SDSU Extension

iGrow Soybean

BEST MANAGEMENT PRACTICES

Chapter 30:
Identification of South Dakota Grass and Grass-like Weeds of Importance

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There are many grass or grass-like weeds that reduce soybean yields. This chapter provides yield loss potentials, emergence information, and keys for identifying important grass or grass-like weeds. Selected characteristics of grass and grass-like weeds are provided in Table 30.1.

Table 30.1. Selected characteristics of grass and grass-like weeds. Information on Weed Science Society of American (WSSA) herbicide Groups are available at http://www.wssa.net/wp-content/uploads/WSSA-Mechanism-of-Action.pdf.

Weed Emergence Timing	Weed	Yield Loss Potential	Notes
Early-season	Volunteer corn	High	May be WSSA Group 9 (glyposate) (if RR cultivars planted); WSSA Group 2 (ALS inhibitors) (e.g., sulfonylureas and imidiazilinones) (if Clearfield cultivars planted); or WSSA Group 10 (glufosinate) (if LibertyLink cultivars planted).
Early-season	Woolly cupgrass	Moderate	Post emergence grass herbicide provides good control, and is not controlled by most pre-grass herbicides.
Early-season Mid-season Mid-season	Giant foxtail Yellow foxtail Green foxtail	Moderate	May be resistant to WSSA Group 1 (ACC-ase inhibitors) (e.g., sethoxydim); Group 2 (ALS inhibitors) (sylfonylureas and imidiazilinones); Group 3 (mitosis inhibitors) (e.g., trifluralin); and Group 5 (photosystem II inhibitors) (e.g., metribuzin).
Early-season	Foxtail barley	Moderate	No resistance reported.
Late-season	Longspine sandbur	Low	No herbicide resistance reported.
Late-season	Barnyardgrass	Low	May be resistant to photosystem II inhibitors (WSSA Group 5, metribuzin) and ACC-ase inhibitors (WSSA Group 1, e.g., sethoxydim).
Late-season	Large crabgrass	Low	May be resistant to ACC-ase inhibitors (WSSA Group 1) (e.g., sethoxydim).
Late-season	Witchgrass	Low	May be resistant to photosystem II inhibitors (WSSA Group 5) (e.g., metribuzin).
Late-season	Wild proso millet	Moderate to High	No resistance reported.
Late-season	Fall panicum	Moderate	No resistance to herbicides in the U.S.
Late-season	Scouring rush Field horsetail	Low	No resistance reported, although difficult to control; found in areas that may have been flooded or very wet.

When choosing an herbicide, always read and follow label instructions. It is a violation of federal pesticide laws to use an herbicide in a manner inconsistent with labeling as to rate, timing, and other restrictions. Read the entire label prior to use. Always follow applicator safety instructions. Protect water quality, by preventing accidents and spills, back siphoning, mixing and applying away from water sources. There is no intent to specify product performance guarantees. Users are responsible for following all herbicide label directions and precautions.

Volunteer Corn *(Zea mays)*

Time of emergence: Volunteer corn typically emerges early, before, or just after planting depending on soil temperature and moisture conditions.

Life cycle and reproduction: Annual, reproducing from seed lost during combining at harvest.

Areas of infestation: Typically occurs in localized areas. Problems are heightened when rotating into a long-term corn monoculture system or when an herbicide-resistant variety was planted the previous year.

Yield loss potential: Volunteer corn may cause yield losses up to 40%. Control should be implemented if volunteer corn density is about 1 plant/yd^2 (about 1 plant/m^2).

Suggested management: If a glyphosate-tolerant corn variety was planted, use a pre-or post-emergent grass herbicide or cultivate inter-row areas if soybeans are in 30" rows.

Herbicide resistance: Hybrid-dependent based on transgenic traits; glyphosate (Roundup Ready®varieties), glufosinate (LibertyLink® varieties), or ALS-inhibiting herbicides (Clearfield® varieties).

