

The Oklahoma Cooperative Extension Service WE ARE OKLAHOMA

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.



Sandbur Control in Bermudagrass Pastures

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Bermudagrass (*Cynodon dactylon* L.) is one of the most common introduced warm-season forages in Oklahoma pastures and serves as the forage base for many livestock enterprises. Its popularity among producers is due to its high forage production potential, drought resistance, grazing tolerance and low pest and disease pressure. However, bermudagrass pastures can be easily infested by weeds if they are not properly managed. Sandbur is one of the most challenging weeds affecting this system due to loss of palatability. Different species of sandbur can invade bermudagrass pastures, including field sandbur (*Cenchrus spindex* Cav.), longspine sandbur (*Cenchrus longispinis* Hackel Fern.) and Southern sandbur (*Cenchrus echinatus* L.). They must be removed or controlled to prevent reductions in forage yield and palatability. Control mechanisms do not differ between species; therefore, it will simply be referred to the species complex as "sandbur."

Life Cycle and Identification

Sandbur is an annual warm-season weed. Seed germination starts when soil temperatures reach 52 F and peaks at 75 F (Boydston, 1989). Emergence can occur until late fall if soil moisture and temperatures are adequate when viable seeds are present. This plant prefers full sun, and can reach 3 feet high. Sandbur is an annual weed that produces seeds inside of a specialized floret known as a bur. The bur protects and keeps the seeds viable for years in the soil. Rhizomes and stolons are not produced, but sandbur can develop roots at the lower nodes of the stems forming a mat, and rarely, behaves as a short-lived perennial (Gould, 1975).

During vegetative stage, the best way to identify sandbur is looking at the leaf collar, which is the bond between the leaf blade and sheath. The sandbur collar is light-colored, hairy, and contains a membrane, i.e. ligule, that appears to have been cut by scissors into very fine strips (Figure 1). Also, the leaf blades are smooth, twisted and range from 2 to 5 inches long. The leaf sheath is loose from the stem, smooth, flattened and slightly hairy on the margins.

The easiest way to identify sandbur is after flowering, by looking at its inflorescence which is a terminal spike 1 to 3 inches long containing 6 to 20 spiny hairy burs (Figure 1). For effective control, sandbur must be identified and managed early in the vegetative stage to avoid seed production.

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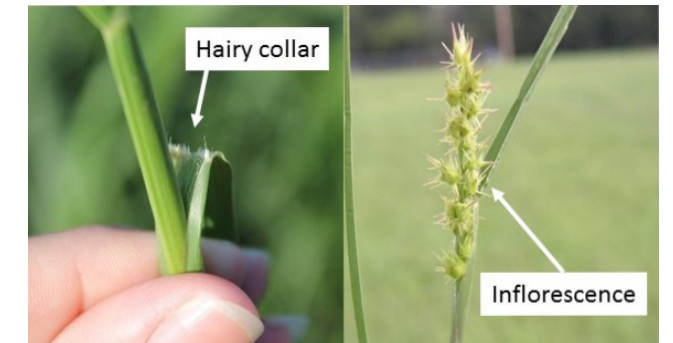


Figure 1. Sandbur identification.

Control Methods

The bur is what makes sandbur a successful competitor against bermudagrass. The bur not only allows the seed to stay viable for years in the soil, but also absorbs and retains soil moisture until conditions are good for germination. In this way, sandbur can easily take over poorly managed bermudagrass pastures on dry sandy soils. The best control is prevention (Table 1). However, some pastures are already infested. In this case, the second alternative is cultural suppression. Good management practices consistently used every year will continuously decrease sandbur and increase bermudagrass yields. The last resource is herbicide application that should be used in severe pasture infestation and in combination with cultural suppression techniques.

Prevention

During bermudagrass pasture establishment, sandbur infestation can be prevented by using certified seed or sprigs, which ensure strict limits on weeds. For subsequent years, it is recommended to inspect and clear equipment, animals and clothes that were previously in other pastures infested with sandbur. The spiny burs can easily attach to them and rapidly infest the next pasture. Hays can also contain and spread sandbur. Avoid introducing hay to your pasture that was produced in fields infested with sandbur. If purchasing hay, it is recommended that you inspect the hay and inquire

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Table 1. Chemical control products labeled for sandbur control in bermudagrass pasture and hay.

Active Ingredient	Example Trade Name	Rate per application	Timing	Maximum Rate/A/yr	Potential yield loss
pendimethalin	Prowl H ₂ O	4.8 pts/A	PRE	4.2 quarts	25%
glyphosate	Roundup Weathermax	8-11 oz/A	POST	2 quarts	63%
imazepic	Plateau	4-12 oz/A	POST	12 oz	30%
nicosulfuron + metsulfuron-methyl	Pastora	1 oz/A	POST	2.5 oz	32%

about sandbur prior to purchase. For more information regarding hay inspection, see factsheet PSS-2588 *Evaluating Hay Quality Based on Sight, Smell and Feel – Hay Judging*.

