

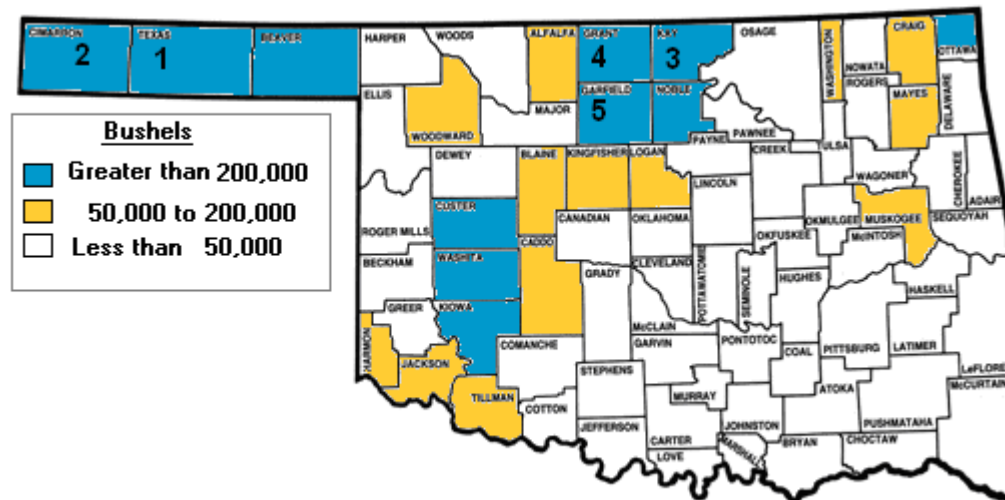
Crop Profile for Oklahoma Sorghum

Prepared: February 28, 2009

General Production Information

(National Agricultural Statistics Service website at <http://www.nass.usda.gov/>)

- 2007 Production Statistics (Grain)
 - Oklahoma contributed 2.52% of the total grain sorghum produced in the United States and ranked 5th in the U.S. in grain sorghum production.
 - Grain sorghum production was valued at 49,662,000 dollars and ranked 12 in value of agricultural commodities produced in Oklahoma.
 - Sorghum was planted on approximately 240,000 acres.
 - Sorghum was harvested on approximately 220,000 acres.
 - Oklahoma produced approximately 12,760,000 bushels of grain sorghum for an average yield of 58.0 bushels per acre.
- 2007 Production Statistics (Silage)
 - Oklahoma contributed 0.92% of the total silage sorghum produced in the United States and ranked 10th in the U.S. in silage production.
 - Oklahoma produced approximately 60,000 tons of silage for an average yield of 5 tons per acre.
- The top five counties in grain sorghum production in Oklahoma in order from first to fifth are (1) Texas County, (2) Cimarron County, (3) Kay County, (4) Grant County, and (5) Beaver County



Production Information 2000-2006 (Grain)

Year	Acres Planted	Acres Harvested	Yield per Harvested acre	Production (bushels)	Value of Production in dollars
2000	450,000	360,000	38.0 Bu.	13,680,000	24,000,000
2001	500,000	420,000	36.0 Bu.	15,120,000	29,000,000
2002	430,000	300,000	45.0 Bu.	13,500,000	31,072,000
2003	300,000	250,000	37.0 Bu.	9,250,000	21,549,000
2004	270,000	240,000	60.0 Bu.	14,400,000	25,321,000
2005	270,000	240,000	52.0 Bu.	11,520,000	21,418,000
2006	270,000	200,000	34.0 Bu.	6,800,000	22,277,000

Production Information 2000-2006 (Silage)

Year	Acres Harvested	Yield per Harvested acre	Production (tons)
2000	17,000	9.0 tons	153,000
2001	18,000	6.0 tons	108,000
2002	15,000	10.0 tons	150,000
2003	18,000	10.0 tons	180,000
2004	15,000	8.0 tons	120,000
2005	14,000	7.0 tons	98,000

Cultural Practices

Most sorghum seed is planted at a depth of 2 inches in rows spaced 30 inches. The seeding rates range from 24,000 to 100,000 seeds per acre. Sorghum is usually planted from mid May through early July. Seeds usually germinate when soil temperature is reaches 70 degrees F. Sorghum is commonly rotated with soybeans or wheat, but is sometimes rotated with corn, cotton or peanuts.

