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DESCRIPTIONS OF ECTOMYCORRHIZAE *11/12:* 131–134 (2008)

"Quercirhiza tomentelloepidermoidea"

+ Quercus suber L.

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Short description

Mycorrhiza dark brown with monopodial-pyramidal ramification. The most remarkable feature is the pseudoparenchymatous outer mantle layer transient to plectenchymatous with irregularly shaped hyphae, some of them almost epidermoid, and the mounds of roundish cells on the surface. Middle and inner mantle layers plectenchymatous with irregularly shaped hyphae distributed without a discernible pattern in a non-gelatinous matrix. The identification of the mycosymbiont as a member of the genus *Tomentella* was confirmed by nrDNA internally transcribed spacer (ITS) sequencing analysis.

Morphological characters (Fig. 1): – *Mycorrhizal systems* dark brown and monopodial pyramidal, with up to 19 mm long systems, ca. 17-38 side-branches per 10 mm, rather frequent. – *Main axes* 0.25-0.4 mm diam. – *Unramified ends* dark brown, cylindrical, surface rough, 0.8-4.5 mm long, 0.25-0.35 mm diam.; older mycorrhizae blackish, not carbonizing. – *Surface of unramified ends* rather rough, distinct, not transparent, cortical cells not visible; emanating hyphae abundant, with dark brown colour and not specifically distributed. – *Rhizomorphs* not observed. – *Cystidia* lacking. – *Sclerotia* not observed.

Anatomical characters of mantle in plan views (Fig. 2): Mantle hyphae plasmatically yellowish brown and cell walls yellowish brown, gelatinous matrix absent. – *Outer mantle layers* densely plectenchymatous, transitional to pseudoparenchymatous, not gelatinous, composed of irregularly shaped hyphae, some of them epidermoid-like, with mounds of roundish cells on the surface (type K, according to Agerer 1987-2006, Agerer & Rambold 2004-2007), (Fig. 2a), hyphal cells 16-38(54) µm long and (6)8-16(23) µm diam., walls 0.5-1 µm thick and septa with dolipore like structures. – *Middle mantle layers* plectenchymatous, similar in structure to the outer mantle layer, with irregularly shaped hyphae, cells 16-38(54) µm long and 7-16(20) µm diam., more densely aggregated in depth, walls and septa 0.5 µm thick (Fig. 2b). – *Inner mantle layers* with no discernible pattern and hyphae less irregular in shape, 18-32 µm long and 4-6.5(11) µm diam, walls 0.5 µm thick, some regions with hyphae distributed in parallel, clamps present (Fig. 2c). – *Very tip* with the same organization as remaining parts.

Anatomical characters of emanating elements – *Rhizomorphs* lacking. – *Emanating hyphae* yellowish brown, smooth, 4.5-5.5(6) µm diam., plasmatically and cell walls yellowish brown, septa 0.5 µm thick, clamps and simple septa present, walls 0.5-1 µm thick, distal ends simple; ramifications mostly close to the septa, forming an acute angle and 1-2 side-branches below the septum, backwards oriented ramifications present; contents or drops of exuded pigment lacking, intrahyphal hyphae absent. – *Cystidia* lacking. – *Chlamydospores* lacking.

Colour reaction with different reagents: *Mantle preparations:* Melzer's reagent: n.r. (= no reaction); guaiac: n.r.; iron(II)sulphate: n.r.; KOH 15%: n.r.; lactic acid: n.r.; sulpho-vanillin: n.r.; toluidine blue: n.r.

Autofluorescence: *Not tested.*

DNA-Analysis: For detailed description of procedure see Azul et al. 2008. The DNA sequence has been lodged in the EMBL database with the accession number AM924143.

Reference specimen for Quercus ectomycorrhiza: Portugal, Distrito de Évora, Concelho de Montemor-o-Novo, Freguesia de Lavre, Herdade Freixo do Meio (latitude N 38°41'10", longitude W 8°20'23"), in managed oak woodland dominated by *Quercus suber* L., soil core exc. AM Azul, 21.04.2004, myc. isol. AM Azul, mycorrhizae AAM 420/04 (in COI).

Etymology: the epitheton *tomentelloepidermoidea* is related to the outer mantle layers with irregularly shaped cells, somewhat resembling epidermoid cells and to the fungal partner of the genus *Tomentella*.

