

# *Beniowskia sphaeroidea* Blight on Knotroot Bristlegrass in Georgia

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## ABSTRACT

Brown, E. A., and Hanlin, R. T. 1982. *Beniowskia sphaeroidea* blight on knotroot bristlegrass in Georgia. Plant Disease 66:1197-1198.

Small, white, cushion-shaped sporodochia and globose conidia borne on short denticles of a fungus found parasitizing *Setaria geniculata* in pastures in Greene County, GA, were identified as *Beniowskia sphaeroidea*. This is the first report of this fungus in Georgia, and apparently only the second in the United States. The potential of this fungus as a threat to cattle and to pasture grasses is discussed.

*Setaria geniculata* (Lam.) Beauv. (knotroot bristlegrass) is a common native weed in cultivated forage pastures in Georgia (5). Because it appears to pose no threat to cattle, no attempt is made to control it and it can become a prominent contaminant of hay.

During September 1977 the county agent in Greene County, GA, was called to a dairy farm to examine hay being baled for dairy cattle feed. Small white fruiting structures were observed on the grass, and because of the publicity surrounding the corn mycotoxin problem in 1977, the grower became concerned that he might be dealing with the same problem. Samples of the grass were forwarded to the University of Georgia Cooperative Extension Service Plant Disease Clinic for diagnosis.

## OBSERVATIONS

The following description is based on fresh material collected in the field. Numerous large, white, cushion-shaped sporodochia occurred singly or in clusters on the leaves (Fig. 1). The sporodochia were circular to elongate, up to 1.5 mm long, and were attached to the host by a basal strand composed of parallel hyphae. The hyphae comprising the sporodochia were extensively branched, septate, hyaline (Fig. 2), and the tips of the branches often terminated in a spiral coil (Fig. 3). Numerous hyaline, globose conidia were borne on short denticles along the sides of the sporodochial hyphae. The average diameter of 200 conidia was 9.8  $\mu\text{m}$ . Conidia were produced singly on the denticles, but some conidia formed additional conidia acropetally (Fig. 2).

Sporodochia initially occurred mainly on the inside surface of the leaves but, in heavy infections, both sides of the leaves were covered with sporodochia. Leaf tissue bearing sporodochia often developed elongate chlorotic areas that were several millimeters wider than the sporodochia that were visible on both sides of the leaf. Heavily infected leaves were almost entirely yellow.

Since its initial discovery in Georgia four years ago, the fungus has recurred each year. It is most commonly found in moist bottomland pastures. The lowermost leaves of diseased plants typically became infected first, with the infection moving to the upper leaves. Infected leaves often were distorted and shrunken. Although infected *Setaria* plants were completely surrounded by dallas grass (*Paspalum dilatatum* Poir.) and coastal bermudagrass (*Cynodon dactylon* (L.) Pers.), the fungus has never been found on the latter two species.

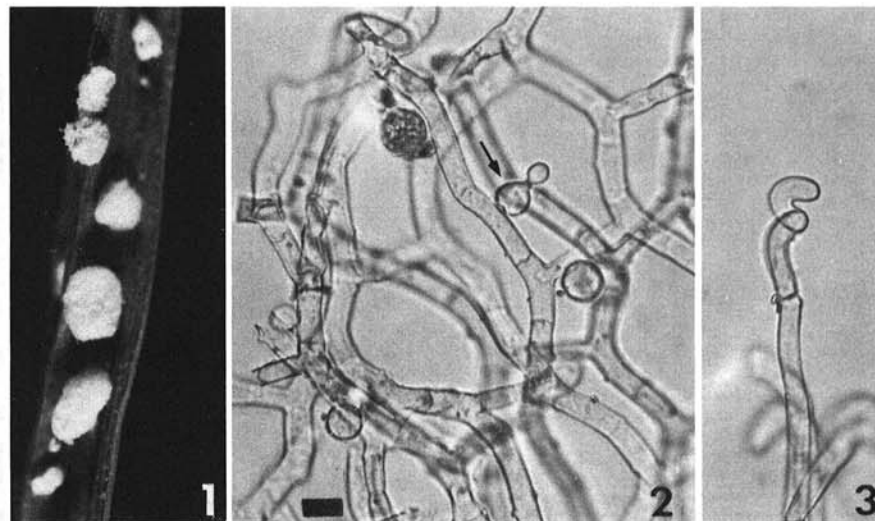
Attempts to culture this fungus on water, potato-dextrose, V-8 juice,

malt extract, and Martin's rose bengal streptomycin agar media were unsuccessful. Neither conidia nor hyphae grew when plated out, and no growth of the fungus was obtained from surface-sterilized infected tissue that was also plated on the same media. Foreign conidia that became trapped in the open network of hyphae comprising the sporodochium often grew out when sporodochia were cultured. Specimens have been deposited in The Julian H. Miller Mycological Herbarium of the University of Georgia (GAM #12656 and 12671).

