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G74-121 Sandbur Control in Field Corn (Revised January 1999)

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Sandbur Control in Field Corn

Sandbur can be a major weed problem in cornfields if not properly controlled. This NebGuide discusses mechanical and chemical alternatives for controlling sandbur.

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Sandbur is a problem weed on coarse to fine-textured soil. The North Platte Valley, southwest and west central Nebraska, and the Sandhills are areas in the state where sandbur is a major weed problem in corn. Sandbur seldom becomes a primary weed problem in eastern Nebraska. Both field (*Cenchrus pauciflorus* Benth.) and longspine [*Cenchrus longispinus* (Hack.) Fern.] sandbur grow in Nebraska.

Description

Sandbur is a summer annual plant which completes its life cycle through seed production in one year. Stems are 6 inches to 3 feet long, branched, flattened and usually semi-erect prostrate, forming a mat on the ground. Leaf blades are smooth, flat or rolled, and attached to a sheath with hairy margins. The roots are fibrous and relatively shallow. Seed spikes bear clusters of 10 to 30 burs. Spiny burs are 1/4 to 1/2 inch in diameter, with one to three seeds per bur. Each straw colored bur has many sturdy, backward hooked spines which cause discomfort to man and animals.

Irrigated Corn

Sandbur Competition With Corn

Research at the University of Nebraska West Central Research and Extension Center was designed to examine sandbur competition with irrigated corn. Plots were kept weed free for the first 0, 3, 4, 6, 8, 10, or 12 weeks after planting. Two locations were used as test sites. Data from both locations are shown in *Table I*.

Table I. Effect of sandbur competition on corn yields at North Platte.					
<i>Weed-free period after planting (in weeks)</i>	<i>Date of last weeding</i>	<i>Sandburs</i>			<i>Corn yield bu/A</i>
		<i>Plants no./yd²</i>	<i>Biomass lb/A</i>	<i>Burs/plant no.</i>	
Location 1					
0	May 26*	109	3630	87	26
3	June 16	41	2290	108	85
4	June 23	35	2650	130	83
6	July 7	28	450	34	101
8	July 21	20	100	13	112
10	August 4	17	43	9	105
12	August 11	3	1	4	102
Location 2					
0	May 12*	17	1300	264	127
3	June 2	12	1140	144	139
4	June 9	14	510	88	140
6	June 16	8	540	97	136
8	June 23	11	300	49	152
10	July 7	22	54	33	147
12	July 23	14	33	11	146

*Tillage to prepare the corn seedbed.

At Location 1, the best corn yields were from plots that were kept weed-free for six weeks after corn planting. Sandbur should be controlled for at least six weeks to produce top corn yields. As with most weed species, the most critical period for sandbur control is when the crop is small and less competitive with weeds. Sandbur density was much higher at Location 1 than at Location 2, and corn yields reflect the greater competition from sandbur.

Sandbur seeds germinate throughout the summer. Those that germinated in late July and early August still produced plants which had burs at harvest. This indicates that it is difficult to eliminate sandbur seed production using herbicides and cultivation. Control of the early season flush of sandbur seedlings, however, should allow production of top corn yields.

Mechanical Control

The first flush of sandbur seedlings develops at normal corn planting time. Tandem-disk harrowing the soil twice with a time between diskings can destroy germinating sandbur seed as the corn seedbed is prepared. Cultivation should usually supplement herbicides for effective sandbur control. Since sandbur is shallow rooted, timely cultivation can be very effective in removing escaped plants between rows.

Preplant tillage before planting can influence sandbur development. Studies conducted at the Panhandle Research and Extension Center showed tandem-disk harrowing increased sandbur density compared with plowing or ridge-till. On sandy soils, infested with sandbur, ridge-till offers a real advantage over tandem-disk harrowing for reducing sandbur density.