Worker Activities

Oklahoma Sorghum worker activities results in few opportunities for direct pesticide exposure. Sorghum production is mechanized from planting to harvest. Due to economics sorghum production relies on as few pesticide applications as possible. Applications are made either by commercial applicators or mechanized sprayers. No hand weeding occurs and opportunity for early entry into fields would be very minimal since most sorghum is not even irrigated. Workers handling treated seed at planting results in one of the few opportunities of direct contact by workers other than actual spray applications. Opportunity for exposure could occur during mixing and loading of sprayers by producers or employees of producers. Tillage and harvest will be done mechanically.

Major Insect Pests

Chinch Bug

(Blissus leucopterus)

Chinch bugs are a sporadic pest of sorghum, but can cause severe damage in some years. Adults are 1/8 inch long, black with white wings that are folded over the back into an “hour glass” shape. Nymphs are reddish to brown, with a white stripe across their “shoulders”. They often migrate into sorghum fields in late spring from winter wheat fields. They may go through one or two generations in sorghum. They feed between the leaf sheath and stem of the sorghum plant where they suck plant juices and cause injury from substances present in their saliva. Chinch bug feeding can result in the death of young sorghum plants. Treatment is suggested when 2-3 bugs per plant on seedlings. Treat if large numbers are moving in to sorghum from grain.

Controls

Cultural – Avoid planting sorghum next to winter wheat fields. Plant dense vigorous plant stands.

Biological – none are effective, although rainfall can sometimes trigger fungus disease outbreaks that reduce chinch bugs numbers.

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
Planting Time			
clothianidin	Poncho	5.1-6.4 fl oz/cwt seed	4A
imidacloprid	Gaucho	8 fl oz/cwt seed	4A
thiamethoxam	Cruiser 5FS	5.1 fl oz/cwt seed	4A
Post Plant			
esfenvalerate	Asana XL*	5.8-9.6 fl oz/acre	3
cyfluthrin	Baythroid XL*	2.0-2.8 fl oz/acre	3
chlorpyrifos+gamma cyhalothrin	Cobalt*	13.38 fl oz/acre	1B, 3

carbofuran	Furadan 4F*	0.5-1 pt/acre	1A
lambda-cyhalothrin	Karate, Warrior*	1.28-3.84 fl oz/acre	3
chlorpyrifos	Lorsban 4E*	1-2 pt/acre	1B
zeta-cypermethrin	Mustang Max	3.2-4.0 fl oz/acre	3
gamma-cyhalothrin	Proaxis, Prolex	1.54-3.84 fl oz/acre	3
carbaryl	Sevin SLR	1-2 qt/acre	1A

* indicates a restricted use product

Corn Earworm (*Helicoverpa zea*)

The corn earworm is also known as the sorghum headworm and is part of the “headworm complex”. A mature caterpillar can reach 1 inch long. Color varies from green, to brown to yellow and pink. Corn earworms can injure developing seed as it feeds in the seed panicle. Sorghum should be inspected for corn earworm larvae when flowering starts. Treatments are suggested when an average or one larva per seed head is found until the seed reaches hard dough stage.

Controls

Cultural – open headed varieties are less susceptible to damage, presumably because they allow access to natural enemies.

Biological – (see cultural)

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
carbaryl	Sevin XLR	1-2 qt/acre	1A
chlorpyrifos	Lorsban 4E*	2 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	19-38 fl oz/acre	1B, 3
cyfluthrin	Baythroid 2*	1.3-2.8 fl oz/acre	3
esfenvalerate	Asana XL*	5.8-9.6 fl oz/acre	3
gamma-cyhalothrin	Prolex, Proaxis*	1.02-3.84 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	1.28-3.84 fl oz/acre	3
Methomyl	Lannate	0.75-1.5 fl oz/acre	1A
Spinosad	Tracer	1.5-3 fl oz/acre	5

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Corn Leaf Aphid (*Rhopalosiphum maidis*)

The corn leaf aphid is a bluish-green, soft bodied aphid with black legs, antennae and cornicles. It typically infests the whorl and leaves of sorghum plants. While large populations may cause a delay in whorl emergence, they rarely cause significant economic loss. They occasionally feed on the upper leaves and tassels which may affect

pollination due to honeydew deposits. It is rarely necessary to control corn leaf aphids with insecticides because they can serve as a food source for natural predators which can reduce the risk of greenbug infestations that typically occur later.

