

Herbicides for Grain Sorghum

This publication primarily concerns chemical weed control. It is not intended to imply that cultivation or other non-chemical weed management techniques, particularly in row crops, are undesirable. One or two cultivations can greatly improve weed control.

Weed Response to Selected Grain Sorghum Herbicides When Applied According to Label Directions¹

Herbicide(s)	Crop tolerance	Annual grasses							Annual broadleaf weeds											Perennials		
		Barnyardgrass	Crabgrass	Fall panicum	Foxtail	Longspine sandbur	Shattercane	Witchgrass	Eastern black nightshade	Cocklebur	Devilsclaw	Jimsonweed	Kochia	Lambsquarters	Morningglory	Pigweed	Puncturevine	Common ragweed	Sunflower		Velvetleaf	Venice mallow
PREPLANT OR PREEMERGENCE																						
Atrazine	G-E	F	F	—	F	—	—	F	G-E	F	—	F	G ²	G	G	G-E ²	—	F	F	F	F	—
Bicep II Magnum ³	G-E	G-E	E	G-E	E	F-G	P	G-E	G-E	F	F	F	F	G	F	G-E	—	F	F	F	F	—
Bicep Lite II Magnum ³	G-E	G-E	E	G-E	E	F-G	P	G-E	G-E	F	F	F	F	G	F	G	—	F	F	P	F	—
Degree Xtra, ³ Fultime NXT	G-E	E	E	E	E	F-G	F	E	G-E	F	—	F	F-G	G	F	E	—	F	F	F-P	F	—
Dual II Magnum ³ and other S-metolachlor	G-E	G-E	G-E	G-E	F-G	P	G		G	—	—	—	—	—	—	G	—	—	—	—	—	—
ImiFlex (<i>igrowth sorghum only</i>)	E	E	G	G	E	P-F	—	—	E	E	G	F	G ²	G	G	E ³	E	G	E ²	G-E	—	F
Lumax EZ, ³ Lexar EZ, ³ Helmet Maxx	G	E	E	E	E	F-G	P	E	E	G	E	E	E	G-E	F-G	E	G	G	G	E	E	—
Mesotrione	G	—	F	—	—	—	—	—	E	G	—	E	G	E	F-G	E	G-E	G	F	E	—	—
Outlook, ³ Slider	G-E	G-E	G-E	G-E	G-E	F-G	P	G	E	—	—	—	—	F	—	G	—	—	—	—	—	—
Sharpen	G	—	—	—	—	—	—	—	G	G	P	G	G	G	G	G	G	G	G	G	G	—
Verdict	G	G	G-E	G	G-E	F	P	G	G-E	G	—	—	G	G	G	G	G	G	G	G	G	—
Zemax and Coyote	G	E	E	E	E	F-G	P	E	G	G	G	G	G	G	F	E	G	G	F	G	G	—

¹Weed response ratings refer to application according to label directions and with favorable growing conditions: E = Excellent, G = Good, F = Fair, P = Poor, and — = weed not listed on the herbicide label.

²Except for resistant weed populations.

³Apply only if field is planted with **Concep-treated sorghum seed**.

Caution: Phorate (Thimet), when applied separately on sandy and silt loam soils with preemergent herbicides commonly used on sorghum, may reduce crop stands. We do not know what causes the adverse interaction.

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POSTEMERGENCE																						
Aim	G	—	—	—	—	—	—	—	E	F	F	F	F	E	F-G	G	F	F	F	G-E	G	F
Ally + 2,4-D	F	—	—	—	—	—	—	—	—	—	—	—	G ²	E	E	G ²	E	G-E	G-E	E	—	F
Atrazine	G	P	F	—	G	P	P	P	G-E	G	G	G	G-E ²	E	G	E ²	F-G	G	G	G	G	—
Broclean, Buctril, Moxy, Bromox	G	—	—	—	—	—	—	—	E	G-E	—	G	F-G	G	F-G	F	G	G	G	G	G	—
Brozine, Buctril + Atrazine	G	—	—	—	—	—	—	—	E	E	—	E	G-E	E	G-E	G	G-E	G-E	E	G-E	E	—
Dicamba	F	—	—	—	—	—	—	—	G	G-E	—	F	G-E	G	G-E	G	—	G	G	F-G	F	F
Facet L, Quinstar 4L, Quinstar GT	G	F	F	F	G	—	—	F	—	—	—	—	F	F	G	—	—	F	F	F	—	G-E
FirstAct (<i>DoubleTeam sorghum only</i>)	E	G-E	G-E	E	E	G-E	—	G-E	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Huskie ²	G	—	—	—	—	—	—	—	E	E	E	—	G	E	E	G-E	—	E	E	E	E	—
ImiFlex (<i>igrowth sorghum only</i>)	E	G	E	G	E	P-F	—	F	E	E	F	F	G ²	G	G	E ²	G	G	E ²	G-E	—	F
Kochiavore	P	—	—	—	—	—	—	—	G-E	E	E	G-E	E	E	E	G-E	G	E	E	G	G	F
Peak	E	—	—	—	—	—	—	—	F	E	E	G	G ²	G	F	G ²	G-E	E	E	E	E	F
Permit	G	—	—	—	—	—	—	—	—	E	—	—	G ²	F	P	F ²	G	E	E	G-E	G	—
RangeStar, Brash, WeedMaster, Outlaw, Latigo	P-F	—	—	—	—	—	—	—	G	G-E	E	F-G	G-E	E	E	G	G	G-E	G-E	G	G	F
Starane NXT	F	—	—	—	—	—	—	—	E	E	F	G	E	G	E	F	G	E	E	G	G	F-G
Starane Ultra	F-G	—	—	—	—	—	—	—	F	G	—	—	E	P	E	P	G	E	G	G	G	F-G
Yukon	F-G	—	—	—	—	—	—	—	G	E	—	F-G	G	G	G	G	G	E	G-E	F-G	—	—
Zest WDG (<i>Inzen sorghum only</i>)	F-G	G-E	F	G	G-E	F-G	—	G	—	—	—	G	—	—	F	F-G ²	—	—	—	—	—	—
2,4-D	P	—	—	—	—	—	—	—	G	E	E	G	G	E	E	G	G	G-E	E	G	G	F

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Herbicides for Grain Sorghum

Before using products containing atrazine, you may consult the Atrazine Watershed Information Center (AWIC) to determine whether the use of atrazine is prohibited in your watershed. The AWIC can be accessed by calling 1-866-365-3014.

Atrazine Rate Limitations

All atrazine uses on cropland must conform to the maximum rate limits shown below. The “Precautionary Statements” on atrazine labels indicate required setbacks from all wells, streams, ponds, or other water sources.

For Wheat Stubble Applications in Wheat-Sorghum-Fallow Rotations

Apply a maximum of 2.25 lb ai/a to stubble ground following wheat harvest. Treat only once during same fallow period. See “Chemical Fallow” section of atrazine label for additional instructions.

For Soil Applications in Spring, Before Crop Emergence

On highly erodible soils (as defined by the Natural Resources Conservation Service)

If plant residue cover at planting is 30% or more, apply a maximum of 2 lb ai/a as a broadcast spray.

If soil coverage is less than 30% at planting, apply a maximum of 1.6 lb ai/a.

