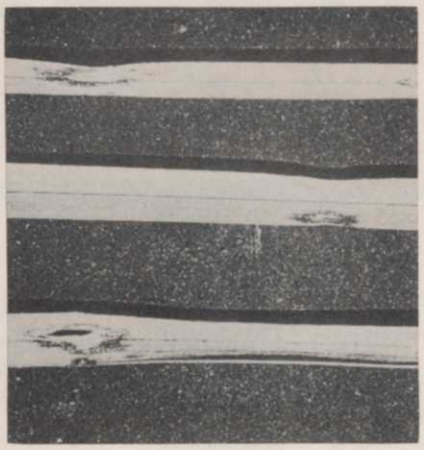
WEEDS and TURF
PEST CONTROL

A SECTION OF PEST CONTROL MAGAZINE

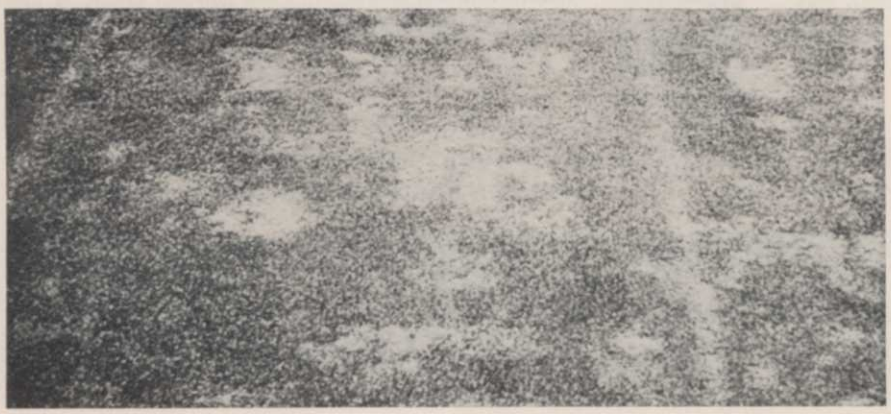
NOVEMBER 1962

# How to Control Turf Diseases

**Snowmold** (above and left) normally occurs when temperatures are 32 to 50 degrees F., with high soil moisture. Patches of injury may run together and are identified by a grey-white color. Apron of the golf course green at left is badly infected with snow mold. The undamaged portion (upper right) was treated with a fungicide.



**If bluegrass leafspot** (right and below) is not controlled, the infection may become a crown or root rot, and cause dead or badly thinned-out areas as appear in the turf pictured below. The disease, *Helminthosporium* spp., first appears as a brownish spot on blades. As the spot grows, the blades are girdled as shown at right.



In recent years the turf business has received increased emphasis because more homeowners are trying to match the lawns and landscapes found on golf courses, large estates, and around well-kept industrial sites. The care and special treatment required for the upkeep of these lawns, however, is far beyond the usual homeowner's ability. Contract applicators, consequently, may be called in to treat ailments.

CAs may also have a problem if the lawn deficiency is unfamiliar to them. One big headache is the control of fungus diseases on turf. Avoided in many cases because of the complexity of the pest organisms, fungus control is a service which, when mastered, provides the CA increased business potential, and helps make his services complete.

Many homeowners don't realize how common fungus-caused turf diseases are. Incidence of fungus damage is often passed off as "bad grass" or "dog spots" (caused by the urine of female dogs), which will return to life in due time. Unfortunately, this diagnosis is not always true, and a lawn may be severely afflicted by a fungus disease before the cause is identified.

### Fungus Infection

Turf grasses, like human beings, have resistance levels. As long as grasses are well kept, there is less chance of infection. But if care is slipshod, chances for fungus damage are greatly increased.

Fungi, assumed by many to live only on dead or decaying matter, have been observed to attack live grasses which are in a weakened condition. Infection of this sort further reduces resistance and paves the way for multiple outbreaks, which lawn experts refer to

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as a "tandem" infestation. When two or three fungi infest a lawn at the same time, diseases are harder to identify, and much harder to control.

Disease-inducing fungi are generally always present in or on the sod, in degrees below infestation levels, in the mat and thatch (dead, decaying material or litter, such as roots, stems, or leaves). When the mat and thatch become too abundant, as they do when grass clippings are not removed, the fungi may begin to grow rapidly. Other conditions which affect the development of the fungi are: temperature, humidity, injury to the turf through excessive wear, and improper cutting, which lower the resistance. When such conditions exist, healthy turf may be transformed into bleached, barren patches.

Parasitic fungi are referred to as diseases because they kill or severely injure the grasses.

Infestations may result from one of three classes of fungi. Of the Class Basidiomycetes, which includes the bracket fungi, smuts, rusts, and toadstools, only the last two are prominent as turf pests.

The Class Ascomycetes, or sac fungi, includes parasitic mildews and pathogenic scabs and blights.

Class Phycomycetes includes the water molds of which the Pythium blight is a good representative.

Identification of a single diseased area can sometimes be made simply by observing the results of fungal activity on the grass; perhaps a correlation can be made with a universally common descriptive name, such as "dollar spot." A good, close look should be taken by placing a plug, taken from the edge of a suspected area, in a dish overnight with a piece of moistened paper towel. If there is an infestation present, a "cobwebby" growth of mycelium or fungus threads should be seen on the blades of grass the following morning. Sample plugs can be kept fresh by moistening them in a wrapper of aluminum foil, or a polyethylene bag.

