1976

Spring 1976 Conference Issue

E. McGuire

J. Griffin

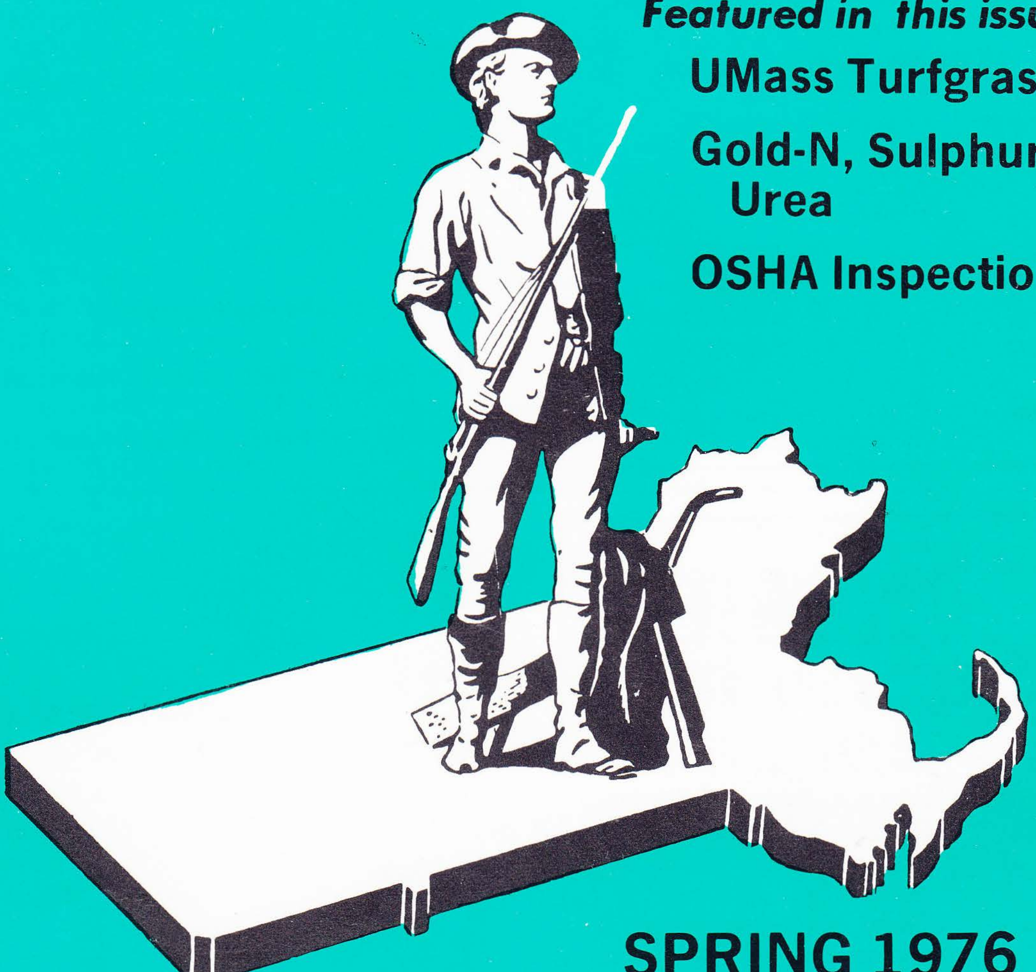
R. N. Carrow

J. Troll

L. H. Davies

TURF BULLETIN

MASSACHUSETTS TURF AND LAWN GRASS COUNCIL
INCORPORATED



Featured in this issue:

UMass Turfgrass Research

Gold-N, Sulphur-Coated Urea

OSHA Inspection Stops

SPRING 1976
CONFERENCE ISSUE

BETTER TURF THROUGH RESEARCH AND EDUCATION

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The Massachusetts Turf and Lawn Grass Council Incorporated is chartered under the laws of the Commonwealth of Massachusetts as a non-profit corporation. The turf council seeks to foster "Better turf through research and education."

More detailed information on the subjects discussed here can be found in bulletins and circulars or may be had through correspondence with the editor.

Table of Contents

Herbicide Evaluation for Crabgrass Control: 1974-1975

By E. McGuire, J. Griffin, R. N. Carrow and J. Troll
University of Massachusetts, Amherst

The objective of this study was to evaluate several commercial and experimental herbicides for their effectiveness in crabgrass *(Digitaria ischaemun)* control and possible phytotoxicity on desirable species. The site was a silt loam soil of pH 6.7. The turf consisted of 85% Baron Kentucky bluegrass and 15% Pennlawn red fescue.

Fertilization in 1974 and 1975 was 0.75 lb N/1000 ft^2 in mid-May of each year and 1.0 lb N/1000 ft^2 in September with 8-6-4 as the carrier. Mowing was twice a week at 1½ inches with the clippings returned. No irrigation was utilized. Crabgrass seed was applied at 0.5 lbs/1000 ft^2 prior to treatment application in both years. Trials were conducted on adjacent areas each year and not on the same plots. Treatments were applied on May 21 and May 20 for 1974 and 1975, respectively. All treatments were replicated three times in 4 x 6 ft plots in each study.

In 1974 crabgrass was evident in the latter part of June. The crabgrass appeared in 1975 in mid-July. The latter part of June and first week of July was very dry, followed by two weeks of very wet, hot, humid weather.

Table 1 contains the phytotoxicity (on desirable species) and percent crabgrass control data. EL-131 exhibited slight to severe phytotoxicity in both studies, especially at the 3 and 4 lb ai/A rates. HER 25893 at the 2 + 4 lb ai/A split application also resulted in slight injury to the Kentucky bluegrass and red fescue.

In 1974 excellent control was achieved with EL-131 at all rates, Dacthal, Tupersan and AM 72-A34 at both rates. In 1975 herbicides which were effective included EL-131 at all rates, Dacthal, Tupersan, AM 72-A34 at both rates, and AM 75-A424 at the high rate.

Table 1. Crabgrass herbicide trials for 1974 and 1975.

