

## ***Hemitrichia pseudoleiocarpa*, spec. nova, a species confused with *Arcyria leiocarpa* (*Myxomycetes*)**

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**Key words:** *Myxomycetes*, *Hemitrichia pseudoleiocarpa*, *Arcyria leiocarpa*. - New species, taxonomy, chorology.

**Abstract:** *Hemitrichia pseudoleiocarpa* is proposed as a new species. It is compared with the type material and some other collections of *Arcyria leiocarpa* from North America (Mexico and USA). Scanning electron micrographs are provided to further illustrate the morphological differences. The most remarkable difference is the spore ornamentation of *H. pseudoleiocarpa* consisting of dendroid structures.

**Zusammenfassung:** *Hemitrichia pseudoleiocarpa* wird als neue Art vorgeschlagen. Sie wird mit dem Typusmaterial und einigen weiteren Kollektionen von *Arcyria leiocarpa* aus Nordamerika (Mexiko und USA) verglichen. Rasterelektronenmikroskopische Fotos werden zur Illustration der morphologischen Unterschiede angefügt. Der auffälligste Unterschied ist die aus dendroiden Strukturen bestehende Ornamentation der Sporen von *H. pseudoleiocarpa*.

MORENO & al. (1993) noted that the species *Arcyria leiocarpa* (COOKE) G. W. MARTIN & ALEXOP. occurs in Spain. In the present paper, scanning electron micrographs of capillitium and spore ornamentation (formed by dendroid structures) are presented. The same specimen (AH 14279) was studied by LADO & PANDO (1997), authors of the first volume dedicated to the *Myxomycetes* in the Iberical Mycological Flora, who placed *A. leiocarpa* in the genus *Hemitrichia*, as *Hemitrichia leiocarpa* (COOKE) LISTER. The specimen was neither compared with the type material nor with material from USA.

Recently, during studies carried out on the *Myxomycetes* from the peninsula of Baja California (Mexico), abundant material of *Arcyria leiocarpa* was collected. The Mexican samples were compared to the Spanish collection (AH 14279). Many differences were observed, which created doubts concerning the identity of *A. leiocarpa*. The type of *A. leiocarpa* was compared with the specimens collected in Mexico and Spain. We concluded that specimen AH 14279 represents a new species, with characters which are different from *A. leiocarpa*.

### Materials and methods

SEM micrographs were prepared using a Zeiss DSM-950 microscope. Spore samples were rehydrated with 100% NH<sub>4</sub>OH for 30 min., then dehydrated in aqueous ethanol solutions (70%) for 1-1.5 h, before fixation in pure ethylene glycol dimethyl ether (1.2 dimethoxy-methane) and immersion in acetone for at least 2 h. The spores were subsequently critical-point dried, mounted on an aluminium stub, and coated with gold-palladium in a Polaron E-5000 sputter coater for 2 min at 1.4 kV and 18 mA (argon atmosphere), creating a metal coating approximately 50 nm thick. Samples for light microscopy were mounted in Hoyer's medium.

The specimens are deposited in the herbaria AH, BM, BPI and BR.

The term sporocarp has been used before by DÖRFELT & MARX (1990) and LADO & PANDO (1997). The term dendroid is defined by HAWKSWORTH & al. (1995).

### *Hemitrichia pseudoleiocarpa* ILLANA, G. MORENO, LIZÁRRAGA & CASTILLO, spec. nova (Figs. 1-12)

= *Arcyria leiocarpa* (COOKE) G. W. MARTIN & ALEXOP., sensu G. MORENO, ILLANA & BURGUETE, Mycotaxon 46: 408. 1993.

= *Hemitrichia leiocarpa* (COOKE) LISTER, sensu LADO & PANDO, Flora Mycologica Iberica 2: 223-225. 1997.

### Latin description:

Sporocarpia gregaria vel dispersa, subglobosa, stipitata, 1-1,6 mm alta. Peridium membranaceum, apice fugax, base calyculus patellaris persistens. Dehiscencia irregularis. Columella nulla. Stipes cylindraceus, erectus, 0,4-1,2 mm altus, brunneus vel griseo-luteus. Capillitium et sporae in massa griseo-luteae. Capillitium ex tubis flexuosis 4-6 µm diametro compositum, ramosum, anastomosans, ad calyculum fixum, non elasticum, pallide luteum luce transmissa, leve sparsipapillatum vel spiraliter ornamentatum. Sporae globosae, pallide luteae luce transmissa, spinosae, 8-10 µm diametro.