Controls

Cultural - none

Biological – Lady beetles, *Lysiphlebus testaceipes*, *Orius* spp.

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
Planting Time			
clothianidin	Poncho	5.1-6.4 fl oz/cwt seed	4A
imidacloprid	Gaucho	8 fl oz/cwt seed	4A
thiamethoxam	Cruiser 5FS	5.1 fl oz/cwt seed	4A
Post Plant			
chlorpyrifos+gamma cyhalothrin	Cobalt*	7-13 fl oz/acre	1B, 3
chlorpyrifos	Lorsban 4E*	0.5-1 pt/acre	1B
dimethoate	Dimethoate 4E	0.5-1 pt/ acre	1B

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Cutworms

(Family; Noctuidae)

Cutworms are the larval stage of noctuid moths. There are several species of cutworms. Cutworms generally feed at night on the roots, or cut stems at ground level, or chew on the leaves depending on the species. Cutworms can cause stand loss if they cut the sorghum plant below the growing point. Treatment is suggested when cutworms are less than ½ inch long, and skips are noticed. Once sorghum plants reach 4-leaf stage, they are less susceptible to stand loss.

Controls

Cultural – Tillage or herbicide to destroy vegetation in late summer or early fall.

Biological - none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
chlorpyrifos	Lorsban 4E*	1-2 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	13-38 fl oz	1B, 3
cyfluthrin	Baythroid XL*	1.0-1.3 fl oz/acre	3

esfenvalerate	Asana XL*	5.8-9.6 fl oz/acre	3
gamma-cyhalothrin	Prolex, Proaxis*	0.77-2.56 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	0.96-2.56 fl oz/acre	3
zeta-cypermethrin	Mustang MAX	1.3-4 fl oz/acre	3

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Fall Armyworm (*Spodoptera frugiperda*)

Fall armyworms are also part of the “headworm complex” When mature, they are striped, non-bristled caterpillar up to 1.5 inches and has a light-colored inverted “Y” on head. They feed in the whorls of sorghum plants and grain heads after they emerge. Sorghum should be inspected for corn earworm larvae when flowering starts. Treatments are suggested when an average or one larva per seed head is found before the seed reaches hard dough.

Controls

Cultural – Planting early to reduce infestation.

Biological – Using sorghum hybrids with loose panicles

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
chlorpyrifos+gamma cyhalothrin	Cobalt*	13-38 fl oz/acre	1B, 3
chlorpyrifos	Lorsban 4E*	1-2 pt/acre	1B
gamma-cyhalothrin	Prolex, Proaxis*	1.02-2.56 fl oz/acre	3
lambda-Cyhalothrin	Karate*	2.56-3.84 fl oz/acre	3
methomyl	Lannate*	0.75-1.5 pt/ acre	1A
parathion	Ethyl Parathion*	0.5 lb/acre	1B
zeta-Cypermethrin	Mustang Max	1.28-4.0 fl oz/acre	3

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False Chinch Bug (*Nysius raphanus*)

False chinch bug adults 1/8 inch long, dirty gray, with brown or black markings and piercing mouthparts. They suck juices from developing sorghum kernels and other parts of the panicle. Although they are an occasional pest, they can cause economic damage when large numbers are present on the heads during kernel development. Treatment is suggested when numbers exceed 140 per head.

