

Ecology, pathogenicity and management of *Bipolaris* and *Curvularia* fungal species associated with decline of ultradwarf bermudagrasses in Florida.

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Rationale/description of problem:

In the Southeast, an increasing number of putting greens consist of the new ultradwarf

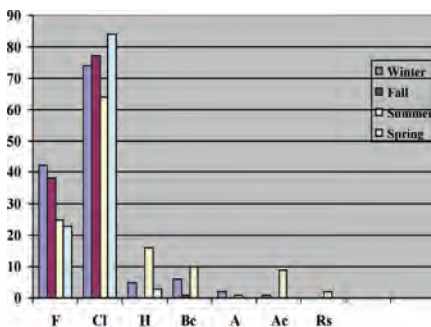


Figure 3. Incidence of selected fungi by season. Fungal abbreviations are as follows: F=*Fusarium*, Cl= *Curvularia lunata*, H=*Hansfordia*, Bc=*Bipolaris cynodontis*, A=*Alternaria*, Ac=*Acremonium*, and Rs=*Ramichloridium subulatum*. Bars with the same letter do not differ significantly at $P \leq 0.05$ as determined by the Fisher's Protected LSD.

bermudagrass (*Cynodon dactylon* X *C. tenuisvaalensis*) cultivars, including Champion, Floradwarf, and TiffEagle. These grasses rival traditional creeping bentgrass (*Agrostis palustris*) greens in part because of their higher shoot densities, faster ball roll and tolerance to lower mowing heights (Hanna, 1998).

Recently in the Gulf Coast region (Alabama, Florida, Louisiana, and Mississippi), more than 70 golf courses in 2000 and 130 golf courses in 2001 reported significant disease problems in their ultradwarf bermudagrass putting greens (Unruh and Davis, 2001). Diagnostic labs, which received turfgrass from the diseased greens, attributed the damage to spring dead spot (*Ophiosphaerella* spp.) and *Curvularia* blight (*Curvularia* spp.). Damage in some

of the samples was attributed to *Bipolaris* species. *Curvularia* blight was the most prevalent reported disease from late spring to late fall.

The fungus was isolated off of the major-

ity of turfgrass samples brought into the labs (Stowell, personal comm.; Unruh and Davis, 2001). While *Curvularia* species were frequently recovered from both healthy and diseased ultradwarf bermudagrass tissue, it is often unclear whether the fungus is the primary cause of the turfgrass symptoms or a saprophytic secondary organism (Stowell, personal comm.). An accurate diagnosis is important to the superintendent

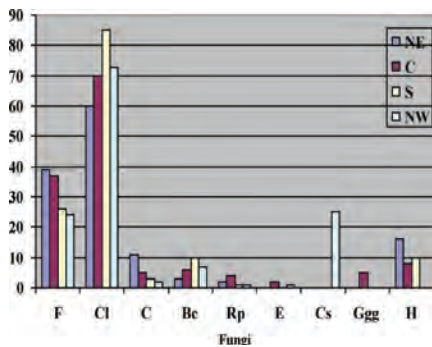


Figure 4. Incidence of selected fungi by location (NE-northeast, C-central, S-south, NW-northwest) in Florida. Fungal abbreviations are as follows: F=*Fusarium*, Cl= *Curvularia lunata*, C=*Codinaea*, Bc=*Bipolaris cynodontis*, Rp=*Robillarda phragmites*, E=*Epicocum*, Cs=*Curvularia geniculatus*, Ggg=*Gaeumannomyces graminis* var. *graminis*, and H=*Hansfordia*. Bars with the same letter do not differ significantly at $P \leq 0.05$ as determined by the Fisher's Protected LSD.

since management of certain diseases by fungicides and cultural methods are often specific for that type of fungus.

Although *Curvularia* species are frequently obtained from ultradwarf putting green samples in Florida, they are not routinely diagnosed as pathogens by university diagnostic laboratories. One reason for this is the ongoing debate about the pathogenicity of *Curvularia* species (Kim et al., 2000). Brown et al. (1972) demonstrated that various *Curvularia* species could cause disease in cultivars of Kentucky bluegrass, creeping red fescue, and bentgrass from 24 to 35° C. In Korea, Kim et al. (2000) recently showed that *Curvularia inaequalis*, isolated

from zoysia with blight symptoms, was pathogenic at 30° C in zoysia, bentgrass, and bermudagrass.

