Two new Aroramyces species (Hysterangiaceae, Hysterangiales) from México

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Abstract: Little is known of the truffle-like fungi of northern Mexico. Few mycologists have collected truffle-like specimens in this area. The wide diversity of habitat and potential mycorrhizal partners portend a unique and varied truffle-like mycota. In the conduct of recent field studies in this region we collected many interesting truffle-like specimens. We present two taxa that have unique characteristics, brownish spores with spines embedded within a distinctly inflated utricle surrounding each spore. Aroramyces balanosporus and A. herrerae are described as new species. This is the first record of the genus Aroramyces from North America.

Introduction

The generic name Aroramyces Castellano & Verbeken 2000 (syn. Radiogaster McGinty 1924; nom. inval.) was introduced for two species described from tropical and subtropical habitats in Africa and Australia: A. gelatinosporus (J.W. Cribb) Castellano 2000 and A. radiatus (Lloyd) Castellano et al. 2000. Five additional species from Australia remain undescribed (Francis & Bougher 2003). Aroramyces was segregated from Hysterangium by Castellano et al. (2000) mainly on the basis of spore characters (prominent spines on the spore surface within an inflated utricle) and a pink to brown, gelatinized gleba, while Hysterangium is characterized by a green-toned gleba with smooth, hyaline spores (Castellano et al. 2000, Montecchi & Sarasini 2000). Recent phylogenetic studies placed both Hysterangium and Aroramyces in the family Hysterangiaceae (Hysterangiales) and postulate that all members of this family are obligate ectomycorrhizal fungi with angiosperms and gymnosperms (Hosaka et al. 2008). The genus Aroramyces had not been reported from North America until recent field trips to forests in central México from 2007 to 2011 yielded two undescribed Aroramyces species.

Material and Methods

Methods of collection, macroscopic, and microscopic study were generally those of Castellano et al. (1989) and Pegler et al. (1993). Colours of fresh basidiomes are given in general terms of the collectors. Dried specimens were hand cut and mounted in 5 % KOH, Melzer’s reagent, or water for microscopic observation. Fungal specimens are deposited in ITCV and OSC. Spore measurements were made with a compound microscope at 1000x under oil immersion on 20 spores.

Taxonomy

Aroramyces balanosporus Guevara & Castellano, sp. nov.

Mycobank MB812927
(Fig. 1 A–F)

Etymology: “balanosporus” in reference to the shape of the spores that resemble an oak acorn formed by the irregular inflation of the utricle.

Diagnosis: This species differs from the two central Africa and northern Queensland species in the brownish spores with a distinct inflated utricle with embedded spines, and also spore size.


Description: Macrocharacters. Basidiomes globose, sub-globose to irregular, 7–12 x 8–12 x 6–8 mm, peridial surface fibrillose or tomentose, often with cottony-like patches of bright white hyphae which encompass some soil debris and ectomycorrhizal roots scattered across the peridial surface,
Aroramyces herrerae
(Fig. 1 G-L)

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Discussion

Aroramyces balanosporus is recognized by its brownish spores with a distinct, inflated utricle with embedded spines. Two other Aroramyces species occur in tropical central Africa or northern Queensland, Australia. Aroramyces radiatus from Africa has smaller spores, 10–12(–13.5) x 6–7(–8) μm (with hilar appendage), and associates with Brachystegia spiciformis (Caesalpinioideae) or Uapaca sp. (Euphorbiaceae). Aroramyces gelatinosporus from Australia has similar-sized spores but possesses a single-layered peridium and associates with Eucalyptus spp. (Myrtaceae).

Aroramyces herrerae Guevara, Gómez & Castellano, sp. nov.

MycoBank MB812928
(Fig. 1 G-L)

Etymology: “herrerae” - in honor to Teófilo Herrera Suárez, one of the pioneer mycologists of México.

Diagnosis: Differs from all other known Aroramyces species in the distinctly inflated wing-like appearance of the utricle (inflated to 6 μm).


Description: Macrocharacters. Basidiomes irregular, globose or subglobose, 5–18 x 6-15 x 5–10 mm, peridial surface white, pale tan to brownish, mottled dark brown with pale areas when handled and when dried, smooth when fresh, much wrinkled when dried, with some white mycelial strands, soil and organic matter adherent to surface, KOH (5%) brown to blackish on the surface of dried specimens; odour acetone/ether solvent-like; taste not recorded. Peridium <0.5 mm thick, somewhat separable. Gleba brown to dark brown in all stages, nearly black when dried, locules ellipsoid to elongate, stuffed with spores, columella dendroid, gelatinized, grayish. Rhizomorphs few, small, white attached at base.