### Microscope Helps Identify Fungi

If no identification can be made with the naked eye, a few blades of dying grass should be placed on a slide for microscopic examination. Using a key to turf fungi available from some of the chemical manufacturers, or a textbook, the exact species of the infestation can be ascertained.

**Powdery mildew,** shown here on Kentucky bluegrass, causes leaves to turn first grey-white, then pale yellow in the final stages of the disease. The fungus is first seen in isolated growth on the upper leaf surface.

Sometimes the most obvious signs of infestation are not observable until the last stages of infection. In this case, all effort should be made to determine the fungus species, and the control methods, before too much damage is done.

A novice in the field of fungus control should have his diagnosis checked by either a government agency specialist or a local turf management expert.

Records of outbreaks should be kept by those in fungus control. This record should include: the species of fungus, grasses affected, specific location, date of occurrence, and environmental conditions a week prior to the outbreak (weather, extent of lawn use, management practices such as fertilization, etc.). Control practices and results of treatments should also be included for future reference. This will eventually lead the CA to a planned program of lawn fungus prevention and correction.

### Chemicals and Application

A number of fungicides are available for turf disease control. This article includes the common names of a few of the active ingredients now marketed. These active chemicals may be obtained in "single component" form or formulated with other ingredients to produce a "broad spectrum" preparation. The latter, gaining in popularity, is used for controlling and preventing a number of fungus diseases with one application, although applications often must be made several times a month when heavy infestations are expected.

Cadmium-based compounds, such as cadmium carbonate, cadmium sebacate, and cadmium chloride are effective against "dollar spot." Mercury-based compounds, such as calomel (mercurous chloride) and corrosive sublimate (mercuric chloride), help combat infestations of brown patch.

Some others which are used in fungus control are: cycloheximide, dyrene, thiram, zineb, methyl mercury dicyandiamide, and phenyl mercury acetate. Fumigation with formaldehyde or methyl bromide is sometimes practiced for eradicating fairy rings.

The most popular preparations are the water soluble or wettable powder forms. When properly agitated these types can be applied with any sprayer.

Application to the soil by syringe injection is sometimes called for in cases of fairy rings, for example, when the turfgrass may be injured by surface applica-

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tion of a chemical such as phenyl mercury acetate on Kentucky bluegrass.

Increasing in popularity is the granular form, which requires less time for preparation, less bulky equipment, and requires less handling.

Choice of application method will depend upon the formulation, the area to be treated, and available equipment.

In order to help the contract applicator better cope with fungus disease problems, here are some of the more common turf diseases, descriptions, and control methods for them.

**Anthracnose**

Anthracnose, caused by an imperfect fungus (species without sexual reproduction) of the genus Colletotrichum, can be a serious problem with cultivated grasses and is often found in conjunction with a condition known as melting-out. Anthracnose is recognized by irregularly outlined patches of blighted turfgrass. The infected areas range from 2 inches to 10 to 20 feet in diameter. From a distance, CAs can see reddish-brown patches which are caused by lesions or wounds on the leaf blades. Blades of grass may have a cobwebby growth of the fungus on them in the early morning. Progression of the disease causes a light-tan coloration throughout the infected area. When infected leaves begin drying out, they appear on close examination to have black spots as a result of the spiny black fruiting (spore-bearing) bodies which will reproduce the disease. Anthracnose is common throughout the United States, attacking mainly fescues, bents, bluegrasses, and ryegrasses. The disease survives below infestation levels in organic debris on the soil surface.

Successful chemical control of this pest has not been developed. Cultural practices, such as high, balanced fertilization, and irrigation at field capacity may reduce the problem.

**Brown Patch**

Brown patch, caused by an imperfect fungus, *Rhizoctonia solani*, is characterized by irregular circles up to 2 feet in diameter, in areas where mowing has been close. The circles have an over-all purplish color, later turning to light brown as the diseased leaves dry out. When mowing has been high, blighted areas may extend up to 50 feet in diameter.

Brown patch becomes evident mostly during warm, humid weather. Diseased areas are best recognized when the grass has dried out about midday, especially after mowing. The "smoke ring" effect of brown patch gives the infected area a sunken appearance. This effect is seen in the morning when there is dew on the grass.

Temperature plays a large part in the development of this fungus. From 64° to 69° F, the fungus grows below infestation levels. At 73° F it will spread, penetrate, and infect the grass leaves. Infestations flourish at temperatures around 80° to 85° F. Brown patch may completely blight a considerable stand of turf in 6 to 8 hours at temperatures in this range. Grasses susceptible to brown patch include bents, bluegrasses, and Bermudagrass.

For control, cultural and chemical practices go hand in hand. Fertility of the soil affects the development of the fungus. When the soil is balanced with fertilizer, the disease effects are not great. If the pH (acidity or alkalinity) is high or in the alkaline range, and there is excess nitrogen present, the disease usually gets the upper hand. If the soil is acidic, i.e. the pH is below 7, which is neutral, low nitrogen fertility fosters fungus development. Also conducive to development is excess water during periods of high humidity. Over-watering and over-feeding of grass should be avoided during the hot, humid summer months.

