

**DICTYOCEPHALOS ATTENUATUS (GASTEROMYCETES,
BASIDIOMYCOTINA) NEW FOR EUROPE**

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ABSTRACT - This is the first record for the Iberian Peninsula and Europe of *Dictyocephalos attenuatus*. A description and microphotographs of the more salient features are given.

RÉSUMÉ - Première récolte de *Dictyocephalos attenuatus* pour la Péninsule Ibérique et l'Europe. Une description et des microphotographies des caractères les plus importants sont fournies.

KEY WORDS : Taxonomy, chorology, *Dictyocephalos attenuatus*, Gasteromycetes.

INTRODUCTION

During a revision currently under way of the Order Tulostomatales from the Iberian Peninsula, we had the opportunity to study a collection of a curious fungus which, in spite of consisting of only one specimen, we identified as *Dictyocephalos attenuatus* (Peck) Long & Plunkett. The specimen is small for the species, very mature and, apparently, weathered; however, this find is worthy of a record, since it is the first one for the Iberian Peninsula and for Europe.

The species has not been treated since Long & Plunkett's monograph (1940), and we still lack further chorological and morphological information. Fischer (1933) includes the genus in the family *Tulostomataceae*, as did Lloyd (1903, 1906). The latter (1906), apparently described teratological forms of the species, under the generic name *Whetstonia*. We are following the treatment of Long & Plunkett (op. cit.) who apparently examined Lloyd's type. The genus is so far monotypic, and was described by Underwood in 1901 as *D. curvatus*. But Peck had described the same species in 1895 under *Battaraea* (curiously with an equally descriptive epithet as that given by Underwood), for which reason his name must be considered valid.

White (1901) gave a detailed description of the species, and stresses as do Lloyd and Fischer, among the salient features, the massive size (although Long & Plunkett give very variable measurements), its very strong odour when fresh, the presence of a large and hard volva at the base of the stipe, which is contorted, usually S-shaped, twisted and woody, at times very thick, the presence of a glebal "network" of

filaments all of which do not conform a true capillitium, and globose, uneven, verrucose spores.

MATERIAL AND METHOD

The material studied has been deposited in the Herbarium of the Dpto Biología Vegetal (Botánica), Universidad de Alcalá de Henares (AH), and has been compared with various collections from the following North American herbaria, namely National Fungus Collections, Beltsville, Maryland (BPI), and The New York Botanical Garden (NY).

The SEM photographs were made with a Zeiss DSM-950 instrument. Samples were critically point dried and submitted to an Argon atmosphere and gold coated under a Polaron E-5000 sputter, thus obtained a 500 Å coating.

DESCRIPTION

Dictyocephalos attenuatus (Peck) Long & Plunkett, *Mycologia* 32(6): 697 (1940) (Figs. 1-9)

= *Battaraea attenuata* Peck, *Bull. Torrey Bot. Club.* 22: 208 (1895).

= *Dictyocephalos curvatus* Underwood, *ibid.*, 28: 441 (1901).

= *Battarraeopsis artini* P. Henn., *Hedwigia* 41: 212 (1912) (fide Long & Plunkett).

