

## Short Communication

A new species of *Eupenicillium* from marine sediment

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A new species of *Eupenicillium* isolated from marine sediment, *Eupenicillium limosum*, is described and illustrated. This species is characterized by subglobose ascospores with spinulose surface ornamentation and irregular biverticillate penicilli.

Key Words—ascomycete; *Eupenicillium limosum*; Japan; marine sediment; Trichocomaceae.

During mycological studies on environmental pollution of aquatic sediment, a species of *Eupenicillium* was isolated from marine sediment in Nagasaki Prefecture. It proved to be sufficiently different from all described species of *Eupenicillium* (Raper and Thom, 1949; Scott, 1968; Udagawa and Horie, 1973, 1977; Pitt, 1979; Udagawa and Ueda, 1982; Stolk and Samson, 1983; Takada and Udagawa, 1983; Gochenaur and Cochrane, 1986) to warrant its description as a new species.

*Eupenicillium limosum* Ueda, sp. nov. Figs. 1–7

Coloniae in agar Czapekii effusae, floccosae, albae; cleistothecia et conidia nulla; reversum brunneum vel brunneo-aurantiacum.

Coloniae in agar maltoso moderate crescentes, ex mycelio tenui coacto compositae, velutinae; conidia abundantia, griseo-viridia; cleistothecia dilute flava, abundantia, intra mycelium coactum immersa; reversum griseo-flavum.

Coloniae in agar farinae avenaceae mixto effusae, tenues, granulares; cleistothecia abundantia, griseo-aurantiaca; reversum dilute flavum.

Cleistothecia superficialia, dispersa, globosa vel subglobosa, 140–275  $\mu\text{m}$  diam, dilute flava vel griseo-aurantiaca, post 2–3 hebdomades maturantia; peridium primo pseudoparenchymaticum, parum sclerotioideum, ex cellulis incrassatis 6–7  $\mu\text{m}$  diam polygonis constans. Asci singulares in hyphis ascogonicis, octospori, subglobosi vel ellipsoidei, 7–10  $\times$  6–7  $\mu\text{m}$ , postremo evanescentes. Ascosporae subglobosae, 3.0–3.5  $\times$  2.5–3.0  $\mu\text{m}$ , hyalinae, subtiliter asperatae. Status anamorphus: *Penicillium limosum*.

Holotypus NEI 5220, colonia exsiccata in cultura ex limo mari in Nagasaki, Japonia, 9. v. 1974, a S. Ueda isolata et ea collectio fungorum, Musei et Instituti Historiae Naturalis Chiba (CBM) conservata.

Etymology: *limosum* = muddy, referring to the nature of the habitat.

Anamorphosis: *Penicillium limosum* Ueda, anam.

nov.

Figs. 1, 5–7

Conidiophora ex hyphis aeriis oriunda; stipites paulo longi, (62–)75–225(–300)  $\times$  2.0–3.0(–3.5)  $\mu\text{m}$ , leves; penicilli biverticillati et asymmetrici, interdum rami divergentes praediti; metulae 2–3 per verticillum, 15–20  $\times$  3.0–4.0  $\mu\text{m}$ ; phialides 5–6 per verticillum, ampulliformes, 8–10(–13)  $\times$  2.5–3.0  $\mu\text{m}$ , abrupte decrescentes. Conidia globosa vel subglobosa, 2.8–3.3  $\times$  2.5–3.0  $\mu\text{m}$ , conspicue asperata, brevicatenata. Status teleomorphus: *Eupenicillium limosum*.

Holotypus NEI 5220, loc. cit.

Colonies on Czapek's solution agar growing rapidly, attaining a diameter of 5 cm in 14 days at 25°C, consisting of a low, dense mycelial felt with floccose surface, white; cleistothecia and conidium-bearing structures absent; exudate and soluble pigment not produced; reverse Brown to Brownish Orange (M. 5C4, after Kornerup and Wanscher, 1978).

Colonies on malt extract agar growing moderately, attaining a diameter of 4.2 cm in 14 days at 25°C, consisting of a thin basal felt, velvety; conidium-bearing structures abundantly produced; cleistothecia pale yellow, abundantly produced, Greyish Green (M. 30B3) in the mycelial felt; reverse Greyish Yellow (M. 4B5).

Colonies on oatmeal agar growing rapidly, attaining a diameter of 8 cm in 14 days at 25°C, thin, with surface becoming granular by the development of abundant cleistothecia, Greyish Orange (M. 5B3); reverse Pale Yellow (M. 4A3).

