Endophragmiella multiramosa a new dematiaceous anamorphic ascomycete from Taiwan

Jin-Liang Chen¹, Shean-Shong Tzean² and Weir-Sen Lin¹

¹ Department of Hospital and Health Care Administration, Chia-Nan University of Pharmacy and Science, Tainan, Taiwan 71710, ROC
² Department of Plant Pathology and Microbiology, National Taiwan University, Taipei, Taiwan 10617, ROC


During a survey of anamorphic ascomycetes in Taiwan, an undescribed fungus belonging to the dematiaceous ascomycetes was found on rotten twigs. This fungus, which is described and illustrated here as Endophragmiella multiramosa, is characterized by producing compactly branched conidiomata with percurrent conidiogenous cells and obovoid, ellipsoidal or pyriform, 0–1-septate, pigmented conidia with basal frills. Its delimitation is discussed and a key for the discussed species is added.

Keywords: anamorphic fungi, dematiaceous hyphomycetes, new species, key.

The genus Endophragmiella was established by Sutton (1973) with two species, E. pallescens Sutton (type species) and E. canadensis (Ell. et Everh.) Sutton (= E. subolivacea [Ell. et Everh.] Hughes). Endophragmiella is characterized by macronematous, mononematous, erect, straight or flexuous, pale brown, branched irregularly, septate, smooth, thin-walled conidiomata with monoblastic, integrated, terminal, determinate or percurrent conidiogenous cells, and by solitary, acrogenous, simple, pale brown, septate, thin-walled conidia (Sutton 1973). Hughes (1979) revised the generic concept of Endophragmiella and accepted 33 species. Kirk (1985) provided a key to the 46 described species of this genus. Holubová-Jechová (1986) also published several new species in Endophragmiella and administered a key to the species of Endophragmiella occurring in Czechoslovakia. Subsequently, the total number of species in Endophragmiella has increased to 72 (Castañeda 1987, 1988; Castañeda and Kendrick 1990; Castañeda et al. 1995, 1998; Hyde et al. 1998, Monchorachary and Agarwal 2003, Matsushima 1989, 1993, 1996; Mercado Sierra et al. 1995, Révay 1987, Sharma 1985, Tsui et al. 2001, Tzean and Chen 1989, Wu and

³ e-mail:goldlight@mail.chna.edu.tw
Zhuang 2005). On the survey of hyphomycetes in Taiwan, many new species have been recovered from various decaying stems or leaves; one of them is *Endophragmiella multiramosa* sp. nov., which is described and illustrated here in detail.

### Materials and Methods

Samples collected from various rotten plant parts were incubated in moist chambers (plastic boxes, 30 x 20 x 12 cm, with three layers of moistened papers) for fungal sporulation. The macroscopic characteristics of the fungus on natural substrate were photographed using a Leica stereomicroscope (MZ125). Anatomical details of the fungus on natural substratum were recorded, photographed and illustrated using an Olympus light microscope (BX50) with attached drawing tube. Twenty conidia, ten conidiomata, and ten conidiogenous cells were measured for the size ranges given in the descriptions. Measurements are given as follows: (minimum) mean ± standard deviation (maximum), (n = sample size). The Methuen Handbook of Colour was used for color description (Kornerup and Wanscher 1978). Dried specimens are deposited in the National Museum of Natural Science (NMNS), Taichung, Taiwan.

### Taxonomy

*Endophragmiella multiramosa* J.L. Chen *sp. nov.* – Figs. 1–5.

