APS Publications

First Report of Ceratocystis Wilt Caused by *Ceratocystis fimbriata* on *Caryocar brasiliense* Trees in Brazil

A. C. da Silva, T. S. Cândido, N. L. P. Sales, T. C. Harrington, and A. C. Alfenas

Affiliations

Authors and Affiliations

A. C. da Silva

T. S. Cândido , Departamento de Fitopatologia, Universidade Federal de Viçosa, CEP 36570-900, Viçosa, MG, Brasil

N. L. P. Sales , Universidade Federal de Minas Gerais, CEP 39404-006, Montes Claros-MG, Brasil

T. C. Harrington , Department of Plant Pathology and Microbiology, Iowa State University, Ames 50011

A. C. Alfenas †, Departamento de Fitopatologia, Universidade Federal de Viçosa, CEP 36570-900, Viçosa, MG, Brasil

Published Online: 7 Aug 2017 | https://doi.org/10.1094/PDIS-03-17-0376-PDN

The pequi tree (*Caryocar brasiliense*) is native to the Cerrado of Brazil, and its edible fruit is harvested for local and commercial use. Collectors of pequi fruit in the northern region of the state of Minas Gerais have noted sudden death of trees up to 40 years in age. During an inspection on pequi trees near Montes Claros in May 2014, several dead and dying trees were observed. The initial symptoms included yellowing, browning, and wilting of the leaves on several lateral branches. Trees in later stages of disease lost most of their leaves and suddenly died. The woody xylem of affected trees showed irregular streaks of discoloration, and dead trees had numerous galleries caused by unidentified ambrosia beetles, both of which are typical symptoms of Ceratocystis wilt. Similar symptoms were noted on several trees near Lontra, Minas Gerais. Fungal isolations from transverse sections of the stem of naturally infected trees were performed by baiting with live carrot roots (**Moller and Devay 1968**). Ascospore masses that formed at the tip of the perithecia were transferred to malt yeast extract agar (MYEA), and isolates typical of *Ceratocystis fimbriata* were obtained from

the two locations: black, globular perithecia (90 to 265 × 80 to 225 µm) with long necks (195 to 800 µm), hyaline ascospores (6 to 8.5 × 2.5 to 4.5 µm) with hat-shaped brims, cylindrical endoconidia (12 to 27 × 2.5 to 5.5 µm) and doliform endoconidia (4.5 to 9 × 3.5 to 8 µm) in chains, and pyriform, dark brown aleuroconidia (13 to 19.5 × 8.5 to 14 µm) were formed on the culture medium. The internal transcribed spacer regions (ITS, MF197435) and a portion of the β-tubulin gene (MF276918) of isolate LPF1325 were sequenced (**Oliveira et al. 2015**). The ITS sequence was found to be 100% identical to the *C. fimbriata* ITS6 haplotype (GenBank HQ157548) described from Bahia, São Paulo, and Rio de Janeiro on *Eucalyptus* hybrids and *Mangifera indica* (mango) (**Harrington et al. 2014**; **Oliveira et al. 2015**). The β-tubulin sequence was found to be 100% identical to GenBank KR002844, which has been identified in *C. fimbriata* isolates from *Ficus carica* (fig) and mango in São Paulo (**Oliveira et al. 2015**). The xylem of six 1-year-old pequi seedlings (15 to 20 cm height) was injected (sterile hypodermic needle, 2 mm diameter) at 1.5 cm above soil line with a suspension of 2.4×10^6 spores/ml, and six control plants were treated with sterile water. The seedlings were placed in a greenhouse that average 25.2°C and 79% RH. All inoculated plants died within 6 to 12 days after inoculation, while control plants remained asymptomatic. Cultures morphologically identical to *C. fimbriata* were reisolated from the stem tissues of the inoculated plants, confirming pathogenicity. Fungal cultures were deposited in the Laboratory of Forest Pathology (LPF1325 and LPF2080) and in the fungal collection of the Universidade Federal de Viçosa (DOA 1239 – COAD 2202 and DOA1240 – COAD2203). This is the first report of *C. fimbriata* causing wilt and death in pequi trees. *C. fimbriata* is a native, soilborne fungus in Brazil, where it is a very aggressive pathogen on numerous crop species (**Harrington et al. 2011**). It is unclear if the strain of *C. fimbriata* on pequi is native to the Cerrado or if it was introduced to the region, but it appears to be a significant threat to pequi trees in its natural ecosystem.