Fungicide applications should be made weekly when the weather is right for brown patch development. Mercury-based fungicides, such as calomel and corrosive sublimate in a 1:1 mixture, applied at the manufacturer's recommended rate, are the most popular. Since the compounds can injure grasses if not used properly, label directions must be followed exactly.

**Dollar Spot**

Dollar spot is a widespread fungus disease of short-cut bentgrass caused by *Sclerotinia homoeocarpa*, an imperfect fungus. It is so named because the infected area is usually not larger than a silver dollar. Individual leaves appear blotched with yellow green, later bleaching to a straw tan. A fine cobwebby growth or white fluffy mass can be seen on each of the "dollars" on mornings when dew is present. The cool nights and warm days, (70° to 80°) which form dew, also foster dollar spot development. If this disease is left to run its course, the spots may merge and produce large damaged areas. Spread of the disease is in a circular manner from the center of infection, but it may also be spread by moving sprinklers over the disease area and from transporting and spilling infected clippings over the lawn.

Dollar spot thrives during periods of low moisture, and if not controlled, may ruin a stand of turfgrass. The grass will recover quickly, however, if a good con-

**Brown patch on St. Augustine grass.** Characteristics of this disease include irregular circles up to 2 feet in diameter. The circles are first purplish, then turn light brown. Brown patch is most evident during warm, humid weather, in areas where mowing has been close. Besides St. Augustine, brown patch also attacks bents, bluegrasses, and Bermudagrass.

trol program is followed early. Fungicides containing cadmium, such as cadmium chloride or cadmium oxyquinolinate, when used in conjunction with a good management program which includes fertilizing with nitrogen and irrigating to a point below runoff, should give ready control of dollar spot. Some others which were successful in trials are: methyl mercury compounds, thiram-based compounds, and captan-based compounds.

**Copper Spot**

Copper spot appears identical to dollar spot except that the infested areas are a true copper color. Copper spot is also similar in that it thrives in warm (65° to 75°), humid periods. Attacking mainly bentgrass, copper spot, *Gloeocercospora sorghi*, is a pest throughout the United States, but is most damaging in coastal areas. Control measures are the same as those recommended for dollar spot, except that grass infested with copper spot should not be watered as much as when dollar spot is present.

**Cottony Blight**

Cottony blight, known also as grease spot, fire streak, and damping-off, is caused by water molds of the genus *Pythium*. These fungi are very destructive, and once conditions are right for their development, are capable of destroying stands of lawn grasses within 24 hours. Complete remaking of the lawn is often necessary after an outbreak.

Cottony blight, and other fungi of the genus *Pythium*, develop mainly in poorly drained areas, and may attack any species of grass. The common names are descriptive of its appearance. At the onset of infection, it appears as small (up to 4 inches diameter) irregular spots. The leaves turn dark as if water-soaked. Later they shrivel, become matted, and have a "greasy" light-brown color. Since low water runoff areas are favorable for development, it is common to see the fungus streaking by the spreading of the pathogen in running water. This fungus also appears as white "cobwebs" on dewy mornings.

A dithiocarbamate, such as zineb, is effective, along with a good management program, in eliminating this hard-to-control disease. Cultural practices include: providing good drainage; maintaining balanced fertilization; and keeping the soil within the acid pH range (below 7) by giving it sufficient water (if the pH is over 7) to leach out the alkaline components. Overwatering, however, will result in the same conditions that the program is trying to eliminate. Accompanying fungicide applications of zineb at the rate of 2 oz. of 50% wettable powder in 5 gallons of water per 1000 sq. feet should be made at 5 to 7 day intervals when the temperature is in the 80° to 95° range. If the temperature goes above 95°, applications should be made every 3 to 4 days for effective control.

**Fairy rings are common** where decaying matter is abundant in soils. Mushrooms appear in an arc or complete circle when mowing is infrequent. Although the "mushroom circles" are apt to attract attention from the neighbors, CAs will find most customers especially dislike this turf defect. Soil fumigation with methyl bromide is a common control measure.

**Fairy Rings**

Fairy rings are common in soils with excess decaying matter. Caused by a number of different fungi of the "toadstool" type, the common name is descriptive of the growth pattern of these organisms. Radial growth is caused by the yearly extension of the underground mycelium or "root" system. Each year during damp periods the mycelium send up fruiting bodies or "toadstools." Although the circle of "mushrooms" attracts curious attention to the phenomenon of the fairy ring, the fungal mycelium can nevertheless damage turf severely by cutting off water from the grass roots. The pattern of infestation is usually as follows: first, an inner area of grass is encircled by a stimulated zone (caused by excess nitrogen produced by bacteria in the old growth zone of the mycelium); this is followed by a circular strip of dead grass, all within the ring of toadstools. Another zone of stimulation appears just outside the ring.

Control and eradication of fairy rings is accomplished either by drenching, or removal of infested sod and fumigation. Drenching technique, which supresses growth, involves removing small plugs, 2 to 4 inches deep and 6 to 8 inches apart, around the outside and throughout the affected area and inserting a fungicide by means of a battery-type syringe. Either phenyl mercury acetate or a cadmium compound, at twice the recommended amount for foliar application, squirted into the plug holes, should do the job. The plugs should be replaced and the area drenched with not less than 1 inch of water. (Phenyl mercury acetate should *never* be used on Merion Kentucky bluegrass.)

