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BEARD

(Continued from page 19)

number of stomata to seriously restrict the photosynthetic process.

A significant reduction in shoot growth was evident at the higher PMA concentration used in the study. The authors indicate that this is a direct phytotoxicity to the leaf tissue rather than the indirect affect of growth reduction caused by a restriction in the photosynthetic process. A small reduction in photosynthesis caused by a restriction in carbon dioxide movement into the leaf would not be critical in high quality turfs as long as sufficient carbohydrates are being synthesized to maintain the existing tissues and to provide an adequate recuperative potential. Thus, a certain amount of shoot growth reduction is not objectionable since it will reduce the mowing requirement and frequency of irrigation.

A potentially more serious problem associated with the use of a stomatal-closing antitranspirant is the possible loss of the vital cooling process of the leaf which will result from a reduction in transpiration. The transpirational process is a vital cooling mechanism in turfgrass leaves during periods of heat stress. If PMA should close sufficient stomata to seriously impair the leaf cooling process associated with transpiration, leaf temperatures can increase to potentially injurious levels quite rapidly. Studies concerning this potential disadvantage associated with the use of stomatal-closing antitranspirants are lacking. Thus just how important such a factor is is not known at this time. It is likely that a sufficiently low concentration of PMA could be used which would provide a significant reduction in the rate of water loss and yet not seriously restrict the transpirational cooling mechanism. However, the specific rates of PMA application at which is achieved cannot be determined by the available data.

The duration of effectiveness of an antitranspirant and the resultant

(Continued on page 24)

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Write for specific information about A-20 Bluegrass and Warren's stolons.



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24 • GOLFDOM/1970 JUNE

BEARD

(Continued from page 22)

frequency of application is determined by the (a) frequency of mowing, (b) amount of shoot growth produced, (c) environmental conditions and (d) efficiency of the chemical used. Further study is also needed in this area. The effectiveness of antitranspirants could vary from as little as a few days to several weeks, depending on the specific conditions.

In summary, the use of stomatal-closing antitranspirants is a promising new idea for modifying certain detrimental physiological processes in the turfgrass plant. However, before it can be utilized with maximum effectiveness further research must be conducted on a number of aspects related to its use, rate of application, method of application and frequency of application, particularly as related to potentially detrimental affects. Possibly, the use of antitranspirants on turfgrasses will become another valuable cultural practice available for use in maintaining high quality turfgrasses.

Growth and carbohydrate storage of three Poa pratensis L. strains as influenced by temperature.

V. B. Youngner and F. J. Nudge.
1968. *Crop Science*. 8:455-457.
(from the Department of Agronomy, University of California at Riverside, Riverside, Calif.)

The objective of this study was to investigate the effect of temperature on the shoot density and total available carbohydrate content of shoot bases of three varieties of Kentucky bluegrass: (a) Merion, (b) 0217 Fylking and (c) Newport. The data was collected after growing eight weeks at a given temperature regime and maintained at a cutting height of 1.6 inches.

Distinct differences were evident among the three Kentucky bluegrass varieties in terms of temperature effects. Merion and

(Continued on page 26)

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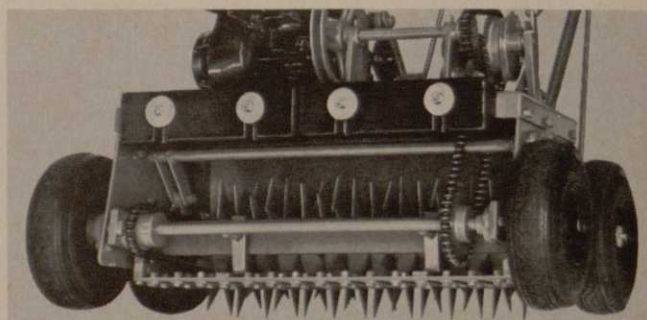
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BEARD

(Continued from page 24)

0217 had significantly higher shoot densities than Newport at high temperatures. Newport produced a higher shoot density at lower temperatures. At any one temperature treatment, the 0217 had a significantly higher shoot density than Merion or Newport.

