

Domenico Puntillo & Sonia Ravera

## *Naetrocymbe mori-albae*, a new species from Calabria (Southern Italy)

### Abstract

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The new taxon belongs to the group *Arthopyrenia rhypona*-*A. punctiformis*, recently transferred to the problematic genus *Naetrocymbe* Korb. (*Naetrocymbaceae* Höhn. ex R.C. Harris), as it is a non or weakly lichenized group. This species is characterized by tadpole-shaped 1-septate ascospores with a conical lower cell and perithecia which are 4-8 linearly arranged.

*Key words:* *Naetrocymbe*, Lichenes, Italy.

### Introduction

*Naetrocymbe* is a genus of pyrenocarpous ascomycetes belonging to the family *Naetrocymbaceae* established by Harris (1995). This family includes species usually not lichen-forming and characterized by short-celled paraphyses with refractive bodies near the septa, obpyriform asci with a distinctive apical region lacking a nasse and short rod-shaped microconidia. It has a mainly temperate/boreal distribution. Because of some *Naetrocymbe* species can be lichenized (Keissler 1938; Knudsen & Lendemer 2009; Roux 2009), Aptroot (1998, 2002), Coppins (2002) and Coppins & Orange (2009) consider unnecessary a separation between *Naetrocymbe* and *Arthopyrenia*. They disagree with Harris (1973, 1975, 1995), Tucker & Harris (1980) and Coppins (1988), about the importance of the hamathecial tissues as valuable character. In Aptroot's opinion, the cosmopolitan genus *Arthopyrenia* s.l. should be considered in its original wide concept: characterized by branched pseudoparaphyses, which may disappear, and sole-shaped ascospores. Cannon & Kirk (2007) and Lumbsch & Huhndorf (2010) actually, accept the *taxa* proposed by Harris (1995).

During a check on Italian *Arthopyrenia* in the Herbarium of Royal Botanic Garden Edinburgh, three new species characterized by 2-celled more or less tadpole-shaped ascospores have been discovered. Two of them have been included in the genus *Arthopyrenia* (*Arthopyrenia tuscanensis* Coppins & S. Ravera and *Arthopyrenia coppinsii* S. Ravera) because they are very close to *Arthopyrenia salicis* A. Massal. and they lack pseudoparaphyses at maturity (Ravera 2006). As the third possesses all of the characters

recognized by Harris (1995) for placement in *Naetrocymbe*, except for the ornamented ascospores, we place this species in that genus.

## Material and Methods

The study is based on collections made by D. Puntillo in 1990 and in 2006, deposited in the Herbaria of the University of Calabria (CLU) and of the Royal Botanic Garden Edinburgh (E).

The morphology of the specimens was examined with standard microscopic techniques.

Sections of the perithecia were prepared by hand cutting with a razor blade and mounted in water and in 10% aqueous solution of KOH; for observing asci in more detail, sections of perithecia were mounted in toluidine blue (0.05%), lactophenol-cotton blue, Lugol's solution and gently squashed. All measurements were made in water. Measurements of hamathecial filaments and ascospores were made at  $\times 1250$  magnification, those of entire asci were made at  $\times 500$  magnification.

## The species

*Naetrocymbe mori-albae* D. Puntillo & S. Ravera, sp. nov. - Fig. 1 - Species corticola, thallus endophloeodes. Ascomata perithecioidea, subglobosa,  $0.18 \times 0.21-0.28$  mm; involucrellum crassum, clypeatum, textura intricata; excipulum angustatum, hyalinum; pseudoparaphyses persistentes moniliformae,  $6.5-7 \times 1.3-1.9$   $\mu\text{m}$ . Asci fissitunicati, obpyriformes,  $40-55 \times 17-23$   $\mu\text{m}$ , octospori; ascospores hyalinae, laeves, sine episporia,  $14-17 \times 4-5$   $\mu\text{m}$ , bicellulares, eguttulatae, ad septum valde constrictae; cellula superior brevis, latitudine cellulam inferiorem superans, cellula inferna leviter angularis, elongata.

*Typus*: Italy, Calabria, Cosenza, loc. Cuccari municipality of Fuscaldo, on twigs of *Morus alba* L., 250 m alt., 22/06/90, D. Puntillo 6892 (CLU - holotypus; CLU, E, IS - isotypi).