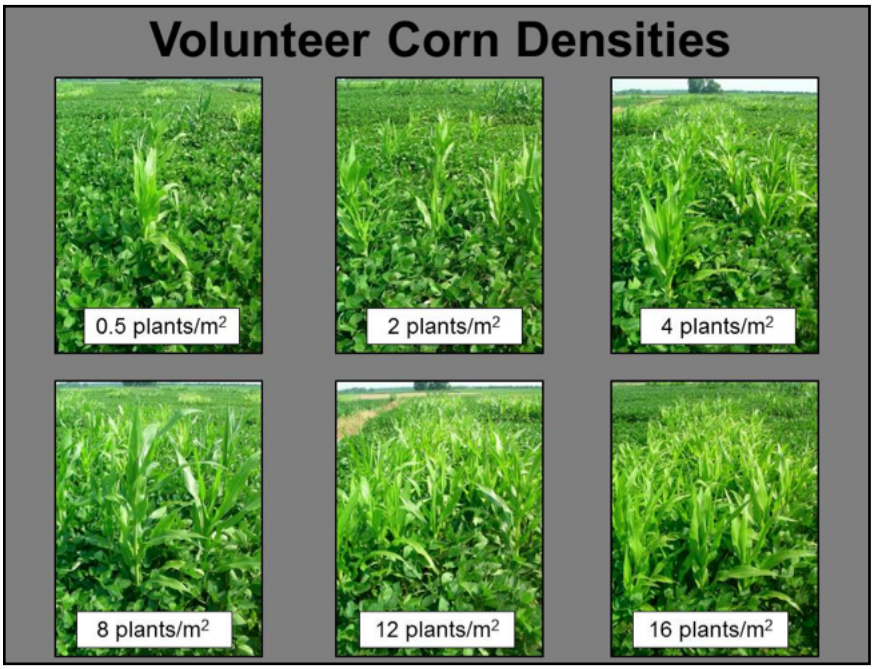

Figure 30.1. Volunteer corn densities. (Produced and prepared by Purdue University Extension Weed Science)

Woolly cupgrass *(Eriochloa villosa)*

Time of emergence: When soil temperatures are favorable, woolly cupgrass emerges before or just at soybean planting. Typically, woolly cupgrass germination period is short (all seedlings emerge within two weeks after initial emergence).

Life cycle and reproduction: Woolly cupgrass is an annual that reproduces by seed.

Distinguishing characteristics: The cotyledon and first true leaf are very wide. Leaves are covered in fine soft hair (hence the name woolly) and one of the leaf margins generally is crinkled. This plant is often confused with foxtails, but typically does not tiller as much as a foxtail plant. The seed head is a distinctive panicle with compressed rows of seed. The seed is oval and vary in color from tan to brown to green.

Areas of infestation: Found in fertile loam to clay loam soils.

Yield loss potential: Moderately competitive, especially plants that emerge early in the season.

Suggested management: Typically uncontrolled by pre-emergence grass herbicides in the acetanilide family (metolachlor, acetochlor) (WSSA Group 15) although early suppression may be seen. Mitosis inhibitor herbicides such as pendimethalin (WSSA Group 3) may give good control. Post-emergence grass herbicides give good to excellent control.

Herbicide resistance: None has been reported.

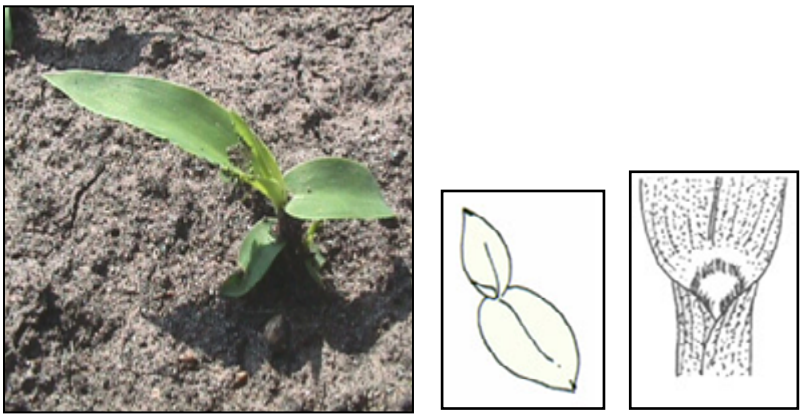

Figure 30.2. Woolly cupgrass seedling, collar region, and seed head. (Top photo & drawings courtesy of Iowa State University; bottom photo courtesy of Michael Moechnig, SDSU)

Giant foxtail *(Setaria faberi)*, Yellow foxtail *(S. pumila)*, and Green foxtail *(S. viridis)*

Time of emergence: Giant foxtail often emerges before soybean planting. Yellow and green foxtails emerge toward the end of planting.

Life cycle and reproduction: Each of these weeds is an annual that reproduces by seed.

Distinguishing characteristics: Giant foxtail is infrequently found in South Dakota. Soft short hairs are found on the leaf blade and the plant has a hairy ligule. Plants can grow up to seven feet tall. Yellow and green foxtails infest most eastern South Dakota fields. Yellow foxtail has long yellow hairs near the ligule, a flattened stem, and large seeds. Green foxtail has no or few hairs on the leaf blade, a round stem, and seeds are small.