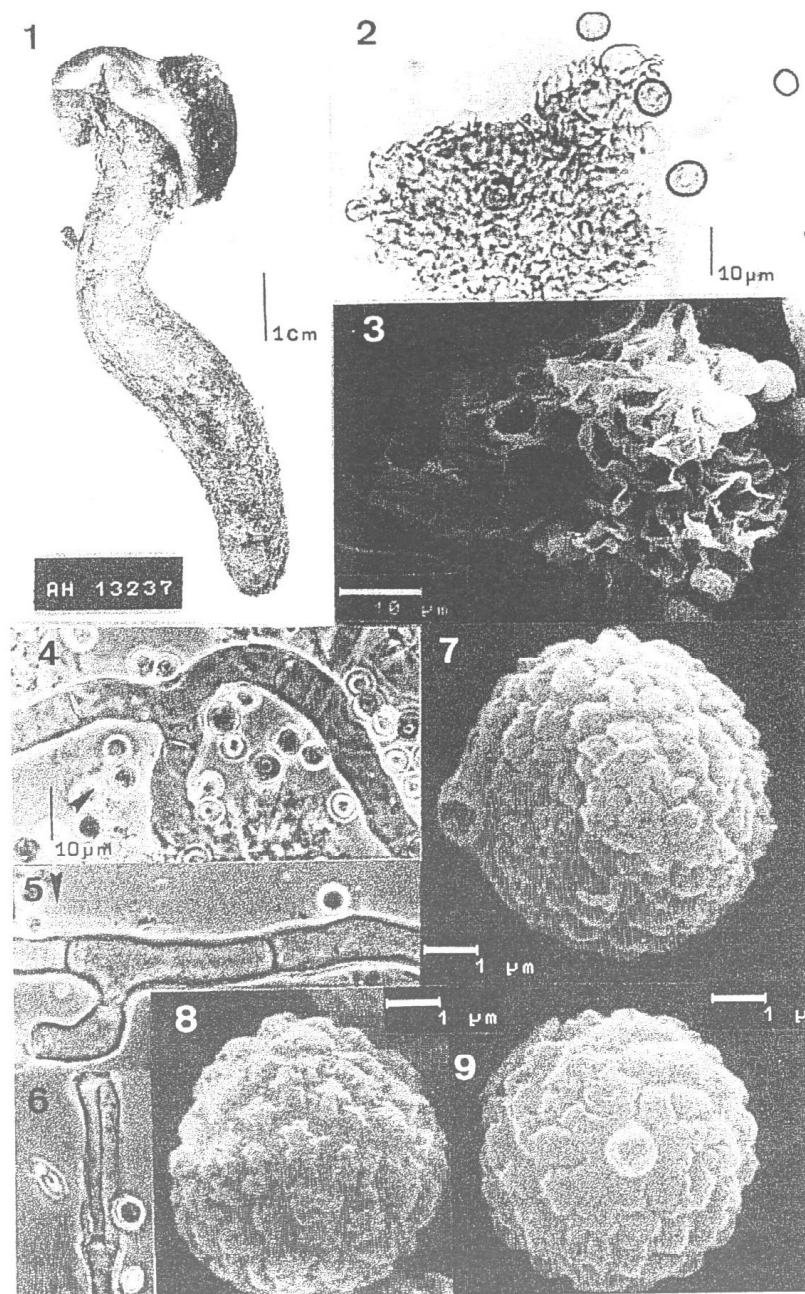
= *Whetstonia strobiliformis* Lloyd, *Mycol. Writ.* 2: 259 (1906) (fide Long & Plunkett).

= *Phellorinia strobilina* Lloyd, *ibid.* 5: 735 (1917).

