

A new species of *Guepiniopsis* (Dacrymycetes) from Greece

P. Delivorias*, Z. Gonou-Zagou & E. Kapsanaki-Gotsi

University of Athens, Faculty of Biology, Department of Ecology and Systematics,
15784 Athens, Greece

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Guepiniopsis fulva sp. nov. is described from Greece, accompanied with taxonomic notes and a discussion on related taxa.

Keywords: *Dacrymyces*, *Dacrymycetaceae*, taxonomy.

Guepiniopsis Pat. is a small genus in the family *Dacrymycetaceae*, comprising about seven species worldwide (Kirk *et al.* 2008). It was originally described by Patouillard (1883), with *Guepiniopsis tortus* Pat. as the type species. However, as argued by Kennedy (1958), the correct name for the type species of *Guepiniopsis* is in fact *Guepiniopsis buccina* (Pers.) L. L. Kenn., based on *Peziza buccina* Pers. In an early description of the genus, Patouillard (1900) portrayed the basidiomata as being cupulate, with a unilateral hymenium and a more or less distinct stipe. Later depictions of the genus based on micromorphological characters mentioned the presence of a palisadic cortical layer of thick-walled hairs at the abhymenium, usually with markedly thickened, capitate or obpyriform apices (Kennedy 1958, Reid 1974). McNabb recognized two different genera with such thick-walled, cortical cells: *Heterotextus* Lloyd, characterized by the presence of ‘thick-walled, inflated, beaked cells, each of which is derived from a single terminal cell’ (McNabb 1965 b), and *Guepiniopsis*, with cortical hairs composed of ‘simple or branched, cylindrical, septate hyphae, the individual cells of which become inflated to varying degrees and frequently assume an oval or subglobose shape’ (McNabb 1965 a). Both Kennedy (1958) and Reid (1974) did not consider this difference to warrant a distinction at generic level, and included *Heterotextus* in their generic concept of *Guepiniopsis*. On the other hand, Oberwinkler (1994) agreed with McNabb’s delimitation of *Heterotextus*, adding the layered cell walls of the cortical hairs of *G. buccina* and the lack of clamp connections to the principal characters separating *Guepiniopsis* from *Heterotextus*.

At present, the taxonomic status of *Guepiniopsis* is unclear. Kennedy (1958) considered the genus to be clearly distinct and its members ‘seldom

* e-mail: panadeli@biol.uoa.gr

difficult to recognize', stressing that the palisade of thick-walled cortical hairs at the abhymenium is a 'structure not met with in the other genera of the family'. This palisadic layer is undoubtedly a significant morphological feature. Indeed, based on this feature, Dueñas (2005) recently proposed the transfer of *Dacrymyces estonicus* Raitv. to *Guepiniopsis*. However, as early as 1965, McNabb had noted the presence of a series of intermediate forms between *Dacrymyces* Nees and *Heterotextus*, encompassing *Guepiniopsis* (McNabb 1965 b), and, a decade later, Reid (1974) raised doubts as to whether *Guepiniopsis* could be maintained as a separate genus from *Dacrymyces*. For instance, sterile surfaces bearing thick-walled hyphae with slightly enlarged apices, albeit not forming a distinct palisadic layer, have been observed in various species of *Dacrymyces*, such as *D. capitatus* Schwein., *D. chrysospermus* Berk. & M. A. Curtis, *D. minutus* (L. S. Olive) McNabb, *D. marginatus* McNabb, *D. pedunculatus* Berk. & M. A. Curtis, *D. subalpinus* Kobayasi, and *D. variisporus* McNabb (McNabb 1973, Reid 1974, Shirouzu *et al.* 2009). Oberwinkler (1994) termed these elements 'marginal hyphae', a term adopted by Shirouzu *et al.* (2009) both for the thick-walled marginal elements of the aforementioned *Dacrymyces* species and for the cells of the cortical layer of *Guepiniopsis buccina*. In recent molecular studies revealing the polyphyly of *Dacrymyces* (Shirouzu *et al.* 2007, 2009), *G. buccina* is shown to be nested within *Dacrymyces* sensu stricto, forming a monophyletic clade with *D. stillatus* Nees, *D. minor* Peck, *D. chrysospermus*, and *D. subalpinus*. For want of further data concerning other species of *Guepiniopsis*, the authors of these studies have refrained from segregating *Dacrymyces* and have retained the generic name *Guepiniopsis* for *G. buccina*. For the time being, this stance is adopted in the present study as well, until a more thorough investigation of the phylogenetic relationships within the *Dacrymycetaceae* is performed and more data become available. *Guepiniopsis* is currently accepted as a distinct genus both in the latest edition of the Dictionary of Fungi (Kirk *et al.* 2008), and in Index Fungorum (<http://www.indexfungorum.org>).

