Green World

AN INDUSTRYWIDE PUBLICATION OF THE NEW JERSEY TURFGRASS ASSOCIATION

Volume 2, Number 2

May, 1972

Systemic Fungicides For Turfgrass Diseases

Philip M. Halisky

Systemic fungicides are a new group of chemicals that work from inside as well as from outside the plant to control fungus diseases. Because of their ability to penetrate, the systemics have been shown to be effective against many fungal pathogens that are established inside plants and therefore "hidden" from standard protectant fungicides. Virtually all fungi that actively parasitize turfgrasses do so by first penetrating susceptible plants during the infection process. Once fungal structures are established within the plant they are less vulnerable to protective chemical action from a fungicide applied externally, unless that fungicide also enters the plant.

Systemic fungicides may be defined as compounds that are absorbed by the plant, translocated within the plant, and stored within for a limited period of time. The use of systemic fungicides eliminates the problems of visible spray residues, rain wash-off, growth of new unprotected grass tillers, and most importantly, the need for repeated, accurately-timed applications common with foliar protectants. In contrast, the need for frequent applications of protectant fungicides results in high labor costs — an obvious disadvantage in any turf management program.

Considering the needs of the turfgrass industry in combatting diseases, it seems appropriate to emphasize the merits of systemic fungicides when compared with protectant chemicals. In addition to the advantages discussed above, the desirable characteristics of systemic fungicides are as follows:

- a) They are effective at low dosages $(1-2 \text{ oz}/M^2)$.
- b) They have long residual activity (persistence).
- c) They show broad spectrum activity against several fungal pathogens of turf.
- d) Most do not injure the turf, they are relatively non-phytotoxic.

Currently, several systemic fungicides are being widely evaluated for usage against turf diseases. Most of those available commercially or under

WHERE WILL THEY BE IN '73?



These familiar turf research plots on College Road at Rutgers are soon to be lost to the bulldozer in preparation for programmed school "progress." The New Jersey Turfgrass Association has expressed its serious concern regarding the future of effective turfgrass research in New Jersey. In this period of environmental concern it seems ironic that established basic turf research is to be plowed under without adequate consideration for the future.

evaluation as "experimental compounds" are listed below.

- a) Thiobendazole compounds (Mertect 140F & Tobaz).
- b) Thiophanate derivatives (Topsin M & Cleary 3336).c) Benzimidazole derivatives (Ter-
- c) Benzimidazole derivatives (Tersan 1991).
- d) Oxathiin compounds (Plantvax & Vitavax).
- e) Triarimol (EL-273 Experimental Compound).

From a chemical standpoint, the Benzimidazole (Tersan 1991) and Thiobendazole (Mertect and Tobaz) compounds are structurally related. The remaining systemics are not related chemically. However, are forgitoxic derivatives or "break-rown poducts" that are formed inside an plant after application of benzimidazole, thiobendazole, or thiophanate fungicides appear to be metabolically related.

In conclusion, each systemic fungicide appears to be a distinct chemical compound that should be evaluated for its own merits with respect to fungicidal effectiveness, phytotoxicity, spectrum of activity, residual qualities, turf color and turf density. However, the mode-of-action of these chemicals within the grass plant appear to be metabolically similar.

Reference

von Rumker, R., T. Parr, C. A. Anderson, J. W. Young, and J. Hensel. 1965. SYSTEMICS, Parts 1 (September), 2 (October), 3 (November), 4 (December); FARM CHEMICALS. (Contribution from Chemagro Corporation).

Results of Systemic Fungicide Survey

R. E. Engel, P. M. Halisky, and C. W. Bussey

The turfgrass industry has always had need for new and better fungicides. Recently the reservations or restrictions on mercury and cadmium fungicides have reduced the choice of types. The mercuries have been used for many decades. In cases where they gave something less than excellent control they offered compensation by giving some protection against most diseases that might appear unexpectedly. Assorted new chemicals have appeared in recent years. Now the systemics have added a new dimension. The experience gained with the systemics that have been on the market briefly should give some insight to the changing scene. As with all new turfgrass fungicides, it is important to determine their strength and weaknesses.

Questionnaires on use of systemic fungicides in 1971 were sent to 200 golf course superintendents in the area of southern New Jersey-Philadelphia through the northern New Jersey-New York City Metropolitan area. A total of 68 replies were returned. Fiftyseven of these reported using systemic fungicides as follows: 57 reports on Tersan 1991, 16 reports on Cleary 3336, and 2 reports on Mallinckrodt Tobaz. The number of reports should not be construed as an indication of desirability, as these fungicides are new on the market. The comments are confined to dollarspot and large brownpatch, as reports on other diseases were too few to determine any trends.

