

dark brown,  $35-40(-43) \times 17-19(-23) \mu$ , in front view elliptical with subacute ends, in lateral view slightly flattened on one side, provided at each end with a germ pore and a gelatinous cauda. *Caudae* eccentrically attached towards the flattened side of the spore, not covering the pores, lash-like,  $50-75 \times 5-8 \mu$ , rounded in cross-section, hollow with a central longitudinal canal of irregular configuration, firm, not swelling in water, nor blackening in indian ink.

**England:** Surrey, Richmond Park, (deer) XI.1900, Massee as *Sordaria hirta* (NY). — **Belgium:** Brabant, Parc de Tervuren ["Tervucrin"] near Brussels, (fallow deer) XII.1883, Marchal; Rabenhorst-Winter: F. Eur. Extraeur. Exs. 3444 as *Sordaria hirta* (UPS, holotype); isotypes in BM, DAOM 18034, H (herb. Karsten 3051), K, L 910247-65 M, NY, PAD, S, UPS, W; ditto, 1882, Marchal as *S. hirta* (BR); ditto, 1882, Marchal; Roumeguère: F. Sel. Gall. Exs. 3443 as *S. hirta* (BR, G, K, L 910247-56, NY, PAV, UPS). — **Hungary:** Pest, Mt. Juharos at Máriabesnyő (deer) 8.IV.1964, Tóth 4775a as *Pleurance setosa* (BP 40137). — Ördögtorony at Pilisszentiván (deer) 17.IX.1962, Tóth 4329 as *Pleurance vestita* (BP 37403). — Veszprém, Mt. Odvaskő at Bakonybél (deer) 27.VI.1963, Tóth 4305 as *P. vestita* (BP 37448); all Hungarian collections published by Tóth 1965.

The species is related to *A. hirtum* (Hans.) Lundq. & Krug and distinguished mainly by its spore shape, eccentric position of the caudae, and different habitat. The irregular form of the cavity of the caudae is caused by several, longitudinal, inner folds, a phenomenon visible sometimes in *A. hirtum* too. This structure seems to be quite natural and not a deformation. However, the appendages may need another examination when fresh material is available. The rigid perithecial hairs are—as is often the case with such a vestiture—variable in size and number, and almost absent in the Hungarian specimens.

Marchal (1883) and Bommer & Rousseau (1884) published the Belgian collections, but did not give any dates.

#### *Arnium cirriferum* (Speg.) Krug & Cain (Figs. 5, 6)

*Perithecia* scattered or aggregated, semi-immersed,  $670-960 \times 385-480 \mu$ , pyriform with a cylindrical, fairly long neck, usually covered with flexuous, olivaceous brown, septate,  $2 \mu$  thick, occasionally agglutinated hairs. *Peridium* membranaceous, olivaceous brown, semi-transparent except in the black neck, 3-layered; outer peridial cells angular,  $5-10 \mu$  in diam., with thin, often undulating walls. *Paraphyses* filiform-ventricose, tapering, soon collapsing. *Asci* 8-spored,  $300-450 \times 50-55 \mu$ , clavate with a pointed tip and a  $130-200 \mu$  long stipe, without apical ring; calotte  $2-2.5 \mu$  wide; subapical chamber very narrow. *Spores* biserial, one-celled, at first hyaline, narrowly ellipsoidal, then ranging through olivaceous to dark brown, ellipsoidal with subacute ends, sometimes slightly inequilateral,  $(42-48-60(-67)) \times 20-27 \mu$ , with a germ pore and a gelatinous cauda at each end and usually surrounded also with a thin gelatinous coating. *Caudae* covering the germ pores,  $90-210 \times 15-21(-30) \mu$ , tapering, broad-based, circular in cross-section,

