

**THE FIRST LOCALITY OF *AMANITA ARGENTEA* HUIJSMAN  
(*AGARICALES*, *BASIDIOMYCOTA*) IN SOUTH-WESTERN POLAND**

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**ABSTRACT:** *Amanita argentea* Huijsman is generally synonymized with *Amanita mairei* Foley in the current mycological literature. Until recently *A. argentea* in the broad sense has been reported only from 5 localities in south and south-eastern Poland. The paper presents the first locality of *A. argentea* in the strict sense in south-western Poland. The recognized species grown in the neighbourhood of *Quercus* and *Carpinus* in municipal park in Wrocław. A brief description and illustration of the species based on recorded specimens are given. The delimitation of the *A. argentea* Huijsman are discussed and the knowledge of distribution, ecology and biology of *A. argentea* sens. lat. is summarized.

**KEY WORDS:** *Amanita argentea*, *Amanita mairei*, urban greenery, Lower Silesia, SW Poland

***Introduction***

*Amanita argentea* Huijsman is usually synonymized with *Amanita mairei* Foley (Moser 1983; Breitenbach and Kränzlin 1995; Krieglsteiner 2003; Horak 2005), or treated with the later species as a collective taxon (Fraiture 1993; cf. Vesterholt 2008). In the presented paper the taxonomical concept of Contu (2000) is adopted. In accordance with Contu's approach, *A. argentea* is treated as distinctive species of the subsection *Ovigerae* (Singer) Contu. The subsection includes several, not annulate *Amanita* species, that are distinguished by subglobose to ellipsoid basidiospores ( $Q = 1.15-1.20$ ). According to Contu's view *A. mairei* Foley is another, closely related to *A. argentea*, species, which is characterized by more elongate ellipsoid basidiospores ( $Q = 1.25-1.50$ ). Recently *A. argentea* Huijsman has been recorded during inventory of the biodiversity of agarics and boletes within greenery objects of Wrocław. The specimens, which represent the first record of the species from south-western Poland, are described and illustrated below.

### **Methods**

Material was gathered within one locality. The description of macroscopic features is based on fresh material, on 1 collection (comprising 3 basidiomata in all stages of development). For microscopic observations, dried pieces of basidiomata were placed in 5% NH<sub>4</sub>OH for about 5 minutes, then transferred to tap water until they become pliable. Free-hand sections of the rehydrated pieces of basidiomata were examined in 5% NH<sub>4</sub>OH, Congo Red, phloxine (in 1% NH<sub>4</sub>OH), and in Melzer's reagent. The microcharacters of one recorded (mature) basidioma were observed and measured under a light microscope at 1500× (basidiospores) and 800× (other features). Terminology of morphological and anatomical features was adopted mainly from Velinga (1988). Reported size of spores, basidia and cheilocystidioid cells, as well as dimensions of pileipellis elements, were based on: 31, 11, 21 and 21 measurements, respectively. The abbreviation *Q* is the ratio of basidiospore length to its width. Data for basidiospore measurements and *Q* coefficient are presented as the mean, standard deviation, with the minimum and maximum dimensions in parentheses. Dimensions of basidia and cystidioid cells are given as the range of minimum and maximum dimensions. Drawings were made with the aid of a drawing tube, under an oil-immersion objective. The voucher specimens of *Amanita argentea* have been deposited in the Herbarium of the Museum of Natural History, Wrocław University in Wrocław, Poland (WRSL).

### **Description of the specimens**

*Amanita argentea* Huijsman ss. Contu (2000), Bull. trimest. Soc. mycol. Fr. 75(1): 14. 1959 (syn.

*Amanita mairei* sensu auct. mult., *Amanita mairei* var. *argentea* (Huijsman) Bon & Contu (Legon et al. 2005).

### **Macroscopic and microscopic features**

Pileus 30-90 × 10-30 mm, initially hemispherical, oval or truncately conical, then convex, plano-convex to applanate, rarely subumbonate in the central part, then even depressed; greyish to silvery grey, with a slightly deeper grey zone in the middle; distinctly radially sulcate at margin (to 1/3 of the radius); dry to slightly viscid and shining when moist; smooth and glabrous. Universal veil forming a sack-like, greyish white to ochraceous white, membranous volva at the stem base and sometimes a white patches on the surface cap. Lamellae moderately crowded, free (rarely adnexed), ventricose, 5-10 mm broad, whitish to greyish white, with entire, even (rarely fimbriate), concolorous edges. Stipe 60-120 × 8-20 mm, cylindrical to tapering upwards; solid at first, then broadly fistulose, fragile; not annulate (partial veil absent); surface greyish white, appressed flocculose, developing transverse cracks (Fig. 1). Context in pileus and stipe fragile, whitish. Smell indistinct, somewhat sweet. Taste mild. Spore print white. Spores (8.0) 10.5 ± 1.2 (12.0) × (6.5) 8.5 ± 0.8 (9.4) μm, *Q* = (1.09) 1.23 ± 0.06 (1.30), broadly ellipsoid to ellipsoid, rarely subglobose, smooth, hyaline, with 1 droplet, non-amyloid. Basidia 40-60 × 13-17 μm, clavate, with 4 (rarely with 2) sterigmata. Cheilocystidia (cystidioid cells), usually in the form of single, clavate, broadly clavate or obpyriform elements, 12-35 × 8-23 μm. Pileipellis an ixocutis of narrow, 2-6 μm wide hyphae. Clamp-connections not observed (Fig. 2).