Controls

Cultural – none

Biological – none

Chemical –

Chemical Name	Trade Name(s)	Rate/acre	MOA
cyfluthrin	Baythroid*	1.3-2.8 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	1.26-3.84 fl oz/acre	3
zeta-cypermethrin	Mustang MAX	3.2-4.0 fl oz/acre	3

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Grasshoppers

Grasshoppers typically move into sorghum from roadside ditches or drying pastureland. They can cause severe defoliations when present in large numbers. Control is suggested when grasshopper nymphs reach 40 or more per square yard in roadside ditches, or 15 or more per square yard in sorghum fields.

Controls

Cultural –none

Biological – none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
carbaryl	Sevin XLR	0.5-1.5 qt/acre	1B
chlorpyrifos	Lorsban 4E*	0.5-1 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	7-13 fl oz/acre	1B, 3
cyfluthrin	Baythroid XI*	2-2.8 fl oz/acre	3
dimethoate	Dimethoate 4E	1 pt/acre	1B
gamma-cyhalothrin	Prolex, Proaxis*	1.02-3.84 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	1.28-3.86 fl oz/acre	3
zeta-cypermethrin	Mustang Max	3.2-4.0 fl oz/acre	3

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Greenbug (*Schizaphis graminum*)

The greenbug is light green with a darker green strip down its back. The tips of the legs, cornicles and most of the antennae are black. They feed by sucking plant juices. The damage made by the greenbug can be detected by the reddish spots on the leaves

caused by toxins contained in their saliva. Treatment suggestions are based on stage of plant growth and number of greenbugs per plant.

Controls

Cultural – Greenbug resistant varieties of sorghum are available.

Biological – lady beetles, *Lysiphlebus testaceipes*, lacewing larvae.

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
	Seed Treatment		
clothianidin	Poncho	5.1-6.4 fl oz/cwt seed	4A
imidacloprid	Gaucho	8 fl oz/cwt seed	4A
thiamethoxam	Cruiser 5FS	5.1 fl oz/cwt seed	4A
	Planting time		
terbufos	Counter CR	Apply per label	1B
	Post-plant		
carbonfuran	Furadan 4F*	1 pt/acre	1A
chlorpyrifos	Lorsban 4E*	0.5-2 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	13-38 fl oz/acre	1B, 3
dimethoate	Dimethoate 4E	1 pt/acre	1A
malathion	Malathion 5E	1.5 pt/acre	1B
methidathion	Supracide 2E	2 pt/acre	1B

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Lesser Cornstalk Borer (*Elasmopalpus lignosellus*)

The lesser cornstalk borer is a caterpillar that reaches ¾ inch long when mature. The body is slender, blue-green in color with brown bands around each body segment. Larvae tunnel into the crown of host plants and can severely weaken large plants or kill young seedlings. Larvae feed for about 3 weeks spinning silken tubes near the soil surface for protection. There is no established threshold for control of lesser cornstalk borer.

Controls

Cultural – Tillage can reduce numbers

Biological – none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
chlorpyrifos	Lorsban 4E*	1-2 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	13-38 fl oz/acre	1B, 3
gamma-cyhalothrin	Proaxis 0.5 CS*	1.02-3.84 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	1.28-3.84 fl oz/acre	3
zeta-cypermethrin	Mustang Max	3.2-4.0 fl oz/acre	3

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Mites

Several species of mites feed on sorghum. The most common are the Banks grass mite and the two spotted spidermite. These mites suck juices from the underside of sorghum leaves where they produce webbing. Feeding damage from mites can cause chlorosis and more severe infestations may kill leaves on the sorghum plant. Control is not justified once the head reaches hard dough stage.

Controls

Cultural –none

Biological – none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
dimethoate	Dimethoate 4E	1 pt/ acre	1B
methidathion	Supracide 2E	2 pt/acre	1B
propargite	Comite II	1.5-2.25 pt/acre	14

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Panicle-feeding Bugs

Panicle feeding bugs include stink bugs (brown conchuela, rice, and southern green stink bugs) and leaf footed bugs. These insects feed on developing seed by piercing the seed with their needle-like mouthparts. Most damage occurs before the seed reaches hard dough stage. Treatment is suggested when numbers reach 5 per head at milk stage, or 9 per head at soft dough stage.