A new species of *Guepiniopsis* recently discovered in a beech forest of central Greece is hereby described. Its taxonomic placement in *Guepiniopsis* is substantiated by the presence of a well-formed palisade of cortical hairs at the abhymenium. The fulvous colour of its basidiomata is a striking feature not only for *Guepiniopsis* but for the *Dacrymycetaceae* as a whole, and the species is accordingly named *G. fulva*.

Materials and methods

Microscopic observations were made using a Zeiss AxioImager Differential Interference Contrast (DIC) microscope. Sections of dried material were mounted in Melzer's reagent and in 3 % KOH with addition of Fluoxine stain for observation and measurements. Microscopic photographs were taken with a Zeiss AxioCam MRc digital camera. All measurements were performed under 1000 × magnification. Spore sizes are given as: (MIN) [mean –

$2 \times \text{stdev}] - [\text{mean} + 2 \times \text{stdev}]$ (MAX), followed by the number of spores measured (n), their length-width ratio (Q), and the mean values of spore length (L'), width (W'), and length-width ratio (Q'). MIN stands for the lowest value measured and MAX for the highest; these values are presented only when they exceed $[\text{mean} - 2 \times \text{stdev}]$ or $[\text{mean} + 2 \times \text{stdev}]$, respectively. The length of the probasidia is measured as the distance between the basal septum and the tip of the central axis. Colour codes refer to Kornerup & Wanscher (1978). Habitat references refer exclusively to the collected material. Greek localities are transliterated to Latin according to ISO 843: 1997 (E). Authorities' abbreviations are in accordance with Kirk & Ansell (1992). All collected specimens are deposited at the Mycethoteca of the University of Athens (ATHU-M).

Taxonomy

Guepiniopsis fulva P. Delivorias, **sp. nov.** – Figs. 1–35.

MycoBank no.: MB 800264

Basidioma 2–7 mm, sessile, gelatinosum, glabrum, fulvum. Stipes minimus vel absentis. Sporae 13,1–17,3 \times 5,2–7,9 μm , ellipsoideae vel subcylindraceae, 3(4)septatae. Probasidia 43–82 \times 3,5–6,0 μm , clavata, bifurcata. Cellulae abhymenii 36–58 \times 5–7 μm . Ad lignum decorticatum Fagi sylvaticae. In Graecia.

Holotypus. – GREECE, Karditsa, Mt. Zygourolivado, forest of *Fagus sylvatica*, alt. ca 1550 m, on dead decorticated wood of *Fagus sylvatica*, 15 Oct 2000, *leg. et det.* P. Delivorias (ATHU-M 6632).