Thallus endophloeodal, inconspicuous, upper surface: gray, smooth; photobiont absent. Ascomata perithecial  $0.18 \times 0.21-0.28$  mm, black, subglobose,  $\pm$  circular, in surface view, numerous, scattered, superficial on the thallus or bark, often linearly arranged in number of 4-8. Ascomatal wall of textura intricata, black, not continuous below the hamathecium; involucrellum dark reddish brown, clypeate, thick and well developed, intermixed with dark hyphae, amorphous pigment localized in the cell wall; excipulum colourless, scarcely discernible; the wall pigment remains brown in K. Hamathecium of moniliform pseudoparaphyses stained with lactophenol blue; filaments  $6.5-7 \times 1.3-1.9$   $\mu\text{m}$  wide, septate, branched and anastomosed. Asci bitunicate with a hemiamyloid epiplasm (I+ orange-red) with a distinct apical region lacking a nasse, arising from the subhymenial zone at the base of the centrum, inclined towards the ostiolum, obpyriform,  $40-55 \times 17-23$   $\mu\text{m}$ , with 8 irregularly arranged ascospores; dehiscence typically fissitunicate. Ascospores  $14-17(20) \times 4-5(6)$   $\mu\text{m}$  [average ( $\pm$ SD):  $15.22(\pm 1.20)-4.64(\pm 0.53)$ , length/breadth ratio  $3.3(\pm 0.4)$  ( $n=50$ )], colourless, smooth, 1-septate, non-guttulate, constricted at the septum with a short upper cell and an elongate pointed lower cell (tadpole-shaped), markedly unequal, mature

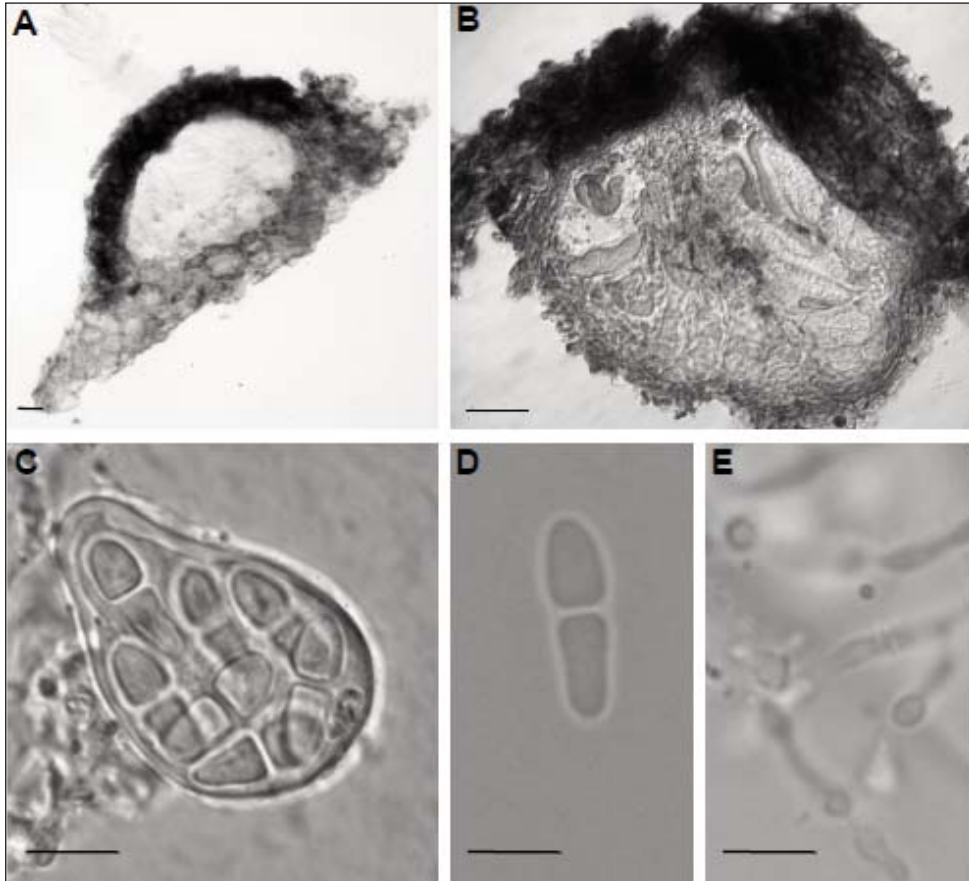


Fig. 1. A, vertical sections of perithecia in 10% KOH; B, showing fissitunicate discharge and tadpole-shaped ascospores in 0.05% TBO; C, bitunicate asci (in KOH); D ascospore (in TBO); E, moniliform pseudoparaphyses (in TBO). Scales: A = 20  $\mu\text{m}$ ; B, C, D, E = 10  $\mu\text{m}$ .

spores often showing a slight median constriction in the lower cell; perispore indistinct but immature spores from broken asci have a broad halo of ascoplasm. Pycnidia not observed. Spot tests all negative, UV negative.