## DISCUSSION

The characteristics of this fungus place it in the genus *Beniowskia* (1), which has been reported only occasionally as a parasite of tropical grasses in South Africa, Trinidad, Japan, and Java (7). This is the first report of this genus in Georgia, and apparently only the second in the United States. It was found growing on the same host in Texas (12) just two months before it was discovered in Georgia.

According to Mason (7), this fungus has been described under several generic names, including *Aegerita* (4), *Albugo* (3), and *Ceratium* (6). Only three species of *Beniowskia* have been described (2,10,11): *B. graminis* Racib. (9) (the type), *B. penniseti* Wakefield (14), and *B. macrospora* Mehrotra (8). Mason (7)



**Figs. 1-3.** (1) Sporodochia of *Beniowskia sphaeroidea* on dried leaf of *Setaria geniculata* ( $\times 3$ ). (2) Extensively branched hyphae comprising sporodochium, with conidia borne on denticles. One conidium (arrow) is forming a second conidium acropetally. (3) Spiral tip of sporodochial hypha of *Beniowskia sphaeroidea*. Bar = 10  $\mu\text{m}$  in Figures 2 and 3.

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considered three other fungi to be conspecific with *B. graminis*, namely, *Ceratium sphaeroideum* Kalchbr. & Cke. (6), *Aegerita penniseti* P. Hennings (4), and *Albugo* sp. (3). Because *C. sphaeroideum* was described before *B. graminis*, the correct citation for this fungus is *B. sphaeroidea* (Kalchbr. & Cke.) Mason. Taber et al (12) incorrectly attributed *B. sphaeroidea* to Raciborski. Mason also examined the type of *B. penniseti* and considered it conspecific with *B. sphaeroidea*. The nomenclature of this species can be summarized as follows:

- Beniowskia sphaeroidea* (Kalchbr. & Cke.) Mason (7)
- = *Ceratium sphaeroideum* Kalchbr. & Cke. (6)
- = *Beniowskia graminis* Racib. (9)
- = *Beniowskia penniseti* Wakefield (14)
- = *Albugo* sp. (3).

Hosts: *Andropogon marginatus* Steud. (So. Africa) (6), *Chaetochloa poiretiana* Hitchc. (= *Setaria poiretiana* (Schult.) Kunth.) (Trinidad) (7), *Panicum palmifolium* Willd. (*S. palmifolia* (Willd.) Stapf.) (Nyasaland) (7), *Pennisetum japonicum* Trin. (Japan) (4), *P. nepalense* Spreng. (Java) (9), *P. purpureum* Schumach. (Uganda) (14),

*Setaria aurea* Hochst. (Uganda) (7), *S. geniculata* (Texas & Georgia) (12), *S. verticillata* (L.) Beauv. (So. Rhodesia) (3), and *Sorghum vulgare* Pers. (Uganda) (15) (So. Africa, So. Rhodesia, and Sudan) (13).

We observed, as did Taber et al (12), that *B. sphaeroidea* is a severe pathogen of *Setaria geniculata*. Although this grass is not cultivated as a pasture grass, related grasses are grown for forage and hay, and it would seem advisable to monitor the occurrence of this pathogen in pastures in the southern United States. A strain of *B. sphaeroidea* capable of attacking cultivated pasture grasses could be a serious problem for the cattle industry. Equally significant is the report of *B. sphaeroidea* on sorghum (*Sorghum bicolor* (L.) Moench) (13,15), which is widely grown in the southern United States. At present there is no evidence to implicate *B. sphaeroidea* as a potential mycotoxin producer, but in view of the prevalence of fungus-induced toxin problems on grasses, this aspect also should be examined.

**Added in galley:** A second collection of *B. sphaeroidea* was received from Troup Co. in Western Georgia in early September 1982. It was collected in a pasture on an unidentified grass.

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