Controls

Cultural –none

Biological – none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
carbaryl	Sevin XLR	1-2 qt/acre	1A
chlorpyrifos+gamma cyhalothrin	Cobalt*	19-38 fl oz/acre	1B, 3
cyfluthrin	Baythroid XL*	1.3-2.8 fl oz/acre	3
gamma-cyhalothrin	Proaxis 0.5 CS*	1.02-3.84 fl oz/acre	3
lambda-cyhalothrin	Karate*	1.28-1.92 fl oz/acre	3
zeta-cypermethrin	Mustang Max	1.9-4.3 fl oz/acre	3

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Sorghum Midge (*Contarinia sorghicola*)

The sorghum midge is a fragile orange bodied fly measuring 1/8 inches. They are active from early to mid morning, and lay eggs in the flowers of a blooming panicle and the larvae feed on the fluids of developing seeds which results in “blasted” heads.

Controls

Cultural – Planting sorghum early so that blooming occurs before August 15 can help prevent damage from the sorghum midge

Biological –none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
chlorpyrifos	Lorsban 4E*	0.5 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	1-13 fl oz/acre	1B, 3
cyfluthrin	Baythroid 2*	1.0-1.3 fl oz/acre	3
dimethoate	Dimethoate 4E	0.25-0.5 pt/ acre	1A
esfenvalerate	Asana XL*	2.9-5.8 fl oz/acre	3
gamma-cyhalothrin	Prolex, Proaxis*	0.77-2.56 fl oz/acre	3
lambda-Cyhalothrin	Karate, Warrior*	0.96-2.56 fl oz/acre	3
methomyl	Lannate*	0.75-1.5 pt/ acre	1A
zeta-cypermethrin	Mustang MAX	1.28-4.0 fl oz/acre	3

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Sorghum Webworm

(*Nola sorghiella* Riley)

The sorghum webworm is reddish to brown with a hairy body. The life cycle of the webworm lasts about one month. The larval stage lasts thirteen days. The larvae feed on the seed, and hollow it out. Sorghum is susceptible until the kernels reach the hard-dough stage.

Controls

Cultural – Planting open-headed sorghum can help prevent damage from the sorghum webworm.

Biological – None.

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
carbaryl	Sevin XLR	1-2 qt/acre	1A
chlorpyrifos	Lorsban 4E*	1 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	19-38 fl oz/acre	1B, 3
cyfluthrin	Baythroid XL*	1.3-2.8 fl oz/acre	3
gamma-cyhalothrin	Prolec, Proaxis*	1.02-3.84 fl oz/acre	3
lambda-Cyhalothrin	Karate, Warrior*	1.28-3.84 fl oz/acre	3
methomyl	Lannate*	1.5 pt/ acre	1A
spinosad	Tracer	1.5-3 fl oz/acre	5
zeta-cypermethrin	Mustang Max	1.76-4.0 fl oz/acre	3

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Southwestern Corn Borer
(*Diatraea grandiosella* Dyar)

The southwestern corn borer is prevalent in late July through October. Full grown caterpillars are white with prominent dark spots on body. The larvae tunnel through the stalk and can cause the peduncle to break. This can also make the plant more susceptible to disease. Chemical control of this pest is generally not economical.

Controls

Cultural – Planting sorghum early. Plow fields soon after harvest to destroy overwintering larvae

Biological –

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
chlorpyrifos	Lorsban 4E*	1.5-2 pt/acre	1B
chlorpyrifos+gamma cyhalothrin	Cobalt*	19-38 fl oz/acre	1B, 3
cyfluthrin	Baythroid XL*	1.3-2.8 fl oz/acre	3
lambda-cyhalothrin	Karate, Warrior*	1.28-3.84 fl oz/acre	3
spinosad	Tracer	1.5-3 fl oz/acre	5
zeta-cypermethrin	Mustang Max	1.76-4.0 fl oz/acre	3

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White Grubs (*Phyllophaga spp.*)

The white grub is a large, brown headed “C” shaped larva of May/June beetles that feeds on roots of sorghum. White grub lifecycles range from one to two or more years. Because of this the white grub can damage sorghum at the time it is planted. An average of one grub per sq ft will cause stand loss.