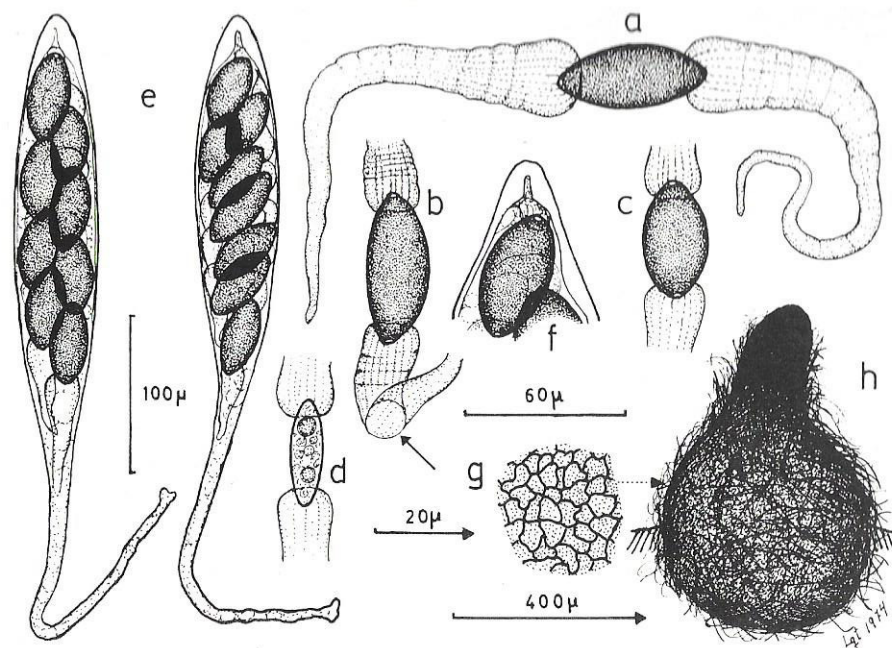


Fig. 5. *Arnium cirriferum*. (a, b, d, e-g) Santesson 17297-d (UPS). (c, h) Lundqvist 4436-f (UPS). Drawn from specimens in water (a-d) and lactic blue. (a-c) Mature spores; note the circular cross-section (at arrow). (d) Young, hyaline spore. (e) Mature asci with spores. (f) Ascus tip. (g) Surface view of peridium. (h) Perithecium.

solid, longitudinally striate, sometimes vaguely transversely segmented in the proximal part, swelling in water, blackening in indian ink.

**Spain:** Asturias, between Cabo Prieto and Cabo de Mar (horse) 29.IV.1959, Lqt 1866-m (UPS, slide). — Burgos, at the crossroads 10 km WSW of Miranda de Ebro (horse) 7.V.1959, Lqt 1955-c (UPS). — **Corsica:** Belgodere, Tour de Lozari (cow) 21.V.1965, Lqt 4485-f (BPI, DAOM, IMI, NY, PC, S, UPS). — Bonifacio, S of Fontanaccia (cow) 15.V.1965, Lqt 4435-e (PC, SOM, UPS). — W of Gurgazu at Golfe de Santa Mancha (cow) 15.V.1965, Lqt 4436-f (BPI, C, CLF, DAOM, IMI, NY, O, PC, S, TRTC, UPS, W). — Pertusato area, E of the semaphore (cow) 14.V.1965, Lqt 4427-g (BP, CLF, UPS). — At the bridge across Ventilegne R. (cow) 13.V.1965, Lqt 4425-p (PAD, UPS). — Porto-Vecchio, NE of the mouth of Stabiaccio R. (cow) 16.V.1965, Lqt 4448-g (IMI, PC, TRTC, UC, UPS, W). — St. Florent, Col de Teghime, (cow) 20.V.1965, Lqt 4480-m (UPS). — **Sicily, Palermo,** S of Cefalu, Santuario di Gibilmanna (cow) 2.VIII.1972, Dennis (UPS). — **South Africa:** Cape Prov., Namaqualand, 30 km N of Kamieskroon at Buffelsrivier on the road to Springbok (donkey) 26.X.1962, Nordenstam (IMI, PRE, TRTC slide, UPS). New for the Old World. — **USA:** California, Los Angeles Co., St. Catalina Island, S of Little Harbour (cow) 5.IV.1966, Santesson 17297-d (BPI, CLF, DAOM, E, IMI, M, NY, PRE, RSA, S, TRTC, UC, UPS). — **Mexico:** Baja California, Punta Banda near the Bufadora (donkey?) 22.IV.1966, Santesson 18300-k (UPS). New for North America.



