

The surest way to control the most turf insects, with one insecticide, is to spray the one that's labelled for the most insects. That insecticide is Diazinon.[®] The one broad-spectrum

turf insecticide. With the label to prove it.

Controls 21 turf insects. More than all the other common turf insecticides combined.

Insects	Rate per 1,000 sq. ft.		Remarks
	Diazinon AG500	Water	
Lawn Chinch Bugs	2-3 fl. oz. or 3-6 fl. oz.	25 gals.*	Use higher rate for longer residual control and in lawns of dense growth, such as St. Augustine lawns.
Ants, Armyworms, Clover mites, Springtails (Collembola), Crickets, Cutworms, Digger wasps, Earwigs, Frit flies, Lawn billbugs, Sod webworms (Lawn moth), Sowbugs, White Grubs (such as Japanese Beetle larva)	4 fl. oz.	3 gals.	Spot spray anthills and wasp ground nest openings. For lawn billbugs and grubs, irrigate the lawn thoroughly immediately after treatment. For frit flies, mow grass and water well before treatment but delay application until grass is dry. Do not water again until necessary.
Brown dog ticks, Bermuda mites, Chiggers, Fleas, Leafhoppers	1¼ fl. oz.	3 gals.	Do not apply to animals. For brown dog ticks spray grass and under shrubbery, particularly near house.
Millipedes	8 fl. oz.	3 gals.	
Rhodesgrass Scales	5 fl. oz.	25 gals.*	Apply when crawlers first emerge.

*Application may be made in 3 gals. of water per 1,000 sq. ft. Thoroughly water treated area immediately following application.

Bear in mind, the actual label has a lot more information you need to know.

If you'd like to have a copy of the complete Diazinon AG500 or 4E

label, pick up one from your local supplier. Or write us.

Agricultural Division, CIBA-GEIGY Corporation, P.O. Box 11422, Greensboro, NC 27409

Diazinon

Turf Renovation Without Tillage

Several reasons exist for renovation of turf areas. These include introduction of improved grass cultivars, reestablishment of grasses killed by weather, disease or insects and elimination of undesirable plants. Traditionally, renovation has involved tillage with a plow or rotavator and reseeding. This requires considerable effort, creates an erosion hazard on sloping sites and a loose seedbed that must be mulched and kept free of traffic until the new seeding is established. Also, perennial weedy grasses are frequently not controlled by tillage.

We have been able to successfully renovate turf areas by spraying herbicides to kill existing vegetation, dethatching or verticutting, and reseeding. If there is no reason to change the existing grade, this method may have several advantages over traditional methods that involve tilling the soil. Much less effort is required and the reseeded area will support traffic much sooner since the soil is not loosened. The erosion hazard is almost negligible even on sloping areas. As a bonus, few buried weed seeds are exposed, creating less of a weed problem in the new seeding, stones in the soil are not turned up, and straw mulch is not required for the new seeding. As with traditional methods, certain principles must be observed and definite procedures

by G. B. Triplett, Jr.
and M. H. Niehaus
Ohio Agricultural Research
and Development Center

followed to insure successful renovation. The existing vegetation must be killed, most of the thatch removed, and seed planted in contact with soil. The seedings that we have made have been quite satisfactory.

The original problem that created poor turf condition must be corrected for renovation to be successful. If the poor turf was caused by excessive shade, poor drainage or too much traffic, these problems must be corrected before renovation will be satisfactory.

Killing existing vegetation. The herbicide glyphosate has been quite effective for killing existing vegetation in our trials. It is a broad spectrum herbicide effective on both grasses and broadleaf plants and with no residual activity in the soil. When properly applied, it is translocated and kills underground parts of plants as well as the tops. To be used effectively it should be applied to the foliage of actively growing plants and may not give satisfactory kill of plants that are under moisture stress or dormant. One application of it may not eradicate some hard to kill perennials such as quackgrass but is usually more

effective on these perennials than one or two tillage operations. After herbicide application, dethatching should be delayed from three to five days to allow the chemical to translocate into underground parts of the plants. It will have no effect on weed seeds germinating after seedings are made.