Basidioma 2.0–7.0 mm, disk-shaped to cupulate, fulvous when fresh (Kornerup & Wanscher 1978: 6C8), drying dark purplish to dark purplish brown (14F4 to 10F5); surface glabrous; context gelatinous. – Stipe absent or rudimentary. (Fig. 1). – Tramal structure homogeneous (excluding rooting base and cortical hairs), consisting of thin-walled hyphae 1.3–2.8 μm wide, embedded in a thick gelatinous matrix (Fig. 17). – Clamp connections absent. – Stipital cortex consisting of more or less thick-walled hyphae 1.8–4.1 μm wide, embedded in a thick gelatinous matrix (Fig. 18). – Cortical hairs forming a palisade, 36–58 \times 5–7 μm , unicellular to tricellular, cylindrical-clavate, clavate to obpyriform; cells becoming inflated with age and acquiring markedly thickened gelatinized apices; thick walls conspicuously layered (Figs. 19–35). – Dikaryophyses cylindrical to cylindrical-clavate, simple, 3.5–5 μm wide. – Probasidia 43–82 \times 3.5–6.0 μm , clavate, becoming bifurcate (Figs. 14–16). – Basidiospores 13.1–17.0(17.3) \times (5.2)5.5–7.2(7.9) μm , $n = 86$, $Q = 1.97$ –2.98, $L' = 14.5$ μm , $W' = 6.3$ μm , $Q' = 2.3$, ellipsoid to subcylindrical, more or less distinctly curved, inamyloid, becoming 3-septate in maturity (Figs. 2–6), rarely 4-septate in over-matured spores (Fig. 13), germinating by minute, globose to broadly ellipsoid conidia, 1.8–2.7 \times 1.5–2.1 μm (Figs. 7–10; 17), or by germ tubes (Figs. 11–13).

Etymology. – From Latin *fulvus*, named after the fulvous colour of the basidiomata.

Habitat. – Gregarious on dead, decorticated wood of *Fagus sylvatica*.