Chemical	Rate (lb ai/A)	Phytotoxicity (0=none, 5=total kill)		% Crabgrass per plot	
		7/22/74[b]	7/28/75	7/22/74[b]	7/28/75
Check	0	0	0	23.3	5.7
HER 26910	4	0	0.3	20.0	6.0
VEL 5052	1	-	0	-	7.0
VEL 5052	2	-	0	-	5.7
VEL 5052	4	-	0	-	4.7
EL-131	1.5	2.0	0	0.3	0
EL-131	2	1.7	0	0.2	0
EL-131	3	1.0	1.0	0.1	0
EL-131	4	4.0	3.0	0	0
Dacthal	10	0	0	0	0
Tupersan	12	0	0	0	0
HER 25893	2	-	0	-	7.0
HER 25893	4	0	0	18.3	2.0
HER 25893[a]	2 + 2	-	0.3	-	1.7
HER 25893[a]	2 + 4	-	1.3	-	1.3
HER 22234	4	0	0	23.3	11.0
AM 72-A34	4	0	0.3	0.3	0
AM 72-A34	6	0	0	0	0
AM 75-A424	4	-	0	-	1.3
AM 75-A424	6	-	0	-	0

[a]Second application was 6/2/75.

[b]If the particular chemical and rate was in the 1974 trial the data are included.

Growth Retardants On A Kentucky Bluegrass and Red Fescue Turf Stand

By R. N. Carrow and J. Troll
1975 University of Massachusetts, Amherst

Objective: To evaluate the effectiveness of several experimental growth regulators on a mature turfgrass stand.

Procedure: The turfgrass stand at the test site was approximately 85% Baron Kentucky bluegrass and 15% Pennlawn red fescue. The turf was established in May 1973. On 5/11/75 an 8-6-4 fertilizer was applied at 0.75 lb N per 1000 ft^2. No further fertilization or irrigation was used. The turf stand was mowed at 3.8 cm two days prior to application of the chemical 5/21/75.

Results: Table 1 contains the treatment rates, phytotoxicity ratings and vegetative plant height. Eight days after treatment (5/29), phytotoxicity was expressed as discoloration as that no thinning was observed on treatments 6, 7, 10, 11, and 17. Six weeks after chemical application (7/13) phytotoxicity effects were exhibited primarily as thinning of the turf stand and some discoloration. Treatments 13 and 18 demonstrated moderate thinning, while treatments 2, 3, 4, 5, 9, 12, and 17 had slight to moderate loss of turf density. Thinning of the turf was still evident from several chemicals 9 weeks after treatment. Moderate to severe phytotoxicity was expressed on treatments 9 and 13, while slight to moderate injury occurred on treatments 5, 8, 12, 16, and 17.

Several chemicals resulted in vegetative growth retardation (Table 1). Growth reduction was apparent for a period of 9 weeks after chemical application for treatments 5, 13, 15, 16, and 17.

Treatments 3, 4, 5, 12, 13, 16, 17, and 18 gave effective control of red fescue seedhead formation. Kentucky bluegrass seedhead control was achieved with treatments 3, 4, 5, 16, and 17. No chemical demonstrated complete control of seedhead formation; however, an earlier treatment date may have resulted in greater effectiveness.

The effectiveness of the various growth retardants depended upon the criteria under which they were evaluated. No single treatment exhibited ranked high in all measurements. Considering all ratings, treatments 5, 16, and 17 were most effective. Treatment 15 was acceptable except for prevention of seedhead formation.

Table 1. Phytotoxicity and plant height determinations.

	Rate (lb ai/A)	— Phytotoxicity[a] — 5/29	7/3	7/22	— Vegetative plant height (cm) — 6/1	7/3	7/22
1. Check	0	0	0	0	5.6	10.0	11.0
2. VEL 3793	0.25	0.3	1.0	0	5.8	8.7	10.3
3. VEL 3793	0.50	0.7	1.7	0.3	4.6	6.3	11.3
4. VEL 3793	0.75	1.0	1.3	0.7	4.9	5.7	10.7
5. Sustar	4	1.0	1.0	1.3	5.2	6.0	8.3
6. EL-509 (FL)	2	2.3	0	0	6.4	10.0	10.7
7. EL-509 (FL)	3	3.0	0	0	6.9	9.3	10.0
8. EL-509 (G)	2	0	0	1.0	6.2	8.0	10.3
9. EL-509 (G)	3	0	1.0	2.3	6.7	8.7	9.3
10. EL-509 (FL)+MH-30	2+3	1.7	0	0	6.9	10.0	11.3
11. EL-509 (FL)+MH-30	3+3	2.3	0.7	0.7	6.4	7.3	11.0
12. EL-509 (G)+MH-30	2+3	0.3	1.3	1.3	6.0	6.7	10.0
13. EL-509 (G)+MH-30	3+3	0	2.0	3.0	6.4	6.3	7.0
14. Ethrel	4	0.3	0	0.7	7.3	10.0	10.3
15. Ethrel	10	0.7	0.3	0.7	6.5	5.7	7.7
16. Ethrel + MH-30	5+1.5	1.0	0.7	1.3	5.8	4.3	7.7
17. Ethrel + Sustar	5+2.0	2.0	1.3	1.3	5.2	6.3	8.7
18. MH-30	6	0.0	2.0	1.0	5.2	7.0	10.0

[a]Phytotoxicity scale: 0 = no injury, 5 = total kill of turf.

Table 2. Red fescue and Kentucky bluegrass seedhead production as influenced by growth retardant treatment.

Treatment identification number	— % Red fescue — seedhead production* 6/1	7/3	— % Kentucky bluegrass — seedhead production 6/1	7/3
1 (Check)	5.3	10.3	10.0	12.7
2	7.3	4.0	7.3	2.0
3	4.7	1.0	8.0	0.3
4	1.7	1.0	1.0	0.0
5	4.0	1.0	2.3	0.7
6	9.7	12.0	17.3	14.3
7	7.0	10.3	11.7	11.7
8	6.3	10.3	13.7	13.7
9	8.0	12.3	18.3	18.7
10	6.3	2.0	21.3	7.0
11	3.3	2.3	7.3	5.3
12	4.0	1.0	14.3	5.0
13	5.3	0.7	18.7	9.0
14	7.0	9.3	15.0	10.3
15	3.0	4.7	7.3	5.7
16	2.7	1.0	4.7	1.0
17	3.3	1.0	6.3	0.7
18	6.7	1.3	20.0	5.3

*The turf area consists of 15% red fescue and 85% Kentucky bluegrass. The ratings are in terms of the percent of all grasses in the plots.

Herbicide Trials on Broadleaf Weeds 1975

By J. Griffin, E. McGuire, R. N. Carrow and J. Troll
University of Massachusetts, Amherst

The objective of this trial was to evaluate the effectiveness and phytotoxicity potential of several experimental and commercial herbicides used for broadleaf weed control. The test site was on the South Deerfield Turf Experimental Plots of the University of Massachusetts. A sandy loam soil of pH 6.7 was utilized. The area received 0.75 lb N/1000 ft^2 on May 25. No irrigation was applied and mowing was twice weekly at 1½ inches with clipping removed.

