

Talaromyces lagunensis, a new species from Philippine soil

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A new species of *Talaromyces* (Ascomycetes; Trichocomaceae) with a *Penicillium* anamorph, *T. lagunensis*, is described and illustrated. This fungus is characterized by its extremely restricted growth on Czapek-yeast extract agar, light yellow to light orange ascomata with a telaperidium, catenate, pyriform or ellipsoidal asci, ellipsoidal or subglobose ascospores with a microtuberculate wall, short conidiophores with an irregular, mostly monoverticillate to biverticillate penicillus, and subglobose to ovoid conidia. The holotype was isolated from forest soil in the Philippines.

Key Words—ascomycete; *Penicillium lagunense*; soil fungus; *Talaromyces lagunensis*; the Philippines; Trichocomaceae.

Recently two cleistothecial ascomycetes were isolated from Philippine soil, collected by H. Iino at the College of Agriculture, University of the Philippines at Los Banos. One of them has been published as a new species of *Petromyces* with an *Aspergillus* anamorph, *P. muricatus* Udagawa, Uchiyama et Kamiya (Udagawa et al., 1994). The second fungus was identified as a member of the genus *Talaromyces* C. R. Benjamin (Trichocomaceae, Eurotiales) on the basis of its non-ostiolate ascomata with a telaperidium, its catenate asci and its *Penicillium* anamorph, but does not appear to be identical with any of the known species in the genus (Stolk and Samson, 1972; Samson and Abdel-Fattah, 1978; Pitt, 1979; von Arx, 1987; Takada and Udagawa, 1988, 1993; Frisvad et al., 1990; Tsuen et al., 1992; Yaguchi et al., 1992, 1993a, b, 1994a, b; Udagawa, 1993; Udagawa et al., 1993; Udagawa and Suzuki, 1994). We therefore propose a new species, *Talaromyces lagunensis*, to accommodate it.

Talaromyces lagunensis Udagawa, Uchiyama et Kamiya, sp. nov. Figs. 1, 2

Coloniae in agaro "Czapek-yeast extract (CYA)" valde restrictae. Coloniae in agaro maltoso (MEA) effusae, floccosae vel funiculosae, planae, ex mycelio basali coacto tenuiter constantes, albae vel luteolae, ascomatibus abundantibus et hyphis aeriis laxae formantes; conidiogenesis nulla vel limitata; reversum dilute aurantiacum. Coloniae in agaro farinae avenaceae mixto paulo effusae, planae, ex mycelio basali coacto tenuiter constantes, granulares, ascomatibus abundantibus formantes, luteolae; conidiogenesis nulla vel sparsa; reversum luteolum. Coloniae in agaro farinae zae mixto modice crescentes, planae, tenues, ex mycelio vegetativo submerso constantes, ascomatibus abundantibus et conidiis limitatis

formantes, luteolae; reversum incoloratum.

Ascomata discreta vel saepe confluentia, non ostiolata, dilute flava vel dilute aurantiaca, globosa vel subglobosa vel ovoidea, 150–250 μm diam, mollia, mycelio flavo laxo radiatim oblecta; paries ex hyphis ramosis septatis 1.5–2 μm diam flavis incrustatis compositus. Asci breviter catenulati, 8-sporei, hyalini, pyriformes vel ellipsoidei, 10–14 \times 7–9 μm , evanescentes. Ascosporae hyalinae vel dilute flavae, ellipsoideae, 3.2–4.8 \times 2.5–3.5 μm , interdum subglobosae, 3–3.5 μm diam, fere leves vel microtuberculatae. Status anamorphus: *Penicillium lagunense*.

Ubiquinona principalia: Q-(10(H₂)(61%)+10(H₄)(39%)).

Holotypus BF 49341, colonia exsiccata in cultura ex solo sylvae, Laguna, Los Banos, in Philippinis, 23.ii.1993, a S. Uchiyama et S. Kamiya isolata et ea collectione fungorum, Musei et Instituti Historiae Naturalis Chiba (CBM) conservata.

