Identification of Genetic Insect and Mite Pest Resistance in Turfgrasses

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Objectives:

1. Establish a regional center to identify genotypes of *Cynodon*, *Zoysia*, *Buchloe*, *Paspalum*, *Agrostis*, and *Poa* with genetic resistance to insects and mites (i.e., fall armyworms, black cutworm, sod webworms, greenbug and host-specific eriophyid mites) for use in cooperating turf breeding programs.
2. Bioassay resistant lines with insect diets to characterize the mechanisms of resistance and determine their biochemical nature.
3. Develop effective and efficient procedures to accommodate screening and identify typical breeding populations previously unavailable to plant breeders.

Start Date: 1998
Project Duration: 5 years
Total Funding: $125,000

A regional center was established to screen and evaluate turfgrass germplasm for resistance to insect and mite pests. The goal for this center has been to identify genetic lines of bermudagrass, zoysiagrass, buffalograss, seashore paspalum, bentgrass and bluegrass with resistance to the primary pests.

This process requires the development of efficient screening procedures to effectively identify genetic resistance to target pests. A secondary goal is for the cooperative grass breeders to incorporate the insect and mite pest resistance identified into agronomically acceptable cultivars.

Work has continued with elite germplasm of bermudagrass from the breeding program under Dr. Charles Taliaferro at Oklahoma State University and cultivars of bermudagrass from the NTEP bermudagrass trial under the supervision of Dr. Richard White at Texas A&M University, College Station. Additional work has continued with zoysiagrass hybrids and bluegrass hybrids from the breeding programs of Dr. Milt Engelke and Dr. James Read, respectively, at the Texas A&M University Research & Extension Center at Dallas.

At Texas A&M University, Dr. Jim Reinert explains how bermudagrass genotypes are screened for mite resistance.

The bermudagrass mite (*Eriophyes cynodoniensis*) has consistently been a major pest of many commonly used cultivars of bermudagrass used throughout the southern United States. An experiment with 83 bermudagrass cultivars and genotypes was established to characterize resistance or level of susceptibility to injury by the bermudagrass mite.

Bermudagrass genotypes can be grouped into five levels of mite infestation: 0.0 rosettes (9 lines); 0.1-0.4 (14 lines); 0.5-1.9 (16 lines); 2.0-9.9 (16 lines); 10.0-19.9 (12 lines) and 20.0+ (16 lines). Cultivars considered highly susceptible are 'Floradwarf', 'Champion', 'Lakewood', 'Tifdwarf', 'Baby', 'Majestic', 'Ormond', 'Tifgreen', 'TifEagle', 'Shangra La', 'MS Supreme', 'Blue-Muda' and 'Southern Star'.

The hunting billbug (*Sphenophorus venatus vestitus*) causes some of the most commonly misdiagnosed damage associated with zoysiagrass and bermudagrass. Increasingly higher populations of this billbug have been observed over the past 10 to 15 years.

An experiment was established to evaluate nine zoysiagrass cultivars for resistance to the hunting billbug. Cages (8 ft. diam.) were used to confine adults of the hunting billbug on nine cultivars of zoysiagrass. A paired-cage arrangement was used so treated plants could be directly compared with untreated paired plants.

Bermudagrass mite can cause extensive damage on susceptible cultivars.

When plants from the treated cages (with billbugs) were ranked and compared with the untreated plants, 'Diamond' exhibited the least leaf firing damage, followed by 'DALZ9601'. Additionally, 'El Toro', 'Cavalier' and 'Royal' sustained less damage than 'Crowne', DeAnza 'Palisades' and 'Meyer'. 'Meyer' sustained the most billbug feeding.

'Meyer' has now been documented as highly susceptible to zoysiagrass mite, fall armyworm, tropical sod webworm, tawny mole cricket, differential grasshopper and hunting billbug.

Summary Points

- Evaluating insect resistance/tolerance of bermudagrass, zoysiagrass, buffalograss, seashore paspalum, bentgrass, and bluegrass.
- Nine bermudagrass lines have been identified with resistance to bermudagrass mite, *Eriophyes cynodoniensis*.
- Hunting billbug resistance found in zoysiagrass.
- Bermudagrass and zoysiagrass screened for resistance to armyworm and other *Lepidoptera* species.