The test site included a wide variety of grasses and weeds. Major week population of dandelion, broadleaf plantain, and white clover were present. Other weeds were mallow, knotweed, spotted surge and mouse-eared chickweed. The grass was predominately creeping bentgrass with some red fescue, tall fescue and Kentucky bluegrass. Sedge was also evident.

All treatments were applied on June 2. At that time the plant composition of each plot was recorded. Treatments were replicated three times in 4 x 6 ft plots. Effectiveness and phytotoxicity rates were obtained on July 8. On July 8 the plant composition of each plot was again recorded. Percent control was expressed as:

$$\% \text{ Control} = 100\% - \frac{\text{number of a weed present on 7/8 (100)}}{\text{number of a weed present on 6/2}}$$

A value of 0 means no control; a negative number (i.e.-11%) means that the population of that weed increased from June 2 to July 8; and a high value means good control (i.e. 90% means 90% control of that weed).

Plantain *(Plantago major* L.) was adequately controlled with 74-A339 at 1 and 2 lbs ai/A, 3-D Weedone, Weedone Lawn Weed Killer, and 74-A354 at 2 lbs ai/A. Fair control was achieved with MCPP, Trex-san, Super D Weedone and 74-A354 at 1 lb ai/A.

Good control of dandelion *(Taraxacum* spp.) was demonstrated with VEL 4207 at all rates, Banvel, Trex-san, 74-A339 at both rates, Super D Weedone, and 3-D Weedone, VEL 4207 at 2 and 4 lbs ai/A and 74-A339 at the 2 lbs ai/A rate did exhibit slight toxicity on the grasses. This was noted as a slight discoloration of the turf leaves.

Control of white clover *(Trifolium repens* L.) was evident for the following treatments: VEL 4207 at all rates, Banvel, Probe at 4 and 6 lbs ai/A, Trex-san, 74-A339 at both rates, Super D Weedone, and 3-D Weedone. While Probe was effective in clover control it was also very phytotoxic toward all the grass species present. At the 4 and 6 lbs ai/A rates, Probe completely killed all the turfgrasses.

The remaining weeds were adequately controlled by VEL 4207 at all rates, Probe, Bromoxynil, 74-A339, 3-D Weedone, 74-A335 at 2 lb ai/A, 74-A354, and Weedone Lawn Weed Killer.

Many of the herbicides were effective against one or two weeds but not for all weeds. Herbicides which demonstrated adequate control of all weeds present in this study were 74-A339, at both rates, Super D Weedone, 3-D Weedone, and Trex-san.

Table 1. Broadleaf herbicide trial for 1975.

Chemical	Rate (lb ai/A)	% Control[b] Plantain	Dandelion	Clover	Other[c]	Turfgrass Phytotoxicity[d]
Check	-	26	30	- 75	17	0
VEL 4207(2EC)	1	11	91	99	87	0
VEL 4207	2	0	100	100	81	0.7
VEL 4207	4	-22	97	98	98	0.7
Banvel (4EC)	1	13	100	96	72	0.3
Probe (75 WP)	2	43	34	30	73	4.3
Probe	4	-11	54	100	57	5.0
Probe	6	- 1	45	100	100	5.0
MCPP	1.7	79	50	-	63	0.3
Trex-San	1	79	92	100	75	0
Bromoxynil	1	50	32	27	97	0
74-A339 (IE)[a]	1	100	96	99	85	0.3
74-A339[a]	2	100	100	100	74	0.7
Super D Weedone[a]	2	75	100	100	62	0
3-D Weedone[a]	2	100	89	97	87	0.3
74-A355 (G)[a]	1	23	- 4	- 2	67	0
74-A355[a]	2	56	36	79	89	0.3
74-A354 (G)[a]	1	71	46	33	81	0
74-A354[a]	2	91	69	65	72	0
Weedone Lawn W.K.[a]	2	100	34	0	81	0.3

[a] lbs ai/A refers to lbs of 2,4-D/A

[b] 100% = complete control, 0 or a minus number means no control or increased infestation.

[c] Other = all other weeds. Does not include grasses or sedges.

[d] Phytotoxicity refers to injury on grasses only and not weeds: 0 = no injury, 5 = total kill.

Dollar Spot Fungicide Control Trials—1975

By J. Troll, R. N. Carrow, J. J. Griffin and E. D. McGuire

Fungus diseases continue to cause serious problems on turfgrasses. Dollar Spot is one that occurs regularly on various grass species but bentgrasses *(Agrostis* spp.) in golf greens appear to be most susceptible. Contact or systemic fungicides or alternate applications of these chemicals have provided good control of the disease. However, failure of satisfactory control of Dollar Spot by these fungicides has been reported periodically. More effective and environmentally safe fungicides are continually being formulated by chemical companies. The efficacy of a test fungicide compared to standard chemicals for the control of Dollar Spot *(Sclerotinia homoeocarpa)* were made. The trial chemical was applied at three different rates to determine significant effects on the control of the disease.

Emerald and Seaside creeping bentgrass cultivars *(Agrostis palustris)* were each seeded to adjacent 40'x12' areas in 1973 to a silt loam soil on the University of Massachusetts, South Deerfield Turfgrass Station.

Both turfgrass areas were mowed twice weekly at 0.25 inch. To enhance fungus infection by natural means only 1.5 pounds of nitrogen per 1000 square feet was applied to each site by mid-July. Additional increments of nitrogen were applied in late August and again in September. The turfed areas were not irrigated throughout the season.

Each area was divided into 30 randomized 4' x 10' plots. There were 10 treatments including the watered controls, each replicated 3 times. Treatments were initiated July 10 and re-applied on July 17 and 24. Thereafter fungicides were applied every two weeks. The last application was made September 6, Results are shown in Table 1.

Based on the environmental conditions in which both grasses were grown it was evident that Emerald creeping bentgrass is very susceptible to Dollar Spot disease in comparison to Seaside.

There were no phytotoxic symptoms at any of the test chemical E1-222 rates. All of the other fungicides were applied at the manufacturer's recommended rate. Systemics 1991 and Fungo gave excellent control of the disease. There is reported Dollar Spot resistance to cadmium containing fungicides but not in this trial. Cadminate, a contact chemical, also gave excellent control. Still another contact, Actidione TGF, showed excellent control when compared to the check. E1-222 applied at the highest rate appeared to be somewhat effective in controlling the organism. If used at still a higher rate, it might have shown as well as others in this test. Readings taken on 8/19 appeared to be inconsistent with the other results. There is no reasonable explanation for this.