**Holotypus: Hispania:** Castellón, Fuente la Reina, ad lignum putridum, 31 Jan. 1990, A. BURGUETE legit (AH 14279).

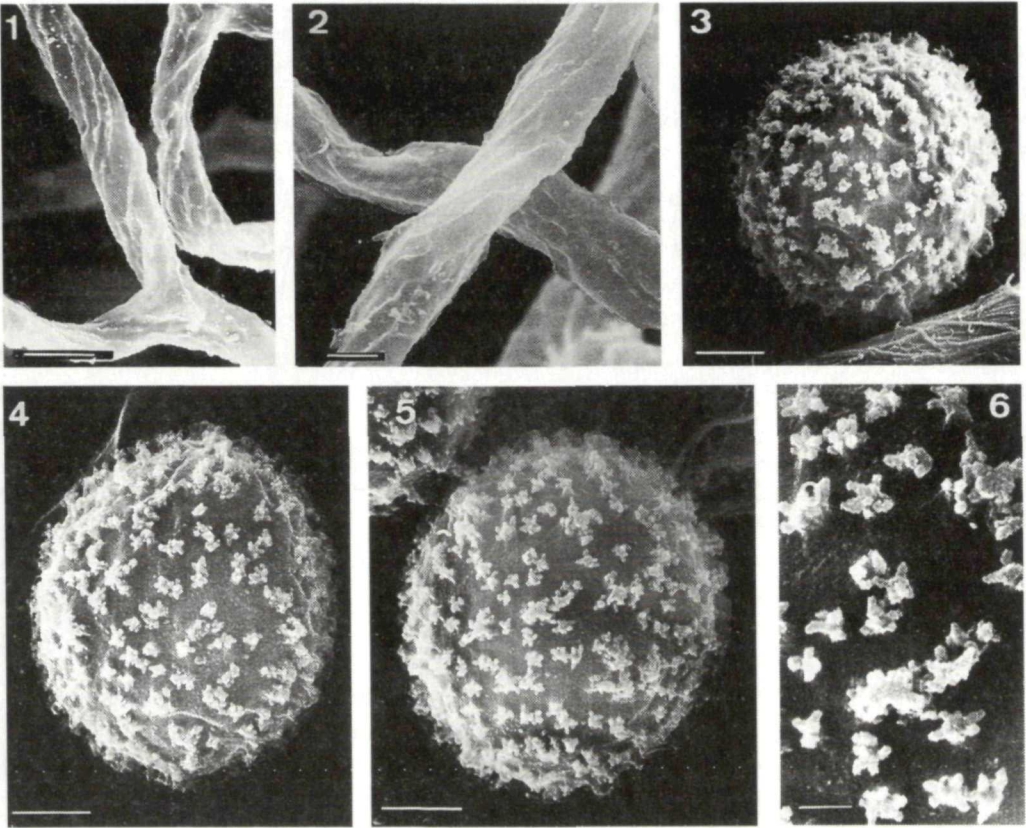
### Characters:

Sporocarps grouped or scattered, subglobose, stalked, 1-1.6 mm in total height. Peridium single, membranous, translucent, visible only in young sporocarps, fugacious above, persistent at the base as a saucer-shaped calyculus, the inner surface with papillae; dehiscence irregular. Columella absent. Stalk cylindrical, erect, 0.4-1.2 mm long, longitudinally striate, brown to greyish yellow, always greyish yellow at the top, filled with spore-like cysts (13-19 µm in diam. at the base). Hypothallus membranous, inconspicuous. Capillitium and spores greyish yellow in mass. Capillitium formed by flexuous tubular threads, branching and anastomosing, firmly attached to calyculus, inelastic, pale yellow in transmitted light, threads 4-6 µm in diam., smooth with some papillae or ornamented with faint to prominent spirals. Spores free, pale yellow in transmitted light, globose, 8-10 µm in diam., densely spinulose. When observed in SEM the capillitial threads smooth and ornamented with slightly interrupted spirals, and the spore ornamentation is formed by dendroid (irregularly branched) structures.

**Etymology:** Macroscopically looking alike with *Arcyria leiocarpa*.

**Habitat:** on decayed vegetable debris.

**Distribution:** known from Spain and The Netherlands.



Figs. 1-6. Scanning electron micrographs of *Hemitrichia pseudoleiocarpa* (Type, AH 14279). 1. Branched capillitium with spirals, bar: 5  $\mu$ m. 2. Capillitium with faint spirals, bar: 2  $\mu$ m. 3-5. Spores, bar: 2  $\mu$ m. 5. Detail of spore ornamentation, bar: 500 nm.

