DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA2155

Sod Farm Weed Control

John Boyd
Professor and Extension
Weed Scientist

Turfgrass competition is an important part of weed control, but it is often a minimal factor on sod farms because much of the acreage is in a constant state of grow-in. About the time turfgrass becomes fully established and capable of competing with weeds, it is harvested and the process begins again.

Figure 1. Harvesting sod in central Arkansas.

Cultural Practices

Good cultural practices will improve weed control. Once turf is established, regular mowing will control many upright growing broadleaf weeds and johnsongrass. Pigweed, ragweed, cocklebur, dogfennel, hemp sesbania and morningglory are all controlled by regular mowing. Good drainage is an essential part of weed control. Stop farming potholes and laser the field to make certain it will drain. A well-drained field has fewer weeds, less disease and is much easier to get back into after a rain. Maintaining the proper soil nutrient levels and pH will also improve weed control through improved crop competition. Plan ahead. It is always easier to take care of things like land leveling and lime application before planting rather than after the fact.

Prevent Weeds From Spreading

Weeds have a variety of mechanisms for dispersal of seeds. Most seeds or seed pods have special structures allowing them to cling, fly or float. Horseweed, dandelion and thistle seeds have a feathery pappus that allows

Figure 2. Land leveling to ensure good drainage.

Arkansas Is Our Campus

Visit our web site at:
https://www.uaex.uada.edu

them to be carried by wind. Weeds also can be spread when animals or birds eat their fruit and deposit the seeds with their droppings. Weed seed may be spread through crop seeds, sprigs, sod, soil, water and wind. Irrigation water from rivers, creeks and canals is a rich source of weed seeds. Vehicles and equipment can spread weed seed and vegetative propagules from one site to another. Wash equipment before moving from a weedy field into a clean field. Keep border areas including ditches and fencerows weed free to eliminate another source of weed seed.

Bermudagrass

Bermudagrass is the most troublesome weed in Arkansas sod production. Bermudagrass spreads by seed, roots, rhizomes (underground stems) and aboveground runners. The characteristics that make bermudagrass a good turfgrass (persistence, aggressive growth and recovery ability) also make it a very successful weed. It readily infests zoysiagrass, centipedegrass, St. Augustinegrass and other bermudagrass varieties. Common bermudagrass contamination in hybrid bermudagrasses is the most serious weed in bermudagrass sod production. Once sod is contaminated with unwanted bermudagrass, the problem typically gets worse with every harvest because bermudagrass rapidly colonizes the bare soil exposed after sod removal.

Preplant Bermudagrass Control

What are the options for bermudagrass control? Fumigation is the most effective method and also the most expensive. The cost of fumigating with methyl bromide or Basamid varies, but $1,500 to $2,000 per acre is a reasonable estimate.

Another choice is to use repeated applications of glyphosate. Using glyphosate requires dedicating at least a full growing season to bermudagrass control. Three to four applications of 4 lb/gal glyphosate at 2 to 3 qt per acre are required. A typical schedule would be spraying 3 qt per acre glyphosate in May, July, September and again the following spring after bermudagrass greens up. It is essential to wait for bermudagrass regrowth between applications. Spraying brown bermudagrass is a waste of time. An effective program requires watering during dry periods to stimulate growth and ensure maximum herbicide performance. Increasing the rate of glyphosate per acre will not compensate for multiple applications. Three quarts per acre applied three times is much more effective than 9 qt per acre applied one time.

The success of a bermudagrass eradication effort depends on many factors including bermudagrass type, age of the stand and environmental conditions during and between applications. The herbicide applications must be accurate, uniform and timely. Strive for 100 percent control of bermudagrass before planting. After the planting site is clean, the second crucial step is using clean, bermudagrass-free planting stock. Planting a clean site with contaminated sprigs has been the downfall of many sod establishment operations. This occurs because it is very difficult to find a source of sprigs that is not contaminated with bermudagrass. Ensuring a supply of clean sprigs often requires buying foundation grade plant ing stock and developing an on-farm sprig nursery. Fumigating five acres for a sprig nursery on your own farm might be the most effective way to spend $10,000. Obviously, weed control in the sprig nursery should be meticulous and continuous.

Figure 3. Bermudagrass in Meyer zoysiagrass.

Bermudagrass in Bermudagrass

Once a stand is infested with bermudagrass, there are some treatments that will provide partial relief. There is no selective herbicide for removing an unwanted bermudagrass in another bermudagrass. The primary option in this situation is spot spraying with glyphosate. Spot spraying for bermudagrass control is labor intensive and ultimately not very effective. It is too easy to miss clumps of bermudagrass as the spray crew passes through.

