Turfgrass Retardation With Chemicals

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D. M. Elkins, associate professor, and Ted Kitowski, graduate assistant, compare Kentucky bluegrass sprayed with a growth retardant (right) and an untreated control.

THE USE of chemical growth retardants on turfgrasses offers a number of exciting possibilities in the not too distant future. These chemicals could be used widely for both agricultural and non-agricultural purposes. Good chemical growth retardation of grasses have these possibilities:

(a) roadbank stablization of long stretches of the interstate highway system — good chemicals have the potential to reduce overall costs of maintenance, making widespread use of retardants feasible
(b) retardation of grass growth in parks and recreation areas, "short roughs on golf courses, and vegetation on grounds of industrial plants, airfields, cemeteries and similar areas
(c) reduction of grass growth in lawns of homeowners — this would be useful throughout the peak periods of grass growth, but would be a particular asset when the home-

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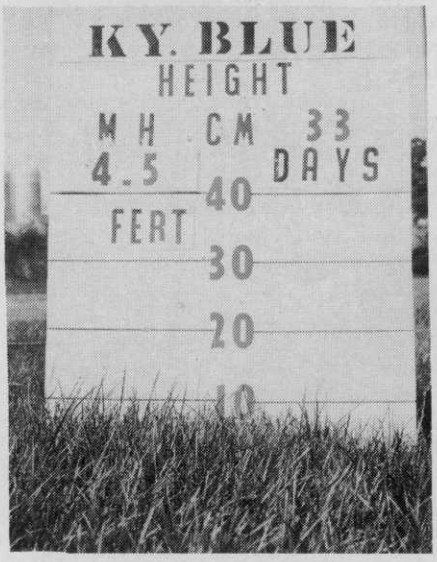
Table 1. Height of Kentucky bluegrass,[1] color ratings, and dry matter yield as influenced by growth retardant treatments.

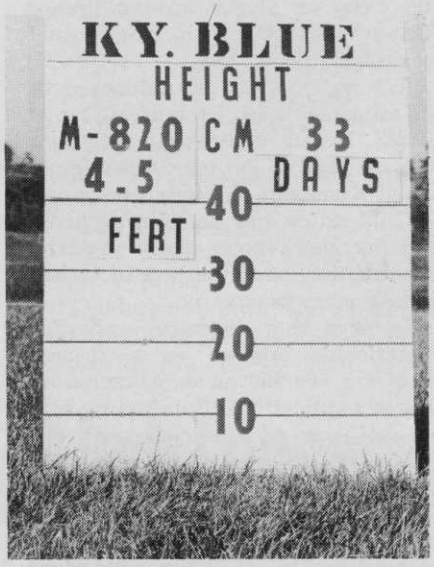
Treatment	Rate (lb/A)	Grass Height (cm) No. Days After Treatment 14	28	42	Color Rating[2] 19	49	Dry Matter Yield g/44 sq. ft. 33
Untreated control	———	9.4	10.3	11.8	9	9	363
MON-820[3]	1	6.5	7.0	9.0	8	8.5	168
MON-820	2	6.0	6.1	6.8	7	7	125
MON-820	3	6.1	6.0	7.1	7	8	137
MON-820	4	6.5	6.0	7.2	7.5	7	132
Slo-Gro[4]	1	8.2	8.9	10.2	8.5	8.5	304
Slo-Gro	2	8.2	8.4	9.9	8	8	256
Slo-Gro	3	7.3	7.4	9.5	8	8	237
Slo-Gro	4	7.9	7.4	9.4	8	8	218

[1] Low nitrogen level plots, Adequate P and K supplied but no N applied during growing season
[2] 0 = dead, 10 — best color
[3] Experimental compounds from Monsanto Company
[4] Maleic hydrazide formulation manufactured by Uniroyal Chemical

Untreated control plot of Kentucky bluegrass. The three photos here were taken 33 days after grass was mowed to an initial height of 5 cm and sprayed.



Plot sprayed with 4 lbs./A of Slo-Gro, a maleic hydrazide formulation.



Plot sprayed with 4 lbs./A of MON-820, an experimental chemical.

Tall fescue treated with three experimental growth retardants compared to an untreated control. All grass was clipped to a height of 3 inches before spraying with a 4 lbs./A rate of MON-814, MON-820, or MON-845. Picture was taken 43 days after clipping and spraying.

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owner is away for extended periods.

The discovery and use of growth regulating chemicals began in the years following 1935. One of the first growth-retarding chemicals tested on grasses was maleic hydrazide. MH-30, a maleic hydrazide formulation, first was tested for grass growth control about 1949, at which time it was found to be effective. At that time the public was not ready to accept chemical retardation of grass growth to a large extent. However, in recent years the increase in motor travel and interstate highway systems has greatly changed the roadside vegetation maintenance picture. Improved highways require better maintenance and make the development of better grass-retarding chemicals and their widescale adoption distinct possibilities. Several companies presently are developing and evaluating a host of grass growth retardants.

