

Identification of Grass Weeds Commonly Found in Agronomic Crops in Nebraska

Debalin Sarangi, Weed Science Postdoctoral Research Associate
 Amit J. Jhala, Extension Weed Management Specialist

This Extension Circular has been prepared to assist growers, extension personnel, students, and other stakeholders in properly identifying grass weeds commonly found in Nebraska agronomic crops. We recommend using a hand or pocket lens with 10× magnification to improve grass weed identification.

The first step of a successful weed management program is to “**know your enemy**.” Properly identifying weed species during their early growth stages can lead to a more effective management plan.

Although grass weeds, specifically during their early growth stages, are difficult to identify, growers cannot wait until flowering to control them. Delayed herbicide application leads to increased early season crop-weed competition and reduced control of larger weeds, which negatively impacts crop yield. Early identification of grass weeds can also help in selecting weed management operations. For example, johnsongrass, a perennial weed, produces rhizomes (root-like structures with a modified underground stem that grows horizontally and produces roots and shoots from its nodes); implementing moderate tillage can spread this weed species. Therefore, a more appropriate weed management operation would be to apply systemic herbicides at the early growth stages.

Several approaches can be used to identify a grass weed. The dichotomous identification key provided in EC130, *Guide for Weed, Disease, and Insect Management in Nebraska*, (published and updated annually by Nebraska Extension weed specialists) is a useful tool.

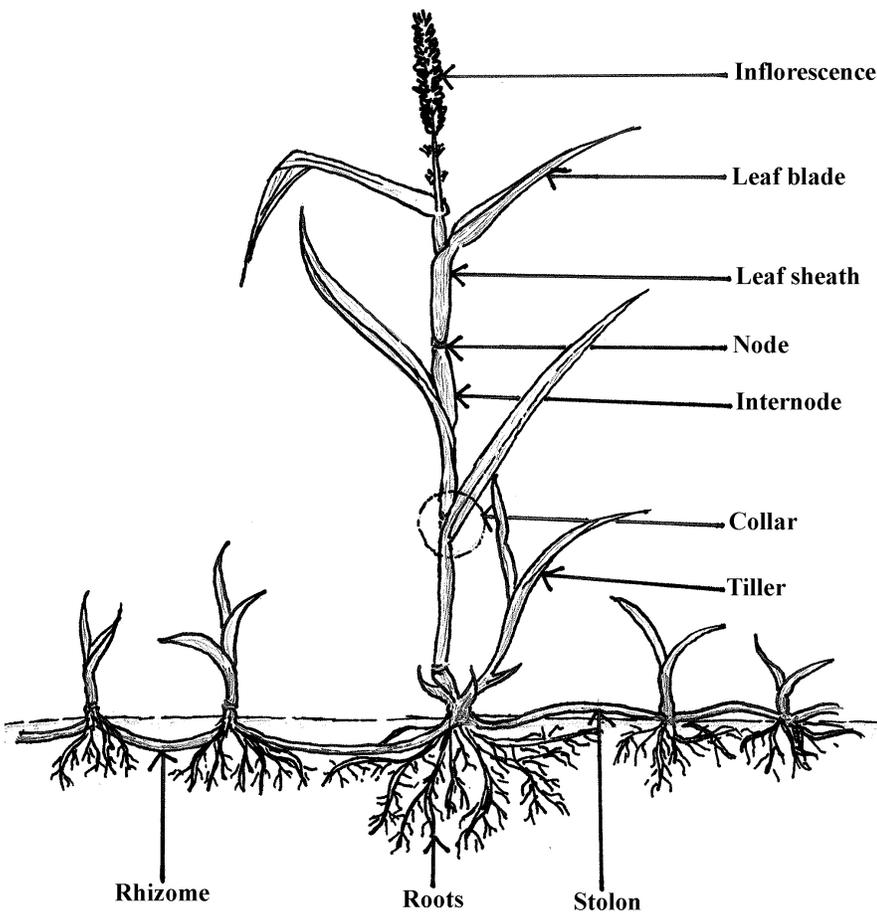


Figure 1. Vegetative and reproductive structures of a grass weed, useful for identification.