The incidence of Dollar Spot occurred late into the 1975 season. When temperatures range from 60° to 80°F, cool nights, warmer days, and humidity, the disease can increase. This is indicated by the percent infection listed on 9/21. Chemicals were last sprayed on September 6 and no doubt the weather enhanced the incidence of disease. Outbreaks of Dollar Spot also occurred in late October and there were reports of disease in November.

We wish to thank Mallinckrodt, UpJohn and Eli Lilly companies for their contributions to these trials.

Table 1. Fungicide treatments, rates, average percent dollar spot infection and date on Emerald and Seaside creeping bentgrass - 1975

		Average percent dollar spot infection											
		Emerald						Seaside					
Treatments	Rate oz/1000 sq.ft.	7/16	7/23	8/6	8/19	9/4	9/21	7/16	7/23	8/6	8/19	9/4	9/21
Tersan	4.0	[1] 17.3	10.0	9.6	18.0	1.6	19.0	4.0	2.6	3.3	12.0	0.3	2.0
Tersan 1991	1.0	6.3	3.0	1.0	2.6	0.3	4.0	2.0	1.3	0.3	0.6	0.0	0.0
E1-222	0.11	13.3	13.6	11.0	7.6	9.6	17.6	2.3	2.0	3.6	2.6	2.0	5.5
E1-222	0.27	11.3	6.6	3.3	5.6	1.0	6.0	1.6	1.0	6.0	2.6	1.0	3.3
E1-222	0.36	10.6	6.3	6.0	2.3	1.6	1.6	2.0	2.0	2.0	0.3	0.0	1.6
Fungo	1.0	5.0	2.6	0.6	6.6	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0
Actidione TGF	1.0	11.0	2.6	2.3	11.3	0.6	3.0	1.6	1.0	1.3	4.0	0.0	1.0
Actidione-Thiram	2.0	8.6	6.0	5.3	3.0	1.0	7.6	1.6	1.3	1.0	5.3	0.0	0.3
Cadminate	0.5	3.6	2.0	1.6	7.6	0.0	0.1	1.6	1.3	1.3	1.0	0.6	0.0
Control	-	16.6	11.0	6.0	21.0	11.3	30.0	2.6	1.6	2.6	5.0	4.6	9.3

1) Average infection of three replicated plots.

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"When I need a herbicide, Baron can take the shocks better without streaks or setbacks. It is an aggressive grass needing only minimum maintenance practices."

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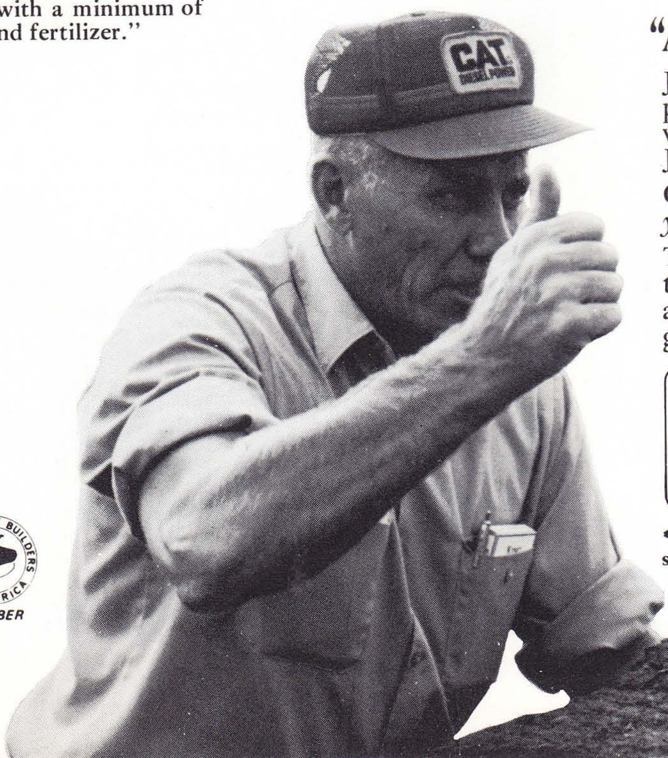
"It's hard enough getting the seedbed ready; I'm not going to spoil everything with a poor quality seed. I don't know why every sod grower doesn't use Baron."



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Jamestown is perfect for a bluegrass blend, particularly Baron. It has great eye appeal and when sod is needed for sun and shade areas Jamestown/Baron really go well together.

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GOLD-N, A Sulphur-Coated Urea from ICI

By L. H. Davies

DEVELOPMENT OF EFFICIENT and economic slow-release nitrogen fertilizers has been high on the priorities list of most major fertilizer companies for some time. Such materials are attractive because optimum crop response can be achieved with a smaller amount of total nitrogen, and without the need for repeated applications.

About ten years ago, the Fertilizer Development Center of the Tennessee Valley Authority demonstrated that a successful controlled release nitrogen fertilizer could be obtained by coating urea granules with sulphur. Developmental work on this material has been carried out subsequently by TVA and other organizations.

The first commerical marketing of a sulphur-coated urea was carried out by Imperial Chemical Industries Ltd. in the U.K. in March 1972. This article, describing ICI's version of SCU, GOLD-N is based on information provided by the Agricultural Division of ICI.

Readers interested in additional information on the properties and uses of GOLD-N may contact: Mr. L. H. Davies, ICI Agricultural Division, P.O. Box 1, Billingham Teesside, TS23 1 LB, England.

The fertilizer division of Imperial Chemical Industries (ICI) investigated a number of potential slow-release nitrogen materials at the Jealott's Hill Research Station. Several materials were found to have a potential use on certain crops in selected areas, however, a material which would be acceptable for general use in the U.K. proved elusive.

Reports of the work carried out by TVA on sulphur-coated urea (SCU) (1, 2, 3, 4, 11, 12, 13) indicated that this material had considerable potential as a slow-release nitrogen fertilizer for general use. An intensive research and development program on SCU was instituted by ICI and a wide range of formulations using different coating technologies and varying amounts of sulphur and wax, were tested under greenhouse and field conditions. Technology for manufacturing SCU was studied concurrently at ICI Billingham and the joint program resulted in a sulphur-coated urea being launched on the U.K. market in March 1972 as GOLD-N.

