Marcello G. Intini

Armillaria cepistipes and *A. gallica (Agaricales, Tricholomataceae)* in Italy

Abstract

Intini, M. G.: *Armillaria cepistipes* and *A. gallica (Agaricales, Tricholomataceae)* in Italy. – Bocconea 5: 861-866. 1997. – ISSN 1120-4060.

The cultural and morphological characteristics of two very similar European *Armillaria* species, *A. cepistipes* and *A. gallica,* are described, and their distribution in Italy is discussed.

Introduction

Five intersterile annulate *Armillaria* species were recognized in Europe by Korhonen (1978) on the basis of incompatibility tests (mating tests performed on laboratory cultures), and were characterized by him as biological species designated as A, B, C, D, and E.

On the basis of subsequent studies, Korhonens's five taxa have been associated by Marxmüller (1987, 1992) with the following binomials: *Armillaria borealis* Marxm. & Korhonen (taxon A), *A. cepistipes* Velen. (taxon B), *A. ostoyae* (Romagn.) Herink (taxon C), *A. mellea* (Vahl : Fr.) Staude (taxon D), and *A. gallica* Marxm. & Romagn. (taxon E).

In Italy, species matching the characteristics of taxa C, D, and E have been described (Intini 1988). A fourth species was referred to Korhonen's taxon B on the basis of incompatibility tests (Intini 1990), but at that time no specimen series had yet be found in nature, in Italy, to permit a complete description.

European mycologists consider taxa B and E to be easily mistaken for each other due to the similarity in morphology of the fruiting bodies and in characteristics of the mycelium in vitro (Roll-Hansen 1985; Termorshuizen & Arnolds 1987; Shaw & Kile 1991; Marxmüller 1992). My recent studies of material collected in various parts of Europe resulted in a better knowledge of the two species and allow a more accurate description of both the features of the mycelia in culture and the morphology of the fruiting bodies, whether produced in nature or obtained in vitro on artificial substrates. Also, some data on the nomenclature, hosts and geographical distribution can now be reported.

Material and methods

In the period 1990-1992, over one thousand samples of fruiting bodies and cultures of *Armillaria cepistipes* (taxon B) and *A. gallica* (taxon E), from numerous Italian sites and from across the Alps, were examined. Special attention was paid to the observation of

