

Kikuyugrass, *Pennisetum clandestinum* Hochst. ex Chiov., was introduced into California about 60 years ago as a turf and erosion-control species. It is a native of eastern and southern Africa and is now found in such wide-ranging areas as Colombia, New Zealand, Hawaii, and Brazil. This perennial grass has become established in California from the Mexican border to San Francisco Bay. Stands are confined almost entirely to coastal areas where minimum average temperatures are above 60° F.

Kikuyugrass is a vigorous competitor in turfgrass and crowds out desirable species. It develops an undesirable thatch of rhizomes or stolons. When managed properly, kikuyugrass can be a desirable turf with good color and high durability, but it is usually considered a weed in golf courses, bowling greens, and some home lawns. It resembles St. Augustinegrass, *Stenotaphrum secundatum* (Walt.) Kuntze., and has been mistakenly propagated as that desirable species.

There are sterile and fertile types of kikuyugrass. Since the fertile type predominates, seedlings, as well as the established perennials, usually must be controlled.

The purpose of our experiment was to evaluate the use of glyphosate to control established kikuyugrass, followed by the establishment of a competitive cool-season grass that would allow preemergence use of siduron to control germinating kikuyugrass seedlings.

Turf trials

The experiment was established in 1978 at two sites within 3 miles of the coast, separated by 200 miles. The Ventura County trial was begun in September on a silty clay soil and the San Diego trial in October on a sandy loam soil. Both sites had adequate phosphorus and potassium. The trials were designed as a split-split plot arrangement with three replications.

There were three main blocks: no glyphosate treatment; one glyphosate treatment; and one glyphosate treatment followed by a second treatment two weeks later. All glyphosate treatments were applied at 4 pounds active ingredient per acre with a CO₂ pressurized backpack sprayer operated at 35 psi with a spray volume of 30 gallons per acre.

Normally a waiting period of seven days is advised after glyphosate treatments before

thatch removal. In the experiment, thatch was removed 48 hours after treatment to minimize the time that the turf area would be unavailable for recreational use. Previous unreported work by the experimenters has indicated that 48 hours is sufficient for adequate kikuyugrass control.

Each of the three main blocks was then split into three and reseeded with one of the following turf species at rates per 1,000 square feet: 'Derby' perennial ryegrass at 6 pounds; 'Alta' tall fescue, 10 pounds; and 'Fylking' Kentucky bluegrass, 3 pounds. The sub-blocks were further split into four plots each for treatment: no siduron; siduron applied preemergence; siduron applied preemergence and repeated in February; and siduron applied preemergence and repeated in February and July. Each siduron application was at 12 pounds active ingredient per acre in water at 30 gallons per acre with the CO₂ pressurized backpack sprayer.

After the three cool-season turfgrass species became established, they were regularly irrigated and fertilized with soluble nitrogen to maintain good turf quality. The test sites were mowed weekly at a 1½-inch cutting height. No other primary or second-

Chemical and cultural control of kikuyugrass in turf

David W. Cudney □ Victor A. Gibeault □ Richard L. Baldwin □ James R. Breece

Kikuyugrass crowds out desirable turf species and develops an undesirable thatch of rhizomes or stolons.



TABLE 1. Kikuyugrass cover at two California sites treated with glyphosate or siduron, rated 1½ years after initial treatment

Herbicide	Kikuyugrass rating* † at:	
	Ventura	San Diego
GLYPHOSATE TREATMENT:		
None	9.4 y	7.8 y
One	2.8 z	5.1 z
Two	2.7 z	4.4 z
SIDURON TREATMENT:		
None	6.4 y	6.5 y
One	4.5 z	5.5 z
Two	4.7 z	5.5 z
Three	4.2 z	5.5 z

TABLE 2. Kikuyugrass cover as influenced by glyphosate and siduron treatments at Ventura, 1½ years after first application

Siduron treatment	Kikuyugrass rating* †		
	Glyphosate treatment		
	None	One	Two
None	9.7 z	4.7 y	4.8 y
One	9.2 z	2.1 z	2.1 z
Two	9.3 z	2.7 z	2.2 z
Three	9.2 z	1.9 z	1.6 z

TABLE 3. Kikuyugrass cover at two California sites overseeded with three cool-season turfgrasses, rated 1½ years after herbicide treatment

Turfgrass	Kikuyugrass rating* †	
	Ventura	San Diego
Kentucky bluegrass	5.8 y	7.5 x
Perennial ryegrass	4.5 z	4.0 z
Tall fescue	4.6 z	5.8 y

*Kikuyugrass cover rating on a 0 to 10 scale, with 0 representing no kikuyugrass and 10 representing 100 percent kikuyugrass.

†Values in a column followed by the same letter are not significantly different at the 5 percent level according to Duncan's multiple range test. Data are analyzed across all treatments.

ary turfgrass maintenance was performed on the two sites.