**Specimen examined** (besides type): **The Netherlands:** Doorwerth, substrate unknown, herb. NANNENGA-BREMERKAMP 11887F in BR.

*Arcyria leiocarpa* (COOKE) G. W. MARTIN & ALEXOP., Myxomycetes: 131. 1969. (Figs. 13-25)

= *Hemiarcyria leiocarpa* COOKE, Ann. Lyceum Nat. Hist. New York **11**: 405. 1877

= *Hemitrichia leiocarpa* (COOKE) LISTER, Monogr. Mycetozoa: 177. 1894

**Original diagnosis:** Sporangia simple, obovate or pyriform, rarely almost globose, pallid, with a stem of the same color, as long as the diameter of the sporangia. Mass of spores and capillitium concolorous, or with a slight ochraceous tint. Capillitium sparse, forming a loose net. Tubes branched in a reticulate manner. Spirals three, thin, prominent along the convex side of the tubes, mixed with a few short obtuse spines. Spores globose, with a thin membrane, 0.0125-0.014 mm. On decayed vegetable debris. Portland, Maine (Bolles).

**Specimens examined:** Mexico: Baja California Sur, Mexico highway 1 (near Loreto), on wood remains of *Fabaceae*, 27. Jan. 1996, M. LIZÁRRAGA, G. MORENO & C. ILLANA (AH 20116, 20131, 20132, 20133 and 20137). USA: Maine, Harpswell, on decayed vegetable debris, I.B.B. (H. J. Howard Bequeathed 1957), slide in BM (type of *Hemycyria leiocarpa*); Oregon, unknown substrate, 749242 in BPI.

### Notes:

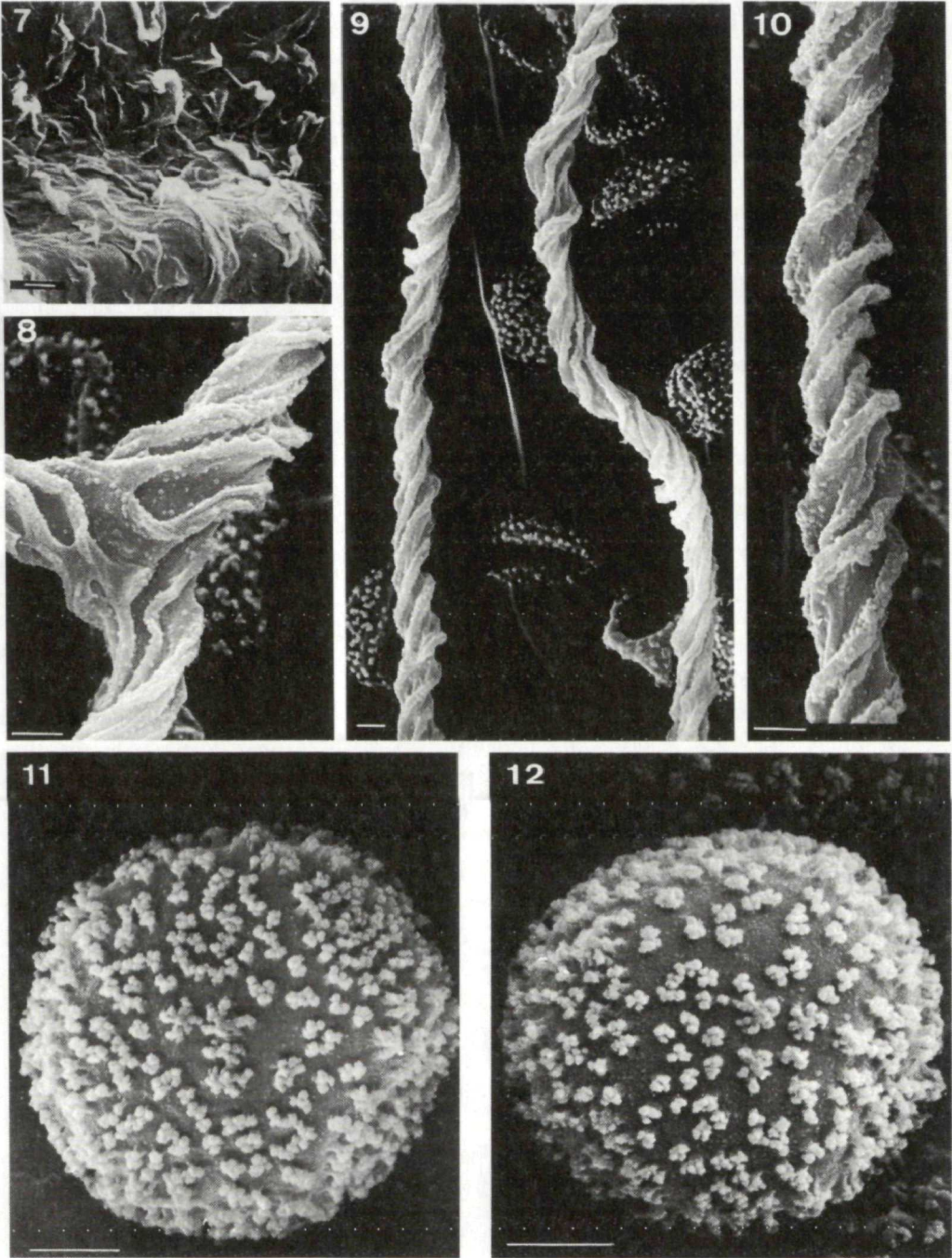
The type studied is represented by a slide, in which two sporocarps and three stalks of 1 mm length are included. The material is collapsed, but the yellowish capillitial threads are approximately 4-8  $\mu\text{m}$  in diam., ornamented with very prominent spirals and some spiny zones. Spores are 8-9  $\mu\text{m}$  in diam. (differing from the original diagnosis, 12.5-14  $\mu\text{m}$  in diam.), globose, hyaline, with small warts in groups. The morphology of the calyculus and the cysts within the stalk have not been studied, due to the state of preservation.