A Step-by-Step Outline for Identifying Grass Weeds

1. Identify the growing season (winter or summer annual, perennial, etc.).

2. Determine the shape of the stem (round or flat). See *Figure 1* for different parts of a grass weed.

3. Determine the presence and shape of the ligule (the thin outgrowth at the junction of the leaf blade and the sheath) and auricles (the appendages that project from either side of the leaf collar). See *Figure 2* to learn about different parts of a grass leaf.

4. Determine the presence of hairs or any distinct twisting on the leaf blades.

The identifying features of common grass weeds follow.

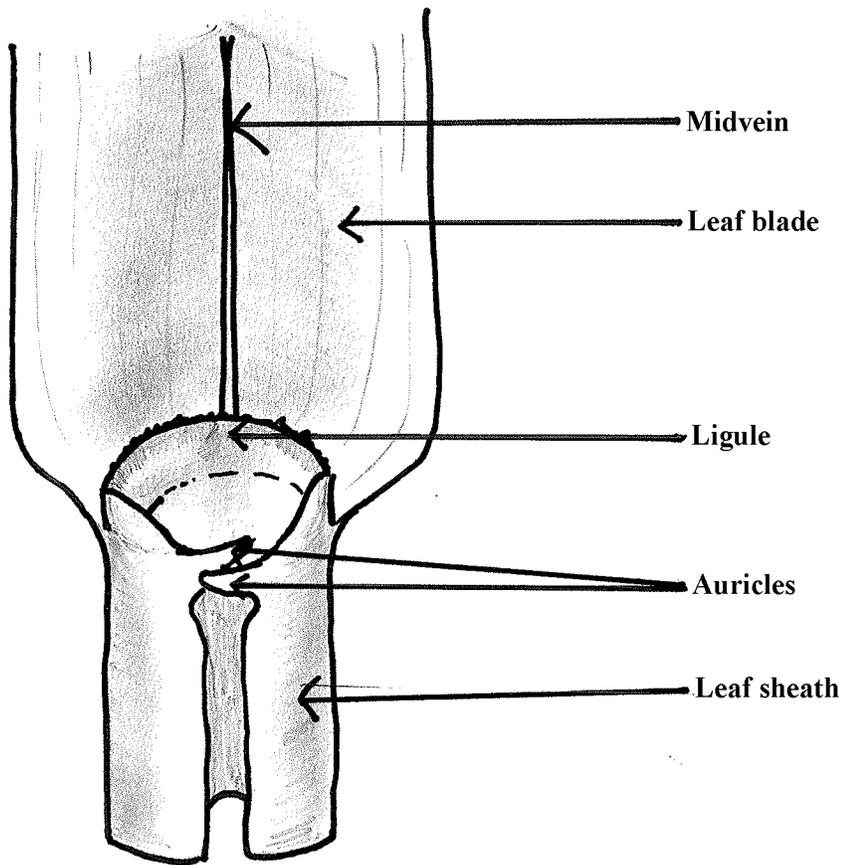


Figure 2. Parts of a grass leaf (the collar region).

Annual bluegrass

Annual bluegrass [*Poa annua* L.] is a winter annual weed found throughout the United States.

While it is a major problem on golf course greens and fairways, it is also a troublesome weed in gardens, vegetables, legumes, and agronomic crops grown during the winter. This weed seed is a common contaminant in Kentucky bluegrass seeds and can grow faster than Kentucky bluegrass, creating an uneven lawn. Annual bluegrass also dies as soon as it matures, and can form a brown patch in the green lawn.

Flowering period: Late April to June

Distinguishing features: Annual bluegrass begins germinating in the late summer or early fall when soil temperatures fall below 70° F. It can grow up to 1 foot tall when left unmowed. Leaf blades are glabrous (no hair) on both surfaces and crinkled partway down. The leaf tip is pointed and boat-shaped (Figure 3). The ligule is membranous and truncated to sharply pointed in shape. Panicles are open and pyramidal in shape. Florets are distinctly separated from one another (Figure 4).



Figure 3. Boat-shaped leaf tip of annual bluegrass.



Figure 4. Florets of annual bluegrass.



Figure 5. Barnyardgrass growing along the roadside in eastern Nebraska.