Controls

Cultural – Planting sorghum in a field where a nongrass crop was grown the previous year. Control weeds in no-till fields during the summer when major flights of the beetle occur.

Biological – none

Chemical – No materials are currently cleared for grub control in sorghum.

Wireworm and Seedcorn Beetle

Wireworms and false wireworms are beetle larvae with yellowish-brown shiny and slender cylindrical bodies. They feed primarily on planted seed, but they also injure small plants by burrowing into underground portions of the stem. The seed corn beetle is a small, brown beetle about ¼ inch long with dark patches on each wing cover. Overwintered adults damage germinating seeds by chewing out the endosperm. Problems are worst in heavy, moist soils with reduced tillage and under sandy conditions that delay germination.

Controls

Cultural – none

Biological – none

Chemical –

Common Name	Trade Name(s)	Rate/acre	MOA
	Seed Treatment		
clothianidin	Poncho	5.1-6.4 fl oz/cwt seed	4A
imidacloprid	Gaucho	8 fl oz/cwt seed	4A
thiamethoxam	Cruiser 5FS	5.1 fl oz/cwt seed	4A
	Planting Time		
terbufos	Counter 15 G*	Apply per label	1B

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Weeds

Percent of acres treated with a specific herbicide in 2000.

Herbicide	% acres
Roundup	34%
Atrazine	31%
2,4-D	17%
Bicep	11%
Dual	7%

Annual weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Glyphosate + Surfactant	Preplant or Preemergence	8 to 32 oz/A + surfactant	9	Be sure to add the necessary surfactant according to the label directions.

* indicates a restricted use product

Small Annual Weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Buctril 2E* (bromoxynil)	Postemergence	1 to 1.5 pt/acre	6	Apply to sorghum after emergence and prior to the boot stage, when the weeds are less than 4 inches tall.

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Annual weeds and grasses

Product Name (common name in parentheses)	Time of App.	Rate/Acre	MOA	Comments
Cyclone Max (paraquat)* + Atrazine* (atrazine)	Preplant in crop residue	0.7 to 2.7 pt/acre + nonionic surfactant 8- 32 fl oz/100 gal	22 & 5	Use to kill small weeds on beds before planting, or to kill weed seedlings that germinate before crop emerges
Atrazine* (atrazine)	Preemergence	3 to 4.75 pt/A-4L or 1.7 to 2.6 lb/A – 90 DF	5	Use preemergence on clay loam and clay soils in eastern Oklahoma. Do not plant to any other crop for 18 months after application.
Dual II Magnum (metolachlor)	PPI or Preemergence with Concep treated seeds	1.0-1.67 pt/acre	15	Dual will kill sorghum if the seeds have not been treated with safener.
Bicep II Magnum (metolachlor +atrazine*)	Preemergence with Concep treated seeds	1.6 to 2.1 qt/A	5&15	Dual will kill sorghum without the seed treatment protectant. Use only on medium and fine textured soils.
Lasso* (alachlor)	Preemergence with Screen treated seeds	2 to 4 qt/Acre	15	Lasso will kill sorghum if the seeds have not been treated with safener.
Lariat* (alachlor + atrazine*)	Preemergence with Screen treated seeds	2.5 to 4 qt/Acre	5&15	Use only when sorghum seeds have been treated with

				Screen protectant, and use only on soils where it is safe to use atrazine.
Micro-Tech* (alachlor)	Preemerge with safened seeds	1.5 to 2.5 qt/acre maximum of 4 qt/acre	15	Use only safened seed.
Bullet* (alachlor+atrazine)	Preemerge with safened seeds	2.5 to 4 qt/acre maximum of 5 qt/acre	5&15	Use only safened seed.
Paramount (quinclorac)	Postemergence	5.3 to 8 oz/acre	4	Make sure grasses are very small (less than 2")
Diuron 80 DF (diuron)	Late Postemergence	0.5 to 0.75 lb/acre	7	Use as a directed spray only when weeds are less than two inches tall and after crop is 15 inches tall.
Prowl (pendimethalin)	Postemergence Incorporated (Cultispray)	1 to 3 pt/acre	3	Apply after the 4 to 6" growth stage of grain sorghum and incorporate it into the soil.
Treflan (trifluralin)	Postemergence Incorporated	0.75 to 2 pt/acre	3	Apply when sorghum is 8 to 12" tall and incorporate with a sweep-type cultivator or rolling cultivator.

