Tests Show Chemicals Control Weeds in Sand Traps

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A question frequently asked is: "What is a good chemical or method to use for inhibiting or killing weeds in sand traps on golf courses, along roadway shoulders and guard rails, paths, and similar areas?"

This report gives results of a preliminary study designed to answer this question. Some of the chemicals used in this test appear to be quite satisfactory for such purposes.

Materials and Methods

These tests were conducted during 1950 on paths between the experimental turf plots at the Rhode Island Agricultural Experiment Station. The paths were 5 feet wide. Size of the chemically treated plots was 50 square feet. The paths were first cultivated by hoeing to eliminate present weed growth, then 2 days later the plots were treated with the various chemicals.

Chemicals used and their commercial sources were as follows:

Ammate, and 90% Sodium TCA, E. I. DuPont DeNemours and Co., Inc., Wilmington, Del.

Ammonium Thiocyanate, Koppers Company, Pittsburgh, Penn.

Aero Cyanamid, American Cyanamid Co., New York, N. Y.

Borascu, Pacific Coast Borax Co., New York, N. Y.

Common salt (CCF grade), Watkins Salt Co., Watkins Glenn, N. Y.

2,4-D butyl ester (40%), Sherwin-Williams Co., Cleveland, Ohio

IPC and IPC 3-chloro, Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Premerge, The Dow Chemical Co., Midland, Mich.

Sodium Arsenite, The Chipman Chemical Co., Boundbrook, N. J.

The plots were on sandy soil that was slightly moist at the time of treatment. Borascu, common coarse-fine salt, Cyanamid, and IPC were applied dry. All other materials were applied in water solution as a spray at 10 gallons per 1,000 square feet. Table 1 on the following page indicates the chemicals used, amounts per 1,000 square feet, and the weed content 2 and 6 months after treatments were applied.

Results and Discussion

Of the materials that were applied dry, Borascu at the 40 and 80 pound rates per 1,000 square feet, and Cyanamid at 100 pounds provided plots that were entirely free of weeds for at least 6 months. IPC at 3 pounds gave fair control. Common coarse-fine salt did not give good weed control at the 40 and 80 pound rates, whereas, Borascu at the same rates gave complete control. It is quite possible that less than 40 pounds Borascu would be suffcient.

Of the materials applied in solution, Ammate at 10 pounds, Ammonium Thiocyonate at 10 pounds and Premerge at 1 and 2 gallons gave satisfactory control. The other materials including Sodium Arsenite, PMAS (10%), 2,4-D Butyl-Ester (40%), Sodium TCA (90%), and 3-Chloro IPC at the rates used in this test did not produce complete control. It is quite probable that increased rates of some of these chemicals would be satisfactory, however, there are limitations such as cost, danger to humans and other factors that should be considered. For example, PMAS may be practical for treating seedbeds prior to planting turf to inhibit weeds and as a possible protection against disease of seedling turf. Since its period of toxicity in the soil does not appear to be too long, it does not seem practical where soil sterilization is required for a long period of time. Furthermore, PMAS at 1¼ ounces per 1,000 square feet is effective for crabgrass and disease control on putting greens. 2,4-D may be useful at higher rates but caution must be exercised around certain plants and adjacent turf. TCA at 1 and 3 pounds per 1,000 square feet gave indication of use, and it is suggested that more testing be done with this material at higher rates. This also applies to 3-Chloro IPC. Premerge gave perfect control of weeds at the 1 and 2 gallon rates but caused considerable damage to adjacent turf from spray-drift and also from rain-wash. Two days after the Premerge plots were treated, one of the men who was mowing adjacent turf happened to step on the treated plots. Some of the Premerge clung to his shoes and was tracked on the adjacent putting-green turf, causing considerable injury.

Although calcium cyanamide gave 100 per cent control of weeds at 100 pounds per 1,000 square feet it is considered that it has other uses on golf courses and elsewhere that are more advantageous and

Table 1. Results of Weed Control with Chemicals on Fallow Areas. Rhode Island Agricultural Experiment Station. 1950.