Summary — Reports of Systemic Fungicides Used on Greens and Fairways

Part I — Reports on Tersan 1991: 49 of the reports were from superintendents who used Tersan 1991 fungicide.

A. Results with Dollarspot — Thirteen of 47 users on greens reported no dollarspot present and 32 reported none at the start of T-1991 treatments. All reported good to excellent control of this disease. Of 23 users of this systemic on fairways, 4 reported dollarspot at the time of treatment. Only 1 reported less than good control after treatment of fairways.

B. Large Brownpatch Control — Ten T-1991 users reported large brownpatch on greens prior to use. Eight of these reported good control, 1 reported fair control, and 1 reported poor control. Five of the users reported that large brownpatch occurred on greens within 10 days after treatment. On fairways, 4 of 23 users reported large brownpatch within 10 days after use.

Part II — Reports on Cleary 3336

A. Dollarspot Control — Of 11 users on greens, all but 1 reported good or better control (1 fair). Three of 5 users on fairways reported dollarspot present at start of treatment with excellent control.

B. Large Brownpatch Control — Two of the C-3336 users reported large brownpatch on greens with fair to poor control. On fairways, 2 users reported large brownpatch after using C-3336 with fair control. One reported this disease before and after with fair to good control.

Part III — *Reports on Tobaz:* Two users reported use of this material. It received ratings of good and poor on dollarspot. Both reported large brownpatch within 10 days after use.

Summary of Attitudes from Users Reporting Would rate as a good to very good fungicide (No. of users) Tersan 1991 46 of 49 Cleary 3336 12 of 15 1 of 2 Tobaz Would use on Large Dollarspot Brownpatch (No. of users) Tersan 1991 27 12 Cleary 3336 6 1 2 Tobaz

In general, the responding superintendents expressed considerable enthusiasm in summarizing their experiences with systemic fungicides. The very good control of dollarspot for extended periods of time was an outstanding feature of the reports. However, it appears that the systemics may have a weakness in failing to control large brownpatch. A wide margin of safety, good residual qualities, and substantial savings in labor dollars were cited as major "plus" factors. Although many superintendents recognized that the systemics were not "cure-all fungicides for all diseases," nonetheless they felt that these chemicals constituted a breakthrough in the turf fungicide industry and were definitely "here-tostay.'

Comments on Fungicides Used

"A breakthrough in the turf fungicide industry. Extended control will save valuable man-hours."

"No disease with 1991 on greens but we were plagued with large brownpatch where 1991 was used on tees at same rate of application as on greens."

"Like to alternate Tersan 1991 with other fungicides."

"More than satisfied with the results of C-3336, especially time and labor saved in applications of other materials used in past." "Nine fairways sprayed with C-3336 have 40-50% less large brownpatch disease than those with T-1991 application."

"Systemics are here to stay — excellent on 'bent-poa' fairways especially — alone, systemics are not expected to be a cure-all."

"There are no signs of disease now (December) on the treated (C-3336) greens. The last application was on Sept. 20, 1971."

"I had *Fusarium roseum* on my Merion; 1991 proved to be effective at the 2-oz rate."

"One-oz of Tersan 1991 was as good as 2-oz and greens have better color."

"I feel that the listed systemics are probably going to be used by 90% of the superintendents in the coming years as they save labor, prevent the disease, and are safe to apply."

"Sprayed tees at 3-week intervals instead of 1-week as in past."

"On 7/29/71, 18 greens were treated with 1991 and 18 greens with Tobaz. The same evening a 1.09" rainfall was recorded. The following week was exceptionally humid, wet and warm. The 18 greens treated with Tobaz experienced a severe infection of brownpatch. In contrast the 18 greens treated with 1991 had none."

Acknowledgments

The authors wish to express their sincere appreciation to those golf superintendents who took the time to respond to our questionnaire on systemic fungicides. You are to be commended for your willingness to share your views and experiences with your fellow superintendents and other turfgrass professionals reading this issue of the GREEN WORLD.

Lawn Diseases and Their Control Anthony Grasso

A frequently asked question of professional landscape gardeners and garden supply dealers is, "What should I do about diseases on my lawn?" Concern for lawn disease control is good, but the answer is complex.

Small dead spots are a common phenomenon in late spring or during the summer. While many of these are caused by oil or gas spills from the mower, dog injury, insect damage or fertilizer spillage, disease is a major offender. If it is a disease, then by all means it is usually worth the time and expense to cure it or prevent it. Selecting grasses that are adapted to local climate, light conditions and soil types is usually the first line of defense against lawn diseases. Proper lawn care such as fertilizing, watering, mowing, insect and weed control are equally important. If heavy rates of fertilizer are used early in order to take advantage of the spring rains on common

Kentucky bluegrass, look for an outbreak of leaf spot, usually about the middle of May. If there is overuse of fertilizer in the spring, by summer we can look forward to *Fusarium roseum* and large brownpatch. On the other hand, too little fertilizer encourages dollarspot. Emphasis on September and October fertilization is better on many lawns.

