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G94-1205 Shattercane and Its Control

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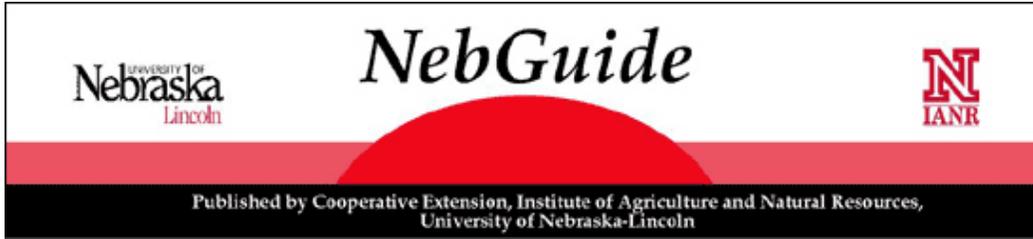


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Shattercane and Its Control

Shattercane infestations may destroy a crop if not properly controlled. This NebGuide describes the characteristics of shattercane and discusses non-chemical, preemergence, herbicide incorporation and postemergence control.

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Shattercane (*Sorghum bicolor* L. Moench) is a forage-type sorghum also known as black amber, chicken-corn, and wild cane (*Figure 1*). Infestations are most prevalent in Nebraska river valleys and tributaries, but are found in upland areas also.

Characteristics

Shattercane competes vigorously with summer annual row crops. A thick stand of shattercane may destroy a crop of corn, sorghum, or soybeans. Four plants per foot of row reduced corn yield 25 percent in Nebraska research and produced 27 million shattercane seeds per acre. An average of 23 million viable shattercane seeds per acre populated the top 4 inches of soil in 12 infested Nebraska fields surveyed prior to planting. This represents a potential population of over 500 shattercane plants per square foot.



Figure 1. Typical drooping head of shattercane.

Shattercane may grow to a height of 12 feet; however, short-statured (3-foot) shattercane has also been found in fields. As plants mature, the open-panicle seed heads tend to droop. A single head may produce one to 2,000 seeds. Head types vary considerably, reflecting the genetic diversity of shattercane. Seeds vary in color, but are usually covered with shiny black, dark brown, or reddish black glumes. These glumes encase the seeds and protect them from rotting in the soil.

Glumes are not retained by commercial sorghums and these seeds do not overwinter in the soil.

Seeds may drop out of the head when mature (about one-third of all shattercane types shatter) or the combine reel may knock the heads to the ground (non-shattering types). Seed shattering is not associated genetically with seed color, plant color, or plant height, so many cane types are possible. Natural selection in the field favors glume retention and shattering types, but nonshattering types also persist as weeds.

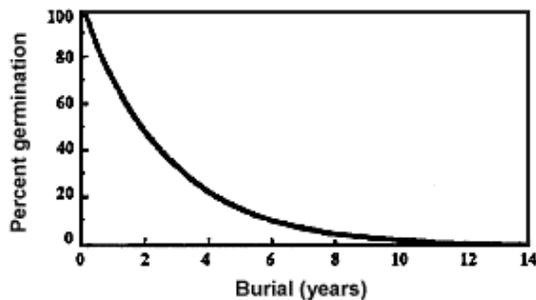


Figure 2. Viability of shattercane seed following burial in soil.

The common weedy characteristic of shattercane is the ability of the seed to persist in the soil for up to 12 years (*Figure 2*). Approximately one-third of shattercane seed still germinated after three years of burial in the soil below the plow layer where conditions did not favor germination. When shattercane seeds are kept near the soil surface,

about 90 percent of the seeds will germinate during the next spring and summer. An after-ripening period of several months, following seed maturity, prevents immediate germination, but there is no natural long-term dormancy. These seed survival characteristics mean that plowing prolongs seed survival. Tillage practices that keep the seed shallow allow more rapid seedbank depletion.

Non-Chemical Control

Select high-quality seed produced in areas free of shattercane and off-type sorghums. Sorghum seed may look pure, but contamination of seed production fields with shattercane pollen will result in shattercane types in the hybrid grain sorghum seed. These seeds are identical to the hybrid seed in size and appearance and cannot be separated. The off-types will only reveal themselves as the crop approaches heading. Use grow-out test results to determine the extent of these contaminants in hybrid seed lots.

