Insects Attacking Your Trees & Shrubs?

ORTHO MSR-2 Emulsive kills the insects other sprays miss.

Aphids, mites, leafhoppers are all controlled by this systemic ORTHO product. Makes short work of leaf miners. White flies too. Because of its short residual life on the surface of the plant, there’s no need to block off traffic flow. Spray morning or evening when people aren’t around. MSR-2 Emulsive is quickly absorbed by your ornamental shrubs and trees. Translocated within the sap stream of the plant it kills the above insects that attempt to feed on the foliage. Great protection for your investment...a full coverage spray schedule with ORTHO MSR-2.
Can Herbicides be Effectively Impregnated Into Asphalt?

By WILLIAM J. BOWMER and WAYNE G. McCULLY
Texas A&M University, College Station

Asphalt pavements often are victims of invasion by Bermudagrass and certain other plants. Sometimes these plants grow through the pavement from plant parts or seeds contained in the base material; or they may originate from vegetative runners from parent plants outside the paved area. They can also arise from seeds washed or blown into the cracks in the pavement.

Regardless of the means by which vegetation becomes established in asphalt pavements, the plants cause a drastic reduction in the life of the pavement, are unsightly, and present a safety hazard by obscuring the pavement edge.

Adjacent Damage Possible

A number of herbicides can prevent growth of plants in pavements when they are applied directly to the underlying base material. However, several of these materials have damaged plants outside the treated area. The damage is caused by roots absorbing material from the treated area or by water carriage of the herbicides away from the treated area and into contact with other structures.

In August 1964, a cooperative research study by the Texas Transportation Institute at Texas A&M University under sponsorship of the Texas Highway Department and the U. S. Bureau of Public Roads was initiated to study the effect of incorporating herbicides into asphalt.

The experiments were conducted on Easterwood Airport, College Station, Texas, where vegetative growth around runway lights is a safety hazard and requires continual maintenance. Bermudagrass was the predominant plant but other plants such as Johnsongrass, Sorghum halepense (L.) Pers., and Dallisgrass, Paspalum dilatatum Poir., were also present.

The soil material on the experimental area was a mixture of surfaces and subsoils used as fill to elevate and level the runways. The soils involved were characteristically fine sandy loams on the surface with tight clay subsoils. Herbicides were applied as surface treatments only, not incorporated into the soil.

Six Herbicides Tested

A square yard area, centered on each light, was scraped bare of vegetation prior to treatment. Six herbicides were selected for application. Application methods for the herbicides were: (1) Applied to the open soil area and...
left exposed; (2) Applied to open soil and covered with an asphalt cap; and (3) Mixed with and applied in the asphalt. Two rates of each herbicide were used, and each treatment was applied around four lights. Herbicides and rates were: (1) TCA, sodium salt, at 100 and 200 lbs. per acre; (2) TCA ester at 100 and 200 lbs. per acre; (3) prometone at 10 and 20 gals. per acre; (4) erbon at 40 and 80 lbs. per acre; (5) fenac at 6 and 12 lbs. per acre; and (6) tritac at 8 and 16 lbs. per acre.

The asphalt used was standard type MC-1 cutback, applied at the rate of 1 gal. per 4 square yards. At this rate, a thin film was obtained which barely covered the soil surface (see illustration). Only oil-soluble herbicides were mixed with the asphalt. All treatments were made using a knapsack sprayer with a fan type T-jet nozzle. The applications were made with a constant nozzle pressure of 35 p.s.i.

The results shown in Table 1 are from a single study, and present a definite contrast with earlier work in presurface application of herbicides in which all materials applied effectively prevented Bermudagrass and other plants from emerging through new pavements. Of the materials in the present test, only sodium TCA and erbon were included in the earlier presurface experiments.

The higher rates of all materials applied to bare soil except tritac and TCA ester gave better control than did the lower rates (Table 1). The same materials applied to the soil surface and then covered with an asphalt cap performed similarly, except fenac. Of the six materials used, only the higher rates of TCA sodium salt and prometone showed an improved performance when the treated area was covered with asphalt. The lower rate of fenac showed some improvement with capping, but the higher rate was somewhat less effective. Both rates of Tritac were less effective covered than when applied to bare soil.

Three of the materials were oil soluble, and were diluted in asphalt for application. Results of mixing erbon and TCA ester in the asphalt were disappointing. Erbon failed to perform better than when applied directly to the soil at either rate of application. The lower rate of TCA ester was more effective applied in the asphalt, but there was no improvement in effectiveness using the higher rate. Although the lower rate of prometone was somewhat less effective applied in asphalt than directly to the soil surface, the higher rate of prometone applied in asphalt not only was more effective, but gave the best control of all the treatments used.