Spot spraying with a 2 percent solution of 4 lb/gal glyphosate is better than nothing, but not much. Spot treatment usually works best when the contamination is isolated and the approach is aggressive with follow-up applications every time the bermudagrass greens up. The spray crew should make multiple

Figure 4. Common bermudagrass in hybrid bermudagrass.

Figure 5. Dew makes bermudagrass stand out in zoysiagrass.

passes through the field to catch missed spots and to spray regrowth of bermudagrass. This will help slow the spread of the problem but, typically, will not result in complete eradication. Depending on the target market, having two or more types of bermudagrass in the field may not be a bad thing. Many buyers are happy if the sod is all bermudagrass of some type and holds together.

Bermudagrass in Centipedegrass

There are selective herbicides available for bermudagrass suppression in centipedegrass. Sethoxydim (Segment) or clethodim (Envoy) will suppress bermudagrass without injuring centipedegrass. These herbicides may be broadcast or spot sprayed. The spot treatment rate is a 1 percent solution. The rate for Envoy is 17 to 34 fl oz per acre. Do not apply more than 68 fl oz per acre per season. Use the 17 fl oz per acre rate when using crop oil as a surfactant. If nonionic surfactant is used, the rate may be increased to 34 fl oz/acre. Wait for bermudagrass to produce 1 to 2 inches of new growth before making the second application. When using Segment on seedling centipedegrass, do not apply more than 1.5 pt per acre or more than 3 pt per acre for the season. On established centipedegrass, the maximum rate for a single application is 2.25 pt per acre. Do not exceed 4.5 pt per acre for the season. As in the case with Envoy, wait until regrowth occurs on the bermudagrass before making the second application of Segment.

Bermudagrass in Zoysiagrass

One of the best times to spot bermudagrass in zoysiagrass is while heavy dew is present. Dew sticks to bermudagrass but not zoysiagrass.

In zoysiagrass, applying a mixture of 1 quart triclopyr ester (Turflon Ester) + 4 to 6 fl oz fluazifop (Fusilade II) per acre at four-week intervals during the summer will significantly reduce the bermudagrass population. June is a good time to make the first application. Another option is using one quart triclopyr ester (Turflon Ester) + 28 fl oz of fenoxaprop (Acclaim Extra) per acre. The Fusilade II + Turflon Ester combination is less expensive. Do not make an application of either mixture later than mid-August. Zoysiagrass needs time to recover before cool weather begins. If contamination is severe, it is probably best to start over or sell the product as a blend. “ZoyMuda” might be a good name under which to market a mixture of bermudagrass and zoysiagrass.

Grass Weeds

The most common summer grass weeds in Arkansas sod production are crabgrass, goosegrass, broadleaf signalgrass, sprangletop and tufted lovegrass. MSMA is the primary tool for control of summer grasses in bermudagrass and zoysiagrass sod production. MSMA does not control goosegrass or tufted lovegrass.

Tufted lovegrass is rarely seen in established grasses but thrives when bare soil is exposed through sod harvest. Use Sencor (metribuzin) for goosegrass control in bermudagrass only.

For control of tufted lovegrass in centipedegrass, apply 2 to 4 fl oz of Tenacity (mesotrione) tank mixed with 0.25 to 0.5 lb per acre atrazine. Make two applications about 10 days apart. Add 0.25% nonionic surfactant. Do not use Tenacity in bermudagrass or zoysiagrass unless injury can be tolerated. Do not tank mix Tenacity with atrazine when spraying

Figure 6. Tufted lovegrass seedlings in zoysiagrass ribbons.

Figure 7. Mature tufted lovegrass.

bermudagrass or zoysiagrass. In our trials, bermudagrass has recovered quickly from visual symptoms of Tenacity. However, it has taken up to six weeks for Meyer zoysiagrass to be free of visual symptoms. Remember that visual symptoms are not always an accurate measure of the effect of an herbicide on the overall growth of a turfgrass. Test mesotrione on a limited area before going wall to wall. Two fl oz of Tenacity per acre followed by 2 fl oz per acre 10 days later is a reasonable starting point for evaluating mesotrione for lovegrass control in sensitive grasses. Add 0.25% nonionic surfactant.

Centipedegrass growers also rely on sethoxydim (Segment) and clethodim (Envoy) for summer grasses other than tufted lovegrass. The primary winter grasses include annual bluegrass, cheat, downy brome, little barley, tall fescue and ryegrass. Glyphosate (Roundup) will control most winter grasses in completely dormant bermudagrass. Timely application (December) of atrazine or simazine in tolerant turfgrasses will control many winter annual grasses.