Microcharacters. Peridium 70–400 μm thick, two-layered. Epicutis 45–175 μm thick, usually on the thinner side with occasional areas with wart-like protrusions, of septate, thin-walled, pale yellow-brown to yellow-brown, repent hyphae, 4.5–6.5 μm broad, occasional cells inflated to 18 μm broad, with interspersed small crystalline particles scattered across layer. Subcutis 110–135 μm thick, of septate, thin-walled, hyaline, interwoven to subparallel or cross-feathered hyphae, 6.5–11(–15) μm broad. Mycelial strands on peridium of dark brown, filiform, branched hyphae, 2–3 μm broad, encrusted with small crystalline particles, clamp connection present. Trama 37–112 μm thick, of hyaline, thin-walled, compactly interwoven to parallel hyphae, 2–5 μm broad, in a gelatinized matrix, clamp connections present. Basidia not found. Basidiospores fusoid, symmetrical, without utricle and hilar appendage 10.5–11.5(–11.5) x 5.5–6 μm, = 1.71–2.17, Q mean = 1.89; with utricle and hilar appendage 12.5–13.5(–15) x (7–)7.5–8 μm, mean = 13.3 x 7.6 μm, Q range = 1.67–1.88, Q mean = 1.75, numerous fine spines within the utricle, in KOH hyaline to pale brown singly, reddish brown to dark brown in mass, hilar appendage 1–2 μm long x 2.5 μm broad, walls to 1 μm wide, utricle inflated and to 3 μm broad, hyaline, many spores with inflated utricle toward the distal part of the spore, inamyloid, nondextrinoid.

Distribution and ecology:

Aroramyces herrerae is recognized by its white to pale tan areas, numerous soil particles adhering to surface; odour fungoid or indistinct; taste not recorded. Peridium separable and fragile, <0.5 mm thick, white to pale tan in cross-section. Gleba brown, gelatinized tramal veins, hard when dried, locules somewhat irregular or elongated. Columella, distinct but thin and gelatinized.

Microcharacters. Peridium 3-layered, 200–450 μm thick. Epicutis 38–150 μm thick, of hyaline to reddish brown, thin-walled, interwoven to repent or erect hyphae, 2.5–6 μm broad, forming scattered saepisipate groups of branches, setal hyphae 2.5–5 μm broad, with abundant crystalline structures adherent on hyphal walls, clamp connections present. Mesocutis 125–180 μm thick, of reddish brown, isodiametric, angular, or irregular hyphae, occasionally interwoven, hyphae 2.5–42 μm broad, walls to 2.5 μm broad. Subcutis 40–125 μm thick, of hyaline, repent or interwoven hyphae, ± 3 μm broad. Hyphae: occasionally with wide terminal prostrate hyphae to 48 μm broad, broadly clavate, walls to 2.5 μm broad, clamp connections present. Trama of hyaline, interwoven to occasionally parallel hyphae, 2–8 μm broad, immersed in a gelatinized matrix, clamp connections present. Basidia clavate to broadly clavate, 11–50 x 5–20 μm, hyaline to pale brown, walls to 1 μm thick, 4-spored. Sterigma 4–10 long μm x 2–3 μm broad, hyaline. Basidiospores ellipsoid to occasionally broadly-ellipsoid, symmetrical, without utricle and hilar appendage (10–)10.5–11(–11.5) x 5.5–6 μm, x = 10.7 x 5.7 μm, Q range = 1.71–2.17, Q mean = 1.89; with utricle and hilar appendage 12.5–13.5(–15) x (7–)7.5–8 μm, mean = 13.3 x 7.6 μm, Q range = 1.67–1.88, Q mean = 1.75, numerous fine spines within the utricle, in KOH hyaline to pale brown singly, reddish brown to dark brown in mass, hilar appendage ± 1 μm long x 2.5 μm broad, walls to 1 μm wide, utricle inflated and to 3 μm broad, hyaline, many spores with inflated utricle toward the distal part of the spore, inamyloid, nondextrinoid.

Distribution and ecology:

Mexico: (states of Jalisco and Michoacán). Hypogeous, under Carpinus sp., Quercus magnifolia, and Styrae sp. at approximately 1730 m elevation, September and November.


Discussion: Aroramyces balanosporus is recognized by its brownish spores with a distinct, inflated utricle with embedded spines. Two other Aroramyces species occur in tropical central Africa or northern Queensland, Australia. Aroramyces radiatus from Africa has smaller spores, 10–12(–13.5) x 6–7(–8) μm (with hilar appendage), and associates with Brachystegia spiciformis (Caesalpinioideae) or Uapaca sp. (Euphorbiaceae). Aroramyces gelatinosporus from Australia has similar-sized spores but possesses a single-layered peridium and associates with Eucalyptus spp. (Myrtaceae).

Discussion: Aroramyces herrerae is recognised by its brown gleba and the distinctly inflated, wing-like appearance to the utricle (inflated up to 6 µm).

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