### **Material examined**

Wrocław (Poland), Szczytnicki Park, amongst grasses, in the neighbourhood of *Quercus robur* and *Carpinus betulus*, 13.09.2001, coll. M. Halama, (in WRSL).

### **Taxonomical remarks**

*A. argentea* belongs to the section *Vaginatae* (Fr.) Quél., that includes nearly 40 species of the genus in Europe. On the basis of length to width ratio of basidiospores ( $Q$ ), two lower rank groups have been distinguished within the *Vaginatae* section, i.e.: subsection *Vaginatae* Singer and subsection *Ovigerae* (Singer) Contu. The first subsection includes taxa, that are characterized by globose or subglobose spores ( $Q = 1.0-1.1$ ), and the second one includes taxa of broadly ellipsoid to ellipsoid spores ( $Q = 1.2-1.5$ ). Subsection *Vaginatae* includes one of the most common species of the section *Vaginatae*, i.e. *A. vaginata* (Bull.: Fr.) Lam., for example. Subsection *Ovigerae*, in turn, includes look-alike of *A. vaginata*, – *A. argentea* Huijsman, and a few other relatives, i.e.: *A. albogrisescens* Contu, *A. cistetorum* Contu et Pacioni, *A. fraudulentata* Contu, *A. pseudolactea* Contu, *A. magnivolvata* Aalto, *A. stenospora* Contu, *A. mairei* Foley (syn. *A. supravolvata* Lanne) and *A. separata* Contu. *A. argentea* can be distinguished from above mentioned members of subsection *Ovigerae* (with exception of *A. cistetorum*), by broadly ellipsoid spores ( $Q = 1.15-1.2$ ) and greyish silver colour of the cap surface. From *A. cistetorum* (associated with *Cistus*), together with dissimilar habitat requirements, *A. argentea* differs also in the consistent, whitish tint of lamellae (first white, next greyish in *A. cistetorum*) and stipe (white to lead grey in *A. cistetorum*) and greyish white (rarely dirty greyish white) colour of volva (white with an ocher tint in *A. cistetorum*). Additionally, *A. argentea* is recognized by a somewhat shorter basidia (Contu 2000). It's also worth emphasizing, that *A. argentea* can be easily confused with *A. vaginata*, from which it differs only slightly macroscopically, e.g. by a non-umbonate cap, sturdy stipe, and usually by the presence of veil remnants on pileus. The two species can be separated with most certainty microscopically, because in contrast to *A. vaginata*, *A. argentea* has broadly ellipsoid spores and more slender basidia (Breitenbach and Kränzlin 1995).

The recorded specimens of *A. argentea* Huijsman (Fig. 1) are well represented in the photograph of *A. mairei* published by Breitenbach and Kränzlin (1995) (similar colour and shape of the basidiomata). Furthermore, other photographs and illustrations of *A. argentea* sens. lat. are also available in Krieglsteiner (2003) and Bas (1967), for example. The description of microscopical features published by Breitenbach and Kränzlin (1995) are similar to those given above for the specimens from Wrocław, although the authors have reported clearly wider range of coefficient  $Q$  values for the basidiospores. Similarly, wider range of values of the coefficient  $Q$  is also given by Krieglsteiner (2003) and Fraiture (1993). It can be assumed that a broader taxonomic approach of *A. argentea* adopted by these authors is the likely cause of such discrepancies.

### **Habitat requirements and general distribution**

As mentioned above, *A. argentea* Huijsman is generally synonymized with *A. mairei* Foley in the current mycological literature (cf. Breitenbach and Kränzlin 1995; Krieglsteiner 2003). Therefore it's hard to decide, which species the available data on localities or

habitat requirements are regarded to. More detailed *investigations* (e.g. DNA studies) seem to be necessary to understand the taxonomical status, as well as distribution and ecology of these two taxa. Therefore, information concerning the biology, ecology and distribution of the species presented below, are related to *A. argentea* sensu lato.