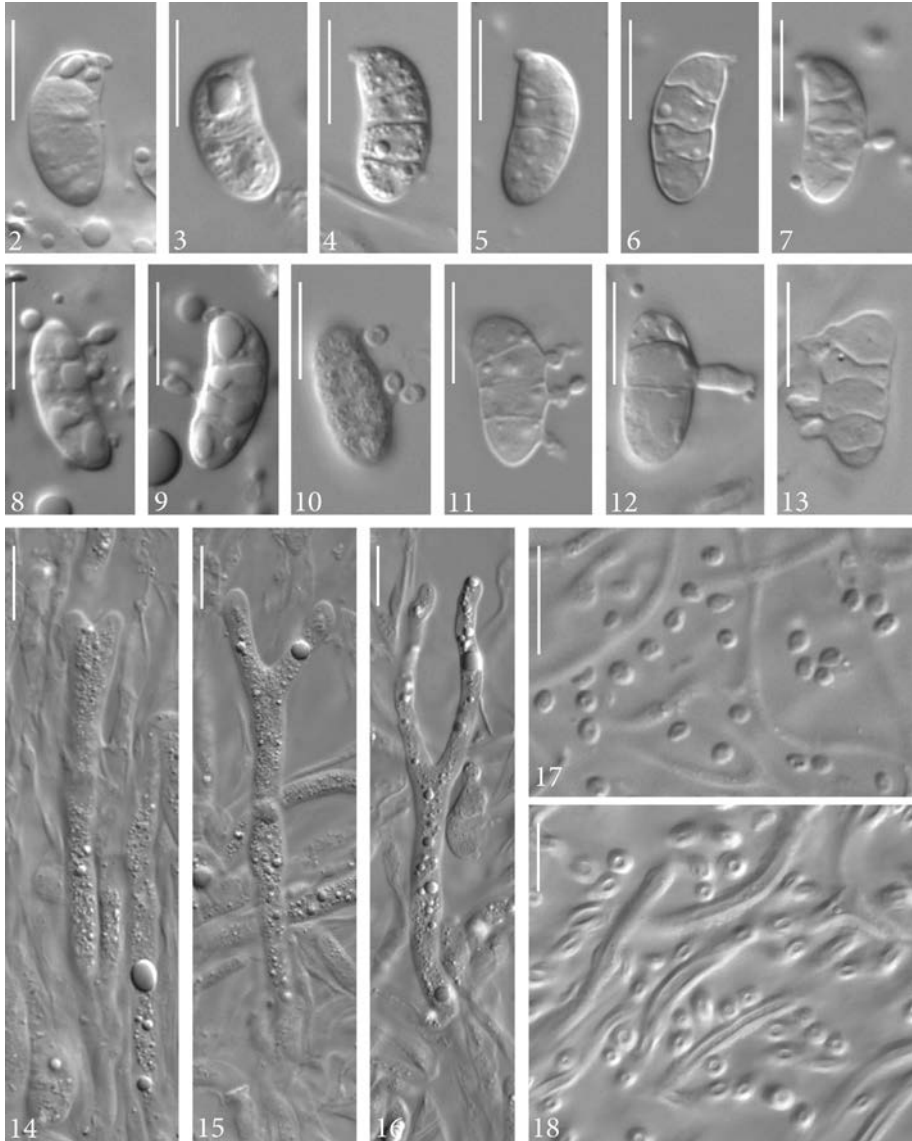


Fig. 1. Basidiomata of *Guepiniopsis fulva* in the field (holotype).

Material examined (besides type). – GREECE, Karditsa, Mt. Zygourolivado, forest of *Fagus sylvatica*, alt. ca 1550 m, on dead decorticated wood of *Fagus sylvatica*, 1 Jun 2003, *leg. et det.* P. Delivorias (ATHU–M 6633, 6634).