Bermudagrass was present in all treatments where regrowth was recorded. The reinfestation of Bermudagrass was from emergent plant material rather than encroachment from outside the treated area. Yellow woodsorrel, Oxalis dillenii var. dillenii also was present in many of the treated areas. Of the plants previously listed as being associated with Bermudagrass, none was present to any degree within any of the treated areas.

**Herbicides Must be in Top ¼ Inch of Asphalt**

The standard treatment, 200 lbs. per acre of sodium TCA, was somewhat less effective than usual under the conditions of this study. Prometone and erbon were the most persistent of the materials applied to the soil surface. The poor results noted in this experiment may be due in part to the relatively low volume of application used. Past experience has shown that herbicides applied to the base material should be distributed through approximately the top one-fourth inch to be most effective.

The results of this experiment indicate that some herbicides which are oil soluble may be effective when applied directly in asphalt. Although the asphalt solution used in these tests was applied at ambient air temperature, asphalts without solvent usually are heated to temperatures of at least 300°F for application. Consequently, any herbicide dispersed or dissolved in undiluted asphalt would have to be stable at relatively high temperatures. Thickness of the asphalt layer, not a consideration in this test, probably should be treated as an independent variable in future testing. While recommendations cannot be made on the basis of this limited study, further research may develop specifications for applying materials in the surfacing material.

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**Table 1. Relative control of Bermudagrass and other plant species with herbicides applied on bare soil, on soil and capped with asphalt, or mixed in the asphalt.**

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate/Acre</th>
<th>Method of Herbicide Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lbs. active ingredient or gallons</td>
<td>On Bare Soil</td>
</tr>
<tr>
<td>TCA, Sodium Salt</td>
<td>100#</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>200#</td>
<td>1.25</td>
</tr>
<tr>
<td>TCA ester</td>
<td>100#</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>200#</td>
<td>1.00</td>
</tr>
<tr>
<td>Prometone</td>
<td>10 gal</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>20 gal</td>
<td>1.75</td>
</tr>
<tr>
<td>Erbon</td>
<td>40#</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>80#</td>
<td>2.00</td>
</tr>
<tr>
<td>Fenac</td>
<td>6#</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>12#</td>
<td>1.50</td>
</tr>
<tr>
<td>Tritac</td>
<td>8#</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>16#</td>
<td>1.50</td>
</tr>
</tbody>
</table>

*The treated area around each light was evaluated by the following scale. 1.0—No control (Plots not visible) 2.0—Some control (Plots visible) 3.0—Good control (Plots with no live vegetation)
Faulty Construction Is Cause of Problems in Athletic Turf Duich Tells Minn. Turf Management Short Course

By JOSEPHINE B. NELSON

"Many of the most serious problems encountered in maintenance of satisfactory turf on athletic fields and golf courses are the direct result of faulty construction," according to a university agronomist.

Speaking at the University of Minnesota’s Turf Management Short Course on the St. Paul Campus, March 16, J. M. Duich, associate professor of agronomy at Pennsylvania State University, declared that among the built-in mistakes that create future maintenance problems are failure to provide for adequate surface and subsurface drainage, poor root-zone mixtures subject to severe compaction, inadequate soil preparation and shoddy seeding methods. Expensive major reconstruction or renovation is often necessary to correct these errors.

The building of a modern golf course or athletic field is a specialized operation, Duich emphasized. Preparation of a complete and concise set of specifications is the first step in protecting a substantial initial investment against future unnecessary outlays of additional funds and of insuring against permanent mediocrity of playing conditions.

Dense Sod Essential

In discussing athletic fields and play areas, the Pennsylvania State University agronomist pointed out that a dense, wear-resistant sod is essential on athletic fields and play areas to provide playing safety, good footing, and pleasing appearance.

Production and maintenance of such a turf depend on the kinds of grasses used, proper design and construction, good soil drainage and preparation, adequate fertility and a maintenance program that recognizes the special nature of the care involved.

To insure athletic field turf of satisfactory quality, a good maintenance program is just as necessary as sound establishment methods. Duich listed these essentials of a good maintenance program:

- That it produce tough grass with maximum wear resistance.
- That it be designed to maintain high density to resist weed invasion and encroachment of undesirable grasses.
- That it encourage deep rooting to provide good anchorage and firm footing.
- That mowing height be adjusted to both grass requirements and playing demands.
- That fertilizing and watering be done at such times and in such manner as to provide steady growth and maximum quality.
- That consideration be given to the endurance limits of the turf in scheduling use of the field.
- That provision be made for repair of injuries due to wear and other causes.

