Hawaiian study

Genetics plays role in insecticide resistance

A Hawaiian study of genetic variation within a population of insects indicates that isolated populations of insects that can have dramatically increased resistance to applied insecticides.

The study found that where the insect populations had a high level of genetic variation (2% of the population was resistant) and that population was subject to the pressure of an average of one insecticide application every 10 days, the amount of time required for more than 50% the population to have developed resistance was 5.5 times faster for the high variation than the low variation (.02% of the population resistant). When the same populations had increased migration from outside insect populations, the ratio between high and low variation populations stayed the same, but the resistance took from 20 - 50% longer to develop.

TGT's view - Resistance of an insect population to a specific insecticide may develop after exposures to as few as 10 applications of that insecticide for groups with 2% resistance. Or that resistance can develop more slowly requiring as many as 55 exposures in groups with .02% resistance. Also sites that have a high rate of migration from off-site groups will delay the development of population resistance by as much as 50%. This study identifies two of the prerequisites for the development of insecticide resistance in a given insect population:

- *consistent use of the same or similar control materials for 10-55 times without changing to an insecticide with a different mode of action. This means resistance can occur within five years at a typical northern site that receives two insecticide applications per year and within three years at warmer sites that receive three applications per year.*
- *isolated sites with indigenous populations are more likely to develop resistance than less isolated populations that intermix with individuals of outside populations.*

Turfgrass managers, particularly at isolated sites, should vary the control materials applied between products with different modes of action, i.e. substitute a carbamate-based insecticide for an organophosphate-based material. Turf managers with an existing resistant insect population should reduce any additional pressure on that population to adapt by employing all cultural control appropriate for that pest species before any additional insecticide applications are made. -CS

Milky spore disease may not be an effective biological control for grubs

At a recent conference on turfgrass research Daniel Potter of the University of Kentucky questioned the efficacy of milky spore disease for control of grub populations. In an address on integrated pest management techniques for insect control in turf he commented that many of the field tests conducted between 1940 and 1975 by the U.S. Department of Agriculture on the efficacy of *Bacillus popilliae* were not replicated, failed to include proper controls, failed to establish a dose response, and were not published in the scientific literature. Also, he cited recent studies that have failed to show any increase in disease infected grubs at treated sites or any reduction in grub populations over the four-year period of the studies. In short, he concluded that the efficacy of milky spore disease had not been established.

TGT's view: Turfgrass managers who are considering milky spore disease as a biological grub control should look at some of the newly-formulated parasitic nematode products as an alternative until new information is developed on the efficacy of bacillus popilliae. -CS

Iowa College of Medicine

Health effects of farming on farmers

The University of Iowa's College of Medicine has begun a study of the long-term health effects of farming on farmers, commercial applicators and their families. The study will monitor the participants over a 10-year period for the development of cancers and other diseases that might be related to farming activities. Historically, farmers and their families have lived longer than other populations, despite the fact that farming is considered to be the most dangerous occupations. The researchers plan to use the gathered information as a means of developing better health and safety programs for farmers.

University of Georgia Research

Bermuda grass can be controlled in tall fescue

Research at the University of Georgia indicates bermuda grass can be suppressed in tall fescue stands with multiple applications of fenoxaprop, whose trade name is Aclaim. Lighter-rate multiple applications over two years provided control equal to heavy rate over one year with only minimal (15%) phytotoxic injury to the tall fescue. Table 1 lists the average control achieved over a two year period at various light rates of application over a varied number of applications.

Table 1

Rates of fenoxaprop applications to control bermuda grass

Rate(ounces/sq.meter)	No.ofapplications	%Controlvs.noapplications
0	0	0
.0225	8	23
"	10	29
"	12	42
.045	8	57
"	10	65
"	12	66
.0675	8	91
"	10	93
"	12	97
.09	8	90
"	10	90
"	12	90

TGT's view: There appears to be a threshold amount of fenoxaprop needed to give excellent control (> 90%) of bermudagrass in tall fescue and the effects appear to be cumulative. That amount is .54 ounce per thousand square feet over two years with minimum application rates of .0675 ounces per square meter per application. Applications at higher rates over one year periods required application rates that were 2.5 to 4 times greater to achieve the same results with twice the phytotoxic damage occurring at the higher rates. -CS

High endophyte levels in tall fescue does not deter grub feeding

A recent Kentucky study of the feeding habits of grubs, under both laboratory and field conditions, showed inconsistent results when the grubs feed on the roots of an endophyte-infected version and non-endophyte version of a variety of tall fescue. In the laboratory, the grubs would reduce their feeding on the endophyte-infected roots by as much as 35%. However, in the field, their was little or no reduction in feeding found by several means of measurement. The study did indicate that grub mortality averaged twice as high in tall fescue and bluegrass stands versus ryegrass, bentgrass, and hard fescue stands.

TGT's view: Until shown otherwise, the level of endophyte infection in a turfgrass variety should not be a consideration in choosing a variety where grubs are the primary insect pest. Species choice should be a consideration in those determinations. -CS

Coming attractions

June Issue

Rhizoctonia
by Christopher Sann

July Issue

Pythium diseases
by Dr. Eric B. Nelson

Pythium fungicides
by Dr. Eric B. Nelson

Cool vs. warm season Pythium
by Dr. Eric B. Nelson

Pythium species & other fungi
by Dr. Eric B. Nelson

ASK THE EXPERT

Have a question on any aspect of turf management?

Contact:

Ask the Expert
Turf Grass Trends
1775 T St. NW, Washington, DC 20009
Tel: (202) 328-0888
Fax: (202) 483-5797
CompuServe: 76517,2451
Internet: 76517.2451@COMPUSERVE.COM

Turf Grass Resources

Back issues of *Turf Grass Trends*: $10.00 each plus $1.50 postage (while they last).

Sturdy vinyl-covered three-ring binders to hold your subscription of *Turf Grass Trends* are $5.00 each plus $2.50 shipping and handling.