New Team Weeds Trees and Turf

James A. Sample joins the editorial staff of WEEDS TREES and TURF as editor. He succeeds Gene Ingalsbe who left The Harvest Publishing Company in 1971. The staff change was announced by Art Edwards, editorial director of WEEDS TREES and TURF and PEST CONTROL magazines.

In making the announcement, Edwards, who edited the magazine during its infancy, said that circulation has grown from 9,000 in 1967 to more than 33,000 today. WTT now serves the non-crop and industrial weed control business, nurserymen, tree service companies, grounds and maintenance contractors, Federal installations, contract and aerial applicators, university specialists and the entire commercial turfgrass market.

As editorial director, Edwards will continue to work closely with advertisers, association groups and industry members.

Sample was previously part of a two man agri-chemicals public relations team for E. I. Du Pont de

Nemours & Co., Inc., Wilmington, Del. For several years he has worked closely in communicating the role of crop protection chemicals to farmers, non-crop and industrial vegetation control industries, agricultural suppliers and the USDA.

He has written numerous articles and produced films, radio and television presentations on agri-chemicals as they relate to food production and vegetation control. He brings a wealth of experience in the fields of journalism and agricultural to WTT.

The new editor is 31, and has a wife, Anita, and two sons.

TIME TO RENEW: Your Renewal Card Is Bound In Above

We need your okay to continue sending you WEEDS TREES and TURF magazine on a *free* basis. In fact, we must have it.

We—and other publishers—have been somewhat remiss in the past in that we've sent your copy of the magazine whether or not you sent your card in. This can no longer be done.

As you know, subscriptions are free to bonafide members of the industry. You qualify. But economics has again reared its head and we must stabilize our circle of readers. We shall maintain the magazine circulation at 33,000—the number which constitutes the basis for our advertising rate. No additional magazines will be sent except at the published rate of $10 per year in the U. S. and Canada.

MAY WE HEAR FROM YOU—by way of the bound in card above? Simply tear it out—SIGN and check your answers. DO NOT LOSE YOUR FREE SUBSCRIPTION TO SOMEONE ELSE. We want your continued support and we need you on our list.

Thank you.

Art Edwards, Editorial Director

(This renewal notice is a requirement of our national auditing service to verify that you are a member of the industry and that you wish to receive the magazine).

