by Dr. James B. Beard

TURFGRASS RESEARCH REVIEW

Use of benomyl to control dollar spot

Control of dollar spot disease on turf in New South Wales with the new systemic fungicide, benomyl. *D. Reilly. 1969. The Journal of the Sports Turf Research Institute. 45:63-66. (from the Department of Agriculture, New South Wales, Aust.)*

The effectiveness of a new systemic fungicide, benomyl (methyl 1-(butylcarbamoyl)- 2-bensimidazole - carbamate), for controlling dollar spot (*Sclerotinia homoeocarpa* F. T. Bennet) was compared with mercuric chloride in this study. The standard recommendation throughout Australia for controlling dollar spot uses mercury or cadmium containing fungicides. The experiments were conducted on two bentgrass bowling greens in the Sydney area which had visible dollar spot damage. Similar experiments were conducted on a Penncross creeping bentgrass (*Agrostis palustris Huds.*) bowling green at the Cronulla R.S.L. Club and on a New Zealand colonial bentgrass (*Agrostis tenuis* Sibth.) bowling green at the Hills District Bowling Club. The fungicide treatments included (a) mercuric chloride applied at two ounces active ingredient (a.i.) per 1,000 square feet, (b) benomyl (50 per cent wettable powder) applied at 1.5 ounces (a.i.) per 1,000 square feet, CC) benomyl (50 percent wettable powder) applied at three ounces (a.i.) per 1,000 square feet and (d) an untreated control plot. Surfactant F was added to the two benomyl treatments at a rate of four ounces per 100 gallons of dilute spray. The experimental area consisted of 5 by 10 foot plots with each of the treatments being replicated six times on both bentgrass species. All fungicide treatments were applied in two gallons of water per 50 square foot plot using a watering can. Two treatment applications were made at a 21 day interval. The degree of dollar spot disease control was quantatively determined by counting the number of two-inch-squares per plot damaged by the pathogen.

Under the conditions of these two experiments both rates of benomyl were more effective in controlling dollar spot than mercuric chloride. The relative per cent control of dollar spot from the three fungicides showed approximately 97 per cent control with the three ounce rate of benomyl, 94 per cent control with the 1.5 ounce rate of benomyl and 65 per cent control with the two ounce rate of mercuric chloride. The author reported that the benomyl appeared to have an eradicant action on the dollar spot disease as well as a longer residual effect than other currently available fungicides.

No visible phytotoxicity to either the Penncross creeping bentgrass or New Zealand colonial bentgrass was observed from the benomyl applied at either rate. Actually, turfs receiving the benomyl application showed improved color, giving the impression that it was stimulating growth. In contrast the two ounce rate of mercuric chloride caused discoloration of the two bentgrasses for an indefinite period of time following its application.

Comments: Dollar spot is a major turf disease in Australia, especially bowling and golf greens. Its occurrence was first recorded from Queensland in 1934. Mercury and cadmium fungicides have been the standards for effective control of dollar spot throughout Australia. Recently, mercury and cadmium have not been as effective in controlling dollar spot disease under certain conditions. The author gave no reason for this development.

The experiments reported in this paper demonstrate that benomyl provides good control of dollar spot without causing discoloration of the turf. Also, this systemic fungicide

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does possess a residual effect.

Practically all turfgrass fungicides which have been used in the past are of the non-systemic type. That is, disease control is achieved by killing the spores, mycelia and sclerotia present on the turfgrass surface at the time of fungicide application and by killing innoculum which is subsequently deposited on the turfgrass surface during the active residue period of the fungicide. Thus, effective control by a non-systemic fungicide is only achieved on those plant parts to which the fungicide is applied and only for the period of time that the fungicide remains on the plant surface in an active state. In contrast to this, a systemic fungicide is absorbed and translocated throughout the plant. It can eradicate fungi which have already infected the host plant and can also prevent subsequent infections by the pathogen. A systemic fungicide is preferred to a non-systemic type providing the disease control is comparable and there is no phytotoxicity to the turfgrasses. Benomyl is a systemic fungicide which fulfills these criteria along with a longer residual on turfs. No doubt, the future trend in turfgrass disease control will be toward the use of systemic type fungicides as they become available.

***Effect of time, rate and gallons of water applied on paraquat for the control of annual bluegrass* (Poa annua).** *W.W. Huffine, J.L. Coltharp, L.B. Gillham. 1970. Oklahoma Agricultural Experiment Station Progress Report P-632. pp. 10-11. (from the Department of Agronomy, Oklahoma State University, Stillwater, Okla. 74075).*

Various methods of paraquat application for the control of annual bluegrass were evaluated in this study. The experiment was conducted under greenhouse conditions utilizing annual bluegrass turfs grown in individual pots. Treatments consisted of (a) time of application—8 a.m. versus 8 p.m.; (b) rate of paraquat application—0.25 versus 0.5 pounds of active ingredient per acre; (c) rate of surfactant—included none versus 0.001 per cent and (d) rate of water utilized—comparing 40, 80 and 120 gallons of water applied per acre. The per cent control of annual bluegrass was determined seven days after the paraquat application.