Many Subjects Presented

Other speakers at the short course included University of Minnesota staff members G. R. Blake, professor of soil science, who spoke on “What is a Good Soil”; D. B. White, associate professor of horticultural science, on “Cultural Methods of Weed Control”; and T. B. Bailey, graduate assistant in horticultural science, on “What Kind of Turf Equipment Do You Need?”

A panel moderated by L.C. Snyder, head of the Department of Horticultural Science, reported on research at the University of Minnesota in horticulture, agronomy and plant genetics, plant pathology, soil science, agricultural engineering and entomology.

Program coordinator for the short course was D. B. White, who commented that it was “another highly successful Turf Management Short Course.” The short course was attended by some 200 people professionally interested in the care and management of turf for golf courses, sodding, parks, institutional grounds and recreational areas.
NOW YOU CAN USE LOW-COST, LOW-ODOR DE-PESTER MALATHION TO BOMBARD MOSQUITOES AND ALMOST ALL OTHER TURF PESTS. DE-PESTER MALATHION WORKS ABOUT AS QUICKLY AS IT’S TAKING YOU TO READ THIS MESSAGE—LASTS LONGER. KILLS INSECT PESTS IN ALL STAGES, AND WITH NO OBNOXIOUS ODOR. TRY IT, AND WATCH THEM DROP.
Performance of Bluegrass Varieties

Clipped at Two Heights

By
A. G. LAW
Agronomist
Department of Agronomy
Washington State University
Pullman, Washington

With the availability of several so-called "dwarf" bluegrass varieties has come an interest in their use for specialized turf.

Bluegrass varieties generally are well adapted for use on many soil types in the inland empire area of the Pacific Northwest. These varieties are used widely in parks, cemeteries, lawns, and on golf course fairways. Also Kentucky bluegrasses are used throughout the northern one-third of the United States. This widespread adaptation has prompted a more intensive study of the response of these grasses to intensive management practices.

Grass Response to Clipping Tested

To test the response of bluegrass varieties to clipping, turf research tests were plotted. Seven varieties were seeded in turf trials in the spring of 1962. They were clipped to 1 inch during the establishment year and fertilized with 4 lbs. of actual nitrogen per 1,000 sq. ft. High phosphorus and potassium levels were maintained based on soil tests. Plots were irrigated as needed to keep the soil moisture above the wilting point.

In 1963, 1964, and 1965, the plots were sampled with a core sampler that cut a plug 4 inches in diameter and 6 inches deep. These plugs were carefully washed out and root production was recorded (Table 1). Additional data obtained in both the fall and spring of each year included color and density ratings. We can consider the numbered varieties, 602, 402, and 205 in Table 1, as "Cougar," a recent variety released from the Washington Agricultural Experiment Station.

The erect-growing variety, Delta, shows the lowest production of roots at the 1-inch height compared to all other varieties cut to the same height. Dwarf types, 0217, 602, 402, 205, and Merion produced more roots at the 1-inch height both in June and September.

Considering the ½-inch height, Delta, a tall-growing bluegrass, produced fewer roots than any of the other varieties. Tall-growing bluegrasses such as Delta, Park, Troy, and most of the common bluegrasses on today's market typically respond this way to close mowing.

As with the 1-inch clippings, plots cut ½ inch high produced more roots by September than they had in June with the exception of 0217. With this variety, production was essentially the same for both June and September.

Variety 0217, an experimental line developed by the Jacklin Seed Co., shows one other characteristic different from the other dwarf bluegrasses in this test. It took almost twice as much equivalent of 10 lbs. of available nitrogen in ammonium sulphate form.

Root Production Sampled from Plugs

In June and September 1965, the plots were sampled with a core sampler that cut a plug 4 inches in diameter and 6 inches deep. These plugs were carefully washed out and root production was recorded (Table 1). Additional data obtained in both the fall and spring of each year included color and density ratings. We can consider the numbered varieties, 602, 402, and 205 in Table 1, as "Cougar," a recent variety released from the Washington Agricultural Experiment Station.

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---

Table 1. Average root production in grams under bluegrass varieties cut at two heights and harvested at two dates in 1965.

