

# Kill off bermudagrass with one less spraying

Replacing obsolete turf requires freedom from old bermudagrass.

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## KEY POINTS

- Tank mixing Fusilade II with Roundup Pro will reduce the number of applications needed for complete bermudagrass control.
- Tank mixing a burn-down herbicide such as Finale or Reward with a systemic herbicide such as Roundup will reduce control of perennial weeds.
- Repeat herbicide applications at moderate rates provide better control of tough perennials than a single application at the maximum rate.

Weed experts often warn golf course superintendents in warmer climates to control bermudagrass (*Cynodon* species) turf completely before replacing it. A proven program is three applications of glyphosate (Roundup Pro) during the current growing season, followed by spot spraying the following spring to clean up the inevitable 1 to 2 percent of missed bermudagrass.

Unfortunately, turfgrass managers rarely feel they have the luxury of setting aside an entire growing season for pre-plant weed control. Most regret it later.

### What usually happens

Typically, when a transition-zone golf course converts bermudagrass fairways to zoysiagrass (*Zoysia japonica*), the superintendent is under pressure to complete the job as soon as possible. Sprayers dispense four to five quarts of glyphosate per acre, then crews plant two to four weeks later with no additional attempts at bermudagrass control.

A follow-up treatment might be applied seven to 10 days after the first spraying to cover missed areas — sometimes even though no regrowth is visible yet. These treatments are of little value because glyphosate only kills growing plants.

It is possible to get lucky and be suc-

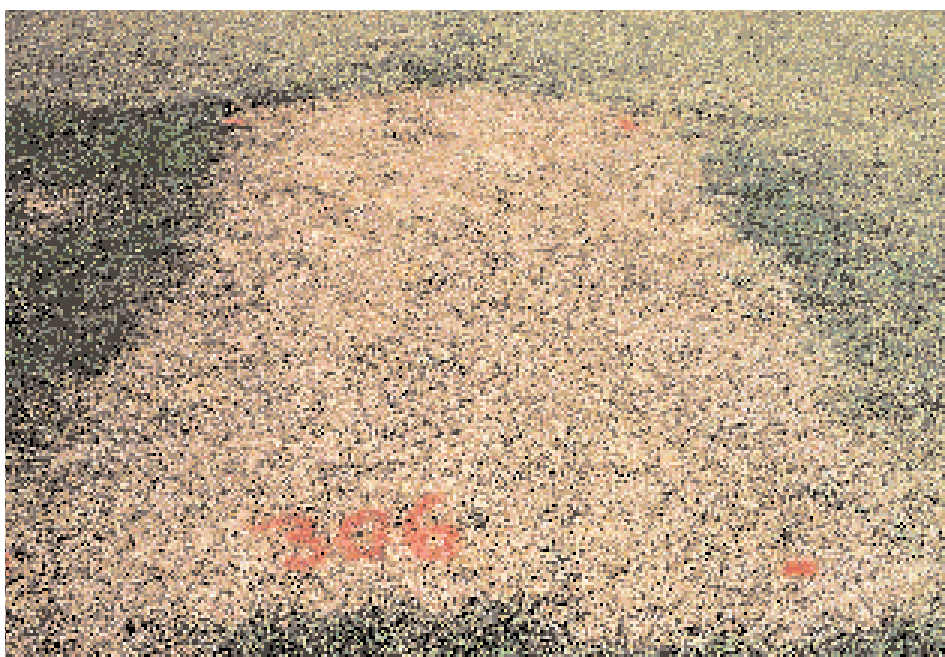
cessful with such an abbreviated program, but the odds are against it. One or two applications of glyphosate will not control bermudagrass.

The severity of future bermudagrass encroachment following incomplete control will vary from site to site. Bermudagrass is slower to appear on areas planted with sod compared with those established from sprigs or seeds. Big-roll sod may further hinder the reappearance of an unwanted bermudagrass because there are fewer gaps that bermudagrass can emerge through than with smaller rolls.

Problems might not show up until stress weakens the desirable turfgrass. Bermudagrass will readily invade thin spots. One of the first places we see bermudagrass appear is in areas of zoysiagrass or tall fescue (*Festuca arundinacea*) that have been weakened by brown patch (*Rhizoctonia solani*). Traffic, drought and other stresses also may open the door for bermudagrass encroachment.