Sandbur is best controlled by using a combination of good cultural practices, cultivation, and herbicides. Clean tillage implements, tires, and the combine after each field to avoid moving seeds and starting new infestations. Sandbur often spreads over the entire field from the headland if good sanitation is not practiced. Some growers have found that by using a more effective sandbur herbicide on the field borders, they can apply a less expensive herbicide treatment on the rest of the field. Poor stands and gaps in the corn row also aid in increasing sandbur.

Preplant Soil Incorporated Herbicides

Eradicane and Sutan+ have given effective, consistent sandbur control of 90 percent or greater. Control at this level plus cultivation should allow maximum corn yields under irrigation.

Although effective on sandbur, Eradicane and Sutan+ must be properly applied. Both herbicides should be incorporated into the soil immediately after application, and whenever possible, application and incorporation should be done in the same operation. Apply Eradicane and Sutan+ to tilled soil that is dry enough to permit good soil mixing. When application and incorporation are done separately, and there is a delay (less than one hour) in incorporation of the herbicide, considerable quantities of Eradicane and Sutan+ may be lost due to volatilization. Eradicane and Sutan+ must be applied to a soil that is dry to at least 1.5 inches and free from dew and incidental moisture.

For more thorough mixing on fine-textured soils, tandem-disk harrow in two directions. When disking the second time, reset the disk to cut no deeper than 3 to 4 inches. A field cultivator is effective for second pass incorporation.

Center pivot application may be used to apply and incorporate Eradicane and Sutan+; however, atrazine and Bladex cannot be applied through a center pivot. Eradicane and Sutan+ control weeds by interfering with normal seed germination and seedling development. To assure success, prepare the seedbed just before planting corn. Germinating sandbur seeds and established plants will be destroyed by tillage. If a rolling cultivator is used for tillage, be sure the sandbur seedlings are being uprooted. If sandbur plants are too large, they may not be destroyed.

Repeated use of Eradicane or Sutan+ over years on the same field results in soil microorganisms quickly degrading the herbicide. To avoid this, rotate your herbicide programs, for example, with a postemergence program one year and a preemergence program the next. Rotating the crop, for example from continuous corn to field corn or soybean, also would be beneficial.

Preemergence Herbicides

Sandbur is a difficult weed to control with herbicides (*Table II*). It is important to include at least one cultivation in the weed management program. Most herbicides widely used on corn do not specifically list sandbur as a controlled weed or claim only partial control. Sandbur control will be in the 60 percent to 85 percent range with preemergence applications of Dual II, Dual II Magnum, Frontier, Fultime, Harness, Micro-Tech, Prowl, and Surpass alone or in combination with AAtrex (atrazine) or Bladex. Bladex substituted for atrazine in combination with preemergence applications of Dual II, Dual II Magnum, Frontier, Harness, Micro-Tech, Prowl, or Surpass gives similar control. Do not use Bladex on

sands or loamy sands (soil containing more than 70 percent sand) containing 1 percent or less organic matter. The maximum application rate for Bladex is 1.1 lb/A on fine-textured soils. These herbicides should be applied within five days of the last tillage before planting. These herbicides may be applied within seven days before planting if the herbicides are shallowly incorporated into the top 1 to 2 inches of soil. The relative ineffectiveness of commonly used preemergence herbicides on sandbur may contribute to the increase of this weed. Repeated use of AAtrex or atrazine alone or with Mirco-Tech, Dual, and Prowl, while controlling other weed species but missing sandbur, permits this weed to increase. Poor spraying techniques, such as driving too wide, plugged nozzles, and poor spray distribution, also contribute to increased sandbur problems.

Table II. Sandbur control with common corn preplant incorporated or preemergence herbicides.