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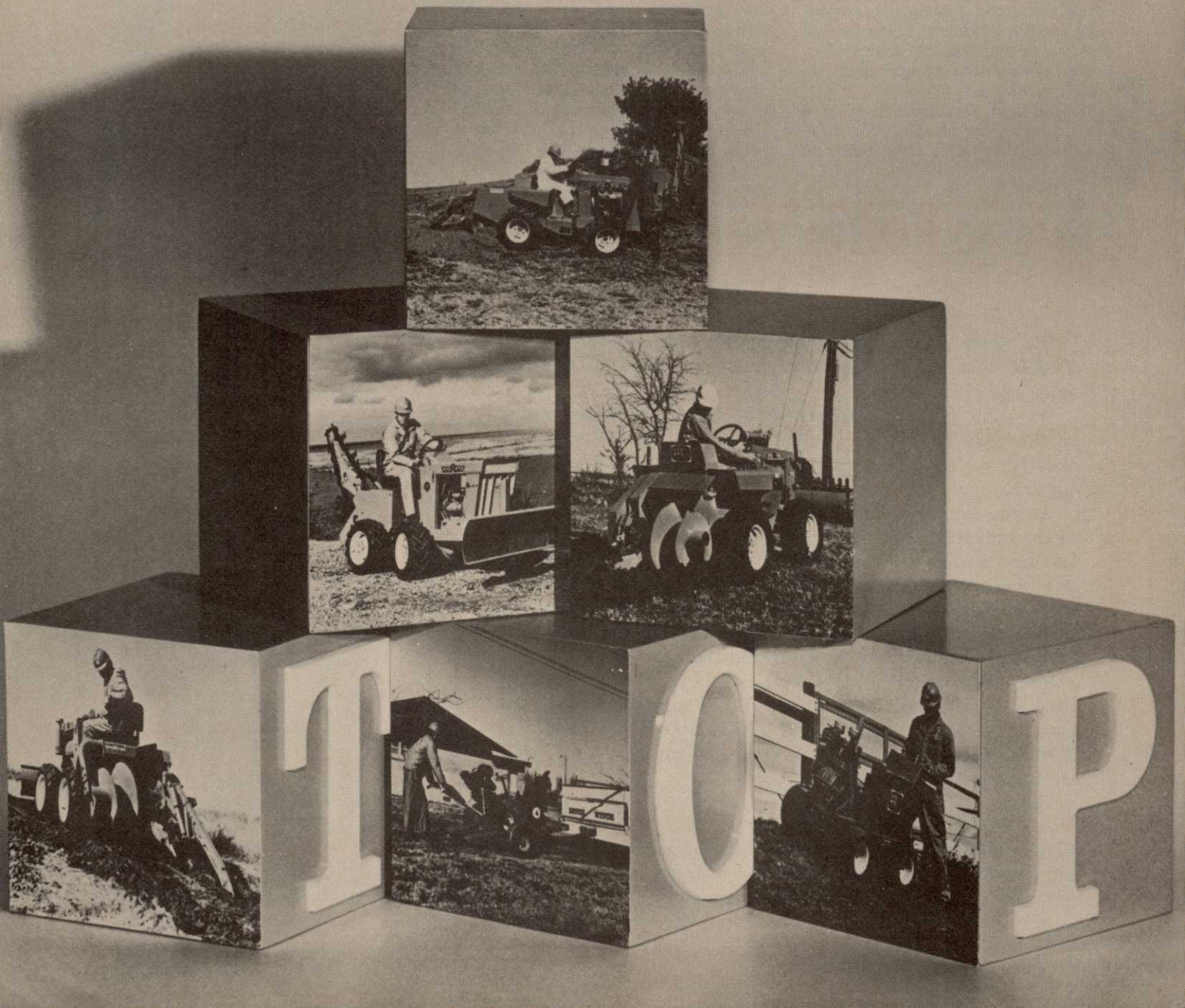

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*U.S. Dept. of Commerce, Bureau of Census, 50.5 per cent of 1970 sales (1971 sales figures not yet available).

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Turf Nutrition

By WILLIAM E. KNOOP
Extension Turf Specialist
University of New Hampshire

THERE are at least 16 chemical elements considered essential for the growth of good turf. Most of these nutrients are required in such small amounts that a soil can normally supply them. Of these 16 or so essential nutrients, the three that are required in amounts usually exceeding the capability of the soil to fully supply are nitrogen, phosphorus and potassium. These major elements are supplied to the turf plant through timely applications of a complete fertilizer.

NITROGEN ranks first in importance for optimum turfgrass growth. The most noticeable effect of low nitrogen is a pale green color together with a reduced growth rate.

Nitrogen's effect on leaf color is related to its role as an essential part of the chlorophyll molecule — the green molecule that converts light energy to chemical energy or food for plant growth. When the nitrogen supply is low, there are fewer chlorophyll molecules in the leaf, and the leaf loses its dark green color. With the reduction of chlorophyll molecules the total food production in the turf plant is lower. The plant becomes weak and may even die.

Nitrogen may be supplied to the turf plant in any of four basic forms; nitrate, amonia, organic, and molecular nitrogen. Molecular nitrogen, or the nitrogen present in the air, cannot be used directly by the turf plant for growth but can be fixed or stored in the roots of plants such as legumes. When a legume dies, this nitrogen becomes available for use by other plants. But because legumes are not normally grown with turf grasses, this source of nitrogen is not important.

Nitrogen is absorbed by the turf plant roots in the nitrate, ammoniacal or the organic form. Of the three forms of nitrogen, ammonical has a greater relative availability for plant metabolism. But, fertilizer high in ammonia can burn turf easily. A given amount of ammonia nitrogen will produce more lush growth than the same amount of nitrate nitrogen. Because of ammonia's tendency to produce lush growth, it is not usually recommended as a fall fertilizer.