Cleistothecia globose to subglobose, superficial, scattered, Pale Yellow (M. 4A3) to Greyish Orange (M. 5B3), 140–275  $\mu\text{m}$  in diam, maturing after 2–3 weeks' incubation. Cleistothecial peridium at first pseudoparenchymatous, slightly sclerotoid, consisting of thick-walled, 6–7  $\mu\text{m}$  diam polygonal cells. Asci borne singly from ascogenous hyphae, 8-spored, subglobose to ellipsoidal, 7–10  $\times$  6–7  $\mu\text{m}$ , evanescent at maturity. Ascospores subglobose, 3.0–3.5  $\times$  2.5–3.0  $\mu\text{m}$ , hyaline, finely roughened.

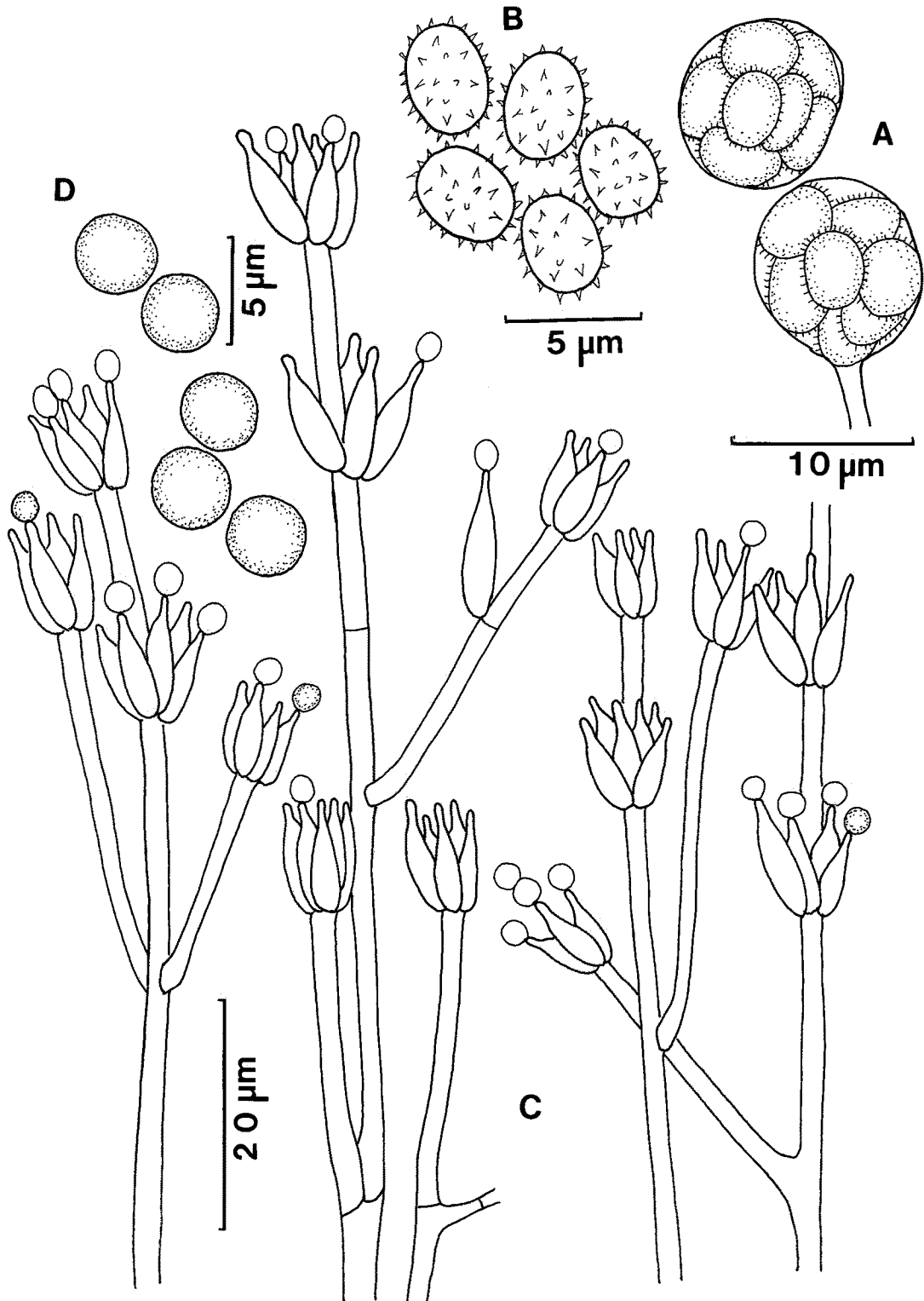
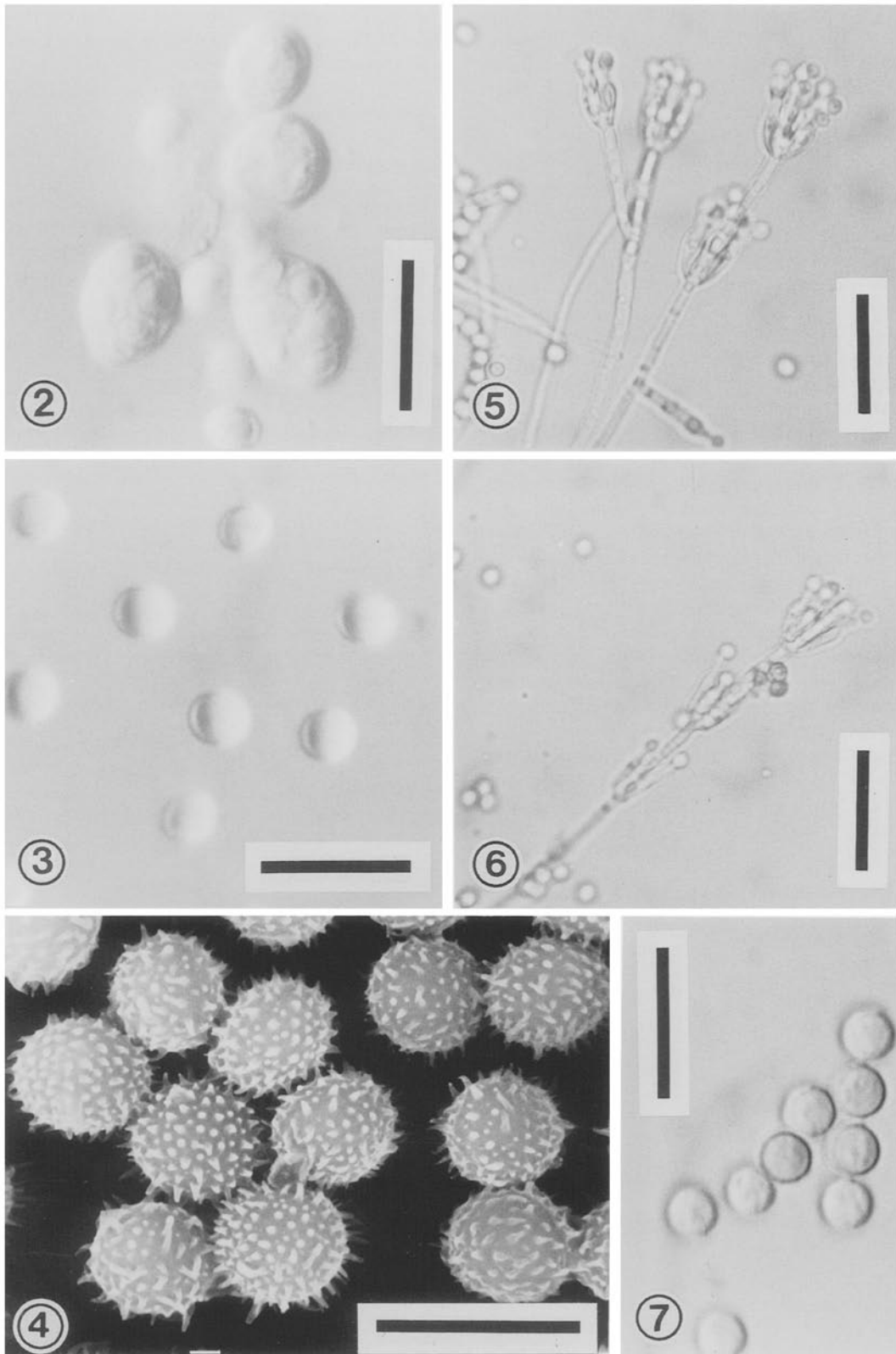


Fig. 1. *Eupenicillium limosum*, NEI 5520.  
A. Asci. B. Ascospores. C. Penicilli. D. Conidia.