<i>Suggested herbicide treatments for corn</i>	<i>Weed control rating¹</i>	<i>Herbicide label (1998) regarding sandbur control</i>
AAtrex or atrazine	5	None
Balance	5	Control
Bicep Magnum (Dual + AAtrex)	6	Partially controlled
Bicep II Magnum	6	Partially controlled
Bicep Lite Magnum	6	Partially controlled
Bladex/Cypro	5	None
Broadstrike + Dual	6	Partially controlled
Contour	9	Reduced competition
Double Play	7	Partially controlled
Dual II Magnum		Partially controlled
Dual II Magnum + AAtrex or atrazine	6	Partially controlled
Eradicane	7	Control ²
Eradicane + AAtrex or atrazine	7	Control ²
Eradicane + Bladex	7	Control ²
Frontier	4	Partial control
Frontier + atrazine	5	None
Fultime	6	Partial control of field sandbur
Guardman	4	Partial control
Harness	6	Reduced competition
Harness Xtra	6	Reduced competition
Hornet	5	None
Mico-Tech	6	Reduced competition

Micro-Tech + AAtrex or atrazine	6	Reduced competition
Micro-Tech + Bladex	5	Reduced competition
Micro-Tech + atrazine + Bladex	4	Reduced competition
Prowl + atrazine	7	Control
Prowl + Bladex	7	Control
Pursuit	2	Reduced competition
Surpass	6	Partial control of field sandbur
Surpass 100	6	Partial control of field sandbur
Sutan	7	Control ²
Topnotch	6	Partial control of field sandbur
¹ From EC 99-130, Guide for Herbicide Use in Nebraska, available from University of Nebraska Cooperative Extension offices. Use the rates listed in the Guide for soil type. ² Cultivation is suggested in fields with moderate to heavy sandbur infestation.		

Postemergence Herbicides

AAtrex or atrazine 4L at 2 quarts per acre plus crop oil concentrate applied postemergence is usually a good sandbur control treatment; however, sandbur is not found on the label (*Table III*). The herbicide must be applied before sandbur seedlings are 1.5 inches tall. Use AAtrex or atrazine *cautiously* on coarse-textured soils or where susceptible crops follow in the rotation.

Table III. Sandbur control with postemergence herbicides in corn.		
<i>Suggested herbicide treatments for corn</i>	<i>Weed control rating¹</i>	<i>Herbicide label (1999) regarding sandbur control, including height at application</i>
AAtrex or atrazine or Bicep	4	None
Accent ²	8	Control, 1-3 inches
Accent + atrazine ³	8	Control, 1-3 inches
Accent + Banvel ^{4,5}	8	Control, 1-3 inches
Accent + Beacon	8	Control, 1-3 inches
Accent + Buctril ^{4, 5}	8	Control, 1-3 inches
Accent + Buctril + atrazine ^{4,5}	8	Control, 1-3 inches
Accent Gold ²	8	Control, □ 2 inches
Accent + Marksman ^{4,5}	8	Control, 1-3 inches
Basis Gold ²	6	Control, □ 2 inches
Beacon ²	4	Partial control, 1-4 inches

Liberty ⁶	8	Control, □ 3 inches
Lightning	6	Reduced competition, □ 1.5 inches
Poast ⁷	9	Control, 3 inches
Pursuit ^{3,8}	6	Reduced competition, □ 1 inch
Roundup Ultra ⁹	10	Control

¹From EC 99-130, *Guide for Herbicide Use in Nebraska*, available from the University of Nebraska Cooperative Extension offices. Use the rates listed in the Guide.
²Use NIS or COC + UAN as spray adjuvants.
³Use COC + UAN as spray adjuvants.
⁴Use NIS + UAN as spray adjuvants.
⁵Green foxtail and yellow foxtail control may be poorer with this mixture, therefore sandbur control might also suffer.
⁶Must use glufosinate resistant (GR) corn hybrids. Use 28 oz/A + AMS.
⁷Must use sethoxydim resistant (SR) corn hybrids.
⁸Must use imidazolinone resistant (IR) corn hybrids.
⁹Must use glyphosate resistant corn hybrids.

Table IV. Effect of Accent plus Beacon at 0.38 + 0.34 oz/acre on longspine sandbur at end of season.

