plant emergence usually are not effective. Gaucho, Cruiser and Poncho seed treatments as applied for wireworm control may help suppress lesser cornstalk borer.  <b>NOTE: DO NOT USE Lorsban/Chlorfos/Chlorpyrifos on sweet sorghum varieties.</b>
	Baythroid XL (1.0EC) (cutworms only)	1.3 fl. oz.	0.01	
	Delta Gold 1.5EC (cutworm only)	1.3 - 1.9 fl. oz.	0.015 - 0.022	
	Lorsban 15G	6.6 lb./acre or 8 oz./1000 ft. of row	0.97	
	<u>chlorpyrifos</u> Lorsban, Chlorfos (4E)	1.5 pts.	0.75	
	Chlorpyrifos 4E Lorsban 7 5WG	2.0 pts. 1.33 lb	1.0 1.0	
	<u>gamma cyhalothrin</u> Declare, Prolex (1.25)	1.02 - 1.54 fl. oz.	0.01 - 0.015	
	Proaxis (0.5)	2.56 - 3.84 fl. oz.	0.01 - 0.015	
	<u>lambda cyhalothrin</u> Karate Z (2.08)	1.28 - 1.92 fl. oz.	0.02 - 0.03	
	Warrior, Silencer, Lambda, others (1.0)	2.56 - 3.84 fl. oz.	0.02 - 0.03	

**GRAIN SORGHUM INSECT CONTROL (continued)**

PEST	INSECTICIDE <sup>1</sup>	AMOUNT OF FORMULATION PER ACRE	LB. ACTIVE INGREDIENT PER ACRE	REMARKS AND PRECAUTIONS
Aphids	<p><b>At-Planting Treatments</b> Gaucho 600, Attendant 600, Access</p> <p>Cruiser 5FS</p> <p>Poncho 600</p> <p><b>Post-Emergence Treatments</b> Delta Gold 1.5EC (suppression only)</p> <p><u>chlorpyrifos</u> Lorsban, Chlorfos Chlorpyrifos (4E) Lorsban 7 5WG</p> <p>Dimethoate 4EC</p>	<p>6.4 fl oz./100 lb. seed</p> <p>5.1 fl oz./100 lb of seed</p> <p>5.1 - 6.4 fl oz/100 lb. of seed</p> <p>1.5 - 1.9 fl. oz.</p> <p>0.5 - 2 pt.</p> <p>0.67 lb.</p> <p>0.5 - 1 pt.</p>	<p>0.25 / 100 lb.</p> <p>0.2 / 100 lb.</p> <p>0.2 - 0.25 / 100 lb.</p> <p>0.018 - 0.022</p> <p>0.25 - 1.0</p> <p>0.5</p> <p>0.25 - 0.5</p>	<p><b>At-Planting Treatments:</b> Aphids seldom require control on sorghum in Georgia. Therefore the need for at-planting treatments for aphids control is questionable. Gaucho and Cruiser are commercial seed treatments and should control aphids for about 20-30 days after planting.</p> <p><b>Post-Emergence Treatments:</b> Aphids seldom require control on sorghum in Georgia. Control the corn leaf aphid when heavy populations occur and leaves appear to be dying over large areas of the field. For yellow sugarcane aphid, treatment should begin as soon as damage is found in seedling sorghum. If populations of greenbugs are killing 3 or more leaves per plant just before booting, treatment should be initiated.</p> <p><b>NOTE: DO NOT USE</b> Lorsban/Chlorfos/Chlorpyrifos on sweet sorghum varieties.</p>
Chinch bug and False chinch bug (on seedlings), Billbugs, Sugarcane beetles	<p><b>At-Planting Treatments</b> Gaucho 600, Attendant 600, Access</p> <p>Cruiser 5FS</p> <p>Poncho 600</p> <p><b>Post-Emergence Treatments</b> <u>chlorpyrifos</u> Lorsban, Chlorfos, Chlorpyrifos, others 4E</p> <p>Baythroid XL (1.0EC)</p> <p>Delta Gold 1.5EC</p> <p><u>gamma cyhalothrin</u> Declare, Prolex (1.25) Proaxis (0.5)</p> <p><u>lambda cyhalothrin</u> Karate Z (2.08) Warrior, Silencer, Lambda, others (1.0)</p> <p>Mustang MAX / Respect (0.8EC)</p> <p>Tombstone (2.0)</p>	<p>6.4 fl oz./100 lb. of seed</p> <p>5.1 fl oz./100 lb of seed</p> <p>5.1 to 6.4 fl oz/100 lb of seed</p> <p>2 pt.</p> <p>2.8 fl. oz.</p> <p>1.9 fl. oz.</p> <p>1.54 fl. oz. 3.84 fl. oz.</p> <p>1.92 fl. oz. 3.84 fl. oz.</p> <p>4.0 fl. oz.</p> <p>2.8 fl. oz.</p>	<p>0.25 / 100 lb.</p> <p>0.2 / 100 lb.</p> <p>0.2 - 0.25 / 100 lb.</p> <p>1.0</p> <p>0.022</p> <p>0.022</p> <p>0.015 0.015</p> <p>0.03 0.03</p> <p>0.025</p> <p>0.044</p>	<p><b>CHINCH BUG, FALSE CHINCH BUG:</b> In seedlings up to 6 in. 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 per plant are present. For post-emergence applications, use at least 20 gal per acre 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 rarely is effective.</p> <p><b>BILLBUGS, SUGARCANE BEETLES:</b> Adult beetles borrow 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 per acre as a band directed at the base of plants. Rescue treatments for sugarcane beetle are rarely effective.</p> <p><b>NOTE: DO NOT USE</b> Lorsban/Chlorfos/Chlorpyrifos on sweet sorghum varieties.</p>
European corn borer	Materials labeled for "foliage feeding larvae" will give helpful control.			Treat if numerous egg masses are found in the field (treat just before eggs hatch), or if shot-hole type leaf feeding by newly hatched larvae appears in 25% of the plants in a field. Insecticides are not effective once larvae bore in to the plant stem.

