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Sod plugs, cut from field test plots, are transplanted to pots filled with sand to determine root production.

Herbicides for Commercial Sod: How Do They Influence the Crop

By JOHN A. JAGSCHITZ and C. R. SKOGLEY[1]

WEED CONTROL chemicals are a must for successful commercial sod production. No matter how good the quality of grass seed that is sown or how refined the establishment and maintenance program, nature will assure a generous supply of weeds. These weeds will most likely be both broad-leaved and grassy types. Fortunately, there are weed control chemicals available that may enable the production of weed-free, quality turf. These chemicals have been around for some time and have been used extensively for turf purposes. Chemicals used in commercial sod production, however, must not delay the development of the crop or interfere with harvesting or successful establishment after harvest.

Studies were initiated at the Rhode Island Agricultural Experiment Station, starting in 1970, to evaluate effects of both crabgrass and broad-leaved herbicides when used in sod production. The goal was to determine whether these herbicides were safe when applied at various stages in the development of sod.

Standard rates of granular preemergence crabgrass herbicides including benefin (Balan), bensulide (Betasan), DCPA (Dacthal) and siduron (Tupersan) were applied in the spring to Kentucky bluegrass sod that was seeded in the fall and still developing (immature) and to mature stands ready for harvest. The rate of sod development was measured visually by assigning turf quality ratings and by plant, tiller and rhizome counts in some trials. Sod tensile strength measurements were also taken to determine development. Root production of

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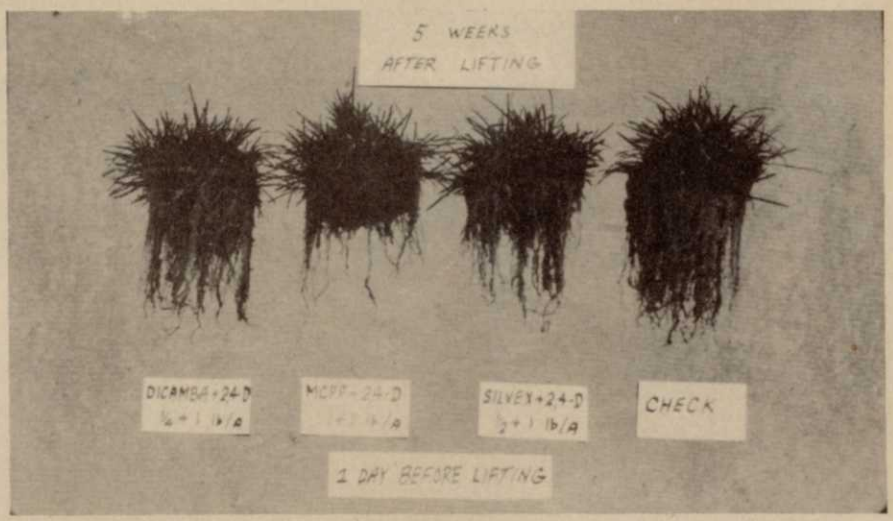
transplanted sod was evaluated by measuring dry weight of roots grown from four-inch plugs on sand. Root strength measurements were taken by recording the force necessary to lift sod plugs from soil.

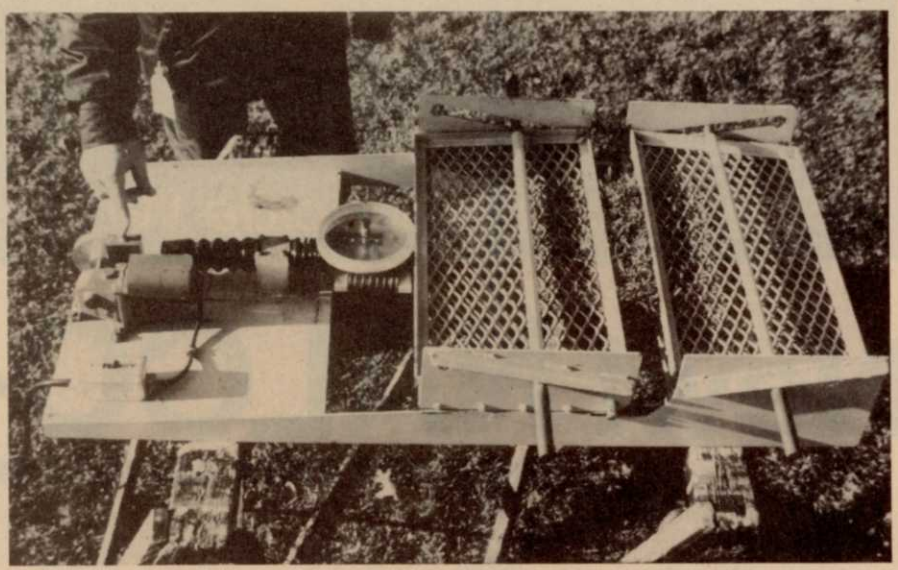
In another series of tests herbicides used for broad-leaved weed control were evaluated on mature sod. Standard rates of 2, 4-D spray mixtures with either dicamba (Banvel), mecoprop (MCPP) or silvex (2,4,5-TP) were applied in the spring and fall at various times before and after sod harvest. Rooting of the transplanted sod was evaluated by measuring root production and root strength.