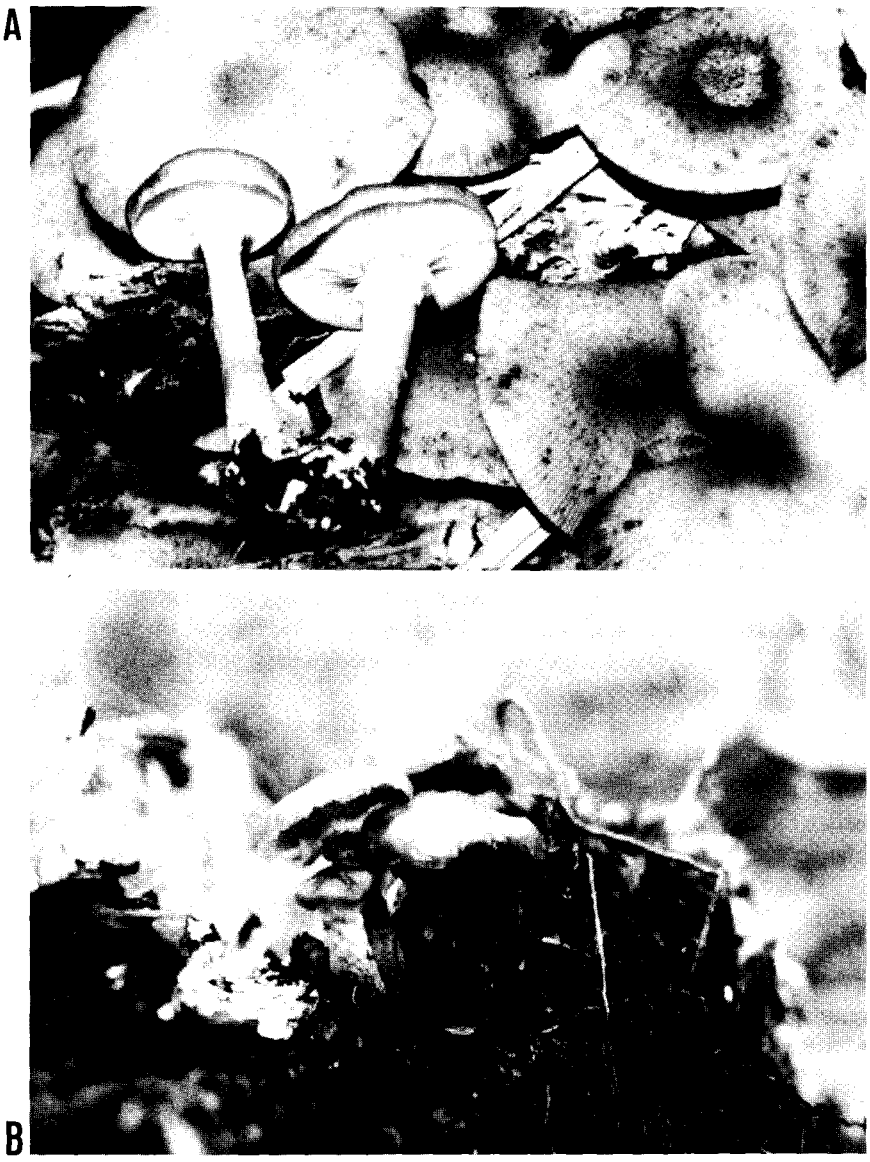

Fig. 1. Fruiting bodies of *Armillaria cepistipes* (A) and *A. gallica* (B).

Fig. 2. *Armillaria*. – A-B, young fruiting bodies of *A. cepistipes* found in nature (A) and differentiated in vitro (B). – C-D, young fruiting bodies of *A. gallica* found in nature (C) and differentiated in vitro (D). – E-F, rhizomorphs of *A. cepistipes* in vitro (E) and *A. gallica* (F), both in vitro.

the ontogeny of the fruiting bodies, starting from their earliest stages of growth. All descriptions were made on the basis of fresh specimens that had developed under normal conditions.

Mycelia of the two species that had been produced in culture, designated with the initials AB-PT and IN-MA, respectively, were sent to institutes at Clermont-Ferrand and Zurich where their identity was confirmed by means of incompatibility trials with testers.

Results

Armillaria cepistipes (Fig. 1A, 2A-B, E).

Macroscopic characters. – Pileus initially pale grey then light brown, up to 150 mm across, initially conical then flattened, covered with small dark squamules. Lamellae decurrent or subdecurrent, initially white then cream-coloured. Stalk up to 120 mm long and 35 mm thick, cylindrical but slightly thickened at the base, with no dark squamules but covered with sparse tufts of nearly white mycelium. Ring cortiniform, nearly white.

Morphology of fruiting bodies differentiated in vitro. – Colour initially ash-coloured. Surface of the pileus covered with fine hairs of a darker colour, light brown and with darker brown scales when expanded. Stipe thickened at the base, ring cortiniform and white.

Microscopic characters. – Basidiospores smooth, elongated, drop-shaped, 6.2-9.6 × 4.2-6.3 µm. Basidia 4-sterigmate, claviform, 25-40 × 5.5-8.5 µm, with clamp connections at the base. Cheilocystidia utriform or claviform, 15-40 × 8.5 µm. Squamules on the pileus 0.5-1.5 mm long, formed by cylindrical to fusiform multiseptate hyphae, hyphal cells 10-70 × 5-25 µm.

Characteristics of rhizomorphs cultured in Petri dishes. – Rhizomorphs circular in cross-section, with scarce branching. Agar around the rhizomorphs with considerable pigmentation.

Habitat. – *Armillaria cepistipes* is an mountain species that has been found at altitudes ranging from 600 to 1500 m, often in association with *A. ostoyae*. It grows in conifer and broadleaf woods in the montane and submontane zone of the Alps as well as in conifer and broadleaf plantations in the Apennines (from Liguria east to Tuscany-Emilia and south-east to Calabria). It has not yet been recorded from Sicily or Sardinia. In the mountains of Italy, it is the first species of the genus to set fruit; when it grows together with *A. ostoyae*, the latter appears one or two weeks later.

Armillaria gallica (Fig. 1B, 2C-D, F).