Areas of infestation: Common in several soil types and in many climates.

Yield loss potential: Soybean yield losses can reach 20% if densities are >2 plants/ft^2. The potential for yield loss is greater with giant foxtail compared to yellow or green foxtail at similar densities.

Suggested management: Tillage, crop rotation, and post-emergence cultivation can effective control measures. Green and yellow foxtail can be controlled with a variety of both pre- and post-emergence grass herbicides typically used in soybean.

Herbicide resistance: Biotypes of all these foxtails have shown resistance to a number of herbicides with different modes-of-action. Giant foxtail has been reported to be resistant to photosystem II inhibitors (e.g., metribuzin, WSSA Group 5); ALS inhibitors (sulfonylureas and imidiazilinones WSSA Group 2); and ACCase inhibitors (e.g., sethoxydim, WSSA Group 1). Yellow foxtail has been reported to be resistant to ALS and photosystem II herbicides. Green foxtail has been reported to be resistant to mitosis inhibitors (e.g., dinitroanailine herbicides such as trifluralin) (WSSA Group 3), ALS, ACCase inhibitors, and photosystem II inhibitors.

Figure 30.3. Giant foxtail ligule (left) and mature plant (right). (Left, photo courtesy of The Weed Science Society of America; right, photo courtesy of Pacific Northwest Weed Handbook)

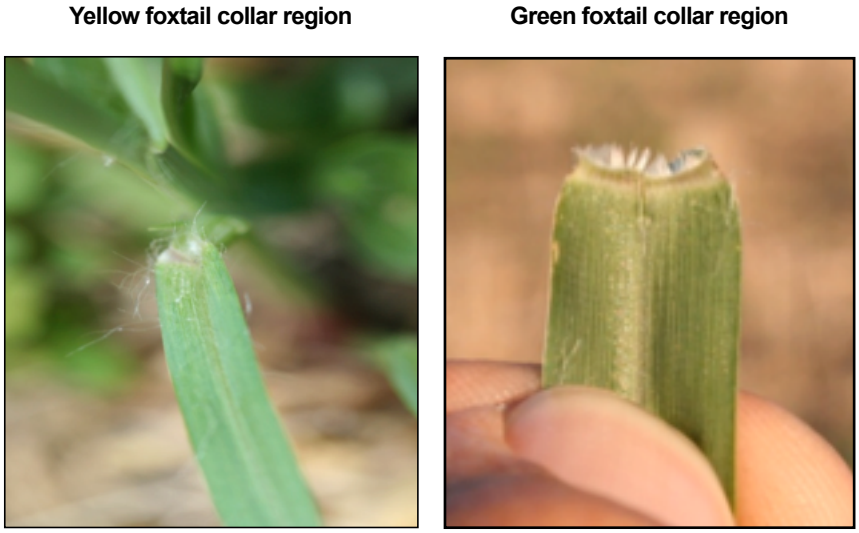

Figure 30.4. Yellow foxtail and green foxtail collar regions. (Photos, M. Moechnig, SDSU)

Figure 30.5. Yellow foxtail and green foxtail seedheads. Note that the seeds of yellow foxtail are larger than those of green foxtail. (Photos, M. Moechnig, SDSU)

Foxtail barley *(Hordeum jubatum)*

Time of emergence: This cool-season grass emerges early in the season.

Life cycle and reproduction: This perennial native cool-season grass is a bunchgrass found in patches. This shallow-rooted plant reproduces by seed. Overwintering plants can start growth very early in the growing season and will produce a seedhead by late May or early June.

Distinguishing characteristics: Vegetative stems are round and have no hair. The ligule is membranous, blunt, and with a few hairs. Clasping auricles are found at the collar region. The glumes and lemma of the seed have long (0.5" to 3") awns that are often purplish in color.

Areas of infestation: Foxtail barley grows well in saline, wetland sites and is often found in field edges and roadsides. This plant is more problematic in no-till fields due to lack of tillage disturbance.

Yield loss potential: Moderate.

Suggested management: Burndown with glyphosate prior to planting. Soil management to decrease water and salt problems in infested areas may be warranted.

Herbicide resistance: None reported.

Figure 30.6. Foxtail barley collar region and mature plant with inflorescence. (Photos, M. Moechnig, SDSU)

Longspine sandbur *(Cenchrus longispinus)*

Time of emergence: Longspine sandbur is a non-native warm-season grass emerging after planting.