Chemical retardation of grass growth can offer these advantages:

(a) reduce cost of maintaining grasses used for roadbank stablization by increasing the savings on equipment and reducing the number of man-hours spent on mowing and trimming — much of the danger involved in mowing steep areas could be removed
(b) reduce formation of undesirable seedheads
(c) reduce drought injury and increase resistance of grass to adverse environmental conditions because of the dormant-like condition of treated grass
(d) possibly enhance grass color

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Table 2. Height of tall fescue, color ratings, and dry matter yield as influenced by growth retardant treatments.

Treatment	Rate (lb/A)	Grass Height (cm) No. Days After Treatment 14	28	42	Color Rating[1] No. Days After Treatment 19	42	Dry Matter Yield g/75 sq. ft. 28
Untreated control	———	13.8	15.2	16.5	10	10	433
MON-820[2]	1	8.2	8.9	13.8	8	9	91
MON-820	2	7.7	7.2	10.9	7	7	64
MON-820	3	6.9	7.1	9.6	6	6	46
MON-820	4	7.0	7.2	9.2	6	5	64
MON-845	2	8.5	7.8	11.7	7	8.5	52
MON-845	4	7.2	7.2	9.5	7	7	48
MON-845	8	6.8	6.5	9.2	5	4.5	45
Slo-Gro[3]	1	9.9	10.0	11.6	8.5	7.5	91
Slo-Gro	2	9.6	9.7	10.4	8	5	92
Slo-Gro	3	9.8	9.6	10.0	8	2	94
Slo-Gro	4	9.8	7.9	9.9	8	1	109

[1] 0 = dead, 10 — best color
[2] Experimental compounds from Monsanto Company
[3] Maleic hydrazide formulation manufactured by Uniroyal Chemical

The plot above was sprayed with 4 lbs./A of MON-820. The plot on the right is an untreated check. Note the difference in grass height after only 8 days. Initial height at start of test was 5 cm.

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with properly adjusted chemical rates — some chemical treatments have resulted in the development of a more attractive dark green color.

In greenhouse studies with grasses in pots and in field studies at Southern Illinois University, the effectiveness of several rates and combinations of 19 different growth retardants in reducing above-ground vegetative growth was evaluated. Included in the test were tall fescue, several varieties of Kentucky bluegrass, zoysia, bermuda, perennial ryegrass, and several grass mixtures. Pot studies were used for screening a large number of chemicals and rates and for selecting the more promising ones for field trials. Prior to spraying, grasses in pots were clipped to a uniform height. All pots were placed at random to receive one treatment within a measured area for spraying. Effectiveness of chemical retardation was measured by means of weekly height measurements and periodic color ratings. In field studies, we took similar measurements but also harvested a portion of each plot in order to calculate dry matter yield as a quantitative measure of chemical retardation.

Growth retardants that have looked most promising in greenhouse and field trials with tall fescue, Kentucky bluegrass, and other turf species have been MON-820

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Table 3. Height of Kentucky bluegrass[1], color ratings, and dry matter yield as influenced by growth retardant treatments.

Treatment	Rate (lb/A)	Grass Height (cm) No. Days After Treatment 14	28	42	Color Rating[2] No. Days After Treatment 19	49	Dry Matter Yield g/44 sq. ft. 33
Untreated control	———	10.3	14.8	16.4	10	10	668
MON-820[3]	1	6.5	8.1	13.2	7	9.5	282
MON-820	2	5.9	6.1	9.1	6	9	158
MON-820	3	6.0	6.1	9.0	6	9	165
MON-820	4	6.4	6.0	9.0	6.5	8.5	148
Slo-Gro[4]	1	9.4	12.7	15.5	9	10	560
Slo-Gro	2	8.5	11.5	13.9	8	9.5	467
Slo-Gro	3	8.3	10.3	13.0	8	9	376
Slo-Gro	4	8.7	9.5	13.4	7.5	9	343

[1] High nitrogen level plots. Adequate P and K were supplied as well as application of 2 lb. N/1000 sq. ft. at beginning of experiment.
[2] 0 = dead, 10 = best color
[3] Experimental compounds from Monsanto Company
[4] Maleic hydrazide formulation manufactured by Uniroyal Chemical

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and MON-845, experimental compounds from Monsanto Company; and Slo-Gro, a maleic hydrazide formulation manufactured by Uniroyal Company. In addition, MBR 6033 from the 3M Company and Maintain CF-124 from U. S. Borax Corporation have looked very promising in greenhouse trials. Field evaluations of these chemicals will be conducted in 1972.