The Mexican material presents the following characters: sporocarps in large groups (more than 40 sporocarps), stalked, 1-2 mm tall, cylindrical or subglobose, pale grey and fading to ochraceous when old. Peridium membranous, translucent, fugacious except for a calyculus at the base, ornamented with faint papillae, irregular dehiscence. Columella absent. Stalk slender, cylindric, 0.2-0.4 mm long, concolorous, filled with spore-like cysts. Hypothallus common to a group of sporocarps. Capillitium and spores grey or ochraceous in mass. Capillitium tubular, yellow by transmitted light, firmly attached to the calyculus, expanding elastically, 4-6  $\mu\text{m}$  in diam., ornamented with 3-4 prominent spirals and sometimes spines. Spores pale yellow by transmitted light, globose, 7-8  $\mu\text{m}$  in diam., warted and with scattered groups of more prominent warts. When observed in SEM the capillitial threads are decorated with spirals and warts, and the spore ornamentation is formed by small warts and larger, coalescent warts.

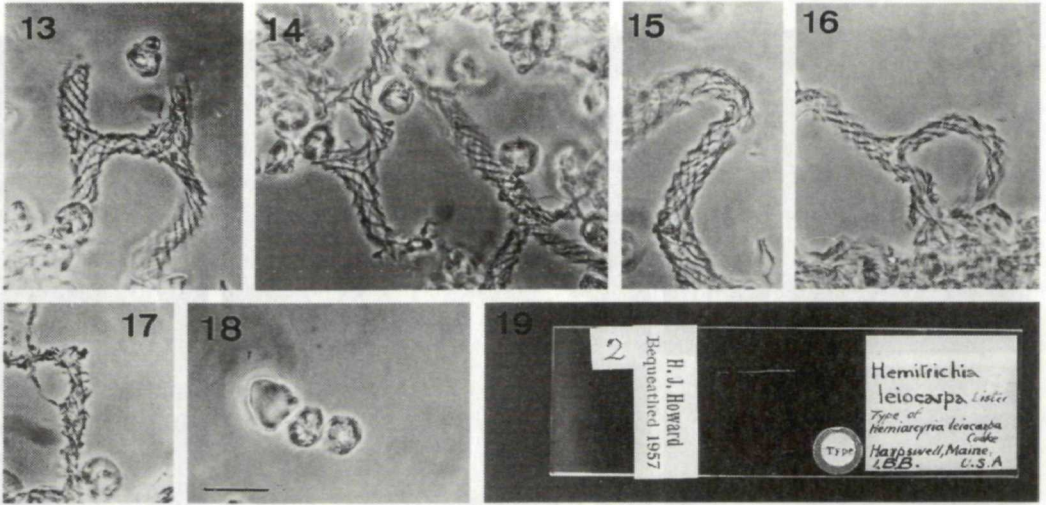
### Discussion and conclusions

The new species *Hemitrichia pseudoleiocarpa*, is included in the genus *Hemitrichia* ROSTAF., because of its capillitium consisting of tubular threads more or less united in a net, without