Material	Rate per 1000 sq. ft	% area covered by weeds After treatment 2 mos.	6 mos.	Weeds that grew on the treated plots were as follows: [1]
Ammate	5.0 lbs.	1.0	2.0	Chickweed
Ammate	10.0 "	T[2]	0.5	Chickweed
Ammonium thiocyanate	5.0 "	T	7.5	Chickweed, spurry, Poa annua, plantain, creeping bent
Ammonium thiocyanate	10.0 "	0.0	T	Spurry
Borascu	40.0 "	0.0	0.0	
Borascu	80.0 "	0.0	0.0	
Common salt	40.0 "	8.0	14.0	Spurry, Poa annua
Common salt	80.0 "	3.0	5.0	Spurry, Poa annua
Premerge	1.0 gal.	0.0	0.0	
Premerge	2.0 "	0.0	0.0	
Check (No treatment)[3]	.....	78.0	91.0	Spurry, chickweed, crabgrass, Poa annua, dandelion, creeping bent, quackgrass and plantain
Cyanamid	50.0 lbs.	1.5	3.5	Spurry, chickweed, crabgrass, Poa annua
Cyanamid	100.0 "	0.0	0.0	
Sodium Arsenite	1.0 "	15.0	63.0	Spurry, chickweed, crabgrass, Poa annua
Sodium Arsenite	2.0 "	12.0	38.0	Spurry, chickweed, crabgrass, Poa annua
Sodium TCA 90%	1.0 "	1.5	5.0	Spurry, chickweed, crabgrass, Poa annua
Sodium TCA 90%	3.0 "	1.0	2.0	Spurry, chickweed, crabgrass, Poa annua
PMAS 10%	2.0 "	16.0	37.0	Spurry, Poa annua
PMAS 10%	4.0 "	8.0	26.0	Spurry, Poa annua
2,4-D butyl ester 40%	0.5 "	7.0	27.0	Poa annua, chickweed, spurry
2,4-D butyl ester 40%	1.0 "	1.0	16.0	Poa annua, chickweed, spurry
IPC	3.0 "	1.0	2.0	Chickweed, spurry, sedge, dandelion
IPC 3-chloro	0.05 "	11.0	17.0	Poa annua, crabgrass, chickweed, creeping bent
IPC 3-chloro	0.10 "	16.0	28.0	Poa annua, crabgrass, chickweed, creeping bent
IPC 3-chloro	0.20 "	9.0	12.0	Poa annua, crabgrass, chickweed, creeping bent

[1] Weeds are listed in order of abundance.
[2] T=Trace, less than 0.10 percent weeds.
[3] Check=average of 4 check plots.

economical. For example, Cyanamid at 50 and 75 pounds used on turf seedbeds prior to seeding has produced weed-free seedbeds. Cyanamid is high in nitrogen and lime and after the toxic period is passed, a soil treated with Cyanamid is in a high state of fertility. Also, Cyanamid at 13 pounds thoroughly mixed with 1 cubic yard of screened compost is the method developed and used at the Rhode Island Agricultural Experiment Station for providing weed-free compost.

The weed content of the plots consisted mostly of annual bluegrass, creeping bent, crabgrass, quackgrass, spurry, both field and mouse-ear chickweed, plantain, dandelion and purslane. Annual bluegrass, spurry and chickweed were predominant. As shown in the table, the untreated plots were covered by from 67 to 85 per cent weeds at the end of 2 months and with 86 to 94 per cent weeds at the end of 6 months, whereas some of the treated plots noted were entirely weed free. The results of these tests are a guide for further testing and suggest rates of materials that should be useful for the purpose of weed control in sand traps and other areas.

At the rates used and under the conditions of this test it appears that Borascu, at 40 pounds or less, Ammate, or Ammonium Thiocyanate at 10 pounds or less have definte use in the treatment of sand traps on golf courses, for paths, roadway shoulders, and near guard rails and similar areas to inhibit weed growth. Premerge gave perfect control of weeds at 1 gallon per 1,000 square feet.

The other materials used in this test such as Sodium TCA, IPC, 3-Chloro IPC and Sodium Arsenite undoubtedly have value for the purpose of eliminating weeds if used at higher rates.

It appears that one of the main objectives in the control of weeds in sand traps is the use of a material that will not track, blow or wash, or be driven by "explosive-shots" on to the fine turf of putting greens and cause damage there.

For the purpose of more specific directions regarding effective materials and amounts for the control of weeds in sand traps, tests should be made in sand traps adjacent to greens, or under similar conditions. At various intervals the treated sand should be applied to the turf in amounts similar to that caused by "explosion shots", to test the toxicity of the

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about ½ a basket per green, you know it is time to fertilize. If you are getting 3 or 4 baskets per green, you know the grass is doing pretty well. This is as good a test as any we have, but the tissue test may show a prospective drop in growth several days before it occurs.

In making the test we gather clippings with a knife. They are placed on a piece of filter paper and rolled up like a cigarette. Juice is squeezed into the paper with a pair of pliers. A white powder is used for the nitrogen test. It turns pink if nitrogen is present in the juice. When the grass gets enough nitrogen there is some present in the plant juice as nitrates. The same is true of phosphorous and potash. The tests show their presence or absence. The phosphorous and potash tests should be the most useful because it is impossible to judge need for them by growth behavior of the plant unless the deficiency is acute.