The Product

GOLD-N is produced at ICI's large chemical complex at Teesside in the north of England. Urea prills are coated with sulphur to give a product containing 32%N, 30% S, and about 2% wax.

GOLD-N has a bulk density of 50 lbs/cu ft (800 kg/m^3) and a bulk volume of 45 cu ft/long ton (1.3m^3/ton). It is packed in yellow polythene bags of 56 lb (25.4 kg), which gives ease of handling.

Storage tests undertaken with GOLD-N showed the product to have a high degree of resistance to caking. Samples retained at manufacture or allowed to travel and be stored on farms have retained all the slow release

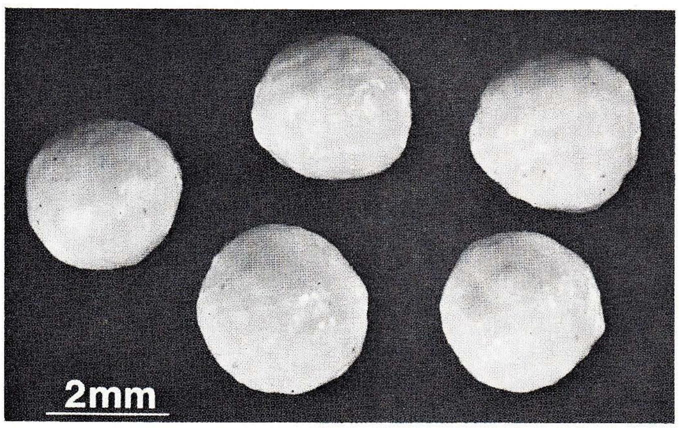

Fig. 1: Typical granules of GOLD-N.

properties over the storage time, at present up to two years.

In common with TVA reports on SCU (6) it has been found possible to apply GOLD-N without damage to the coating, with all fertilizer spreaders except those using a very high speed spreading disc. In practice this excludes only a small minority of machines in the U.K., all of which are normally used on extensive agricultural crops where a GOLD-N market does not currently exist.

GOLD-N in the Glasshouse

Slow-release nitrogen fertilizers are in common use in the U.K. glasshouse industry. Organic materials such as hoof and horn meal and dried blood predominate. Some manufactured fertilizers such as urea-formaldehyde have also been in limited use. In most cases these fertilizers have been used to provide a base level of nitrogen, followed by adjustments with solution fertilizers to suit crop growth. Recently the prices of all of these fertilizers have been rising rapidly and the deficiencies in the nitrogen release patterns of these materials, such as their dependence on temperature, have become less acceptable. GOLD-N, with its reliable nitrogen release pattern, satisfies the demand of glasshouse use; the release of all its nitrogen over most crop growth periods results in a very high nitrogen efficiency.

The experiments in the U.K., closely followed by results from trials in Holland (7), have enabled firm use recommendations to be drawn up for the major glasshouse crops: tomatoes, lettuce, cucumbers, chrysanthemums, carnations, and roses.

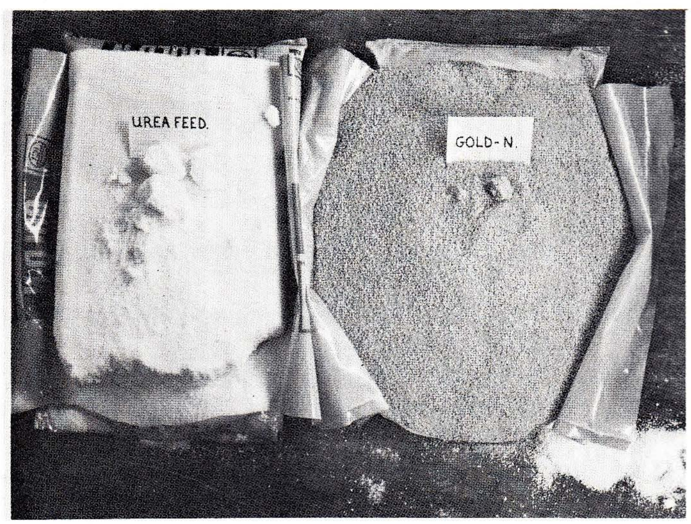

Fig. 2: Caking after storage for two months.

In the glasshouse it is common practice to store composts, with the fertilizer nutrients added, for some time. There was concern that the nitrogen release from GOLD-N might continue during the storage, thus ultimately giving a compost with excessive "available" nitrogen.

(Continued on Page 13)

1976 TURF CONFERENCE

"Better Turf Through Research and Education"

March 3, 4, 5, 1976
Treadway Motor Inn Chicopee, Massachusetts

Spondored by Massachusetts Cooperative Extension Service
Massachusetts Turf and Lawn Grass Council
Golf Course Superintendents Association of New England

PLEASE BRING THIS PROGRAM WITH YOU.

WEDNESDAY, MARCH 3

—Morning—

11:00 Registration—Lobby

—Afternoon—

GENERAL SESSION
Corinthian Room

Chairman: Dr. Joseph Troll
University of Massachusetts/Amherst

1:00 Welcome
Dr. Gene McMurtry, Associate Dean
and Associate Director,
College of Food and Natural Resources,
University of Massachusetts/Amherst

1:15 Golf Course Architecture—Past, Present, Future
Past: Mr. Geoffrey S. Cornish
Golf Course Architect
Amherst
Present: Mr. Edward Lawrence Packard
Golf Course Architect
LaGrange, Ill.
Future: Mr. Edwin B. Seay
Golf Course Architect
Ponte Vedra Beach, Fla.

2:45 Break

3:00 Trees with Turf
Mr. George Thompson, Supt.
Columbia Country Club
Chevy Chase, MD

3:45 After the Job Interview
Mr. Angelo Cammarota, Supt.
Hobbit's Glen Golf Club
Columbia, MD

4:30 Massachusetts Turf and Lawn Grass Council
Membership Meeting

4:45 University of Massachusetts Turf Alumni Meeting

—Evening—

Free—A good time to look up old friends.

THURSDAY, MARCH 4

GOLF COURSE SESSION
Corinthian Room

—Morning—

Chairman: Dr. Robert N. Carrow
University of Massachusetts/Amherst

9:30 New Turfgrass Cultivars and Where Are They Taking Us?
Mr. Lee Record
Mid-Continent Director
USGA Green Section, Crystal Lake, Ill.

10:15 What's New in Turf Research and What Is Needed?
Mr. T. L. Haschen
E. I. duPont de Nemours & Co., Inc.
Wilmington, Del.

