

## *Erythrogymnotheca*, a new genus of Eurotiales

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Accepted for publication 23 April 1994

*Erythrogymnotheca*, a new genus of the Eurotiales, is proposed. The genus, based on the single species *E. paucispora*, is characterized by non-ostiolate ascomata with a telaperidium composed of an envelope of yellowish or reddish, branched, thin-walled hyphae, 1-2(-4)-spored asci, one-celled, subglobose to broadly ellipsoidal, thick-walled ascospores with spines, and the absence of an anamorph. The ascomatal initials of *E. paucispora* are long clavate to vermiform, and reminiscent of those of *Talaromyces flavus*.

Key Words—cleistothecial ascomycetes; *Erythrogymnotheca paucispora*; Eurotiales; Japan; soil fungus.

An interesting gymnothecial fungus of the Eurotiales was isolated from Japanese soil during the course of an exploratory survey of soil-borne ascomycetes as producers of metabolites useful to the pharmaceutical industry. This fungus is characterized by the absence of distinct ascomatal peridium, mostly 1-2-spored asci clustered within a loose network of yellowish or reddish hyphae, and large, subglobose to broadly ellipsoidal, thick-walled ascospores with prominent spines. Although the fungus does not have an anamorph, it is considered to belong to the Trichocomaceae of the Eurotiales on the basis of the clavate to vermiform initials of its ascomata (reminiscent of those of *Talaromyces flavus* (Klöcker) Stolk et Samson) and its large spinulose ascospores. The distinctive features of the asci, however, seem to separate the fungus from the related genera in the Eurotiales (Malloch and Cain, 1972; Benny and Kimbrough, 1980; von Arx, 1987), and we therefore propose a new genus to accommodate it.

*Erythrogymnotheca* Yaguchi et Udagawa, gen. nov.

Coloniae restrictae, griseo-chlorinae vel roseo-vinosae; reversum rubrum. Ascogonia ex cellulis longis clavatis vel vermiformibus constantia. Ascomata superficialia, discreta, non ostiolata, plerumque globosa; paries ex hyphis ramosis, laxe intertextis, pigmentosis, tenuibus compositus, "telaperidium" formans. Asci singulariter formantes, 1-2(-4)-spori, globosi vel subglobosi, evanescentes. Ascosporae hyalinae vel dilute flavae, interdum rubrae, unicellulares, subglobosae vel late ellipsoideae, incrassatae, spinulosae, sine poro germinali. Anamorphosis abest.

Species typica: *Erythrogymnotheca paucispora* Yaguchi, Someya et Udagawa.

Etymology: Greek, *erythros*=red, and *gymnotheca*=gymnothecium, referring to the peridial charac-

ter of the ascomata.

Colonies restricted, Greyish Yellow-green to Rosy Vinaceous (Rayner, 1970); reverse Red (R). Ascomatal initials composed of long clavate to vermiform cells (ascogonia), around which thin hyphae coil tightly several times. Ascomata superficial, discrete, non-ostiolate, usually globose; wall composed of a loose network of branched, interwoven, pigmented, thin-walled hyphae, forming a telaperidium (Currah, 1985). Asci singly borne, 1-2(-4)-spored, globose to subglobose, evanescent. Ascospores hyaline or pale yellow, sometimes red, one-celled, subglobose to broadly ellipsoidal, thick-walled, spinulose, without a germ pore. Anamorph lacking.

Type species: *Erythrogymnotheca paucispora* Yaguchi, Someya et Udagawa.

*Erythrogymnotheca paucispora* Yaguchi, Someya et Udagawa, sp. nov. Figs. 1, 2

Coloniae in agar "Czapek-yeast extract (CYA)" restrictae, floccosae, radiatim sulcatae, ex mycelio basali coacto compacto constantes, griseo-chlorinae vel roseo-vinosae, ascomatibus abundantibus formantes; exsudatum valde abundans, rubrum; reversum cum agar rubrum.

Mycelio vegetativo ex hyphis hyalinis vel rubris, ramosis, septatis, levibus vel asperatis, 1.5–3.5  $\mu\text{m}$  diam composito. Ascogonia ex cellulis longis clavatis vel vermiformibus constantia. Ascomata superficialia, discreta, non ostiolata, globosa vel subglobosa, 200–500  $\mu\text{m}$  diam; hyphae peridii sinuosae, ramosae, intertextae, hyalinae vel dilute flavae, dein rubrae, septatae, leves vel asperulatae, tenues, 1.5–2  $\mu\text{m}$  diam, "telaperidium" formantes. Asci singulariter formantes, 1-2(-4)-spori, globosi vel subglobosi, 22–25(-26)  $\times$  18–22(-25)  $\mu\text{m}$ , incrassati, in maturitatem evanescentes. Ascosporae hya-

linae vel dilute flavae, interdum rubrae, subglobosae vel late ellipsoideae,  $14-18 \times 12-16 \mu\text{m}$ , incrassatae, spinulosae, sine cristis. Anamorphosis abest.