APS Publications

The American Phytopathological Society (APS)

3285 Northwood Circle, Suite 100, St. Paul, MN 55121 USA

+1.651.454.7250
FAX +1.651.454.0766
APS

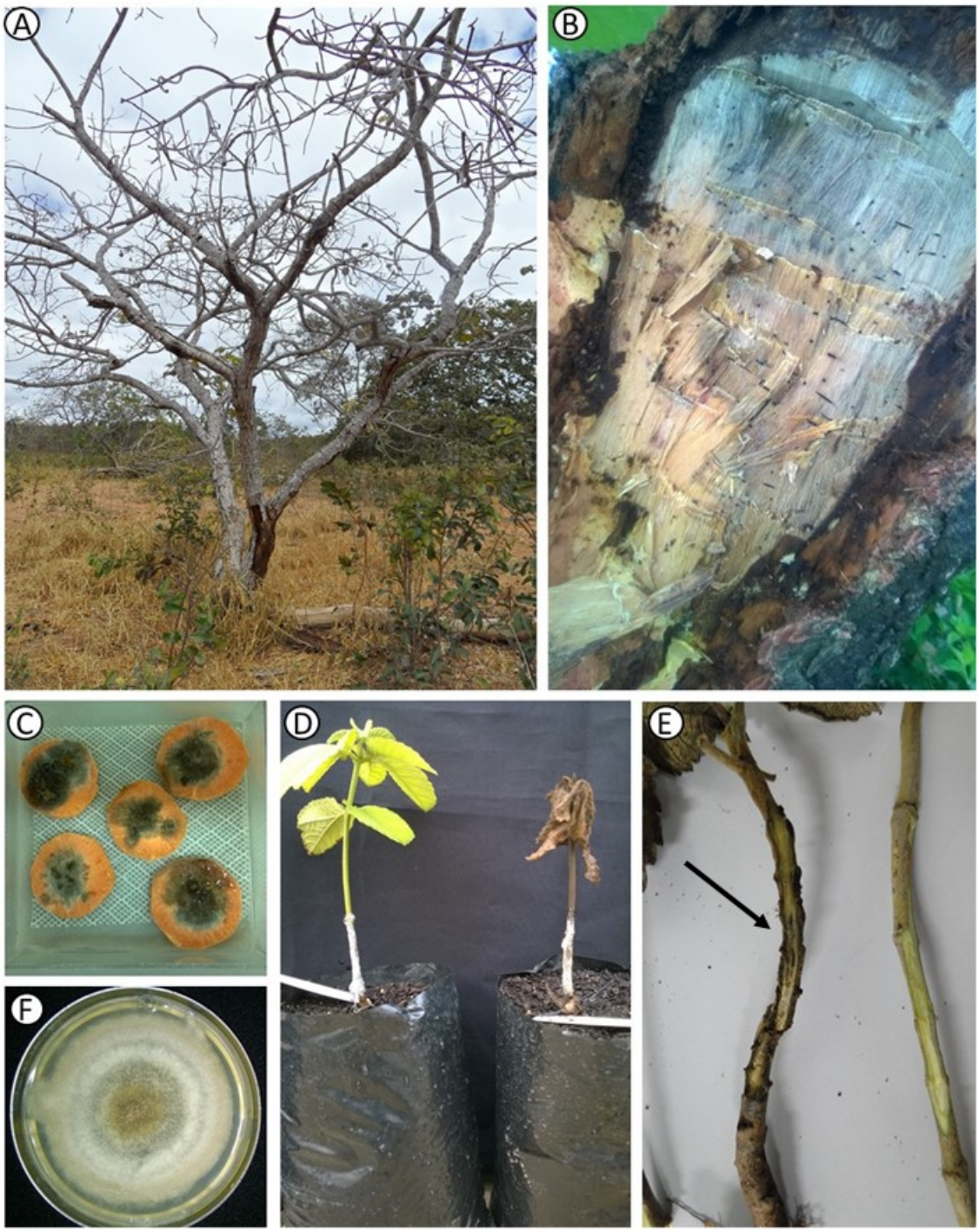

Figure 1. Ceratocystis wilt on pequi tree death. A - Dead pequi tree in the field; B – Discoloration and ambrosia beetle galleries in the main stem of a dead tree; C - Isolation of the fungus from discolored xylem showing dark mycelium and sporulation on the carrot slices; D – Control (left) and inoculated (right) pequi seedlings; E – Internal discoloration and death of inoculated (left) seedling compared to a control seedling 6 days after inoculation; F - Reisolation of the fungus from an inoculated seedling.

