

Red as a flame and lovely as a flower: *Perrotia flammea* from Greece

Panagiotis Delivorias*, Marina Triantafyllou & Zacharoula Gonou-Zagou

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

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Abstract. Six new records of the unusual ascomycete *Perrotia flammea* (*Helotiales*, *Hyaloscyphaceae*) from Greece are presented, along with a detailed description based on dried material, taxonomic notes, line drawings and a colour plate.

Key words: *Ascomycota*, cup fungi, discomycetes, taxonomy

Introduction

The genus *Perrotia* was established by Boudier (1901) to house a most extraordinary fungus, *Peziza flammea* Alb. & Schwein. With its fiery coating of cinnabar-red hairs, this ascomycete seemed to warrant a placement in a genus of its own. Indeed, *Perrotia* was originally a monotypic genus, with *P. flammea* as its only resident, but over the years several species were transferred from other genera and a number of new taxa were described, so that today it comprises about 18 species (Zhuang & Yu 2001). Its utterly unreactive apical apparatus in iodine reagents misled Seaver (1942) to include *Perrotia* in the operculate ascomycetes; however, many previous and subsequent authors suggested that *Peziza flammea* is an inoperculate fungus, initially stipulating a relatedness with *Lachnella* Boud., a genus now considered synonymous to *Lachnum* Retz. (Phillips 1893; Rehm 1896), and later deftly proposing a placement in the family *Hyaloscyphaceae* (Dennis 1960; Moser 1963; Dennis 1978). Recently, molecular data (Cantrell & Hanlin 1997) have confirmed that *Perrotia* indeed belongs in the *Hyaloscyphaceae*.

Perrotia flammea, the type species of the genus, has been collected on six occasions from four different parts of Greece, and is hereby presented with a detailed description and illustrations. To date, this is the second report of the genus from Greece. The single previous record originates from northern Greece and was included in a field guide published by an association of amateur mushroom collectors (Konstantinidis 2006).

Materials and methods

Microscopic observations were made using a Zeiss Axioimager Differential Interference Contrast (DIC) microscope. Sections of dried material were mounted in water, Melzer's reagent, Lugol's solution and 3% aqueous KOH solution for observation and photography. All measurements were performed under 1000× magnification. Only spores released from the asci were measured. Spore sizes are given as: (MIN) [mean–2×stdev]–[mean+2×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 [mean–2×stdev] or [mean+2×stdev], respectively. Habitat references in the descriptions refer exclusively to the material collected for the present study. Greek localities are transliterated to Latin according to ISO 843: 1997 (E). Taxonomic authorities are abbreviated in accordance with Kirk & Ansell (1992). All collected specimens are deposited at the Mycological Herbarium of the University of Athens (ATHU–M).

Taxonomic part

Perrotia flammea (Alb. & Schwein.) Boud., Bull. Soc. Mycol. Fr. 17: 24 (1901).