Fumigation with methyl bromide follows standard fumigation techniques with modifications. After removing all of the infested sod, taking care not to spill any on healthy turf, the area should be covered with a fumigating canvas

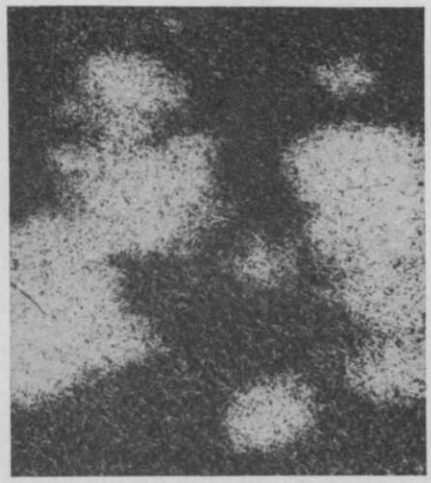
or plastic cover. Evaporating pans should be placed at regular intervals and be accessible from outside the cover. Odorized methyl bromide is then inserted under the cover into the pans at 2 lbs. per 100 sq. ft. After 36 to 48 hours, the soil should be allowed to aerate for 7 to 14 days before remaking.

Fumigation with formaldehyde is less dangerous but requires more time under cover and a longer period to aerate. Either type of fumigation is hazardous and should not be attempted by anyone who has not had previous experience with the chemicals and the techniques involved in their use.

**Snow Molds**

Snow molds are caused by any of several fungi which thrive in cool, wet, humid conditions like those found in the snow belt of the United States in late winter or early spring.

Gray snow mold, also called snow scald and winter scorch, is caused by a small basidiomycete called *Typhula itoana*. First noticed after spring thaw as light yellow areas about 1 to 2 inches in diameter, the infection centers soon enlarge and turn grayish white due to the strands or growing fungus and the decomposition of the grass leaves. Small fungus bodies (sclerotia), no larger than 3/16 inch diameter, can be found embedded in the infected blades of grass. The sclerotia appear yellow or light brown in the early stages, turning dark brown as they mature.



**Snow mold (left) and leaf spot (right) are common diseases lawn spraymen are called on to control. As with all turf defects, prevention is more important than remedial treatment. Remind your customer that good turf management, with fertilization, proper mowing, aerifying, verticutting, and other practices, are necessary precautions if a fine lawn is to be enjoyed. And remind him, too, that chemical treatment requires a pro!**

Pink snow mold, caused by *Fusarium nivale*, is also recognized as a yellowish, irregular circle, although it's actually an ascomycete. Under snow cover on unfrozen ground, the white mycelia develop over the grass blades. With the melting of the snow, the mycelium turns pink upon exposure to the sun. This fungus usually attacks only leaves, but occasionally will damage crowns and roots of grasses, making complete reseeding necessary.

Control methods for the snow molds include cultural practices which attempt to prevent conditions which harbor the fungus, and chemical methods which will kill a snow mold if one is present.

Since nitrogen assists growth of molds, just as it does for grasses, refraining from nitrogen application in late fall will hinder the growth of molds without harming the grass. Early fall fertilization will help grass "harden." Gathering mower clippings and not putting straw over the lawn for winter will eliminate "hiding places" for the molds by reducing thatch or soil surface debris.

Fungicides containing mercury, such as 2 oz. calomel and 1 oz. corrosive sublimate per 1000 sq. ft., will provide satisfactory preventive control of these fungi in areas characterized by snow molds. Application should be made before the first snowfall, during a midwinter thaw, and after the first spring thaw.

**Melting-Out**

Melting-out, leaf spot, leaf blotch, brown blight, and zonate eyespot are all caused by various species of *Helminthosporium*. The character which all *Helminthosporium* fungi have in common is an ovular spot or lesion on the leaf blade. Sometimes the lesions expand in concentric circles, producing a zoned appearance. These lesions vary in color according to species from dark brown to reddish purple. Advance of the infection causes the individual leaves to yellow at the tips and gradually work back to the base of the plant.

Melting-out is one of the diseases which will respond if turf is mowed at a maximum height (1¼ inches or higher). Fertilization with nitrogen will quickly increase growth rate of the grass and help combat the disease if the weather is not wet.

Application of zineb, 50% wettable powder, at 1 lb. per 1000 sq. ft., or captan, 50% wettable powder, at 2 lb. per 1000 sq. ft. in 10 gallons of water, will give good chemical control of *Helminthosporium* diseases. Other fungicides which will work are dyrene, thiram, and cyclohexamide.

**Red Thread**

Red thread, *Corticum fuciforme*, is a basidiomycete which does great damage to almost all of the cultivated grasses in the cooler, more humid portions of North America and Europe. It first appears as irregular blighted patches up to 3 feet in diameter. On close observation the fungus is seen to be a small dark green spot on the grass leaf. The leaves begin drying out, as the disease advances, and turn tan. In the final stages, the dead leaves have fine threadlike filaments of fungus at their dried-up tips which are a characteristic coral-pink color.

Fungicides containing mercury or cadmium compounds applied along with fertilizer to speed up growth and aid recovery should combat red thread.