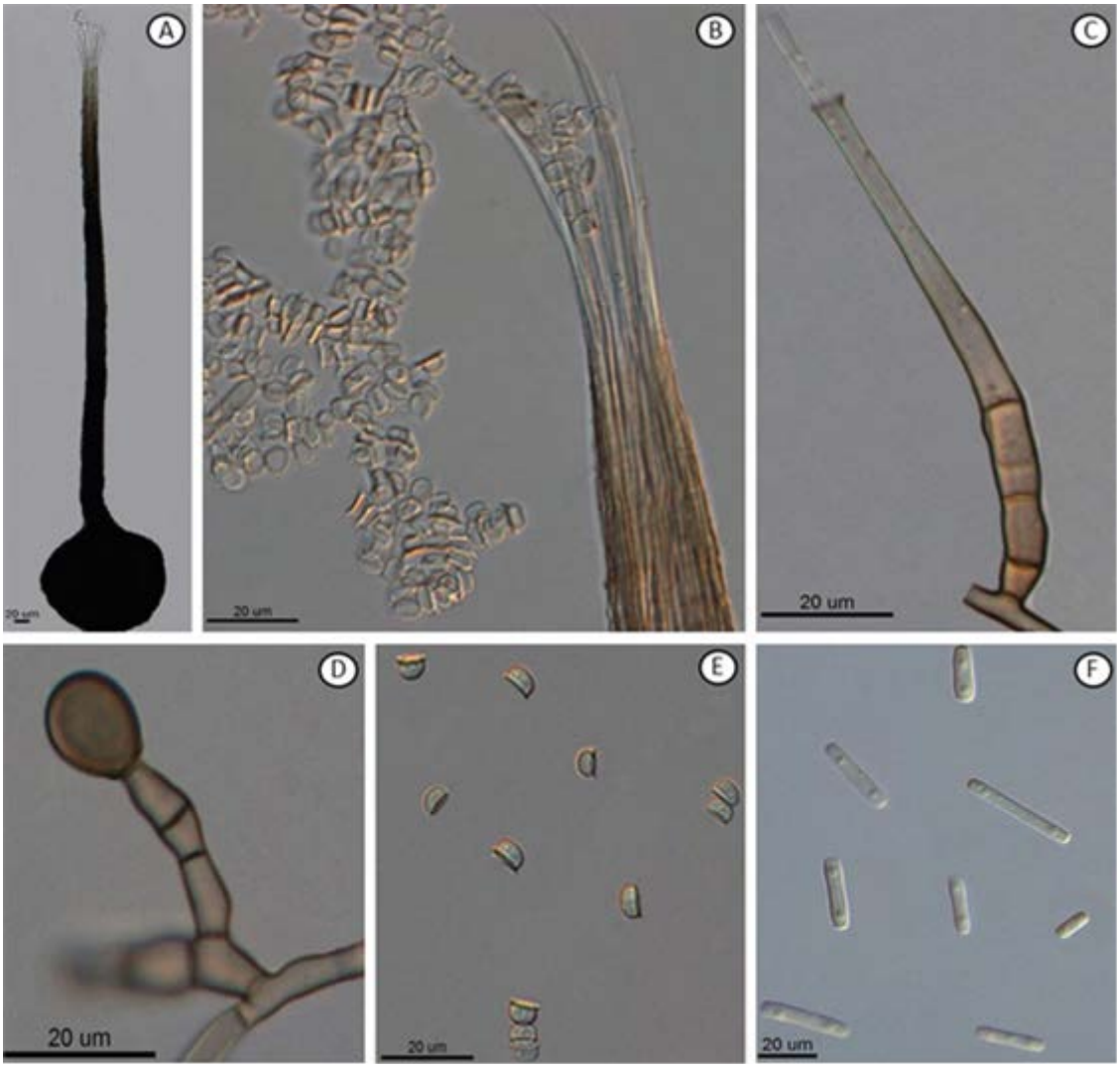

Figure 2. Morphological characteristics of *Ceratocystis fimbriata* from *Caryocar brasiliense*. A - Perithecia; B - Ostiolar hyphae and ascospores; C - Flask-shaped endoconidiophore producing cylindrical endoconidia; D - Aleuroconidiophore producing aleuroconidium; E - Hat-shaped ascospores; F - Cylindrical endoconidia.

References:

Harrington, T. C., et al. 2011. **Phytopathology** 101:555. https://doi.org/10.1094/PHYTO-08-10-0228 Link, ISI, Google Scholar

Harrington, T. C., et al. 2014. **Mycologia** 106:224. https://doi.org/10.3852/13-189 Crossref, ISI, Google Scholar

Moller, W. J., and Devay, J. E. 1968. **Phytopathology** 58:123. ISI, Google Scholar

Oliveira, L. S. S., et al. 2015. **Phytopathology** 105:1229. https://doi.org/10.1094/PHYTO-03-15-0065-R Link, ISI, Google Scholar