Ubiquinona principalia: Q-10 et Q-10 (H<sub>2</sub>).

Holotypus PF 1150, colonia exsiccata in cultura ex solo, Kumamoto, in Japonia, 16. x. 1968, a T. Yaguchi

isolata et ea collectione fungorum, Musei et Instituti Historiae Naturalis Chiba (CBM) conservata.

Etymology: Latin, *pauci*=few and *sporus*=spored, referring to the few spored asci.

Colonies on CYA growing restrictedly, attaining a diam of 15–18 mm in 14 days at 25°C, floccose, central-

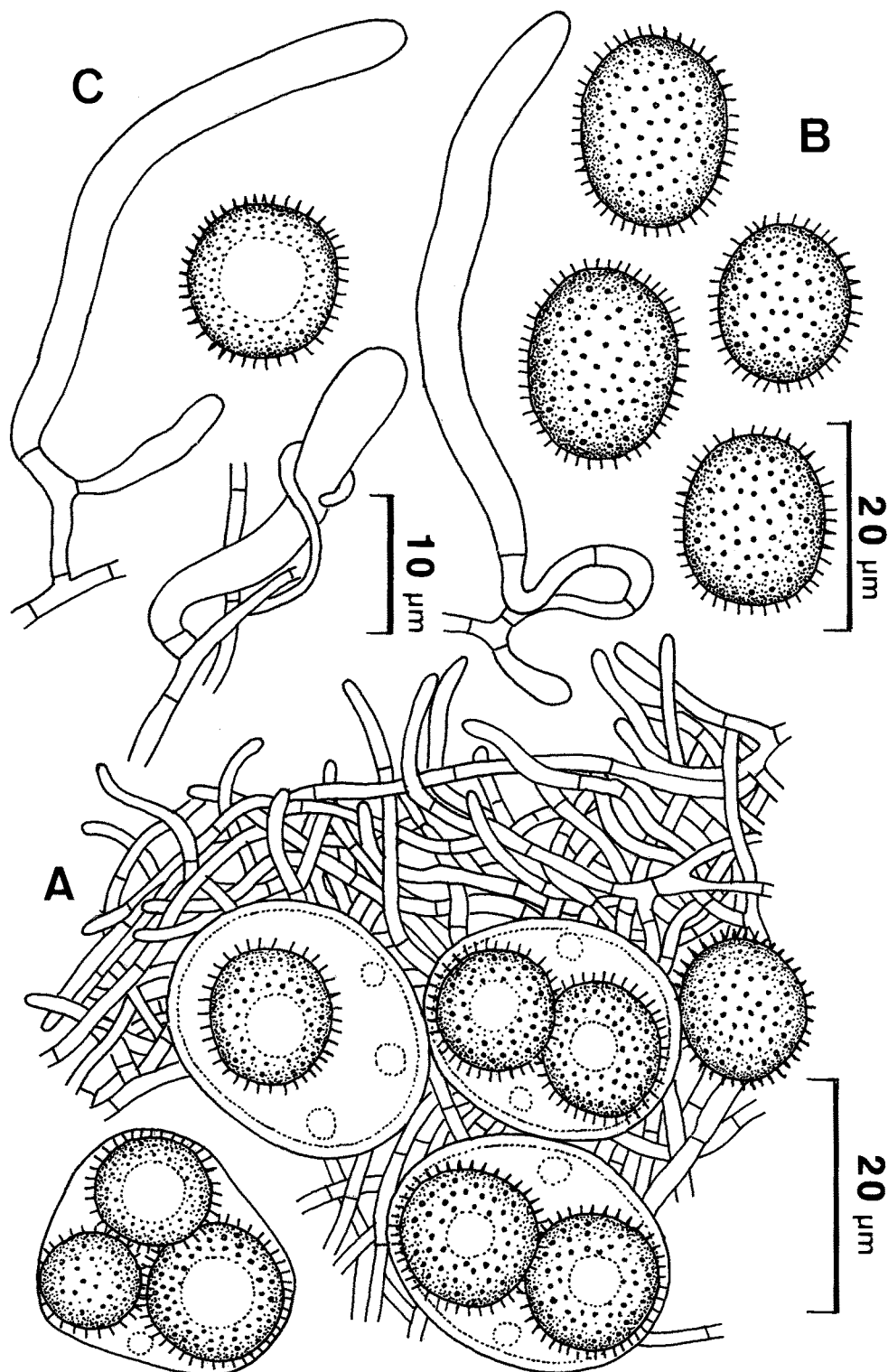


Fig. 1. *Erythrogymnotheca paucispora*, PF 1150. A. Part of ascoma; B. Ascospores; C. Ascomatal initials.