Etymology: Latinized from the name Laguna, referring to the type locality.

Anamorphosis: *Penicillium lagunense* Udagawa, Uchiyama et Kamiya, anam. nov.

Conidiophora ex hyphis aeriis oriunda; stipites hyalini, 10–40(–65) \times 1.5–2 μm , interdum superne inflati, leves, septati. Penicilli saepe irregulares, vulgo monoverticillati vel biverticillati, interdum divaricati, hyalini vel brunnei, leves. Rami 8–18(–24.5) μm longi. Metulae vulgo 4–6 verticillatae, 8–10 \times 1.5–2 μm . Phialides acerosae, 4–8(–10) verticillatae, 8–12 \times 1.5–2 μm . Conidia hyalina, subglobosa vel ovoidea, 1.5–3 μm diam, levia. Status teleomorphus: *Talaromyces lagunensis*.

Holotypus BF 49341, loc. cit.

Colonies on CYA extremely slow-growing, attaining a diam of 4–5 mm in 14 days at 25°C, more or less floc-

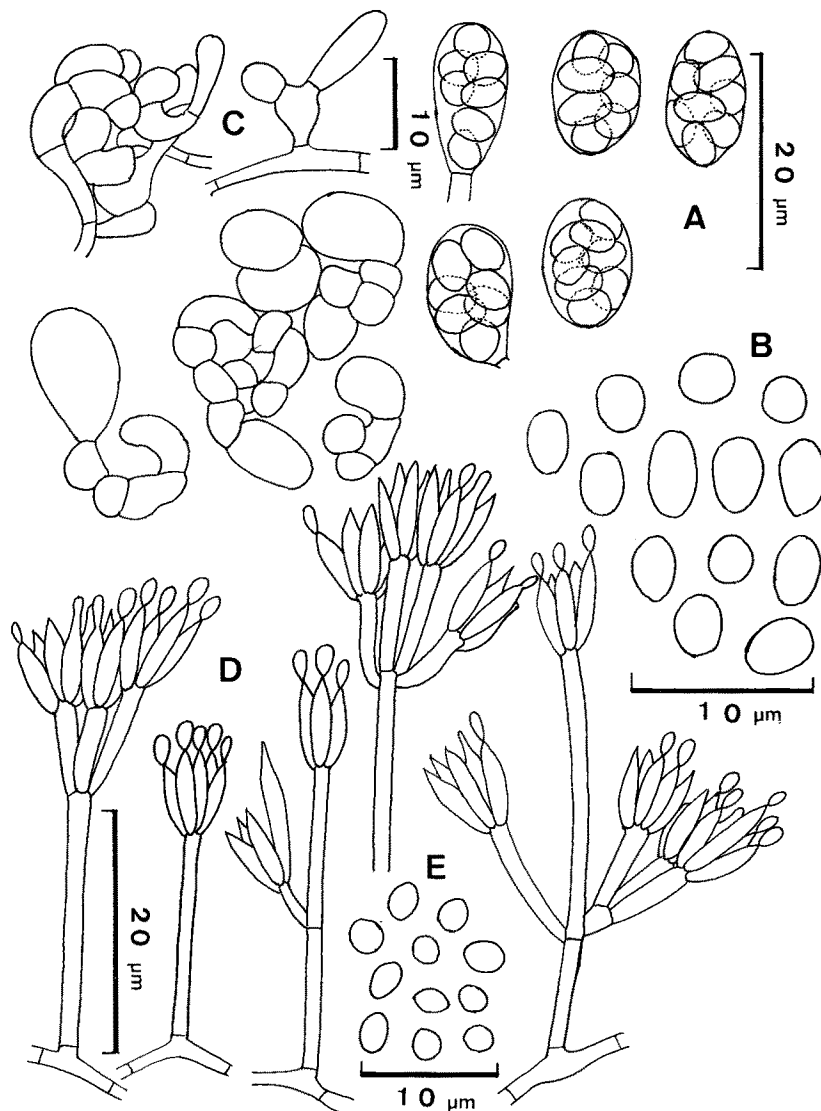


Fig. 1. *Talaromyces lagunensis*, BF 49341. A. Asci and different stages of ascus development. B. Ascospores. C. Ascomatal initials. D. Penicilli. E. Conidia.