Life cycle and reproduction: Longspine sandbur is an annual that reproduces from seed.

Distinguishing characteristics: Sandbur has stems that are flattened with hairs; leaves may be rough to the touch. The plant has a short, fringed, hairy ligule. Seeds are enclosed in sharp, spiny, hairy burs that are characteristic and give the plant its name.

Areas of infestation: Found in sandy soils, although may be found in fertile loam to clay loam soils.

Yield loss potential: Yield loss is often low. Nuisance plant due to sharp burs.

Suggested management: Tillage is effective when sandbur is small. Competition with shading reduces growth. Many pre-emergent and post-emergent grass herbicides typically used in soybean give good to excellent control. However, pre-emergence seedling shoot inhibitor herbicides (e.g., metolachlor, WSSA Group 15) have been shown to provide only marginal control for sandbur.

Herbicide resistance: None has been reported for field sandbur.

Figure 30.7. Longspine sandbur seedling, mature plant, and seed head.
(Photos courtesy of (1) L.L. Berry, Bugwood.org; (2 and 3) M. Moechnig, SDSU)

Barnyardgrass *(Echinochloa crus-galli)*

Time of emergence: Barnyardgrass is a warm-season grass that emerges later in the season after planting.

Life cycle and reproduction: Annual plant that reproduces by seed.

Distinguishing characteristics: This warm-season grass has flattened, smooth, and branched stems without an auricle or ligule. This grass has broad leaves and typically is reddish or purple at the base of the plant. Barnyardgrass size can vary from two inches tall with only one tiller to over four feet tall with 50 + tillers. Larger plants are found around field edges, in wet areas, or in areas with poor canopy cover.

Areas of infestation: Found in wetter areas.

Yield loss potential: Yield loss is often low due to late emergence.

Suggested management: Tillage is effective when plants are small. Shade under a crop canopy reduces growth. Pre-emergent herbicides that contain PPO inhibitors (e.g., sulfentrazone, WSSA Group 14), microtubule inhibitors (e.g., triflulalin,WSSA Group 3), or seedling shoot inhibitors (e.g., metolachlor, WSSA Group 15) provide good to excellent control of barnyardgrass. Post-emergent grass herbicides such as ACCase inhibitors (e.g., fluazafop, WSSA Group 1) are often effective. Depending on herbicide-resistant variety planted, glyphosate (WSSA Group 9) and glufosinate (WSSA Group 10) will provide excellent post-emergence control.

Herbicide resistance: Biotypes have been reported to be resistant to photosystem II inhibitors (e.g., metribuzin, WSSA Group 5); ACCase inhibitors (e.g., sethoxydim, WSSA Group 1); and other chemicals.

Figure 30.8. Barnyardgrass collar region and seed head. (Photos, M. Moechnig, SDSU)

Large crabgrass *(Digitaria sanguinalis)*

Time of emergence: This warm-season grass emerges after soybean emergence.

Life cycle and reproduction: Large crabgrass is an annual that reproduces by seed.

Distinguishing characteristics: Hairs found everywhere on plant, flattened stem, ligule membranous, seedhead finger-like spikes. This grass can grow from six inches to two feet tall.

Areas of infestation: No specific growing requirements.

Yield loss potential: Low even at high densities.

Effective management: Tillage, crop rotation, and post-emergence cultivation may be effective management tools to reduce stand numbers. This grass is often difficult to control post-emergence and should be controlled with pre-emergence chemicals.

Herbicide resistance: Herbicide resistance has been reported to ACCase inhibitors (e.g., sethoxydim, WSSA Group 1) in Wisconsin.

Figure 30.9. Large crabgrass collar region and mature plant. (Photos, M. Moechnig, SDSU)

Wild proso millet *(Panicum miliaceum)*

Time of emergence: Typically late in the season, after soybean planting.

Life cycle and reproduction: Wild proso millet is an annual that reproduces by seed.

Distinguishing characteristics: This warm-season grass has a round stem with membranous ligule tipped with a fringe of hair. Seedlings look like corn but are hairy. Leaf blades are flat. Hairs may or may not be on the blade and sheath, but hairs are present at nodes. This grass can grow up to six feet tall. Seeds large, shiny, and white, green striped, olive brown, or black and often remain on the root of seedlings, which help in identification. Nonblack seeds in soil are usually not viable after two seasons; black seeds have been reported to remain viable for up to four years.

Areas of infestation: Tolerates sandy, dry soils and high temperatures.

Yield loss potential: Yield loss is moderate to high.