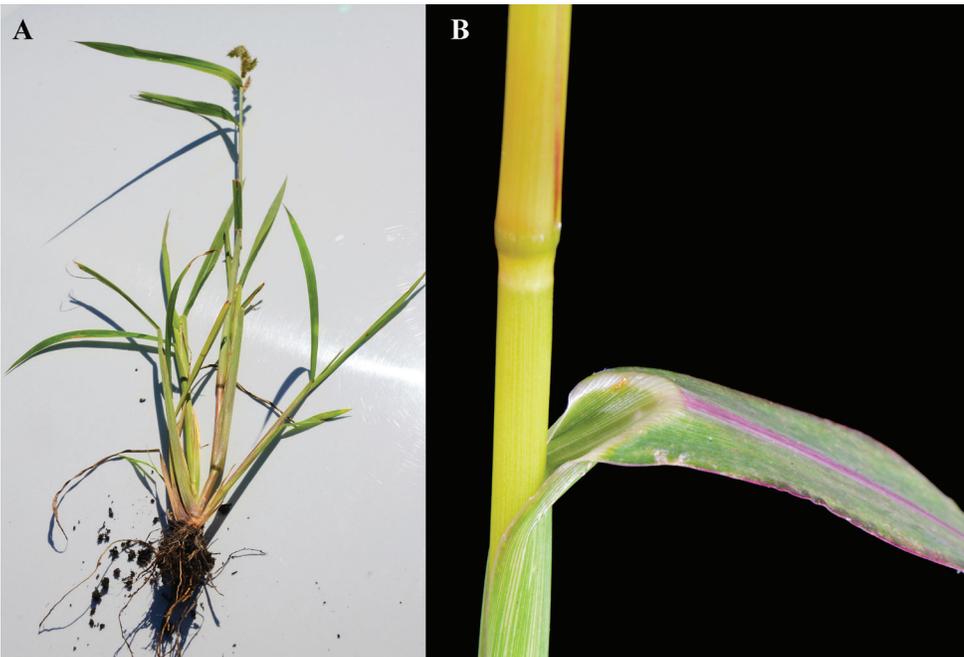


Figure 6. (A) Matured barnyardgrass plant, and (B) absence of ligule and auricles in barnyardgrass.

Barnyardgrass [*Echinochloa crus-galli* (L.) Beauv.] is a summer annual grass that grows best in low, moist areas in a cultivated field. This weed can also be found in waste ground, orchards, lawns, and roadsides (Figure 5). Barnyardgrass can make good forage for livestock during the early growth stages, and the seeds serve as a food source for birds.

Flowering period: June through October

Distinguishing features: Barnyardgrass is an erect annual that usually grows from 1 to 5 feet tall. Stems are flat and often bent and branched at the lower nodes (Figure 6A). Leaf blades and sheaths are glabrous, but the leaf blades are rough on both surfaces. Ligule and auricles are absent (Figure 6B). Panicles are upright or nodding with spreading branches, and spikelets are usually arranged on one side of each branch. Flower heads are sometimes purplish in color.

Canada wildrye

Canada wildrye [*Elymus canadensis* L.] is a native, cool-season perennial grass found throughout the United States except in the Southeast. This weed has an excellent tolerance for shade and can be found near stream banks, along fence rows, in prairies, and in open woodlands. It is also moderately tolerant to soil salinity. Canada wildrye is considered a quality forage for grazing livestock during its early growth stage.

Flowering period: March to June

Distinguishing features: Canada wildrye can grow from 1 to 5 feet tall and form small rhizomes. Leaves are alternate and flat, but rough around the edges. Leaf blades are generally curled inward near the tip. A waxy bloom on the underside of the leaves gives them a bluish tint. A short and membranous ligule is present, which later turns brown. Auricles are present (Figure 7), and are brown to purplish in color around the edges. The inflorescences are the drooping or nodding type and range from 5 to 9 inches long. Awns range from 0.5 to 2 inches long (Figure 8).