**GRAIN SORGHUM INSECT CONTROL (continued)**

PEST	INSECTICIDE <sup>1</sup>	AMOUNT OF FORMULATION PER ACRE	LB. ACTIVE INGREDIENT PER ACRE	REMARKS AND PRECAUTIONS
Foliage-feeding larvae: armyworms, fall armyworm, corn earworm  Headworms (larvae feeding on grain heads): fall armyworm, corn earworm, sorghum webworm	Asana XL, Adjourn 0.66EC (Corn earworm on heads only)	9.6 fl. oz.	0.05	<p><b>ARMYWORM, FALL ARMYWORM, CORN EARWORM IN WHORL:</b>  <u>Seedling plants</u>, treat when stand loss reaches 10 %, OR 40% or more plants are infested.  <u>Whorl stage plants</u>, 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 25 gal/acre of spray. For large infestation use tank mix of OP insecticide (Lannate or Lorsban) plus pyrethroid (Asana/Adjourn, Baythroid, Delta Gold, lambda/gamma cyhalothrin, Mustang, Tombstone).</p> <p><b>FALL ARMYWORM, CORN EARWORM, SORGHUM WEBWORM, FEEDING ON GRAIN HEADS:</b> Treat when an average of 2 or more (1/2 inch or larger) of any of these insects are found per grain head. For sorghum webworm, treat when an average of 5 or more small (1/4 inch) 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><b>NOTE:</b> Tracer is most effective against smaller larvae.</p> <p><b>NOTE:</b> DO NOT USE Lorsban/Chlorfos/Chlorpyrifos or Lannate on sweet sorghum varieties.</p>
	Baythroid XL (1.0EC)	2.8 fl. oz.	0.022	
	Belt (4.0)	2.0 - 4.0 fl. oz.	0.63 - 0.125	
	<u>carbaryl</u> Sevin XLR Plus, 4F, Sevin 80S Carbaryl (4)	1 - 2 qt. 2.5 lbs	1.0 - 2.0 2.0	
	Delta Gold 1.5EC	1.9 fl. oz.	0.022	
	<u>chlorpyrifos</u> Lorsban 4E Chlorpyrifos 4E	1 - 2 pt. 2 pt.	0.5 - 1.0 1.0	
	<u>gamma cyhalothrin</u> Declare, Prolex (1.25) Proaxis (0.5)	1.28 - 1.54 fl. oz. 3.2 - 3 .84 fl. oz.	0.0125 - 0.015 0.0125 - 0.015	
	<u>lambda cyhalothrin</u> Karate Z (2.08) Warrior, Silencer, Lambda, others (1.0)	1.6 - 1 .92 fl. oz. 3.2 - 3 .84 fl. oz.	0.02 - 0.03 0.02 - 0.03	
	Lannate 2.4 LV Lannate 90SP	2 pt. 0.5 lb.	0.45 0.45	
	Mustang MAX / Respect (0.8EC)	4.0 fl. oz.	0.025	
Tracer 4SC	2.0 - 3 .0 fl. oz.	0.062 - 0.093		
Tombstone (2.0)	1.3 - 2.8 fl. oz.	0.028 - 0.038		
Mites	Comite II (6.0)	1.5 - 2.25 pt.	1.125 - 1.6875	<p>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.                      Comite II: See comments under pesticide use restrictions section below.</p>
	Dimethoate 4EC, 400 Dimethoate 2.67EC	1.0 pt. 1.5 pt.	0.5 0.5	
Sorghum midge	Asana XL, Adjourn 0.66EC	2.9 - 5 .8 fl. oz.	0.015 - 0.03	<p>Treat when an average of 1 adult per head is observed after 25% to 3 0% of the heads are blooming. Treat again 5 to 10 days later if there are still many heads blooming and at least 1 midge per 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.</p> <p><b>NOTE:</b> DO NOT USE Lorsban/Chlorfos/Chlorpyrifos or Lannate on sweet sorghum varieties.</p>
	Baythroid XL (1.0EC)	1.0 - 1.3 fl. oz.	0.008 - 0.01	
	<u>chlorpyrifos</u> Lorsban, Chlorfos, Chlorpyrifos, others (4E) Lorsban 7 5WG	0.5 pt. 0.33 lb.	0.25 0.25	
	Delta Gold 1.5EC	1.3 - 1 .9 fl. oz.	0.015 - 0.022	
	Dimethoate 4EC, 400	0.25 - 0.5 pt.	0.125 - 0.25	
	<u>lambda cyhalothrin</u> Karate Z (2.08) Warrior, Silencer, Lambda, others (1.0)	0.96 - 1.28 fl. oz. 1.9 - 2 .56 fl. oz.	0.015 - 0.02 0.015 - 0.02	