Basidiocarps of *A. argentea* sens. lat. appear in summer and fall season (June–November), but are found mostly from the beginning of July to the end of September (Fraiture 1993, Krieglsteiner 2003). In southern Europe and northern Africa they have been reported also in April, May, December and January (Fraiture 1993). In the last mentioned regions the species was recorded in the neighbourhood of *Quercus ilex*, *Q. suber*, *Q. cerris*, *Pinus halepensis*, *P. pinaster* and *P. pinea*, on calcareous, acidic, loamy and sandy soils (Fraiture 1993). In Central Europe, the fungus occurs mainly (solitary to gregarious) in calciphilous and mesophilous beech forests and also in appropriate oak-hornbeam associations, at forest margins, in forest clearance areas and also urban parks. In this area of its distribution the species is mainly associated with *Fagus* and *Quercus*, and definitely much rarely with *Picea* and *Pinus* (Fraiture 1993; Breitenbach and Kränzlin 1995; Krieglsteiner 2003).

*A. argentea* sens. lat. has been reported from the Canaries, North Africa (Algeria, Morocco) and Europe. In Europe the species is widely distributed and, apart from Poland, is known from Spain, the Balearic Islands, Corsica, Sardinia, Italy, Greece, Slovenia, Serbia, Romania, Bulgaria, France, Great Britain, Switzerland, Liechtenstein, Austria, Hungary, Luxembourg, Germany, the Czech Republic, Denmark and Sweden (Breitenbach and Kränzlin 1995; Diamandis 2000; Krieglsteiner 2003; Vesterholt 2008; British Mycological Society 2009). In Poland, *A. argentea* sens. lat. is known from 5 localities (Wojewoda 2003). Its presence was noted near Krzeszowice (Raclawka Stream Valley near Dubie: on limestone, in *Carici-Fagetum/Tilio-Carpinetum* forest association) (Wojewoda 1979), in Cracow (Wojewoda 1996), in Częstochowska Upland (Parkowe Reserve: *Luzulo pilosae-Fagetum* forest association) (Adamczyk 1996), in Biłgorajska Plain (Panasówka), in Dolnego Bugu Valley (Łochowskie Forests, n. Jerzyska) (Domański 1997) and near Teresopol (Domański 1999).

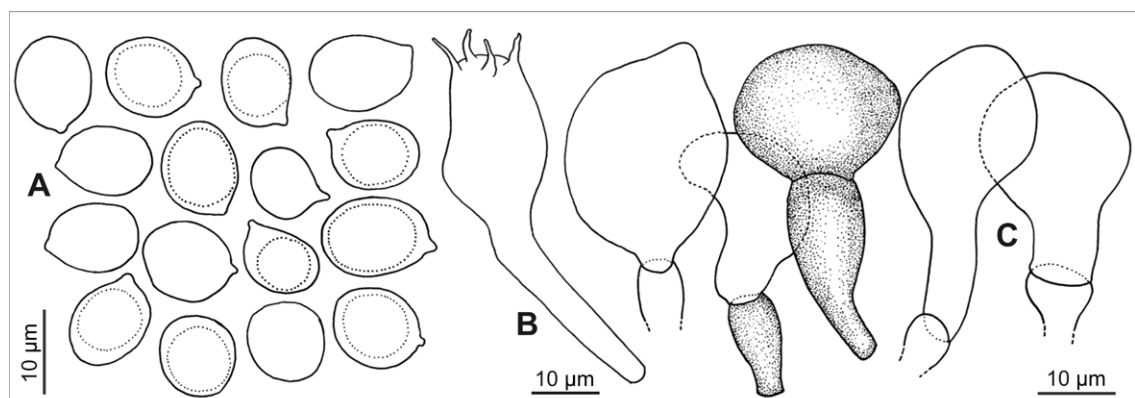
*A. argentea* sens. lat. is recognized as a very rare species in temperate zone (Vesterholt 2008) and is included in the red lists of a few European countries, i.e.: in Germany (Benkert et al. 1992; treated as threatened species), Greece (Diamandis 2000; treated as threatened species) and in Poland (Wojewoda and Ławrynowicz 2006; treated as vulnerable species). The discovery of a new locality of this rare species in the anthropogenic site is important because it draws attention to the need of mycological investigations in man made landscape. This type of habitats usually appear as worthless for fungi. Moreover, some particular herbarium collections should be checked, because there may be either many unpublished data or not correctly determined specimens, in the case of *Amanita* section *Vaginatae*. More investigations are also needed to reveal the real distribution and ecology of both: *Amanita argentea* and *A. mairei* in Poland.

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**Fig. 1.** Fruit bodies of *Amanita argentea* recorded in Wrocław (coll. 13.09.2001; photo by M. Halama).



**Fig. 2.** Basidiospores (A), basidium (B) and cheilocystidia (cystidioid cells) (C) of *Amanita argentea* recorded in Wrocław (coll. 13.09.2001; drawn by M. Halama).

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