On soils not highly erodible

Apply a maximum of 2 lb ai/a as a broadcast spray.

For Postemergence Applications

If no atrazine was applied before sorghum emergence, apply a maximum of 2 lb ai/a broadcast. If a postemergence treatment is required following an earlier herbicide application, the total atrazine applied may not exceed 2.5 lb ai/a per calendar year. Postemergence applications over 1 lb ai/a are not considered best management practices. Runoff loss potential is very high from mid-April through July.

Practices to Reduce Atrazine Losses in Surface Water Runoff in Central and Eastern Kansas

Sorghum producers who no-till plant should consider split applications of herbicides. The highest atrazine losses occur when intense rain storms follow atrazine application to high-residue, wet soils.

Sorghum producers who till before planting should consider preplant incorporation of atrazine and companion herbicides such as Dual II Magnum, Outlook, and Warrant. Mechanically incorporating these herbicides in the top 2 inches of soil reduces atrazine losses in runoff by about two-thirds. Soil incorporation can be done with field cultivators, finishing disks, or spring tooth harrows at any time within 14 days before planting. Harrow attachments are recommended for the incorporation implement to avoid streaking. At planting, avoid furrowing that could move herbicide-treated soil out of the crop row.

Reduced-rate atrazine approaches for sorghum. Some soil-applied formulations, such as Bicep Lite II Magnum and Keystone LA NXT, contain a lower proportion of atrazine than other formulations, such as Bicep II Magnum and Degree Xtra. Also, banding preemergence herbicides reduces the amount applied per acre by one-half to two-thirds. Postemergence herbicides such as Buctril + atrazine, dicamba + atrazine, and many postemergence tank mixtures contain only about 0.5 lb ai/a atrazine still provide good control of tough broadleaf weeds such as velvetleaf, cocklebur, pigweeds, morningglory, and sunflower.

Non-atrazine alternatives for sorghum. Peak, Permit, and Ally XP are sulfonyleurea herbicides for weed control in sorghum. They often are tank-mixed with dicamba or 2,4-D. Huskie also can be used without atrazine. All of the non-atrazine herbicides discussed are less effective when applied without atrazine. Verdict can be applied before sorghum emergence.

Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
0.5 to 2 pt of 4 lb/gal 2,4-D LVE	2,4-D LVE (4) 0.25 to 1	No-till: Low volatile esters are preferred over amine formulations as components of preplant burndown applications. They are more effective in controlling weeds and are less water soluble than amine salts. These factors help reduce potential for crop injury. Sorghum can be injured by carryover from preplant 2,4-D. Observe the rate guidelines and preplant waiting periods on product labels. Including 2,4-D in the burndown mixture helps control winter annual weeds such as dandelion, prickly lettuce, horseweed, and evening primrose and early spring-germinating weeds such as ragweed and lambsquarters.
0.5 to 1 fl oz Aim EC or Longbow EC	Carfentrazone (14) 0.008 to 0.016 or 2 lb/gallon	No-till: Can be applied alone or with other herbicides in fallow and preplant burndown applications to control or suppress annual broadleaf weeds. Combine with glyphosate, paraquat, or atrazine to broaden the burndown spectrum. Apply with NIS or COC. Aim is a contact herbicide requiring thorough spray coverage of the foliage. Do not exceed 1 fl oz/a per season for all fallow, preplant, or in-crop applications to sorghum.
1.6 to 2 qt Atrazine 4L or 1.8 to 2.2 lb Atrazine 90DF	Atrazine (5) 1.6 or 2	A restricted-use pesticide. It can injure sorghum on calcareous soils. Controls small-seeded broadleaf weeds best and suppresses annual grasses and large-seeded broadleaf weeds. Preplant incorporate or apply after planting but before sorghum emerges. In sensitive watersheds, atrazine best management practices suggest that soil surface applications at sorghum planting time should not exceed 1 lb/a because of high potential for runoff losses. Do not use on coarse-textured soils or other soils with less than 1% organic matter. Choice of rotational crops depends on atrazine rate, soil pH, and time of application. Follow atrazine rate limits and label directions. No-till: Atrazine can be applied to Kansas row-crop stubble from fall harvest to December 31 to control winter annual weeds and reduce the need for burndown herbicide application or preplant tillage in spring on fields to be planted to sorghum. Apply with COC to enhance foliar activity. Tank mixing with 2,4-D LVE and/or dicamba enhances control of dandelion and other broadleaf winter annual weeds. Can be tank-mixed with Gramoxone SL to enhance control of cheat, downy brome, and Japanese brome. For highly erodible soils with less than 30% plant residue cover, limit fall application to a maximum of 1.6 lb. Total atrazine applications must not exceed 2.5 lb/a per calendar year. Do not apply to frozen ground or where soil surface conditions favor wind erosion. Do not plant any crops except corn, grain sorghum, or forage sorghum in the following spring. Follow directions on 24(c) Special Local Need label for Kansas.
1.6 to 2.1 qt Bicep II Magnum	S-metolachlor (15) + Atrazine (5) 0.96 to 1.26 + 1.24 to 1.6	These are formulated mixtures of 3.1 lb of atrazine (a restricted-use herbicide) and 2.4 lb of S-metolachlor/gal. Apply preplant and incorporate into the top 2 inches of soil before planting, or apply after planting but before sorghum or weeds emerge. In sensitive watersheds, atrazine best management practices suggest that soil surface applications at sorghum planting time should not exceed 1 lb/a because of high potential for runoff losses. For a tank mix of Dual II Magnum and atrazine, follow directions on the Dual II Magnum label. Can injure sorghum on calcareous soils and should not be used on coarse-textured soils or other soils with less than 1% organic matter. The benoxacor safener in these products is specific to corn and does not safen these herbicides for use on sorghum. Use only Concep-safened forage or grain sorghum seed. Do not apply to acres treated with propazine. No-till: Apply two-thirds of the recommended rate as a split treatment 30 to 45 days before planting and the remainder at planting. From 15 to 30 days preplant, a split application is preferred because it increases the chances of satisfactory activation by rainfall, but a single application is permissible. Can be tank-mixed with paraquat or glyphosate.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.

