SOD

FOR
GREENS AND TEES

PENNCROSS BENT
AND
TORONTO C-15 BENT
SOD or STOLONS

—BLUEGRASSES—
*Adelphi *XL-100 BLEND
*Merion *KY-33 BLEND

Quality—Service
H&E SOD
NURSERY, INC.
TINLEY PARK, ILL.

4301 WEST FLOSSMOOR ROAD
TINLEY PARK, ILLINOIS 60477
312-798-2210

Circle No. 160 on Reader Service Card

RAKE OUT YOUR SANOTRAP WORRIES!
RAKE EZEE
SAND TRAP RAKE

Short handle, light weight. Golfer can rake trap while holding club in other hand.

HIGH DENSITY PLASTIC WEATHER-PROOFED

Sturdy, attractive, won't rust, yet low in cost. Rake-Ezee stands erect on point, reminds golfer to rake trap. Fully guaranteed with tough plastic head. See your distributor, or write:

NORTH CENTRAL Plastics INCORPORATED
ELLENDALE, MINNESOTA 56026

Circle No. 161 on Reader Service Card


# DR. JAMES B. BEARD

## TURFGRASS RESEARCH REVIEW

### ALTERNATE FUNGICIDES TO CONTROL TURFGRASS DISEASES

***A benzimidazole resistant strain of* Erysiphe graminis.** *J. M. Vargas Jr. 1973. Phytopathology. 63 (11): 1366-1368. (from the Department of Botany and Plant Pathology, Michigan State University, East Lansing, Mich. 48824).*

The objective of this study was (a) to determine whether strains of powdery mildew *(Erysiphe graminis)* existed that are resistant to benomyl and (b) to determine whether the benomyl resistant strains of powdery mildew are also resistant to other benzimidazole systemic fungicides, a thiophanate systemic fungicide and a pryimidine systemic fungicide.

The experiments were conducted on Merion Kentucky bluegrass turfs maintained in 10-inch diameter pots. One set of Merion Kentucky bluegrass plugs was collected from benomyl treated plots suspected of containing a benzimidazole resistant strain of powdery mildew. These plugs were placed in a growth chamber along with additional pots of unaffected turf. A similar set of Merion Kentucky bluegrass pots was established in a second growth chamber. This set was infected with a common strain of powdery mildew, which was susceptible to benzimidazole control. The two strains of powdery mildew were allowed to increase in each of the respective chambers at temperatures of 70 degrees F. A similar set of Merion Kentucky bluegrass pots was also established and then treated with the following fungicides, each at four concentrations. Included were (a) two benzimidazole systemics (benomyl and thiabendazole), (b) a thiophanate systemic (thiophanate-methyl) and (c) a pyrimidine systemic (triarimol). Six pots of each treatment were exposed to a benzimidazole resistant strain in one chamber, and another six pots were exposed to a benzimidazole susceptible strain in the second chamber.

Results after six weeks of treatment showed that benomyl, thiabendazole, thiophanate-methyl and triarimol effectively inhibited the development of the benzimidazole susceptible strain of powdery mildew. In contrast, benomyl, thiabendazole and thiophanatemethyl treated turfs exposed to the benzimidazole resistant strain proved ineffective in controlling this powdery mildew. The one systemic fungicide that did prove effective in controlling the benzimidazole resistant strain of powdery mildew was triarimol.

The data indicate that the two benzimidazole and the thiophanate systemic fungicides have similar cross resistance to the benzimidazole resistant strain of powdery mildew. The author points out that this interrelationship is not surprising, because earlier work showed that there are certain conversions of these systemic fungicides into a common compound in terms of fungicidal activity. Because there was no cross resistance to triarimol, the author suggests that the mode of action for this systemic fungicide differs from that for the benzimidazole and thiophanate systemic fungicides.

The benzimidazole resistant strain of powdery mildew utilized in these experiments developed in only one and one-half growing seasons after use of the benzimidazole fungicide was initiated. Similar rapid development of benzimidazole resistant strains of dollar spot have also been observed by the author. For this reason it is recommended that the benzimidazole and thiophanate fungicides should not be used on an exclusive basis in order to protect against development of resistance to these systemic fungicides. A preferred approach would be to use the benzimidazole and thiophanate fungicides on an alternating basis with either (a) an effective nonsystemic or (b)

*continued on page 18*

**BEARD** *from page 16*

a different type of chemically active systemic fungicide such as triarimol.