11:00 Why the Limitations Preventing Good Control of Scarabaeid Grubs, Hyperodes Weevil, Dung Beetle, Sod Webworm, and Other Turf Insects?
Dr. Haruo Tashiro
Dept. Entomology
New York State Experiment Station, Geneva

11:45 Lunch

—Afternoon—

1:00 Past and Present Golf Course Maintenance Panel—
Past: Mr. Arthur Anderson, Former Supt.
Brae Burn CC, Newton

Mr. Charles G. Wilson, Director
Agronomy and Marketing
Sewerage Commission, City of Milwaukee, Wis.
Mr. Thomas Mascero,
Safe-T-Lawn Co., Miami, Fla.

Present: Mr. Sherwood Moore, Supt.
Woodway GC, Darien, CT
Mr. Paul O'Leary, Supt.
Ekwanok CC, Manchester, Vt.
Mr. Stanley J. Zontek, Agronomist
Eastern Region, USGA Green Station
Highland Park, NJ

2:45 Break

3:00 Program of a Golf Course Owned by the Superintendent
Mr. Keith Nisbet, Supt.
Westview Golf Club, Guelph, Ontario

3:30 Understanding the Golf Professional's Point of View
Mr. George S. Wemyss, Executive Director
New England Section, PGAA,
Wakefield

4:00 Nitrogen Fertilization of Experimental Golf Greens
Dr. William Mitchell
Plant and Soil Science Dept.
University of Delaware, Newark

THURSDAY, MARCH 4

ALTERNATE SESSION
Springfield Room

—Morning—

Chairman: Mr. Charles Mruk
Hercules Inc.

9:30 Management of Athletic Fields at Harvard University
Mr. Bernard Keohan, Supt.
Buildings & Grounds
Harvard University, Cambridge

10:15 Tennis Court Maintenance at Philadelphia Cricket Club
Mr. James Taylor, Supt.
Philadelphia Cricket Club
Flourtown, PA

11:00 Fertilizer Supply and Demand in 1976
Mr. Donald Collins
The Fertilizer Institute
Washington, D.C.

11:45 Lunch

—Afternoon—

1:00 Lime—To Make Fertilizer Go!
Dr. Frederick E. Hutchinson
Vice President for Research and Public Service
University of Maine, Orono

1:45 The Sod Industry
Mr. Chris Beasley
Tuckahoe Farms
Slocum, R.I.

2:30 Break

2:45 Turfgrass Establishment—Athletic Fields, Roadsides, and Industrial Sites
Mr. Norman Gray, President
Transit Seeding, Inc., Mansfield

3:30 Use Pesticides Carefully or Not At All
Prof. J. Lincoln Pearson
Dept. Plant and Soil Sciences
University of Rhode Island, Kingston, R.I.

—Evening—
Corinthian Room

7:00 Banquet and Winter School Graduation Exercises
Speaker: Mr. Irv Wermont
You're Worth More Than You Think

FRIDAY, MARCH 5

GOLF COURSE SESSION
Corinthian Room

Chairman: Dr. Joseph Troll

9:30 Know Your Soils
Dr. Coleman Ward, Head
Dept. Ornamental Horticulture
University of Florida/Gainesville

10:15 A Review of Turfgrass Fertilizer Research
Dr. Donald V. Waddington
Dept. Agronomy
Pennsylvania State University/University Park

11:00 Introduction Foxhills to the States
Mr. John Campbell
Foxhills Golf & Country Club Ltd.
Surrey, England

11:45 Adventures of Turfman Holmes
Mr. James L. Holmes, President
The Green Makers
Bryan, Texas

(Continued on Page 12)

(Continued from Page 11)

CONFERENCE PLANNING COMMITTEE

Golf Course Superintendents Association of New England
Thomas Curran

Massachusetts Turf and Lawn Grass Council
Charles Mruk

University of Massachusetts
Joseph Troll, Chairman
Robert N. Carrow

Cooperate Extension Service, University of Massachusetts, United States Department of Agriculture and County Extension Services cooperating.

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(Continued from Page 9)

Work with a wide range of compost types stored at a number of temperatures showed that this is not a problem, since at no time was more than 10-20% of the applied N available in a water soluble form.

Several experiments have been carried out on supplying the nitrogen requirements with slow-release materials (14, 15). By replacing at least part of the regular solution feeding, glasshouse management problems would be eased.

In a series of glasshouse trials at Jealott's Hill, tomatoes were given a base nitrogen application equivalent to 300 lbs N/acre, which is standard U.K. practice, as GOLD-N. This was then supplemented by either ammonium nitrate solution five days each week to give a further 300 lbs N/acre, or by GOLD-N to give 168 or 336 lbs N/acre, all applied at transplanting. The same weight of fruit was picked from all the treatments (Fig. 3) with no difference in quality. This work has particular relevance to tomatoes grown other than under glass, where solution feeding presents even more management problems.

Another application is in the production of plants in small containers for sale through retail outlets. These plants have traditionally been grown with solution fertilizers. Such a plant rapidly depletes its N supply when moved to the retail centers and on to the final buyers. Liquid feeding at the shop is difficult and expensive. GOLD-N when used in the production of such plants, ensures a continuing supply of nitrogen after the plant leaves the grower.

GOLD-N on Grass

During the initial experiments on the sulphur-coated urea formulations, grass was used as the major test crop. By repeated cutting it was possible to measure the recovery of N from the fertilizer and its effect on crop yield. It was also possible to measure the effects of temperature, soil pH, etc., by growing the grass in pots where soil conditions and environment were fairly easily controlled.