Crabgrass herbicides applied to immature sod were not all beneficial. The grass treated with benefin and DCPA became coarser in texture and were of poorer quality within 2½ months of treatment. No visible adverse effects resulted from bensulide and siduron treatments. The tensile strength of sod, 2½ months after treatment, was reduced by benefin and, despite no adverse visual appearance, by bensulide. In fact, even five months after treatment, bensulide treated sod had reduced tensile strength. Tensile strength was not reduced by DCPA or siduron treatments.

In an effort to determine the influence of benefin and bensulide on plant development and relationship to sod strength, counts of plants, tillers and rhizomes were made 2½



Here are effects of herbicides on root growth of sod plugs grown for five weeks in pots filled with sand. Herbicides were applied one day before sod was lifted from the field and transplanted to pots.



This machine tests sod strength. A sod strip is clamped to the fixed stage at right and to moveable stage at left. When the machine is activated, the moveable stage is pulled to the left. The maximum force at which the sod breaks is measured by the scale in center of photo.

These sod plugs are transplanted and allowed to root. The rooted plugs are used to determine the force necessary to lift the plugs from the soil. The ring with the cross bar is placed under the plug and a nail is inserted so the cross bar can be located later for lifting.

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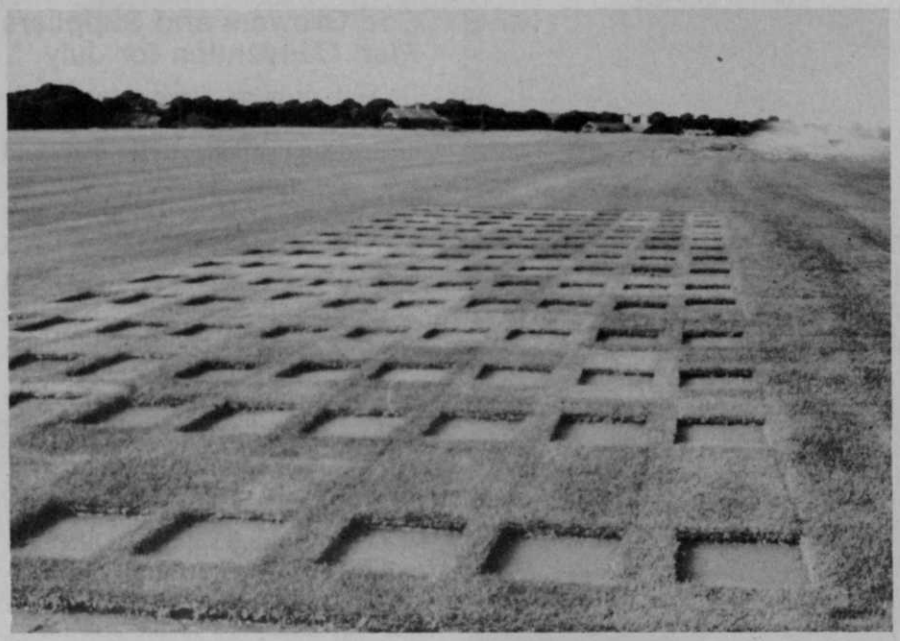
months after treatment. Benefin treatment on immature sod did reduce tiller and rhizome production. This could account for reduced tensile strength. There was no reduction in tiller or rhizome number with bensulide so it is possible that root production also influences sod strength.

When determining root growth of the immature sod transplanted four months after treatment is was determined that benefin, bensulide and DCPA inhibited rooting. No effect on rooting was detected with siduron treatment.

When the same four crabgrass herbicides were applied to mature sod no reduction in sod strength was noted when measured three months after treatment. Root growth measurements made at the same time showed inhibition only with bensulide.

On the basis of these trials it appears safe to use siduron for crabgrass control in young, developing stands of Kentucky bluegrass to be used for sod. On mature stands of sod results indicate that benefin, DCPA and siduron may be used safely for crabgrass control.

A sod plug is pulled from the soil to measure the force necessary to separate it from the soil. The metal hook is inserted through a nail hole and attached to the cross bar. A scale attached to the other end of the hook measures the maximum force necessary to lift the plug.



A view of an experimental sod plot after the sod was removed for strength tests or for transplanting to determine the effect of herbicides on rooting.

