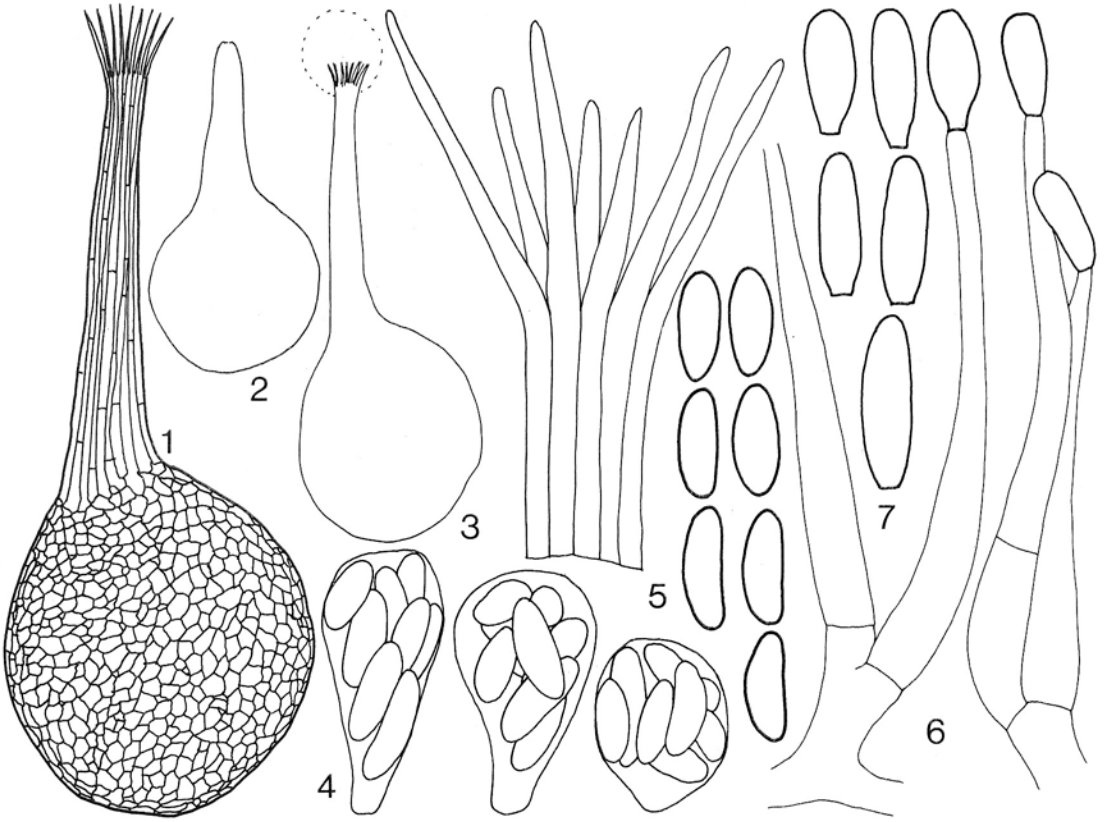
SPHAERONAEMELLA HELVELLAE



1, ascocarp (× 250); 2, ascocarps, one with outline of spore mass at apex of neck (× 150); 3, ostiolar setae (× 1500); 4, asci (× 1500); 5, ascospores (× 1500); 6, phialides (× 1500); 7, conidia (× 1500).

Sphaeronaemella helvellae (Karsten) Karsten, Hedwigia 23: 17. 1884.
≡*Sphaeria helvellae* Karsten, Fungi Fenn. exs., No. 674. 1867.
≡*Sphaeronaema helvellae* (Karsten) Jacz., Nouv. Mem. Soc. Imp. Nat. Moscow 15: 302. 1898.
≡*Melanospora karstenii* Arx and Müller (ut nom. nov.), Beitr. Krypt. Schweiz 11: 146. 1954.

ASCOCARPS superficial to semi-immersed in the hymenium of the host, densely gregarious, subglobose to ovoid, bright yellow-orange, glabrous, smooth, 90-250μ in diam., with a long neck. ASCOCARP PERIDIUM about 8.5-17μ thick at maturity. PERIDIAL CELLS relatively thick-walled, and yellowish at the surface, thinner-walled and hyaline toward the interior, forming a *textura angularis* to *textura epidermoidea* in surface view, flattened in side view, 2-12μ in diam., 1-4μ thick. ASCOCARP NECK composed of vertically parallel hyphae, terminated by a ring of ostiolar setae 20-50μ long, glabrous, up to 600μ long, 8.5-30μ in diam. ASCI irregularly disposed, clavate to ovoid, 8-spored, extremely delicate and evanescent, occasionally substipitate, 14-25 × 10.5-16μ. ASCOSPORES hyaline by transmitted light, yellowish in mass, unilaterally flattened-elliptical in side view, elliptical in face view, smooth, lacking gelatinous appendages, lacking germ pores, 8.2-10.6 × 3.3-4.5μ. CONIDIA produced on phialides, hyaline, ellipsoidal to ovoid, truncated at one end, smooth, 7-15 × 3.0-4.5μ. PHIALOPHORES short to nearly absent, usually represented only by a short side branch of the vegetative hyphae. PHIALIDES clavate to lanceolate, occasionally with a single septum, rarely with a small collarette, 37-83 × 4.0-5.0μ, produced singly or in pairs at the apex of the phialophores.

