

Cochliobolus heliconiae sp. nov. (Ascomycota)

J. L. Alcorn

Plant Protection Unit, Department of Primary Industries,
Indooroopilly, Qld 4068, Australia.

Abstract

A new species of *Cochliobolus*, *C. heliconiae*, is described and illustrated. The species is heterothallic and ascomata were produced in pure culture using two isolates of its *Bipolaris* anamorph, also described as new, obtained from lesions on *Heliconia* spp. in northern Australia.

Introduction

The genus *Heliconia* (family Heliconiaceae) contains species of horticultural interest because of their decorative foliage and often brightly coloured inflorescence bracts. Two cultures of a *Bipolaris* species originating from *Heliconia* spp. in the Northern Territory, Australia gave rise to a *Cochliobolus* teleomorph when grown in paired culture. Morphological characteristics distinguish it from previously described species, and it is therefore described here as new. Teleomorph morphology is that expressed in cultures on Sachs agar + maize leaf, dark incubated at 25°C for approximately 1 month.

Observations

Cochliobolus heliconiae Alcorn, sp. nov. (Fig. 1)

Ascomata atra, 280–565 μm alta, 270–575 μm diam., globosa, rostro late conico 80–155 μm alto, ad basim 90–175 μm diam. ad apicem c. 30–80 μm , in pariete supero setosa. Setae atrobrunneae, versus apicem pallidiores, laeves vel ad basim verrucosae, rectae, 1–5 septatae, 55–225 \times 4–9 μm , ad basim 7.5–10 μm diam. Asci fusoidi, obclavato-fusoidi, cylindrici, ellipsoidei vel obpyriformes, pedicellati, 100–245 \times 25–60 μm . Ascosporeae hyalinae, filiformes, torsivae valde, versus apicem leviter angustatae, versus basim gradatim angustatae, 5–24 septatae, 310–650 \times 6–11 μm . BRIP 17349 holotypus.

Ascomata black, setose, with a beaked globose body sometimes flattened across the base, overall height 280–565 μm , 270–575 μm diam. Beak broadly conical, 80–155 μm high, 90–175 μm wide at the base and c. 30–80 μm at the apex. Setae dark brown in lower part and paler apically, straight, uniform to somewhat undulate in outline, smooth except for basal cell which may be verrucose, thick-walled (1–2 μm), 55–225 \times 4–9 μm , 7.5–10 μm diam. at the base, 1–5 septate. Asci fusoid, obclavate-fusoid, cylindrical to ellipsoid or obpyriform, 100–245 \times 25–60 μm , often with a pedicel 15–43 \times 7–11 μm . Ascospores hyaline, filiform, scarcely tapered to apex and gradually tapered to base, strongly coiled for the full length of the ascus or sometimes irregularly looped, thin-walled, 310–650 \times 6–11 μm , 5–24 septate.

Ascospore length alone distinguishes this taxon from most other *Cochliobolus* species. The minimum length of 310 μm is greater than the maximum length reported for 31 of the previously described species. A maximum ascospore length greater than 500 μm is known

for only two species, *C. akaii* Tsuda & Ueyama (1985) and *C. heteropogonis* Alcorn (1990). In both of these species other characteristics such as length of ostiolar neck, ascus shape and width, and connection with *Curvularia* anamorphs clearly separate them from *C. heliconiae*. Morphological attributes of the teleomorph indicate relationship to *C. heterostrophus* (Drechsler) Drechsler and generally similar species such as *C. carbonum* Nelson, *C. chloridis* Alcorn, *C. miyabeanus* (Ito & Kurib.) Drechsler ex Dastur, *C. setariae* (Ito & Kurib.) Drechsler ex Dastur and *C. victoriae* Nelson. No ascomata were formed when the parent isolates or single-ascospore cultures were grown singly under conditions conducive to their development in paired cultures of opposite mating types. Protothecia and asci, but no mature ascospores, were formed when single-ascospore cultures of *C. heliconiae* were paired with tester strains of *C. heterostrophus* and *C. melinidis* Alcorn.