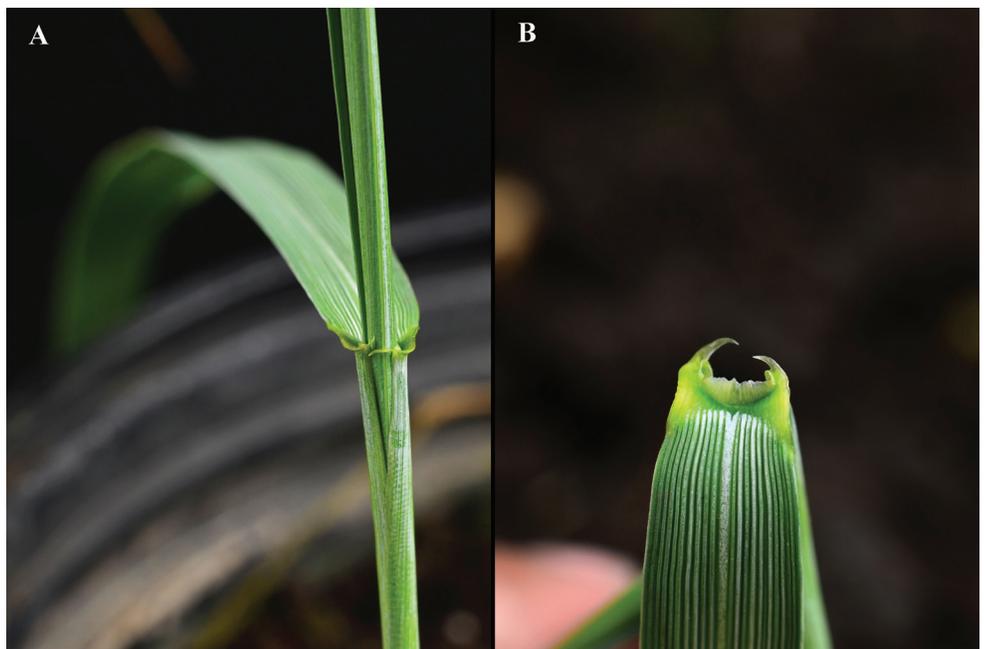


Figure 7. (A) Auricles of Canada wildrye clasping the stem, and (B) ligule and auricles of Canada wildrye.



Figure 8. Inflorescence of Canada wildrye.



Figure 9. Downy brome leaf blade and leaf sheath covered with soft hairs, with the presence of membranous ligule.



Figure 10. Downy brome leaf showing clockwise twisting at seedling stage.

Downy brome [*Bromus tectorum* L.] is a winter annual weed found throughout Nebraska. It is a troublesome weed in pastures, rangeland, alfalfa, wheat-fallow rotation, and continuous winter wheat production fields primarily in western Nebraska. Downy brome can also be found along roadsides, railroads, and fence rows. It is a common contaminant in grass seed, meaning that certified seeds should always be planted. Downy brome's long awns can cause injury to grazing animals, and dry downy brome presents a major fire hazard during the summer.

Flowering period: Late April through May

Distinguishing features: Downy brome is an erect plant that can grow up to 2 feet tall. Stems are glabrous or slightly hairy. Leaf blades and sheaths are light green and covered with soft hairs (Figure 9). Downy brome has membranous ligule with a frayed margin; auricles are absent (Figure 9). At the seedling stage, leaves are usually twisted clockwise (Figure 10). Downy brome panicles are loose with slender and drooping branches. Long-awned panicles change color from green to purple/brown when they mature.

Foxtails

Foxtails [*Setaria* spp.] are considered one of the most problematic summer annual grass weeds in row crops. They can also be found in pastures and on waste ground, lawns, and turf. Foxtails consist of a complex of many species, and in Nebraska, bristly foxtail [*Setaria verticillate* (L.) Beauv.], giant foxtail [*Setaria faberi* Herrm.], green foxtail [*Setaria viridis* (L.) Beauv.], and yellow foxtail [*Setaria pumila* (Poir.) Roem. & Schult.] are commonly found in corn and soybean production fields. Comparative descriptions of their morphological characteristics are discussed below.

Flowering period: June to October

Distinguishing features: The first leaves of foxtail plants grow parallel to the ground (Figure 11). The four foxtail species mentioned above have several characteristics in common during their early growth stages; however, they can be identified by the distribution of hairs on their leaves and by their inflorescences. Foxtail ligules consist of a fringe of short hairs extending from a membranous base, and auricles are absent.