### Bermudagrass to bermudagrass

When converting a common bermudagrass golf course to hybrid bermudagrass, complete eradication of the undesirable bermudagrass is imperative. No herbicide can selectively remove one bermudagrass from



Photos courtesy of John Boyd

Just two applications (top) of a mixture of Roundup Pro with Fusilade II were as effective at killing bermudagrass as three applications of straight Roundup Pro (bottom).

another. After establishment, all that works is mechanical removal and spot spraying with nonselective herbicides.

#### Contamination from off the site

When buying sprigs or sod in bermudagrass country, inspect the farm. That is the best way to be reasonably sure that hybrid bermudagrasses are not contaminated by off-types and that other

turfgrasses are free of bermudagrass.

The best time to search a zoysiagrass field for bermudagrass contamination is in the early morning when bermudagrass patches are very obvious because their leaves retain dew more readily than zoysiagrass leaves do.

#### Sod farms

Managing bermudagrass invasion is

more difficult on sod farms than on golf courses. Sod harvest creates an ideal opening for bermudagrass encroachment. The rapid regrowth of bermudagrass gives it an advantage against less-aggressive species and allows it to spread before the desired grass covers the open area. Many growers of zoysiagrass and centipedegrass have eliminated bermudagrass production from their farms to reduce the potential for contamination.

A common sight on sod farms, where pre-plant bermudagrass control failed, is a skirmish line of workers advancing across a field armed with backpack sprayers. They are spot spraying bermudagrass with glyphosate. The difficulty in achieving complete coverage and consistent follow-up applications under these conditions makes this

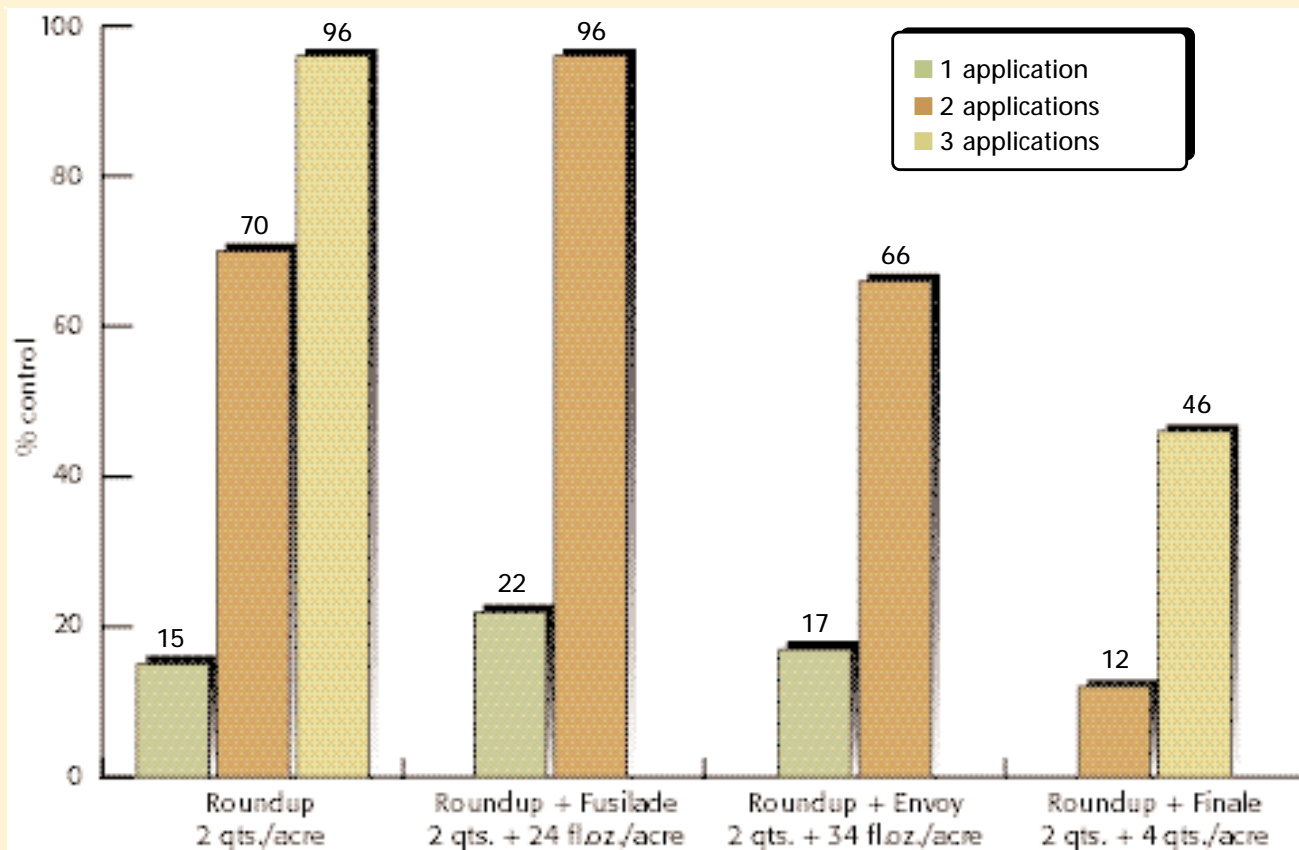
a less-than-perfect method. Spot control of bermudagrass is a job that rarely ends until the field is taken out of production and cleaned up.