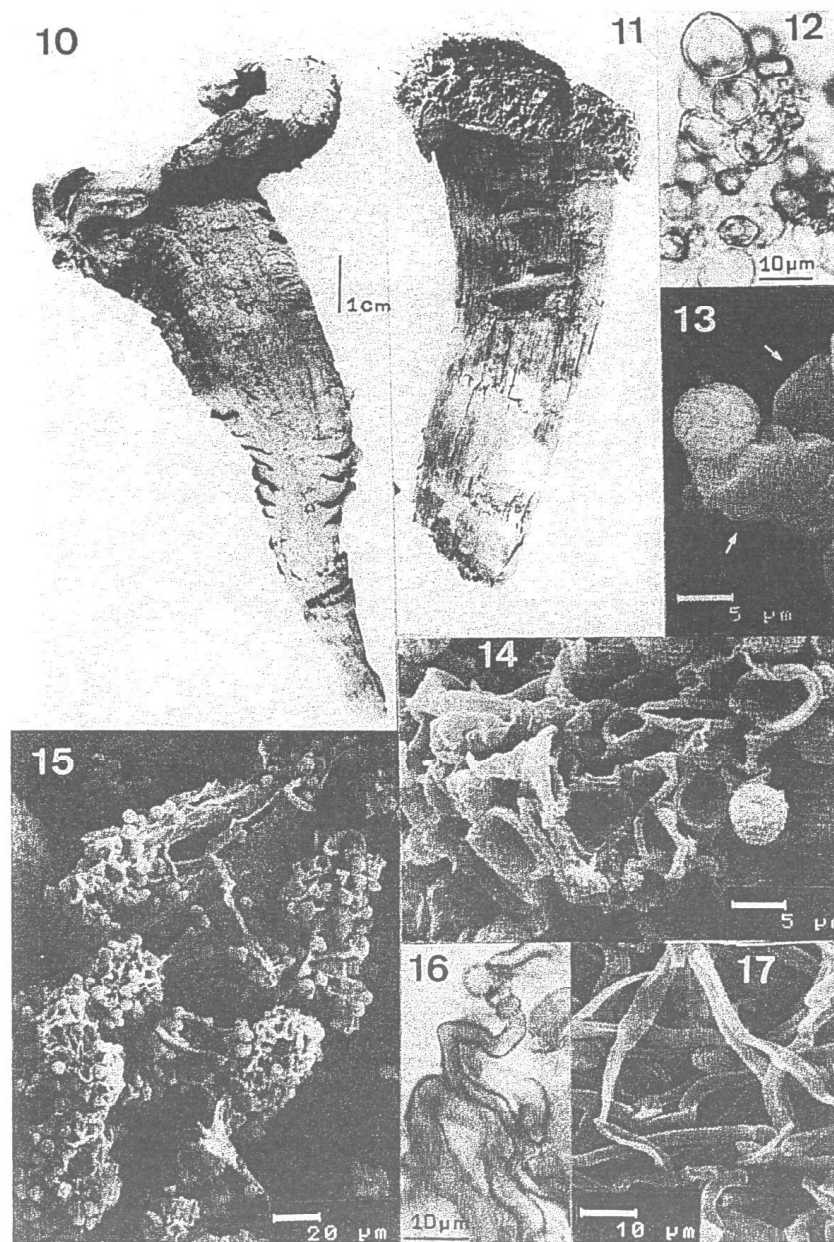
Collection of only one specimen. Gastrocap 80mm high, composed of a stem upon which remains a portion of nude gleba, the peridium having almost completely disappeared due to weathering and overmaturity. Stem woody, recurved and S-shaped, 80 x 15 mm, somewhat thicker in the middle portion and more slender towards the extremes, without a visible basal volva, and with abundant ochraceous non fungal rootlets along its length and particularly at the base. The apical portion of the stem is widened as a convex button or disk, of some 33mm diam., with acute, wavy and revolute margin, the basal surface with remains of ruptured emergency tissue. Gleba dark ferrugineous brown, mingled with whitish walls delimiting zones or cavities. This feature has been recorded as characteristic of the North American specimens and was well illustrate by Long & Plunkett (*op.cit.*).

Spores globose to deformed, ochraceous brown under L.M., of uneven shape and size, mostly 5.4-8 x 5.4-7.2µm, with short and thick hilar appendices. Under SEM the ornamentation appears formed by more or less plane verrucae, with a cerebriform aspect and generally grouped in small areas, due to the progressive cracking of the most external portion of the spore wall. Glebal threads rather scarce, tortuous, septate, thick-walled, staining well with lactic cotton-blue, 3-7µm diam.; among them appear deformed cellular bunches which seem to correspond to groups of collapsed basidia. These basidia in bunches are 9-11µm diam. in the North American collections.