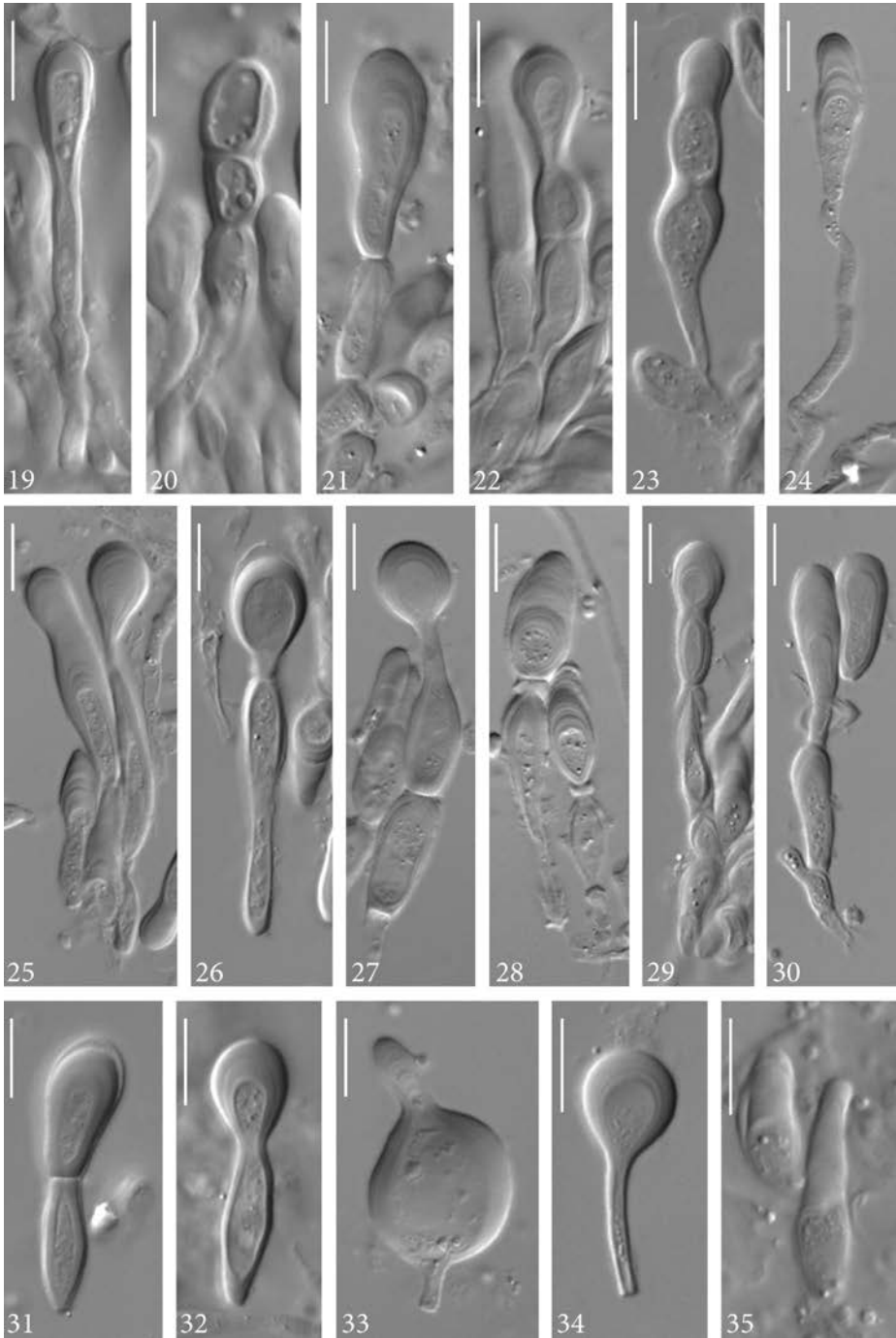
Discussion

Allowing for the fact that the colour of the basidiomata in the Dacrymycetales may vary significantly depending on environmental conditions, the colour of *G. fulva* is nevertheless not encountered in any other species of *Guepiniopsis*, all of which are reported to have hues ranging from yellow to orange-yellow, or, at most, bright orange. The fulvous colour of the fresh basidiomata of *G. fulva* was noted in all three examined specimens, collected in two different seasons (October and June), and should therefore be considered a constant and distinctive character. Furthermore, the colour difference applies to the dried state as well, which would not be strongly influenced by environmental factors. For instance, in the type species of the genus, *G. buccina*, the colour of the dried specimens varies from orange to rusty orange (McNabb 1965 a, Reid 1974), whereas in *G. fulva* it is much darker, i.e. dark purplish to dark purplish brown, falling well outside the range of variability of *G. buccina*.



Figs. 2-18. Microscopical characters of *Guepiniopsis fulva*. 2-13. Basidiospores. 14-16. Basidia in various stages of development. 17. Conidia and thin-walled hyphae of the cortex. 18. Thick-walled hyphae of the stipital cortex embedded in gelatinous matrix. Bars: 10 μ m.

The rudimentary or completely lacking stipe is a second deviating feature from the traditional generic concept of *Guepiniopsis* as portrayed through the type species *G. buccina*, which produces cup-shaped basidiomata with a well-developed stipe that bears a ribbed outer surface. This feature is stressed both in the publication by Patouillard (1900), as well as in the



Figs. 19–35. Cortical hairs of *Guepiniopsis fulva*. Bars: 10 μ m.

thorough studies of McNabb (1965 a) and Reid (1974), and is also attested by a number of other available descriptions and illustrations of *G. buccina*. The lack of a well-formed stipe, however, is not unique to the genus, as species later included in *Guepiniopsis*, such as *G. chrysocoma* [treated by many authors as *Dacrymyces chrysocomus* (Bull.) Tul.], *G. estonica*, and *G. suecica*, have mostly sessile to substipitate basidiomata.