<table>
<thead>
<tr>
<th>Variety</th>
<th>June 1 Inch</th>
<th>Sept. 1 Inch</th>
<th>June ½ Inch</th>
<th>Sept. ½ Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>0217</td>
<td>17.2</td>
<td>19.8</td>
<td>14.9</td>
<td>14.1</td>
</tr>
<tr>
<td>602</td>
<td>11.5</td>
<td>14.0</td>
<td>10.1</td>
<td>18.7</td>
</tr>
<tr>
<td>205</td>
<td>17.5</td>
<td>20.0</td>
<td>14.4</td>
<td>15.9</td>
</tr>
<tr>
<td>402</td>
<td>16.0</td>
<td>24.6</td>
<td>9.7</td>
<td>18.8</td>
</tr>
<tr>
<td>Merion</td>
<td>12.2</td>
<td>20.3</td>
<td>10.3</td>
<td>14.4</td>
</tr>
<tr>
<td>Newport</td>
<td>10.7</td>
<td>17.4</td>
<td>9.6</td>
<td>16.9</td>
</tr>
<tr>
<td>Delta</td>
<td>11.0</td>
<td>12.9</td>
<td>7.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Cougar</td>
<td>14.9</td>
<td>20.6</td>
<td>5.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Nebr. blend</td>
<td>4.2</td>
<td>19.7</td>
<td>7.4</td>
<td>9.6</td>
</tr>
</tbody>
</table>

1. These varieties in the second cutting year; all others in third cutting year.
time to wash soil from the root plugs of 0217 as it did from other dwarf bluegrasses. This longer washing time is apparently related to the greater amount of fibrous roots and, conversely, a lower amount of rhizomes in the upper 6-inch profile of the 0217 plugs. Density readings at the turf surface indicate that there was approximately 50% reduction in density of Delta compared to the low-growing bluegrass cut at the 1/2-inch height.

**Tall Delta Can't Take Close Clip**

Root yield, percent rhizomes, and surface density of bluegrass varieties grown in trials at Pullman, Wash., are shown in Table 2. These plots were clipped at ½ and 1-inch heights and were irrigated to prevent wilting. Root data from these plots were taken in the fall of the second clipping year. Here again, Delta, the tall-growing variety, produced much less root growth under both the 1-inch and 1/2-inch cut. Also, surface density of Delta is significantly less than that of dwarf varieties, indicating that this variety can not tolerate close clipping for any extended period.

In addition, the percent rhizomes, as determined by Dr. R. L. Goss, shows a highly significant difference between the 3 dwarf varieties, Newport, Cougar, and Merion, compared with the tall-growing variety, Delta. Similar data have been reported by other workers with many plants. In every case, dwarf plants consistently withstand closer defoliation than erect-growing plants.

Data obtained from this study and those of Dr. Goss are in agreement. They show that many of the failures of bluegrass plantings on such specialized

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yield in Grams</th>
<th>% Root</th>
<th>Surface Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newport</td>
<td>5.5</td>
<td>4.1</td>
<td>47</td>
</tr>
<tr>
<td>Cougar</td>
<td>4.8</td>
<td>3.8</td>
<td>48</td>
</tr>
<tr>
<td>Merion</td>
<td>3.4</td>
<td>3.1</td>
<td>40</td>
</tr>
<tr>
<td>Delta</td>
<td>2.4</td>
<td>2.2</td>
<td>12</td>
</tr>
</tbody>
</table>

1. Data adapted from Ph.D. thesis by Dr. R. L. Goss, 1960

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How to Diagnose Tree Diseases (from page 17)
trees examined by the authors have been caused by injuries to roots or diseases of root systems.

The sudden death of a tree usually results from the destruction of nearly all the roots or from the death of the tissues at the trunk base near the soil line. Factors most commonly involved are infection by disease organisms (Fig. 9), winter injury, rodent damage, heavy concentrations of natural gas, lightning, and various types of toxic chemicals. Trees that progressively weaken over a period of years may be affected by girdled roots, decay following nearby pavement work, poor soil or drainage, lack of food, grade changes, natural gas leaks, and excessive planting depths. Any of these factors and several more may contribute to the ultimate death of the tree. Diagnosticians must be ever alert for the symptoms above ground as well as for those not so obvious below the soil.

Apply Fungicide Now To Check Snow Mold
Lawn care specialists who applied fungicide to customers' lawns last November or December for snow mold control should plan to make another application this spring.

But even if lawns were not treated last fall, applying a fungicide now will help control the disease.

This advice comes from Dr. R. E. Partyka, Ohio State University Extension plant pathologist, who says fungicides containing mercury provide satisfactory chemical control of snow mold. He suggests fungicides with organic mercury such as phenyl mercury acetate, or inorganic mercury as mixtures of mercu- rous chloride and mercuric chloride. Also effective are Tersan OM, Thimer, Dyrene, and Ortho Lawn plus Turf Fungicide, Partyka says.

Mercury compounds can cause plant damage if applied in heavy doses, the specialist warned. He advises that special attention be given to manufacturer's recommendations for chemical use.
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