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Johnsongrass

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Roundup Ultra Max (glyphosate) + Touchdown (glyphosate)	Prior to planting	26 to 78 fl oz/acre 1 to 3 qt/acre	9	Spray johnsongrass after it is at least 12 inches high
Roundup Ultra Max (glyphosate) + Touchdown (glyphosate)	Postharvest	26 fl oz/ acre 1 qt/acre	9	Apply after the crop is harvested, according to the label directions.

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Annual Broadleaf weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Aim (carfentrazone-ethyl)	Postemergence	0.33 oz/acre	14	Apply to emerged weeds when sorghum is up to 6 leaf collar growth stage, and weeds are less than 4" tall
2,4-D Amine	Postemergence	0.5 to 0.75 lb/acre	4	Use only after the crop is 6" tall. If applied after the crop is 10" tall use a drop nozzle.
Banvel (dicamba)	Postemergence	0.25 lb/acre 0.5 pt/acre	4	Apply postemergence after sorghum is in the 3 leaf stage, but before it reaches 15".
Ally (metsulfuron) + 2,4-D Amine	Postemergence When grain sorghum is 3 to 15" tall	1/20 oz/acre + ¼ lb ai/acre	2&4	Do not use surfactant or crop oil. Apply when weeds are 6" tall or less, but after emergence.

Atrazine* (atrazine)	Postemergence	2 to 4 pt/acre - 4L or 1.7 to 2.6 lb acre – 90 DF + surfactant	5	Apply to sorghum planted in medium and fine textured soils.
Peak (proflufenoxon)	Postemergence or Preemergence	0.75 to 1.0 oz/acre	2	Refer to label for use of C.O.C and/or N.I.S.

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Annual broadleaf weeds and suppression of some perennial broadleaves

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Marksman (dicamba+ atrazine)	Postemergence	1.5-2.0 pts/acre	4&5	Apply broadcast when sorghum is no higher than 8 inches

* indicates a restricted use product

MOA=Mode of Action

Annual broadleaf weeds and suppression of some perennial broadleaves, and yellow nutsedge

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Permit (halosulfuron)	Postemergence	0.67 oz/acre	2	Refer to label for application timing, use of N.I.S. and recommended tank mixes.

* indicates a restricted use product

MOA=Mode of Action

Susceptible annual broadleaf weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Basagran (bentazon)	Postemergence	0.75 to 1 lb/acre 0.75 to 1 qt/acre	6	Grain sorghum is very tolerant to Basagran, but applications should be made when the weeds are small and actively growing.

* indicates a restricted use product

MOA=Mode of Action

Annual and Perennial broadleaf weeds and grasses

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Aim (carfentrazone-ethyl) + Roundup Ultra Max or Touchdown (glyphosate) + Surfactant	Preplant	0.33 oz/acre 0.25% v/v	14	Apply up to 30 days before planting but before crop emergence to emerged, actively growing weeds.

* indicates a restricted use product

MOA=Mode of Action

Seedling Weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Cyclone Max* (paraquat) + Nonionic Surfactant	Preplant Or Preemergence	0.7 to 2.7 pt/acre + 8 to 32 fl oz/ 100 gal	22	Use to kill small weeds on beds before planting

* indicates a restricted use product

MOA=Mode of Action

Diseases

Disease in sorghum is not a major economic concern in Oklahoma. Although several of these diseases are listed below very few cause a significant decline in crop production.

Head smut

This disease attacks seedlings, but symptoms do not appear until boot or heading stage. Smut galls replace all or part of the entire head. No chemical controls are available.

Controls

Cultural –Crop rotations can reduce the occurrence of head smut

Biological – There are resistant hybrids for this disease.