Turfgrass canopies in Florida consistently reach these temperatures used for the previous pathogenicity

studies from late spring through the fall.

While *Bipolaris* species are more often attributed to causing a disease in turfgrass (Couch 1995), little information is available about the role these fungi play in affecting ultradwarf bermudagrasses (Pratt, 2001). In fact, very little is known about the pathogenicity, etiology, and ecology of *Bipolaris* and *Curvularia* species and no disease research has been conducted on the ultradwarf bermudagrasses.

Basic information on the biology and ability to cause disease by *Bipolaris* and *Curvularia* species in the ultradwarf cultivars is critical for developing accurate and rapid diagnostic procedures and for creating optimum, long-term integrated disease-management strategies that the superintendents can use to please their membership.

Benefits of research to golf course superintendents:

This research will determine whether or not *Bipolaris* and *Curvularia* species are directly responsible for the disease problems in putting greens comprised of ultradwarf bermudagrasses in Florida. By understanding which fungi are pathogenic, diagnostic procedures can be developed to more accurately identify the true cause of disease, and allow superintendents to correctly manage the situation. Integrated disease management strategies that included cultural (such as mowing heights) and chemical approaches can then be developed for superintendents, giving them more options for prevention and control of the disease problem.

Objective 1: Determine the influence of mowing heights and fungicides on the decline of ultradwarf bermudagrass.

(Editor's note: The report on objective one can be found in the March/April 2005 Issue of the Florida Turf Digest. Dr. Datnoff was gracious enough to let us publish his update report on the other two objectives of the overall project as a timely follow up.)

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Objective 2: Determine the occurrence of *Bipolaris* and *Curvularia* on ultradwarf bermudagrass greens in Florida golf courses.

A statewide systematic study was undertaken to determine the true extent of *Bipolaris* and *Curvularia* and other fungi associated with disease problems on golf courses with ultradwarf bermudagrass greens (TifEagle, Champion and Floradwarf) in Florida. Every other month samples were collected from eight golf course greens located in four geographical regions of Florida, USA (northeast, northwest, central, southeast), with each region having a Floradwarf and TifEagle cultivar. This research actually began in 2003 and is ongoing in 2004. The data shown herein are from 2003 and a portion of 2004.

Twenty different species of fungi and one actinomycete were recovered from the two ultradwarf cultivars, including *Alternaria* sp., *Acremonium* sp., *Biplaris cynodontis*, *Bipolaris hawaiiensis*, *Codinaea* sp., *Choanephora* sp., *Curvularia lunata*, *Curvularia geniculatus*, *Cylindrocarpon* sp., *Epicoccum* sp., *Fusarium* spp., *Gaeumannomyces graminis* var. *graminis*, *Hansfordia* sp., *Leptosphaerulina trifolii*, *Myrothecium leucotrichum*, *Pestalotia* sp., *Penicillium* sp., *Pythium* sp., *Robillarda phragmites*, *Ramicladium subulatum*, *Rhizoctonia zeae* and a *Streptomyces* species. The incidence of *Fusarium* sp., *Curvularia lunata*, *Hansfordia* sp., *Bipolaris cynodontis*, *Alternaria* sp., *Acremonium* sp., and *Ramicladium subulatum* was significantly different depending on the season ($P < 0.05$) (Figure 3.). *Fusarium* and *Alternaria* species were recovered significantly ($P < 0.05$) more often on leaves during the winter and spring months than on other plant parts and times of the year (data not shown). *Acremonium* sp. were recovered significantly ($P < 0.05$) more often on leaves during the spring than on other plant parts and times of the year (data not shown).

The incidence of *Biplaris cynodontis*, *Codinaea* sp., *Curvularia lunata*, *Curvularia geniculatus*, *Epicoccum* sp., *Fusarium* sp., *Gaeumannomyces graminis* var. *graminis*, *Hansfordia* sp., and *Robillarda phragmites* was influenced significantly by the location of the turfgrass in the state of Florida ($P < 0.05$) (Figure 4).

Objective 3: Ascertain which isolates of *Bipolaris* and *Curvularia* obtained from the statewide survey are pathogenic and determine disease develop-

ment. Isolates of *Bipolaris* and *Curvularia* species obtained from the statewide survey will be used to test their ability to cause both foliar and root disease in Champion, Floradwarf, and Tifeagle. These tests are currently under way.

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