At present, Roundup by Monsanto Co., St. Louis, Mo., is labelled for use in non-crop areas and for application before emergence of wheat, oats, barley, sorghum, corn, and soybeans. Applications to turf areas followed by seeding has not yet been approved, although in our studies we have had excellent control of species present at time of spraying and no evidence of injury to seeded species. Even high rates of it applied at time of seeding have not affected establishment of several turfgrass species. It should not be used for turf renovation until approval for this purpose is obtained.

Dethatching. Established turf areas are often covered with thatch that varies in thickness, and most of this must be removed. The dethatcher should be operated until 10 to 30 percent bare soil is exposed and the debris removed. This may require several passes over the area with the dethatcher, and machines equipped with blades to slice the thatch are probably the most effective.

Seeding. In seeding, good seed-soil

contact is important and seeds falling on top of thatch will grow poorly or not at all. We have operated core aerifiers prior to seeding and later observed a tuft of grass seedlings growing in holes made by the aerifier. More effective, however, are vertical slicers adjusted to cut through remaining thatch and into the soil beneath. The blades should loosen the soil to a depth of $\frac{1}{4}$ to $\frac{1}{2}$ inch and leave an open slit. Seeds falling into this shallow trench are in an excellent position to grow well when moisture and temperature conditions are satisfactory for germination. Seeders that slice the soil and drop seeds into the slit made by the knives are available.

A definite, stepwise procedure should be followed for successful renovation.

- Kill old vegetation. Be sure the plants in the area to be renovated are actively growing. If the renovation is performed in late summer, fertilization and irrigation may be necessary to insure active growth. For spring renovation, delay spraying until vegetation is actively growing and has been mowed at least once. Do not mow for several days before herbicide application to insure adequate leaf area for herbicide uptake. When approved, spray with two quarts per acre glyphosate in 30 to 40 gallons per acre water (1.5 oz. in three to four quarts water per 1000 square feet). Be careful when walking or moving equipment from areas freshly treated to untreated areas. Herbicide can be carried by traffic to untreated area and cause injury. We have had no problem with transporting the herbicide after a rain or for traffic delayed for several hours after application.

- Dethatch. Wait three to five days after spraying and operate the dethatcher to loosen and remove enough thatch so that 10 to 30 percent bare soil is exposed. Enough cover should be left to insure good footing for traffic when soil is moist. If thatch is completely removed in some areas, mulching may be necessary for a satisfactory seeding. Delaying the thatching operation less than three days will not reduce germination of seeded species, but may result in less than satisfactory kill of vegetation.



Verticutting.

- Fertilize. Using soil test information as a basis, apply lime and fertilizer needed for satisfactory grass growth. If more than 500 pounds fertilizer is required per acre, split the application and apply $\frac{1}{2}$ after grass is established.

- Seed. The last dethatching operation should leave grooves cut into the soil as a site for seed placement. Seeders equipped to cut grooves and drop seeds in the slots are good for renovation operations. Seed with cultivars and rate recommended for your area. Drag or rake seeded area lightly to provide some coverage of seeds.

While weeds germinating after seeding have been less of a problem in our trials than for conventionally prepared seedbeds, crabgrass has been present in some of our spring seedings. Suitable preemergence herbicides may be used if weed problems are anticipated.

In our renovation trials, we have seeded various Kentucky bluegrass cultivars with excellent results. The new plant becomes established at approximately the same rate expected for seedings made in conventionally prepared seedbeds. Ryegrass might be added to the seed mixture if quick cover is desired. We have not felt that a moderate amount of traffic was detrimental to the new seeding. Certainly, there is less of a problem with tracks in the seeded area because of the firm soil and little problem with tracking mud when the soil is moist as compared to conventional methods.

With the effective herbicide for vegetation control that has recently become available, renovation of turf areas should be possible with less effort and problems than for systems involving tillage. □



Closeup of area after verticutting.



Plugging and debris removal.



Closeup of cored and verticuted area.



Soil after preparation.



Final product.