Before attempting the control of diseases, proper diagnosis of the lawn problem is very important. One way to tell if it's a disease is to check the blades of grass. Diseased grass usually shows some disfigurement. Dark margins, straw colored spots, shriveling blades or dark blotches of one sort or another. Whereas if the damage is from insects, the blades of grass have a chewed effect or a ragged look. The experienced man often recognizes several of the diseases by general appearance. In some cases microscopic examination is necessary. The most common diseases found in the appearance area are Helminthosporium leaf spot, dollarspot, some brownpatch, stripe smut, and Fusarium blight.

Leaf Spot

This fungus produces reddish brown to purplish black spots on leaves and stems of Kentucky bluegrass. Leaves usually shrivel and when the disease is severe, the stems, crowns and rhizomes usually rot. This disease is most active in mid- to late-spring.

Control — This disease can be controlled by growing resistant varieties of grass, such as Merion, Fylking, Pennstar, and Baron as compared with the common Kentucky bluegrass types.

Dollarspot

This disease usually appears as the name indicates — small, light colored brown spots the size of a silver dollar. The fungus usually is most active during cool wet weather of late spring and early fall. Damage is usually greatest when there is a deficiency of nitrogen. When this disease is growing actively, a white cobweb mycelium can be seen when the dew is still on the grass. Many times the upper grass blades are affected by light brown blotches across the blade.

Control — Be sure that nitrogen rates are adequate. The use of systemic fungicides during early spring and early fall can be valuable on lawns that have a history of trouble from this disease.

Brownpatch

This disease occurs during warm wet weather, but usually it does most damage following a heavy application of nitrogen fertilizer. The disease spreads by mycelium or by fungus threads and gives assorted size patches with a smoky outer ring. It usually disappears during cool, dry weather. However, the diseased areas have been known to recover with just a change in temperature.

Control — Avoid heavy use of nitrogen fertilizer. When watering lawns, be sure the grass blades have time to dry before night.

Stripe Smut

This disease is a problem on the widely used Merion Kentucky bluegrass strain. This is a systemic type disease and usually the infected plants remain diseased until completely destroyed. The diseased blades develop a stringy, shredded appearance and when the grass is wiped with a white cloth, a black powdery stain will show. This sign is most apparent in mid- to late-spring.

The Case for Fungicides

While most lawns are not destroyed by diseases, the damage caused by disease is a major cause of unattractiveness and weed encroachment. I would urge that good management should be a major method of attacking disease at all times. Also, it is my opinion that a greater number of our better lawns should have a fungicide program. An assortment of improved fungicides is available.

Timely Reminders

Dr. Henry W. Indyk

Spring Lawn Establishment -

Spring is the second best period for establishing new lawns or other turfgrass areas from seed. Spring, as contrasted to late summer-early fall, seedings generally have a more difficult time in becoming successfully established. The young seedlings must struggle against the competition of weeds, particularly crabgrass and high temperature conditions.

Chances of success with spring seedings can be greatly increased. Earliness — as soon as soil and weather conditions permit — is very critical. Attempts to successfully establish a new lawn after May 1 become very difficult. However, all is not lost sodding is a technique that can be effectively used at any season of the year providing the soil can be prepared and water is available.

An important aid for spring seedings is a light mulching. Salt hay is one of the best materials to use. For best results, the mulch should be applied lightly and evenly and not removed. Light application can be best described by applying it so thinly that the soil is visible through the mulch when you look straight down at your toes. Usually a large bale of salt hay is adequate for about 2500 sq. ft. The inclusion in the seed mix of a small percentage (10 to 20 percent) of fast germinating turfgrass is another useful technique. The recent development of the new improved turf-type ryegrasses such as the variety Manhattan, greatly improves the chances with spring seedings. Their quick germination and establishment and attractive turf quality characteristics as contrasted to the unsightly pasture-type ryegrasses serves a definite need in spring seedings.

