
Alfaria cyperi-esculenti

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Alfaria Crous, N.J. Montaño-Mata & García-Jim., *gen. nov.*

Etymology. Named in honour of Prof. dr Agustín Alfaro, Spanish plant pathologist and founder of the Plant Pathology Laboratory of the Universitat Politècnica de València (Spain).

Plant pathogenic, associated with leaf tip dieback and tuber rot. *Ascomata* black, hypophyllous on leaves, globose, immersed, subepidermal with central ostiole; wall of 6–10 layers of thin-walled brown *textura angularis*, upper region of perithecium somewhat darker brown than base or sides; ostiolar area containing several additional layers, thus thicker than base or sides. *Paraphyses* intermingled among asci, hyaline, smooth, subcylindrical, hyphal-like, with obtuse apices, septate, at times constricted at septa. *Asci* fasciculate, hyaline, short stipitate, subcylindrical with obtuse apices, unitunicate, with apical mechanism, not staining in Meltzer's reagent, containing 2–8 ascospores that are bi- to tri-seriate in ascus. *Ascospores* hyaline, smooth, granular, fusoid-ellipsoid, widest in middle with obtuse ends, 0–3-septate, at times with mucoid sheath or mucoid caps.

Type species. *Alfaria cyperi-esculenti*.
MycoBank MB808923.

Alfaria cyperi-esculenti Crous, N.J. Montaño-Mata & García-Jim., *sp. nov.*

Etymology. Named after the host from which it was isolated, *Cyperus esculentus*.

Associated with leaf tip dieback and tuber rot. *Ascomata* black, hypophyllous on leaves, globose, up to 300 µm diam, immersed, subepidermal with central ostiole, up to 20 µm diam; wall of 6–10 layers (10–20 µm diam) of thin-walled brown *textura angularis*, upper region of perithecium somewhat darker brown than base or sides; ostiolar area containing several additional layers, thus thicker than base or sides, up to 35 µm diam. *Paraphyses* intermingled among asci, hyaline, smooth, subcylindrical, hyphal-like, up to 90 µm long, 4–8 µm diam with obtuse apices, 1–4-septate, at times constricted at septa. *Asci* fasciculate, hyaline, short stipitate, subcylindrical with obtuse apices, 65–130 × 9–12 µm, unitunicate, with apical mechanism, not staining in Meltzer's reagent, containing 2–8 ascospores that are bi- to tri-seriate in ascus. *Ascospores* hyaline, smooth, granular, fusoid-ellipsoid, widest in middle with obtuse ends, 0–3-septate, at times with mucoid sheath or mucoid caps, (19–)24–28(–30) × (4–)5(–6) µm.

Culture characteristics — Colonies flat, spreading, with sparse aerial mycelium and even, lobate margins, reaching 15 mm diam after 2 wk at 25 °C. The optimum growth temperature was between 25–28 °C, with no growth at 31 °C. Colonies on PDA vary in growth rate at 25 °C from 1.5–2 mm/d. Sporulation was achieved on an artificial medium consisting of cornmeal agar supplemented with autoclaved *Cyperus esculentus* leaves. On MEA surface ochreous, reverse apricot. On OA surface saffron. On PDA surface and reverse pale luteous.

Typus. Spain, Valencia, on leaves of *Cyperus esculentus* (*Cyperaceae*), 14 June 2013, *A.M. Pérez Sierra* (holotype CBS H-21703, culture ex-type CPC 23153–23154; ITS sequence GenBank KJ869143, LSU sequence GenBank KJ869200, MycoBank MB808924).

Notes — Tiger nut (*Cyperus esculentus*) has been used as food for over 3000 yr, but also represents a major weed worldwide (Pascual et al. 1997). Its origin is in Africa and southern Europe, and its most common habitats are tropical and subtropical areas. In some countries tiger nuts are used as feed for livestock, fisheries and have been cited as a potential food for some birds. It is used in the manufacturing of emulsions for medical treatment for digestive dysfunctions. Its oil and fats are used to make soaps. With regard to human consumption the tubers can be consumed in different ways: fresh, roasted, malted or squeezed in refreshing drinks. In Spain, tiger nut is cultivated in Valencia province, eastern Spain, for the production of tiger nut milk ('horchata'). This beverage is one of the traditional drinks in this region.

Since 2002 a new fungal disease affecting this crop was detected in almost all tiger nut cultivated areas in Valencia. The symptoms appeared in plants randomly distributed in the field and consisted of leaf apical necrosis in the early stages of plant development (approximately the first 30–45 d). The symptoms could be detected as early as 15–20 d after plant emergence and the fruit bodies of the fungus could be observed on the affected leaves 7–10 d later. In parallel, a reddish orange discolouration could be observed on the tubers, which also extended to the inside of the tuber and subsequently resulted in tuber rot. The necrosis can also affect the inflorescences, where the fruiting bodies can be detected on the bracts, on the umbel peduncle and the pedicel of the spikes. However, the disease cannot be observed on leaves and stems that develop in later stages of development and therefore, the disease can be overlooked. *Alfaria cyperi-esculenti* was consistently isolated from affected plant material and its presence was confirmed in inflorescences, leaves and tubers. Since this species could not be accommodated elsewhere, the hypocrealean genus *Alfaria* is introduced to accommodate it.

ITS. Based on a megablast search of NCBIs GenBank nucleotide database, the closest hits using the ITS sequence are *Myrothecium leucotrichum* (GenBank AJ301992; Identities = 578/585 (99 %), Gaps = 2/585 (0 %)), *Myrothecium gramineum* (GenBank AY254151; Identities = 548/572 (96 %), Gaps = 9/572 (1 %)) and *Stachybotrys chartarum* (GenBank KC787692; Identities = 540/591 (91 %), Gaps = 21/591 (3 %)).

LSU. Based on a megablast search of NCBIs GenBank nucleotide database, the closest hits using the LSU sequence are *Stachybotrys microspora* (GenBank KC305349; Identities = 784/801 (98 %), Gaps = 3/801 (0 %)), *Stachybotrys chlorohalonata* (GenBank JN938870; Identities = 780/804 (97 %), Gaps = 1/804 (0 %)) and *Stachybotrys chartarum* (GenBank JF746157; Identities = 780/804 (97 %), Gaps = 1/804 (0 %)).

Colour illustrations. *Cyperus esculentus* with leaf dieback symptoms; infected tuber; ascomata on leaf tissue; vertical section through ascoma, paraphyses, asci and ascospores. Scale bars: ascoma = 250 µm, all others = 10 µm.

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