SUBSTRATE: On living ascocarps of *Gyromitra infula* and *G. ambigua* (see Fungi Canadenses No. 52 for a description of these hosts).

DISTRIBUTION: Ontario.

COLLECTIONS: Ont., Haliburton Co., 5 miles S of Dorset, on *Gyromitra infula*, 15 Sept. 1967, DAOM 136541 (Malloch), on *G. infula*, 17 Sept. 1969, DAOM 136826 (Malloch); Algoma Dist., Ont. Min. Nat. Res. Station, Agawa Bay, on *G. ambigua*, 14 Sept. 1972, DAOM 145223 (Malloch).

NOTES: *S. helvellae* is easily recognized in the field by the long perithecial necks protruding from the hymenium of the host, giving it a velvety appearance. Although the host ascocarps appear to be withered by the infection, ascospores are always present, indicating that the infection does not occur until host maturity.

The ecology of this species poses some interesting questions. How, for example, do the ascospores of *S. helvellae* get from one host to another? The superficial resemblance of this species to species of *Ceratocystis* (an unrelated genus), with its long-necked perithecia bearing apical masses of sticky spores, suggests dispersal by insects. However, not just any insect will do. If we assume that the insect vector is one that visits any fleshy fungus, it is difficult to imagine its finding a *Gyromitra* on its next or even fiftieth stop. Therefore, I think that we need to find a "*Gyromitra* bug", one that searches out *Gyromitra* ascocarps and, inadvertently, transfers to them some of the spores of the parasite clinging to its body. Alternatively, we might look for a "*Sphaeronaemella* bug", but it is unlikely that such an organism would be visiting uninfected hosts and transmitting the parasite. The final word on the ecology of *S. helvellae*, however, can come only after a pateint and careful study of the insects visiting the *Gyromitra* hosts.

S. helvellae has been reported in North America from Alaska by Wells and Kempton (Mycologia 60: 888-901. 1968) and from New Hampshire, New York and Michigan by Seeler (Farlowia 1: 119-133. 1943). Seeler (loc. cit.) was also, incidentally, the first to show it to be an Ascomycete, confirming the suspicions of von Höhnel (Hedwigia 60: 151. 1919). C.T. Rogerson (personal communication) reports additional specimens from Colorado, Idaho and Washington. It is also known from northern Europe, having first been described from Finland.

A second species, *S. fimicola* Marchal, is known from dung and differs from *S. helvellae* in producing smaller and more nearly allantoid ascospores. It was studied in detail by Cain and Weresub (Can. J. Bot. 35: 119-131. 1957) who demonstrated it to be parasitic upon certain other fungi (*Eurotium* and *Microascus* species). An isolate identified as *S. fimicola*, reported in detail by Pease (Mycologia 40: 114-124. 1948), has broader and more ellipsoidal spores than the Cain and Weresub material and was isolated from fruits of Cucurbitaceae. Possibly the Pease isolate is conspecific with *Viennotidia spermosphaerici* Negru and Verona (Mycopath. Mycol. Appl. 30: 306. 1966), described from seeds of various plants (including *Cucurbita*) in Roumania. Both *V. spermosphaerici* and *V. raphani* Negru and Verona (Mycopath. Mycol. Appl. 30: 307. 1966) undoubtedly belong in *Sphaeronaemella* and are transferred to that genus here as **Sphaeronaemella spermosphaerici** (Negru & Verona) Malloch, comb. nov. and **Sphaeronaemella raphani** (Negru & Verona) Malloch, comb. nov.

The four species of *Sphaeronaemella* can be separated as follows:

1.Growing on the hymenium of *Gyromitra infula* and *G. ambigua*; ascospores 8-11 × 3.3-4.5μ .... *S. helvellae*
1.Growing on dung or plant materials; spores usually shorter........ 2
  2.Growing on dung; ascospores 6-8 × 2-3μ .... *S. fimicola*
  2.Growing on plant materials; ascospores mostly broader than 3μ 3
3.Ascospores 4.0-6.5 × 4.0-4.5μ .... *S. raphani*
3.Ascospores 5.0-7.0 × 3.0-5.0μ .... *S. spermosphaerici*

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