**Etymology.** - The epithet “mori-albae” refers to the tree (*Morus alba* L.) from which all the samples were collected.

**Ecology and habitat.** - The new species grows on smooth bark, usually on twigs, of *Morus alba*, accompanied by *Arthonia excipienda* (Nyl.) Leight., *Arthonia punctiformis* Ach. and *Lecidella elaeochroma* (Ach.) M. Choisy.

**Remarks.** - The size of ascomata and asci suggest affinities to *Naetrocymbe punctiformis* (Pers.) R. C. Harris, early colonizer of smooth bark, especially on twigs of a

wide variety of trees. These two species with very small ascospores are very similar and are likely to be confused, although differences in morpho-anatomical characters can be used to separate them (Table 1).

According to Harris (1995) North American species belonging to *Naetrocymbe* can be determinate on the basis of shape and dimension of ascospores. The relevance of these characters allows us to not considered *Naetrocymbe mori-albae* to be an extreme variant of *N. punctiformis*.

Tadpole-shaped ascospores are a diagnostic feature of *Arthopyrenia tuscanensis* and *Anisomeridium ranunculosporum* (Coppins & P. James) Coppins. *A. tuscanensis* characteristically lacks pseudoparaphyses and can be easily distinguished by its strictly conical lower cell. *A. ranunculosporum* is easily distinguished from *N. mori-albae* by its well-lichenized thallus (with *Trentepohlia*), K+ greenish involucrellum, long-celled pseudoparaphyses, larger, guttulate ascospores, and usual presence of macro- and microconidia. Furthermore *N. mori-albae* seems to have a different habitat ecology and it is locally frequent only in pioneer communities on twigs of *Morus alba*.

Table 1. Characters distinguishing *Naetrocymbe punctiformis*, *Arthopyrenia tuscanensis*, *N. mori-albae*.

| Character                            | <i>Naetrocymbe punctiformis</i> (source: Coppins & Orange, 2009)  | <i>A. tuscanensis</i>   | <i>N. mori-albae</i>   |
|--------------------------------------|---|---|--|
| Ascomata (mm)                        | 0.1 × 0.23  | 0.09-0.23 × 0.09-0.11   | 0.18 × 0.21-0.28   |
| Pseudoparaphyses size (µm) and shape | 1.5-2.5 × 3-8 moniliform  | Absent  | 1.3-1.9 × 6.5-7 moniliform   |
| Periphysoids size (µm) and shape     | Absent  | 5-10 × 1-1.5, branched and septate  | Absent   |
| Asci size (µm) and shape             | 40-55 × 15-22, obpyriform   | 38-55 × 12-14, obclavate-obpyriform   | 40-55 × 17-23, obpyriform  |
| Ascospores size (µm) and shape       | 16-20(22) × 4.5-5, 1-septate, ± biguttulate, slightly constricted at the septum, apices ± rounded, perispore usually distinct | 9.5-14 × 3-4.7, 1-septate, non-guttulate, tadpole-shaped, lower apex strongly pointed, perispore indistinct | 14-17(20) × 4-5(6), 1-septate, non-guttulate, tadpole-shaped, lower apex ± pointed, perispore indistinct |

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Addresses of the authors:

Domenico Puntillo<sup>1</sup> & Sonia Ravera<sup>2</sup>,

<sup>1</sup>Museo di Storia Naturale della Calabria ed Orto Botanico, Università della Calabria, I-87030 Arcavacata di Rende (CS), Italy. E-mail: domenico.puntillo@unical.it

<sup>2</sup>Dipartimento di Bioscienze e Territorio, Università degli Studi del Molise, C.da Fonte Lappone, I-86090 Pesche (IS). E-mail: sonia.ravera@unimol.it