Material examined: SPAIN: Madrid, Alcalá de Henares, neighbourhood of Cerro Malvecino, in loamy gypsum soil, *leg.* G. Moreno, J.L. Manjón & A. Altés, 3-XI-1989, AH 13237. UNITED STATES: Arizona: Tucson, *leg.* Griffiths, autumn 1900, NY; *ibid.*, *leg.* H.E. Ransier, 25-XI-1940, Herb. Long (BPI). California: Lancaster, *leg.* O.A. Plunkett, 9-IX-1938, Herb. Long 8231 (BPI); *ibid.*, 5-X-1938, Herb. Long 8344 (BPI); *ibid.*, *leg.* W.H. Long, 27-VIII-1939, Herb. Long 8437 (NY); *ibid.*,



Figs. 1-9: *D. attenuatus* AH 13237: 1. Fruit-body. 2-3. Groups of collapsed basidia under LM and SEM. 4-6. Glebal hyphae. 7-9. Spores.



Santa Barbara, leg. P. Rea & M. Rea, ca. 1938, Herb. Long 8436/8437 (BPI). New Mexico: Sandoval Co., San Ysidro, leg. W.H. Long, 25-X-1927, Herb. Long 8053/8054 (BPI). SOUTH AFRICA: Stellenbosch, leg. A.V. Duthie, Herb. Long ex Herb. Lloyd - as *Phellorinia strobilina* - (BPI).

REMARKS

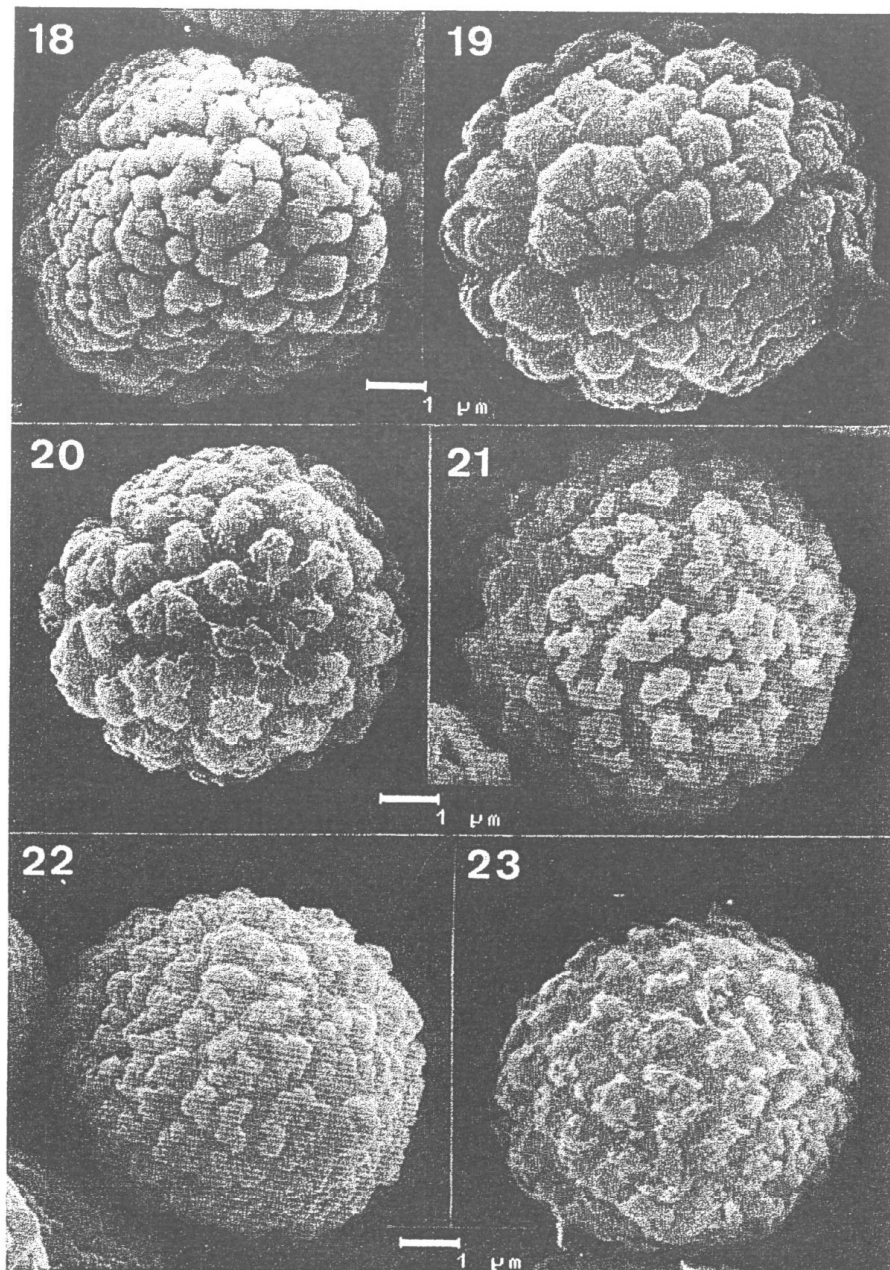
The only specimen found is small, although it coincides with the inferior rank of measurements given by Long & Plunkett (op. cit.), for the species. It is atypical in various ways, since it lacks a volva, scales on the stem and a tuberculous/pyramidal peridium (probably lost). The remains of the basidia in bunches although present, are much collapsed and are not as visible as in most of the North American collections (some of Long & Plunkett's lack them, perhaps due to overmaturity). Similarly, the reticulate remains of the gleba ("network" of Long & Plunkett), much more obscure in our specimen than in the rest of the material studied, may be due to weathering. However, it is practically identical in its spore features, which were well illustrated by Heim & Perreau (1971) - as *Whetstonia strobiliformis* and which we show here in some SEM photomicrographs. These spores are specially similar, within the North American material studied, to those of the New Mexico collection, Herb. Long 8053/54, both in the ornamentation as in the measurements ($6.1-9 \times 5.7-7.2 \mu\text{m}$), although they belong to a specimen measuring more than 30cm high.

