CHAPTER 48

APHANODICTYON Huneycutt ex Dick
Trans. Brit. Mycol. Soc. 57:422. 1971

Monoecious. Mycelium of limited extent, very delicate, but much branched. Sporangia variable in shape, but predominantly globose, subglobose, clavate, cylindrical, or capitate; produced laterally on the principal hyphae; wall evanescent. Spores monomorphic; encysting in the sporangium, and each emerging individually from the cyst, leaving a dictyuchoid cluster of cyst walls. Oogonia spherical to irregular; lateral. Oogonial wall unpitted, ornamented. Oogonial stalks slender, variable in length. Oospores with an eccentric globule surrounded by cytoplasm; one to eight per oogonium. Antheridial branches monoclinous or diclinous.

Type species: *Aphanodictyon papillatum* Huneycutt ex Dick, Trans. Brit. Mycol. Soc. 57:422. 1971. (Also *in* Huneycutt, J. Elisha Mitchell Sci. Soc. 64:79, p1s. 35, 36. 1948.)

Huneycutt (1948) described the genus without a Latin diagnosis; Dick (1971a) validated it.

Originally assigned to the Saprolegniaceae in a position near *Aphanomyces*, *Aphanodictyon* was placed in the Leptolegniellaceae by Dick (1971). Of this change Dick wrote (1971a:420): "Its affinity with the Saprolegniaceae is based almost entirely on the cytoplasmic appearance of the mycelium since the primary zoospores encyst within the zoosporangium." We do not know if by this statement Dick meant that the genus can be removed *because* of this encystment? If so, this is precisely the behavior of primary spores in other genera of the family (for example, *Brevilegnia* and *Dictyuchus*), and does not at all by itself, constitute a basis for excluding *Aphanodictyon* from the Saprolegniaceae. In the North Carolina specimens of *A. papillatum* that we have examined, the spores are cleaved within the sporangium in precisely the same fashion as occurs in members of other genera (Chapters 7, 8) of the family. Furthermore, in Huneycutt's species spore release is dictyuchoid accompanied by a thraustothecoid (brevilegnioid) deliquescence of the sporangial wall to leave an asexual structure that is analogous to a false-net sporangium in *Dictyuchus* species. Moreover, the sexual apparatus is undeniably oomycetous (as Dick admits), and not at all different in its configuration from the usual watermolds with multioosporous oogonia.

If a character is to be singled out as indicative of a non-saprolegnian affinity, it is the thick-walled nature of the oospore and the internal disposition of the oil reserve. The oospores are not eccentric in the usual sense, for although the mature ones have an eccentric globule, it is surrounded by cytoplasm. Dick (1969b) suggested that such an oospore was possibly identical to those in his *Brevilegniella keratinophila*. However, in *Aphanodictyon papillatum* the oospores are formed within a saprolegniaceous gametangium, and are thus unlike "parthenospores" of the representative of Dick's genus.

In spite of the "nonsaprolegnian" type of oospore structure in *Aphanodictyon papillatum*, we believe the available evidence overwhelmingly favors retaining the monotypic genus in the Saprolegniaceae.

Aphanodictyon papillatum Huneycutt *ex* Dick
Trans. Brit. Mycol. Soc. 57:422. 1971
(Figure 84 E-I)

Aphanodictyon papillatum Huneycutt, J. Elisha Mitchell Sci. Soc. 64:279; pls. 35, 36. 1948.

Monoecious. Mycelium limited; hyphae slender, much branched, usually with many short, lateral ones. Sporangia predominantly globose, subglobose, clavate, cylindrical, or capitate, occasionally ellipsoidal, obovate, oblong, or reniform, sometimes asymmetrical; renewed as lateral branches from growing hyphae, globose or subglobose ones 7-53 μm in diameter; elongate ones 11-44 x 21-38 μm; wall evanescent. Spores monomorphic; single to many; encysting in the sporangium, and emerging individually as laterally biflagellate planonts, leaving cysts intact in sporangium in a dictyuchoid fashion, cysts at first polygonal, then becoming rounded prior to planont release. Gemmae absent. Oogonia lateral or intercalary; spherical, subspherical; ellipsoidal, obpyriform, oblong, or cylindrical to irregular; spherical to subspherical ones 14-43μm in diameter, elongate ones 15-66 x 22-47 μm, exclusive of wall ornamentations. Oogonial branches very slender, long, curved and irregular. Oogonial wall sparsely or densely provided with slender, short papillae or slender, long-conical or cylindrical ornamentations. Oospores containing a single, large, eccentrically-placed refractive body surrounded by cytoplasm; generally subspherical, oval, or ellipsoidal, or pyramidal from mutual pressure, rarely spherical; 1-8 per oogonium, and generally filling it; 11-26 μm in diameter; wall usually conspicuously thickened and faintly refractive; germination not observed. Antheridial branches nearly always present; monoclinous or diclinous, slender, irregular or straight, unbranched or sparingly branched, and often bearing one to a few short, lateral, cylindrical or papillate protrusions; persisting. Antheridial cells often not delimited; when formed, elongate, tubular, once-branched, lobed, or unbranched, sometimes noticeably irregular; persisting; laterally appressed; fertilization tubes not observed.

The hyphae of *Aphanodictyon papillatum* are much like those of species of *Aphanomyces*: slender and much-branched. The oogonia and sporangia of specimens collected in Iceland by Howard and his collaborators (1970) were slightly smaller, for the most part, than Huneycutt described for the species. A specimen recovered by Sparrow (1950) from Cuban soil only had oospores with moderately thickened walls.

See also, discussion of the genus *Aphanodictyon*.

In a paper published in 1954 (p. 52), Gaertner reported the collection (in Africa and Sweden) of a "Keratinophile Saprolegniaceae" that he thought possibly belonged to

Huneycutt's genus *Aphanodictyon*. Gaertner did not see oogonia nor did he observe spore release. He described the spores as large, refractive cells produced successively in a catenulate fashion at the ends of lateral branches of the slender principal hyphae. The brief description (without illustrations) of this keratinophilic fungus does not suggest to us that it had a saprolegniaceous affinity. Nothing but the substratum on which Gaertner collected the fungus argues for a kinship to *Aphanodictyon*.

CONFIRMED RECORDS: -- CZECHOSLOVAKIA: Cejp (1959b:134, figs. 5, 6). ICELAND: Howard *et al*. (1970:77, fig. 20). UNITED STATES: Huneycutt (*loc. cit*.). WEST INDIES: Sparrow (1950:54, figs. 8-14).

RECORDED COLLECTIONS: -- UNITED STATES: Huneycutt (1955); Scott (1960b); Sparrow (1965). WEST INDIES: Sparrow (1952a).

SPECIMENS EXAMINED: -- ICELAND (1), UNITED STATES (1), TWJ. WEST INDIES (1), F. K. Sparrow (preserved specimen).