ly convolute and raised, radially sulcate, more or less zonate, consisting of a compact basal felt, at first white, then becoming Greyish Yellow to Pastel Pink (M. 1B4-11A3, after Kornerup and Wanscher, 1978), or Greyish Yellow-green to Rosy Vinaceous (R), producing abundant ascomata on the felt, with a thin irregular margin; exudate very abundant, Red (M. 10A7); odor indistinct; reverse and agar Violet Brown (M. 11E8) or Red (R). Colonies on malt extract agar growing restrictedly, attain-

ing a diam of 19–20 mm in 14 days at 25°C, velvety to tomentose, almost plane, consisting of a thin basal felt, Dull Yellow to Pastel Pink (M. 3B4-11A3), or Amber to Flesh (R), producing abundant ascomata on the felt, with a narrow entire margin; exudate lacking; reverse and agar Ruby (M. 11E8) or Blood Colour (R). Colonies on oat-meal agar growing restrictedly, attaining a diam of 15–18 mm in 14 days at 25°C, velvety, plane, consisting of a thin basal felt, becoming granular due to the develop-

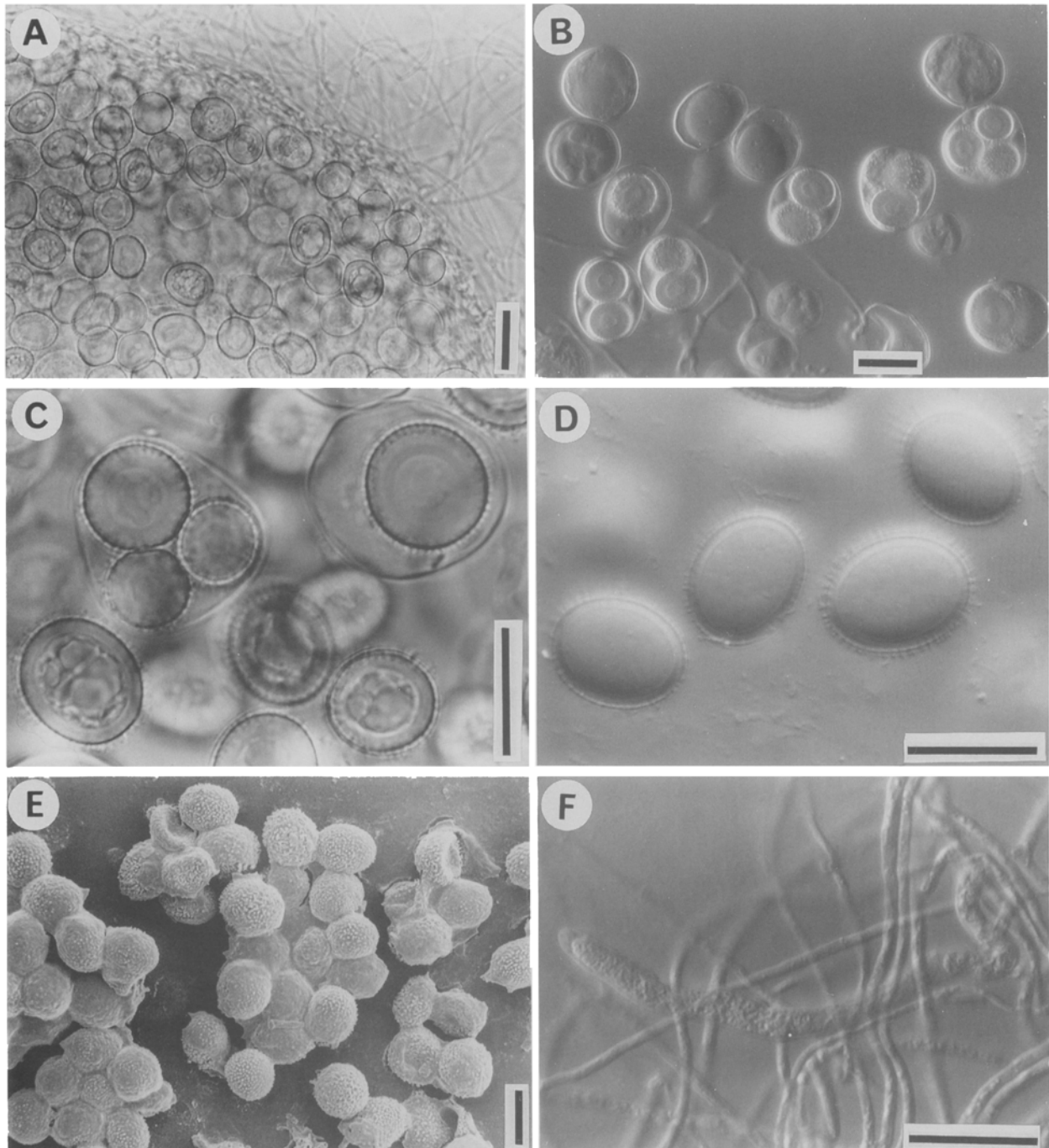


Fig. 2. *Erythogymnotheca paucispora*, PF 1150. A. Part of ascoma; B, C. Asci; D. Ascospores; E. Ascospores (SEM); F. Ascomatal initial. All scale bars = 10  $\mu$ m.

ment of abundant ascomata, Pale Yellow (M. 4A3) or Straw (R), with growing margin broad and entire; exudate small, Pink (M. 11A5) or Coral (R); reverse and agar Greyish Red (M. 10B5) or Coral (R). Colonies on MY20 agar slowly growing, attaining a diam of 12 mm in 14 days at 25°C, velvety to floccose, radially sulcate, consisting of a rather compact basal felt, producing abundant ascomata, Greyish Red (M. 10B5) or Coral (R); exudate very abundant, Pastel Red (M. 9A4) or Flesh (R); reverse Dark Ruby (M. 12F7) or Blood Colour (R).

Vegetative mycelium composed of hyaline or red-pigmented, branched, septate, smooth or roughened, 1.5–3.5  $\mu\text{m}$  wide hyphae. Ascomatal initials composed of long, straight or twisted, clavate to vermiform cells (ascogonia) measuring 24–65  $\times$  3.5–4.5  $\mu\text{m}$ , around which thin hyphae coil tightly several times. Ascomata superficial, discrete, non-ostiolate, yellow to sometimes red, globose to subglobose, 200–500  $\mu\text{m}$  in diam, maturing within 21 days; peridial hyphae sinuous, branched, interwoven, at first hyaline to pale yellow, then becoming reddish, septate, smooth or roughened, thin-walled, 1.5–2  $\mu\text{m}$  