Mon-820 has looked especially promising in retarding grass growth for six weeks or longer without much color loss. At rates of 1, 2, 3, or 4 lb/A it has given consistently better tall fescue and Kentucky bluegrass retardation over a 42-day period than Slo-Gro, which is currently available for use on roadbank vegetation in some areas. Some color loss became evident with higher rates of all chemical treatments. At no time during the study did lower rates of the MON chemicals affect color greatly. No rate of Slo-Gro affected color significantly in the early growth, but tall fescue color loss was very severe, particularly with higher rates, about five weeks into the trial. Kentucky bluegrass was not affected as severely by Slo-Gro treatments. Color maintenance was not affected as severely by Slo-

Table 4. Height of several grass varieties and species as influenced by treatment with the growth retardant MON-820.

Variety and Species	MON-820 Rate (1b/A)	Grass Height (cm) at 8 Days After Treatment
Common Kentucky Bluegrass	2	7.2
	4	7.3
	Control	14.2
Merion Kentucky Bluegrass	2	7.8
	4	6.9
	Control	12.4
Pennstar Kentucky Bluegrass	2	7.9
	4	7.2
	Control	11.1
Prato Kentucky Bluegrass	2	8.0
	4	7.4
	Control	13.0
Newport 25% / Merion 50% / Park 25% } Kentucky Bluegrass	2	7.5
	4	7.0
	Control	11.7
N-7-16 Kentucky Bluegrass	2	7.5
	4	7.3
	Control	13.3
Fylking Kentucky Bluegrass	2	8.0
	4	7.7
	Control	11.7
Red Fescue 50% Common Kentucky Bluegrass 50%	2	8.7
	4	7.9
	Control	13.2
Perennial Ryegrass	2	8.6
	4	7.4
	Control	13.2
Perennial Ryegrass 50% Common Kentucky Bluegrass 50%	2	7.9
	4	7.2
	Control	12.4
Kentucky 31 Tall Fescue	2	7.5
	4	7.2
	Control	13.2
Common Bermuda	2	7.1
	4	6.7
	Control	10.7
U-3 Bermuda	2	5.6
	4	7.0
	Control	8.4
Tiffine Bermuda	2	5.5
	4	5.4
	Control	7.3
Kentucky 31 Tall Fescue 50% Common Kentucky Bluegrass 50%	2	7.6
	4	7.4
	Control	13.8
Meyer Zoysia	4	5.7
	Control	7.0
Midwest Zoysia	2	6.1
	4	6.2
	Control	9.1

Gro than with MON compounds on Kentucky bluegrass throughout the test and with tall fescue for a few weeks, but Slo-Gro was greatly inferior on tall fescue after five weeks.

All MON-820 treatments — 1, 2, 3, and 4 lb/A — gave greater retardation than the same rates of Slo-Gro on both N-fertilized and N-unfertilized Kentucky bluegrass plots over a 42-day period. Differences between treated and control plots were greatest when all plots had been fertilized with 2 lb N/1000 sq. ft. This N application brought about a greater color loss with the MON compounds than with Slo-Gro early in the experiment, but these effects did not last throughout the duration of the experimental period.

Dry matter yields of tall fescue and Kentucky bluegrass from MON-820 and MON-845 plots were generally lower than yields from Slo-Gro plots at comparable chemical rates, which indicates better growth retardation. In most instances, yields from MON plots averaged only one-fourth to one-seventh the yield of the untreated controls.

MON-820 treatments resulted in significant retardation of common, Merion, Pennstar, Prato, N-7-16, and Fylking Kentucky bluegrass; common, U-3, and Tiffine bermuda; Meyer and Midwest zoysia, and mixtures of Kentucky bluegrass with red fescue, perennial ryegrass, or tall fescue.

Based on our results with 19 growth retardants, we believe that chemical growth retardation of grasses has a great potential and a great future.

Literature on Chinch Bug Available From Stauffer

Literature about Chinch bug control with Aspon insecticide is now available from Stauffer Chemical Company.

A new brochure tells how to detect these pests in turf and specifies control procedures.

According to Stauffer, Aspon is recommended by leading turf experts and has been successfully used by home owners, golf course superintendents and commercial lawn care specialists with outstanding results. The product, Stauffer says, is one of least hazardous materials available for chinch bug control and in most instances only one application is needed per season.

A special section lists suggested application rates. For more details, circle (725) on the reader reply card.

U.K. Forestry Plantations Adopt Shell Prefix

Forestry plantations of the United Kingdom have adopted Shell Prefix herbicide. The official approval follows extensive field trials on Prefix granular formulation containing 7½% of the active ingredient.

The trials demonstrated Prefix as an efficient and economically attractive forestry herbicide, with cost savings arising from a smaller labor requirement and improved manpower utilization compared to other methods of weed control.

The first application of Prefix is recommended at a rate of 50 lbs. of granules per treated acre applied as a 3 ft. band over the trees.

Prefix is applied by means of the specifically developed machine, the Horstine Farmery Air Flow Granular Applicator, which ensures accurate and rapid placement either as a 3 ft. continuous band over the trees or, as a spot treatment over and around individual trees. The Applicator will treat an average of 5 acres per man day.