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Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
1.1 to 1.5 qt Bicep Lite II Magnum	S-metolachlor (15) + Atrazine (5) 0.92 to 1.25 + 0.73 to 1	These are formulated mixtures of 3.1 lb atrazine (a restricted-use herbicide) and 2.4 lb S-metolachlor/gal. Apply preplant and incorporate into the top 2 inches of soil before planting, or apply after planting but before sorghum or weeds emerge. In sensitive watersheds, atrazine best management practices suggest that soil surface applications at sorghum planting time should not exceed 1 lb/a because of high potential for runoff losses. For a tank mix of Dual II Magnum and atrazine, follow directions on the Dual II Magnum label. Can injure sorghum on calcareous soils and should not be used on coarse-textured soils or other soils with less than 1% organic matter. The benoxacor safener in these products is specific to corn and does not safen these herbicides for use on sorghum. Use only Concep-safened forage or grain sorghum seed. Do not apply to acres treated with propazine. No-till: Apply two-thirds of the recommended rate as a split treatment 30 to 45 days before planting and the remainder at planting. From 15 to 30 days preplant, a split application is preferred because it increases the chances of satisfactory activation by rainfall, but a single application is permissible. Can be tank-mixed with paraquat or glyphosate.
6 to 6.4 oz Callisto, Explorer, Incinerate, Motif, or Mesotrione	Mesotrione (27) 0.188 to 0.2	Apply preplant unincorporated from 21 days before planting until prior to sorghum emergence for residual broadleaf weed control. If emerged weeds are present at the time of application, add NIS or COC. Tank-mix with atrazine and/or group 15 herbicides labeled for use on sorghum for improved activity and residual weed control. Do not apply to coarse textured soils. Do not use on forage sorghum, sudangrass, or dual purpose sorghum.
20 to 24 fl oz Callisto Xtra	Mesotrione (27) + Atrazine (5) 0.078 to 0.094 + 0.5 to 0.6	Controls broadleaf weeds in all types of corn after crop emergence by before corn exceeds 12 inches in height. Use higher rates for extended residual control. Add NIS (0.25% v/v), COC (1% v/v), or MSO (1% v/v) to control emerged weeds. AMS (8.5 to 17 lb/100 gallons) may also be added. Do not plant small grains for 4 months; alfalfa, canola, cotton, soybeans, or sunflowers for 10 months.
2 to 3.7 qt Degree Xtra or Fultime NXT	Acetochlor (15) + Atrazine (5) 1.35 to 2.5 + 0.67 to 1.24	Degree Xtra and Fultime NXT are restricted-use herbicides. May be applied preplant incorporated, preplant surface, preemergence surface, or postemergence surface to grain sorghum (grain sorghum is a supplemental label and must use safened seed). The rate used in sorghum is dependent on soil texture and organic matter. If atrazine has been used early preplant, do not exceed a total of 2.5 lb atrazine active ingredient per calendar year. When applied to sorghum planted in alkali, eroded, or calcareous soils, crop injury may result. May be applied postemergence to sorghum up to 11 inches tall. Must be applied preemergence to emerging seedling grasses for adequate control.
up to 1 pt Dicamba	Dicamba (4) up to 0.5	No-till: Apply up to 0.5 lb/a in fall for control of winter annual weeds. In spring, may apply up to 0.25 lb if applied at least 10 days before sorghum planting. Especially helpful to control certain weeds not very susceptible to 2,4-D and glyphosate, such as chickweed, smartweed, wild buckwheat, kochia, and Russian thistle. The addition of AMS to a spray mixture containing dicamba will increase the risk of volatility of dicamba and mitigate the benefits of lower volatility formulations.
0.5 pt Dicamba + 1 qt of 4 lb/gal 2,4-D or 1 qt Range Star, Brash, or WeedMaster	Dicamba (4) + 2,4-D* (4) 0.25 + 1 amine or LVE	No-till: For control of established alfalfa and annual weeds, apply when alfalfa regrowth is 6 to 8 inches tall and growing actively. Most effective if applied to alfalfa regrowth in fall. If alfalfa escapes occur, apply only dicamba at rate recommended on label after sorghum emerges. Do not apply less than 15 days before planting sorghum.
1 to 1.66 pt Dual II Magnum, Cinch, Charger Max, or EverpreX	S-metolachlor (15) 1 to 1.6	Controls most annual grasses and small-seeded broadleaf weeds. Apply preplant and incorporate into the top 2 inches of soil, or apply after planting but before sorghum or weeds emerge. The benoxacor safener in these products is specific to corn and does not safen these herbicides for use on sorghum. Plant only Concep-safened forage or grain sorghum seed. Small grains can be planted 4.5 months after treatment.

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Herbicides for Grain Sorghum

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BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
2.5 to 3.75 qt Expert	S-metolachlor (15) + Atrazine (5) + Glyphosate (9) 1.1 to 1.6 + 1.3 to 2 + 0.47 to 0.70	No-till: This premix contains the active ingredients of Bicep Magnum (a restricted-use pesticide) and glyphosate. Use before crop emergence as a burndown when weeds are present. Use only on sorghum with Concep seed treatment.
22 fl oz Facet L or 0.5 to 0.75 pt Quinstar 4L or 5.3 oz Quinstar GT	Quinclorac (4) 0.24 to 0.36	Facet L, Quinstar 4L, or Quinstar GT may be applied preplant or postplant preemergence to grain sorghum for control of annual grass and broadleaf weeds. The addition of atrazine at 0.5 to 1 lb will enhance the spectrum of broadleaf weed control. If 2,4-D or dicamba are added to the mix, follow the most restrictive plantback restrictions.
Glyphosate (see glyphosate table)	Glyphosate (9)	No-till: Use to control annual weeds up to 6 inches tall and some perennial weeds in fallow fields or before sorghum emergence. Application in 3 to 10 gal/a spray is more effective than in higher gallonage. Condition spray water with 1 to 2%, by weight, of spray-grade AMS (9 to 17 lb/100 gal water) before adding glyphosate products to the tank. Some glyphosate products contain little or no adjuvant, so check label requirements carefully. Dust on plants can decrease performance. Usually applied with 2,4-D or dicamba to enhance control of broadleaf species.
2 to 4 pt Gramoxone SL 2.0 or 1.3 to 2.7 pt Gramoxone SL 3.0	Paraquat (22) 0.5 to 1.0	No-till: Gramoxone SL is a formulation designed to reduce the amount of paraquat absorbed after accidental ingestion. Paraquat can only be handled and applied by certified individuals. Paraquat is a nonselective, nonresidual contact herbicide often used for preplant burndown of weeds. Apply in clean water or clear fertilizer solutions to thoroughly cover actively growing annual weeds 1 to 6 inches tall. Rate depends on weed size. Dust on plants reduces paraquat activity, but application with atrazine and/or nitrogen carrier enhances activity. Adjuvants are required for good performance. Use NIS at 0.25% v/v (1 qt/100 gal) when applying with atrazine in nitrogen fertilizer carrier. For all other applications, use either COC at 1% v/v or NIS.
4 to 6 pt Halex GT	S-metolachlor (15) + Mesotrione (27) + Glyphosate (9) 1.05 to 1.57 + 0.105 to 0.157 + 1.05 to 1.57	Halex GT may be applied from 21 days prior to planting to post planting but prior to sorghum emergence. Sorghum seed must be Concep III treated. Halex GT may be applied as a split application with the first application being made to the soil surface not incorporated and the second application being made post plant preemergence to the sorghum. The total maximum use rate of Halex GT is 6 pt. Do not apply to sorghum that has emerged as Halex GT will cause crop death. If weeds are emerged, Halex GT should be applied with NIS at 0.25 to 0.5% v/v and spray grade AMS at 8.5 to 17 lb/100 gal of spray solution. Do not apply to sorghum grown on sandy soils (sand, sandy loam, or loamy sand). Do not use in production of forage sorghum, sweet sorghum, sudangrass, sorghum-sudan hybrids, or dual purpose sorghum.