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

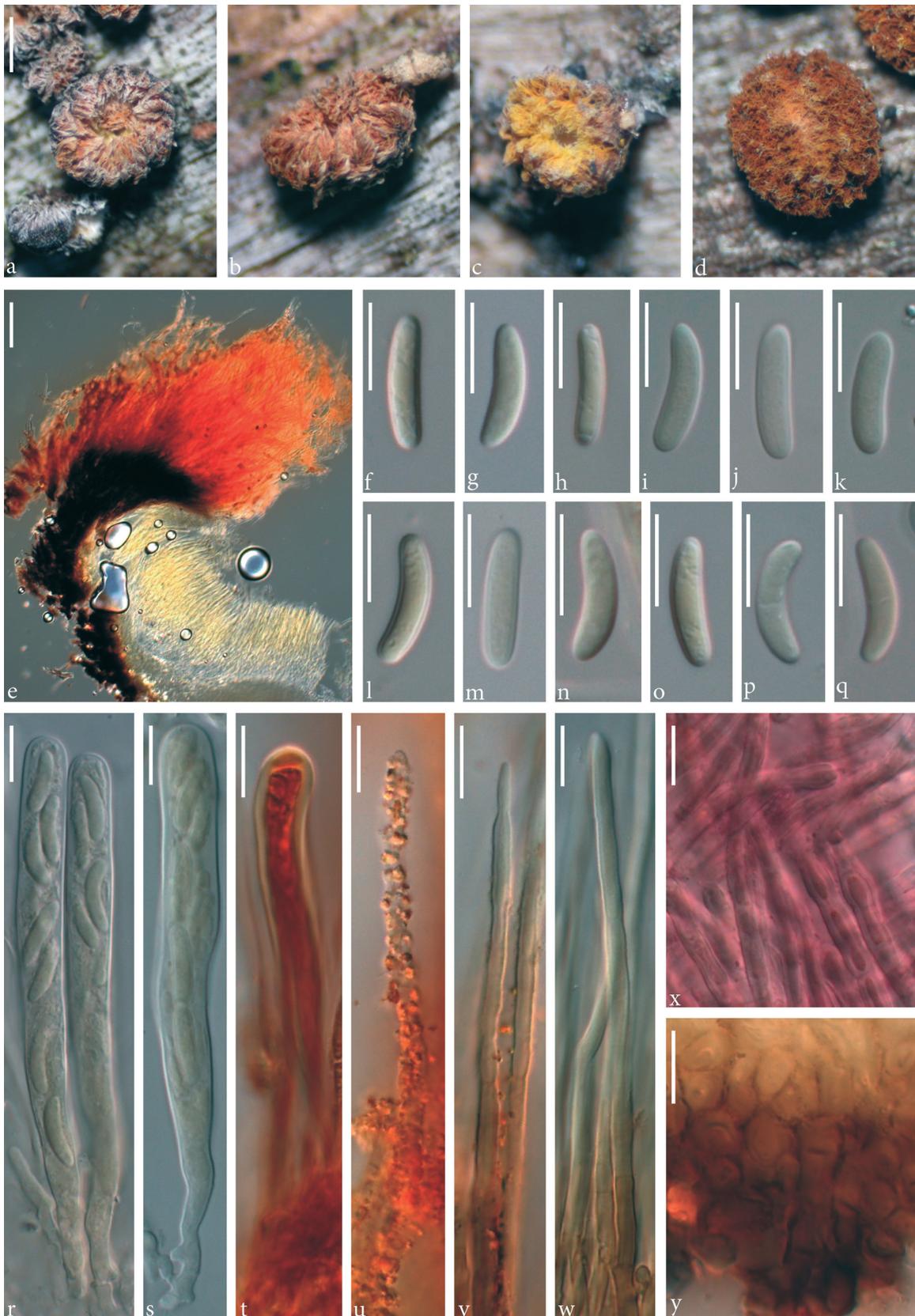


Fig. 1. *Perrotia flammea*: **a–d.** Dried apothecia, *ca* 15× life size; **e.** Apothecium in median vertical section; **f–q.** Ascospores; **r.** Ascus with ascospores; **s.** Ascus arising from crozier; **t.** Ascus with orange-brown tip in Lugol's solution; **u–x.** Excipular hairs (**u.** in water; **v–w.** in Melzer's reagent; **x.** in 3% aqueous KOH solution); **y.** Cells of the ectal excipulum. Scale bars = 1 mm (a), 100 μm (e), 10 μm (f–y)

Apothecia 0.5–3 mm, sessile, low cup-shaped; upper part densely clothed with orange, orange-red to cinnabar-red hairs; basal part glabrous to minutely downy, blackish; hymenium cream to ochraceous; flesh dark, blackish. **Stalk** rudimentary to absent (Fig. 1a–d).

Ascospores (9.4–) 11.1–16.9 (–18.4) × (2.3–) 2.7–4.2 (–4.5) μm, $n = 133$, $Q = 3.17–5.00$, $L' = 14.0$ μm, $W' = 3.4$ μm, $Q' = 4.09$, cylindrical to allantoid, usually distinctly curved, hyaline, smooth, biseriata, mostly aseptate but tardily becoming uniseptate when mature (Figs 1f–q, 2a). **Asci** 63–117 × 6.8–11.1 μm, cylindrical to clavate-cylindrical, 8-spored, arising from croziers; apex rounded, unreactive in Melzer's reagent but in some cases staining orange-brown in Lugol's solution; apical pore inamyloid, utterly unreactive in either Lugol's solution or Melzer's reagent, both with and without pretreatment with KOH (Figs 1r–t, 2b). **Paraphyses** filiform, 1.3–2.2 μm wide, septate, hyaline; tips obtuse to somewhat tapering, straight (Fig. 2b). **Ectal excipulum** of textura prismatica; cells 7.5–16 × 3.8–7.7 μm, agglutinated, with dark brown walls (Fig. 1y). **Medullary excipulum** composed of moderately thick-walled, hyaline, interwoven hyphae 2.1–2.7 μm wide. **Excipular hairs** 2.4–5.0 μm wide, thick-walled, multiseptate, at most of their length covered with coarse orange to orange-brown granules that immediately turn bright lilac-purple in 3% KOH and dissolve; upper part hyaline; basal part coloured with dark brown intraparietal pigment (Figs 1u–x, 2c).

Habitat: gregarious on decorticated wood of *Fagus*, *Abies*, and *Olea*. September to April.

Collections examined: GREECE: **ATTIKI**, Mt. Parnitha, alt. ca 1000 m, forest of *Abies cephalonica*, on dead branches of *A. cephalonica*, 15 Nov 2002, Gonou-Zagou (ATHU–M 6888); **EVVOIA**, Mt. Ktypas, alt. ca 250 m, on dead branches of *Olea europaea* subsp. *oleaster*, 31 Jan 2011, Triantafyllou (ATHU–M 6892); Mt. Ktypas, alt. ca 150 m, on dead branches of *Olea europaea* subsp. *oleaster*, 3 Apr 2011, Triantafyllou (ATHU–M 6893); **KARDITSA**, Mt. Zygyroulivado, alt. ca 1550 m, forest of *Fagus sylvatica*, on dead branches of *F. sylvatica*, 30 Sep 2009, Delivorias (ATHU–M 6890); 30 Sep 2009, Delivorias (ATHU–M 6891); **FOKIDA**, Mt. Vardousia, Vryzes, alt. ca 1200 m, forest of *Abies cephalonica*, on dead branches of *A. cephalonica*, 3 Nov 2007, group of foray (ATHU–M 6889).