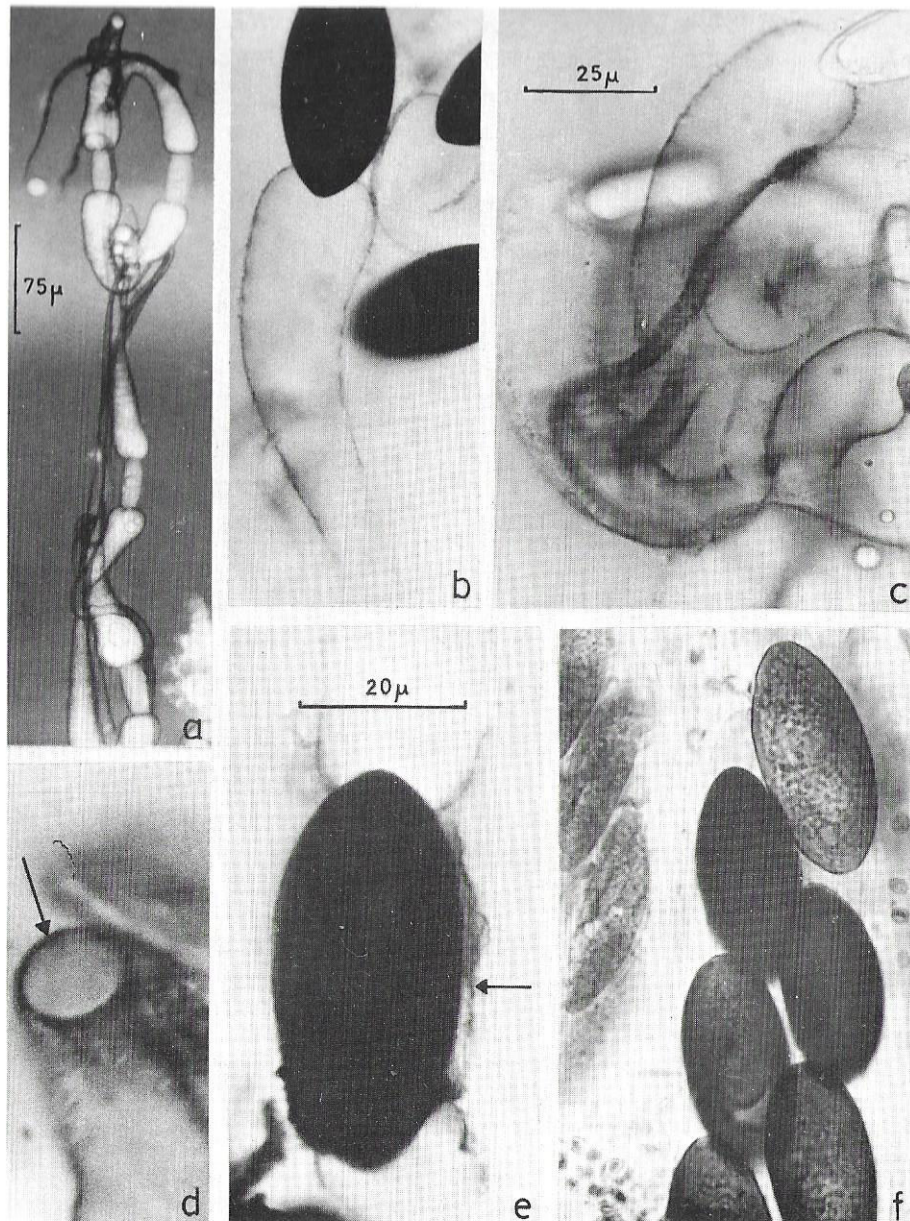


Fig. 6. *Arnium cirriferum*. (a–e) Lundqvist 4448-g (UPS). (f) Holotype (LPS 6834). Specimens in indian ink (a–e) and lactic blue. (a, c) Immature, hyaline spores with inflated caudae; a segmentation of the caudae is visible on a. (b, e) Mature spores with inflated caudae; note the thin gelatinous coating on e (at arrow). (d) Cross-section of caudae (at arrow). (f) Mature and immature spores in asci. — Scale: b = c; d = e.

*A. cirriferum* has now been found 14 times: 10 times on cow, twice on horse, and twice on donkey dung. I have investigated the type specimens on cow dung from La Plata, Argentina, 25.V.1888, leg. Spegazzini (LPS 6834). They are easily identified and agree well with Spegazzini's description and enclosed drawing. The spores are biseriata,  $48\text{--}57 \times 20\text{--}27 \mu$ , with two germ pores and  $14\text{--}18 \mu$  wide, longitudinally striate caudae. The asci are  $48\text{--}54 \mu$  broad, lacking apical ring. The perithecia are  $480\text{--}626 \times 430\text{--}530 \mu$ , but rather worn and have certainly been taller when intact. On living specimens filiform-ventricose paraphyses can be observed, which was not detected by Spegazzini ("asci . . . aparaphysati"). Other species were also present on the original gathering, and Spegazzini accordingly divided it. I have thus found *A. cirriferum* also on the type collection of *Sordaria communis* v. *brachyura* Speg. (LPS 6829), which is an unidentifiable *Podospora* (Lundqvist 1972: 175).

The best characteristics of the species are the pointed, ring-less ascus tip, the large, biseriata spores with subacute ends and two germ pores, and the very broad caudae. Sometimes a central, larger "stria" is visible in the proximal part of the non-dilated caudae, indicating the existence of a longitudinal furrow or canal, but neither such structures nor others have so far been observed in the cross-sections. Fresh specimens have unfortunately not yet been tested in indian ink, which might have clarified this micromorphology.