This work showed the relative insensitivity of GOLD-N nitrogen release to a change in the environment and thus its high efficiency under glass and in the field. The trials also showed the success that could be obtained with

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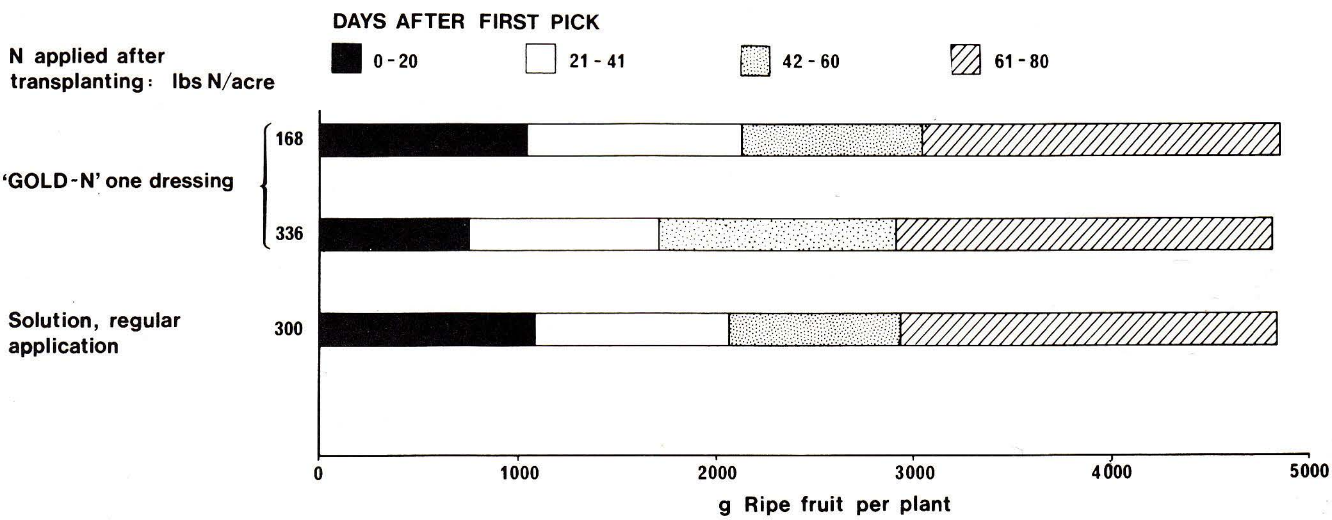
Fig. 3: Yield of tomatoes. Effect of one dressing of GOLD-N compared to ammonium nitrate solution five days per week.



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a 'once a year' application of GOLD-N compared with regular applications of conventional soluble fertilizers.

For example, results from two trials in 1971 (8) showed that not only did a single application of GOLD-N give grass yields equal to those obtained with repeated dressings of soluble fertilizers, but N recovery was greater and there was also evidence that the problem of urea hydrolysis had been overcome by the coating (Fig. 4).

Although these results indicate that GOLD-N would be suitable for general agricultural use, the price premium above conventional fertilizers does not presently make its use universally attractive. While there will always be a cost differential between urea and SCU, recent increases in the cost of urea tend to reduce this differential. Also, in a number of other uses on grass, the cost and availability of labor is more important and this overrides the price differential for GOLD-N. Hence the fertilization of amenity grass on parks, golf fairways, games pitches, etc., has often been neglected because of the need for multiple applications to obtain satisfactory results. The once-a-year application of GOLD-N can overcome the labor problem, and the high efficiency compared with traditional fertilizer mixes containing hoof and horn meal, etc., can result in some substantial savings in material costs. In addition, there has been a reduction in the risk of grass scorch, since only a small part of the nitrogen is available for foliar uptake at the time of application. A further benefit is that the dust-free uniform granule size and hygienic nature of GOLD-N have removed some spreading problems and considerably improved working conditions for operators.

In use on amenity grass the sulphur coating has been beneficial in that many soils have a pH above the opti-

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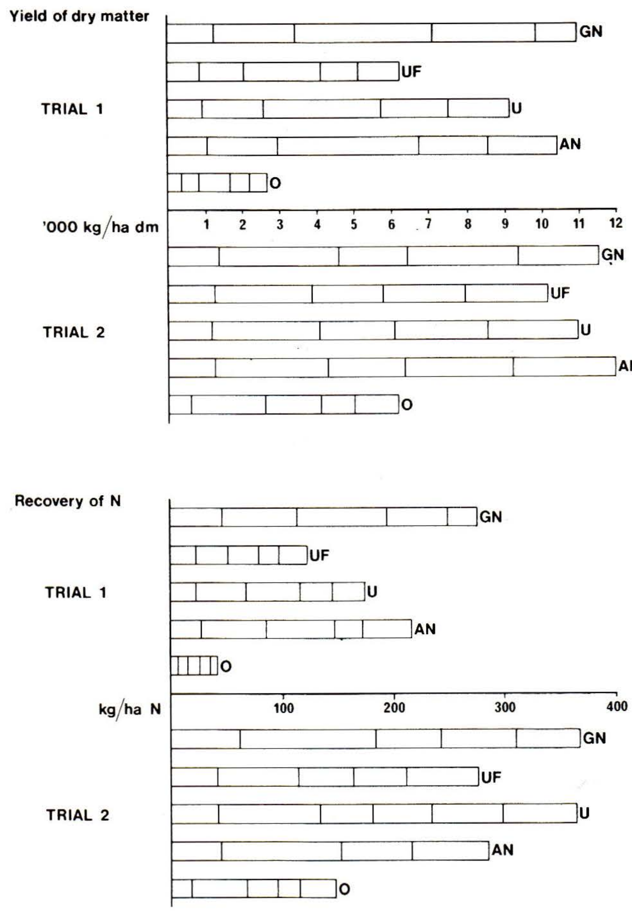
Fig. 4: Comparison of the effect of nitrogen fertilizers on grass yield and N-recovery.



Key:
GN = 'GOLD-N' UF — urea formaldahyde, U = urea.
AN = ammonium nitrate, O = control no nitrogen.
All fertilizers applied at 375 kg N/ha. GN and UF in March only. U and AN in 5 applications of 75 kg N/ha in March, April, May, June and July.

The grass was cut 5 times in the year.

Each segment of a horizontal column gives the yield for one grass cut.

(Continued from Page 15)

mum for fine turf. With time, the sulphur oxidizes and lowers the pH (Table 1). While sulphur deficiencies in Europe so far have not been extensive, with the implementation and extension of "clean air" policies it is probable that sulphur responses will become more common. The sulphur content of SCU would then be an added benefit.

Table 1: Effect of Nitrogen Fertilizers on Soil pH.

Fertilizer Material [1]	Start (1972)	January 1973	January 1974
GOLD-N	6.2	6.2	5.7
Urea-Formaldehyde	6.2	6.2	6.1
Ammonium Nitrate	6.2	6.2	6.1
Urea	6.2	6.2	6.1
Control	6.2	6.2	6.2
LSD 5%			0.22
1%			0.31

[1] 335 lbs N/acre applied in 1972 and again in 1973. GOLD-N and UF applied once a year, ammonium nitrate and urea in four equal applications in March, May, June, and July.