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Discussion: *"Quercirhiza tomentelloepidermoidea"* differs from the tomentelloid ECM described up to now by plectenchymatous outer mantle layers composed of densely aggregated irregularly shaped cells, that are somewhat epidermoid, and by the mounds of roundish cells on its surface. The presence of groups of roundish cells on the mantle surface was described for *Tomentella stuposa* (Jakucs et al. 2005), *"Quercirhiza tomentellocystidiata"* (Azul et al. 2006) and *"Quercirhiza tomentellocumulata"* (Azul et al. 2008). *Tomentella stuposa* has pseudoparenchymatous outer mantle layers with star-like arranged hyphae. *"Quercirhiza tomentellocystidiata"* shows outer mantle layers with star- to rosette-like organization and is covered by a network of hyphae ending in cystidia. *"Quercirhiza tomentellocumulata"* exhibits pseudoparenchymatous outer mantle layers with mounds of roundish cells.

References: Agerer R (1987-2006) Colour Atlas of Ectomycorrhizae. Einhorn-Verlag, Schwäbisch Gmünd, 1st-13th delivery. – **Agerer R**, Rambold G (2004-2007) [first posted on 2004-06-01; most recent update: 2007-05-02]. DEEMY – An Information System for Characterization and Determination of Ectomycorrhizae. www.deemy.de, München, Germany. – **Azul Am**, Agerer R, Freitas H (2006) *"Quercirhiza tomentellocystidiata" + Quercus suber* L. Descr Ectomyc 9: 115-119. – **Azul Am**, Agerer R, Martín Mp, Freitas H (2008) *"Quercirhiza tomentellocumulata" + Quercus suber* L. Descr Ectomyc 11/12: 125–130. – **Jakucs E**, Kovács Gm, Agerer R, Romsics C, Erős-Honti Z (2005) Morphological-anatomical characterization and molecular identification of *Tomentella stuposa* ectomycorrhizae and related anatomotypes. Mycorrhiza 15: 247–25.

Captions: Fig. 1. Mycorrhizal systems illustrating the monopodial-pyramidal ramification and the straight to slightly bent unramified ends. – ***Fig. 2.*** – ***a.*** Plan view of outer mantle layers showing the irregular shaped hyphal cells, distributed with no discernible pattern. – ***b.*** Plan view of middle mantle layer; cells irregularly shaped and densely arranged. – ***c.*** Plan view of inner mantle layer; cylindrical hyphae and some irregularly shaped unevenly distributed ones. *All figs. from AAM 420/04 (in COI).*