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BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
6 to 9 fl oz ImiFlex	Imazamox (2) 0.047 – 0.072 lb ae/a	Apply ImiFlex only to igrowth grain or forage sorghum. Conventional and non-igrowth sorghum will be killed if treated with ImiFlex. ImiFlex may be applied pre-emergence or post-emergence and has broad-spectrum activity on grass and broadleaf weeds. Activity of ImiFlex is optimized when it is included in a comprehensive weed control program. For pre-emergence applications apply ImiFlex at a rate of 6 to 9 fl oz/a. ImiFlex may be applied post-emergence at 6 fl oz/a. Growers are limited to 1 application of ImiFlex/year to igrowth sorghum. ImiFlex has a wide application window and may be applied pre-emergence up to 20 inches in crop height. ImiFlex has residual soil activity in addition to post-emergence activity. ImiFlex has flexible tank mix capabilities, and can be mixed with many of the traditional products used in sorghum production, such as <i>S</i> -metolachlor, Atrazine, Dicamba, 2,4-D, Mesotrione, etc. For pre-emergence applications, apply ImiFlex in conjunction with a Group 15 chemistry, such as <i>S</i> -metolachlor, before or shortly after planting but prior to weed germination. Always use sorghum seed treated with a safener when utilizing a Group 15 chemistry. Post-emergence applications of ImiFlex should be preceded by a Group 15 chemistry and target weeds that are less than 2 to 3 inches in height. Post-emergence applications of ImiFlex are optimized with a COC or MSO at 1-2% v/v and a Nitrogen source – use either AMS at 12 to 15 lb/100 gal of spray solution or UAN at 2.5% v/v. In arid conditions or when targeting weeds that are stressed, use MSO at 2% v/v and UAN at 5% v/v or AMS at 20 lb/100 gal of spray solution. Stronger adjuvant packages can increase the possibility of crop response. For applications of ImiFlex made with auxin chemistries such as 2,4-D or dicamba, do not use an oil-based adjuvant, instead utilize a high-quality NIS at 0.25% v/v. Do not tank mix ImiFlex with Huskie, Peak, or Ally Herbicides. Applications of ImiFlex to igrowth sorghum will generally not interfere with traditional sorghum rotations, as these plantback intervals are anytime to soybeans and any Clearfield crop, 3 months to alfalfa, 8.5 months to corn, 9 months to cotton, and 3 months to wheat as long as certain soil pH and rainfall/irrigation parameters are met. ImiFlex has a 0-day pre-harvest interval and no feeding restrictions for igrowth grain or forage sorghum. Refer to the product label for a complete list of rotational intervals and regional differences. Contact your local UPL representative or visit sorghumpotential.com for proper stewardship guidelines and more information.
3 qt Lexar EZ	<i>S</i> -metolachlor (15) + Atrazine (5) + Mesotrione (27) 1.3 + 1.3 + 0.17	Can be applied preplant nonincorporated from 21 days before planting through preemergence in sorghum for which the seed has been treated with Concep III. Applying Lexar EZ less than 7 days before planting may increase the risk of crop injury. Lexar may be applied in a split application to grain sorghum. Apply 1.5 to 1.75 qt of Lexar EZ early preplant nonincorporated followed by 1.25 to 1.5 qt prior to sorghum emergence. Do not apply more than 3 qt Lexar EZ total in the split applications. Do not apply to sandy soils including sand, sandy loam, or loamy sand. Do not apply to emerged sorghum. Do not use on forage sorghum, sweet sorghum, sudangrass, or any dual-purpose sorghum. Do not apply to acres treated with propazine.
2.7 qt Lumax EZ	<i>S</i> -metolachlor (15) + Atrazine (5) + Mesotrione (27) 1.68 + 0.63 + 0.168	Can be applied preplant nonincorporated (up to 21 days before planting) up through planting but prior to sorghum emergence. Plant Concep-treated seed only. Applying Lumax EZ less than 7 days before planting will increase the risk of crop injury. Lumax EZ also may be applied as a split application to grain sorghum. Apply Lumax EZ at 1.35 qt/a as a nonincorporated early preplant application (7 to 21 days before planting) followed by a second application of 1.35 qt/a preemergence prior to sorghum emergence. The total amount of Lumax EZ cannot exceed 2.7 qt/a. Do not apply to sandy soils (sand, sandy loam, or loamy sand). Do not apply to emerged grain sorghum. Do not use on forage sorghum, sweet sorghum, sudangrass, or any dual-purpose sorghum. Do not apply to acres treated with propazine.
1 to 1.67 pt Me-Too-Lachlor II, Parallel, Parallel PCS, Helmet, or Stalwart	Metolachlor (15) 0.98 to 1.67	For use on grain or forage sorghum planted using safened seed. Controls annual grasses and small seeded broadleaf weeds. May be applied early preplant (see label for specific timing, rate, and soil restrictions) or preplant-incorporated or preemergence using 1 to 1.33 pt on coarse soils, 1.33 to 1.5 pt on medium soils, or 1.33 to 1.67 pt on fine soils. Research indicates that metolachlor formulations have approximately 1/3 less herbicidal activity than <i>S</i> -metolachlor formulations when equal rates are compared.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.

Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
12 to 21 oz Outlook	Dimethenamid-P (15) 0.6 to 1.0	Controls most annual grasses and small-seeded broadleaf weeds. For best weed control with Outlook, use 14 oz/a in coarse-textured soil, and use 18 oz/a for medium soils with less than 3% organic matter. Apply within 2 weeks before planting and shallowly incorporate, or apply after planting up to grain sorghum emergence. Use only Concep-safened grain sorghum seed. Not registered for use on forage sorghum. Grain sorghum treated with Outlook may be grazed or fed to livestock 60 days after treatment. Fall cereals can be planted after 4 months.
0.5 to 1 oz Peak	Prosulfuron (2) 0.018 to 0.036	In Kansas and Nebraska only, Peak can be applied after planting but before weed or sorghum emergence. See label for precautions. If applying with Dual II Magnum or Bicep Lite II Magnum, plant only Concep-treated seed. Preemergence application gives less control of velvetleaf, common cocklebur, and morningglory than postemergence application. No restrictions for rotation to wheat. Refer to most recent label before rotating Peak-treated fields to soybean in the next year. Do not rotate to sunflower for 24 months.
2.4 to 4 pt Sequence	S-metolachlor (15) + Glyphosate (9) 0.94 to 1.5 + 0.70 to 1.125	Sequence is a premix of 3 lb S-metolachlor (Dual II Magnum) and 2.25 lb ae glyphosate and may be applied to all Concep-treated sorghum before, during, or after planting but before sorghum emerges. Apply with 8.5 to 17 lb AMS/100 gal spray solution to enhance foliar activity of the glyphosate on emerged weeds. The Dual II Magnum component will provide early season residual of annual grasses and some small seeded broadleaf weeds; however, Sequence may be applied with a few different tank mix partners listed on the label to broaden the spectrum of weeds controlled. Do not exceed 3.5 pt when used on coarse-textured soils, 3.75 pt on medium soils with less than 3% organic matter, or 4 pt on all other soils. No-till: Formulation of 2.25 lb ae glyphosate and 3 lb S-metolachlor/gal. Apply preplant to preemergence as burndown before crop emergence. Use only on sorghum with Concep seed treatment.
1 to 2 fl oz Sharpen	Saflufenacil (14) 0.022 to 0.044	Sharpen can be applied preplant surface, preplant incorporated, or preemergence to grain sorghum. Do not apply to sorghum that has emerged, or significant crop injury may result. Sharpen has excellent burndown activity of broadleaf weeds and should be applied with MSO at 1% v/v (minimum of 1 pt/a) plus AMS 8.5 to 17 lb/100 gal or liquid nitrogen at 1.25 to 2.5 gal/100 gal. Sharpen may be tank-mixed or applied sequentially with but not exclusively with Clarity, Outlook, atrazine, or glyphosate. Sorghum forage can be harvested, fed, or grazed 70 days or more after application. Sequential applications with Sharpen or Verdict require 14 days between applications. Do not apply more than 0.111 lb/a saflufenacil per cropping season. Do not use if organophosphate or carbamate insecticides were used at planting.
2 to 3 oz Valor SX, Outflank, Panther, or Tuscany or 2 to 3 fl oz Panther SC or Tuscany SC	Flumioxazin (14) 0.064 to 0.096	Apply flumioxazin to the soil surface at least 30 days before planting sorghum. A minimum of 1 inch of precipitation must be received between application and planting. Tank mix with glyphosate, dicamba, or 2,4-D to control emerged weeds. Flumioxazin can be tank-mixed with atrazine to broaden the spectrum of weed control. Controls several broadleaf weeds including pigweed species. Do not rotate to wheat for 1 month, or to alfalfa or oats for 8 months.
10 fl oz Verdict	Saflufenacil (14) + Dimethenamid-P (15) 0.044 + 0.39	Apply Verdict with additional Outlook for enhanced residual control. The addition of atrazine is required for full-season broad-spectrum weed control. Applications may be made preplant surface or preplant incorporated up to 14 days before planting or preemergence surface after planting. Do not treat emerged sorghum, as severe crop injury may result. When Verdict is used to burndown emerged broadleaf weeds, it must be applied with MSO at 1% v/v (minimum of 1 pt/a) plus AMS at 8.5 to 17 lb/100 gal spray solution or liquid nitrogen 1.25 to 2.5 gal/100 gal. Sequential applications with Sharpen or Verdict require 14 days between applications. Do not apply more than 0.111 lb ai/a per cropping season. Do not use Verdict if organophosphate or carbamate insecticides have been used at planting. Use Concep-safened sorghum seed.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.

Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
BURNDOWN, PREPLANT, AND/OR PREEMERGENCE		
1.5 to 3 qt Warrant	Acetochlor (15) 1.13 to 2.25	Warrant may be applied preplant incorporated or preemergence surface to forage or grain sorghum. Must use safened seed. Use 1.5 to 2.25 qt on coarse or medium textured soils with less than 3% organic matter or 2 to 3 qt on these soil textures with greater than 3% organic matter. Apply 1.5 to 2.5 qt on fine textured soils with less than 3% or 2.25 to 3 qt with greater than 3% organic matter. See postemergence section for Warrant postemergence applications. Do not graze or feed treated forage to livestock for 60 days following application.
2 qt Zemax or Coyote	<i>S</i> -metolachlor (15) + Mesotrione (27) 1.67 + 0.165	May be applied preplant up to 21 days before planting and preemergence to grain sorghum for grass and broadleaf weed control. Sorghum must be treated with a safener (e.g., Concep III) that provides tolerance to <i>S</i> -metolachlor. Zemax applied 7 to 21 days before planting will reduce the risk of crop injury. Zemax may be applied as a split application with 1 to 1.25 qt/a 7 to 21 days before planting and 0.75 to 1 qt/a as a preemergence application not to exceed 2 qt/a. If weeds are present at the time of application COC at 1% v/v or NIS at 0.25% v/v + UAN or AMS should be added to enhance burn down activity of the emerged weeds. Do not apply Zemax to sorghum grown on sand, sandy loam, or loamy sand soils. Do not apply postemergence to grain sorghum. Do not use on forage sorghum, sweet sorghum, sudangrass, sorghum-sudan hybrids, or dual-purpose sorghum. Cereal crops (wheat, rye, barley, and oats) may be planted 4.5 months following application. Soybeans may be planted the following spring. All corns or Concep treated sorghum may be planted anytime.
POSTEMERGENCE		
0.67 to 1 pt 2,4-D amine or 0.5 to 1 pt 2,4-D LV4	2,4-D (4) 0.33 to 0.5 amine or mixed amine, or 0.25 to 0.5 LVE	Numerous formulations of 2,4-D are available. Weedar 64 contains 3.8 lb/gal dimethylamine salt. Savage is a dry soluble formulation containing 95% dimethylamine salt. Weedone 638, Weedone LV4, and Weedone LV6 contain 2.8 lb, 3.8 lb, and 5.7 lb/gal, respectively, of the butoxyethyl ester. Hi-Dep contains 3.8 lb/gal of the dimethylamine and diethanolamine (mixed amine) salts. Salvo and SEE 2,4-D LV4 contain 5 lb and 3.8 lb/gal, respectively, of iso-octyl ester. Application rates, spray volumes, and timings differ with company and formulation. 2,4-D controls or suppresses annual and perennial broadleaf weeds. Most sorghum hybrids are injured by 2,4-D. High relative humidity and air temperature increase potential for sorghum injury. Sorghum is most tolerant to 2,4-D when 5 to 10 inches tall. Even then, expect crop response in the form of rolled leaves and brittle, spreading stems and tillers. When crop is more than 8 inches tall, use drop nozzles to reduce spray deposition on sorghum leaves. Do not apply during boot, flowering, or early dough stages. Very low rates of 2,4-D in combination with other postemergence herbicides are much safer to sorghum than higher rates of 2,4-D used alone. Yield-reducing sorghum injury can occur from over-the-top application rates as low as 0.125 lb and is common for rates of 0.25 lb and up. Producers should weigh potential sorghum injury from 2,4-D against potential loss of sorghum yield from weed competition.
0.5 fl oz Aim EC or Longbow EC	Carfentrazone (14) 0.0074 or 2 lb/gallon	Helps control black nightshade, lambsquarter, pigweeds, and morningglory when applied to actively growing plants 1 to 4 inches tall and velvetleaf up to 18 inches tall. Can be applied to grain sorghum from 4 inches tall to prior to boot stage. Always apply with NIS at 0.25% v/v. Application with COC may cause excessive sorghum leaf burn and is not recommended. Avoid spraying under high-moisture conditions (heavy dew, rain). Can be tank-mixed with other postemergence sorghum herbicides to broaden the weed spectrum and increase the level of control. For tank mixes, follow application and rotation guidelines of the more restrictive partner. Aim is a contact herbicide requiring thorough and uniform spray coverage. Any crop can be planted after 30 days following application.
0.05 oz Ally XP or Accurate + 1/2 pt 2,4-D amine	Metsulfuron (2) + 2,4-D amine (4) 0.002 + 0.25	Broadcast apply to grain sorghum 3 to 10 inches in height. May be applied with drop nozzles to sorghum up to 15 inches tall, but only before the boot stage. Controls pigweeds, puncturevine, and velvetleaf less than 6 inches tall. Do not use surfactant or crop oil. May be ground or aerial applied. Prior cultivation to cover sorghum brace roots is recommended to minimize injury from 2,4-D.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.

Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
POSTEMERGENCE		
1.2 to 2 qt Atrazine 4L or 1.3 to 2.2 lb Atrazine 90DF	Atrazine (5) 1.2 to 2	A restricted-use pesticide. It can injure sorghum on calcareous soils. Controls broadleaf weeds more effectively than grasses. The 2 lb/a rate is permissible only when no atrazine was applied before sorghum emergence. Postemergence atrazine rates over 1 lb/a are not considered best management practices because of high potential for movement in surface water runoff. Apply before weeds are 1.5 inches tall and before sorghum exceeds 12 inches. Do not plant treated fields to any crop other than sorghum or corn for 18 months after application. Apply with 1% v/v COC or 0.25% v/v NIS to enhance foliar uptake. Follow atrazine rate limits and cropping, feeding, and grazing instructions on label.
1.3 to 2.58 qt Bicep II Magnum FC	S-metolachlor (15) + Atrazine (5) 0.78 to 1.5 + 1 to 2	Apply postemergence to sorghum from the V3 stage to 12 inches tall for residual control and control of small emerged weeds that haven't exceeded the 2 leaf stage. Use the lower rates on coarse textured soils and higher rates on fine textures soils. Apply with COC at 1% v/v for control of emerged weeds. The combined amount of Bicep II Magnum from all applications to sorghum must not exceed a total of 2.58 qt/a and the combined amount of atrazine from all sequential applications of atrazine containing products should not exceed 2.5/a per calendar year. Do not graze or feed forage for 60 days following application.
1 pt Brash, Range Star, WeedMaster, or Saddle-Up	Dicamba (4) + 2,4-D (4) 0.125 + 0.36	Apply to sorghum in the 3- to 5-leaf stage (4 to 8 in tall). Performs best on weeds less than 3 inches tall. Expect injury symptoms on sorghum, such as leaning and brittle stems and rolled leaves. These symptoms may be outgrown within 2 weeks. Do not apply if potential for injury is not acceptable. Do not apply with surfactants and oils.
1 to 1.5 pt Bromoxynil 2	Bromoxynil (6) 0.25 to 0.375	Apply bromoxynil when broadleaf weeds are small and growing actively but before they reach size limits listed on the label. Apply at 3- to 4-leaf stage up to boot stage of sorghum. Use a maximum of two applications per season. This is a contact herbicide, so thorough coverage is required. Bromoxynil is safer for sorghum than 2,4-D or dicamba. Pigweeds are somewhat tolerant and should be no larger than the 4-leaf stage. Can be tank-mixed with low rates of 2,4-D or dicamba. Do not cut forage for feed or allow grazing within 30 days of treatment.
1.5 to 3 pt Buctril + Atrazine	Bromoxynil (6) + Atrazine (5) 0.19 to 0.38 + 0.38 to 0.75	Atrazine is a restricted-use pesticide. These premixes of 1 lb bromoxynil and 2 lb atrazine/gal control many broadleaf weeds. Use up to two applications per season when weeds are small and growing actively but before they reach size limits listed on the label. Apply after 2- to 4-leaf stage but before grain sorghum is 10 inches tall. Can be tank-mixed with dicamba to increase control of pigweeds, kochia, and field bindweed. Tank mixing with up to 8 oz/a 2,4-D increases control of devilsclaw and field bindweed but also increases potential for sorghum injury. Bromoxynil plus atrazine application is considered an atrazine best management practice for use in sensitive watersheds because the low rate of atrazine reduces runoff loss potential. Do not cut forage for feed or allow grazing within 30 days of treatment. Follow atrazine rate limits and label directions.
2 to 3.7 qt Degree Xtra or Fultime NXT	Acetochlor (15) + Atrazine (5) 1.35 to 2.5 + 0.67 to 1.24	These herbicides are restricted-use pesticides. These herbicides may be applied to sorghum up to 11 inches tall. Use rates will vary based on soil texture. For fields in sensitive watersheds, please review K-State Research and Extension Publication MF-2208 for atrazine best management practices. Total atrazine applied in a single crop season cannot exceed 2.5 lb. Restrictions apply to the herbicide with the most limiting restrictions in the mix.
0.5 pt Dicamba	Dicamba (4) 0.25	Controls annual broadleaf weeds. Broadcast apply when weeds are small and growing actively and sorghum is in the 2- to 5-leaf stage but before it is 8 inches tall. On sorghum from 8 to 15 inches tall, apply with drop nozzles to keep dicamba off leaves and out of whorls. Failure to observe these height guidelines can result in damaged seed heads. Do not apply to sorghum grown for seed. Do not allow grazing of treated areas or feed treated forage or silage before mature grain stage. Do not apply when the temperature on the day of application is expected to exceed 85°F. Expect some crop response in the form of rolled-up leaves and leaning stems. The addition of AMS to a spray mixture containing dicamba will increase the risk of volatility of dicamba and mitigate the benefits of lower volatility formulations.

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Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
POSTEMERGENCE		
1 to 1.67 pt Dual II Magnum, Charger Max, EverpreX or Moccasin II Plus	S-metolachlor (15) 0.95 to 1.59	S-metolachlor alone or in certain tank mixes can be applied postemergence to grain or forage sorghum. The risk of injury increases when adjuvants (NIS or COC), nitrogen sources, or other fertilizer are applied with Dual II Magnum. Dual II Magnum has no foliar activity on weeds as it is intended for residual soil activity only. Thus, this application must be in conjunction with tillage or companion herbicides which provide good control of emerged weeds.
22 to 32 fl oz Facet L, or 0.5 to 0.75 pt Quinstar 4L, or 5.3 to 8 oz Quinstar GT	Quinclorac (4) 0.25 to 0.38	Facet L, Quinstar 4L, or Quinstar GT can be applied to grain sorghum from emergence to 12 inches for control of field bindweed, foxtail, barnyardgrass, and morningglory. Best annual grass control occurs when applied with 0.5 to 1 lb atrazine, grass density is moderate to low, and plants are less than 2 inches tall. Field bindweed should be growing actively with runners at least 4 inches long. Always apply with MSO when applying alone or tank mixing with atrazine. NIS should be used if tank-mixed with growth regulator herbicides. UAN or AMS can be added. The addition of 8.5 lb AMS/100 gal will help control bindweed. Because of root uptake, rainfall following Facet L or Quinstar GT application may improve weed control.
5 to 12 fl oz FirstAct	Quizalofop (1) 0.03 to 0.075	Use only on Double Team sorghum hybrids. Controls annual and perennial grasses. Apply with 1% v/v COC or 0.25% v/v NIS. Slightly higher rates are recommended west of I-135. Tank mixing with broadleaf herbicides can reduce grass control. Stewardship information can be found at sorghumpartners.com/double-team/
1 to 1.5 fl oz Gambit	Halosulfuron (2) + Prosulfuron (2) 0.031 to 0.047 + 0.018 to 0.027	Apply Gambit herbicide from the 2-leaf through lay-by stages to grain sorghum (before grain head emergence). Controls several broadleaf weed species and suppresses yellow nutsedge. Usually used following a foundation application of Intrro or Lariat-type herbicide. To improve control of pigweed and morningglory species, tank mix with dicamba or 2,4-D. Always apply with a quality NIS at 0.25 to 0.5% v/v (1 to 2 qt/100 gal) or with MSO or COC at 1% v/v (1 gal/100 gallons of spray solution).
12.8 to 16 oz Huskie	Pyrasulfotole (27) + Bromoxynil (6) 0.031 to 0.039 + 0.175 to 0.219	This premix controls broadleaf weeds when applied to grain or forage sorghum between the 3-leaf stage of growth and 30 inches tall and/or prior to flag leaf emergence, whichever comes first. The addition of 1 lb/a of AMS and 0.25% v/v NIS or 0.5% v/v high-surfactant oil concentrate may optimize Huskie activity. Huskie will perform best if applied with 0.25 to 1 lb of atrazine. Huskie must be applied in a minimum of 10 gpa spray solution. A maximum of 32 oz of Huskie may be applied in two applications per year. There must be an interval of 11 days between Huskie treatments. Transitory leaf burn and yellowing may occur following a Huskie application on sorghum. These symptoms generally dissipate within 21 days. Potential for increased injury exists when Huskie-treated sorghum has been previously treated with preemergence-applied herbicides containing mesotrione (Lexar, Lumax, and Zemax). Do not graze or cut for forage within 7 days following Huskie application. Do not harvest grain or stover within 60 days of Huskie application.
15 to 19 fl oz Huskie FX	Pyrasulfotole (27) + Bromoxynil (6) + Fluroxypyr (4) 0.030 to 0.038 + 0.17 to 0.21 + 0.07 to 0.09	Controls many broadleaf weeds. Apply between -leaf and flag-leaf stages or before sorghum reaches 30 inches tall. Use a minimum of 10 GPA. The addition of 1 lb/a AMS and 0.25% v/v NIS or 0.5% v/v HSOC may increase activity. Do not apply with chlorpyrifos. Transitory sorghum injury will occur following application. Sorghum varieties may vary in sensitivity.