Most of the preemergence herbicides used in turfgrass are root growth inhibitors. For this reason, they are little used in sod production due to their potential to inhibit root development on sprigs or stolons that are trying to establish. One exception is oxadiazon (Ronstar), an effective preemergence grass herbicide that is not a root inhibitor. It may be used in sprigged bermudagrass or zoysiagrass.

Metolachlor (Pennant) is a shoot-inhibiting preemergence herbicide used by sod farmers for preemergence grass control. It is typically tank mixed with simazine or atrazine. This combination provides decent weed control with little effect on grow-in. Typical per acre rates are 1 to 1.5 lb of metolachlor + 1.0 to 1.5 lb of atrazine or simazine. Metolachlor + atrazine or simazine may be used on bermudagrass, centipedegrass, St. Augustinegrass and zoysiagrass. Control is short term, and the application should be repeated in 45 to 60 days. Do not use atrazine or simazine when sprigging matrella-type zoysiagrasses.

Figure 8. Tenacity symptoms on zoysiagrass.

Figure 9. Nubby zoysiagrass roots caused by a root-inhibiting herbicide.

Broadleaf Weeds

Buttercup, carpetweed, clover, henbit, wild garlic, purslane and spurge are some of the most common broadleaf weeds in Arkansas sod production. A three-way mix of 2,4-D + dicamba + MCPP (Trimec, etc.) is commonly used for broadleaf weed control. Metsulfuron (Manor/Blade) also controls a wide range of broadleaf weeds. If possible, avoid spraying metsulfuron on zoysiagrass and centipedegrass during transition. Manor is the herbicide of choice for wild garlic and spurge control. Carpetweed is not controlled by Trimec or metsulfuron. Monument, atrazine or simazine applied early postemergence will control carpetweed. In general, zoysiagrasses seem to be more sensitive to atrazine than simazine. Neither atrazine nor simazine should be used on matrella-type zoysiagrass that is not well established.

Table 1. Zoysiagrass Types

Zoysia japonica types	Zoysia matrella types
Meyer	Cavalier
Crowne	Zorro
Palisades	Zeon
El Toro	Diamond
Empire	Emerald

Sedges and Rushes

Sedges make up the third major weed group. Purple nutsedge, yellow nutsedge, kyllinga, rice flatsedge, globe sedge, cylindric and Texas sedge are the most common types. Two applications of MSMA, seven days apart, will control annual sedges, rice flatsedge, Texas sedge and kyllinga. Monument (trifloxysulfuron) and Certainty (sulfosulfuron) are very effective on most sedges including yellow, purple and kyllinga. Monument is safe on bermudagrass and zoysiagrass. Certainty may be used on bermudagrass, centipedegrass, St. Augustinegrass and zoysiagrass. SedgeHammer (halosulfuron) controls purple and yellow nutsedge and is safe on all turfgrassses. Other less commonly used sedge herbicides include Image (imazaquin), Basagran (bentazon) and Dismiss (sulfentrazone).

In some cases, path rush may become a problem on farms with highly compacted soils. Vigorous core aeration or other compaction relief practices are the most effective control. Two applications of 2,4-D ester, two weeks apart, will give partial control of path rush. Spraying should be done in May at the rate of 1 qt per acre.

Postemergence Herbicides

These recommendations are based on results obtained in Arkansas field trials. In our research plots, broadcast applications are applied at 15 or 30 gallons per acre using a boom sprayer equipped with Spraying Systems 8002 flat fan nozzles on 10- or 20-inch spacing. We add 0.25% nonionic surfactant to the spray mix. Sod farmers should use a boom sprayer and keep water volumes between 10 and 40 gallons per acre.

Weeds stressed due to dry weather, heat or other environmental factors (dust-covered leaves) are more difficult to control with postemergence herbicides. Applying herbicides such as MSMA, 2,4-D, mecoprop, dichlorprop and dicamba at temperatures above 90 degrees F increases the risk of turfgrass injury. The resistance of postemergence herbicides to wash-off by rainfall or irrigation varies among products. Typically, a rain-free period of 6 to 24 hours is sufficient to avoid a reduction in effectiveness. Even if rain falls soon after application, some degree of control will be achieved.

The use of most postemergence herbicides during spring transition (green-up) may temporarily injure the turfgrass and may retard spring green-up. Use herbicides at this time of year only if there is a severe weed infestation. Annual weeds that are small (two- to four-leaf stage) and actively growing are much easier to control with postemergence herbicides. Perennial weeds should be actively growing at the time of application.

Reference

McCarty, L.B., Gil Landry, Jeff Higgins and Landon Miller. 1999. *Sod Production in the Southern United States*. Clemson University.