It has not been possible to match this taxon to any described species of *Bipolaris*. The large spore size invites comparison with a limited number of taxa, both graminicolous and on other plant families. These species include *B. eleusines* Alcorn & Shivas with conidia up to 170 μm long, but they are darker, less curved, and wider than those of *C. heliconiae* (Alcorn 1990); *B. incurvata* (Ch. Bernard) Alcorn with somewhat wider, paler conidia, and shorter, thicker conidiophores; *B. microlaenae* Alcorn (1990) with darker conidia up to 185 μm long and up to 14 septate, and darker thicker conidiophores; *B. musae-sapientis* (Hansford) Khasanov with straighter, paler, wider conidia which tend to be slightly obclavate in shape (Ellis 1971; personal observation); *B. pluriseptata* (Khetarpal, Nath & Lal) Alcorn with much longer, 2–30 septate conidia (Khetarpal *et al.* 1984); *B. urochloae* (Putterill) Shoem. with darker, more or less straight, fusoid to obclavate conidia; *B. zaeae* Sivan. with obclavate to fusiform, darker conidia, up to 225 μm long and 22 μm wide (Sivanesan 1987); and *B. heveae* (Petch) Arx usually with navicular to fusiform conidia (Ellis 1971), and which in culture forms conidia with pronounced, unilateral thickening of the wall on the convex side (personal observation). Helminthosporioid fungi reported from *Heliconia* spp. include *Drechslera musae-sapientum* in Venezuela (Madriz *et al.* 1991), and unidentified *Helminthosporium* spp. in Barbados (Chandler *et al.* 1992). Unfortunately, voucher specimens or cultures of these fungi have not been available for comparison with *B. heliconiae*. The fungus recorded by Farr *et al.* (1989) as *Helminthosporium* sp. is a species of *Bipolaris* distinct from *B. heliconiae*. The absence of a suitable specific epithet in *Bipolaris* for the anamorph of *C. heliconiae* is remedied below, in line with previous practice when *Cochliobolus* states have been discovered for previously undescribed *Bipolaris* species (Alcorn 1990).

***Bipolaris heliconiae* Alcorn, sp. nov. (Fig. 2)**

Conidiophora singularia, cylindrica, simplicia, infra medio-olivaceobrunnea, apicem versus pallidiora, recta vel flexuosa, supra geniculata, cicatricata, ad cicatrices verruculosa, alibi laevia, usque ad 595 μm longa, ad basim saepe tumida 11–15 μm diam., prope basim 9–10 μm diam., ad apicem 5–6 μm diam. Conidia olivaceobrunnea vel rufobrunnea, concoloria, fusoida vel clavatofusoida, laevia, curvata, ad basim hemiellipsoidea, ad apicem hemisphaerica vel hemiellipsoidea, 7–10 distoseptata, 65–150 \times 14.5–19 μm . BRIP 17186 holotypus.

On water agar + wheat straw exposed to near ultraviolet light at room temperature (c. 20–26°C), conidiophores are mid-olivaceous brown below, paler apically, single, multiseptate, straight to flexuous in the lower part, geniculate in the fertile region with conidiogenous nodes distant and obviously verruculose, up to 595 μm long after 7 days, basal cell often swollen to 11–15 μm , 9–10 μm diam. just above the basal cell and 5–6 μm at the apex. Conidia fusoid to clavate-fusoid, often slightly wider in upper half, curved, olivaceous to slightly reddish brown, 65–150 \times 14.5–19 μm , 7–10 septate, mean cell length 11.8–12.8 μm , basal cell hemiellipsoidal with an inconspicuous hilum or slightly truncate, 10–19 μm long, apical cell near hemispherical to hemiellipsoidal, 6–15 μm long. The primary septum in developing conidia is submedian, and the second septum delimits the basal cell.