On the other hand, the similarity between the microscopical features of this taxon and those of *Phellorinia herculanea* (Pallas:Pers.) Kreisel are striking. This is also a rare tulosmataceous fungus growing solitary or subgregarious in arid and sandy places, which has been described in detail for peninsular Spain a few years ago by Martin & Rocabruna (1988). Both size and spore ornamentation are practically identical as in *Dictyocephalos*, it has similar glebal filament and collapsed basidial bunches can also be observed in the mature gleba. Thus, the separation of both taxa is purely macroscopic, which may be a source of problems.

The peridial features of *Dictyocephalos* has not been previously studied. It only persists in the lower part of the spore sac, it is hard and composed of at least two layers; the outermost is caducous, rugose and ornamented, greyish brown, and the innermost is smooth, whitish-grey, although stained brown by the mass of spores. The remains of the gleba persist attached to the internal part of the peridial base at maturity. Microscopically, the peridium of the North American material studied is composed of periclinal hyphae which are much interwoven, clampless, thin to regularly thick-walled, sparsely septate, mixed with very thick (conductive?) enteriform hyphae, strongly staining with phloxine, $6-15 \mu\text{m}$ diam.

So far, *D. attenuatus* appears recorded in rather xeric regions of Africa (Egypt, Morocco, and South Africa) and North America (United States), according to Long & Plunkett (op.cit.), and has recently been found in the State of Baja California, Mexico (B. Silver, pers. comm.). The two records for Northern Africa make its appearance in

Figs. 10-17. *D. attenuatus*: 1. Fruit-body (Herb. Zeller ex Herb. Long 8437-NY-). 11. Fruit-body (Herb. Long. 8436/8437 -BPI-). 12. Groups of collapsed basidia under LM (Herb. Zeller ex Herb. Long 8437 -NY-). 13-15. Groups of basidia under SEM (Herb. Long 8053 -BPI-). 16; hyphae from glebal walls under LM (Herb. Zeller ex Herb. Long 8437 -NY-). 17. Hyphae from glebal walls under SEM (Herb. Long 8053 -BPI-).



Figs. 18-23. *D. attenuatus*: Spores under SEM. 18,20,23. Herb. Long 8436/8437 (BPI). 19, 21-22. Herb. Long 8053 (BPI).

the Iberian Peninsula more plausible. It is probable that our specimen responds to a particular ecotype.

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