

Bipolaris microstegii



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Bipolaris microstegii Minnis, Rossman, Kleczewski & S.L. Flory, *sp. nov.*

Etymology. Named after the host, *Microstegium vimineum* (*Poaceae*), from which the species was isolated originally.

Leaf spots on Microstegium, up to 2 × 0.5 cm, ellipsoid to irregular, brown with a darker, near black border. *Conidiophores* macronematous, mononematous, erect, more or less straight to slightly flexuous, simple or with a single dichotomous branch, cylindrical, geniculate at apex, pale to medium brown, often darker towards apices, smooth walled, septate, up to at least 750 µm long × 5–8 µm diam. *Conidiogenous cells* integrated, terminal or intercalary, with sympodial proliferation, monotretic or polytretic with darkened, circular scars. *Conidia* solitary, curved, cylindrical to obclavate, apex obtuse, base obtuse with inconspicuous hilum, pale brown, becoming medium to dark brown, end cells usually paler, walls smooth or faintly granulose, 5–10 distoseptate, with septa becoming accentuated at maturity, 40–97.5(–105) × 12.5–15(–17.5) µm, Q = 3.2–7.8 (L^m = 69.6 µm, W^m = 13.5 µm, Q^m = 5.2). *Germination* via a germ tube at each end cell of conidium.

Culture characteristics — Colonies 10–44(–70) mm diam on potato-dextrose agar (Difco) after 7 d at 24 °C with a 12 h light/dark diurnal cycle; surface near dull green (30D4, 30E3), dark green (28F3, 30F3), to greenish grey (28F2), velutinous to tomentose with sparse, white, aerial hyphae and dark conidiophores; margin uneven and lobed, whitish; reverse near greenish grey (30F2), dark green (30F5), to almost black.

Typus. USA, West Virginia, near Arnoldsburg, Crummies Creek Tree Farm, on living leaves of *Microstegium vimineum*, Aug. 2009, coll. R. Richardson, *Bipolaris* 4 isolated by N.M. Kleczewski, holotype BPI 883727 (dried culture on PDA); culture ex-type CBS 132550; ITS sequence GenBank JX089579, *gpd* sequence GenBank JX089575, LSU sequence GenBank JX100808, MycoBank MB801569.

Additional specimens examined. USA, West Virginia, near Arnoldsburg, cove near Crummies Creek Tree Farm, on living leaves of *Microstegium vimineum*, Aug. 2009, coll. R. Richardson, *Bipolaris* 2 isolated by N.M. Kleczewski, BPI 883728 (dried culture on PDA); culture CBS 132549; ITS sequence GenBank JX089577 and *gpd* sequence GenBank JX089573; savannah near Crummies Creek Tree Farm, on living leaves of *Microstegium vimineum*, Aug. 2009, coll. R. Richardson, *Bipolaris* 3 isolated by N.M. Kleczewski, BPI 883729 (dried culture on PDA); culture CBS 132548; ITS sequence GenBank JX089578 and *gpd* sequence GenBank JX089574.

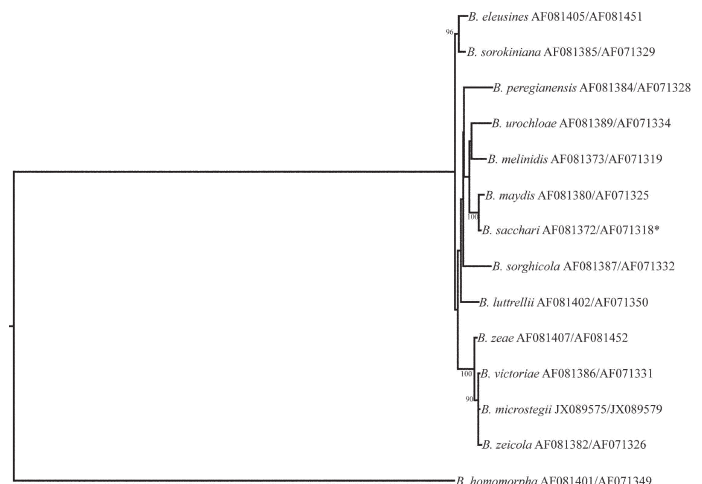
Phylogenetic analysis — The *gpd* and ITS sequences for all three isolates, *Bipolaris* 2–4 (Flory et al. 2011), were identical. A concatenated alignment of both loci was made using sequence data from the ex-type and Group 1 species (Berbee

et al. 1999). A maximum likelihood search was then performed using the RAXML BlackBox (<http://phylobench.vital-it.ch/raxml-bb/>) with gamma, partitioned model, and per gene branch length optimization; 100 bootstrap replicates were included.

Notes — The microscopic description is based on PDA cultures and colony colour is based on Kornerup & Wanscher (1978). Many species of *Bipolaris* are important pathogens of grasses. This new species was isolated from *Microstegium vimineum*, an invasive plant in the USA. The fungus causes disease on *Microstegium*, but it also infects a wider range of hosts (Kleczewski & Flory 2010, Flory et al. 2011, Kleczewski et al. 2012). Comparison of ITS and *gpd* sequence data to sequences in GenBank and subsequent phylogenetic analyses based on Group 1 species (Berbee et al. 1999), referred to herein as *Bipolaris* (sensu Manamgoda et al. 2012), suggest that the present species is distinct and closely related to *B. victoriae* and *B. zeicola*. These species of *Bipolaris* consist of a highly pathogenic species complex that shows large differences in virulence and host ranges in spite of few genetic differences in the sequenced loci. Using Sivanesan (1987), *B. microstegii* is morphologically similar to *B. miyakei* and *B. zeicola*. A probable original culture of *B. miyakei* (CBS 197.29) is not closely related to *B. microstegii* based on ITS (JX089580) and *gpd* (JX089576) sequences. *Bipolaris microstegii* differs from *B. zeicola* by its longer and sometimes branched conidiophores.

Microstegium vimineum is native to Asia. Several isolates of *Bipolaris* are known from *Microstegium* in Asia (Shimizu et al. 1998), but the origin of *B. microstegii* is unknown. Species of *Bipolaris* in Group 1 (Berbee et al. 1999) are highly pathogenic on a wide range of native and non-native hosts and these include major pathogens of corn and oats.

The best scoring tree from the maximum likelihood analysis. Bootstrap values ≥ 70 % are indicated. GenBank numbers of included sequences for each species are given as *gpd*/ITS. An asterisk denotes that *gpd* and ITS sequences were from different isolates.



Colour illustrations. Landscape invaded by *Microstegium vimineum*; leaf spots on *M. vimineum*; surface view of culture on PDA; conidiophore; conidia. Scale bars = 30 µm.

Andrew M. Minnis, Center for Forest Mycology Research, Northern Research Station, USDA-Forest Service, One Gifford Pinchot Dr., Madison, WI 53726, USA; e-mail: amminnis@fs.fed.us

Amy Y. Rossman, Systematic Mycology & Microbiology Laboratory, USDA-ARS, Rm. 246, B010A, 10300 Baltimore Ave., Beltsville, MD 20705, USA; e-mail: Amy.Rossman@ars.usda.gov

Nathan M. Kleczewski, Department of Botany and Plant Pathology, Purdue University, Southwest Purdue Agricultural Program, 4369 North Purdue Rd., Vincennes, IN 47591, USA; e-mail: nklecze@purdue.edu

S. Luke Flory, Agronomy Department, University of Florida, Gainesville, FL 32611, USA; e-mail: flory@ufl.edu