Macroscopic characters. – Pileus initially greenish-yellow then ochre or burnt sienna, up to 160 mm across, at first obtusely conical then flattened, at times appressed, covered with darker squamules that may be weathered off in nature in adult specimens, in which case the pileus surface becomes brownish-yellowish and translucent. Lamellae wide, decurrent, initially white then creamy rusty-brown. Stalk up to 150 mm long and 40 mm thick,

cylindrical but thickened at the base and covered with yellow flocci. Ring pale yellow, wide and turned upwards, appearing shredded into a star shape.

Morphology of fruiting bodies produced in vitro. – Colour initially yellow, fading to light yellow in the adult stage. Surface of the pileus covered with fine hairs, with various shades of brown, but covered by shades of dark brown squamules. Stipe nearly cylindrical but thickened at the base, with a more or less pronounced ring.

Microscopic characters. – Basidiospores smooth, almond-shaped or elongated and drop-shaped, 7-10 × 4.5-6.5 µm. Basidia 4-sterigmate, claviform, 30-45 × 6-9 µm, with rare clamp connections at the base. Cheilocystidia utriform or claviform, 15-30(-50) × 5-7(-10) µm. Squamules on the pileus 1-2.5 mm long, formed by cylindrical to fusiform multiseptate hyphae, hyphal cells 25-120 × 10-35 µm.

Characteristics of rhizomorphs cultured in Petri dishes. – Rhizomorphs circular in cross-section, with comb-like branches. Agar around the rhizomorphs with slight pigmentation.

Habitat. – *Armillaria gallica* is widespread both in the Mediterranean macchia, where it is mostly associated with *Quercus* species, and in forests of *Fagus* at altitudes ranging from 600 to 1500 metres. It has been found in various places in northern, central and southern Italy as well as on the large islands.

Nomenclatural remarks

Korhonen's taxon B has been equated by Marxmüller with *Armillaria cepistipes*. However, Velenovský's holotype (PRC) is an aberrant form that deviates strongly from the great majority of specimens presently assigned to this species, which rather resemble those of *Armillaria gallica* (Marxmüller, 1987; 1992).

In view of this discrepancy, it may prove necessary to redescribe and rename taxon B as a new species, if possible by consensus among those working on the genus *Armillaria*. One might then choose an epithet that accounts better for the salient characteristics of this particular species. To our mind, the epithet *cepistipes* (from Latin *cepa* = onion and *stipes* = stalk, meaning "with a bulbous stalk") is ill suited for use restricted to any particular *Armillaria* species, since they all present, at least at some stage of their ontogenesis, a stalk that is thickened at the base.

Korhonen's taxon E has been described and named by Marxmüller (1987; 1992) as a new species, *Armillaria gallica*, a name that we have retained for the time being. On the basis of our own investigations, however, the name *Armillaria lutea* Gillet (1874), judging from its protologue, belongs to the same species and, if indeed synonymous, has priority. The epithet *lutea* (yellow) would, we think, be well suited to denote this *Armillaria* species, since yellow is the prevailing colour of its stipe and, in adult carpophores, also of the pileus.

Acknowledgement

I am most grateful to Francesca Pesciolini for excellent technical assistance.

References

Gillet, C. C. 1874: Les hyménomycètes. – Alençon.

Intini, M. G. 1988: Contributo alla conoscenza delle *Agaricales* italiane. Guida al riconoscimento delle *Armillaria* lignicole. – Micol. Veg. Medit. **3(1):** 49-72.

– 1990: Note sul genere *Armillaria* in Italia. – Inform. Fitopatol. **4:** 51-55.

Korhonen, K. 1978. Interfertility and clonal size in the *Armillaria mellea* complex. – Karstenia **18:** 31-42.

Marxmüller, H. 1987: Quelques remarques complémentaires sur les armillaires annelés. – Bull. Soc. Mycol. France **103:** 137-156.

– 1992: Some notes on taxonomy and nomenclature of five European *Armillaria* species. – Mycotaxon **44:** 267-274.

Roll-Hansen, F. 1985: The *Armillaria* species in Europe. – Eur. J. Forest Pathol. **15:** 22-31.

Shaw, C. G. & Kile, G. A. 1991: *Armillaria* root disease. – Agric. Handb. **691.**

Termorshuizen, A. & Arnolds, E. 1987: On the nomenclature of the European species of the *Armillaria mellea* group. – Mycotaxon **30:** 101-116.

Address of the author:
Dr Marcello G. Intini, Istituto di Patologia del Consiglio Nazionale delle Ricerche, Piazzale delle Cascine 28, I-50144 Firenze, Italy.