**GRAIN SORGHUM INSECT CONTROL (continued)**

PEST	INSECTICIDE <sup>1</sup>	AMOUNT OF FORMULATION PER ACRE	LB. ACTIVE INGREDIENT PER ACRE	REMARKS AND PRECAUTIONS
Sorghum midge (cont.)	<u>gamma cyhalothrin</u> Declare, Prolex (1.25) Proaxis (0.5)  Lannate 2.4 LV Lannate 90SP  Mustang MAX / Respect (0.8EC)  Tombstone (2.0)	0.77 - 1.02 fl. oz. 1.90 - 2.56 fl. oz.  0.75 - 1.0 pt. 0.25 - 0.5 lb.  1.76 - 3.2 fl. oz.  1.0 - 1.3 fl. oz.	0.0075 - 0.01 0.0075 - 0.01  0.225 - 0.45 0.225 - 0.45  0.011 - 0.02  0.016 - 0.020	NOTE: Some brands of dimethoate do not allow application after heading.
Stink bugs, Leaffooted bugs, False chinch bugs on grain heads	Baythroid XL(1.0EC)  Delta Gold 1.5EC  <u>gamma cyhalothrin</u> Declare, Prolex (1.25) Proaxis (0.5)  <u>lambda cyhalothrin</u> Karate Z (2.08) Warrior, Silencer, Lambda, others (1.0)  Mustang MAX / Respect (0.8EC)  Tombstone (2.0)	1.3 - 2.8 fl. oz.  1.5 - 1.8 fl. oz.  1.28 - 1.54 fl. oz. 3.2 - 3.84 fl. oz.  1.6 - 1.92 fl. oz. 3.2 - 3.84 fl. oz.  4.0 fl. oz.  1.3 - 2.8 fl. oz.	0.01 - 0.022  0.018 - 0.022  0.0125 - 0.015 0.0125 - 0.015  0.025 - 0.03 0.025 - 0.03  0.025  0.020 - 0.044	STINK BUGS, LEAFFOOTED BUGS: Treat if combined numbers of adults and large nymphs exceed 4 bugs per head at milk stage or 8 bugs per head at soft dough stage. Damage not important during hard dough stage.  FALSE CHINCH BUG: For grain head infestations, treat if populations exceed 140 bugs per grain head at milk stage. Damage not important during medium to hard dough stages.

**PESTICIDE USE RESTRICTIONS FOR GRAIN SORGHUM**

**Asana XL, Adjourn (0.66 EC, esfenvalerate):** Do not apply within 21 days of harvest. Do not apply more than 28.8 fl. oz. per acre per season. REI = 12 hours.

**Baythroid XL (1.0EC, beta-cyfluthrin):** Do not harvest grain or dry forage within 14 days of treatment. If 5.6 fl. oz. per acre per crop or less has been applied, green forage may be grazed or fed on day of treatment. Do not apply more than 8.4 fl. oz. per acre per crop or more than 2.8 fl. oz. per acre in any 10 day period. REI = 12 hours.