- Bristly foxtail leaf blades are glabrous to scabrous along with rough margins. Leaf sheaths are keeled and glabrous or sometimes scabrous with some hairs on the upper margins. Inflorescences are the spike-shaped, erect or nodding type. Bristly foxtail inflorescence can be identified from other foxtails as it adheres to clothes and fur due to its downward-barbed bristles.
- Giant foxtail leaf blades are pubescent (hairy) from the upper surface (Figure 12A) and leaf sheaths are glabrous except on the margins. Inflorescences are 3 to 8 inches long (usually the longest among the four species) and of the nodding type (Figure 13A).
- Green foxtail leaf blades are glabrous, but the leaf sheaths have hairs on the margin (Figure 12B). It has a cylindrical inflorescence, and the rachis (central axis of an inflorescence) has long hairs (Figure 13B).
- Yellow foxtail leaf blades are mostly glabrous; however, long silky hairs are also present at the base of the leaf blades (Figure 12C). Its inflorescences are yellowish when mature and its seeds are relatively larger than the other three foxtail species (Figure 13C).

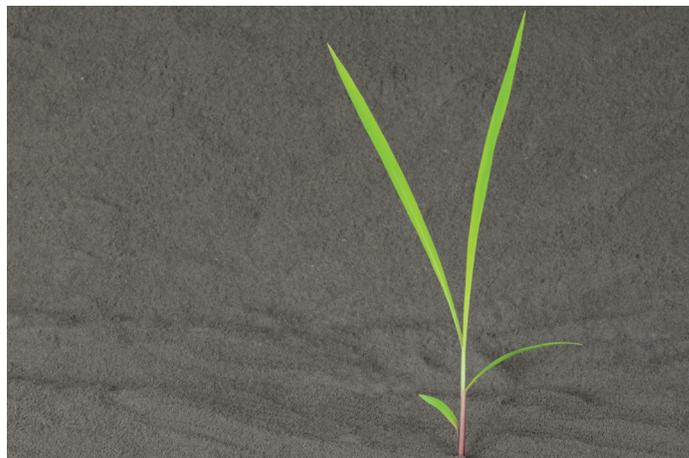


Figure 11. Bristly foxtail seedling.

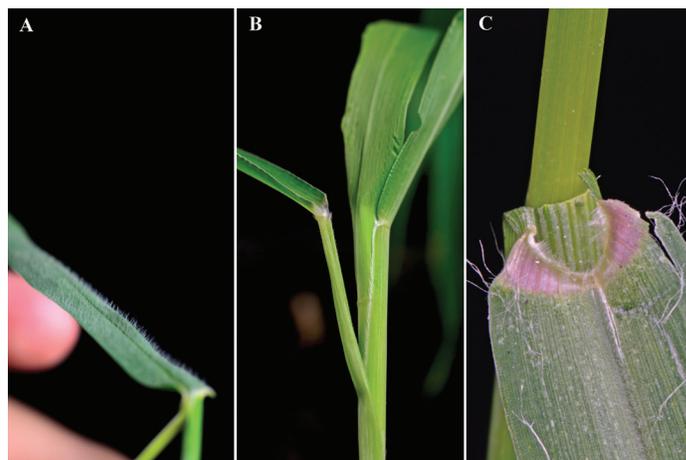


Figure 12. (A) Hairs on the upper surface of giant foxtail leaf, (B) hairs on the leaf sheath-margin of green foxtail, (C) silky hairs at the base of the yellow foxtail leaf blade.

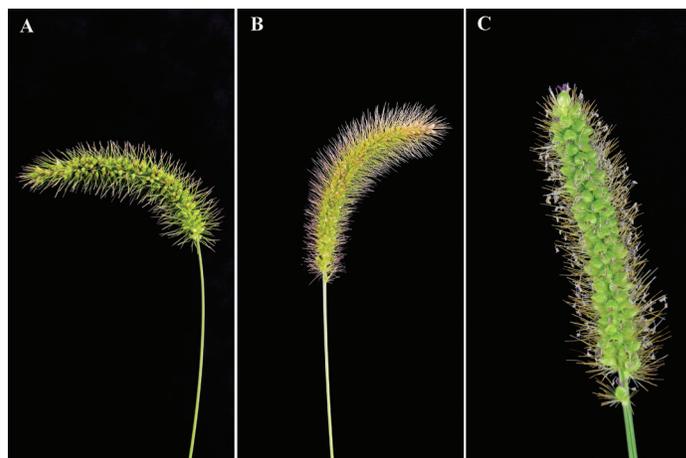


Figure 13. Inflorescence of three foxtails: (A) giant foxtail, (B) green foxtail, and (C) yellow foxtail. (Because the photos are not on the same scale, the size of the inflorescence can be deceiving.)