Suggested management: Tillage is effective when plants are small. Shading by the crop canopy reduces growth. Fair or poor control is obtained when pre-emergent grass herbicides are used. However, post-emergent weed control is rated as good if using herbicides that contain ACCase inhibitors (WSSA Group 1). Sanitation of equipment is suggested to prevent spread.

Herbicide resistance: None noted at this time.

Figure 30.10. Wild proso millet seedling, ligule, and seedhead. (Photos 1 and 3 courtesy of Steve Dewey, Utah State University; Photo 2, courtesy of Weed Science Society of America)

Witchgrass *(Panicum capillare)*

Time of emergence: This warm-season annual grass emerges after soybean emergence.

Life cycle and reproduction: This annual weed reproduces by seed.

Distinguishing characteristics: Witchgrass has a flat stem with long, soft hairs covering most of the plant. The ligule is a fringe of hair. Panicles are an open inflorescence, spreading, hairy, and large. When mature, the panicle can break off and tumble along the ground.

Areas of infestation: Grows well in sandy, droughty soil.

Yield loss potential: Low, even at high densities.

Suggetsted management: Tillage, crop rotation, and post-emergence cultivation can be effective control measures reducing stand numbers. Pre- and post-emergent grass herbicides typically used in soybean can be used for control.

Herbicide resistance: A biotype of witchgrass, resistant to photosystem II herbicides (e.g., metribuzin, WSSA Group 5) has been reported in Canada.

Figure 30.11. Images of witchgrass. (Photos courtesy of Weed Science Society of America)

Fall panicum *(Panicum dichotomiflorum)*

Time of emergence: This warm-season grass emerges late in the season, after soybean has emerged.

Life cycle and reproduction: This annual weed reproduces by seed.

Distinguishing characteristics: Vegetative stems are sometimes confused with witchgrass, although fall panicum has few hairs. Sheath is round. Blade is hairless and midrib is usually white and prominent. Seeds are bigger than witchgrass seed.

Areas of infestation: Fall panicum grows well in sandy or droughty soil types.

Yield loss potential: Moderate.

Suggested management: Pre-emergence grass herbicides can be effective against this grass weed.

Herbicide resistance: Worldwide; only Spain has reported resistance to photosystem II inhibiting compounds in WSSA Group 5 (e.g., metribuzin).

Figure 30.12. Fall panicum collar region, inflorescence emerging, and mature inflorescence. (Photos courtesy of (1) Weed Science Society of America; (2) Bruce Ackley, The Ohio State University, Bugwood.org; and (3) Lynn Sosnoskie, University of Georgia, bugwood.org)

Scouring rush *(Equisetum hyemale)* and Field horsetail *(Equisetum arvense)*

Time of emergence: These warm-season, grass-like plants emerge after soybean emergence.

Life cycle and reproduction: These perennial weeds reproduce from rhizomes and spores. They are slow to establish.

Distinguishing characteristics: Both plants have hollow stems; reproduce by spores and not seed. Scouring rush has erect, green, and unbranched stems. Most field horsetail plants have many branches that occur in whorls in the joints. Stems of both plants contain silica and were used to scrub pans.

Areas of infestation: Commonly found in wet roadside ditch areas. Encroaches into field edges and seasonally wet areas, but is often slow to spread.

Yield loss potential: Low, even at high densities, although soybean growth may be hampered in the wet soils, exaggerating the importance of these weeds.

Suggested management: Due to the perennial rhizomes of these weeds, tillage may spread the problem. Flumetsulam (ALS inhibitor, WSSA Group 2 herbicide) has been shown to give some control to these weeds. However, these plants are not on the label and no control is guaranteed.

Herbicide resistance: None reported.

For more information: http://www.weeds.iastate.edu/mgmt/2009/equisetum.pdf

Figure 30.13. Scouring rush plant. (Photo, M. Moechnig, SDSU)

Figure 30.14. Field horsetail plant. (Photo courtesy of Weed Science Society of America)

References and additional information

Center for Invasive Species and Ecosystem Health. Available at http://bugwood.org/

Herbicide Resistance links. Available at http://www.wssa.net/Resistance/

Summary of herbicide mechanism of action according to Weed Science Society of America (WSSA). Available at http://www.wssa.net/wp-content/uploads/WSSA-Mechanism-of-Action.pdf

Weed Science Society of America. http://www.wssa.net/Society/

Acknowledgements

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Clay, S.A. 2013. Identification of South Dakota grass and grass-like weeds of importance. In Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). iGrow Soybeans: Best Management Practices for Soybean Production. South Dakota State University, SDSU Extension, Brookings, SD.