**Belt (4.0, flubendiamide):** Do not harvest grain or stover within 14 days of treatment. Do not graze within 3 days of treatment. Do not apply more than 12 fl. oz. per acre per crop or 4 fl. oz. per acre in any 7 day interval. REI = 12 hours.

**Counter 15G (terbufos):** Do not place granules in direct contact with seed. Band granules in a 7-inch band over the row and lightly incorporate. Drill granules at planting 1-4 inches below and 1-4 inches to the side of seed. Do not harvest grain or fodder within 100 days after treatment nor graze or harvest green forage within 50 days after treatment. Make only one application per year. See label for other restrictions and calibration information. REI = 48 hours.

**Counter 20G (terbufos):** Do not place granules in direct contact with seed. Band granules in a 7-inch band over the row and lightly incorporate. Drill granules at planting 1-4 inches below and 1-4 inches to the side of seed. Do not harvest grain or fodder within 100 days after treatment nor graze or harvest green forage within 50 days after treatment. Make only one application per year. See label for other restrictions and calibration information. REI = 48 hours.

**Comite II (propargite):** Harvest interval is 30 days for silage and 60 days for grain. Use minimum of 20 gal. per acre by ground application and 5 gal. per acre 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. Restricted entry interval (REI) is 7 days.

**Cruiser 5FS (thiamethoxam):** Commercial seed treatment. Cruiser Extreme also contains fungicide active ingredients. Check label for crop plant-back restrictions. REI = 12 hours.

**Delta Gold 1.5EC (deltamethrin):** Do not apply within 14 days of harvest grain, cut forage or grazing. Do not apply more than 3.8 fl. oz. per acre in one growing season. REI = 12 hours.

**Dimethoate (dimethoate):** No more than 3 applications and 1 lb a.i. per acre per season. Do not graze or harvest for fodder or grain within 28 days of last application. Some formulations and brands do not apply after heading. REI = 48 hours.

**Gaicho 600, Attendant 6 00 (imidacloprid):** Commercial seed treatment. Do not graze or feed livestock in treated area within 45 days after planting. Check label for crop plant-back restrictions. Gaicho XT is not labeled for use on sorghum. REI = 12 hours.

**GRAIN SORGHUM INSECT CONTROL (continued)**

**PESTICIDE USE RESTRICTIONS FOR GRAIN SORGHUM (continued)**

**Karate, Warrior, Lambda T, Silencer, others (lambda cyhalothrin):** Do not apply within 30 days of harvest. Do not apply more than 0.08 lb a.i. per acre per season, more than 0.06 lb a.i. per acre after crop emergence, and more than 0.02 lb a.i. per acre after soft-dough stage. REI = 24 hours.

**Lannate (methomyl):** Do not apply within 14 days of grazing or harvest for fodder or grain. Do not make more than 2 applications per crop. DO NOT USE ON SWEET SORGHUM VARIETIES. REI = 48 hours.

**Lorsban, Chlorfos, Chlorpyrifos, others 4E (chlorpyrifos):** Do not apply more than a total of 3 pt. per acre per crop. Do not graze treated crop or harvest for fodder within 30 days of last application of 1 pt. per acre, or 60 days of rates greater than 1 pt. per acre. Do not treat drought stressed sorghum within 72 hours of a rain. DO NOT USE ON SWEET SORGHUM VARIETIES. REI = 24 hours.

**Mustang MAX, Respect (0.8E) (zeta-cypermethrin):** Do not apply more than 21.5 fl. oz. per acre per season. Do not make applications less than 10 days apart. Do not apply within 14 days of harvest for grain and stover or within 45 days for forage. REI = 12 hours

**Declare, Proaxis (gamma cyhalothrin):** Do not apply within 30 days of harvest. Do not apply more than 0.04 lb a.i. per acre per season, more than 0.03 lb a.i. per acre after crop emergence, and more than 0.01 lb a.i. per acre after soft-dough stage. REI = 24 hours.

**Sevin XLR Plus, 4F, Carbaryl (4) (carbaryl):** Do not apply within 21 days of harvest or within 14 days of grazing of harvest for forage or silage. Do not apply more than 6 qt per acre per year. REI = 12 hours.

**Tracer 4SC (spinosad):** Do not apply within 7 days of grain or fodder harvest or within 14 days of grazing forage harvest. No grazing interval but do not allow cattle to graze treated area until spray has dried.. REI = 4 hours.

**Tombstone (2.0, cyfluthrin):** Do not harvest grain within 14 days of treatment. Do not apply more than 8.4 fl. oz. per acre per crop or more than 2.8 fl. oz. per acre in any 10 day period. REI = 12 hours.