**Rust**

*Puccinia graminis*, better known as rust (one of several species), appears 10 days after infection as light yellow flecks or lesions on the leaf blades. These lesions gradual-

(*Continued on page W-11*)

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"Scientific Guide to Pest Control Operations" (published by Pest Control magazine) was written by and for pest controllers. Author Dr. Lee C. Truman is a successful PCO in Indianapolis, Ind., and Professor William L. Butts is in charge of the four-year pest control curriculum of Purdue's entomology department. Working with them was an editorial committee representing important phases of the pest control industry: Dr. John V. Osmun, head of Purdue's entomology department; Dr. Howard O. Deay, Purdue professor of entomology; Dr. Philip J. Spear, technical director of the National Pest Control Association; Dr. Harry D. Pratt, in charge of insect and rodent control training for the Communicable Disease Center of the U.S. Public Health Service; George L. Hockenyos, PCO-researcher, owner of Sentinel Laboratories, Springfield, Ill.; and James A. Nelson, editor and publisher of Pest Control magazine.

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**On the road for a two-day field trip** which followed lecture sessions in this year's Ohio State Roadside Development Short Course, delegates paused to inspect roadside rest stations and test plots where herbicides and other turf chemicals are tried out.

## Ohio Roadside Course Shows CAs What's New in Highway Weed and Turf Spraying

Contract applicators hungry for lucrative highway weed and turf jobs were treated to a mouth-watering feast of information at the 21st Annual Short Course in Roadside Development at Ohio State University recently.

Nearly 200 delegates, comprised of CAs, landscape architects, and highway officials, attended the informative seminars which began October 2 in the Departments of State Building, Columbus, Ohio. The course lasted through Oct. 5, but a two-day field trip through Ohio countryside terminated the gathering this year.

While the Ohio program, which is sponsored jointly by the university, and the Ohio Department of Highways, covered many fields not of interest to CAs, the lectures on weed control, turf maintenance, and highway spraying in general, were of particular interest.

One important address was on fertilizing roadside turf. Zenas H. Beers, Midwest Regional Director of the National Plant Food Institute in Chicago, outlined chemicals and techniques for maintaining vigorous grasses on roadsides.

One highlight of the field trip was an actual demonstration of a new sprayer developed specifically for MH-30 by the F. E. Myers & Bro. Co., of Ashland, Ohio.

Called the RW-29, the Myers machine was described as the first device built exclusively for spraying MH-30, the new growth-retarding chemical from Naugatuck Chemicals, Naugatuck, Conn.

A problem the Myers engineers had to solve was the necessity for absolute regularity in dispensing chemical. Application of irregular quantities of the growth regulator would cause uneven grass growth, and thereby eliminate the advantages of using the chemical.

Since millions of dollars are spent for mowing roadside turf each year, the combination of Myers machinery and Naugatuck chemicals was of great interest to the short course students.

After the Myers demonstration, which was held at the intersection of highways 250 and 71 near Ashland, Ohio, delegates were taken on a tour of Myers production facilities and were invited to a luncheon in Ashland.

Several busses were chartered to carry delegates on the two-day field trip, during which all aspects of roadside maintenance were examined by touring actual problem spots, and scenes of special interest to the landscape architects.

The Ohio short course is an annual affair open to all interested parties for a nominal registration fee. Dates for next year's program will be announced later, a course spokesman told *Weeds and Turf*.


**A rainy, gray morning was evident** as Roadside Conference delegates sat in parked busses to witness a demonstration of a new roadside sprayer built by the F. E. Myers and Bro. Co. of Ashland, Ohio. Truck and sprayer can be seen at lower left as experimental quantities of MH-30, new growth-regulating chemical from Naugatuck, is spread over the roadside slope. Myers engineers say the new machine, called the RW-29, was developed especially for MH-30 applications.

### Use Chlordane to Control Sod Webworm, Purdue Staffer Says

Although sod webworms are ruining many lawns, Dr. Glen Lehker, Purdue University extension entomologist, points out that the worms could be controlled with a chlordane dust or spray. One-half pint of a 45% emulsifiable concentrate will treat 1,000 sq. ft., Lehker notes. Dieldrin, DDT, and heptachlor are also recommended.

Regardless of the material used, Lehker cautions CAs not to water the turf until all webworms have been killed, which usually occurs in 72 hours. The chemical must remain on the grass blades where the insects feed.

To assist CAs in identifying sod webworms, Lehker notes that the worms are from ¼ to ¾" long, and live in silk-lined tunnels at the base of the grass plants. Injured turf is strewn with bits of chewed grass blades and there are numerous fine webs between the stems.

### Mulching Aids Weed Control

CAs who do contract spraying of home gardens should remind customers that mulching is also an important factor in weed control. Not only are weeds hindered by this process, but mulching also keeps soil cooler and allows for better root growth.

**Distinguished service awards** in honor of outstanding contributions to the Florida turfgrass industry were presented by Ralph White, Jr., (second from left), president of the Florida Turfgrass Association. Recipients were (standing left to right with plaques) Willard Fifield, Frank Holland, and Col. Frank Ward. Other awards included a scholarship in turfgrass management which was given to Harry Meyers, turf student at the University of Florida. Nearly 400 delegates registered for the annual conference.