A significant distinctive feature of *G. fulva* is its spore size, as most of the other members of the genus have either smaller or larger basidiospores (Tab. 1). In particular, *G. buccina* has clearly shorter and narrower spores, only partly entering the range of variability of *G. fulva*, whereas species such as *G. chrysocoma*, *G. estonica*, and *G. suecica* have much larger spores, often exceeding 20 µm in length and usually becoming 7–9 septate in maturity. The only representative of *Guepiniopsis* with spores similar (albeit somewhat narrower) to those of *G. fulva*, both in respect to their size and to their becoming 3-septate in maturity, is *G. alpina*. This species, however, is clearly distinct from *G. fulva* not only because of its differently coloured, clearly stipitate basidiomata, but also because of the presence of basal clamp connections on the basidia, the germination of the basidiospores by elongate, bacilloid conidia, and the preference for coniferous substrates.

In maturity, the spores of *G. fulva* generally become 3-septate, but 4-septate spores were also seldom observed (Fig. 13). Germination occurs either by germ-tubes or, more frequently, by minute, globose to ellipsoid conidia. Both characters are considered to be of taxonomic significance in the study of the Dacrymycetaceae.

The cortical hairs of the abhymenium are variable both in respect to their form and to the number of septa they bear. An important point concerning their ontogeny should be noted. According to McNabb (1965 a), *Guepiniopsis* differs from *Heterotextus* in the manner of formation of these peculiar cells: in *Guepiniopsis* the cortical hairs are composed of septate hyphae, the individual cells of which become inflated to varying degrees, whereas in *Heterotextus* the palisadic layer consists of inflated terminal elements, each of which is derived from a single terminal cell. Hence, in the generic sense of McNabb, the cortical hairs of *Guepiniopsis* should be septate, and those of *Heterotextus* unicellular. Furthermore, Oberwinkler (1994) stresses that the 'marginal hairs' of *G. buccina* can be separated from those of *Heterotextus* not only because they are multicellular, but also because their gelatinized cell walls are layered. Our newly proposed species has multicellular cortical hairs with conspicuously layered walls, both characteristic features of *Guepiniopsis*, but these cells seem to arise from initially unicellular elements, the walls of which gradually become thickened and finally constricted at the site where the septum is formed (Figs. 19–35). This would appear to place *G. fulva* in an intermediate position between *Guepiniopsis* and *Heterotextus*, bearing testament to the fact that no clear boundaries exist between the two genera and hence vindicating Kennedy's (1958) and Reid's (1974) stance on their synonymy.

Tab. 1. – Spore sizes (μm) of various species of *Guepiniopsis* as presented by different authors.

	<i>G. alpina</i> (Tracy & Earle) Brasf.	<i>G. buccina</i> (Pers.) L. L. Kenn.	<i>G. chrysocoma</i> (Bull.) Brasf.	<i>G. estonica</i> (Raitv.) M. Dueñas	<i>G. suecica</i> (McNabb) Jülich	<i>G. fulva</i>
McNabb (1965 a)		(11)12–14.5(16) × 4–6				
McNabb (1965 b)	14.5–16.5(18) × 4.5–5.5					
McNabb (1973)				(17.5)21–24(26.5) × 9–12	(15.5)17–23(26) × 5–6.5(7)	
Reid (1974)		(10.0)11.5–13.75 × (4.2)4.75–5.3	16.0–24.0 × 7.75–8.75	18.0–23.4 × 8.0–11.75		
Jülich (1984)	10–16.5(18) × 4.2–5.5	11–14.5(16) × 4–6	16–24–28 × 7.5–10	18–24(26.5) × 8–12	(15.5)17–23(26) × 5–6.5(7)	
Phillips (1991)	15–17.5 × 5–6					
Torkelsen (1997)	15–17.5(20) × 5–6		17.5–23 × 8–10(11)	18–23 × 8–12		
Dueñas (2005)			16–24 × 8–9	14–23 × 9–12	17–24 × 5.5–7(8)	
Dimou <i>et al.</i> (2008)				19–23 × 10–11		
Shirouzu <i>et al.</i> (2009)		10–16 × 5–7				
this work						13.1–17.0(17.3) × (5.2)5.5–7.2(7.9)

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Autor(en)/Author(s): Delivorias P., Gonou-Zagou Z., Kapsanaki-Gotsi E.

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