PHOSPHORUS, the second element contained in a complete fertilizer, is found in smallest amounts in the grass leaf. Phosphorus is involved in photosynthesis, enzyme systems and has a very important role as a carier of energy. It is said to stimulate root growth. If a plant is deficient in phosphorus, fertilization with phosphorus usually increases the yield of roots more than that of the above-ground parts.

Phosphorus is involved in translocation of food to the roots for storage. Therefore, if phosphorus is deficient, less food is translocated to the roots and the storage organs (roots) tend to be smaller.

Phosphorus, released in soluable form in soils from the weathering of phosphorus bearing minerals and from fertilizers, recombines primarily with the clay fraction of the soil. The phosphorus percentage of the soil usually increases as the clay content increases.

Soluble phosphate fertilizers react rapidly with soils so that most of the added phosphorus will not leach from the point of addition. The availability of phosphorus is strongly dependent on soil pH with an optimum availability at pH 6.0-6.5.

POTASSIUM is another essential element and is second only to nitrogen in the amount required for plant growth. Potassium is the most active of the essential plant nutrients. It is easily leached from the soil and may even be leached from plant leaves during a rain or during irrigation.

A potassium deficient plant is said to have a lower disease resistance. The plant is more susceptible to winter-kill and may be more susceptible to insect damage. Potassium deficient plants suffer high water loss, thus require more water than those not deficient in potassium.

When high amounts of nitrogen, relative to potassium, are supplied to a turf plant, the plant produces a lush succulent type of growth. This type of growth is easily winter-killed, more susceptible to insects and disease and requires more water to keep it alive. Even though this is a fast growth rate, it is not necessarily a desirable growth rate.

The adverse effect of a high nitrogen supply may be tempered by potassium when it is supplied in large enough quantities. This interaction betwen nitrogen and potassium is perhaps the most important interaction in turf nutrition. The

(continued on page 37)

Table I. Percent Nutrients Found in Tifgreen Bermudagrass Leaf Tissue

Figure	Treatment	%N	%P	%K	Dry Weight (grams)
1	Complete Nutrient Solution	2.80	0.19	1.17	32.70
2	No-N	1.50	0.24	1.60	1.77
3	No-P	2.70	0.05	1.80	13.47
4	No-K	3.17	0.32	0.38	3.77
5	No N-P-K	1.60	0.12	0.97	1.80

Golf course superintendents and other turf experts throughout the country rely on these outstanding Chemagro Blue Bullseye chemicals to keep their grass in first-class condition throughout the year:

®**DYRENE** 50% Wettable Powder turf fungicide provides outstanding protection against leaf spot, melting-out, copper spot, rust, *Sclerotinia* dollar spot, brown patch and snow mold. Will not clog or corrode spray equipment. No unsightly deposit. Will not stain fabric or shoes when dry.

®**DASANIT** nematicide provides fast contact and long-lasting residual control of nematodes. Merely apply with a granular applicator and drench the soil with water.

®**DYLOX** 80% Soluble Powder insecticide provides outstanding control of sod webworms. Three spray applications at monthly intervals are recommended.

®**BAYGON** 70% Wettable Powder insecticide provides economical, long-lasting control of certain destructive insects attacking turf. Sprays are easy to mix and apply.

®**DEXON** 35% Wettable Powder fungicide is unsurpassed for long-lasting control of *Pythium*. Will not cause leaf burn when applied as directed. Compatible with other turf pesticides.