<i>Date of application</i>	<i>Density¹</i>	<i>Biomass¹</i>	<i>Corn yield^{2,3}</i>
June	no./m ¹	lb/A	bu/A
12	25 b	67 b	123 ab
17	30 b	35 b	120 ab
22	54 b	490 b	128 a
27	144 a	2280 a	102 b

¹Numbers followed by the same letter are not significant at the 5% level.
²Numbers followed by the same letter are not significant at the 10% level.
³Corn yield in check was 91 bu/A.

Accent (nicosulfuron) controls several summer annual grasses, including sandbur, and some broadleaf weeds in corn. Sandbur should be treated before it is 3 inches tall (*Table III*). As sandbur matures its sensitivity to Accent decreases. Sandbur control with Accent can be improved by adding crop oil concentrate (1 gallon per 100 gallons spray solution) plus liquid nitrogen fertilizer (4 percent by volume, 2 to 4 quarts per acre of 28 percent UAN) to the spray solution. Control is enhanced by following Accent application with cultivation 7 to 14 days after application. Cultivation before application may decrease control by placing the weeds under stress. A crop oil concentrate should always be added with Accent plus atrazine. Spray before corn has six collars (V6), preferably less. If corn has seven to 10 collars (V7 to V10), use drop nozzles. Use only a nonionic surfactant with Accent plus Buctril tank mix. Accent plus Beacon is effective on sandbur, but with all postemergence herbicides application must be timely (*Table IV*). Basis Gold and Accent Gold also contain nicosulfuron and will control sandbur if applied when the weed is less than 2 inches tall.

With the advent of corn genetically engineered to be tolerant to selected herbicides, several new

herbicide programs are available to the grower. Poast is an excellent grass killer which combined with sethoxydim tolerant (SR) corn can be used to control sandbur. Poast should be applied when sandbur is approximately three inches tall. Be sure to add crop oil concentrate to the spray solution. Lightning can be combined with imidazolinone resistant (IR) corn for sandbur control. Sandbur should be 1.5 inches or less in height for optimum herbicide performance. Postemergence applications of Lightning require a surfactant and liquid fertilizer. A third option is to use Liberty with Liberty tolerant corn or Roundup Ultra with Roundup Ready corn. Liberty could be combined with atrazine and applied postemergence when sandbur is less than three inches tall. Poast, Liberty, and Roundup Ultra do not control weeds preemergence so with dense stands of sandbur a preemergence grass herbicide may be necessary.

Table V. Irrigated corn yields with or without layby herbicide application at Battle Creek, Nebr. on a loamy fine sand.

<i>Treatment</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Ave¹</i>
No layby treatment	151	144	140	144
Layby herbicide applied	155	143	138	145

¹Average of five herbicide treatments applied with drop nozzles when corn was about 36 inches tall.

Layby Herbicide Application

Since sandbur seed continues to germinate throughout the summer, applying a second herbicide treatment after layby cultivation could extend sandbur control and prevent seed production. Layby treatments are especially useful in hybrid corn seed production fields. Dual, Prowl, and Treflan are registered for over-the-top or directed sprays for grass weed control after cultivation of field corn. Information for these treatments is given in the latest *Guide for Herbicide Use in Nebraska*, University of Nebraska Extension publication EC 99-130, or consult the herbicide label. Prowl and Treflan list sandbur control on the product label. Dual and Prowl provide fair control.

Research in northeast Nebraska has shown that while layby herbicide applications can be effective in providing season-long weed control, irrigated corn yield was not increased (*Table VI*). Green foxtail and large crabgrass were the weed species present in this study, not sandbur.

Table VI. Effect of herbicides on sandbur in ecofallow corn at the end of the growing season at North Platte.