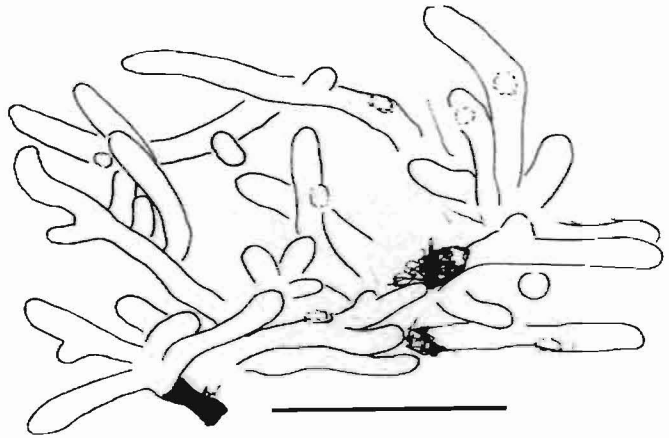

Fig. 1 – "Quercirhiza tomentelloepidermoidea" + Quercus suber

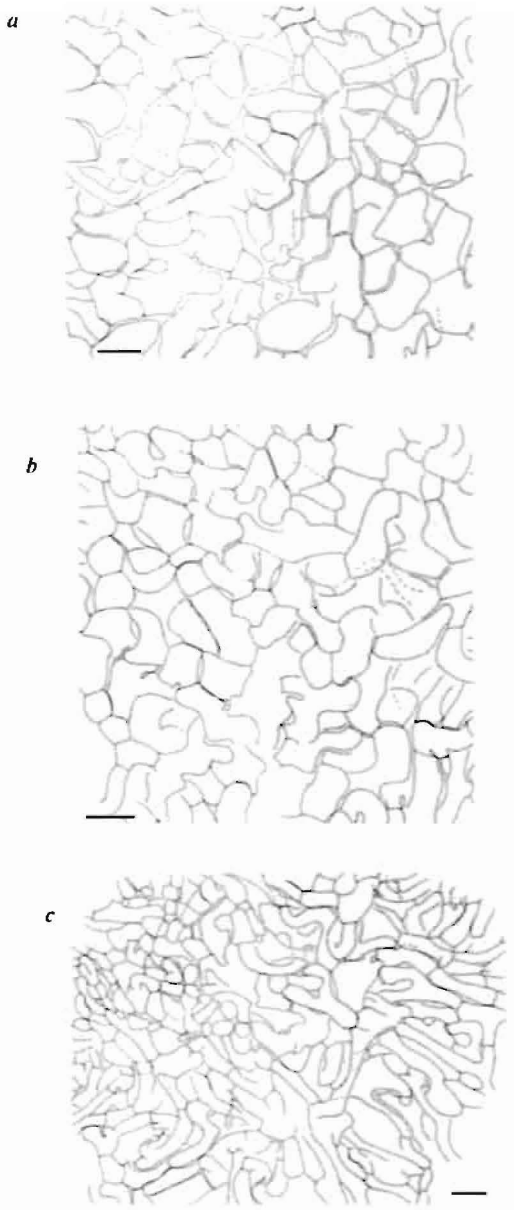

Fig. 2 – "Quercirhiza tomentelloepidermoidea" + Quercus suber

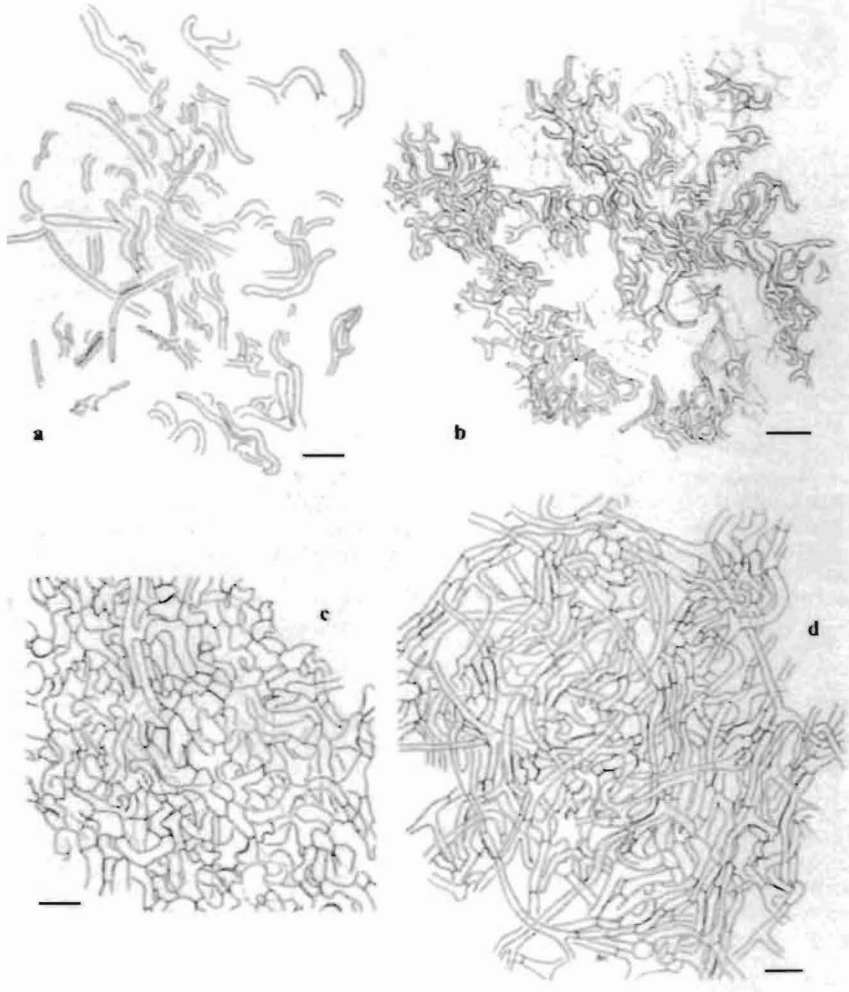

Fig. 2 – "Quercirhiza tomentelloreticulata" + Quercus suber