**MycoBank no.: MB 512267**

Coloniae effusae, cristatae, bruneae ad atratae bruneae. Mycelium immersum. Conidiophora macronemata, mononemata, clare caespitosa, presse ramose, recta vel flexuosa, septata, laevis, brunnea, ad apicem pallidiora, (57.6) 62.3–83.9 (88.0) x (2.8) 3.3–5.2 (5.6) μm, ad apicem usque ad 6 proliferationibus percurrentibus induta. Cellulae conidiaenae monoblasticae, terminales, percurrentes, in conidiophoris incorporatae, cylindraceae vel clavatae, (6.2) 9.1–15.4 (16.8) x (2.6) 2.8–3.9 (4.4) μm. Conidia acrogena, solitaria, obovoidea, ellipsoidea vel pyriformia, fere 1-septata, laevis, pallide brunnea ad basaliibus cellulis, brunnea ad apicalibus cellulis, (9.2) 10.3–12.6 (13.3) x (3.6) 6.3–7.5 (7.8) μm, raro 0-septata, laevia, pallide brunnea vel brunnea, (8.0) 8.4–10.4 (11.2) x (5.4) 5.5–6.8 (7.2) μm, frequentem cum cicatrici ad base praedita, 0.8–1.2 x 1.0–1.2 μm. Teleomorphis ignota.

**Holotype**. – In caulibus putridis, Taiwania, J.L. Chen lectus (TNM F21431 in NMNS)

Colonies effuse, tufted, brown to dark brown. Mycelium immersed. Conidiomata macronematous, mononematous, conspicuously caespitose, compactly branched, straight or flexuous, septate, smooth, smooth, thick-walled at the base, brown, paler towards apex, (57.6) 62.3–83.9 (88.0) x (2.8) 3.3–5.2 (5.6) μm (n = 10), 198
with percurrent proliferations. Conidiogenous cells monoblastic, percurrent, integrated, terminal, cylindrical or clavate, (6.2) 9.1–15.4 (16.8) x (2.6) 2.8–3.9 (4.4) \( \mu m \) (n = 10). Conidia solitary, acrogenous, ovoid, ellipsoid or pyriform, usually 1-septate, smooth, pale brown at the basal cell, brown at the apical cell, (9.2) 10.3–12.6 (13.3) x (5.6) 6.3–7.5 (7.8) \( \mu m \) (n = 20), rarely 0-septate, smooth, pale brown or brown, (8.0) 8.4–10.4 (11.2) x (5.4) 5.5–6.8 (7.2) \( \mu m \) (n = 10), often with basal frills, 0.8–1.2 x 1.0–1.2 \( \mu m \). Teleomorph absent.
Figs. 2–5. – *Endophragmiella multiramosa*. 2, 3. Partial view of colony on natural substrate. 4. Compactly branched conidiomata with percurrent proliferations (arrows). 5. Obovoid, ellipsoidal or pyriform, smooth, 0- or 1-septate conidia with basal frills (arrows). Bars: 2, 3 – 500 μm; 4, 5–10 μm.

**Etymology.** – The specific epithet, multiramosa, refers to the numerous branched conidiomata.

**Habitat.** – Saprophytic on a rotten twig.

**Distribution.** – Taiwan.


Key to Endophragmiella multiramosa and four closely related Endophragmiella species

1  Conidiomata branched ........................................ 2
1* Conidiomata unbranched ...................................... 3
2  Conidiomata loosely branched and conidia
   1-septate .......................................................... E. cambransis
2* Conidiomata compactly branched, and conidia 0- or
   1-septate .......................................................... E. multiramosa
3  Conidial apical cell pale brown, basal cell very pale
   brown ................................................................. E. resinæ
3* Apical cell darker: mid brown, brown or dark brown; basal cell
   pale brown .......................................................... 4
4  Conidia 9–17 x 7–10μm .......................... E. uniseptata var. pusilla
4* Conidia 13–27 x 9–13 μm ........................ E. uniseptata var. uniseptata

Discussion

The new species is most closely related to E. resinæ P. K. Kirk (1981) from an injured site of Picea sitchensis, collected in UK, E. uniseptata (Ellis) Hughes (1979) from rotten wood of sweet chestnut and beech, collected in UK [as E. uniseptata var. uniseptata (Ellis) Hughes by Hol.-Jech. (1986)] and E. uniseptata (Ellis) Hughes var. pusilla Hol.-Jech. (1986) from a rotten trunk of Fraxinus excelsior, collected in Czechoslovakia, all of them having similarly shaped and pigmented conidia. Endophragmiella multiramosa can easily be distinguished from these two species (incl. varieties) because of its conidia, which are 0- or 1-septate, smaller, and lacking a wide or dark brown septum. In addition, the conidiomata of E. multiramosa are distinctly shorter and more branched than those in E. resinæ and E. uniseptata. Endophragmiella cambransis M.B. Ellis (1979), found on rotten wood (UK), also can be easily distinguished from our new species by its loosely branched conidiomata and obovoid or clavate, dark brown, 1-septate conidia. A comparative summary of the important characteristics of Endophragmiella multiramosa and the three closely related Endophragmiella species mentioned above is presented in Table 1.