<i>Herbicide treatment</i>	<i>Rate</i>	<i>1997</i>	<i>1998</i>
	Product/A	—— % ——	
Weedy check	—	0	0
Handweeded	for 1 month	100	77
Balance	4 oz	20	50
Balance + atrazine	2 oz + 1.5 qt	75	51
Dual II	2.25 pt	76	88
Dual II + atrazine	2 pt + 1.5 qt	88	92

Dual II + atrazine fb Poast	2 pt + 1.5 qt + 1 pt	99	100
Poast	1 pt	95	74
Poast late	1 pt	77	84
Basis Gold	14 oz	99	73
Basis Gold, applied late	14 oz	28	77
Accent	0.67 oz	95	73
Accent, applied late	0.67 oz	51	99
Accent + Beacon	0.34 + 0.38 oz	94	63
Poast treatments included 1.6 COC + 1 gal UAN. Basis Gold included 1 qt COC + 1 gal UAN. Accent included 0.25 % X-90 + 1 gal UAN.			

Prowl may be used for extended sandbur control in corn. Prowl is registered as a culti-spray (postemergence incorporated) treatment either alone or with atrazine in fields previously treated with a registered herbicide (not Prowl since only one application of Prowl can be made in the same season). The culti-spray treatment can be applied from the 4-inch corn growth stage up to layby cultivation. Cultivate and destroy all emerged weeds before herbicide application. Cultivation should move at least 0.5 inch of soil over the base of the corn plants. Apply Prowl or Prowl plus atrazine with ground equipment, using drop nozzles if corn foliage prevents uniform coverage of the soil surface. Incorporate the herbicide into the top 1 inch of soil with cultivation, rainfall, or irrigation water.

Treflan is not intended as a primary weed control treatment but should follow prior application of a registered corn herbicide. Treflan may be applied in two ways, with ground equipment or by chemigation, but ground equipment is preferred. With this method cultivate corn 8 inches or taller to remove existing weeds and to move soil around the corn roots. Apply Treflan over-the-top or as a directed spray with drop nozzles for more uniform soil coverage. Cultivate to incorporate the Treflan. With chemigation, Treflan is applied from the two-leaf stage up to 30-inch height of corn. Use 0.5 to 1 inch of water for soil incorporation of Treflan. Treflan does not control sandburs that have emerged so it is desirable to cultivate prior to chemigation to ensure a weed-free seedbed.

Ecofarmed Corn

In the winter wheat-corn-fallow rotation sandburs can be a problem in southwest and west central Nebraska. Sandbur seed germinates in the winter wheat and produces seed after the wheat is harvested. Sandbur seed production must be prevented during the ecofallow period. Weed management must begin before planting winter wheat.

Fields in the winter wheat-corn-fallow rotation infested with sandbur should be planted to tall winter wheat varieties. Apply fertilizer according to a soil test before planting winter wheat. Spread wheat straw and chaff during harvest then apply Roundup Ultra at 16 to 20 oz/A or Landmaster BW at 54 to 68 oz/A as soon as conditions are suitable for spraying and before sandbur plants head. If atrazine is included, Roundup Ultra and Landmaster BW rates should be increased.

If corn is planted early the following spring, use Dual II Magnum, Harness, or Surpass plus atrazine. Another approach is to delay corn planting and use Roundup Ultra to kill a crop of sandbur that has escaped the early preplant herbicides. Additional preemergence herbicides need to be added after planting. In either case a postemergence herbicide may be needed to control sandbur escapes (*Tables IV*

and VI).

Poast on sethoxydim-resistant corn or Accent applied postemergence to the corn has been effective, but timing is critical. Best control was obtained with a preemergence treatment followed by a postemergence treatment (*Table VI*). Sandbur emergence can be variable with some plants emerging with corn and others emerging several times after corn emergence. After corn emergence when the crop is about 6 inches tall, it is not unusual to observe sandbur of several sizes such as from 0.5 inch to 1 to 2 inches tall. There have been multiple flushes of sandbur and this is an excellent time to apply herbicides postemergence.

Note: Herbicide label information is subject to periodic change. Always read product label carefully before buying or using any herbicide.

Reference to commercial products or trade names does not indicate either endorsement or lack of endorsement by University of Nebraska Cooperative Extension

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