cose, consisting of a tough mycelial felt, with central colony area slightly wrinkled and raised, Orange Red (M. 8A6, after Kornerup and Wanscher, 1978) or somewhat Scarlet (Rayner, 1970); ascomata and conidia absent; reverse uncolored.

Colonies on MEA growing rapidly, attaining a diam of 18–21 mm in 7 days and 49–53 mm in 14 days at 25°C, floccose to funiculose, plane, consisting of a thin mycelial felt, White to Pastel Yellow (M. 3A4) or Pale Luteous (R), producing abundant ascomata accompanied by the loose development of white aerial hyphae; conidiogenesis absent or limited, not influencing the colony appearance; margins broad, thin; exudate clear, abundantly produced in central area; odor musty; reverse Light Orange (M. 5A5) or somewhat Orange (R), with surrounding agar similarly colored.

Colonies on oatmeal agar growing rather rapidly, attaining a diam of 29–33 mm in 14 days at 25°C, plane,

consisting of a thin basal felt, with surface appearing granular due to the production of abundant ascomata, Light Yellow (M. 4A4) or Pale Luteous (R); conidiogenesis absent or sparse, not influencing the colony appearance; exudate clear; odor musty; reverse Pale Yellow (M. 4A3) or Pale Luteous (R).

Colonies on cornmeal agar growing moderately, attaining a diam of 34–40 mm in 14 days at 25°C, plane, thin, with vegetative mycelium submerged, producing abundant ascomata and very limited conidia, Pale Yellow (M. 4A3) or Pale Luteous (R); reverse uncolored.

Ascomata discrete or often confluent, non-ostiolate, light yellow to light orange, globose to subglobose or ovoid, 150–250 µm in diam, soft, loosely covered by radiating yellow mycelial wefts up to 50–100 µm long; ascomatal wall composed of a network of branched, septate, 1.5–2 µm diam, yellow, often encrusted hyphae. Ascomatal initials growing as swollen side branches of

