by Dr. James B. Beard

TURFGRASS RESEARCH REVIEW

Controls of potentially serious pests

Changes in billbug and chafer controls. *H. Tashiro and K.E. Personius. 1970. New York Turfgrass Assn. Bulletin 86. pp. 333-336. (from the New York State Agricultural Experiment Station, Geneva and the Monroe County Cooperative Extension Assn., Rochester, New York, respectively).*

The authors investigated the habits and control of the bluegrass billbug and European chafer over a period of two years. These two insects have become major turfgrass pests in the Rochester, N.Y., area during the last three years.

Bluegrass billbug damage to Kentucky bluegrass turfs was severe during 1969. The adults were particularly active during the latter part of June with feeding punctures evident on approximately 20 per cent of the Kentucky bluegrass stems examined. The overwintering adults lay their eggs in early June. Larvae of the new generation appear in the soil by the last week in June.

The bluegrass billbug control studies involved an evaluation of (a) various types of insecticides and (b) the proper timing of insecticide applications for most effective control. Insecticides evaluated included Baygon, carbaryl, diazinon and Dursban. Effective control of the bluegrass billbug was obtained with all four insecticides. Rate of application studies revealed that adequate control could be achieved with one ounce of active ingredient per 1,000 square feet of Baygon and diazinon or 1.5 ounces of carbaryl per 1,000 square feet.

Proper timing of the insecticide applications was particularly important in achieving effective control of the bluegrass billbug. A general guideline proposed by the authors is that an insecticide should be applied when 10 to 15 adult bluegrass billbugs can be collected on a hard surface area during a five minute period of warm, sunny weather. Best control was achieved during the peak activity period of the overwintering adults. This occurred during late June and early July under Rochester conditions. An annual insecticide application made in mid-June gave season-long insect control.

Historically, an application of chlordane, dieldrin or heptachlor applied once every four to six years provided adequate European chafer control. The recent ineffectiveness of these insecticides in controlling this insect resulted in the discovery of a European chafer strain which was highly resistant to the standard soil insecticides. Insecticide studies similar to those conducted on the bluegrass billbug revealed that both diazinon and Dursban provided adequate control of the resistant European chafer strain. On the other hand, carbaryl was not consistent in providing adequate control, primarily because of the critical timing required. Baygon did not provide acceptable control.

The adult European chafer is in peak flight activity during late June and early July. Egg hatching occurs primarily during late July and early August. The hatching period and very young, first instar stage are the most desirable times for control measures to be practiced.

The authors indicated that where both the bluegrass billbug and resistant European chafer strain are a problem, the insecticide used should possess some residual activity for controlling both turfgrass pests in a single application. Diazinon is quite effective whereas carbaryl lacks sufficient residual activity. The authors predict that damage to Kentucky bluegrass turfs caused by the bluegrass billbug and the resistant European chafer strain will spread to other areas.

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Comments: The bluegrass billbug and European chafer have not been as serious a problem on bluegrass turfs as other "grub type" insects, such as the June beetle and Japanese beetle. However, they have become a serious problem on turfs in certain areas and may become a more widespread reoccurring problem.

The bluegrass billbug is a hard-shelled beetle and has a long snout or bill with a set of chewing mouth parts at the tip. The larvae are legless, 0.4 to 0.7 inch long and white with a yellowish-brown to reddish-brown head. The billbug larvae feed primarily on the roots and rhizomes of the grass plant whereas the adult feeds on grass stems near the soil surface. Punctures of the stem and crown are commonly observed. The larvae may also burrow directly into the stem. Visible injury appears as irregularly shaped, brown patches. This insect prefers moist areas.

The European chafer damages turfs primarily as a result of the root and rhizome feeding of the larvae. The adult beetle causes little damage because of its minimal feeding activity. This insect has a one year life cycle. The adults are approximately 0.5 inch long and have a light-tan to chocolate-brown color. The adults are characterized by a distinctive buzzing noise during active flight in June and July. Injury to turfs generally appears as irregularly shaped brown patches. A more detailed examination reveals the lack of a root system.

Most professional turfmen are probably not as acquainted with these two turfgrass insects as with some of the more commonly occurring species. However, these two insects can cause severe damage to turfs and may become a more widespread problem in the future. Each professional turfman, particularly in the Northeast and Midwest, should become acquainted with these two turfgrass insect pests so that he can readily identify them and take immediate corrective procedures before serious damage to turfs occurs.

The effect of two preemergence herbicides on the rooting and establishment of 'Tifgreen' and 'Tifway' bermudagrass. *M. T. Ayer. 1970. Proceedings of the Florida Turfgrass Management Confer-*

(Continued on page 25)

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ence. 18:106-108. (from the Department of Ornamental Horticulture, University of Florida, Gainesville, Fla. 32603).

The objective of this study was to determine the effect of two preemergence herbicides on the root and shoot establishment of bermudagrass. The herbicides used were: (a) granular bensulide applied at 15 and 30 pounds of active ingredient per acre, (b) granular benefin applied at three and six pounds of active ingredient per acre, and (c) an untreated check. The granular herbicides were mixed with 25 grams of dry soil and spread over the surface of the soil. The herbicides were applied to two bermudagrass (*Cynodon* sp.) cultivars: (a) Tifgreen and (b) Tifway. Two six-inch bermudagrass stolons of comparable uniformity were established in large pots, 15 inches in diameter and six inches deep.