Clean machinery, particularly combines and tillage equipment, before leaving an infested field. Harvest infested fields last. Be aware that shattercane seed can be spread in manure, runoff water, or irrigation water. Approximately 16 percent of all shattercane seed eaten by cattle passes through the digestive tract in a viable condition. Livestock moved within five days after grazing infested fields will spread shattercane to new areas in the manure. Harvesting shattercane-infested fields for silage is useful in preventing or reducing seed production. The ensiling process destroys the viability of shattercane seed. However, by late August some shattercane seed will be mature and may have shattered.

Scattered shattercane plants can often be hand-rogued at a reasonable cost. The first seven to 10 days of August is the best time to cut shattercane to prevent seed production. Shattercane produces viable seed 10 days after flowering, so seed panicles of plants cut after this time must be removed from the field. Plants cut before August may tiller and produce viable seed before frost.

Deep plowing can reduce a shattercane problem by burying the seed below the depth of germination. As indicated previously this does not immediately destroy the seed but just prevents germination. Subsequent plowing or deep tillage will return the seed to the surface where it can germinate, but with some deterioration that is proportional to the number of years of burial (*Figure 2*). Plowing is not suggested where soil erosion will occur. Crop rotations help control shattercane. Good stands of alfalfa, small grains, or perennial grasses will outcompete shattercane. Periodic mowing prevents shattercane seed production.

Shattercane requires a minimum soil temperature of 65°F for vigorous germination. Winter wheat, spring oats, and barley grow and develop before shattercane and are harvested before shattercane seed matures. Shallow tillage following small grain harvest and prior to wheat planting encourages germination of shattercane seed. Similarly, periodic tillage on set-aside land can substantially deplete the shattercane seed population in the soil.

Another method of aiding shattercane control is to use ridge planting. Ridge planting is a system of reduced tillage used in conjunction with cultivation and soil ridging. Sweeps or disks displace the tops of the ridge (old crop row) at planting and move the cane and other weed seeds into the middles where the seedlings can be cultivated out. Reducing the cane seed population in the rows also improves preemergence herbicide performance. It is important to operate the ridge cleaners deep enough to move the top two inches of soil into the middles. Refer to NebGuide *G92-1071, Ridge Plant Systems: Weed Control*, for information on ridge tillage.

Preemergence Control

Shattercane can be controlled in corn and soybeans with a combination of herbicides and cultivation (*Table 1*). Usually sorghum herbicides will not provide acceptable preemergence control, so it is best to rotate to corn, soybeans, small grain, alfalfa, or set-aside. Dual and Lasso herbicides which must be used with seed safeners (Concep and Screen) to protect sorghum, can suppress low shattercane populations (scattered plants) if used at the highest labeled rates. Using these herbicides in conjunction with ridge-planting will improve control. The safeners also protect any shattercane contaminants in the hybrid seed.

Sutan+ and Eradicane in corn provide about four weeks of shattercane control under normal conditions. Repeated annual use may lead to shortening of the control period to a week or less, thereby rendering them ineffective for shattercane control. This enhanced soil degradation effect can develop during the first year of use and persist for 12 to 18 months. Rotate Eradicane and Sutan+ with other herbicides to maintain their effectiveness.

Pursuit and Pursuit Plus, which contains Prowl and Pursuit, can be used in soybeans and corn if the corn hybrid is imidazolinone resistant (IR) or tolerant (IT). Pursuit is effective on shattercane as a soil-applied or postemergence treatment. Do *not* incorporate Pursuit Plus in corn. Pursuit usually controls weeds more consistently when incorporated. Because of the potential for development of resistant weeds, herbicide rotation and herbicide combinations are recommended as standard practices.

Pursuit Plus and Passport (which contains trifluralin and Pursuit) are excellent for shattercane control in soybeans. Passport must be incorporated. Do not use Passport in corn.

Treflan, whose active ingredient is trifluralin, and Prowl generally provide good full-season shattercane control in soybeans. Trifluralin is also sold under other brand names. Application rates for shattercane control should be about 30 to 50 percent higher than for general grass control. Delayed planting of soybeans until early June will often allow the first flush of shattercane seeds to germinate. Eliminating this early flush with tillage or postemergence herbicides in no-till will help the soil-active herbicides work better on the remaining seeds.

Herbicide Incorporation

All soil-incorporated shattercane herbicides should be thoroughly mixed into the upper 2 to 3 inches of soil prior to planting. As a rule-of-thumb, the tandem disc or field cultivator incorporates the herbicide to about one-half the depth of the tillage operation.

Eradicane and Sutan vaporize quickly from the soil surface, so do not delay incorporation. Treflan and Prowl permit a time delay between application and incorporation; however, for best results also incorporate these as soon as possible.