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Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
POSTEMERGENCE		
6 to 9 fl oz ImiFlex	Imazamox (2) 0.047 – 0.072 lb ae/a	Apply ImiFlex only to igrowth grain or forage sorghum. Conventional and non-igrowth sorghum will be killed if treated with ImiFlex. ImiFlex may be applied pre-emergence or post-emergence and has broad-spectrum activity on grass and broadleaf weeds. Activity of ImiFlex is optimized when it is included in a comprehensive weed control program. For pre-emergence applications apply ImiFlex at a rate of 6 to 9 fl oz/a. ImiFlex may be applied post-emergence at 6 fl oz/a. Growers are limited to 1 application of ImiFlex/year to igrowth sorghum. ImiFlex has a wide application window and may be applied pre-emergence up to 20 inches in crop height. ImiFlex has residual soil activity in addition to post-emergence activity. ImiFlex has flexible tank mix capabilities, and can be mixed with many of the traditional products used in sorghum production, such as <i>S</i> -metolachlor, Atrazine, Dicamba, 2,4-D, Mesotrione, etc. For pre-emergence applications, apply ImiFlex in conjunction with a Group 15 chemistry, such as <i>S</i> -metolachlor, before or shortly after planting but prior to weed germination. Always use sorghum seed treated with a safener when utilizing a Group 15 chemistry. Post-emergence applications of ImiFlex should be preceded by a Group 15 chemistry and target weeds that are less than 2 to 3 inches in height. Post-emergence applications of ImiFlex are optimized with a COC or MSO at 1-2% v/v and a Nitrogen source – use either AMS at 12 to 15 lb/100 gal of spray solution or UAN at 2.5% v/v. In arid conditions or when targeting weeds that are stressed, use MSO at 2% v/v and UAN at 5% v/v or AMS at 20 lb/100 gal of spray solution. Stronger adjuvant packages can increase the possibility of crop response. For applications of ImiFlex made with auxin chemistries such as 2,4-D or dicamba, do not use an oil-based adjuvant, instead utilize a high-quality NIS at 0.25% v/v. Do not tank mix ImiFlex with Huskie, Peak, or Ally Herbicides. Applications of ImiFlex to igrowth sorghum will generally not interfere with traditional sorghum rotations, as these plantback intervals are anytime to soybeans and any Clearfield crop, 3 months to alfalfa, 8.5 months to corn, 9 months to cotton, and 3 months to wheat as long as certain soil pH and rainfall/irrigation parameters are met. ImiFlex has a 0-day pre-harvest interval and no feeding restrictions for igrowth grain or forage sorghum. Refer to the product label for a complete list of rotational intervals and regional differences. Contact your local UPL representative or visit sorghumpotential.com for proper stewardship guidelines and more information.
1 to 1.5 pt Kochiavore	Fluroxypyr (4) + Bromoxynil (6) + 2,4-D (4) 0.084 to 0.126 + 0.21 to 0.31 + 0.21 to 0.31	Apply Kochiavore for broadleaf weed control to sorghum from the V4 to V8 stage. Drop nozzles should be used when treating at the V8 to pre-boot stage. DO NOT tank mix with atrazine, crop oils, or other adjuvants such as NIS. Some sorghum hybrids are sensitive to 2,4-D and will be injured. Consult your seed dealer. Do not allow the crop to be used as fodder, forage, or grazing for 45 days following application. Do not harvest within 70 days of the application. Only one application is allowed per growing season.
12 to 21 oz Outlook	Dimethenamid-P (15) 0.6 to 1.0	Outlook may be applied postemergence to grain sorghum up to 12 inches tall. Must use safened seed. Use 12 to 18 fl oz on coarse soils and 14 to 21 oz on medium and fine soils. Maximum rate depends on soil organic matter, refer to label for details. If Outlook is applied sequentially following preplant/premerge applications of Outlook or Verdict, do not exceed 21 fl oz Outlook or 0.98 lb dimthenamid-P, per season. Outlook is intended to provide residual control of annual grasses and some broadleaf weed, however, it does not have postemergence activity on weeds, so tank mix with a postemergence herbicide that effectively controls emerged weeds.
0.375 to 0.75 oz Peak	Prosulfuron (2) 0.013 to 0.027	Controls or suppresses many broadleaf weed species. Usually used following a foundation application of Dual- or Bicep-type herbicide. Apply over-the-top to sorghum at least 5 inches tall. Refer to label for weed size limitations. If applied alone or tank-mixed with atrazine, add COC at 1 qt/acre. Also add 2 to 4 qt/a UAN if velvetleaf is targeted. If tank-mixed with 2,4-D, dicamba, or liquid formulations of bromoxynil, add NIS instead of COC. There are no restrictions for rotation to wheat. Sunflower and soybean are very sensitive to Peak carryover. See label for rotation restrictions that differ by field location, rate of Peak applied, and soil pH.