## "Ten Years of Progress—Where Do We Go From Here?" Theme of 10th Annual Fla. Turfgrass Conference

"If the present population trend continues, Florida will be the third largest state in the Union," Dr. Gene Nutter, executive director of the Golf Course Superintendents Assn. of America told almost 400 delegates to the 10th Annual Florida Turfgrass Management Conference. "This presents a real challenge to the CA," he stated.

Dr. Nutter's address, "Ten Years of Progress in Turf Management," and the talk by Dr. G. C. Horn, conference coordinator and associate turf technologist at the University of Florida, "Where Do We Go From Here?" were the keynote speeches of the three-day conclave of Florida spraymen, held at the University of Fla., Gainesville, August 28-30.

**At the annual banquet, Florida turfmen** heard Jacksonville mayor Hayden Burns (standing above at microphone) in an after-dinner speech, "Communism vs. Democracy." In one of the field demonstrations (below), delegates heard Jack Cabler (standing at right) explain work he is doing with growth regulators, such as MH-30, on Bermudagrass. Cabler is a Graduate Fellow in Botany at the University of Florida, Gainesville. The experimental plot shown below was one of several the turf experts visited.

### Hold Nematode Symposium

A symposium on nematode control, directed by Dr. A. A. Di Edwardo, assistant nematologist at the University of Fla., was the first ever held on nematodes in turfgrasses in this country. Dr. Di Edwardo reported that he is spending most of his time working on parasitic nematodes that affect turf, and that he expects much valuable information for CAs will result from his studies.

Discussions and demonstrations of the use of chemicals in controlling the growth of grass were also highlighted at the meet. "Controlling the Growth Rate of Bermudagrass with Chemical Regulators" was the title of a speech by Jack Gabler, who is doing his Ph.D. thesis on this problem. Gabler reported on the results of his experiments and demonstrated his findings at the research plots at the Turf Research Unit.

### Growth Regulators Praised

Research workers at the Horticultural Unit reported on growth-retarding studies in which CCC, Phosfon, and MH-30 were controlling the growth of Ormond, Tifgreen, and Pensacola bahia. Materials were giving excellent control after 20 weeks, during which time no mowing was necessary. "The future of this study is obvious, and we shall follow the reports carefully in future conferences," Dr. Horn told the conference.

Other areas under discussion included golf courses, playlands, parks, and cemeteries; retail dealers and garden suppliers; horticultural spraymen and lawn service agencies; and turf nurseries.

### Col. Frank Ward Honored

An award of appreciation from the association was presented to the retiring executive secretary, Col. Frank Ward, for his long service. Col. Ward served the organization as president, member of the board of directors, and then as executive secretary. Newly appointed secretary Walter D. Anderson was then introduced.

Other new officers of the Fla. group are Ralph W. White, Jr., president; Gene C. Nutter, vice

Retiring Florida Turfgrass Association Executive Secretary Frank Ward (left) greeted his successor, Walter Anderson. The active Florida group requires the full-time services of an executive secretary.

president; and James L. Blackledge, secretary-treasurer.

James E. Ousley, Sr., a member of the board of directors, was also named as general chairman of the Second Annual Trade Show, to be held in the spring of 1963. Date and location are still to be announced.

Mailing address for the Fla. Turfgrass Assn. has been changed to P.O. Box 5284, Jacksonville 7, Fla., and interested CAs may write to that address for more information about the group.

**Turf Diseases**

*(from page W-6)*

ly enlarge and elongate parallel to the veins in the leaf. Reddish-brown (rusty) pustules are exposed as the outer layers of grass tissue are ruptured. The disease eventually turns an entire stand of grass yellow. The bentgrasses are relatively immune to rust infection, whereas Merion bluegrass is very susceptible.

With the rising popularity of Merion Blue the rusts are now considered to be among the more important and costly turfgrass diseases. Outbreaks may be expected in July or August.

Cycloheximide can be effective against rust if applied at the rate of 2 gallons of 60 ppm per 1000 sq. ft. Zineb applied at the rate of 2 oz. per 1000 sq. ft. in 3 to 5 gallons of water will also combat rust. Most of the fungicides are aided in their action if a commercial spreader-sticker is used with the preparation.

Preventative practices include nitrogen fertilization and application of granular urea.

Additional information concerning the identification and control of fungus diseases affecting turfgrass may be obtained in booklets produced by extension services, or by fungicide manufacturers. An excellent text on the subject, *Diseases of Turfgrasses* by Houston B. Couch (See book review, August, 1962), would be helpful to anyone interested in this new, exacting, and expanding phase of a contract applicator's service.

**Editor's Note . . .**

This original article on turfgrass diseases was prepared by *Weed's and Turf's* technical staff, from available literature and our own investigations. While opinions presented are strictly our own, we wish to thank the companies which reviewed our manuscript and made helpful suggestions. Firms especially cooperative were Chemagro Corp., The Dow Chemical Co., E. I. DuPont de Nemours and Co., Morton Chemical Co., The Mallinckrodt Chemical Works, and the Upjohn Co. We also thank university researchers who reviewed the text.

## COMMON CHICKWEED

*(Stellaria media)*

Common chickweed is an annual or winter annual which reproduces by seeds and by rooting at low points along the trailing stems. The weed is common on rich soils of gardens and shady or moist lawns throughout North America, especially on the east coast. This weed shares the same common name as another pest species, mouse-eared chickweed, a perennial plant which is densely hairy and has no stalks on its leaves.