The broad-leaved weed control chemicals were applied only to mature turf. When used at the standard, recommended rates mixtures of 2, 4D with either dicamba, mecoprop or silvex applied four weeks before transplanting in the fall or spring did not effect sod rooting. Mixtures of 2,4-D with either mecoprop or silvex applied two weeks before harvest in the fall reduced root growth. No root inhibition was evident from the 2,4-D plus dicamba mixture. None of the three mixtures affected root growth from spring treatments made two weeks before transplanting.

All herbicide mixtures applied two weeks after sod installation in either spring or fall resulted in root inhibition. When the various mixtures were applied four weeks after transplanting in the spring there were no adverse affects on root growth. No fall treatments were made.

Conclusions based on results with the broad-leaved herbicides used on fully-developed sod are: (1) mixtures of 2,4-D with either dicamba, mecoprop or silvex can be used safely if applied at least four weeks before or after harvest. (2) if it is necessary to apply broad-leaved herbicide mixtures as close as two weeks before harvest it appears safe to use any of the three mixtures in the spring or 2,4-D plus dicamba in the fall. None of the mixtures should be applied within two weeks after transplanting in either spring or fall.

These studies should provide added assurance to commercial sod growers who rely on certain of the herbicides for effective and safe weed control.

Sheraton Inn/Washington, N.E., 8500 Annapolis Rd., New Carrollton, Md., 20784, will host the American Sod Growers Association Convention on July 16-19.

Sod Growers and Suppliers Plan Convention for July

Sod growers have consistently faced problems of unstable prices, inconsistent supplies of fertilizer and seed and most recently, a near removal from their agricultural status by the Federal Energy Office.

The organization's 9th annual convention and field days is slated for July 16-19 at the Sheraton Inn, Washington-Northeast (located in New Carrollton, Maryland). The event gets underway Tuesday night with an open house at the exhibit arena from 6 to 10 p.m. where the latest in equipment, supplies and services will be displayed. Other activities planned for the meeting include equipment demonstrations, tours of local sod farms and many social activities.

The convention is open to all sod producers, supplier representatives and others interested in turfgrass production. For further information regarding registration, exhibiting, and ASPA membership, contact the American Sod Producers Association Bldg., 9th and Minnesota, Hastings, Nebraska, 68901.

Nematode Control: Wise Insurance

By JOHN WESELOH
Sales Manager
Dow Chemical Co.

The number 10 fairway at the Ocala, Florida Municipal Golf Course is lush with deep-rooted, abundant bermudagrass this year. But this is in contrast to the turf throughout the course when Jim Yancey came to Ocala less than four years ago. Nematodes, which feed on the roots of grass can either restrict the root system or can completely eliminate it, were taking their toll of the turf. They caused thinning of the grass and produced joy for the weeds. What was the answer? More water and fertilizer?

They didn't solve the problem, but a new nematicide did. Previously found to be successful in such farm crops as soybeans, Fumazone 86 was available and its application at Ocala for the past two summers "has made the Ocala golf course," Yancy said.

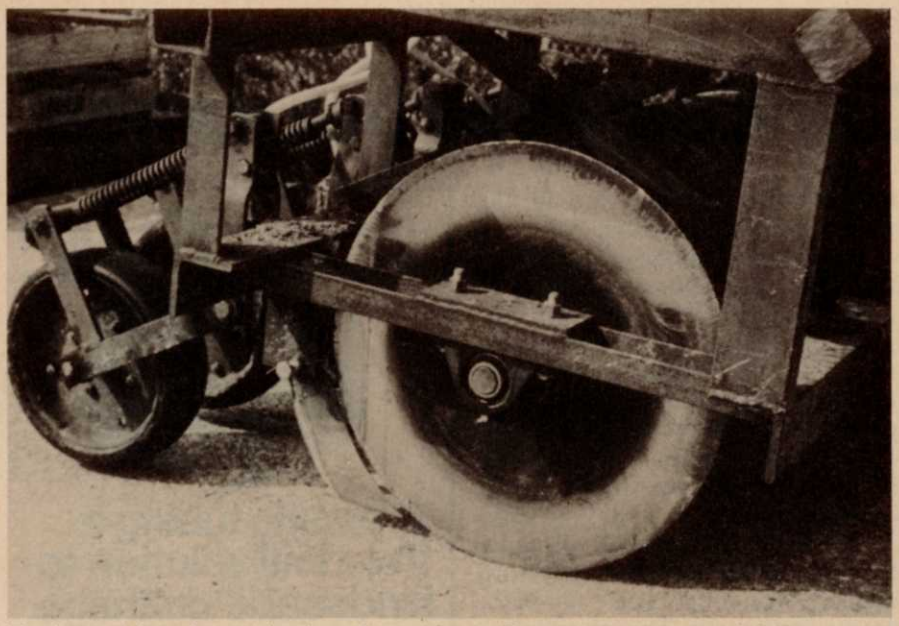
"The improvement of the course is unreal," Yancey said after two annual applications, "The 10th fairway had no grass previously, and now there is a good stand of grass. A couple other fairways are in the same improved condition."