Remarks. In the key provided by Zhuang & Yu (2001), one arrives at *P. flammea* only by asserting that the ascospores are septate, but great care should be taken here, as in reality only a small portion of the spores become septate, and these only in late maturity.

The spores of *P. flammea* are generally reported as being somewhat narrower than those measured in our study [10–15 × 3 μm, Phillips 1893; 14–16 × 2.5–3.5 μm, Rehm 1896; 10–15 × 2.5–3 μm, Moser 1963; 10–14 × 2.5–3 μm, Dennis 1978; 10–14 × 2.5–3 μm, Ellis & Ellis 1985; 10–15 × 2–3 μm, Vesterholt 2000; 10–14 × 2.5–3 μm, Zhuang & Yu 2001], and only Seaver (1942) reports them as reaching 4 μm in width. Thus, the spore-width reported in our study (with a mean value of 3.4 μm and reaching 4.2 μm or, exceptionally,

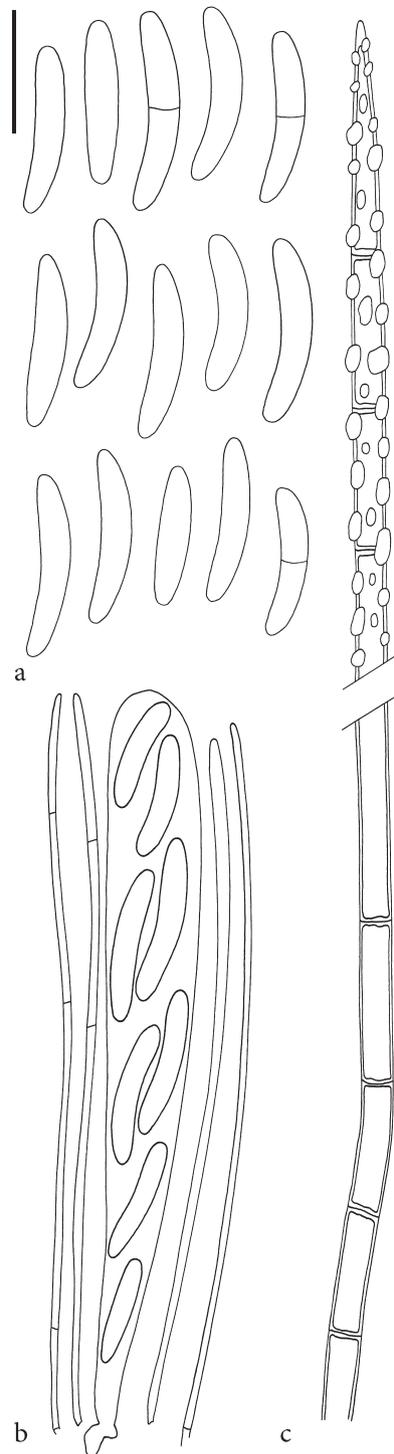


Fig. 2. *Perrotia flammea*: a. Ascospores; b. Ascus and paraphyses; c. Excipular hair. Scale bar = 10 μm

4.5 μm) should be considered as representing the broad-spored part of the spectrum.

The reported substrates of *P. flammea* include a variety of broad-leaved trees and shrubs (*Arbutus*, *Carpinus*, *Corylus*, *Fagus*, *Fraxinus*, *Ligustrum*, *Malus*, *Prunus*, *Salix*), as well as conifers. To our knowledge, there have been no previous reports on *Olea*, which should thus be considered a new host for the species. The same also applies for *Abies cephalonica*, an endemic tree of southern Greece.

Its small size notwithstanding, *P. flammea* is a striking find in the field, what with its dense coating of fiery hairs and all. Nonetheless, it is probably easily overlooked. Although it has a wide distribution, and has long been known from various parts of Europe (Albertini & Schweinitz 1805; Phillips & Plowright 1876; Rehm 1896; Dennis 1978; Vesterholt 2000; Galliot & Sugny 2004; Rubio *et al.* 2005), North Africa (Dennis 1984), and North America (Berkeley 1875; Seaver 1942; Kanouse 1947; Miller 1994), it is invariably considered rare. Reports from Southeastern Europe are particularly difficult to come by, and it seems not to have been reported from most Balkan countries. The scarce reports from the Balkan region include a very recent record from the Republic of Macedonia, where it was found for the first time (Karadelev 2011), and a single earliest report from Greece (Konstantinidis 2006). However, it may well not be rare in Greece, as six collections are presented here from no less than four different prefectures.

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