Figure 14. Johnsongrass (tallest plant at the center) growing in grain sorghum field in eastern Nebraska.

Johnsongrass [*Sorghum halepense* (L.) Pers.] is a troublesome perennial weed in row crops, especially in corn and grain sorghum (Figure 14). Johnsongrass was originally introduced as a forage crop in the United States but has now become a weed in the Midwestern and Southern United States.

Flowering period: Late July through October

Distinguishing features: Johnsongrass is an erect, stout perennial grass weed that can grow up to 8 feet tall. It forms thick and creeping rhizomes (Figure 15). Leaf blades are glabrous with a prominent midrib (mostly whitish in color). The ligule is membranous and auricles are absent (Figure 16). Johnsongrass's panicles are open, with numerous purple whorled branches.



Figure 15. Rhizomes of a johnsongrass plant.



Figure 16. Ligule of johnsongrass.

Jointed goatgrass

Jointed goatgrass [*Aegilops cylindrica* Host] is a winter annual weed found mostly along the roadsides, in fields, and on waste sites. Jointed goatgrass seeds are similar in size to wheat seeds; therefore, the use of contaminated wheat seeds can spread this species in the field. To check for jointed goatgrass seeds in wheat, place a seed sample into a bucket, add water and stir; wheat grain will sink and jointed goatgrass seeds will float to the top.

Flowering period: Early to mid-June

Distinguishing features: Jointed goatgrass is an erect plant (bent mostly at the lower nodes) ranging from 1 to 2 feet tall. Its leaves are alternate with a membranous ligule and auricles at the base. Leaves are covered with occasional hairs, mostly along the leaf margins near the collar (*Figure 17*). The leaves often show a clockwise twist. Jointed goatgrass spikes are narrow with an appearance of half-inch cylinders (joints) stacked one on top of the other. Each joint can produce one to three seedlings.



Figure 17. Jointed goatgrass leaf with auricles present.



Figure 18. Large crabgrass leaf.

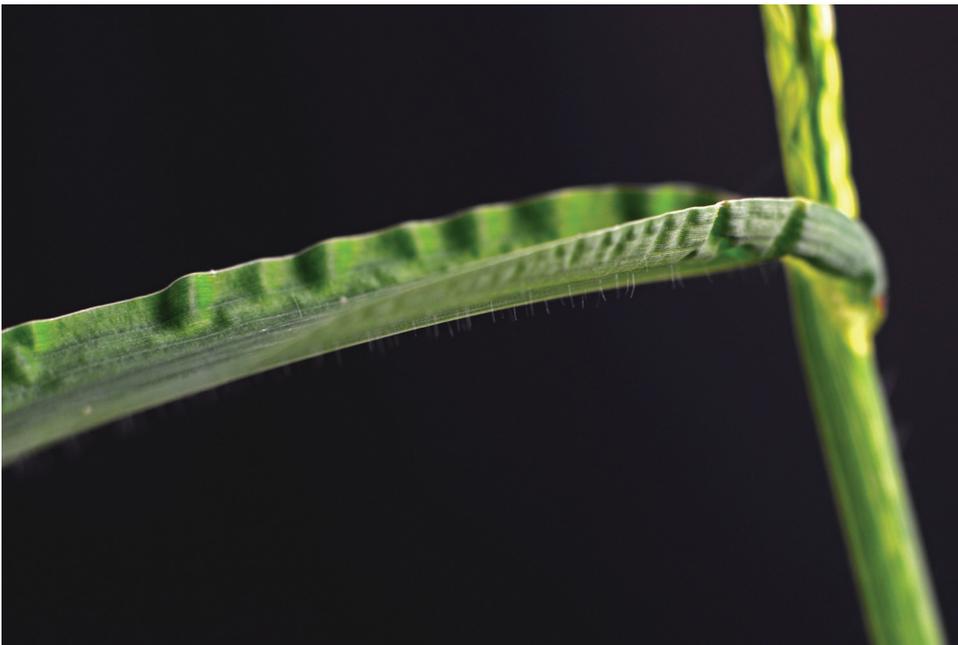


Figure 19. Hairs present on the lower surface (leaf) of large crabgrass plant.