The total available carbohydrate content found in the base of turfgrass shoots was significantly lower for Newport at any given temperature than for either Merion or 0217. This investigation also showed that the lowest level of total available carbohydrates occurred at the temperature which resulted in the greatest amount of shoot growth.

Comments: The results of this study indicate that Newport is better adapted to cooler temperatures, whereas Merion and 0217 Fylking are better adapted to warmer conditions as measured by the shoot density and level of reserve carbohydrates. The results of this paper suggest one factor which may contribute to the better adaptation of Merion to warmer climates in comparison to other Kentucky bluegrass varieties. It also suggests that 0217 Fylking may produce a similar response.

The measurement of total available carbohydrates in turfgrass tissues is an important indicator of the overall vigor, rooting depth and recuperative potential of the plant. Turfmen should attempt to develop cultural practices which will maintain a medium to high level of carbohydrate reserves at all times. In this paper the lowest carbohydrate level occurred at the highest rate of shoot growth. Other factors which tend to deplete the carbohydrate reserve are (a) an excessively high nitrogen fertility level or (b) severe defoliation of the shoots, due to either an excessively close cutting height or an excessively long interval between mowings.

More studies of this type are badly needed in order to obtain a more detailed understanding of the proper adaptation and use of the turfgrass varieties currently available. In the past most studies have been devoted to comparisons between species such as bentgrass and bluegrass. With the increased number of researchers working in the turfgrass area more effort will go into the responses of varieties within a species. □

Other papers of interest:

1. *Measuring rooting of sodded turfs.* J.W. King and J.B. Beard. 1969. *Agronomy Journal*. 61(4): 497-498. (from the Department of Crop and Soil Sciences Michigan State University, East Lansing, Mich. 48823.)

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by Fred V. Grau

ANSWERS TO TURF QUESTIONS

Still hope for real grass

Something quite unusual happened at the 1970 Penn State Turfgrass Conference. Dr. Joseph Duich, leader of turfgrass research and resident teaching, was handed a check for \$1,800 during post-banquet ceremonies. Money for continuing research and teaching in itself is not unusual. The significant fact is that the money came from 55 turfgrass winter course students who had finished their course work and have become golf course superintendents in 16 states and Canada during the past 11 years.

Frank Dobie, Sharon Club, Akron, Ohio, and Tom Burrowes, The Playboy Club, Lake Geneva, Wis., took the lead in soliciting funds from fellow graduates. "We wanted to show our appreciation for the great start we were given in turfgrass work," they said. Also, "We hope to make this an annual contribution."

Here, then, is the new breed of golf course superintendent. They have a fresh, forward outlook, bridging the gap between the "old-timers" who had no chance at a formal education and the new generation who think for themselves. These young men accept their responsibilities as a challenge, not a chore. True, the job gets tougher

every year and mistakes will be made, but the same mistakes very likely will not be made a third time. These alert thinking young men will figure out a way to do the job better—not try to find an easy way out.

In their course work these men were not given all the answers. They were taught to evaluate problems for discovering the answers. We believe that with a continuing program like the one started by Dobie and Burrowes, turf students in the field in commanding positions will help to motivate further those who soon will be on the firing line. If each graduate elects to make a substantial annual contribution, the benefits would be incalculable. The turfgrass world would then have greater assurance that qualified superintendents and turfgrass managers would carry on the work of giving everyone beautiful real grass for everyone's benefit and enjoyment.

Q.—We were planning to attend the Turfgrass Field Day at Penn State last fall and also participate in the dedication of the Joseph Valentine Turfgrass Research Center. Both were canceled rather abruptly. Are there any plans for the future for dedicating the Valentine Memorial?

(New Jersey)

*A.—*At the most recent meeting of the Valentine Memorial committee (Steiniger, Duich, Mascaro, Shuman, Miller, Grau) at Pine Valley GC on November 7th, it was decided to plan the Memorial Exercises and Dedication for Wednesday to Thursday, June 24 to 25, 1970. There will be an abbreviated Spring Turfgrass Field Day also. Mark your calendar and plan to attend. Those who cannot attend may receive a souvenir Valentine Memorial program by requesting one from Valentine Memorial, Box 324, State College, Pennsylvania 16801. Contributions are not being actively solicited, but will be accepted. □

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