Bermudagrass Sod Weed Control

Note: All herbicide rates are product rates per acre

Month	Recommended Weed Control Practice
Late November through December	Apply 1 qt of Princep Liquid or AAtrex 4L (or equivalent amount of other simazine or atrazine formulations) to control winter annual weeds. Princep and AAtrex will control annual bluegrass, common chickweed, henbit and most other winter annual weeds. Princep and AAtrex will not control wild garlic, dandelion, plantains and most other perennial weeds.
Late November through December	Apply 2 qt of 2,4-D (3.8 lb/gal formulation) or a Trimec-type product to control wild garlic (onions), dandelions and plantains. Add 0.25% v/v of a nonionic surfactant with 2,4-D or Trimec-type product. Alternatively, apply Manor or Blade at 0.5 oz to control wild garlic and most winter broadleaf weeds.
Mid-January to Mid-February	If wild garlic was treated with a 2,4-D or Trimec-type product, repeat the application six to eight weeks after the first application.
January to Mid-February	If winter annual weeds emerge following the November-December application of Princep or AAtrex, apply an additional 1 qt of either herbicide. If a field has received applications of 2,4-D or Trimec-type product for wild garlic control, this application may not be necessary unless annual bluegrass is the dominant weed.
Mid-February to March 15	Apply Ronstar Flo at 2.5 to 3.8 qt or Ronstar 50W at 4 to 6 lb to control summer annual grasses such as crabgrass and goosegrass. Pennant Magnum may be used for annual grass control at 1 to 2 pt. Pennant Magnum may be tank mixed with atrazine or simazine at 2 pt.
May through June	If crabgrass, bahiagrass or dallisgrass becomes a problem, use MSMA at a rate of 1/3 gal (6 lb/gal formulation). Drive 75DF at 1 lb may also be used for crabgrass control. If goosegrass becomes a problem, add 4 oz of Sencor 75W Turf to recommended rate of MSMA. Repeat the application on a 7- to 10-day schedule. Sencor should be used only on bermudagrass that is close to or has achieved complete soil coverage. Turf will be temporarily injured. **For broadleaf weeds**, use an amine formulation of 2,4-D or Trimec-type product. 2,4-D, 2,4-D + dicamba, 2,4-D + 2,4-DP and 2,4-D + MCPP + dicamba are commonly available formulations of two-way and three-way herbicide mixtures. Alternatively, Manor may be used to control numerous annual broadleaf weeds. Repeated mowing will control non-typical turfgrass weeds such as common ragweed, sicklepod, morningglories and others. It is usually not necessary to use an herbicide to control this group of weeds.
June through July	If purple or yellow nutsedge becomes a problem, apply Monument at 0.56 oz or Certainty or SedgeHammer at 1.33 oz + 0.5% v/v nonionic surfactant. Repeat applications of MSMA will control kyllinga and annual sedges. Established warm-season turfgrasses have excellent tolerance to SedgeHammer and Certainty. Use Monument on bermudagrass and zoysiagrass only. MSMA will control annual sedge, rice flatsedge and kyllinga.