Chemical – none available

Northern Corn Leaf Blight

This disease occurs during prolonged periods of warm, humid weather. The symptoms include large elliptical spots with tan to gray centers and red-to-purple borders.

Controls

Cultural –Crop rotations along with tillage

Biological – There are resistant hybrids for this disease.

Chemical – None recommended.

Seed rot and Seedling blight

These diseases are more prevalent during or after prolonged periods of cool, wet weather just after planting especially in poorly drained soils. Seedling blight can also occur during periods of hot weather following emergence.

Controls

Cultural – Use of quality seed planting.

Biological – Avoid planting in low pH soils

Chemical – Use metalaxyl to eliminate certain fungi that cause this disease. Avoid using certain herbicides including alachlor, metolachlor and atrazine in low pH soils to reduce severity of seedling blight

Fusarium stalk rot

Symptoms of this disease include the shredding of the internal part of the stalk in the lower internode. The deteriorated inner stalk tissue can range in color from tan to salmon to dark red.

Controls

Cultural – Avoid continuous cropping, high nitrogen and potassium levels, and high plant populations. Control insects and diseases to prevent leaf area losses.

Biological – Plant resistant hybrids

Chemical – None recommended.

Charcoal rot

Symptoms of this disease include the shredding of the internal part of the stalk in the lower internode. Numerous small, black fruiting structures called sclerotia can be found attached to the vascular strands giving the interior of the stalks a blackened appearance.

Controls

Cultural – Avoid drought stress by reducing plant populations.

Biological – Plant late-maturing hybrids

Chemical – None recommended.

Maize dwarf mosaic virus and Sugarcane mosaic virus

These diseases are primarily transmitted by the greenbug and corn leaf aphid. Maize dwarf mosaic virus overwinters in Johnson grass. The initial symptoms consist of a yellowish-green mosaic pattern in the whorl leaves.

Controls

Cultural – Avoid drought stress by reducing plant populations. Control johnsongrass populations.

Biological – Plant hybrids resistant to the red leaf phase of the disease.

Chemical – None recommended.

Zonate leaf spot

This disease appears on sorghum leaves as circular, reddish purple bands alternating with straw-colored or tan areas. High humidity helps promote this disease.

Controls

Cultural – Crop rotation combined with tillage to eliminate surface residues

Biological – Plant high yielding resistant hybrids

Chemical – None recommended.

Rust

Rust is favored by warm, wet weather and occasionally can cause economic yield loss. Symptoms consist of small brown blister-like pustules that can form on both the upper and lower leaf surfaces.

Controls

Cultural – Not a common disease that occurs frequently. Crop Rotation could be an option.

Biological – Plant resistant hybrids

Chemical – None recommended.

Sorghum downy mildew

Symptoms consist of leaves with bright green and white strips in late spring or early summer. Later in the season, leaves are shredded by wind until most of the veins are separated. Heads are partially or completely sterile.

Controls

Cultural – Avoid planting sorghum after sudan grass. Use crop rotation

Biological – Plant resistant hybrids

Chemical – Treat seed with metalaxyl.

Crazy top downy mildew

Occurs in heavy or poorly drained soils, and infects young seedlings during periods of flooding within two weeks of emergence. Infected plants exhibit thick, stiff, twisted, yellow leaves. Diseased plants either do not produce heads or produce a leafy structure in place of the head.

Controls

Cultural – Avoid wet areas of the field where the disease has been a problem in the past.

Biological – Plant resistant hybrids

Chemical – Treat seed with metalaxyl or mefenoxam

Sorghum ergot

This disease causes a mass of white fungal mycelia known as a sphacelium to replace the seed. Also a sweet sticky discharge known as honeydew will drip from the head onto the leaves or soil and produces a white, powdery mass of conidia when moist conditions are present.

Controls

Cultural – Avoid late planting

Biological – Avoid planting male-sterile forages or hybrids with cold sterility problems

Chemical – None recommended.

Gray leaf spot

This disease usually occurs late in the growing season. Symptoms include leaf lesions that are either tan or purple in color.

Controls

Cultural – Use crop rotation

Biological – Plant resistant hybrids.

Chemical – None recommended.

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