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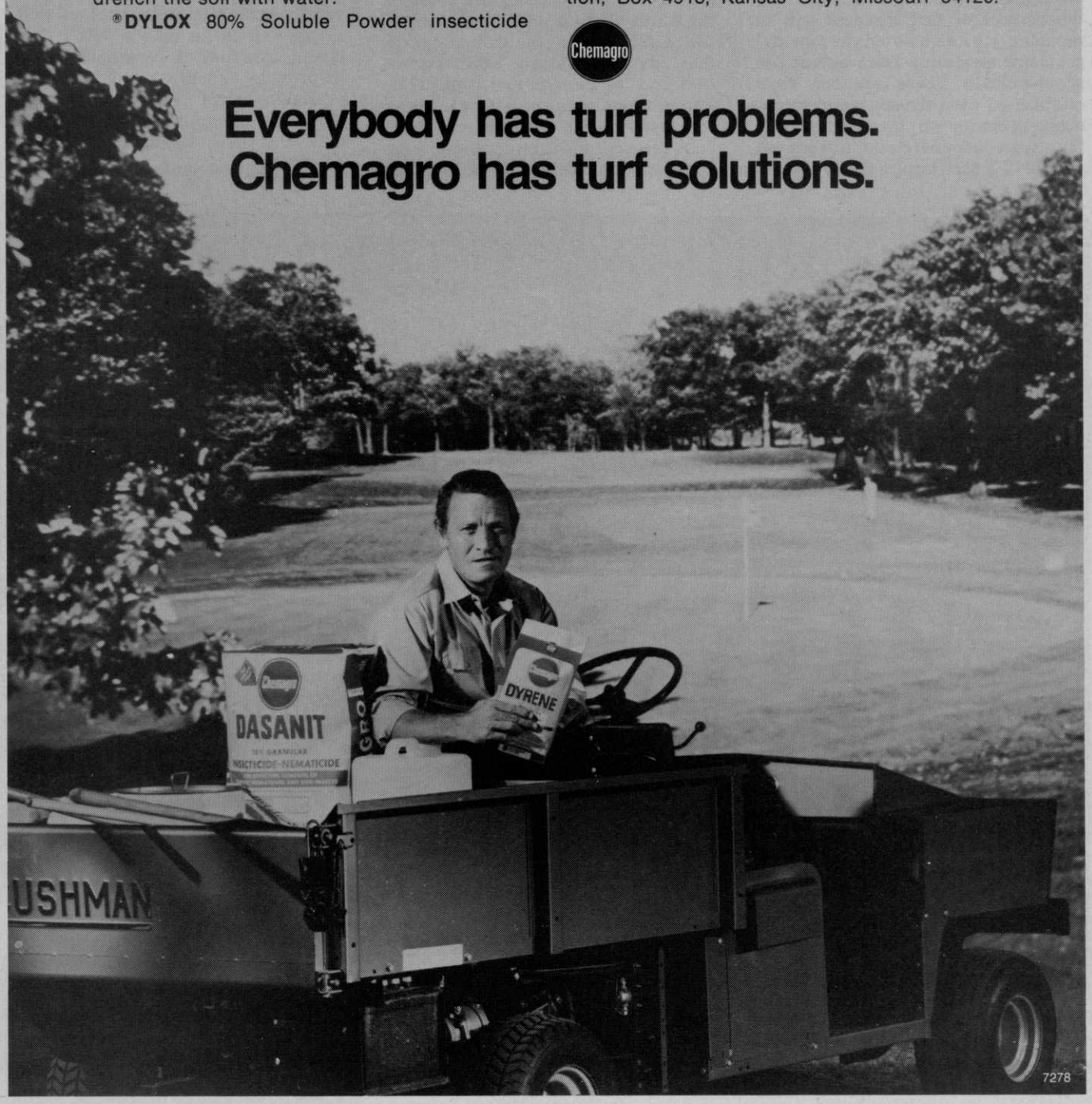


Programmed Turf Disease Control

By ROBERT T. MILLER

Biochemicals Department

E. I. Du Pont de Nemours and Co.

Wilmington, Del.

Programming and proper timing in application of specific fungicides offer great potential for improving the control of turf diseases and in reducing possible environmental problems stemming from excess use of chemicals. These are the facts established by a three-year development program on three fungicides that were commercially introduced as a "1-2-3 turf program" in 1971.