Kikuyugrass cover ratings were made over a 30-month period after the trial began. Kikuyugrass cover was evaluated on a 0 to 10 scale with 0 representing no kikuyugrass and 10 representing 100 percent cover. All data were subjected to statistical analysis and mean separation using the Duncan's multiple range test.

Results and discussion

At both San Diego and Ventura, either one or two applications of glyphosate resulted in significantly less kikuyugrass reinvasion than no glyphosate treatment, but there was no significant difference between the two herbicide treatments (table 1). At both test sites, practically no kikuyugrass recovered after the first and before the second glyphosate application, which would account for the lack of difference between the two treatments.

Siduron also affected kikuyugrass reinvasion, primarily by limiting seedling germination. All siduron treatments resulted in significantly less kikuyugrass than no treat-

ment at Ventura and San Diego (table 1). At both sites, there was no significant difference in kikuyugrass reinvasion among one, two, or three siduron treatments, which demonstrates the importance of applying siduron at the time of renovation. Apparently kikuyugrass begins reestablishment right after the glyphosate/thatch-removal/over-seeding treatment, so siduron is needed immediately.

The importance of glyphosate in the combined treatments is readily apparent (table 2), because plots receiving no glyphosate treatments were entirely covered with kikuyugrass, irrespective of the siduron treatments. Any combination of glyphosate and siduron produced the greatest decrease of kikuyugrass cover.

Perennial ryegrass and tall fescue, which germinate and become established much more rapidly than Kentucky bluegrass, resulted in significantly less reinvasion of kikuyugrass 1½ years following herbicide treatments (table 3). Evidently, initial competition of the overseeded grasses is very important in reducing kikuyugrass regrowth. This conclusion is further supported by turfgrass

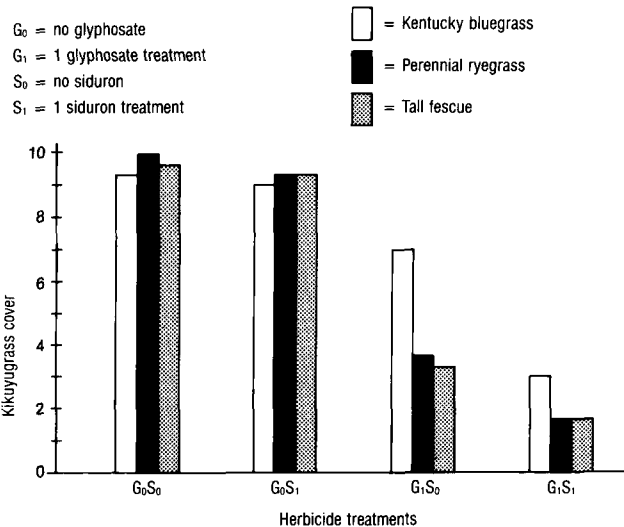


Fig. 1. Cumulative effect of kikuyugrass control (0 = no weed cover; 10 = 100% cover) 1½ years after first treatment, Ventura.

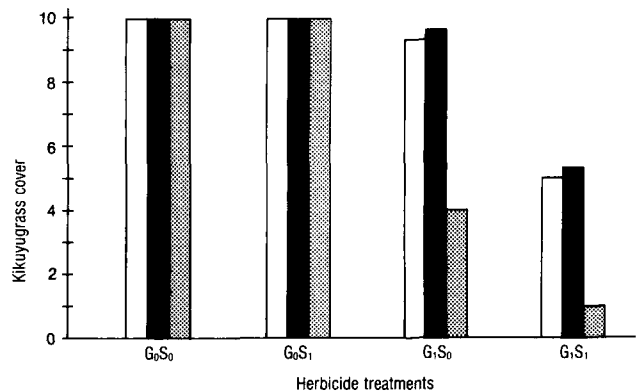


Fig. 2. Cumulative effect of kikuyugrass control (0 = no weed cover; 10 = 100% cover) 2½ years after first treatment, Ventura.

cover ratings six weeks after the Ventura trial was seeded. Perennial ryegrass and tall fescue, with ratings of 6.9 and 7.7, respectively, covered the plots significantly more quickly than Kentucky bluegrass, with a 3.7 rating.

The best combination of treatments in Ventura (fig. 1 and 2) 2½ years after application of glyphosate to control established kikuyugrass was overseeding with tall fescue followed immediately by one or more treatments of siduron for kikuyugrass seedling control. Kentucky bluegrass grew slowly and proved to be a poor choice for kikuyugrass renovation. Perennial ryegrass equaled tall fescue 1½ years after glyphosate treatment but was weakened, because of low maintenance levels, and eventually reinvaded by kikuyugrass after 2½ years.

David W. Cudney is Weed Scientist, and Victor A. Gibeault is Environmental Horticulturist, Cooperative Extension, University of California, Riverside; Richard L. Baldwin and James R. Breece are Farm Advisors, Ventura and San Diego counties, respectively.