The best contact control of annual bluegrass was obtained by applying paraquat at the rate of 0.5 pounds active ingredient per acre along with a surfactant in 40 gallons of water. The 0.25 pound per acre rate of paraquat applied in 40 gallons of water with a surfactant gave more effective annual bluegrass control than the 0.5 pounds per acre rate applied without a surfactant. Forty to 80 gallons of water per acre was the optimum amount of carrier for paraquat applications. The degree of annual bluegrass control was not affected by the time of application when the 8 a.m. "day" treatment and the 8 p.m. "night" treatment were compared.

Comments: Paraquat provides a contact nonselective post-emergence type of weed control. A contact herbicide kills only those plant parts or living cells to which the chemical is applied. The death of the plant occurs very rapidly after application. A nonselective herbicide kills all plant species or plant parts which the chemicals comes into contact with, regardless of whether desirable turfgrass species are present.

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A surfactant is a surface active agent which increases the ability of a liquid such as water to moisten a solid substance such as a plant surface. Basically, a surfactant acts by modifying the surface tensions which exist between water and plant surface. The resultant net reduction in inter-facial tensions causes improved wettability.

Contact herbicides such as paraquat are most commonly used on turfgrass areas for complete kill or "burn off" of the turfgrass shoots and above ground plant parts of weeds just prior to renovation overseeding. Paraquat has proven to be one of the better contact herbicides for the nonselective control of weedy turfgrass vegetation. In the case of annual bluegrass, kill of individual plants is more complete than with the other commonly available contact herbicides. In using paraquat, one should be aware that it can move laterally from the area of application in surface drainage water and thus cause kill to adjacent vegetation where a direct paraquat application has not been made. This most commonly occurs for a 14-day period following application when an intense rainfall or when irrigation has occurred.

Southern chinch bug, a new pest of St. Augustinegrass in Southern California. *F.S. Morishita, R.N. Jefferson and L. Johnston. 1969. California Turfgrass Culture. 19(2): 9-10. (from the Department of Entomology, University of California at Riverside, Riverside, Calif. 92502).*

This paper summarizes results from seasonal population studies and insecticide control experiments with southern chinch bug (*Blissus insularis* Barber) on St. Augustinegrass turfs.

Studies conducted over the growing season showed that a major population build-up began during the latter part of March and declined substantially during late October. Two distinct generations of the insect developed in early May and late July. Although the nymphs were difficult to see, they constituted the dominant portion of the population counts made. In contrast, the active crawling adults were readily visible, particularly in turfs which had been severely damaged during the late summer period.

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Three granular insecticides plus an untreated check were evaluated for the control of southern chinch bug. The three insecticides used were diazinon, ethion and Akton. All three were applied at the rate of four pounds of active ingredient per acre. The turf received an extended irrigation following the application. The insecticide treatments were made in mid-June. Dursban was also included in a comparable, second study.

The diazinon, ethion and Akton provided southern chinch bug control for a period of two months. In addition to utilizing an insecticide, the authors stress the importance of good turfgrass cultural practices in reducing the damage to turfs because the pests appeared to attack turfs which were in a more weakened condition.

Comments: The southern chinch bug is thought to have been introduced into the Whittier area of Southern California in 1967 and has subsequently become a problem on St. Augustinegrass lawns in that area. The southern chinch bug develops from white, translucent eggs having a red spot. The immature nymph stages have two distinct colorations: the earlier instars are brilliant red whereas the last instar is distinctly black. The adult, crawling form of the insect is of two distinct types. There are long-winged and short-winged forms: both are black with white wings.

Damage caused by the southern chinch bug appears as large irregular yellowish to brown patches. Detailed examination of the damaged area frequently reveals large concentrations of the insect which feeds by sucking juices from the turfgrass plant.

Diazinon and ethion, both organic phosphates, have proven quite effective for chinch bug control over the years. In utilizing these materials, one should be aware that the former has a comparatively high human toxicity rating whereas the latter ranks as comparatively less toxic. All insecticides should be utilized judiciously as needed to control a potentially damaging insect infestation. □

Other papers of interest:

1. ***Cytogenetic studies on* Cynodon *L.C. Rich.* (Gramineae).** *J.R. Harlan, J.M. J. de Wet, K.M. Rawal, M.R. Felder, and W.L. Richardson. 1970. Crop Science. 10(3):288-291. (from the Agronomy Departments, University of Illinois and Oklahoma State University.)*

2. ***Post-harvest drying rate and germination of Kentucky bluegrass seed.*** *C.L. Canode, A.G. Law and J.D. Maguire. 1970. Crop Science. 10(3):315-317. (from the Department of Agronomy, Washington State University, Pullman, Wash. 99163).*

3. ***Performance of crownvetch and selected cool season grass on roadside backslopes as affected by slope exposure and nitrogen fertilization.*** *A.E. Dudeck and J.O. Young. 1970. Agronomy Journal. 62(3): 397-399. (from the Horticulture and Forestry Department, University of Nebraska, Lincoln Neb. 68503).*

4. ***Sources of variation in Cynodon Dactylon*** *(L.) pers. J.R. Harland and J.M.J. deWet. 1969. Crop Science. 9(6): 774-778. (from the Department of Agronomy, University of Illinois, Urbana, Ill. 61801).*