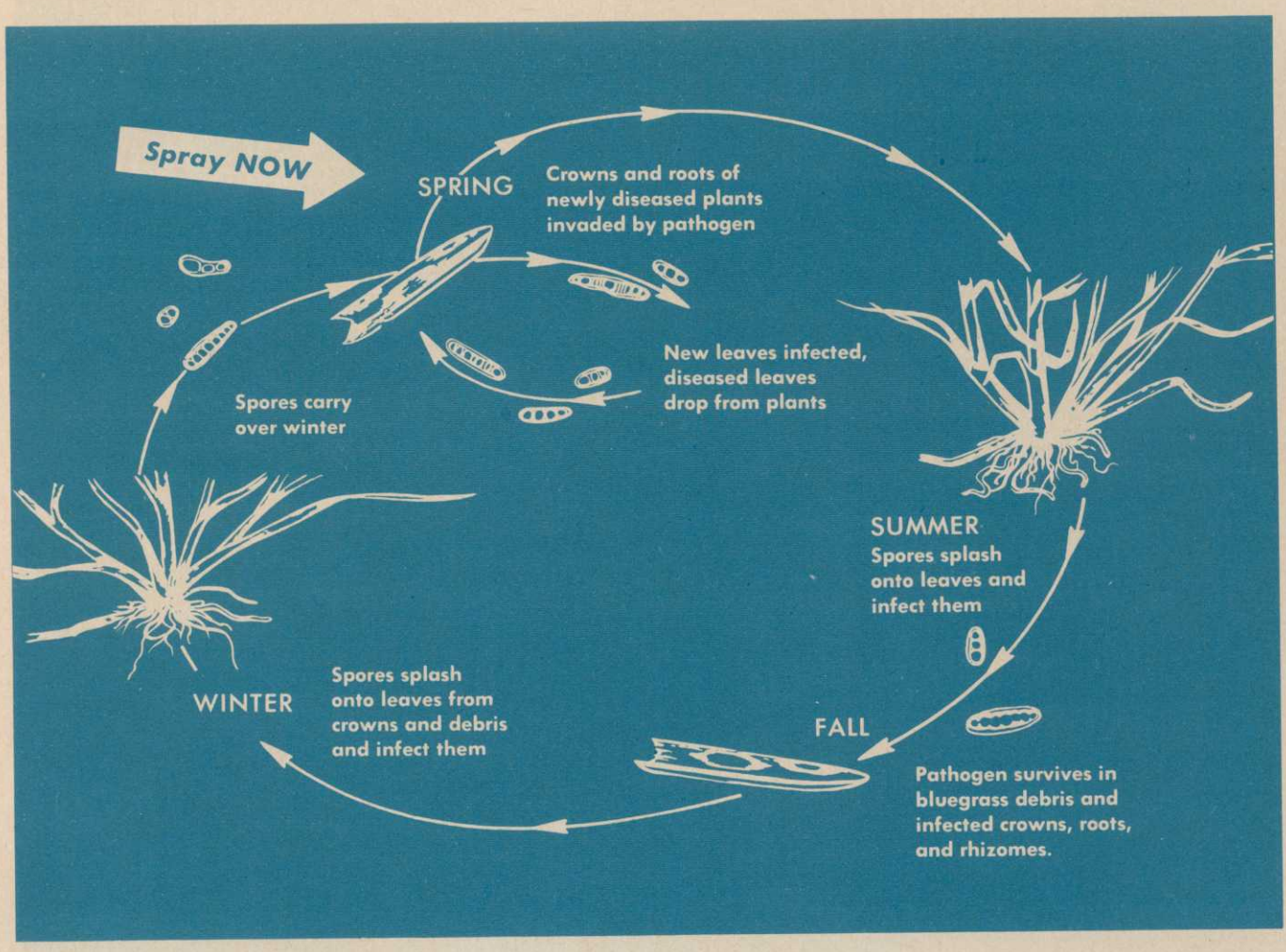
Now, with additional experience wherever cool season grasses are grown and in the bentgrass areas of the south, there is added evidence of the effectiveness of this program that involves Tersan LSR, Tersan 1991 and Tersan SP turf fungicides. The program requires action in three seasons — spring, summer and fall.

In essence, the first step calls for application of Tersan LSR in early spring, about the time of first or second cutting, to control leafspot (Helminthosporium spp.). Spraying at this time breaks the disease cycle of overwintered innoculum. Turf enters the spring growing period in a healthy condition. This decreases the chances of melting out or thinning out later on in the warmer weather of late spring or early summer.