**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.

<b>Brand name (active ingredients)</b>	<b>Range of formulation rates</b>
Cobalt (chlorpyrifos, gamma-cyhalothrin)	7 - 36 fl. oz per acre
Consero (spinosad, gamma-cyhalothrin)	2.0 - 3.0 fl. oz per acre

# GRAIN SORGHUM WEED CONTROL

Eric P. Prostko, Extension Agronomist - Weed Science

USE STAGE AND HERBICIDE	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<b>PREEMERGENCE (Conventional Tillage)</b>			
metolachlor (Stalwart, Parallel PCS, Me-Too-Lachlor)	1.0 - 1.33 pts	1.0 - 1.33	<b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> If sorghum seed are not properly treated, metolachlor will severely injure sorghum. Apply after planting before weeds and sorghum emerge. Metolachlor can be applied with fluid fertilizer. <sup>1</sup> The generic formulations of metolachlor ( <b>Parallel, Stalwart, Me-Too-Lachlor</b> ) have not provided the same length of residual control of certain weeds as similar rates of Dual Magnum formulations in some UGA field trials. MOA = 15.
S-metolachlor (Dual Magnum 7.62EC) (Cinch 7.64EC)	1.0 - 1.33 pts	0.96 - 1.27	
alachlor (Micro-Tech/Intro) 4EC	1.5 - 2.25	1.5 - 2.25	<b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> If sorghum seed are not properly treated, Intro will severely injure sorghum. Apply after planting before weeds and sorghum emerge. Intro can be applied with fluid fertilizer. <sup>1</sup> MOA = 15.
dimethenamid-p (Outlook/Propel) 6 lb/gal	13 ozs	0.61	<b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> If sorghum seed are not properly treated, Outlook will severely injure sorghum. Apply after planting before weeds and sorghum emerge. MOA = 1
acetochlor (Warrant) 3ME	1.5 - 2.25 qt	1.13 - 1.69	<b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> Can be applied preemergence 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, Intro, or Outlook. Can be tank-mixed with glyphosate or paraquat for use as a burndown in minimum tillage systems. Warrant does not control emerged weeds. MOA = 15.
<b>CENTER PIVOT IRRIGATION APPLICATION</b>			
metolachlor (Stalwart, Parallel PCS, Me-To-Lachlor)	1.0 - 1.33 pts	1.0 - 1.33	May be applied by injection through center pivot irrigation systems. Apply in maximum of one-half inch water per acre 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 insure that the herbicide solution cannot siphon back into water supply. <b>Use Intro or Dual only with Concep treated sorghum seed.</b> 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.
S-metolachlor (Dual Magnum 7.62EC) (Cinch 7.64EC)	1.0 - 1.33 pts	0.96 - 1.27	
alachlor (Micro-Tech/Intro) 4EC	1.5 - 2.25 qts	1.5 - 2.25	
<b>PREEMERGENCE (Minimum Tillage)</b>			
paraquat (Gramoxone Inteon / Gramoxone SL) 2.0 lb/gal (Firestorm/Parazone) 3.0 lb/gal	1.88 - 3.76 pts	0.47 - 0.94	Apply at, or immediately after planting in 20 to 60 gals. water/A. Use low rate of paraquat if emerged annual weeds are less than 4 in. tall and high rate if emerged annual weeds are 4 to 6 in. tall. Add nonionic surfactant at 0.25% v/v. Paraquat usually will not suppress bermudagrass, johnsongrass, or other perennial weeds well enough to permit high yields. <b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> See remarks for metolachlor - PREEMERGENCE- Conventional Tillage. Refer to paraquat label(s) for compatibility with fluid fertilizers. The generic formulations of metolachlor ( <b>Parallel, Stalwart, Me-Too-Lachlor</b> ) have not provided the same length of residual control of certain weeds as similar rates of Dual Magnum formulations in some UGA field trials. MOA = 22 + 15.
+ metolachlor (Stalwart, Parallel PCS, Me-To-Lachlor)	+	+	
	1.0 - 1.33 pts	1.0 - 1.33	
S-metolachlor (Dual Magnum 7.62EC) (Cinch 7.64EC)	1.0 - 1.33 pts	0.96 - 1.27	