free ends and ornamented with conspicuous spiral bands. Further, the spore ornamentation is different from species of the genus *Arcyria* F. H. WIGG. We include *A. leiocarpa* in the genus *Arcyria* because the spore ornamentation is similar to the other *Arcyria* species. MARTIN & ALEXOPOULOS (1969) had already pointed out that „in every character except that of the spiral bands on the elaters, this is a typical *Arcyria*. It should be referred to that genus with the generic diagnosis modified to include it“.

The taxonomic status of *Arcyria leiocarpa* has been discussed by different authors. LISTER (1925) quoted „this species outwardly resembles a slender form of *Arcyria cinerea*“ and MARTIN & ALEXOPOULOS (1969) comment „cultural studies, when they become possible, may show that it should be included in *A. cinerea*, perhaps as a variety“. However, NANNENGA-BREMEKAMP (1991) says „... a variety of *A. cinerea* seems very unlikely“.



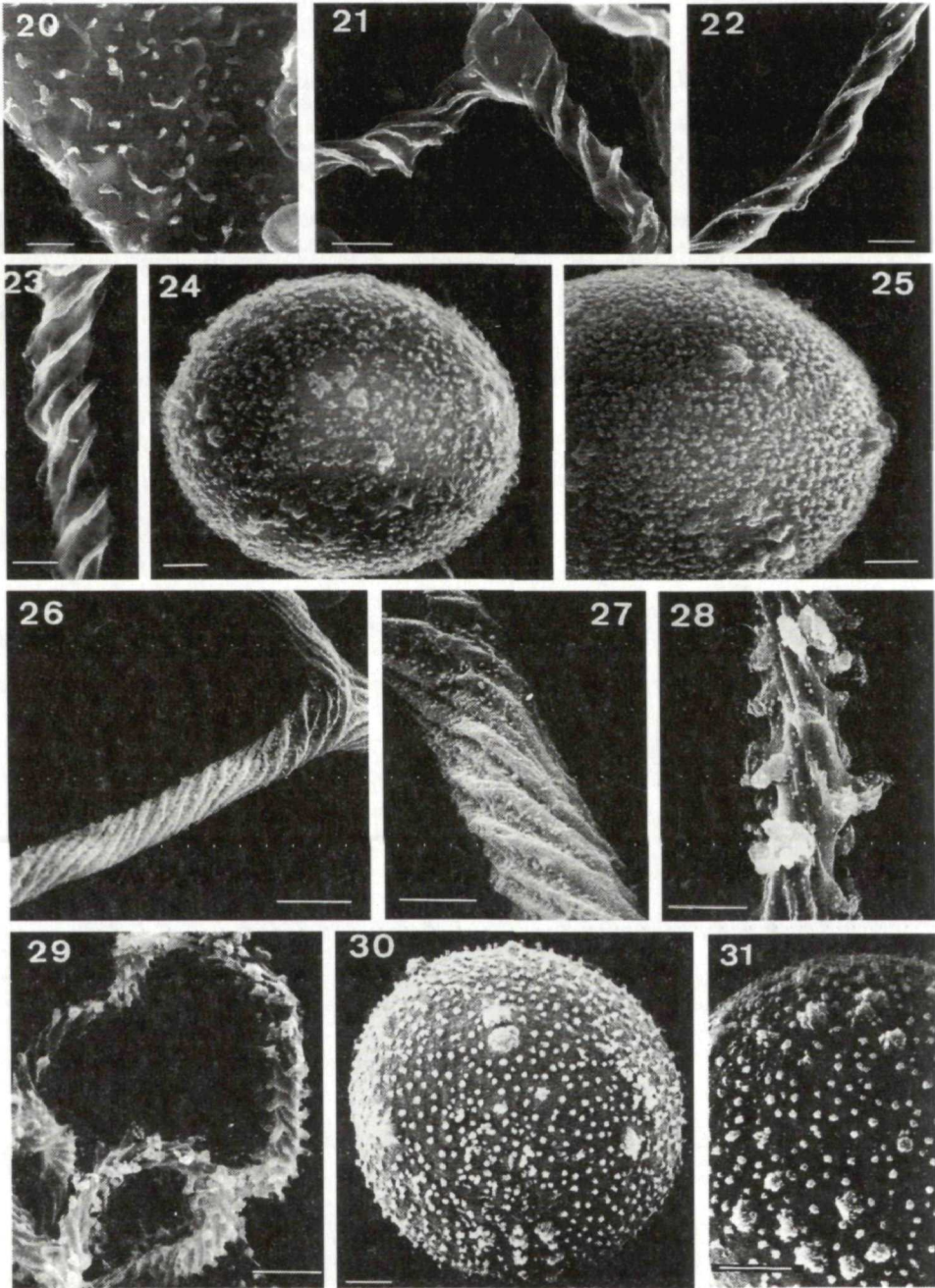
Figs. 7-12. Scanning electron micrographs of *Hemitrichia pseudoleiocarpa* (NANNENGA-BREMEKAMP 11887F in BR). - 7. Ornamentation on inner side of calyculus. 8. Branched capillitium with prominent spirals. 9-10. Capillitium with spirals. 11-12. Detail of spore ornamentation. All bars: 2  $\mu$ m.