*Comments:* Certain of the common turfgrass diseases have sexual reproductive capabilities such that continued use of a fungicide or similar (related activity) group of fungicides will enhance the potential for development of resistant strains of the disease-causing organism. If steps are not taken to avoid this by varying the type of fungicide utilized throughout the growing season, there is a great likelihood of resistant strains of the organism occurring. Possibly a strain might develop that could not be controlled by any of the currently available fungicides. This is a potentially serious threat to golf course turfs, particularly the bentgrasses and annual bluegrasses. Accordingly, all golf course superintendents should seriously consider a program of alternating a group of two or three effective fungicides for the particular disease or diseases being controlled. The importance of this practice should not underestimated. □


# A GRAND NEW TRIO OF TURF GRASSES

Modern grasses are different. Now you can take advantage of improved varieties designed to do a superior job on your turf. They're new, but proven in the field and at university testing stations.

**Highlight** — **CHEWINGS-TYPE RED FESCUE**

An improved Chewings-type red fescue, Highlight is distinguished by its brilliant green color. Highlight is dense growing and tends to hold this denseness through the summer. A good mixer, it persists and will eventually colonize in shade areas, in poor, sandy soils, windswept slopes and under trees.

**Compas** — **TURF-TYPE PERENNIAL RYEGRASS**

A truly fine-leaved turf-type perennial ryegrass. Compas is low-growing and fast germinating. It develops sod of above average density and is resistant to excessive traffic and wear. It's dark green color and fine leaf means it will blend beautifully with other standard lawn grasses such as Kentucky bluegrass and red fescue.

**EMERALD** (SMARAGD)

An improved creeping bentgrass especially developed by W. Weibull AB of Sweden for fine turf areas such as golf greens, fairways, tees and other fine turf. Forms a dense creeping turf capable of healing injuries without the excessive vigor which creates "puffiness". Exceptionally uniform in appearance, Emerald does well from Canada to the Mid-Southern U.S. Along with excellent cold tolerance, it has persisted during hot, humid summer months.

PRODUCTS FROM VEZ, WEIBULL AND ISI

*For free brochures and information regarding local distributors, write to:*

INTERNATIONAL SEEDS, INC.

P.O. Box 168G Halsey, Oregon 97348

Circle No. 143 on Reader Service Card


# COMING EVENTS

RHODE ISLAND TURFGRASS FIELD DAY, University of Rhode Island, Kingston, R.I., August 21.

NORTHERN MICHIGAN TURFGRASS FIELD DAY, Michigan State University Experimental Area, Traverse City CC, Traverse City, Mich., September 10.

TURF AND LANDSCAPE DAY, Ohio Agricultural Research and Development Center, Wooster, Ohio, September 10.

FLORIDA TURFGRASS ASSN. CONFERENCE AND SHOW, Riverside Hilton, Curtis Hixon Convention Center, Tampa, Fla., September 16-19.

SOUTHERN ILLINOIS TURFGRASS FIELD DAY, Southern Illinois University Agricultural Research Station, Belleville, Ill., September 24.

NORTHWEST TURFGRASS CONFERENCE, Sun River Lodge, Sun River, Ore., September 24-27.

MIDWEST TURF FIELD DAY, Purdue University Agronomy Farm, West Lafayette, Ind., September 30.

SOUTHWEST TURFGRASS CONFERENCE, New Mexico State University, Las Cruces, N.M., October 10-11.

CENTRAL PLAINS TURFGRASS CONFERENCE, K-State Union, Manhattan, Kan., October 23-25.

WISCONSIN GOLF TURF SEMINAR, Pfister Hotel, Milwaukee, Wis., October 30-31.

FIFTH ANNUAL GEORGIA GCSA/-UNIVERSITY OF GEORGIA TURF-GRASS SHORT COURSE, Center for Continuing Education, University of Georgia, Athens, Ga., November 3-5.

TEXAS TURFGRASS CONFERENCE, Texas A & M University, College Station, Tex., December 1-4.

OHIO TURFGRASS CONFERENCE AND SHOW, Ohio State University, Columbus, Ohio, December 3-5.