**GRAIN SORGHUM WEED CONTROL (continued)**

USE STAGE AND HERBICIDE	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<b>PREEMERGENCE (Minimum Tillage) (continued)</b>			
glyphosate (numerous trade names) 3.00 lb ae/gal 3.73 lb ae/gal 4.00 lb ae/gal 4.17 lb ae/gal 4.50 lb ae/gal 5.00 lb ae/gal + metolachlor (Stalwart, Parallel PCS, Me-Too-Lachlor)  S-metolachlor (Dual Magnum 7.62EC) (Cinch 7.64EC)	32 - 64 ozs 26 - 52 ozs 24 - 48 ozs 23 - 46 ozs 21 - 42 ozs 19 - 38 ozs + 1.0 - 1.33 pts  1.0 - 1.33 pts	0.75 - 1.50 ae      + 1.0 - 1.33  0.96 - 1.27	Apply at, or immediately after planting in 10 to 40 gals. water/A. Use low rate of glyphosate to control emerged annual grass and broadleaf weeds; high rate for control of emerged johnsongrass and bermudagrass. <b>Use only with sorghum seed that have been treated by the seed company with Concep.</b> See remarks for metolachlor. 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. MOA = 9 + 15.
<b>POSTEMERGENCE (Over-the-top)</b>			
atrazine (numerous trade names) 80W 90DG 4L	1.5 lbs 1.3 lbs 1.2 qts	1.2	Apply with 1.0 qt. crop oil concentrate/A after sorghum reaches the three-leaf stage but before it reaches 12 inches tall. Controls broadleaf weeds 2 to 3 in. tall and newly emerged (1-leaf) annual grasses. <b>DO NOT</b> use on sands or loamy sands. <b>DO NOT</b> apply with fluid fertilizers or crop injury may occur. <b>DO NOT</b> 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. <b>DO NOT</b> graze or feed forage for 21 days following application. Rain-free period is 2 hours. MOA = 5.
2,4-D amine (numerous trade names) 3.8 lb/gal	0.50 - 1.0 pt	0.24 - 0.48	Sorghum is not as tolerant to 2,4-D as corn. Apply low rate (0.33 lb. ai/A) over-the-top for control of annual broadleaf weeds when sorghum is 6 to 8 inches tall. Arrange nozzles to keep spray out of crop whorl. If sorghum is 8 to 15 in. tall, apply as directed spray - see recommendation under POST-EMERGENCE (Directed Spray). Sorghum is most subject to 2,4-D injury from over-the-top treatments, use of high rates or applications made during high soil moisture and high air temperatures. <b>DO NOT</b> (a) apply during boot, bloom, or early dough stages, or (b) apply in fluid fertilizers. Use only the amine formulation to help prevent drift to susceptible crops. <b>DO NOT</b> use with adjuvants. MOA = 4.
bentazon (Basagran) 4.0 lb/gal	1.5 - 2.0 pts	0.75 - 1.0	Apply over-the-top when sorghum has 1 to 5 leaves. Grain sorghum is tolerant at all stages of growth up to, and including the early boot stage. <b>DO NOT</b> apply to grain sorghum that is heading or blooming. Add oil concentrate (2.0 pts/A) according to label directions for the weed species present. <b>DO NOT</b> apply more than 2.0 pts of bentazon per season. <b>DO NOT</b> apply with fluid fertilizers. Rainfall or irrigation within 4 hours of application may decrease effectiveness. MOA = 6.
bromoxynil (Buctril) 2E	1.0 - 1.5 pts	0.25 - 0.38	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 inches tall. <b>DO NOT</b> 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. Do not cut for feed or graze within 30 days of treatment. MOA = 6.