Fungicide Report

The basis for this report on turf fungicides is simple and to the point. WEEDS TREES & TURF went to the major manufacturers and asked them "what do you have on the market and what can it control?" The checklist we have prepared follows.

Mallinckrodt, Inc., St. Louis, Mo., manufactures a number of fungicides. Cadminate can control dollar spot, gray snow mold, copper spot and red thread. Calo-Clor can control brown patch, dollar spot and snow mold. Calo-Gran can control snow mold. Fungo 50 can control brown patch, dollar spot, copper spot, red thread, *Fusarium* patch, *Fusarium* blight and stripe smut. Koban can control *Pythium* blight, cottony blight, grease spot, spot blight and damping-off. Kromad can control brown patch, dollar spot, red thread, copper spot, *Helminthosporium* leaf spot and *Curvularia* leaf spot. Thiramad can control brown patch, dollar spot and snow mold.

Scotts ProTurf, Marysville, Ohio manufactures nine fungicides. ProTurf Fertilizer Plus DSB Fungicide can control dollar spot, brown patch and *Fusarium* patch. ProTurf Broad Spectrum Fungicide can control brown patch, red thread, copper spot, dollar spot, snow mold, leaf spot, *Fusarium* patch and moss. ProTurf Fertilizer Plus Fungicide can control brown patch, red thread, *Fusarium* patch, snow mold, dollar spot, leaf spot, copper spot and moss. ProTurf 101V Broad Spectrum Fungicide can control *Helminthosporium* leaf spot, dollar spot, brown patch, copper spot, *Curvularia* leaf spot, rust, *Alternaria* leaf spot in dichondra, and *Gleospodium* in dichondra.

ProTurf Fungicide III can control brown patch, dollar spot, leaf spot, red leaf spot, melting-out, gray

snow mold, copper dichondra and rust.

ProTurf Fungicide II can control *Pythium* blight and gray snow mold. ProTurf FF II can control stripe smut, leaf spot, brown patch on St. Augustine grass, bahiagrass and centipedegrass, rust, snow mold and dollar spot. It is not for use on bentgrass, zoysiagrass and dichondra, and it contains fertilizer.

ProTurf Systemic Fungicide can control brown patch, dollar spot and copper spot. ProTurf California Fertilizer Plus Fungicide can control brown patch, red thread, *Fusarium* patch, dollar spot, snow mold, leaf spot, copper spot and moss.

TUCO, Division of Upjohn Co., Kalamazoo, Mich., manufactures Acti-dione TGF, Acti-dione Thiram and Acti-dione RZ.

Acti-dione TGF can control dollar spot, melting-out, fading-out, rust, powdery mildew and leaf spot. Acti-dione Thiram can control dollar spot, fading-out, gray leaf spot, *Helminthosporium* leaf spot, large brown patch, melting-out, pink patch, powdery mildew, rust and snow mold. Acti-dione RZ can control large brown patch, melting-out, rust, dollar spot, fading-out, grease spot, powdery mildew, *Helminthosporium* leaf spot and gray leaf spot.

Rhodia, Inc., Monmouth Junction, N.J., manufactures three products from its Agricultural Division for control of turf diseases.

Chipco Thiram 75 can control large brown patch, dollar spot and gray snow mold. Chipco Spot Kleen can control dollar spot, copper spot, large brown patch, *Fusarium* blight and stripe smut. Chipco Microgreen Liquid is a blend of iron, zinc, manganese and copper and it corrects turf yellowing, or chlorosis, caused by metal nutrient deficiencies.

Rohm and Haas Co., Philadelphia, manufactures Fore for turf and ornamentals. It can control 10 turf diseases, including copper spot, *Fusarium* blight, red thread, slime mold, *Helminthosporium* melting-out, *Rhizoctonia* brown patch, rust, *Pythium*, dollar spot, *Fusarium* snow mold and algae.

W. A. Cleary Corp., Somerset, N.J., manufactures nine fungicides. 3336 Systemic Turf Fungicide can control dollar spot, copper spot, brown patch, red thread, *Helminthosporium*, *Fusarium roseum*, and stripe smut.