Endophragmiella pallescens Sutton (1973) from stromata of Cytospora chrysosperma on Populus tremuloides collected in Canada, and E. ramificata Hol.-Jech. (1986) from a rotten Carpinus betulus trunk, collected in Czechoslovakia, exhibit a conidiomatal and conidial development similar to that of E. multiramosa, but the former has ellipsoidal, 1-2-septate, pale brown conidia, and the second has broadly ellipsoidal to slightly ovoid, 1-septate, pale brown to brown conidia with a dark, thick septum.
### Tab. 1. - Comparative summary of the important characteristics of *Endophragmiella* multiramosa and three closely related *Endophragmiella* species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Microscopic characters</th>
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<tbody>
<tr>
<td><strong>E. cambrensis</strong></td>
<td>Conidiomata: Loosely branched, branched flexuous with 0–2 percurrent proliferations, up to 100 μm long, 3–4 μm thick</td>
</tr>
<tr>
<td><strong>E. uniseptata var. uniseptata</strong></td>
<td>Singly or in groups of 2–3, erect or ascending, simple, with up to 15 successive terminal proliferations, up to 220 μm long, 4–7 (10) μm wide</td>
</tr>
<tr>
<td><strong>E. uniseptata var. pusilla</strong></td>
<td>Crowded or single, erect, ascending, unbranched, with several successive percurrent proliferations, 40–180 μm long, 5–7 μm wide near the base, 2.5–4 μm wide in the middle and the upper part</td>
</tr>
<tr>
<td><strong>E. resinae</strong></td>
<td>Arising singly, simple, with 1–6 percurrent proliferations, 140–210 μm high, 3.5–4.5 μm wide, 6–12 μm wide at the base</td>
</tr>
<tr>
<td><strong>E. multiramosa</strong></td>
<td>Conspicuously caespitose, compactly and numerous branched, brown, paler towards the apex, with several successive percurrent proliferations, 57.6–88.0 x 2.8–5.6 μm</td>
</tr>
</tbody>
</table>
Endophragmiella multiramosa differs from E. arranensis P.M. Kirk (1983) (on rotten wood, UK) as the latter produces conidia that are broadly ellipsoid to ovoid or obovoid, 1-septate, 6.5–9.5 x 4–5 μm, and pale brown to brown.

Regarding conidium morphology, E. multiramosa may appear to be related also to E. taxi (Ellis) Hughes (1979) (from dead leaves of Taxus, USA). But E. taxi forms larger conidia with dark blackish brown septa on shorter and more slender conidiomata, which grow singly or in groups of two or three.

Endophragmiella ovoidea P.K. Kirk (1981) (on dead wood, UK) differs from E. multiramosa in the shape, size, and pigmentation of conidia which are always ovoid to obclavate or ellipsoid, 1-septate, constricted at the septum, with brown to dark brown basal cells, and apical cell pale brown.

Endophragmiella boewei (Crane) Hughes (1979) from decaying plant materials (USA) resembles E. multiramosa in the shape of the conidia, but its simple conidiomata appear singly or in small groups forming pyriform, 1-septate, and subhyaline to light brown conidia measuring 13.8–20.8 x 7.7–11.5 μm.

Endophragmiella globulosa (B. Sutton) Hughes (1979) (on dead wood, Canada) resembles E. multiramosa in the pigmentation of its conidia, but their shape and size are distinctly different: conidia globbose to broadly pyriform, 15–17 x 10–13 μm.

A key to Endophragmiella multiramosa and three closely related Endophragmiella species is provided.

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References


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