**Current recommendations**

In 1988, B.J. Johnson published the definitive research on preplant bermudagrass control. At Griffin, Ga., Johnson demonstrated that three applications of Roundup Pro over a growing season (May, June, August) were required for acceptable control of bermudagrass.

After countless calls from golf course superintendents and sod farmers, we sought enhancements to this approach. Generally following Johnson's methods, we combined some grass-specific herbicides with glyphosate. Fusilade II (fluzifop-P-butyl) and Envoy (clethodim)

**Bermudagrass control**



Various mixtures of Roundup with other herbicides provide very different results in the control of bermudagrass.

were selected based on past performance in bermudagrass control studies. We also included the nonselective herbicide Finale (glufosinate). Repeat applications of the grass-specific herbicides alone were not included because the broadleaf and sedge control provided by Roundup is usually an important part of turfgrass renovation programs.

We initiated trials in May 1998 at sites about 50 miles apart in central Arkansas. One study was in a Tifway hybrid bermudagrass field on a sod farm. The other site used established plots of Tifway and Midlawn hybrid bermudagrass located at the University of Arkansas research station at Lonoke.

The herbicide treatments at each location were identical, but the application timings varied slightly because the research station plots received irrigation, whereas the sod farm plots relied solely on rainfall. Follow-up herbicide applications were not made until regrowth appeared.

At the sod farm, applications occurred a few days after significant rainfalls to coincide with favorable growing conditions. The trial was repeated in 1999 on Tifway at the sod farm.

The experimental design was a randomized block design. Plots were 6 feet by 10 feet with four replications. Herbicides were applied with a carbon dioxide pressurized backpack sprayer. The carrier volume was 20 gallons per acre. Application dates at Lonoke in 1998 were May, July and September. In 1998, the spray dates at the sod farm were May, July and October. Application timings on the sod farm site in 1999 were May, June and September.

## Results

Results were straightforward and easy to interpret. Only two treatments provided acceptable control:

- The standard recommendation of three applications of Roundup Pro at 2 quarts of product per acre
- Two applications of a herbicide combination: 2 quarts of Roundup Pro plus 24 fluid ounces Fusilade II product per acre

The results from these two treatments were consistent across the three trials at one year after treatment. Compared with Roundup Pro alone, the tank mix with Fusilade II allows turfgrass managers to achieve the same level of control with two applications rather than three.

Glufosinate, a contact herbicide, mixed with glyphosate severely reduced bermudagrass control during both years across all locations. Apparently, the rapid tissue destruction caused by glufosinate prevented translocation of Roundup Pro within the plant, therefore reducing long-term control.

Overall, herbicides applied in 1999 were less effective than the same treatments applied in 1998. The most logical explanation for the drop in control was the hot, dry conditions that persisted during the summer of 1999.

Our results support two basic tenets of perennial weed control:

- Tank mixing a fast-acting herbicide such as glufosinate with a slow-acting systemic herbicide such as glyphosate will reduce overall control. Three applications of Roundup Pro and Finale produced less than 50 percent control in 1998 and 1999.
- Repeat applications over time with postemergence, systemic herbicides are superior to a single application using the maximum label rate of the herbicide. We included a glyphosate treatment at 10 quarts per acre in our 1999 trials. Five months after spraying, a single 10-quart application was providing zero control compared with 98 percent control for three applications at 2 quarts per acre.

## References

1. Johnson, B.J. 1988. Glyphosate and SC-0224 for bermudagrass (*Cynodon*) cultivar control. *Weed Technology* 2:20-23.

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