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Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
POSTEMERGENCE		
0.67 oz Permit	Halosulfuron (2) 0.031	Controls several broadleaf weed species and suppresses yellow nutsedge. Apply to grain sorghum from the 2-leaf through lay-by stages (before grain head emergence). Usually used following a foundation application of Inttro or Lariat-type herbicide. To improve control of pigweed and morningglory species, tank mix with dicamba or 2,4-D. Always apply with a quality NIS at 0.25 to 0.5% v/v (1 to 2 qt/100 gal). To control velvetleaf up to 12 inches tall, add 4% (4 gal/100 gal) liquid nitrogen fertilizer.
21 fl oz Starane NXT	Fluroxypyr (4) + Bromoxynil (6) 0.10 + 0.38	Starane NXT can be applied to grain or forage sorghum from the 4-through the 7-leaf stage or up to just prior to boot if using drop nozzles. Applications to sorghum later than just prior to boot can reduce grain yield. Starane NXT may be tank-mixed with other broadleaf herbicides, however, tank mix partners or the addition of adjuvants may increase leaf burn. Do not graze or harvest fodder or forage for 45 days following the application.
0.4 pt Starane Ultra, Comet, StareDown, or Vista XRT	Fluroxypyr (4) 0.14	Starane Ultra can be applied to grain sorghum from the 3- to 7-leaf stage of growth as a broadcast application by either ground or air. Use drop nozzles and directed spray from the 8-leaf stage to boot stage. Do not make more than two applications or apply more than 0.7 pts per acre per year. Starane Ultra can be tank-mixed with other herbicides registered for postemergence application to grain sorghum. Do not apply with Ally XP herbicide.
1.5 to 3 qt Warrant	Acetochlor (15) 1.13 to 2.25	Warrant may be applied to forage or grain sorghum. Must use safened seed. Use 1.5 to 2.25 qt on coarse or medium textured soils with less than 3% organic matter or 2 to 3 qt on these soil textures with greater than 3% organic matter. Apply 1.5 to 2.5 qt on fine textured soils with less than 3% or 2.25 to 3 qt with greater than 3% organic matter. Used primarily as a tank mix with postemergence herbicides to provide residual control of certain annual grasses and broadleaf weeds. Do not apply with fluid fertilizer as the carrier. Apply before sorghum reaches 11 inches tall. Do not graze or feed treated forage to livestock for 60 days following application.
4 to 6 oz Yukon	Halosulfuron (2) + Dicamba (4) 0.03 to 0.05 + 0.125 to 0.19	4 oz of Yukon premix is equivalent to 2/3 oz Permit and 4 fl oz dicamba. May be broadcast applied over grain sorghum from the 2-leaf stage up to 8 inches tall and with drop nozzles up to 15-inch-tall sorghum. May be applied with atrazine and COC.
0.67 to 1.33 oz Zest WDG	Nicosulfuron (2) 0.031 to 0.062	Apply Zest WDG to Inzen (ALS herbicide tolerant) Sorghum hybrids only. Conventional sorghum hybrids will be destroyed if treated with Zest. Zest may be applied up to 1.33 oz, not to exceed 1.8 oz/season to sorghum 4 to 20 inches tall. To ensure good control of the annual grasses, treat within label maximum size recommendations and when grass are small. See label for susceptible grass species. Apply with COC at 1 to 2% v/v using the higher rate in arid conditions. For aerial applications use COC at 0.5% v/v. NIS at 0.25% v/v may be used or 0.5% in arid conditions. Also include a nitrogen source, UAN at 2 quarts/a or 2 lb AMS/a. Double the quantity of the N source when applications are made under arid conditions. DO NOT apply Zest with fertilizer as the total carrier solution. Use this program in conjunction with an effective preemergence herbicide program and/or tank mix Zest with effective tank mix partners to assure effective control of broadleaf and difficult grass weeds. Zest may cause temporal yellowing to Inzen sorghum but will recover quickly. Do not apply with Huskie as significant antagonism of grass control and crop injury may occur. Crop rotational restrictions include corn, field and seed anytime; corn, pop, and sweet, non-Inzen grain sorghum 10 months; soybean 15 days and 0.5 inches precipitation; winter cereals, wheat, barley, rye, and oats 4 months; cotton and drybeans 10 months; alfalfa and red clover 12 months; and all sorghum, including Inzen sorghum, 18 months. See www.traitstewardship.com for required Inzen Stewardship training to utilize Zest on Inzen sorghum.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.

Herbicides for Grain Sorghum

Formulated product/acre*	Herbicide* and lb active ingredient needed/acre	Comments and limitations
DIRECTED POSTEMERGENCE		
1 to 2 pt Gramoxone SL 2.0 or 0.7 to 1.3 pt Gramoxone SL 3.0 or Helmquat	Paraquat (22) 0.25 to 0.5	Apply when freestanding sorghum is at least 12 inches tall. Use precision-directed spray equipment adjusted so that no more than the lower 3 inches of sorghum stem is contacted by paraquat. Always add NIS, but do not tank mix with liquid fertilizer. Paraquat can only be handled and applied by licensed individuals.
HOODED APPLICATIONS		
Glyphosate (see glyphosate table)	Glyphosate (9)	Some glyphosate products are labeled for application under hooded sprayers between grain sorghum rows. Equipment must be operated in a manner that avoids bouncing or raising the hoods off the ground, or sorghum injury may occur. Use low-pressure/low-drift nozzles. Maximum sprayer speed is 5 mph, and maximum wind speed is 10 mph. See "Selective Equipment" section of label for further details.
FOR SPOT TREATMENT ONLY		
1 to 2 gal Glyphosate per 100 gal + surfactant or 1.28 to 2.56 fl oz/gal spray mix	Glyphosate (9)	Apply as spot treatment to control annual and some perennial weeds. Apply at stage of weed growth recommended on glyphosate label but before heading of sorghum. Sorghum in treated area will be killed. Avoid spray drift outside target areas.
ROLLER OR WICK-TYPE APPLICATORS		
Note: Expect best results when target weeds are 8 to 12 inches taller than grain sorghum. Two applications made in opposite directions give better coverage. Operate at ground speeds of less than 5 mph. See glyphosate label for application directions and precautions.		
Herbicide/method	<u>Mixing Ratio</u> herbicide: water	Comments and limitations
Glyphosate (9)/Roller	1:19	A 5% solution for control of volunteer corn and shattercane.
	1:9	A 10% solution to control volunteer corn and shattercane and suppress johnsongrass, redroot pigweed, giant ragweed, sunflower, velvetleaf, common milkweed, and hemp dogbane. Roller speed should be maintained at 40 to 60 rpm.
Glyphosate (9)/Wick	1:2	This 33% solution in a rope wick should perform like the 10% solution in the roller.
HARVEST AIDS		
Up to 1 fl oz Aim EC or Longbow EC	Carfentrazone (14) 0.015 or 2 lb/gallon	May be applied, alone or tank-mixed with other desiccants, to physiologically mature sorghum. Apply with 1% v/v COC. Good spray coverage is essential. Allow at least 3 days between application and harvest.
3.6 to 4.8 qt Defol 5 or 2.4 to 3.2 qt Defol 750	Sodium chlorate (NC) 4.5 to 6.0	Can be used to reduce moisture content in sorghum grain. Apply at physiological maturity, when kernels at the base of the sorghum head show black-layer formation. Most effective when application is followed by dry, sunny weather. Apply by aircraft or ground equipment 7 to 10 days before harvest. Use spray adjuvants as recommended on the label. Can be applied in 28% UAN carrier to enhance foliar desiccation and to apply nitrogen for the succeeding crop.
Glyphosate (see glyphosate table)	Glyphosate (9)	Use for feed grain production only. For preharvest desiccation of sorghum foliage and grain, apply when grain moisture is 30% or less. This coincides with black layer on kernels in the lower part of the heads. After application, a 7-day harvest delay is required, and a 2-week delay is recommended to give glyphosate time to work. Apply aerially or by ground.

* Numbers in parentheses indicate herbicide site of action; see p. 3 for more information. Products often are available in several formulations or brand names, and label information may vary. Refer to the Names, Toxicities, and Persistence table, p. 12.