



DAOM 116433: 1, Ascostromata on *Carex sitchensis* ($\times 1$); 2, ascostromata ($\times 5$); 3, mature ascococule ($\times 300$); 4, section of immature stroma on hypostroma ($\times 30$); 5, part of section of mature ascostroma ($\times 30$); 6, tube culture, 2% PDA, 15°C, 14 weeks ($\times 0.8$); 7, 8, asci ($\times 1200$); 9, microconidia ($\times 750$); 10, 11, macroconidia ($\times 450$), 11, with conidiophore.

Melanodothis caricis R. Horner Arnold, Can. J. Bot. 49: 2188. 1971.

ASCOSTROMATA parasitic on florets of *Carex* spp., arising from a hypostroma formed within the ovary and perigynium, black externally, dark within, subspherical, 1.5-4 mm diam., 1-3 mm high, size fairly constant on one host species but dependent on size of parasitized ovary, composed of pseudoparenchyma of dark brown angular-oblong or angular-spherical hyphal cells, with an outer rind 20-45 μ thick of more compressed darker cells. Stromata may become hollow at maturity. ASCOLOCULES 55-90 \times (30-)45-65(-80) μ , numerous, in a single layer just beneath the surface of the stroma, each locule opening lysigenously by a pore at the tip. Centrum Dothidea-type. ASCI bitunicate, 30-45(-50) \times 5.5-9.5(-11) μ before dehiscence, oblong or rarely oblong-pyriform, aparaphysate, astipitate, attached to a basal cushion of small-celled hyaline ascogenous pseudoparenchyma, bluntly rounded or truncate at the base, rounded at the apex, inner wall with apical canal, eight-spored. ASCOSPORES (9-)10-12.5(-14.5) \times (2-)3-4 μ , hyaline, thick-walled, single-celled, narrow elliptical with ends sometimes narrowed abruptly.

MICROCONIDIA 2-3 × 0.5 μ, narrow-oblong, hyaline, formed on short projections on hyaline cells lining microconidial locules; appear to function as spermatia. Microconidial locules formed in ascostromata just beneath the outer dark rind at a very early stage of development of the stroma when ascogonia are formed, open by a split in the outer rind.

MACROCONIDIA seen only in pure culture on 2% potato dextrose agar (PDA) when colonies were 5-14 days old. Conidia of two types: ovoid blastoconidia, 8-15 × 2-3 μ formed first, singly on the tips of hyphae in the periphery of colonies, then hyphae grew sympodially beyond these conidia, and when colonies were 2 weeks old and 1-3 mm diam., central section of each colony was covered with Ramularia-like, hyaline, smooth-walled, blastoconidia borne in chains on sympodulae. Conidia appeared like hyphal fragments, 30-51 × 3-4.5 μ, one- or two-celled, branched or unbranched, with a disc-like swelling at each end at separation points. Conidiophores indeterminate in length, conidia-bearing portion 80-100 × 4.5 μ. Some ovoid conidia formed as secondary conidia on the long cylindrical conidia.

SUBSTRATE: Ovaries of *Carex* spp.

DISTRIBUTION: British Columbia, confined to the coastal area (Queen Charlotte Islands, Prince Rupert, Vancouver) in wet habitats.

COLLECTIONS (selected): Naturally mature stromata: on *C. sitchensis* Prescott, Prince Rupert, VI.1965, DAOM 116433 (Holotype) (R.H. Arnold, A. Funk, & W. Ziller); on *C. pauciflora* Lightf., Q.C.I., VI.1957, DAOM 106060 (R.L. Taylor). Stromata collected with immature hymenium and matured under artificial conditions: on *C. sitchensis*, Prince Rupert, VIII.1954, DAOM 44922 (J.A. Calder, D.B.O. Savile & J.M. Ferguson); on *C. livida* (Wahl.) Willd., Prince Rupert, VIII.1954, DAOM 44921 (J.A.C., D.B.O.S. & J.M.F.); on *C. pauciflora*, Q.C.I., VII.1964, DAOM 107731 (J.A.C. & R.L.T.).

CULTURAL CHARACTERS: Growth very slow on 2% PDA. By 2 weeks, at 20°C, colonies from single ascospores 1-3 mm diam., gray-green; by 6 weeks, 64-66 mm diam., felty, compactly woven, olive-brown. At 2 weeks, Ramularia-like macroconidia abundant on surface of mat. At 14 weeks, stromata, similar in structure to those found in nature, well developed, with locules containing microconidia and ovoid areas of undifferentiated hyaline cells resembling early stages of ascocules. However, ascogonia or ascogenous cells were not seen and these areas finally became filled with brown cells like those of the rest of stroma. At 7 months, small hemispherical secondary stromata had formed on top of original stromata. These also contained locules filled with microconidia and ovoid areas of hyaline undifferentiated cells.

NOTES: Known locations of this species extend around the Pacific Basin. Collections have been examined from New Guinea, China, Japan, U.S.A. (Alaska) and Canada (British Columbia). It has been reported on 14 species of *Carex*, one *Carex* hybrid, and one species of *Kobresia*. Mature asci have been seen in stromata on 4 species of *Carex*, *C. capillacea* from New Guinea, and the 3 species from Canada cited above. The remaining records are of stromata with immature hymenium. This species has usually been collected when the stromata were full size but the hymenium immature. Such collections have been made in Canada on *C. anthoxantha* Presl., *C. livida*, *C. lyngbyei* Hornem. × *C. sitchensis*, *C. macrochaeta* C.A. Meyer, *C. pauciflora*, *C. phyllomanica* Boott, *C. pluriflora* Hult., *C. sitchensis*, and *C. viridula* Michx. The large subspherical black stromata on florets bear a superficial resemblance to fructifications of *Anthracoidea* Bref. in the Ustilaginales. In Canada, although the stromata develop to full size during the year in which the florets are infected and are clearly visible on the upright plants, the centra of the ascocules contain only ascogenous cells by the end of the growing season. Asci and ascospores mature the following Spring and are ejected at the time of anthesis of the *Carex* spp. The stromata remain firmly attached to the rachis over winter, although the old stalks are often flattened in bogs or marshes. In Canada, the stromata become hollow before winter and thus float when ascospores are ejected to be caught by air currents for dispersal.

A fungus similar to this and thought likely to be the same species, was first collected with immature hymenium in Japan by the Abbé Faurie and was described by Patouillard and Hariot (Bull. Soc. Myc. Fr. 9: 206-211. 1893) under the name '*Hyalodothis? caricis*' (*nom. dub.*).

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