Land Reclamation

It has been stressed that with the slow release of N there is less risk of substantial nitrogen loss due to leaching (16, 17). This property has been exploited in work concerned with reclaiming the spoil heaps associated with past mining and steel making industries. The heaps are composed mainly of aggregates which allow very rapid percolation of water. When the tips were landscaped, the usual practice was to apply several inches of top soil over the surface and seed with grass. This soil helped retain nitrogen. Alternatively, where no soil was used several N applications were required each year until a humus layer was built up.

It has now been shown to be possible to eliminate the expensive work of spreading soil, or the frequent application of N (often by hand because of steep slopes), by a single annual application of GOLD-N (9).

A similar use for GOLD-N appears in the stabilizing of sand dunes where the rapid establishment and spread of a cover crop is essential.

Market Garden Crops

Many valuable food crops grown intensively are susceptible to salt concentrations caused by fertilizer applied before planting. An example of this is the lettuce crop. When lettuce is seeded it is of considerable advantage to be able to "drill to a stand" as this avoids extensive thinning operations. Because of the problem of damage to establishment of the seedling it has been necessary to sow more seed than the number of plants desired. The effect of lowering salt concentration by using GOLD-N has been demonstrated (Table 2). This improvement has application to other crops as well, such as cabbage, cauliflowers and others.

Table 2: Effect of Nitrogen Fertilizers on Establishment of Lettuce.

Fertilizer Material	lbs N/acre	Plants/acre [1]
GOLD-N	84	46,040a
	168	48,460a
	252	39,930ab
Ammonium Nitrate	84	38,800b

Seed drilled Oct. 18, plant count Nov. 17.

[1] Values not followed by the same letter are significant at the 1% level.

Unexpectedly, it was found that lettuce transplanted in November and treated with GOLD-N in December survived the winter better than when treated in the traditional way (no autumn N on fertile soils). These GOLD-N-treated plants were fit for sale earlier, giving the grower an additional benefit (Table 3).

Growers have found benefit and advantages in the use of GOLD-N on heavily irrigated crops such as celery, leeks, marrows, sweet-corn, etc.

Other Uses

Possible advantages for SCU have been reported on crops outside the temperate zones, for example on paddy rice (5, 10). Several research workers and commercial organizations have secured supplies of GOLD-N for trials and use in a wide range of climatic conditions.

The properties of SCU outlined above indicate that this material can be a profitable commercial product and ICI is continuing to explore and exploit applications for GOLD-N.

Table 3: Effects of Nitrogen Fertilizers on Lettuce Survival and Cutting Date.

Fertilizer Material lbs N/acre [1]	Plants/acre surviving Winter	Number of plants cut for sale by		
		May 17	May 24	June 4
GOLD-N 56	38,900	17,100	30,200	36,900
84	38,000	20,300	33,100	36,900
100	39,500	23,200	34,000	38,300
Nitro-Chalk 84	35,100	15,100	27,300	33,700
LSD 5%	2,700	4,900	3,100	NS
1%	3,600	6,600	4,200	NS

[1] GOLD-N applied in December, Nitro-Chalk in March.

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Priorities Given For OSHA Inspection Stops

During the past four months, we have received a number of inquiries concerning: 1) OSHA's inspection priorities ("what are the probabilities of OSHA inspecting my business?") and 2) OSHA's inspection procedures ("if my business is inspected, what can I expect to happen?"). This article and our next article will attempt to answer these questions.

The OSHA Act covers in excess of five million workplaces. Obviously, all of these locations cannot be inspected immediately. The worst situations need attention first, and OSHA's system of inspection priorities has been established accordingly.

Imminent danger situations are given top priority. An imminent danger is any condition where there is reasonable certainty a danger exists that can be expected to cause death or serious physical harm—either immediately or before the danger can be eliminated through normal enforcement procedures.

If a compliance officer finds an imminent danger, he will ask for voluntary abatement of the hazard and removal of endangered employees from the area. If an employer fails to do so then OSHA, through the Regional Solicitor, can go to the nearest Federal District Court to correct the situation.

High priority also is given to investigation of catastrophes, fatalities, and accidents resulting in hospitalization of five or more employees. Such situations must be reported to OSHA within 48 hours. Investigations are made to determine if OSHA standards were violated and to learn how to avoid reoccurrence of similar accidents.

Third priority is given to valid employee complaints of alleged violations of standards or of unsafe or unhealthful work conditions.

Next are OSHA's programs that focus on particular dangers. In its first three years, OSHA conducted the Target Industry Program, which called for frequent inspections of five industries with injury rates that were more than *double* the national average: longshoring, meat and meat products, roofing and sheet metal, lumber and wood products, and manufacture of miscellaneous transportation equipment. In addition, special attention went to trenching and excavation work. Targets for special emphasis now are selected on a regional basis, based on the injury frequencies of local industries. OSHA continues to emphasize the Target Health Hazards Program which focuses on five hazardous substances: asbestos, carbon monoxide, cotton dust, lead, and silica. These were selected because of broad employee exposure and severity of danger.

OSHA's fifth inspection priority are random inspections, and these inspections are conducted in establishments of all sizes and types, in all parts of the country.

Finally, establishments cited for alleged serious violations are reinspected to determine whether the problems have been corrected.

University of Massachusetts Turfgrass Research Fund

We would like to take this opportunity to thank the following for their generous contribution to the Massachusetts Turf and Lawn Grass Council and apologize to those we have failed to mention.

Research Contributions—Nov. 26, 1975 - Jan. 12, 1976

Belmont CC, Belmont MA	$100.00
Oyster Harbors Club, Inc., Oyster Harbors, MA	$100.00
Country Club of Wilbraham Wilbraham, MA	$ 50.00
The Magovern Co., Inc. Windsor Locks, CT	$400.00
Hemlock Ridge GC, Fiskdale, MA	$ 50.00
Whitinsville GC, Whitinsville, MA	$ 50.00
Winchester CC, Winchester, MA	$100.00

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MASSACHUSETTS TURF AND LAWN GRASS COUNCIL INCORPORATED

RFD #2, HADLEY, MASS. 01035

Join Your Massachusetts Turf and Lawn Grass Council

For more information write:

Mass. Turf and Lawn Grass Council

attn.: Dr. Joseph Troll

RFD #2, Hadley, Mass., 01035

The Massachusetts Turf and Lawn Grass Council is a non-profit corporation. Its officer derive no benefits except the satisfaction of keeping Massachusetts and its neighbors first in turf. It was founded on the principle of "Better Turf Through Research and Education." We must support our University to accomplish this, and we can with a large and strong Turf Council.

Membership is not restricted to Massachusetts residents or turf professionals alone, all are welcome to take part. Write today.