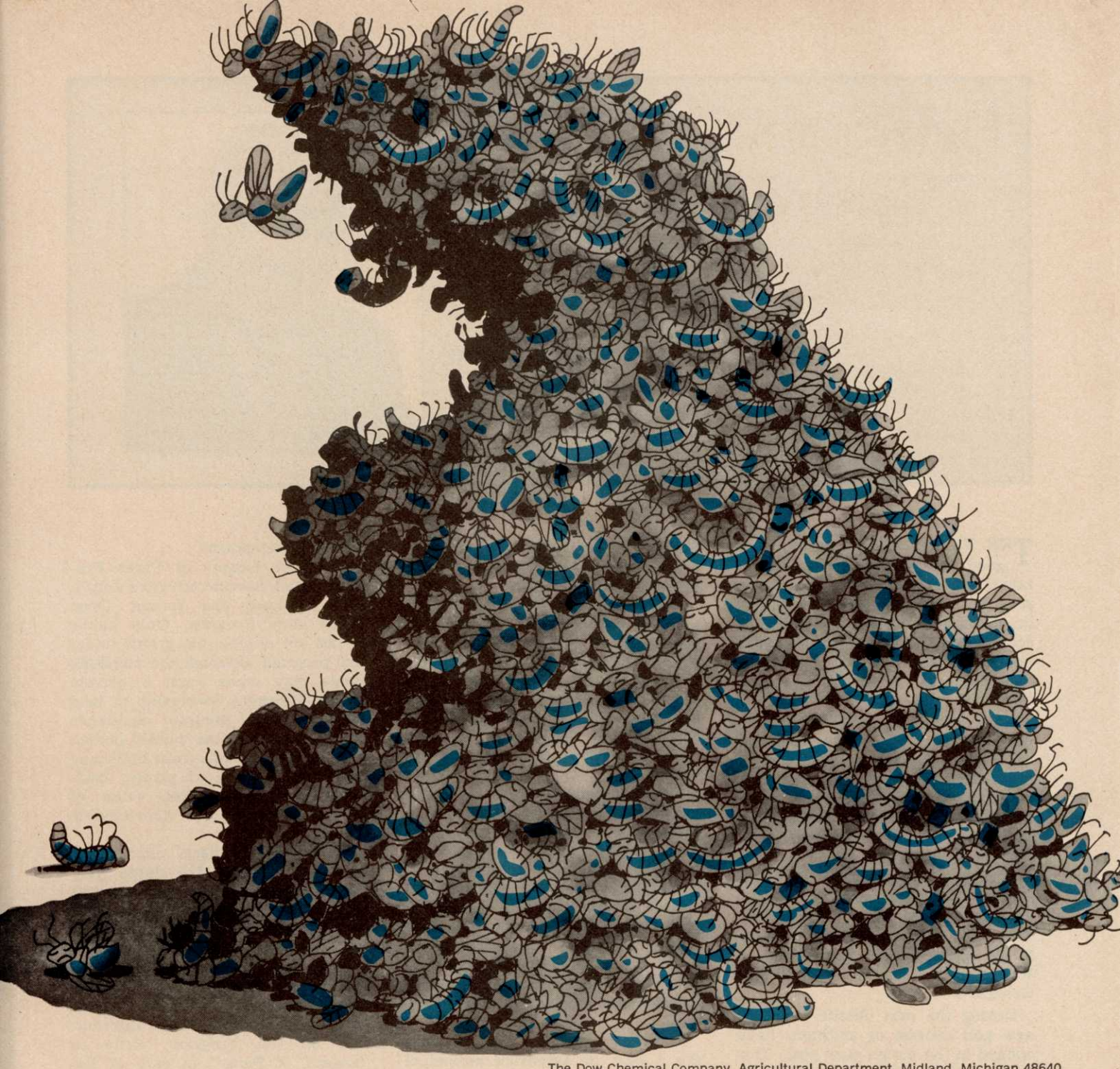
In addition, large brown patch (Rhizoctonia) and rust can be controlled with this fungicide.

A second step in the program calls for application of Tersan 1991 when dollar spot (Sclerotinia) first appears usually May or June, depending on the area. This application will prevent or eradicate dollar spot, as well as prevent large brown patch. The lasting qualities of Tersan 1991 help to provide longer control than that available with other previously available compounds; and in addition, this new fungicide will also

(continued on page 40)



Control Helminthosporium by spraying "Tersan" LSR early in the spring—at the beginning of the disease cycle. This inhibits the "melting-out" stage. Should symptoms appear during the season, use "Tersan" LSR to check disease spread. Spray at rate of 3-4 ozs. per 1000 sq. ft. at 7 to 10 day intervals. Reduce intervals during periods of severe disease conditions.