Zoysiagrass Sod Weed Control

Note: All herbicide rates are product rates per acre

Timing	Recommended Weed Control Practice
Late November through December	Apply 1 qt of Simazine 4L or Atrazine 4L (or equivalent amount of other simazine or atrazine formulations) to control winter annual weeds. Simazine and atrazine will control annual bluegrass, common chickweed, henbit and most other winter annual weeds. Simazine and atrazine will not control wild garlic, dandelion, plantains and most other perennial weeds.
Late November through December	Apply 2 qt 2,4-D (3.8 lb/gal formulation) or a Trimec-type product to control wild garlic (onions), dandelions and plantains. Add 0.25% v/v of a nonionic surfactant with 2,4-D or Trimec-type product. 2,4-D and Trimec-type products are safe to use on fall-seeded ryegrass that has been mowed four to five times. Alternatively, apply Manor/Blade (metsulfuron) at 0.5 oz to control wild garlic and most broadleaf weeds.
Mid-January to Mid-February	If wild garlic was treated with 2,4-D or Trimec-type product, repeat the application six to eight weeks after the first application.
January to Mid-February	If winter annual weeds emerge following the November application of Princep or AAtrex, apply an additional 1 qt of either herbicide. If a field has received applications of 2,4-D or Trimec-type product for wild garlic control, this application may not be necessary unless annual bluegrass is the dominant weed.
Mid-February to March 15	Apply Ronstar Flo at 2.5 to 3.8 qt or Ronstar 50W at 4 to 6 lb to control summer annual grasses such as crabgrass and goosegrass. Pennant Magnum (metolachlor) may be used for annual grass control at 1 to 2 pt. Pennant Magnum may be tank mixed with atrazine or simazine at 2 pt as a cheaper alternative to Ronstar.
May through June	If crabgrass, bahiagrass or dallisgrass becomes a problem in bermudagrass or zoysiagrass, use MSMA at a rate of 1/3 gal (6 lb/gal formulation). Drive 75DF (quinclorac) at 1 lb may also be used for crabgrass control. Zoysiagrass cultivars vary in their tolerance to summer applications of MSMA. 'Emerald' is more sensitive to injury from MSMA than 'Matrella' or 'Meyer'. Fusilade II at 4 fl oz + 32 fl oz of Turflon Ester + 0.25% v/v nonionic surfactant may be used in zoysiagrass to suppress bermudagrass. Make the first application in May to early June and repeat every 30 days to control regrowth. Do not apply this mix later than mid-August. **For broadleaf weeds**, use an amine formulation of 2,4-D or Trimec-type product. 2,4-D, 2,4-D + dicamba, 2,4-D + 2,4-DP and 2,4-D + MCPP + dicamba are commonly available formulations of two-way and three-way herbicide mixtures. Refer to the specific product to determine if it is labeled for use on centipedegrass. Alternatively, Manor may be used to control numerous annual broadleaf weeds. Do not apply Manor to zoysiagrass or centipedegrass during transition. Repeated mowing will control non-typical turfgrass weeds such as common ragweed, sicklepod, morningglories, others). It is usually not necessary to use an herbicide to control this group of weeds.
June through July	If purple or yellow nutsedge becomes a problem, apply SedgeHammer (halosulfuron) or Certainty (sulfosulfuron) at 1.33 oz + 0.25% v/v nonionic surfactant or Monument (trifloxysulfuron) at 0.56 oz + 0.25% v/v nonionic surfactant. MSMA will control annual sedge, rice flatsedge and kyllinga.

Centipedegrass Sod Weed Control

Note: All herbicide rates are product rates per acre

Timing	Recommended Weed Control Practice
November	Apply 1 qt of Princep Liquid or AAtrex 4L (or equivalent amount of other simazine or atrazine formulations) to control winter annual weeds. Princep and AAtrex will control annual bluegrass, common chickweed, henbit and most other winter annual weeds. Do not apply to fields overseeded with perennial ryegrass. Princep and AAtrex will not control wild garlic, dandelion, plantains and most other perennial weeds.
Late November through December	Apply only 1 qt of 2,4-D or the lowest recommended rate of Trimec-type product. Alternatively, apply Manor at 0.25 oz to control wild garlic and numerous winter annual broadleaf weeds.
Mid-January to Mid-February	If wild garlic was treated with 2,4-D or Trimec-type product, repeat the application six to eight weeks after the first application.
January to Mid-February	If winter annual weeds emerge following the November application of Princep or AAtrex, apply an additional 1 qt of either herbicide. If a field has received applications of 2,4-D or Trimec-type product for wild garlic control, this application may not be necessary unless annual bluegrass is the dominant weed.
Mid-February to March 15	Apply Pennant Magnum at 1 to 2 pt to control summer annual grasses such as crabgrass and goosegrass. Pennant may be tank mixed with atrazine or simazine.
May through June	Segment may be used to control annual grasses and to suppress common bermudagrass and bahiagrass. Do not apply Segment to either bermudagrass or zoysiagrass production fields. **For broadleaf weeds**, use an amine formulation of 2,4-D or Trimec-type product. 2,4-D, 2,4-D + dicamba, 2,4-D + 2,4-DP and 2,4-D + MCPP + dicamba are commonly available formulations of two-way and three-way herbicide mixtures. Refer to the specific product to determine if it is labeled for use on centipedegrass. Alternatively, Manor may be used to control numerous annual broadleaf weeds. Do not apply more than 0.25 oz of Manor. Repeated mowing will control non-typical turfgrass weeds such as common ragweed, sicklepod, morningglories and others. It is usually not necessary to use an herbicide to control this group of weeds.
June through July	If purple or yellow nutsedge becomes a problem, apply SedgeHammer or Certainty at 1.33 oz + 0.25% v/v nonionic surfactant. Established warm-season turfgrasses have excellent tolerance to SedgeHammer and Certainty. Do not use Monument on centipedegrass.

DR. JOHN BOYD is professor and Extension weed scientist, University of Arkansas Division of Agriculture, Cooperative Extension Service, Little Rock.

FSA2155-PD-11-08N