Bromasan is a blend of 3336 and thiram and can control *Rhizoctonia* and *Helminthosporium* and can give excellent control of dollar spot and copper spot.

Caddy can control dollar spot and copper spot. It has also been successful in controlling snow mold, the company reports.

Granular Turf Fungicide can control snow mold, copper spot, dollar spot, leaf spot and brown patch.

PMAS (10&%) is a dual purpose herbicide/fungicide that can control dollar spot, snow mold, copper spot and brown patch. Cad-Trete can prevent and control dollar spot, copper spot, snow mold, brown patch and *Helminthosporium*.

Spotrete is a wettable powder fungicide that can control dollar spot, brown patch, large brown patch and snow mold.

Spectro can control dollar spot, copper spot, brown patch and leaf spot. Sno-Chek can control snow mold.


Diamond Shamrock Corp., Cleveland manufactures Daconil 2787. It can control copper spot, dollar spot, brown patch, leaf spot,



PRO4

Diamond Shamrock

DACONIL 2787® pours it to nine fungus diseases

 Broad spectrum Daconil 2787 fungicide controls nearly all of the fungus diseases found on golf greens, tees and fairways, as well as many ornamentals.

And now it is available in convenient flowable or wettable powder form.

Excellent turf tolerance permits use right on through the hot, summer months. Used successfully on over 25 species of grass... established turf or new seedings. Daconil 2787 is highly effective against *Helminthosporium* in the spring and fall.

For professional turf care over your entire golf course, follow the Diamond Shamrock Pro-4 system: Daconil 2787 fungicide, DACTHAL® preemergence herbicide, DACAMINE® and DACONATE 6® post-emergence herbicides. You'll see beautiful results.

Contact your turf chemicals supplier, or write the Diamond Shamrock sales office nearest you.

Diamond Shamrock
AGRICULTURAL CHEMICALS DIVISION



SALES OFFICES: • 1100 Superior Ave., Cleveland, Ohio 44114 • 1401 W. Paces Ferry Rd. NW, Atlanta, Georgia 30327 • 1006 Main St., Houston, Texas 77002 • Commerce Plaza Building, 2015 Spring Rd., Oak Brook, Illinois 60521 • 617 Veterans Blvd., Redwood City, California 94063

Nine Turf Diseases



Curvularia leaf spot: Frequently, new growth at the tips remains green. Older leaves become chlorotic; eventually they turn brown and die. Susceptible grasses — centipede grass, zoysiagrass and bermudagrass.



Brown patch: Occurs in more or less circular areas varying from a few inches to several feet in diameter. Affected leaf blades first appear water-soaked and dark-colored, then wilt and become light brown as tissue dies.



Copper spot and dollar spot: With copper spot, spots first appear as small red to brown water-soaked lesions becoming straw-colored with purple borders and elongated. Diseased leaf blades usually covered with copper-colored fungus spores.



Stem rust: Small, elongated brick-red pustules of spores on leaves. Lesions may be surrounded by a green, yellow or brown border depending on age of pustule and susceptibility of the grass.



Dollar spot: Lesions are light tan with a reddish brown border and may extend downward from the leaf tip to an inch or more in length. Stems may also be affected. In early morning, when grass is wet, wisps of white fungus *mycelium* or threads may be observed on diseased turf.



Red thread: Coral-pink to red fungus strands may be seen on leaves and leaf sheaths binding leaves together. Affected turf areas are more or less circular and vary from two to 15 inches in diameter. When dry, the pink strands resemble red threads.



Helminthosporium leaf spot: Symptoms include general thinning out of grass in scattered areas. Often, general browning is evident on affected plants. Circular to elongated purplish, brown to dark brown, or reddish brown spots with white, tan brown or straw-colored centers on leaf blades, sheaths and stems.

Gray leaf spot: Lesions are round to oval, gray with brown or purple borders on leaf blades. Under warm, humid conditions, spots may be covered with gray mold. Lesions on stem are gray to brown.