Repair Weak Spots ---

Turfgrass areas which show evidence of damage or thinning need bolstering with some repair seeding. Such areas were candidates for frost seeding in late February or early March if bare soil were exposed. Now it is too late to take advantage of frost action. Areas to be seeded need some preparation before seed is planted. Generally, a dead mat of old grass is covering the soil in such areas. Vigorous hand raking is effective but difficult and prohibitive on large areas. Thatching machines make the job much easier and the results are much better for proper germination of the seed. Selection of the machine becomes very important since many do not prepare the area adequately. The best type of thatcher is one which has straight rigid (not swinging) blades capable of being adjusted to penetrate through any dead mat that may be present and at least $\frac{1}{2}$ inch into the soil. The same type of machine is very effective for dethatching a well-established lawn.

Many overseedings on existing turfgrass are failures due to improper preparation. Seedings made the easy way — directly on a dead mat of grass usually are an effort in futility. In order for seed to germinate the area must be prepared so that when the seed is planted, it comes in direct contact with soil.

Pre-emergence Crabgrass Control -

The development of this technique with effective and safe herbicides has provided a very potent weapon against crabgrass. The timely and proper application of pre-emergence materials is much easier and more effective than postemergence treatments. Aside from applying the pre-emergence material correctly, time of application is very closely associated with effectiveness of the results. Application before the crabgrass germination season begins is essential for the highest degree of control. Although seasonal variations do occur, application before May 1 will provide assurance of beating early germination of crabgrass.

Buying Manhattan Ryegrass —

Manhattan ryegrass has been developed and proven as a superior variety of perennial ryegrass. Because of its superior performance, it is gaining wide-spread recognition with increasing demands on available seed. Every effort possible was taken to maintain the superior characteristics of the variety by insistence on conformance to high standards in seed production. One of the stipulations was to produce certified seed. Through certification, a means was provided for maintaining the genetic identity of the variety which has proven its superior turf characteristics and performance.

At present, uncertified Manhattan ryegrass seed is beginning to find its way into the retail turfgrass seed trade. It is possible that the availability of uncertified seed will increase in the future. This is an unfortunate situation since unless high standards are maintained in seed production, the superiority of the variety can be easily destroyed. In uncertified Manhattan ryegrass seed, the possibility exists that it has been contaminated with annual and other inferior ryegrass types as well as other undesirable grass seeds which would detract from its performance as well as appearance. As a consequence, the many years of effort by the plant breeder in the development of the variety, as well as the conscientious effort of responsible seed producers can be wasted. More importantly, the prime losers in such a situation are the purchasers of the seed.

Your assurance of high quality seed that carries the potential of superior characteristics of Manhattan ryegrass as developed by the breeder is certified seed. When purchasing Manhattan ryegrass, *insist* on certified seed.

Response of Turfgrass Diseases to Certain Fungicides

(1) Benomyl stimulates Growth of a Basidiomycete on Turf. A. M. Smith, B. A. Stynes, and K. J. More. 1970. Plant Disease Reporter 54(9): 744-775. In New South Wales, a basidiomycete developed in bentgrass turf that had received treatments of benomyl 4 weeks earlier. The grass was not infected, but the turf was disfigured by the circular patches that contained an abundance of mycelium. Isolates of the fungus were stimulated by benomyl in culture plates. One application of 2 to 4 oz of 50% w.p. per 1,000 ft² of turf controlled dollarspot for at least 10 weeks.

(2) Evaluation of Some Chemicals for Control of Stripe Smut in Kentucky Bluegrass Turf. Jackson, N. 1970. Plant Disease Reporter 54(2): 168-70. In Rhode Island, wettable powder formulations of benomyl, chloroneb, pentachloronitrobenzene (PC-NB), 2, 3-dihydro-5-carboxanilido-6-methyl-1, 4-oxathiin-4, 4-dioxide, and thiabendazole were evaluated for their ability to control stripe smut in heavily smutted "Merion" Kentucky bluegrass turf. Fall application of benomyl significantly reduced the number of smutted tillers as measured the following spring. Thiabendazole gave varying results and the other three materials proved ineffective. PCNB and chlo-roneb, though not reducing stripe smut, afforded good protection against Helminthosporium leaf spot. Indications are that benomyl and thiabendazole may encourage Helminthosporium leaf spot in "Merion" Kentucky bluegrass turf.

Comments: It is gratifying to see such very good promise for dollarspot and smut control in turf. Again, these studies show the need to determine whether a fungicide that controls one disease is stimulatory toward other turfgrass diseases. It does not seem likely that fungicides which control one disease and stimulate another are common, but it is important to know the specific cases where this does occur.

R. E.

N. J. TURFGRASS ASSOCIATION

DON MARSHALL, President EUGENE FIELD, Vice-President RALPH ENGEL, Secretary JANET SCHERNECKE, Treasurer Membership applicants apply to:

P.O. Box 123 Caldwell, New Jersey 07006

*

EDITORIAL STAFF Ralph E. Engel Eugene A. Field Roy Bossolt