For good mixing action, the soil must be within the proper moisture range for tillage. Wet soil leads to poor incorporation and causes rapid vaporization loss of Eradicane. Clods and trash on the surface will interfere with soil mixing. Two perpendicular passes with a field cultivator or a finishing-type tandem disc (20-inch blades with 7 1/2-inch spacings) cutting 4 to 6 inches deep and operated at 5 to 7 mph provide acceptable

incorporation. Streaking and reduced control are often seen if only one pass is made. Tillage-type discs (22-inch blades with 9-inch spacings) do not mix the soil adequately and can bury the herbicide too deep. Power rotary tillers require only a single pass.

Using furrow openers presents a problem with preplant soil incorporated herbicides because the herbicide may be displaced at planting. Avoid removing treated soil from the row.

Postemergence Control

Selective postemergence herbicides are very effective for shattercane control. They control shattercane up to 18 inches tall. Shattercane should be controlled by 3 to 4 weeks after planting to prevent crop yield loss. If shattercane numbers are moderate to high, this early removal is especially important.

Accent and Beacon are very effective herbicides for shattercane control in corn (*Table 1*). Nebraska studies have shown that applications at half of the normal dosages required to control other weeds will control 4 to 6-inch shattercane. The Beacon label permits application at .38 oz/A, which is a half dosage, on 4 to 12 inch shattercane when conditions are favorable for control.

Soybeans are an ideal crop to clean up shattercane. In high cane populations, preplant soil incorporation of Treflan or Prowl, followed by cultivation and a postemergence herbicide (*Table 1*) applied over the row, should provide excellent control.

Roundup applied with a wiper applicator, such as the rope wick, can effectively control shattercane escapes in soybeans and sorghum if the shattercane is 8 to 12 inches taller than the crop. Several applications may be needed. Exercise care to avoid Roundup contact with the crop, especially sorghum.

Many postemergence herbicides can be spot applied to shattercane for significant cost savings and effective control of scattered plants. Apply these only in crops for which they are registered. Roundup will also kill crop plants which are sprayed.

Table I. Herbicides for shattercane control			
<i>Herbicide</i>	<i>Apply this amount commercial product/A</i>	<i>Application time^a and crop</i>	<i>Remarks</i>
Accent 75DG	.67 oz	Post in corn	Add a nonionic surfactant or crop oil concentrate. Apply on 4 to 6-inch shattercane. ^b Half rates such as .38 oz/A of Beacon have given good control if shattercane is small and growing well.
Beacon 75DG	.38 oz		
Eradicane 6.7E	7.3 pt	PPI in corn	Incorporate immediately by cross tandem discing or equivalent soil mixing. Label claims suppression of shattercane only. Repeated annual use may result in poor control.
Sutan + 6.7E	7.3 pt		
Pursuit 2AS	.25 pt	PPI, PRE or Post in corn and soybeans	Use only on a imidazolinone resistant (IR) or tolerant (IT) corn hybrid. For post control add a nonionic surfactant and apply to 4 to 6-inch shattercane. ^b Pursuit Plus can be soil
Pursuit Plus	2.5 pt		

		corn and soybeans	incorporated in soybeans but not in corn.
Passport Treflan 4E Prowl 4E	2.5 pt 2 to 2.5 pt 3.0 pt	PPI in soybeans	Incorporate immediately by cross tandem discing or equivalent soil mixing for best results. An incorporation delay of 24 hrs for Treflan and 7 days for Prowl is allowable.
Assure II Fusilade 2000 Fusion Poast Plus Select	7.0 oz .75 pt .38 pt 1.0 pt 0.5 pt	Post in soybeans	Apply when shattercane is 4 to 6 inches tall. ^b Add 1 qt/A of crop oil concentrate. These herbicides can also be applied in a bean bar sprayer at a 1% herbicide concentration with 1% v/v COC or .25% v/v nonionic surfactant.
Roundup in wiper	20% solution	Post in soybeans and sorghum	Shattercane at least 8 to 12 inches above crop canopy. Keep solution off of crop. Wiping in both directions may be needed. Do not add surfactant.
Roundup in Bean Bar	5% solution	Spot treatment in soybeans	Soybeans will be killed in sprayed areas. Do not add surfactant.
<p>^aPPI=preplant incorporated, PRE=preemergence, Post=postemergence</p> <p>^bAlthough many of these herbicides will control taller shattercane, it is important to control the shattercane before serious crop loss occurs. That usually begins at 3 to 4 weeks after planting when the crop and shattercane are still small.</p>			

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