Nematodes are easy for Yancey and other golf course managers to control because they need not purchase special application equipment nor train regular personnel to apply the material. The Ocala club contracts with Southern Mill Creek Products of Tampa to do the job. Other companies have good facilities, too. In late May or early June, Southern Mill Creek will come to Ocala again and treat the entire course, including tees, fairways, greens and roughs. The job will take two days and Yancey will close nine holes each day while the job is progressing.

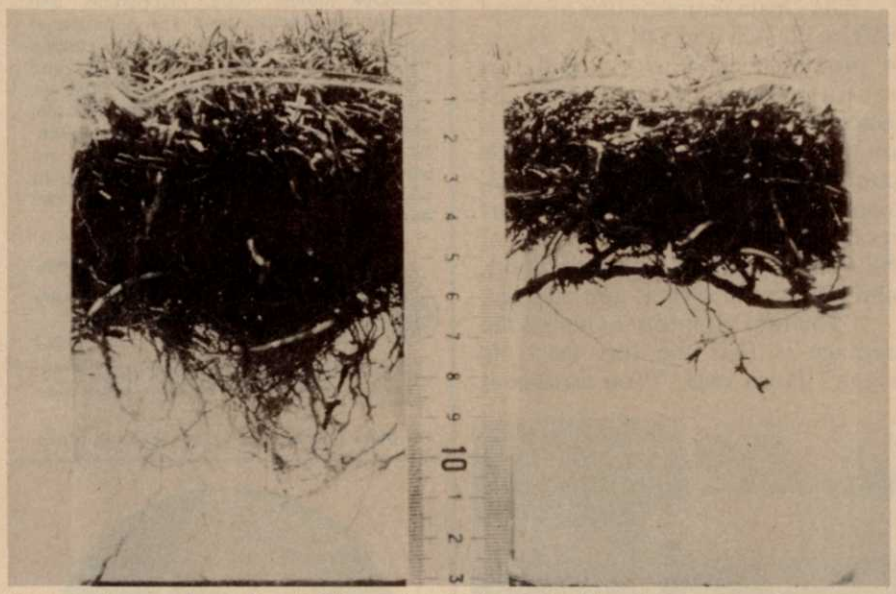
The Ocala course is one of about 650 in Florida and Dr. G. C. Horn, a prominent golf course and turf management agronomist of Gainesville, Fla., believes Yancey is on the right track with his nematode control program. Horn ended a 23-year career as professor of turf management at the University of Florida to be a full-time consultant, and his chief interest is golf courses.

"The first symptom of nematode damage is that the turf loses its vigor," Horn said. "You fertilize it

Injection fumigation of golf course turf was found to be more effective for nematode control than the older drench method. The nematicide is injected into the turf at a depth of three to five inches using a Coulter and shank unit. Because special equipment is needed, most golf courses are treated by custom applicators.



Equipment has been developed to treat golf course greens and fairways with nematicide. Injection is made on 10 to 12 inch centers with pack wheels behind to seal the slits.



Nematodes can keep the turf from developing a healthy root system. Fumagation controls the nematodes and allows a deep rooted system to develop. The left plug is the root system of grass treated with Fumazone fumigant; the right plug is untreated.

and it doesn't respond. The grass yellows from a defidiency of iron even when the soil may have plenty of iron in it, the grass has no roots to absorb the iron."

Another problem is that weed seeds abound in the soil and when the turf gets thin, the seeds germinate and weeds become a problem. One weed associated with nematode damage is the "milk weed" or spotted spurge. This weed will come onto a green when nematodes injure the turf, but it doesn't get a chance to grow if the turf is thick and vigorous.

Pioneer in nematode control on golf courses in Florida is Dr. V. G. Perry, Professor of nematology at the University of Florida. He began publicizing the problem about 1953 and developed some tests to determine the existence of nematodes in turf. After good responses from chemical injections with hand injectors, Perry and Horn turned to developing an injection machine. The early experimental models were inefficient and did a poor job. Some of the early chemicals burned the turf; however, improvements have been made in the last few years, and the mechanical and chemical problems largely eliminated.

Treatment of greens came first and even today golfers cringe a bit when they see application specialists roll over a green, slicing the immaculately conditioned Bermuda grass with sharp injector knives. Small garden tractors with dual back wheels and hydraulic lifts are used. Copper tubing in welded on the backs of the cutting blades and the nematicide passes through tubes by gravity flow or pressure into three-to-five-inch slits in the turf. The greens bounce back quickly from effects of the scalpel.