in diam, forming a loose network (telaperidium). Asci singly borne, 1-2(-4)-spored, globose to subglobose, 22-25(-26)  $\times$  18-22(-25)  $\mu\text{m}$ , thick-walled, at maturity evanescent. Ascospores hyaline to pale yellow, sometimes reddish due to diffused pigments, subglobose to broadly ellipsoidal, 14–18  $\times$  12–16  $\mu\text{m}$ , thick-walled (ca 2  $\mu\text{m}$  thick), ornamented with spines up to 1.5  $\mu\text{m}$  long, without crests. Anamorph lacking.

Main ubiquinones: Q-10 (37%) + Q-10 (H<sub>2</sub>) (63%).

At 37°C, growth is nil.

Specimen examined: PF 1150 (holotype), a dried culture isolated from soil, Aso-machi, Aso-gun, Kumamoto Pref., Japan, 16 October 1968, by T. Yaguchi. The type specimen is deposited in the Natural History Museum and Institute, Chiba, Japan (CBM).

Despite the absence of a phialidic anamorph, the loose hyphal yellow- or red-pigmented ascomata which develop from long clavate to vermiform ascogonia place *Erythrogymnotheca* in the Trichocomaceae of the Eurotiales (Malloch and Cain, 1972, 1973). The ascomatal initials of *E. paucispora* approximate those of *Talaromyces flavus* and some species of *Talaromyces* (Stolk and Samson, 1972; Pitt, 1979). In most species of *Talaromyces*, however, asci develop in chains, and the two genera are congeneric neither in the ascus character nor in the ascospore morphology. The large, broadly ellipsoidal, thick-walled, spiny ascospores are rather similar to those of *Hamigera spinulosa* (Warcup) von Arx (von Arx, 1986), but *E. paucispora* differs in its large ascomatal initials and its ascus morphology as well as its ubiquinone type. When the ascospores of *E. paucispora* are first delimited, there are four in each ascus. They are very small. However, two or three of these are rapidly dwarfed and the other one or two usually begin to en-

large and mature. *Hamigera spinulosa* has regularly 8-spored asci, a *Raperia* anamorph and ubiquinone Q-10 (Raper and Fennell, 1965; Udagawa, 1980; von Arx, 1986; Kuraishi et al., 1990). The ubiquinone types of other species of *Hamigera* (Stolk and Samson, 1971), *H. avellanea* (Thom et Turesson) Stolk et Samson and *H. striata* (Raper et Fennell) Stolk et Samson (= *Talaromyces striatus* (Raper et Fennell) C. R. Benjamin), were also determined as Q-10 by Kuraishi et al. (1991).

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