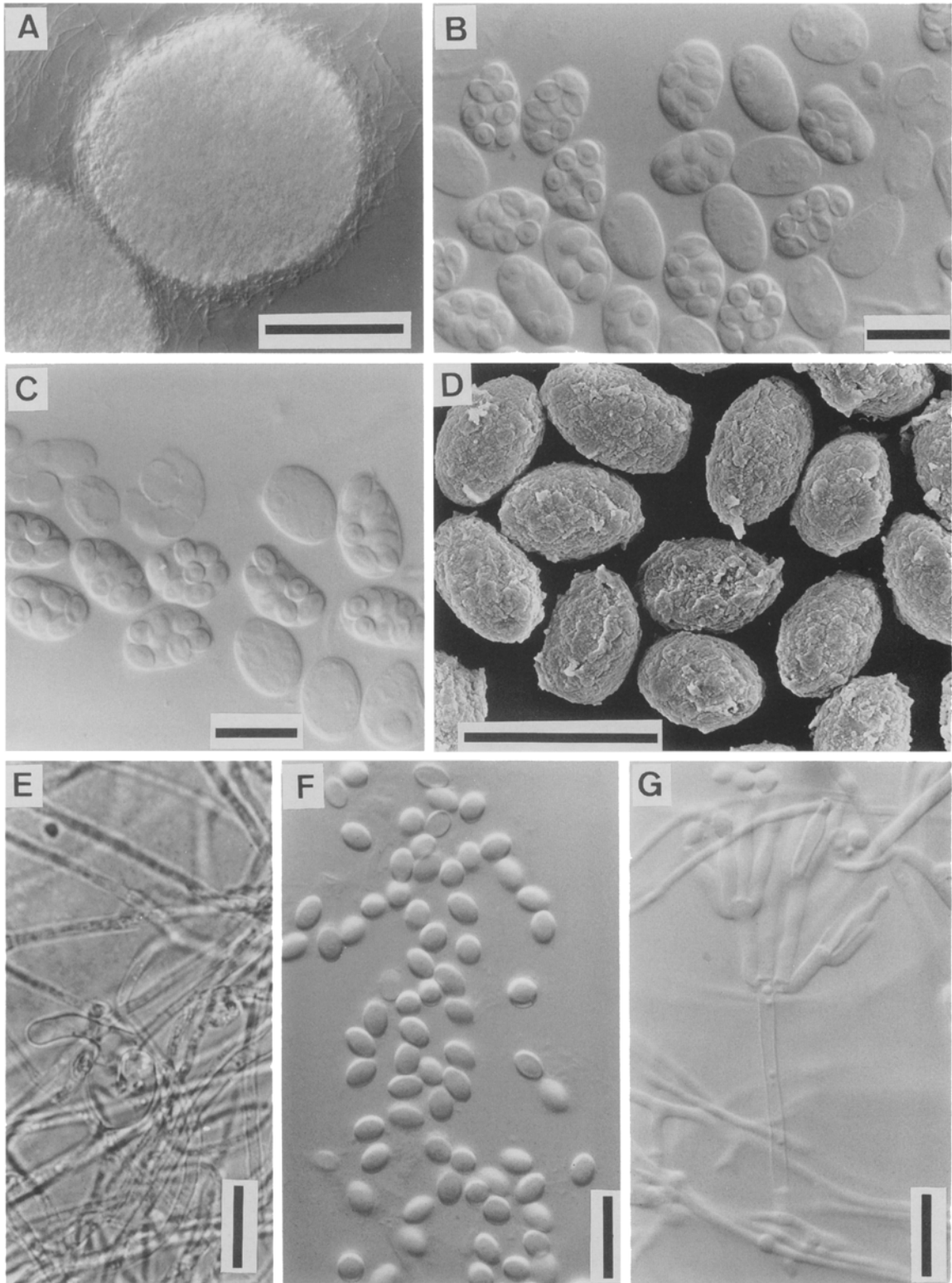


Fig. 2. *Talaromyces lagunensis*, BF 49341. A. Ascoma. B, C. Asci. D. Ascospores (SEM). E. Ascomatal initial. F. Ascospores. G. Penicillus and conidia. Scale bars: A=100 µm; B, C, E-G=10 µm; D=5 µm.

Table 1. Morphological differences between *T. lagunensis* and the two taxa characterized by a slow growth-rate on CYA.

Character	<i>T. lagunensis</i>	<i>T. retardatus</i>	<i>T. subinflatus</i>
Cultural characters (14 days, 25°C)			
Growth on CYA	4–5 mm	8–10 mm	14–16 mm
Reverse color (CYA)	uncolored	deep red	olive brown–citrine
Growth on MEA	49–53 mm	20–24 mm	25–28 mm
Colony color (MEA)	white–pale luteous	ochreous–saffron	primrose
Teleomorph			
Ascomatal color	light yellow–light orange	amber	sulphur yellow
Ascomatal diameter	150–250 µm	100–280 µm	300–480 µm
Ascus shape	pyriform–ellipsoidal	subglobose–ovoid	subglobose–pyriform
Ascus size	10–14 × 7–9 µm	(7.5–)8–9 × 6–8 µm	7–9.5 × 6.5–8 µm
Ascospore shape	ellipsoidal–globose	ellipsoidal	broadly ellipsoidal
Ascospore size	3.2–4.8 × 2.5–3.5 µm or 3–3.5 µm	3.5–4 × 2.5–3 µm	3–4 × 2.5–3 µm
Ascospore wall	smooth–microtuberculate	verrucose	spinulose
Anamorph			
Conidiophore size	10–40(–65) × 1.5–2 µm	280–480 × 3–5 µm	(100–)160–350 × 2.4–4 µm
Penicilli	variable, monoverticillate–biverticillate	biverticillate	mostly biverticillate