Conidiophores borne from aerial hyphae; stipes rather long,  $(62-75-225(-300) \times 2.0-3.0(-3.5) \mu\text{m}$ , smooth-walled, bearing biverticillate or sometimes show-

ing divergent rami, and often in verticils of 2 to 3, irregularly biverticillate penicilli with subterminal verticils of phialides or concurrent metulae and phialides; metulae



Figs. 2-7. *Eupenicillium limosum*, NEI 5520.

2. Asci. 3. Ascospores. 4. Ascospores (SEM). 5-6. Penicilli. 7. Conidia. Scale bars: 2, 3=10  $\mu\text{m}$ ; 4=5  $\mu\text{m}$ ; 5, 6=20  $\mu\text{m}$ , 7=10  $\mu\text{m}$ .

15–20 × 3.0–4.0 μm; phialides in verticils of 5–6, ampulliform, 8–10(–13) × 2.5–3.0 μm, narrowing abruptly; conidia globose to subglobose, 2.8–3.3 × 2.5–3.0 μm, with walls conspicuously roughened, borne in short chains up to 100 μm in length.

Growth is observed at 37°C, but cleistothecia are lacking.

Specimen examined; NEI 5220(holotype), in dried culture isolated from marine sediment, Nagasaki Bay, Nagasaki City, Nagasaki Pref., Japan, 9 May 1974, coll. S. Ueda. The holotype has been deposited with the Natural History Museum and Institute, Chiba (CBM), Japan.

The genus *Eupenicillium* is one of ascomycetous fungi with a *Penicillium* anamorph. Hitherto, more than 40 species have been found from soil, food, dung and other materials, being particularly abundant from soil. Ueda (1995) reported that *E. javanicum* (J. F. H. Beyma) Stolk & D. B. Scott and *E. brefeldianum* (B. O. Dodge) Stolk & D. B. Scott were the most common of the *Eupenicillium* species detected in aquatic sediment. *Eupenicillium limosum* was also frequently isolated from marine sediment, and it thus appears that some *Eupenicillium* species are ubiquitous in marine environments. Udagawa and Horie (1973) emphasized that the surface ornamentation of ascospores is a primary criterion for identifying species in *Eupenicillium*. They divided the genus into two groups of species, those having distinct equatorial ridges and those without such ornamentation. *Eupenicillium limosum* belongs the latter group and has singly borne asci, subglobose, spinulose ascospores (as shown in Fig. 4). *Eupenicillium limosum* closely resembles *E. brefeldianum*, from which it differs in having irregular biverticillate penicilli.

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#### Literature cited

- Gochenaour, S. E. and Cochrane, E. 1986. *Eupenicillium cryptum* sp. nov., a fungus with self-limiting growth and restricted carbon nutrition. *Mycotaxon* **26**: 345–360.
- Kornerup, A. and Wanscher, J. H. 1978. "Methuen handbook of colour, 3rd ed.," Eyre Methuen, London. 252 p.
- Pitt, J. I. 1979. "The genus *Penicillium* and its teleomorphic states *Eupenicillium* and *Talaromyces*," Academic Press, London. 634 p.
- Raper, K. B. and Thom, C. 1949. "A manual of the Penicillia," Williams and Wilkins, Baltimore. 875 p.
- Stolk, A. and Samson, R. 1983. "The ascomycete genus *Eupenicillium* and related *Penicillium* anamorphs," *Studies in Mycology*, No. 23, Centraalbureau voor Schimmelcultures, Baarn. 149p.
- Scott, D. B. 1968. "The genus *Eupenicillium* Ludwig," *Microbiol. Res. Group, Bull. 1, Council for Scientific and Industrial Research, South Africa, Pretoria*. 150 p.
- Takada, M. and Udagawa, S. 1983. Two new species of *Eupenicillium* from Nepalese soil. *Trans. Mycol. Soc. Japan* **24**: 143–150.
- Ueda, S. 1995. "Ecological and taxonomic studies on filamentous fungi of sediment in fresh water, brackish water and marine environment, with special reference to water pollution," Hiroshima Univ. (Thesis). 161p. (In Japanese).
- Udagawa, S. and Horie, Y. 1973. Some *Eupenicillium* from soils of New Guinea. *Trans. Mycol. Soc. Japan* **14**: 30–38.
- Udagawa, S. and Horie, Y. 1977. A new species of *Eupenicillium* from Japanese soil. *Mycotaxon* **5**: 493–497.
- Udagawa, S. and Ueda, S. 1982. A new *Eupenicillium* species with reticulately ornamented ascospores. *Mycotaxon* **14**: 266–272.