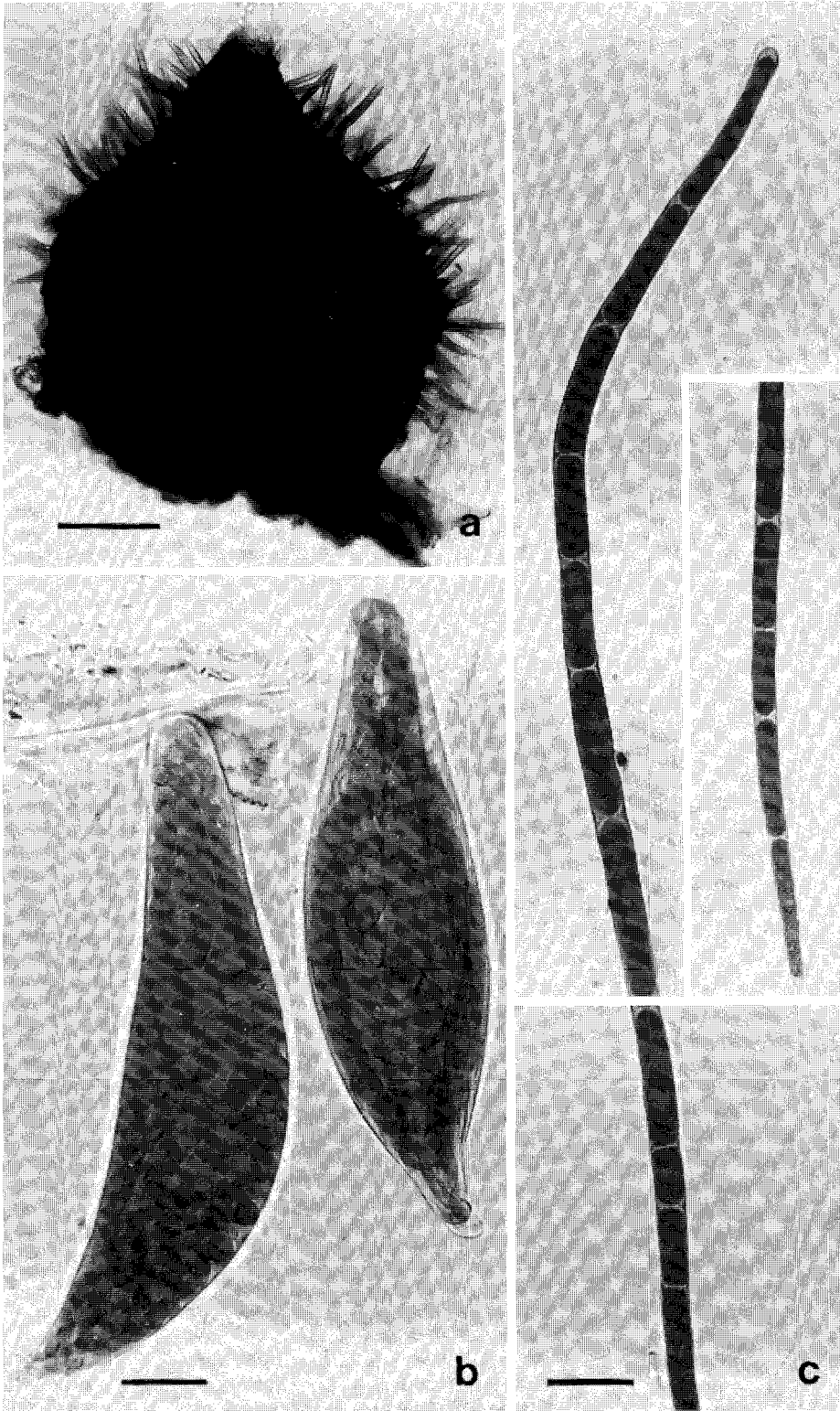


Fig. 1. *Cochliobolus heliconiae*. BRIP 17349. (a) Ascoma (b) Asci (c) Ascospore (inset: lower portion of spore). Scale bars = 100 μ m (a), 20 μ m (b and c).