JOHN DEERE MAKES TRACTORS FOR JOBS OF ALL SIZES. BECAUSE YOU CAN MAKE MONEY ON JOBS OF ALL SIZES.



There's no such thing as a tractor that's right for any size job. If it's big enough for golf course maintenance, it's probably too big for most residential work.

That's why John Deere Tractors come in a wide range of sizes. So you can have John Deere performance and dependability going for you on any job.

Take the new John Deere 2040. It has a 40*-hp diesel engine, 8-speed constant-mesh transmission, and plenty of hydraulic power to handle any attachment you might need. Including a 6-foot, center-mounted rotary mower. The 2040 was designed to do the big jobs faster and easier.



For work that doesn't require a tractor as big as the 2040, there's the hydrostatic-drive John Deere 400. It's powered by a twin-cylinder, 19.9-hp engine. And there's a 5-foot, center-mounted rotary mower that's designed to match the 400.

To do small jobs economically and efficiently, John Deere offers you the 200 Series lawn and garden tractors. You can choose from 8-, 10-, 12-, and 14-hp models, all with variable-speed drive to change ground speed without stopping or shifting gears. Rotary mowers are available in either 38- or 46-inch widths.

With any size John Deere Tractor, you also get the John Deere tradition of expert service, parts availability and flexible financing.

For any job that comes along —big, small or in-between—John Deere has a way to do it. Profitably.

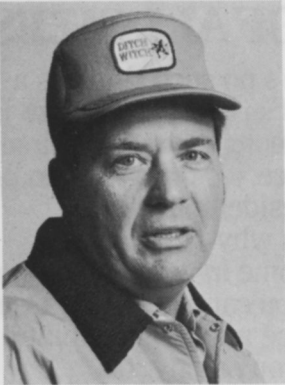
*Maximum PTO horsepower measured at 2,500 engine rpm (factory observed).



NOTHING RUNS LIKE A DEERE®



Circle 132 on free information card



"Let's talk about the reasons the Modularmatic concept can save you a lot of money!"

"A Ditch Witch Modularmatic can do more different underground jobs than any other machine!

One vehicle using interchangeable work modules — that's what our Modularmatic concept is all about. An example of what this can mean to you: Let's say you have a big trenching job now — buy the right Modularmatic vehicle with a trenching module. When that job is finished, a vibratory plow contract comes up. Your major investment — the Modularmatic vehicle — is already bought and paid for. All you need is a vibratory plow module and you're ready to go. Modularmatics get the job done, give you greater job flexibility and help spread equipment costs.

We'd like the chance to tell you more. We'd like to give you a free demonstration to show you what a Modularmatic can do. Remember, at Ditch Witch, we tell it to you straight!"

Call (800) 654-6481 Toll Free for the name of the dealer nearest you.



This Ditch Witch Modularmatic is equipped with the Combo module for both trenching and vibratory plowing; a backhoe module is mounted on the front

Ditch Witch... equipment from 7- to 195-HP.

CHARLES MACHINE WORKS, INC.
P.O. Box 66
Perry, Oklahoma 73077

Circle 135 on free information card



Fungicide from page 14

melting-out, going-out, leaf blotch, gray leaf spot, stem rust, *Curvularia* fading-out and leaf spot.

Chemagro Agricultural Division of Mobay Chemical Corp., Kansas City, Mo. manufactures Dyrene and Dexon.

Dyrene can control brown patch, copper spot, dollar spot, leaf spot, melting-out, rust and snow mold. Dexon can control cottony blight.

Du Pont Co., Wilmington, Del. manufactures Tersan 75, Tersan 1991, Tersan LSR and Tersan SP. Tersan 75 can prevent and control large brown patch, dollar spot and snow mold.

Tersan 1991 is recommended for control of dollar spot, large brown patch, *Fusarium* patch (pink snow mold), *Fusarium* blight and stripe smut.

Tersan LSR is recommended for control of leaf spot diseases incited by *Helminthosporium spp.*, rust, and *Rhizoctonia* brown patch on turf. Tersan SP is recommended for control of snow mold and *Pythium* blight.