The Dow Chemical Company, Agricultural Department, Midland, Michigan 48640

Dursban insecticide gets you more bugs for your buck.

That means you'll not only wipe out chinch bugs and sod webworms, but more! You'll find a little Dursban® insecticide goes a long, long way. And Dursban won't leach, has excellent residual activity, even though it's degradable. It's safe, too–for all common turf grasses. Keep the holes out of your turf *and* out of your budget. Tell your contract applicator you want Dursban insecticide . . . the unsurvivable one.

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GOLF COURSE DEVELOPMENT OUTLOOK — 1972

By HARRY C. ECKHOFF
Facility Development Consultant
National Golf Foundation

THE NEW YEAR promises to be good for golf facility development. National Golf Foundation records reveal 290 new golf courses or additions to existing facilities in some stage of construction at year's end. Of these, 258 are regulation length and 32 are par-3's or executive type.

New regulation length courses under construction total 174; additions to existing courses account for 84. For par-3's the figures are 28 and 4, respectively. NGF files also show another 517 regulation courses and 84 par-3 projects under consideration or in planning.

Michigan leads with 25 golf courses under construction followed by Florida with 17, Ohio 16, New York 14, Texas 13, Indiana 12, California, Pennsylvania, Tennessee and Wisconsin — 11 each, Iowa 10 and Georgia 9.

During the past decade over 300 new golf courses or additions have opened in the nation each year. This record was maintained in 1971 when 371 new facilities came into play. There were 228 new regulation length courses, 89 additions, 42 new par-3 or executive layouts and 12 additions opened during the year.

The leading states with new golf course openings in 1971 were Michigan 29, Florida 26, Texas and Wisconsin 18, New York 16, Pennsylvania 15, North Carolina and Ohio 14, California 13, Colorado and Illinois 12, Indiana and Washington 11, Kentucky 10 and South Carolina 9.

Of the 371 new course openings in 1971, 33% were private operations, 48% semi-private, 15% municipal and 4% miscellaneous (collegiate, industrial or military). About 35% were part of real estate or resort developments.

About 65% of the new courses opening for play in 1972 are expected to be semi-private or municipal operations. And probably 40% of these facilities will be associated with new planned communities, high rise apartment and condominium complexes, second home projects or recreation and resort areas.

The continued growth of semi-private and municipal courses is in keeping with the trend of recent years. Golf no longer belongs solely to a few; it is everyone's game.

Sixty new municipal golf courses opened throughout the nation in 1971. This is an increase of 43% over 1970. Thirty-five were regulation length; 12 were additions to existing courses; 9 were new par-3 or executive layouts and 4 were par-3 additions.

Many of these new golf facilities are a part of extensive municipal recreation and park complexes. In addition to a well designed golf course, they often include tennis courts (sometimes lighted for night play), swimming pools, artificial ice skating rinks, playground and picnic areas, a community center building, fishing, camping, hiking, nature study and sometimes ski areas.

This new look for municipal recreation complexes is being spurred by strengthened federal incentives currently in operation. Many municipalities are taking advantage of a state grant-in-aid program administered by the Bureau of Outdoor Recreation, U.S. Dept. of Interior, or the Legacy of Parks Program directed by the Dept. of Housing and Urban Development.

The new Legacy of Parks Program which became effective July 1, 1971, replaces the former Open Space Land Program. Only public bodies are eligible for grants under this program although the matching funds may come from a private source. However, ownership of land acquired with program assistance must remain in the public bodies. The matching grants from HUD may cover up to 50% of project costs based on fair market value of property acquired and other eligible project costs.

Among the projects eligible for matching grants are large city parks, regional parks and areawide recreational facilities. This includes development of swimming pools and areas devoted to picnicking, camping, hiking, fishing, hunting, nature study and skiing. It also includes land acquisition costs for sites of golf courses. For detailed information on this program, write to "Legacy of Parks" in care of the U.S. Dept. of Housing and Urban Development, Washington, D.C. 20410.