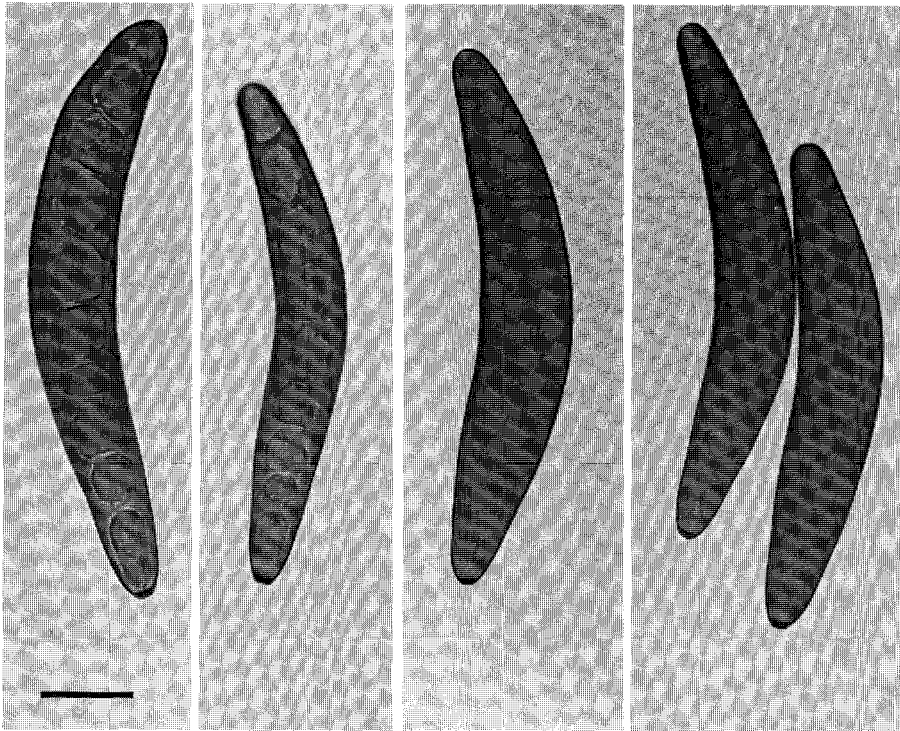


Fig. 2. *Bipolaris heliconiae*. BRIP 17186, two conidia on left; BRIP 17189, conidia on right. Scale bar = 20 μ m.

Heliconia appears to be a congenial host for species of *Bipolaris*, and several other taxa from this host are known to the author. These collections are cited below to make it clear that they are considered distinct from *B. heliconiae* described above.