Large crabgrass [*Digitaria sanguinalis* (L.) Scop.] is a summer annual grass species widely distributed throughout the United States. Large crabgrass starts growing late in the spring when soil temperature increases. Large crabgrass seeds serve as an important food source for birds, and the plant itself can make good forage for livestock. This species usually inhabits agricultural lands, turfs, and lawns, though it can also thrive under hot and dry conditions.

Flowering period: July through October

Distinguishing features: Large crabgrass is a rapidly growing yellowish-green grass. The stems are spreading and branched (mat-forming), developing roots at the lower nodes. This weed can grow up to 3.5 feet tall. Its leaves are flat and rough with a prominent midrib and hairs on both surfaces (*Figures 18 and 19*). Long hairs can often be found on the leaf margins near the sheath. Leaf sheaths are covered with long, stiff hairs (papillose-pilose). Large crabgrass has membranous ligule, and auricles are absent (*Figure 18*). Flowers cluster and form fringelike branches located toward the end of the flowering stems. Spikelets are arranged in two rows on one side of a rachis.

Longspine sandbur

Longspine sandbur [*Cenchrus longispinus* (Hack.) Fern.] is considered a summer annual weed in Nebraska, though it can also be a biennial or perennial, depending on the growing conditions. It is a problem weed in the North Platte Valley, southwest and west-central Nebraska, and the Sandhills region. Longspine sandbur can be found in agricultural lands, orchards, roadsides, and disturbed lands. This weed's spiny burs can cause injury to grazing animals, though immature plants provide good forage for livestock.

Flowering period: July through September

Distinguishing features: Longspine sandbur's cotyledon is flat with a purplish tinge at the base. During the early stage, spiny burs can be found by digging carefully around the seedling base. The stems are usually bent and spread, forming a mat on the soil surface, and are flat and sometimes rooted at the lower nodes. The leaf blades are rough on the upper surface with scattered hairs or no hairs present. Leaf sheaths are purplish in color and mostly smooth (Figure 20). Very few hairs can be found on the sheath margin. Ligule consists of a fringe of hairs (Figure 21). Auricles are absent. Spikelets are surrounded by oval burs covered with dense hairs (Figure 22).



Figure 20. Seedlings of longspine sandbur with red leaf sheath.



Figure 21. Ligule of longspine sandbur.



Figure 22. Spikelets of longspine sandbur.

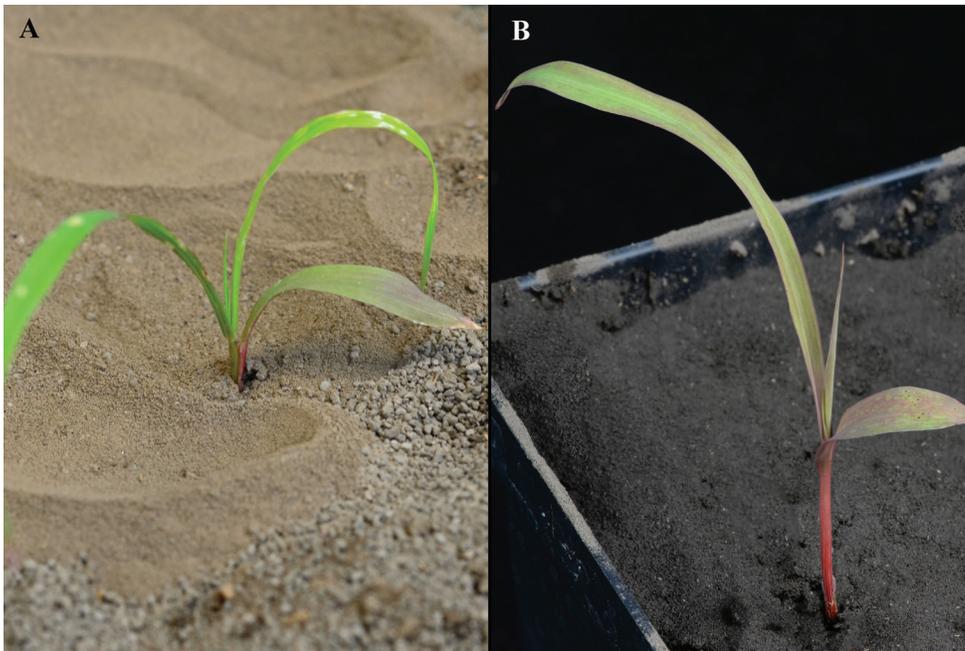


Figure 23. Seedlings of (A) johnsongrass, and (B) shattercane. Shorter and wider cotyledon of shattercane (right) compared to johnsongrass (left).