The Bureau of Outdoor Recreation (U.S. Dept. of Interior) makes grants from the Land and Water Conservation Fund to states and through them to political subdivisions and other units of states for planning, acquisition and development of public outdoor recreation areas and facilities including golf courses.

Prime importance is attached to projects in areas where concentrations of people live. Projects must be available for use by the general public. Development of basic rather

(continued on page 58)

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For example: *Tote* can kill any weed it hits; is non-poisonous. *E.W.T.-Plus* is a selective weed-killer. *Penetrate* improves soil porosity. *Lake Dye* colors ponds blue. *Anti-Dessicant* protects turf from drought and snow damage. *Boost* detergent-degreaser cleans machinery. Dolge also supplies famous fungicides.

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2 **E.W.T.-PLUS** selective weed-killer finishes broad-leaved weeds—kills dandelions, plantain, mouse-eared chickweed, even poison ivy—does not harm good grasses. Amine formulation: non-volatile; does not "jump" to flower beds or shrubbery.

3 **PENETRATE** natural, organic soil improver. Works through compacted soil; lets air, water and nutrients go deeper. Promotes deeper, stronger root growth. Encourages vigorous, beautiful turf, shrubs, trees. Prevents soil erosion and puddling of surface water. Speeds germination of wanted vegetation.

4 **LAKE DYE** a safe, non-toxic blue water dye for lakes, ponds, water hazards. Colors to shade of blue you desire. Apply 2 pounds to the acre, 4 to 5 feet deep. Harmless to wild life—swans, ducks, geese, fish, frogs. Harmless to grass too. Compatible with fungicides, insecticides, turf chemicals.

5 **DOLGE ANTI-DESSICANT** protects turf grasses and broad leafed evergreens against drought and snow. Allows plants to breathe, yet prevents loss through water transpiration. Guards against summer scald and plant shock, too.

6 **BOOST** detergent-degreaser for machinery. Spray or mop it on mowers, tractors, carts; hose off: clean! In the clubhouse, Boost is a real handyman for extra-heavy cleaning jobs. Great on concrete floors.

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The Search For Shade Tolerant Turf

SHADE from trees can often become a problem in good turf management. Even though trees are a very necessary and desirable part of our ecological balance, they can cause some rather perplexing problems in turf management.

Most difficulties develop when grass plants under or near trees do not receive enough full sunlight to carry on adequate photosynthesis. Consequently, shaded turf often deteriorates, thins out and becomes unsightly and patchy.

In some instances, less that 5% of available sunlight is able to penetrate a canopy of trees. However, turf failure under trees is not always due to a reduction in light intensity. A deleterious shift also occurs in the spectral composition of light. Tree leaves filter out much of the blue and red portions of the spectrum—the segment most efficiently utilized by grass plants. This causes a reduction in photosynthesis and diminishes the ability of the plant to manufacture carbohydrates required to maintain normal growth. Leaves become smaller, less prolific and more succulent. Color fades due to the reduction in chlorophyll. Plants lose their ability to develop new tissue and do not spread and fill in open areas.

In fact, the entire micro-climate under trees is considerably altered. Dew remains on grass leaves longer and humidity is increased. These conditions, plus the softer growth of the leaves, provides an ideal climate for diseases to attack the grass plants. In addition, many roots of large trees can rob grass plants of valuable moisture.

Certain management steps can be taken which help maintain turfgrasses under trees. Regular pruning of tree limbs allows more direct sunlight to penetrate through and reach the soil. Additional fertilization and water will make it easier for grass to survive. Stagnant air at ground level will allow turf diseases to thrive. Therefore, any plants or shrubs that restrict adequate ventilation should be removed or pruned. Aerification of the soil will aid the plant in absorbing nutrients more easily and mowing the grass at a 2-inch to 3-inch height

(continued on page 36)

Above: Shade trials were conducted under this canopy of trees. Sod plugs were transplanted throughout the middle of the area. Left: This is Nugget. Note that it has thinned, but the stand is still good. Leaves have elongated somewhat over their appearance in full sunlight. Color is dark green.