Specimens Examined

Teleomorph: BRIP 17259, paired single-ascospore cultures (various), 17 Sept.–19 Oct. 1990; BRIP 17266, NT 17605 \times NT 17610, 13 Aug.–12 Sept. 1990; BRIP 17295, paired single-ascospore cultures (9083–4 \times 9083–6), 24 Oct.–22 Nov. 1990; BRIP 17349, paired single-ascospore cultures (9083–4 \times 9083–6), 20 Dec. 1990–18 Jan. 1991 (holotype); BRIP 17769, paired single-ascospore cultures (9083–1 \times 9083–4; 9083–4 \times 9083–6), 26 Mar.–23 Apr. 1991. **Anamorph:** BRIP 17186, *Heliconia psittacorum* cv. Parakeet, Batchelor, Northern Territory, Australia, *J. Duff NT 17605*, comm. July 1990 (holotype); BRIP 17188, *H. psittacorum* cv. Andromeda, Batchelor, N.T., *J. Duff NT 17609*, comm. July 1990; BRIP 17189, *H. chartacea* cv. Sexy Pink, Batchelor, N.T., *J. Duff NT 17610*, comm. July 1990; BRIP 17424, single-ascospore cultures 9083–4 & 9083–6 ex NT 17605 \times NT 17610, Sept. 1990. **Other *Bipolaris* species.** BRIP 22574 *Bipolaris cynodontis* (Marig.) Shoem. on *H. chartacea* cv. Sexy Pink, Oahu, Hawaii, USA, *D. Ogata ADSC 91–072*, 1991; BRIP 22576 *B. salviniae* (Muchovej) Alcorn on *H. orthotricha*, Hilo, Hawaii, *J. Uchida 92–372*, 1992; ***Bipolaris* spp. undet.** BRIP 15286 on *Heliconia* sp., Babinda, Queensland, Australia, *L. Forsberg*, 28 Aug. 1986; BRIP 15944 on *Heliconia* sp., Brampton Beach, Qld, *F. D. Hockings*, Sept. 1987; BRIP 16403 on *Heliconia* sp., Gordonvale, Qld, *M. Ramsey M. 4897*, Aug. 1988; BRIP 17260 on *Heliconia* sp., Mossman, Qld, *I. Sargeant*, 22 Oct. 1990; BRIP 17404 on *Heliconia* sp., Atherton, Qld, *P. Trevorrow M. 56761a*, 6 Nov. 1990; BRIP 17466 on *Heliconia* sp., Miami, Florida, USA, *W. B. Wood*, 22 Feb. 1923, slide ex BPI 428320; BRIP 22573 on *H. caribaea* cv. Caribaea, Hilo, Hawaii, *D. Ogata ADSC 93–764*, 1993; BRIP 22575 on *Heliconia* sp. cv. Bengal, Hilo, Hawaii, *J. Uchida 92–367*, 1992; BRIP 22577 *Bipolaris* sp. aff. *B. setariae* on *H. stricta* cv. Dwarf Jamaican, Kauai, Hawaii, *R. Yamakawa*, 1990; BRIP 22578 on *H. chartacea* cv. Sexy Pink, Kalaheo, Kauai, Hawaii, *D. Ogata*, Apr. 1986; BRIP 22750 on *Heliconia* sp. cv. Golden Torch, Woombye, Qld, *K. Adamson*, May 1995.

Acknowledgments

I am grateful to M. Aragaki, J. Duff and J. Uchida for supplying some of the cultures cited above, and to the curator of BPI for lending specimens.

References

- Alcorn, J. L. (1990). Additions to *Bipolaris*, *Cochliobolus* and *Curvularia*. *Mycotaxon* **39**, 361–392.
- Chandler, J. St A., Paulraj, L., and Chinnery, L. E. (1992). Pests, diseases and other problems affecting heliconias and their relatives in Barbados—past, present and future. In 'Proceedings Tenth Annual Conference of the Barbados Society of Technologists in Agriculture, Barbados, November, 1992'. pp. 97–111. (Barbados Society of Technologists in Agriculture: Christ Church.)
- Ellis, M. B. (1971). 'Dematiaceous Hyphomycetes.' (Commonwealth Mycological Institute: Kew.)
- Farr, D. F., Bills, G. F., Chamuris, G. P., and Rossman, A. Y. (1989). 'Fungi on Plants and Plant Products in the United States.' (The American Phytopathological Society: St Paul.)
- Khetarpal, R. K., Nath, R., and Lal, S. P. (1984). A new species of *Drechslera* recorded on seed of *Eleusine coracana*. *Indian Phytopathology* **37**, 320–321.
- Madriz, R., Smits, B. G., and Noguera, R. (1991). Principales hongos patógenos que afectan algunas especies ornamentales del género *Heliconia*. *Agronomia Tropical (Maracay)* **41**, 265–274.
- Sivanesan, A. (1987). Graminicolous species of *Bipolaris*, *Curvularia*, *Drechslera*, *Exserohilum* and their teleomorphs. *Mycological Papers* **158**, 1–261.
- Tsuda, M., and Ueyama, A. (1985). Two new *Pseudocochliobolus* and a new species of *Curvularia*. *Transactions of the Mycological Society of Japan* **26**, 321–330.

Manuscript received 18 December 1995, accepted 23 May 1996