MycolObs - Mycological Observations Vol. 6: 9-10 2023-03-08

Article received 20 December 2022, accepted 30 January 2023

Entoloma phaeocarpoides, a molecular type revision

Pietro Voto[1]

[1]Via Garibaldi 173, I-45010 Villadose (RO), Italy; ORCID 0000-0003-1922-1324 - pietrovoto@libero.it

Key words:
Agaricales
Entolomataceae
Entoloma subcollariatum
Entoloma anthracinum
Entoloma undulatosporum

Abstract: A molecular sequence of *E. phaeocarpoides*, the ITS gene, was recently obtained which gives important phylogenetic information evidencing that it is very close to other taxa. Its relationship with *Entoloma subcollariatum*, *Entoloma anthracinum* and *Entoloma undulatosporum* are discussed.

MATERIALS AND METHODS

The ITS sequence was obtained in the first half of December 2022 by N. Forin at the University of Padua and registered in GenBank with accession number OQ302119.

NOTES

The ITS sequence obtained from the type of *E. phaeocarpoides* has a 99.65% identity with the type of *E. anthracinum* (LN850598), a 99.84% identity with the type of *E. subcollariatum* (LN850599), and a 99.84% to 99.85% identity with two non-typical Spanish vouchers (MZ493169 and KJ001408) identified as *E. undulatosporum*. Also, all these taxa have 100% identity when crossed with each other.

Rhodophyllus anthracinus J. Favre 1955, basionym of *E. anthracinum* (J. Favre) Noordel. 1981, has a glabrous pileus with a pileipellis composed of a cutis to a thin ixocutis of narrow, cylindrical hyphae, 3-15 µm wide, adnate or emarginate gills, spores 8.5 – 10.5 × 6.5 µm in the basionymic description, and the type was found on humic soil among dwarf willows.

Rhodophyllus subcollariatus Kühner 1977, basionym of *E. subcollariatum* (Kühner) Bon 1991, was described with gills attaching to a lamellar collarium around the stipe, spores 10 – 11 × 7 – 8.5 µm, a pileipellis composed of a thin cutis of 2.5 – 5 µm wide cylindrical hyphae, and the type was found at the boundary of a mineral soil, above the last *Salix herbacea*, at 2600 m a.s.l. Kühner (1977) did not identify his material with the Favre's species because of more heterodiametrical spores and the presence of a pseudocollarium.

E. undulatosporum Arnolds & Noordel. 1979 was described with narrowly adnate gills, a pileipellis in cutis composed of 3.8-15 µm broad hyphae, spores (7.7) 7.9 – 10.8 (12) x (5.7) 6 – 6.8 (7.5) µm and the type had been found in grass along the Linthorst-Homan canal in Beilen, Netherlands. In the notes, Arnolds & Noordeloos (1979) placed the taxon in subgen *Nolanea* (Fr.) Noordel., sect. *Papillati* (Romagn.) Noordel.; they made no comments on, and no comparisons with, the two aforesaid taxa.

Noordeloos (1981) reviews various taxa of subgenera *Entoloma* and *Allocybe*; he transfers *Rhodophyllus anthracinus* to *Entoloma* and only comments upon *Rhodophyllus subcollariatus*. No mention is made of any comparison with *E. undulatosporum*.

Bon (1991) transfers *Rhodophyllus subcollariatus* to *Entoloma*, apparently thus seeming not to recognize a correspondence between it and *E. anthracinus* and *E. undulatosporum*.

Noordeloos (1992, 2004) keeps *E. undulatosporum* and *E. anthracinus* in his keys treating them separately. However a change occurs between the two works in the description of the gill attachment [which changes from adnate-emarginate to almost free (1992) to broadly adnate, sometimes emarginate (2004)] and of the pileus [which changes from convex then expanding, finally radially fibrillose, with a pileipellis of a cutis of narrow, 3.5-15 µm wide cylindrical hyphae (1992) to convex with slightly depressed centre, rarely umbonate, glabrous and smooth to distinctly roughened subtomentose, with a pileipellis sometimes transitional to a trichoderm of up to 15 µm wide elements (2004)] of *E. undulatosporum*.

Kokkonen (2015), basing on molecular type revisions, reduces *E. subcollariatum* to synonymy with *E. anthracinum*; *E. undulatosporum* is not included in her study.

Recently, I published *E. phaeocarpoides* Voto (Voto 2022), a clitocyboid to omphalioid looking species, which features a depressed pileus with an involute margin, pileipellis composed of a cutis with transition at centre to a trichoderm with 10 – 20 µm broad emerging end cells, broadly adnate to decurrent gills, and the type was found on sand of coast back dunes. The combination of data from pileus, pileipellis, lamellae and habitat seemed to direct the comparative analysis neither towards *E. anthracinum* nor towards *E. undulatosporum*.

CONCLUSIONS

On a molecular base, *E. phaeocarpoides* is a later synonym of *E. anthracinum*.

On a morphological base, *E. phaeocarpoides*, together with other Mediterranean collections identified as *E. undulatosporum* (e.g. Hausknecht & Zuccherelli 1996; Moreno *et al*. 2021), has affinities with Noordeloos's (2004) modified description of *E. undulatosporum*.

Until its type is sequenced an unclear point remains if *E. undulatosporum* is conspecific with *E. anthracinum*; in case it should be so, although *anthracinum* is the oldest epithet, *undulatosporum* would be chronologically prior as the first one combined with the genus name *Entoloma*.

REFERENCES / BIBLIOGRAFIA

Arnolds EJM, Noordeloos ME (1979) New taxa of *Entoloma* from grassland in Drenthe, the Netherlands. *Persoonia* **10**(2):283–300

Bon M (1991) Inventaires des espèces récoltées au stage de mycologie alpine (Les Arcs - 23-26 Août 1990). *Bulletin Trimestriel de la Fédération Mycologique Dauphiné-Savoie* **31**(122):25–28

Hausknecht A, Zuccherelli A (1996) Ritrovamenti interessanti dal Ravennate. 4° parte. *Agaricales* con polvere sporale rosa. *Boll. Gr. Micol. G. Bresadola* (n.s.) **39**(1):19–70

Kokkonen K (2015) A survey of boreal *Entoloma* with emphasis on the subgenus *Rhodopolia*. Mycol Progress **14**:116 DOI 10.1007/s11557-015-1135-y

Moreno G, Picado JA, Rosario P, Alvarado P (2021) Contribution to mushrooms study from the Alcala's University external campus. *Bol. Soc. Micol. Madrid* **45**:91–113

Noordeloos ME (1981) *Entoloma* subgenera *Entoloma* and *Allocybe* in the Netherlands and adjacent regions with a reconnaissance of their remaining taxa in Europe. *Persoonia* **11**(2):153–256

Noordeloos ME (1992) *Entoloma* s.l. Fungi Europei, vol. 5. Ed. Biella, Saronno, Italy

Noordeloos ME (2004) *Entoloma* s.l. Supplemento. Fungi Europei, vol. 5A. Ed. Candusso, Alassio, Italy

Voto P (2022) *Entoloma phaeocarpoides*, a new sand-inhabiting dark omphalioid species from Italy. *Mycological Observations* **4**:33–40