**GRAIN SORGHUM WEED CONTROL (continued)**

USE STAGE AND HERBICIDE	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<b>POSTEMERGENCE (Over-the-top) (continued)</b>			
prosulfuron (Peak) 57 DF	0.75 - 1.0 oz	0.024 - 0.036	Provides postemergence and residual controls of many annual broadleaf weeds. Apply after sorghum reaches 5 inches in height and before 30 inches. Refer to label for specific weed sizes but as a general rule apply before weeds reach greater than 4-6 inches high. The use of a non-ionic surfactant or crop oil is recommended. May be tank-mixed with Banvel, 2,4-D, or atrazine. Do not apply Peak within 15 days to sorghum treated with foliar applied organophosphate insecticides. Rotational restrictions include the following: wheat, barley, rye, oats - 0 months; field corn - 1 month; sweet corn, soybeans, peanuts, tobacco, cotton - 10 months; onions - 22 months. MOA = 2.
halosulfuron (Proflone, Sandea) 75 DF	0.67 oz	0.032	Controls many annual broadleaf weeds and suppression of nutsedge. Can be applied over-the-top from the two-leaf stage through layby stage of grain sorghum. Can be tank-mixed with Banvel, 2,4-D, Buctril or atrazine. The use of a non-ionic surfactant or crop oil 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. MOA = 2.
dicamba (Banvel, Clarity, Sterling, Vision) 4.0 lb/gal	8 oz	0.25	Apply over-the-top when sorghum is in the 3-leaf stage to 8 in. tall. If sorghum is 8 to 15 in. tall, apply only as a directed spray - see recommendation under POSTEMERGENCE (Directed Spray). <u>DO NOT</u> apply to sorghum grown for seed production. Make only one application per season. Prevent drift to susceptible crops. Do not graze or feed treated sorghum forage or silage prior to mature grain stage. Rain-free period = 4 hours. If dicamba is applied during periods of rapid growth, temporary leaf rolling and plant leaning may occur. MOA = 4.
<b>POSTEMERGENCE (Directed Spray)</b>			
2,4-D amine (numerous trade names) 3.8 lb/gal	0.5 - 1.0 pt	0.24 - 0.48	Apply as a directed spray to sorghum 8 to 15 in. tall. Use low rate if applications are made under conditions of high soil moisture and high air temperatures. <u>DO NOT</u> (a) apply during boot, bloom, or early dough stages, or (b) apply in fluid fertilizers. Use only the amine formulation and prevent drift to susceptible crops. MOA = 4.
dicamba (Banvel, Clarity, Sterling, Vision) 4.0 lb/gal	8 ozs	0.25	Apply as a directed spray to sorghum 8 to 15 in. tall. <u>DO NOT</u> apply to sorghum grown for seed production. Make only one application per season. Prevent drift to susceptible crops. Do not graze or feed treated sorghum or silage prior to mature grain stage. If dicamba is applied during periods of rapid growth, temporary leaf rolling and plant leaning may occur. MOA = 4.
linuron 4L 50DF (numerous trade names)	1.0 - 2.0 pts 1.0 - 2.0 lbs	0.5 - 1.0	Apply as a directed spray after sorghum is 12 in. tall. Use low rate when sorghum is 12 to 15 in. tall, and a sprayer equipped with skirts, shoes or shields. Use the high rate when sorghum is 15 in. tall and weeds are up to 4 in. in height. Make only one application per season. Add nonionic surfactant (1 pt./25 gals. spray). <u>DO NOT</u> graze or feed plant parts to livestock within 3 months after application. MOA = 7.
paraquat (Gramoxone Inteon / Gramoxone SL) 2.0 lb/gal  (Firestorm/Parazone) 3.0 lb/gal	1.0 - 2.0 pts  0.7 - 1.3 pts	0.25 - 0.50	Apply with a nonionic surfactant (1 qt./100 gals. spray solution) when sorghum is at least 12 in. tall. Use low rate for weeds less than 2 in. tall; high rate for weeds 2 to 3 in. tall. <u>DO NOT</u> apply with (a) drop nozzles mounted on a boom or (b) fluid fertilizers. Use 20 to 40 gals. of water/A and do not exceed 30 psi pressure. Do not spray higher than 3 in. on the sorghum stalks. <u>Can also be used with hooded-sprayer</u> . MOA = 22.
carfentrazone (Aim 2EC)	0.5 - 1.0 ozs	0.08 - 0.016	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. MOA = 14.

**GRAIN SORGHUM WEED CONTROL (continued)**

USE STAGE AND HERBICIDE	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<b>POSTEMERGENCE - INCORPORATED (Culti-Spray)</b>			
pendimethalin (Prowl/Pendimax 3.3EC) (Prowl H20 3.8 ACS)	1.2 - 1.8 pts 1.5 pts	0.50 - 0.75 0.71	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. 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 culti-vator prior to application. 3. The herbicides can be applied over-the-top or with drop nozzles, depending on sorghum size. Pendimethalin can be applied from the 4" growth stage up until layby. Trifluralin 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 0.5-1.0" can be used instead of mechanical cultivation. MOA = 3.
trifluralin (numerous trade names) 4.0 lb/gal	1.0 pt	0.50	
<b>HARVEST AID</b>			
carfentrazone (Aim 2EC)	1.0 ozs	0.016	For the pre-harvest desiccation of pigweeds and morningglories. Apply at least 3 days before harvest. Can be applied by ground or air. Use with a crop oil concentrate @ 1% v/v (1 gal/100 gal). Can be tank-mixed with glyphosate to improve the spectrum of control. MOA = 14.
diquat (Reglone) 2SL	24-32 ozs	0.375-0.50	Apply 1-2 weeks before harvest when seed moisture is less than 30%. Can be applied by ground (15 GPA) or air (5 GPA). Use a NIS @ 0.25% v/v (1 qt/100 gallons). Do not graze or feed treated forage to livestock. MOA = 22.
sodium chlorate 2.0 lb/gal 3.0 lb/gal 6.0 lb/gal	3 gals 2 gals 1 gal	6.0	Apply 7 to 10 days prior to harvest by aerial or ground equipment. Proper agitation is necessary. Apply on warm, sunny day with high temperatures and humidity. Do not apply if rainfall is expected within 24 hours. More effective on grass weeds than broadleaf weeds. Desiccation of morning glory and other vines may be erratic. MOA = NC.
glyphosate (numerous trade names) 3.00 lb ae/gal 3.73 lb ae/gal 4.00 lb ae/gal 4.17 lb ae/gal 4.50 lb ae/gal 5.00 lb ae/gal	32 - 64 ozs 26 - 52 ozs 24 - 48 ozs 23 - 46 ozs 21 - 42 ozs 19 - 38 ozs	0.75 - 1.50 ae	Apply when grain moisture is 30% or less. Allow a minimum of 7 days between application and harvest. Do not use on sorghum grown for seed as a reduction in seed germination or vigor may occur. Not all formulations of glyphosate may be labeled for this use. Refer to specific product label. MOA = 9.