Stauffer Chemical Co., Westport, Conn., manufactures Captan 50-WP. It can control brown patch, damping-off, leaf spot, fungus root rot and melting-out.

The Agricultural Products Division of **Olin Corp.**, Little Rock, Ark. manufactures Terrazole soil fungicide and Turfcide 10 percent granular fungicide.

Turfcide can control brown patch. Terrazole controls *Pythium* fungus that cause cottony blight, spot blight, grease spot and damping-off on turf; and *Pythium* as well as phytophthora fungi which cause root and stem rot and damping-off on ornamentals.

Elanco Products Co., Indianapolis, has received an experimental permit for turf for its EL-222. It is not on the market.

Market planning manager of specialty products Dan Lynch told WEEDS TREES & TURF it is formulated as a wettable powder and as an emulsifiable concentrate for turf use. He said tests have shown that it can control dollar spot, brown patch, striped smut, *Fusarium* blight and snow mold. □

PRINCETON IS GROWING

...So Can Your Sod Harvesting Profits!

Big — medium — even smaller-size operations can, and will increase the **profitability** of their sod business by using Princeton Sod Harvesting Equipment. Princeton Sod Harvesters save time . . . money . . . man-hours! Increase production! Eliminate the need for full field crews. Harvest thousands of square yards of sod per day, completely palletized, ready to ship!



THE PRINCETON "TOW BOY" for the smaller volume sod producer. The first pull-type harvester to incorporate the features of the Princeton Self-Propelled model. Three men

can harvest up to 1,500 sq. yds. per hr. with adequately sized and equipped tractor.* \$10,000 FOB Columbus.



THE PRINCETON SELF-PROPELLED Now, the industry standard for quality-made, high-production, low-maintenance harvesters. Proven in the field to be superior, all ways! Harvests up to 2,500 sq. yds. per hr. with only 3 men.* \$30,000 FOB Columbus.

*Actual production will vary with soil conditions and crew experience.

Harvest this much . . . one half hour . . . one man . . .



NEW! And, now . . . fresh off the drawing board . . . our very latest model — The Princeton Fully Automatic Sod Harvester! The first harvester designed to **do it all!** **One man**, in one operation, cuts, aerates, crosstie stacks, and palletizes ready-for-loading, up to **24,000 sq. yds. per day!** Interested? Let us know. We'll send complete details!

You caught us! Overwhelming industry response to Princeton Sod Harvesting equipment caught us with our guard down. We are now building a new plant to help fill your many orders. Until this second manufacturing facility begins operation (3 to 6 months) we are running slightly behind in filling orders. We appreciate your patience.



For demonstration or further information, write or call collect:
C. R. "Chuck" Braun,
National Sales Manager,
2625 Johnstown Road,
Columbus, Ohio 43219 (614) 475-8520

Quality Equipment

PRINCETON

for the Sod and Nursery Industries



WIPE OUT WITH BANVEL[®] 4S...

Banvel herbicides are broadleaf weed "specialists" designed for professional turf programs.

As a professional turf man you have a reputation to be proud of. And, rightly so! Your skill, knowledge and effort shows in the beauty and quality of your turf. So why take chances with understrength herbicides? Herbicides that get some broadleaf weeds but leave you with repeated deep-rooted problems—such as dandelions and plantain. Banvel 4S and Banvel +2,4D control all the major broadleaf weeds, and most of the time with just one application. Check the chart and compare your weed problems with the herbicides available.

Here's why Banvel herbicides are the professionals' choice for weed control

- When used as directed Banvel will not harm trees, ornamentals or grass—it just eliminates weeds.
- No season restrictions. Lay down Banvel from early spring to late fall—all through the growing season.
- Rain will not affect Banvel. It keeps working because it translocates—penetrates leaves and is absorbed through roots to attack every part of the weed.
- Banvel is not a soil sterilant. There is no residual reaction from Banvel as it is broken down in the soil by bacterial action. It is biodegradable.
- No special spraying equipment necessary. It is easy to clean out of equipment after use.
- Mixes readily with hard or soft water.
- Easily stored through winter months without losing potency.