The phosphorous test is made by wetting the paper with ammonium molybdate solution and adding stannous chloride. Phosphorous produces a blue color. The intensity of color is roughly proportional to the amount of phosphorous. In making the potash test a drop of test solution is placed on the paper. Juice from grass clipings is squeezed into the spot. After 30 seconds the spot is drenched with dilute hydrochloric acid. If there is no potash in the tissue, the spot bleaches to a lemon yellow. If potash is present, a brick-red color develops. The red color means that the grass is obtaining ample potash.

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chemicals on various grasses used on putting greens.

On fallow areas where adjacent plant materials and grass are not factors which have to be considered, the above chemicals which gave from excellent to good control have outstanding possibilities as long term weed control treatments from only one application. In this respect the practical use of some of these materials may be limited by cost.

The control of weeds in sand traps will

not only be limited by cost, but also by the effect of the chemicals on grass when treated sand is driven onto adjacent putting green turf by an "explosion-shot". As this was not determined in this study, further tests are planned in this respect, along with additional work on various rates of application. Leaching away of the chemicals in the sand traps, as well as continuous raking are other factors that have a bearing on the effectiveness of the chemicals.

It should be understood that the above report is based on preliminary testing of the chemicals. Some of the chemicals and rates used appear practical. The results are given as a suggestion of what chemicals might be effective and as a guide for further testing under actual conditions.

Certainly, the effective use of chemicals for purposes mentioned above will save many hours of hand labor and expense.

NOTE: The author would appreciate the benefit of any suggestions or experiences of others in the chemical method, or any other method, for controlling weeds in sand traps.

Southern California Holds Third Turf Conference

Southern California third annual conference on turf culture, April 30 and May 1, held its first session on the turf plot at the University of California at Los Angeles, giving visitors an opportunity to see comparative trials of the many new and standard turf grasses under various cultural treatments. More than 200 persons from various parts of Southern California attended the two-day meeting.

The meeting was opened by Dean Robert W. Hodgson, head of the Los Angeles division of the University of California College of Agriculture. Prof. H. B. Musser, Pennsylvania State College, explained the operation of his program, one of the oldest and largest turf research programs in the United States. Prof. Musser also discussed control of weeds.

Dr. F. V. Grau, Director, USGA Green Section, described new improved turf grasses, including Zoysia Z-52, U-3 bermuda grass and Merion bluegrass, and discussed their use in combinations of warm and cool season grasses. He also reviewed turf aeration.

O. J. Noer showed many color slides illustrating maintenance methods and solutions of turf problems. Dr. Robert Hagan of the Division of Irrigation on the University of California's Davis campus, discussed the fundamentals of watering turf grasses.

John E. Gallagher of the University of California Division of Floriculture and Ornamental Horticulture on the Los Angeles campus presented results of experimental trials of herbicides and fertilizers on the turf plots at UCLA.

These five speakers earlier conducted a broadcast panel discussion on turf culture for Armed Forces Radio, with emphasis on the military aspects of turf.

Additional speakers on turf subjects from UCLA were Prof. Pierre A. Miller of the Division of Plant Pathology, who discussed turf diseases and their control by fungicides, and Prof. V. T. Stoutemyer, chairman of the Division of Floriculture and Ornamental Horticulture, who explained the purpose of some of the experimental grass plots.

Another panel discussion on trees and turf at the morning session of the second day evoked many questions. This panel was conducted by Fred W. Roewekamp, city Forester of Los Angeles, Prof. Pierre A. Miller, and Dr. Mildred E. Mathias of the U.C.L.A. Botany Department. William H. Johnson, president of the National Golf Course Superintendents Assn. presided at this meeting.

At the final afternoon session, John J. McElroy of the Agricultural Extension Service on the Berkeley campus of the University of California described their methods of operation and the possibility of assistance to those groups concerned with recreational and ornamental turf.

WHAT PROS SHOULD KNOW

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length, each ⅜ inch deflection, upright or flatter, is equal to a 1 degree change in lie.

Hook Variations

The next item on the order is "not too much hook." The factory has means of checking and measuring hook, but the amount of hook on a wood club varies with practically every pro, that is, as far as personal opinion goes. A straight face to Cary Middlecoff is 2 degrees open to the factory. A straight face to Skip Alexander is 1 degree hook to the factory. The standard hook on a driver and brassie is ½ degree, ¼ degree on the No. 3 spoon, and on the No. 4 spoon 0 degree. This is a perfect example as to the importance of the home professional to the factory. It is understandable that the touring pro uses a wood club faced much more open than the club you would recommend for Mr. Average Golfer. The exact amount of hook necessary to make a club more playable, or the lack of hook, comes to us directly from your recommendations.

That last item on the order was "grip a little oversize." The factory uses a ladies' gauge, a men's standard gauge, slightly oversize, and full oversize. Reducing these descriptions to simple figures, the difference between each gauge is 1/32 of an inch in diameter. "A little