Stems of common chickweed are many branched, low and creeping, and have rows of hairs on them. The branches which stand erect may reach a height of 12 inches. Leaves are opposite each other on the stem, spoon-shaped in appearance, and less than 1 inch long. The lower leaves have a stalk while upper ones sit close against the stem. Flowers of common chickweed are small and white, with 5 deeply notched petals. Seeds are nearly round, 1 mm. across, and notched. The reddish-brown seeds are roughened by curved rows of tubercles.

Roots are shallow, fibrous, and easily pulled from the ground.

Common chickweed often germinates in the fall and grows during the winter. It flowers and produces seed in late spring and early summer. It usually dies by summer.

Recommended control methods of chickweed in established lawns consist of applying urea compounds such as neburon in fall until the ground freezes. Silvex may be used at any time that the weeds are growing rapidly.

Application of a pre-emergent herbicide such as Dacthal in the fall would prevent germination of chickweed and other winter annuals such as annual bluegrass.

*Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.*

DRAWING BY REGINA HUGHES, USDA, BELTSVILLE

## U. S. Borax Makes Soil Sterilant To Control Weeds Under Paving

Undesirable vegetation in the subsoil of a paving project can be effectively controlled with Monobor-Chlorate, a new herbicide from U.S. Borax, the firm announced recently.

The weedkiller can be applied either dry, by hand or mechanical spreader, or in solution from conventional spray equipment. It has nonselective, quick-killing action on the root systems and shoots of perennial and annual vegetation, the company stated.

To be marketed in 25 lb. and 50 lb. bags, the new product is a combination of sodium chlorate and sodium borate, and will not corrode underground piping or application equipment, according to U.S. Borax.

"Because Monobor-Chlorate Granular kills plant tissue on contact, the pavement is protected against initial ruptures. And because weeds under paving can be killed only by absorbing a toxic chemical dissolved in the moisture about them, Monobor-Chlorate's high solubility in water enables it to be incorporated into the soil from existing moisture," Dr. L. M. Stahler, U.S. Borax Director of Agricultural Chemical Sales, reports.

Dr. Stahler also says the new product is effective in other surfaced areas, such as irrigation ditches, reservoir sites, and fire walls around storage tanks containing flammable liquids.

CAs interested in more information on Monobor-Chlorate should write to U.S. Borax, Marketing Department, 630 Shatto Place, Los Angeles 5, Calif.

## Data on Spreader-Sticker Ready

Test results of effectiveness and proportionate cost of various spreader-stickers, chemical agents which reduce the surface tension of water to give better coverage of sprayed surfaces, are contained in Star-Bar Technical Bulletin No. 101.

The bulletin, which includes results of tests with Star-Bar's "Slick," is available to interested CAs by writing to the Star-Bar Division, Agricultural Specialties, 12200 Denton Dr., Dallas, Texas.

## —W & T Mailbox—

### Tip on Scales

In an article in October's *Weeds and Turf* (p. W-26), about the pine needle scale insect, you twice referred to the "female turning to eggs."

I've known for quite a while that eggs turn into females (and males), but this is the first time I've heard of females turning into eggs!

Could you please explain how the female insect turns to eggs?

*Fred Schoener*

Los Angeles, Calif.

*Editor's note: Dr. M. H. Farrier, of the North Carolina State College Entomology Department research division, explained this unusual terminology as follows:*

After the pine needle scale reaches the crawler stage, the female moves over the plant until a suitable feeding place is found. Once positioned, the female settles down to suck the sap, never again moving from that position.

As the female attaches her sucking mouthpart to the needle and begins feeding, eggs begin to develop inside her. The insect then secretes wax over itself. After the maximum number of eggs has been developed, the female dies, and her dead carcass and the wax form a protective white crust. During the winter, the eggs remain inside this white crust.

Thus, in a literal sense, the female pine needle scale insect does "turn to eggs."

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### Industry Needed W&T

I wish to take this opportunity to congratulate you on the first issues of *Weeds and Turf*. We have had many favorable comments on your magazine, and it is something that the industry has needed for a long time.

*Charlie P. Johnson*

Charlie P. Johnson Spray Co., Inc.
Miami, Fla.

*Weeds and Turf welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to Charles D. Webb, Editor, Weeds and Turf, 1900 Euclid Ave., Cleveland 15, Ohio.*

### Test Fungi For Lawn Chinch Bug Control at Fla. Experiment Sta.

Fungi and wormlike nematodes are being used in experiments in Florida as natural controls for chinch bugs. Already resistant to DDT, chinch bugs are developing resistance to parathion, the University of Florida Experiment Station reported recently.

Dr. Stratton Kerr, assistant entomologist with the Florida station, reports promising results with a fungus tested for lawn chinch bug control.

Dr. Kerr has also found a new St. Augustine grass that seems to have some degree of chinch bug resistance, a recent report from the University of Florida Experiment Station says. Somewhat coarser than some St. Augustine varieties, the grass is claimed to be fairly attractive, and with no appeal to chinch bugs.

CAs interested in obtaining more information about the experiments or the new St. Augustine grass can write to Dr. Kerr at the University of Fla., Gainesville.