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

**Herbicide Programs for Managing Palmer Amaranth in Grain Sorghum**

Preemergence <sup>1</sup>	Postemergence <sup>2</sup> (over the top)	Postemergence <sup>3</sup> (Directed Spray)	Hooded Sprayer
Dual Magnum or Intro/MicroTech or Outlook or Warrant	Atrazine	2,4-D or Clarity	Gramoxone Inteon or Gramoxone SL or Firestorm or Parazone

<sup>1</sup>Must use Concep treated seed.  
<sup>2</sup>3-leaf sorghum up until 12" in height.  
<sup>3</sup>8-15" tall sorghum.

# GRAIN SORGHUM WEED RESPONSE TO HERBICIDES

Eric P. Prostko, Extension Agronomist - Weed Science

	Intro* Micro- Tech	Dual Magnum* <sup>1</sup>	Outlook Propel	Atrazine	Linex- Lorox	Paraquat**	2,4-D	Banvel	Buctril	Peak	Sandea/ Profine	Basa- gran
	PRE	PRE	PRE	POT	PDS	PDS	POT/ PDS	POT/ PDS	POT	POT	POT	POT
<b>PERENNIAL WEEDS</b>												
johnsongrass, rhizome	P	P	P	P	P	P	P	P	P	P	P	P
nutsedge, purple	P	F	P	P	P-F	P	P	P	P	P	F-G	P
nutsedge, yellow	F	F-G	F	P	P-F	P	P	P	P	P	F-G	F-G
<b>ANNUAL GRASSES</b>												
crabgrass	E	E	E	G	G	G	P	P	P	P	P	P
crowfootgrass	E	E	E	G	E	G	P	P	P	P	P	P
goosegrass	E	E	E	G	E	G	P	P	P	P	P	P
fall panicum	G	G	E	F	E	G	P	P	P	P	P	P
johnsongrass (seedling)	P	P	P	P	G	G	P	P	P	P	P	P
sandbur	F-G	F-G	F-G	F	E	G	P	P	P	P	P	P
signalgrass, broadleaf	F-G	F-G	F-G	P	G	G	P	P	P	P	P	P
Texas panicum	P-F	P-F	P-F	P-F	G	E	P	P	P	P	P	P
<b>BROADLEAF WEEDS</b>												
bristly starbur	P	P	P	E	G	G	G	E	G		G	E
citronmelon	P	P	P	G	E	F	E	E		F	P-F	P
cocklebur	P	P	P	E	E	G	E	E	E	G	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		P	P
Florida pusley	G-E	G-E	G-E	G	G	F-G	G	G	E			P
jimsonweed	P	P	P	E	E	G	E	E		G		E
lambsquarters	F	F	F-G	E	E	F-G	E	E	G	G	F	P
morningglories	P	P	P	E	G	G	G	E	G	F	P	F
Pigweed	G	G	G	E	E	G	G-E	G-E	G	F-G	F-G	P
ALS-resistant	G	G	G	E	E	G	G-E	G-E	G	P	P	P
Atrazine-resistant	G	G	G	P	E	G	G-E	G-E	G	F-G	F-G	P
prickly sida	F	F	F	E	G	F-G	E	E	G	G	F	F-G
purslane	G	G	G	E	G	G	G	E		G		P
ragweed, common	F	F	F	E	E	G	E	E	G	G	G	F
sesbania, hemp	P	P	P	F-G	G	P-F	G	E	G		F-G	P
sicklepod	P	P	P	G	E	G	E	E	P	F-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.

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

<sup>1</sup> 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.

\*\*Commercially available as Gramoxone Inteon, Gramoxone SL, Parazone, or Firestorm.

PRE = Preemergence; POT = Postemergence over-the-top; PDS = Postemergence directed spray.