The treatments were arranged in a randomized block design with four replications. The data taken included a visual rating of per cent vegetative cover made 35 days after planting. Clippings were collected at 10 day intervals from the 30th through 60th day. The experiment was terminated 75 days after planting, the soil washed from the root system in the pots, and measurements made of root depth, density and total dry weight.

The results showed no detrimental effect on the shoot growth of Tifgreen and Tifway bermudagrass from the application of benefin and bensulide at two rates. In contrast, significant root damage was observed on Tifway from both herbicides, each applied at two rates. The root system of Tifgreen bermudagrass was also damaged by both rates of bensulide and the higher rate of benefin. Thus, a varietal difference in preemergence herbicide tolerance was noted within the bermudagrass species.

Comments: Benefin and bensulide have been effective in controlling annual bluegrass (*Poa annua*) in bermudagrass turfs. Both herbicides are recommended for use on established turfs only. No phytotoxicity was visually apparent in studies with established turfs where shoot density and turfgrass quality were the primary criteria. This establishment study suggests that these two turfgrass herbicides can be potentially harmful to the root system of bermudagrass, particularly at the higher rates.

Recent research indicates that a number of herbicides can cause serious damage to the meristematic areas of the root system. Should this occur, there is usually no visible evidence in terms of immediate effects on above ground turfgrass quality. However, should the turf be subjected to stress conditions, particularly moisture stress or intense traffic, the proneness of the turf to serious damage would be increased substantially. In addition, the recuperative potential is decreased.

In the past, the urgent need for effective herbicides to control some of the serious turfgrass weeds limited selectivity evaluations primarily to above ground visual observations. This situation is changing with the increase in turfgrass research among the state agricultural experiment stations. More detailed, long term studies are revealing some of the subtle, less easily measured effects such as root phytotoxicity. No doubt future evaluations of turfgrass herbicide selectivity will involve a more comprehensive characterization. □

by Fred V. Grau

ANSWERS TO TURF QUESTIONS

Fighting the artificial turf invasion

Real turf is facing a challenge from the installation of synthetic carpets that try to imitate the real thing. In some respects it is an improvement over the poorer examples of real turf; in other respects the qualities of the best real turf can never be equaled by any artificial covering.

Many failures in providing acceptable real turf stem from the fact that the caretaker of the installation was never trained to understand the needs of real grass. Supervisory personnel often failed to provide adequate quantities of the essential materials. Once in the past I recommended the best fertilizer program I knew for the main playing field at a major university. The director of athletics vetoed the program and bought the cheapest fertilizer he could find and severely burned the grass so that it could not recover in time for the season's schedule. This kind of interference has hastened the installation of artificial turf. In this case, the needs of the turf were ignored in the interests of saving a few dollars. The turf that season went to pieces and was the cause of much player dissatisfaction. For the most part, the field was mud instead of clean grass.

Clean uniforms seem to be a plus for artificial turf, especially on color television. True it costs less in cleaning bills, but with all factors under control, real turf need be no dirtier than fake turf. There will be grass stains, of course, but there will be no infected brush burns that come from the imitation turf. Excellent real turf can be grown on sandy soil which does not churn into a giant mud pie when wet because excess water quickly drains through the soil. Our failing has come from our inability to sell the coaches and the administration on providing the money to build the field properly the first time. But, when the fake stuff is installed, the money somehow miraculously appears. Some artificial installations have materialized because agronomists and coaches failed to agree or even talk the same language.

High temperature distress is a big cause of unhappiness with the fake grass. No one has ever complained of this on real turf which has a built in cooling system, evapotranspiration. Real turf contributes much to the environment; synthetic turf contributes nothing.

In this brief discussion I stressed athletic fields, but golf courses and other turfgrass areas are not immune to the persuasion of the profit-seeking firms that produce, sell and install artificial turf. These firms are eyeing golf course tees and greens. Here, with existing high-quality real turf managed by professional superintendents, the challenge has so far been met. Hopefully invasion of synthetic turf will continue to be a minor consideration.

No such bulletin

Q—*We are puzzled and bewildered as to what to do concerning all these new grass varieties that are being put on the market. Right now we refer to the bluegrasses, but the bents and the fescues are crowding us too. Is there any place where we can get a bulletin that will give us unbiased statements concerning the performance of each variety so that we can choose more intelligently?*

(Quebec, Canada)

A—We who follow research and variety testing closely across the country also have to work hard to keep from being befuddled. We feel that some varieties that are offered for sale have not been tested adequately. So far as I know the bulletin that you seek does not exist. Were you to ask for information from Purdue, Ohio,