Figs. 13-19. *Arcyria leiocarpa* (type). - 13-17. Variation of capillitium ornamentation with spirals and spines, bar: 10  $\mu\text{m}$ . 18. Spores, bar: 10  $\mu\text{m}$ . 19. Slide of the type of *Arcyria leiocarpa*.

*Hemitrichia pseudoleiocarpa* is macroscopically similar to *Arcyria leiocarpa* in its general habit, peridium persistent as a calyculus at the base, branching and anastomosing capillitium which is firmly attached to the calyculus; capillitium and spores greyish yellow to ochraceous in mass. Microscopically, *H. pseudoleiocarpa* resembles *A. leiocarpa* since both species have capillitial threads with faint to prominent spirals. The most remarkable differences between the two taxa are found in their size and spore ornamentation, the latter is especially evident in SEM. *Arcyria leiocarpa* has spores 8-9  $\mu\text{m}$  in diam., with an ornamentation formed by small scattered warts and a few groups of larger warts. The spores of *Hemitrichia pseudoleiocarpa* are 8-10  $\mu\text{m}$  in diam., appearing spinulose in transmitted light, and forming dendroid (irregularly branched) structures regularly distributed on the spore surface. The size and colour of *Hemitrichia pseudoleiocarpa* sporocarps are similar to those of *Arcyria cinerea* (BULL.) PERS., but the latter has a capillitium ornamented with warts and spines and the spores have scattered groups of more prominent warts (visible with immersion oil). Another species with spiral bands on the capillitium is *A. elaterensis* MULLEAVY. This species has tawny olive sporocarps, the capillitium is never firmly attached to the calyculus with numerous clavate free ends, and the spores are 6.5-9  $\mu\text{m}$  in diam., ornamented with small warts and larger, colaescent warts (MULLEAVY 1977).

*Arcyria stipata* (SCHWEIN.) LISTER is described by MARTIN & ALEXOPOULOS (1969) with 3-4 spiral bands - for this character it is close to *Hemitrichia pseudoleiocarpa* -, intermixed with spines, cogs, half-rings or occasional rings and reticulations, but RAMELOO (1986) showed that the ornamentation has only warts and crests.



Figs. 20-31. Scanning electron micrographs of *Arcyria leiocarpa* (20-25: BPI 749242, 26-31: AH 20116). 20. Ornamentation on inner side of calyculus, bar: 5  $\mu\text{m}$ . 21-23. Capillitium with marked spirals, bar: 2  $\mu\text{m}$ . 24. Spore, bar: 1  $\mu\text{m}$ . 25. Detail of spore ornamentation, bar: 1  $\mu\text{m}$ . 26-27. Capillitium with marked spirals, bars: 26: 5  $\mu\text{m}$ , 27: 2  $\mu\text{m}$ . 28-29. Capillitium with marked spines and spirals, bars: 28: 2  $\mu\text{m}$ , 29: 5  $\mu\text{m}$ . 30. Spore, bar: 1  $\mu\text{m}$ . 31. Detail of spore ornamentation, bar: 1  $\mu\text{m}$ .

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