aerial hyphae, then branching several times and intertwining. Asci borne in short chains, 8-spored, hyaline, pyriform or ellipsoidal, 10–14 × 7–9 µm, evanescent. Ascospores hyaline to pale yellow, variable in shape, ellipsoidal, 3.2–4.8 × 2.5–3.5 µm, sometimes globose, 3–3.5 µm in diam, almost smooth-walled or microtuberculate (under SEM).

Conidiophores arising from aerial hyphae, erect; stipes hyaline, 10–40(–65) × 1.5–2 µm, sometimes swollen up to 2.5–4 µm in diam in upper portion, smooth-walled, septate. Penicilli irregularly arranged, mostly monoverticillate to biverticillate, sometimes divaricate, all elements of the penicillus hyaline to brownish and smooth-walled. Rami 8–18(–24.5) µm long, in a few whorls. Metulae mostly in verticils of 4–6, 8–10 × 1.5–2 µm. Phialides acerose, 4–8(–10) in the verticil, 8–12 × 1.5–2 µm. Conidia hyaline, subglobose to ovoid, 1.5–3 µm in diam, smooth-walled, with distinct connectives at the ends, borne in short chains.

Main ubiquinones: Q-(10(H₂))(61%) + 10(H₄)(39%).

At 37°C, growth is reduced, and only mycelium is produced.

Specimens examined: BF 49341 (holotype), in dried culture isolated from forest soil, Laguna, College of Agriculture, University of the Philippines at Los Banos, the Philippines, 23 February 1993; BF 49342, in dried culture isolated from soil near spa source, Laguna, College of Agriculture, University of the Philippines at Los Banos, the Philippines, 23 February 1993. The holotype has been deposited with the Natural History Museum and Institute, Chiba, Japan.

The diagnostic features of *T. lagunensis* are: (1) extremely restricted growth on CYA; (2) pale luteous colony color; (3) pyriform to ellipsoidal asci; (4) ellipsoidal to subglobose, nearly smooth-walled ascospores (microtuberculate in SEM); (5) rather irregularly biverticil-

late penicilli produced on short stipes; and (6) small, smooth-walled, subglobose to ovoid conidia. Furthermore, the slow growth on MEA shown by its growth-rate of less than 30 mm in diam in 7 days, the swollen and irregularly branched initials of the ascomata, short conidiophores and the ubiquinone system determined as a mixture of Q-10(H₂) and Q-10(H₄) indicate that *T. lagunensis* undoubtedly belongs in series *Trachyspermi* of section *Talaromyces* (Pitt, 1979).

Talaromyces lagunensis is distinguished from other species in ser. *Trachyspermi* by its extremely restricted growth on CYA, pyriform to ellipsoidal asci, and ellipsoidal to subglobose, microtuberculate ascospores (Pitt, 1979). Among the *Talaromyces* added since the publication of "The genus *Penicillium* and its teleomorphic states *Eupenicillium* and *Talaromyces*" by Pitt (1979), *T. retardatus* Udagawa, Kamiya et Osada (Udagawa et al., 1993) and *T. subinflatus* Yaguchi et Udagawa (Yaguchi et al., 1993b), are characterized by their poor growth on CYA. The two species, however, differ from *T. lagunensis* in having distinctly ornamented ascospores and in some other macroscopic and microscopic characters, as shown in Table 1.

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