The distribution of *A. cirriferum* is remarkable (Lundqvist 1972: 30). The fungus seems to be subtropical and prefer a semi-arid climate, even though a few finds originate from drier (NW Mexico) or rainier (NW Spain) places. Fourteen collections are certainly not much to base a world distribution on, but it should be remembered that the substrates in question are found everywhere and have been investigated thoroughly from many parts of the world by numerous mycologists. Such a conspicuous fungus would not have remained unnoticed, if present.

#### *A. hirtum* (Hans.) Lundq. & Krug

**Iceland:** *Suður-þingeyjarsýsla*, Mývatnsveit, S of Haganes at W shore of Lake Mývatn (cow) 28.VII.1971, Lqt 7077-g (UPS). First verified record for Iceland (cp. Lundqvist 1972: 32, 39). — **Mongolia:** *Central Aymag*, 25 km W of Lüng (=145 km W of Ulan Bator) (cow or yak) 24.VI.1970, Ahti 26567-f (UPS). New for Asia.

#### *A. kansense* (Griff.) Krug & Cain (Figs. 7, 8)

*Perithecia* scattered, semi-immersed, pyriform,  $675\text{--}900 \times 180\text{--}450 \mu$ , with a cylindrical,  $120 \mu$  broad neck, covered all over with flexuous, olivaceous brown, septate, ca.  $1.5 \mu$  thick, sometimes agglutinated hairs. *Peridium* membranaceous, olivaceous brown, semi-transparent, except in the black neck, 3-layered with angular, thin-walled,  $4\text{--}10 \mu$  large outer cells. *Paraphyses* filiform-ventricose, tapering. *Asci* 8-spored, at first cylindrical, later clavate,  $180\text{--}275 \times 30\text{--}35 \mu$ , with a broadly rounded tip without apical ring or any light-refractive membranes, long-