Figure 24. Ligule of shattercane.

Shattercane [*Sorghum bicolor* (L.) Moench ssp. *arundinaceum* (Desv.) de Wet & Harlan] is a problematic summer annual weed found in row crops throughout the United States. It can readily cross with commercially available grain or forage sorghum, resulting in low quality and value of the harvested seeds. It can also outcross with johnsongrass, another weed species from the genus *Sorghum*. Shattercane and johnsongrass can serve as good forage for livestock; however, exposure to stress, such as frost, drought, or herbicide, may increase the levels of hydrocyanic acid in the leaves, making them poisonous when ingested by livestock. Livestock can spread the shattercane seeds in their manure.

Flowering period: Late July through October

Distinguishing features:

Shattercane resembles grain sorghum and corn plants during its early growth stages. The leaf blades are flat, sometimes with reddish or purplish splotches. Shattercane's cotyledon and first leaf are wider than those of johnsongrass (Figure 23). The ligule is membranous at the early growth stage and fringed with trichome later in the season (Figure 24). Auricles are absent. The inflorescence may be compact or loose and open with a pyramidal shape. Seedheads droop at maturity, containing seeds that are tan or brown in color.

Wild oat

Wild oat [*Avena fatua* L.] is a winter annual grass mostly found in agricultural lands, grasslands, and roadsides. Wild oat spreads via contaminated cereal seeds, and also via farm implements. It is also frequently found in feed and silage. Wild oat is considered one of the most problematic weeds in grain crops such as wheat and barley, and the long awns of its seedheads can injure grazing animals.

Flowering period: March through June

Distinguishing features: Sturdy wild oat plants can grow up to 4 feet tall. Stems are round and hairless or with relatively little hairs. Wild oat has a long (0.20 inches long vs. 0.02 inches in jointed goatgrass) membranous ligule but has no auricles present (Figure 25). Spikelets are long, narrow, and awned. The long-awned spikelets usually droop (Figure 26). Another distinctive characteristic of wild oat is the twist of its leaf blade: Wild oat leaf blades twist counter-clockwise, while wheat and barley leaf blades twist clockwise.



Figure 25. Ligule of wild oat.



Figure 26. Long-awned spikelets of wild oat.

Wild-proso millet



Figure 27. Hairs on the leaf sheath and leaf blade of wild-proso millet.



Figure 28. Ligule of wild proso millet.

Wild-proso millet [*Panicum miliaceum* L.] is a problem weed in corn in the western Great Plains. It is a summer annual weed found mostly in cultivated areas, fields, lawns, turf, and roadsides. Wild-proso millet seeds make good food for birds and can be spread by birds, animals, and water.

Flowering period: July to September

Distinguishing features: Wild-proso millet is an erect plant and its stems branch out at the base. Its nodes are hairy, and leaf blades are flat with stiff hairs on both surfaces. Its leaf sheaths have long, spreading hairs (Figure 27). The ligule is short with a fringe of hairs from a basal membrane, and auricles are absent (Figure 28). Wild-proso millet has a drooping, branched, but compact inflorescence, and the lower florets are sterile.

For detailed information about herbicide options for controlling grass weeds in row crops, range, and turfgrass, see the Guide for Weed, Disease, and Insect Management in Nebraska (EC130) available at <https://marketplace.unl.edu>.

Weeds of the Great Plains, by J. Stubbendieck, M.J. Coffin, and L.M. Landholt, published by the Nebraska Department of Agriculture. The guide costs \$25 and can be ordered by mail or by phone at (402) 471-2351. Nebraska Department of Agriculture, Central Fee Collection, P.O. Box 94668, Lincoln, NE 68509.

Resources

Weed Identification and Herbicide Injury Guide for Corn and Soybean, published by the University of Missouri Extension. Available for purchase at <http://extension.missouri.edu>.

Contact

Amit J. Jhala, University of Nebraska–Lincoln, email: Amit.Jhala@unl.edu



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