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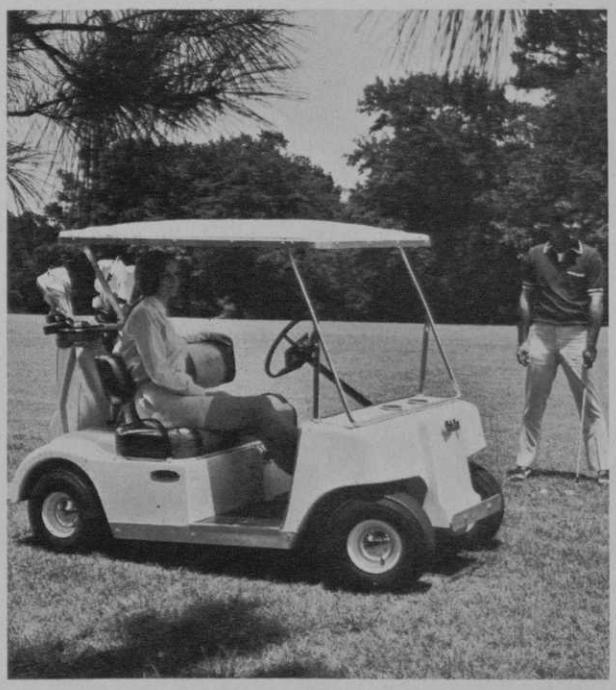

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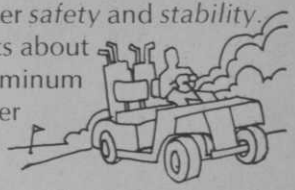

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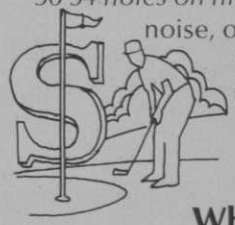
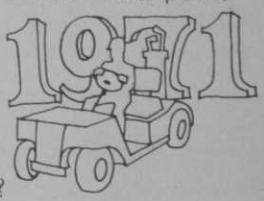
Congress has set 1975 as the deadline for eliminating harmful exhaust from cars. The electric CAROCHE *will go 36-54 holes on hilly courses*, without the pollution, smoke, noise, odor or fire hazard of gas cars. In addition, independent studies have proven electric vehicles cost considerably less to operate and maintain than those powered by gasoline engines.



Why is CAROCHE ahead of its time?

When CAROCHE was introduced in 1970, it caught the golf car industry by surprise. For instance, it was the first golf car to employ both automotive type hydraulic wheel brakes and a mechanical braking system on both rear wheels. It was the only golf car available with supplementary bag racks—easily attached or detached at rental point—enabling it to carry either three or four bags. Its combination of light weight, compact size and easy serviceability made it an instant winner with fleet owners. And how do you make the best even better?



That's the story for CAROCHE in 1971.

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Pennsylvania and New Jersey, for example, you would get factual unbiased data. But, a bluegrass that does well in New Jersey may not necessarily be the best one for Indiana.

There are regional tests now operating that eventually will give you what you seek. All of the better new varieties are under tests that are as uniform as possible except for the effects of climate. Apparently, it has not been easy to engineer regional tests. I do know that the Northeast Regional Committee is now testing bluegrasses. The North Central Regional testing was involved with weed control and a cooperatively-published bulletin was distributed at the Nebraska Conference. We can hope for the same thing with the grasses. Keep prodding; it will eventually get results.

Q—*Recent soil tests indicate that, with scarcely an exception, we are amply supplied with phosphorus but potash is uniformly low. We want to continue our ureaform program but we cannot seem to locate or formulate the fertilizer that is best for our conditions. What do you suggest? Our soils are sandy and very well drained.* *(Maryland)*

A—I have examined your soil test results and concur that you need not apply any additional phosphorus this season. Your nitrogen and potassium requirements indicate to me that your turf would be served best by applications of a 1:0:1 ratio, made with 38:0:0 ureaform and 0:0:50 sulfate of potash. This applies to greens where you spray powdered ureaform and potash and to tees and fairways where you spread a granular material.

A 1:0:1 ratio can be made simply by blending 1,200 pounds of ureaform (456 pounds N) with 800 pounds sulfate of potash (400 pounds K_2O). It is not a precise 1:0:1, but it is close enough for all practical purposes. Actually it comes out to a 22.8:0:20 mixed fertilizer. A 10 pound application per thousand yields 2.28 pounds N and 2.0 pounds K_2O. This is just about right for your conditions, and you will be able to build up your potassium reserves in the soil. When you find a company that will make this special mix for you, let me know. □

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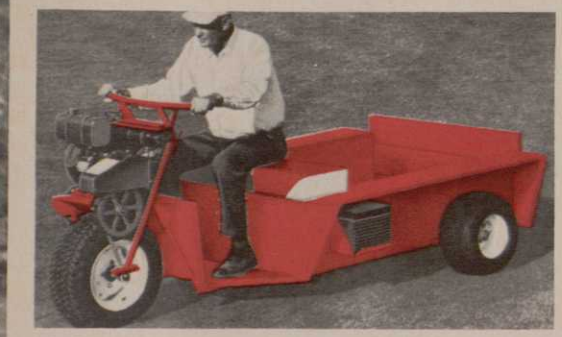

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