### Southern Weedmen Meet Jan. 16-18

Authorities from 12 southern states will swap information on better ways to control weeds on farms, industrial sites, parks, in water, and on other areas at the 1963 Southern Weed Conference, Admiral Semmes Hotel, Mobile, Alabama, January 16-18.

More than 500 research and education workers, representing state and federal agencies, chemical companies, and other organizations, will attend.

Dr. R. P. Upchurch of North Carolina State College, Raleigh, will be in charge of the program, and V. S. Searcy, of Auburn University, Auburn, Ala., will handle local arrangements. CAs interested in more information about the conference may write directly to Dr. Upchurch.

### No Cure For Dutch Elm Disease

Plant pathologists at Purdue University caution CAs that homeowners may try any remedy claimed effective for prized individual elms that have been attacked by Dutch Elm disease.

Pathologists point out that at this time there is no known cure or preventative for the Dutch Elm disease on individual elm trees that can be substantiated by reliable results from competent research workers.

## New Test Herbicides to be Unveiled At '63 Northeastern Weed Meet

New herbicides, available for testing in 1963 but not yet thoroughly researched, will be presented to delegates at the 17th Annual Meeting of the Northeastern Weed Control Conference. Leaders in weed control research, and representatives of the leading chemical companies and commercial weed control firms, will gather for the annual affair at the Hotel New Yorker, New York City, January 9-11.

Chemical companies participating in the demonstrations will be allotted five minutes to present technical data and information on their new formulations. Delegates to previous meetings recall that many of today's leading herbicides were originally introduced at Northeastern Weed Control Conferences. Interested companies should contact Alex Zaharchuk, Herbicide Research, Cooperative G. L. F. Exchange, Inc., Ithaca, N.Y., for more information about the presentations. Firms participating have been asked to have available for distribution at least 600 copies of a technical data sheet for each product.

Papers of basic research and of general interest will be read on Wednesday, the first day of the conference. Call for papers to be presented has already been issued.

Section divisions and subject matter chairmen have already been selected. Areas of particular interest to the contract applicator include:

*Industrial weed control*, with B. W. Bergstrom, New England Power Service Co., 441 Stuart St., Boston 16, Mass., as chairman.

*Highways*, under A. M. Ditton, Department of Public Works, State of New York, Albany 1.

*Railroads*, chairman Roy R. Gunderson, Engineer Maintenance of Way, Western Maryland Railway Co., 300 St. Paul Place, Baltimore 2, Md.

*Public Health*, C. S. Maneri, Department of Health, State of New York, 84 Holland Ave., Albany 8, N.Y.

*Aquatic Weed Control*, with the program under the direction of J. E. Gallagher, Amchem Products, Inc., Ambler, Pa.

*Turf Maintenance*, with J. F. Cornman, Department of Floriculture and Ornamental Horticulture, N.Y. State College of Agriculture, Cornell University, Ithaca, N.Y., as chairman.

Sectional meetings and a business meeting will also be included in the conference.

CAs who desire more information on the 17th Annual Meeting of the Northeastern Weed Control Conference may write to Dr. John Meade, NEWCC Secretary-Treasurer, Department of Agronomy, University of Maryland, College Park.

## Trimmings

***Nipp and Tuck.*** **We've been hearing a lot from Floridian Larry Nipp recently, and are beginning to wonder why this busy applicator is not all "tuckered" out from his many activities. Besides running his American Power Spraying Company in Ft. Lauderdale, Larry finds time to participate in such hard-working organizations as the Florida Turfgrass Association and the Horticultural Spraymen of Florida. Larry tells us he has 12 trucks, operates in 22 municipalities and 4 counties, and has 5,000 lawns under yearly contract! A good example of the kind of companies which contribute to the thriving Florida turf spraying business.**

* * *

*Aussies Hike Weed Funds.* News from down under is that state appropriation for control of noxious weeds has been raised from £40,000 to £80,000. Australia has community noxious weed councils much like our mosquito abatement districts, and area groups will certainly welcome this increase in funds.

* * *

***Transfer for Tony.*** **We've just learned that Tony Tafuro, vice president of the Northeastern Weed Control Conference, has moved from Amchem Products to American Cyanamid's Agriculture Research Center in Princeton, N.J. Veteran members of the NEWCC will remember the fine job Tony did on publicity last year, and will be interested to learn of his new position.**

* * *

*Bell Is Ringing.* Our ears are still ringing with words of congratulations we just received from weed controller Ken Bell, who wrote to commend our new *Weeds and Turf* publication. Ken, whose Bell Industrial Weed Control Company is in Amarillo, Texas, is widely known as a proponent for more technical data for contract applicators. He is also active in the National Pest Control Association, and runs a thriving pest control business in Amarillo.

* * *

***Proud Pennsylvanians.*** **We've had occasion to talk to a lot of Pennsylvania applicators recently, and are pleased to see how highly they speak of their turfgrass education program at Penn State. "It's the biggest turfgrass school in the land," they are wont to say proudly. Under the leadership of Dr. J. M. Duich, the Pennsylvania school, located in College Park, is really turning out some top notch men who'll soon be taking their place with weed and turf spraying companies throughout the country. A credit to everyone involved!**

* * *

*It's "Dr." Merkle Now.* We understand Morris Merkle has just finished his Ph. D. at Cornell, and has joined the faculty there to work in aquatics. Hope to hear great things in water weed control from Cornell next year!

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