Cultural Suppression

Proper fertilization and stocking rate combined are the best sandbur control in bermudagrass pastures. Proper fertilization will provide all nutrients, while proper stocking rate will assure enough energy reserves for fast and vigorous bermudagrass regrowth. Following these measures will not only make bermudagrass more competitive against sandbur, but they will also increase the pasture productivity and quality. As a rule of thumb, it is recommended applying 50 pounds of nitrogen from May to October for every one ton of bermudagrass forage production. Soil phosphorus and potassium should be maintained in good levels for good root development and plant regrowth. See Fact Sheet PSS-2263 *Fertilizing bermudagrass Hay* and the *Oklahoma Pasture Fertility Guide* for more information regarding proper bermudagrass fertilization. Proper stocking rate can be achieved by monitoring available bermudagrass forage. Keep in mind that 2 to 3 inches stubble height is essential for good bermudagrass regrowth and sandbur suppression. Bermudagrass is well known to tolerate heavy grazing. However, heavy grazing decreases bermudagrass yield and increases weed pressure in pastures. Focus on achieving optimum yields by keeping 2 to 3 inches stubble height whether cutting for hay or grazing. Fact Sheets PSS-2594 *Plan Grazing Management Using the Oklahoman Grazing Stick* and PSS-2871 *Pasture and Stocking Rate: The Key to Successful Livestock Production* contain information on proper forage availability and stocking rate estimation.

Pasture burning can reduce sandbur populations if executed at the right time and intensity. Conversely, burning may stimulate sandbur germination if it is not intense enough to kill the seed and the remaining soil cover is low. In this case, burning can increase herbicide efficacy because a high percentage of sandbur seeds will germinate and will be exposed to the applied herbicide.

Chemical Control – Herbicides

Chemical products for sandbur control are limited and do not differentiate between sandbur species. Currently only four products are labeled for sandbur control or suppression in ber-

mudagrass pasture. They are glyphosate (many formulations), Plateau, Pastora and pendimethalin (many formulations). MSMA is no longer available for use in bermudagrass pasture. Use rates, timing and potential yield losses are presented in Table 2. In 2014 and 2015, research at Oklahoma State University indicated that both Plateau and Pastora controlled sandbur best at 90 and 100 percent, respectively, when applied within three weeks after germination. After three weeks of age, only Pastora adequately controlled sandbur. These two products also limit yield losses compared to glyphosate treatments. While the glyphosate treatment is much cheaper than Pastora or Plateau, yield losses are much higher.

If sandbur is a concern for your pastures, it is best to take a multi-faceted approach to control. Make sure stocking rates are suitable for the productivity of the land and implement management strategies including appropriate fertility, periodic burning where allowed and only use chemical weed control where yield losses can be tolerated for a season.

References

Boydston, Rick A. (Jan, 1989). Germination and Emergence of Longspine Sandbur (*Cenchrus longispinus*). *Weed Science* 37 (pp 63-67). *Weed Science Society of America* and Allen Press.

Gould, F. W. (1975). *The grasses of Texas*. College Station, TX: Texas A&M University Press. 65

PSS-2588 *Evaluating Hay Quality Based on Sight, Smell and Fell – Hay Judging*. Available at: <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2556/PSS-2588web2015.pdf>

PSS-2263 *Fertilizing Bermudagrass Hay*. Available at: <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-7126/PSS-2263web.pdf>

Oklahoman Pasture Fertility Guide. Available at: <http://npk.okstate.edu/documentation/factsheets/Pasutre%20Handbook/E-1021web.pdf>

PSS-2871 *Stocking rate: The Key to Successful Livestock Production*. Available at: <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2050/PSS-2871web.pdf>

PSS-2594 *Plan Grazing management using the Oklahoman grazing stick*. Available at: <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-10394/PSS-2594web.pdf>

Table 2. Summary of best management practices (BMPs) to control sandbur and recover bermudagrass pastures. The gray cells indicate optimum timing of each BMP through the year.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Winter			Spring			Summer			Fall		
Prevention Bermudagrass Seeding (establishment/renovation)												
Prowl H ₂ O (chemical)												
Sprigging (establishment/renovation)												
Equipment and animals												
Hay inspection												
Cultural Suppression Fertilization												
Grazing pasture												
Hay pasture												
Burning												
POST Chemical Control Roundup												
Pastora												
Plateau												