

of roots in grams, harvested from a 4 inch plug after 8 weeks growth was:

Cutting Treatment	Temperature in °F			
	60°	70°	80°	90°
	gms.	gms.	gms.	gms.
Uncut	6.43	4.52	1.78	0.55
Cut	0.19	0.09	0.04	0.03

Results indicated that as the temperature was raised, the weight of roots in terms of the organic component was reduced very noticeably.

In another test using the root boxes, eight weekly foliar applications of materials, including glucose, fructose and vitamin B1 were applied. Under those limited test conditions there was no consistent increase in root activity.

To supplement those results, tests were placed under more natural conditions on the experimental putting green at Purdue University. Three root observation boxes were constructed into the putting green in late March. The boxes were 18" deep and had a slanting glass side which allowed close observation of the root development and deterioration under undisturbed conditions. Root color ratings were taken three times weekly. Because of unusually wet summer weather, the initiation of new roots from the surface had been observed twice last summer. Also, two core samples 15" deep were taken three times weekly. Actual root counts at depths of 2", 5", 10" and 15" were made on those plugs.

To measure the effect of summertime temperatures, micro-climatic techniques were used. A 60-point continuous potentiometer recorder was used to record soil temperatures at seven depths in two

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replications, plus air temperature at three heights and relative humidity. Thermocouples were inserted at the following depths: surface mat, 1/2", 1 1/2", 3", 6", 12" and 18". Air temperatures were taken at 1", 12" and 36" heights.

Besides those parameters, cooperative studies with Mr. Ed Jordan, graduate assistant, were designed to measure the following parameters: soil moisture at 1", 2", 4" and 6" depths, light intensity in accumulated units per day, plus total yield, reducing sugars, fructose, N, P and K in clippings from plots receiving six levels of nitrogen feeding.

All of this data was entered on IBM punched cards. The simple and multiple correlations and regressions will be run to find some of the relationships and their importance in creeping bentgrass performance.

H. Burton Musser Advances Turfgrass Management

By **CHARLES K. HALLOWELL**
Mid-Atlantic Director, USGA Green Section

On June 30 Dr. H. Burton Musser retired as Professor of Agronomy, College of Agriculture, Pennsylvania State University, thus concluding thirty years of continuous service to turfgrass studies.

Those who have known "Burt" Musser throughout much of his career find it difficult—if not impossible—to conceive of his actually retiring. Undoubtedly, he will find many ways to put his knowledge, experience and judgment to work. Yet this "stepping down," as he has put

it, does present an appropriate opportunity to evaluate his contributions to turfgrass.

The contributions which H. Burton Musser has made to turfgrass are many indeed. A list of them prepared recently included:

1. Isolated by systematic selection and breeding; (a) Pennlawn creeping red fescue, (b) Pennlu creeping bentgrass (veg. strain) and (c) Penn-

cross creeping bentgrass (Syn-O seed strain).

2. Conducted tests over a ten year period to determine relative value of various nitrogenous fertilizers for use on special purpose turf. (Solubles, natural organics and synthetics, as urea-formaldehyde.)

3. Studied weed control in special purpose turf. He was among the first to recognize and advocate mixtures of 2,4-D with fertilizer for simplicity and effectiveness, and standardized rates of application of potassium cyanate for crabgrass control.

4. Determined adaptability of Penn-gift crown vetch for slope control on highways and similar areas.

5. Developed the burning method of control of silver top problem in seed production of Kentucky bluegrass and red fescues.

6. Established and maintained breeders seed source nursery for Merion Kentucky bluegrass.

7. Determined the differential effects of various nitrogen-potassium ratios on growth and disease on turf-grasses.

Valuable though each of these is, the most important contribution which Professor Musser has made is in the area of training turfgrass personnel. Above all others, this contribution will have an ever increasing effect for years to come.

It was because of his interest in adding to the knowledge of turfgrass personnel, that he consented to write "Turf Management" for the United States Golf Association. Almost at once, after "Turf Management" was published in 1950, it became the accepted standard.

When asked at the National Turfgrass Conference in 1957 what, in his opinion, was the most serious turfgrass problem, his firm answer was, "Lack of trained personnel!"

Long before 1957, however, Professor Musser was doing far more than talking and writing about the problem. He was acting.

More than ten years ago, through his instigation, Penn State began awarding advanced degrees to men who majored in turfgrass management. James R. Watson, recipient of the first fellowship of

the USGA Green Section, was awarded his Ph.D. in 1950.

One test of a teacher's skill is his ability to train someone to take his own position. Professor Musser has passed this test, as he has many others, with flying colors. On July 1, J. M. Duich, Ph.D., became Professor of Agronomy in Penn State's Department of Agriculture.

The Penn State Winter Short Course, which Professor Musser inaugurated so that personnel could be trained at a time when they could be spared from their golf courses, graduated eighteen students in March of this year.

How fitting it was that Professor Musser was given a testimonial dinner during the 28th Annual Penn State Turfgrass Conference in February!

Joe Valentine of Merion Golf Club spoke for all present when he said, "The turf program you have conducted at Penn State is appreciated not only in Pennsylvania but throughout the United States." The plaque which Paul Weiss presented for the Golf Course Superintendents Association of America was aptly inscribed: "In recognition of your contribution to better turf for golf."

At the banquet, the guest of honor was presented with gifts of all sorts, including a sizable check. But probably nothing will please him more through the years to come than the two thick albums of letters written by his friends throughout the country, and presented by the chairman of the banquet committee, Tom Mascaro. For, in his thirty years on the job, Burt Musser has made more than progress—he has made friends.

A solid record of worthwhile achievements. A long list of devoted friends. What man, upon "stepping down," could wish for more?

TURF MANAGEMENT

The book "Turf Management," sponsored by the United States Golf Association and edited by Prof. H. B. Musser, is a complete and authoritative guide in the practical development of golf-course turfs.

This 354-page volume is available through the USGA, 40 East 38th Street, New York 16, N. Y., the USGA Green Section Regional Offices, the McGraw-Hill Book Co., 350 West 42nd Street, New York 36, N. Y., or local bookstores. The cost is \$7.