

## CHAPTER 34

### *APLANOPSIS* Höhnk

Veröff. Inst. Meeresf., Bremerhaven 1:127. 1952

Monoecious. Mycelium extensive, open, and diffuse; hyphae slender, sparingly or much branched, tenuous and very flexible. Sporangia unknown. Gemmae present, and very sparse, or absent. Oogonia terminal, lateral, or intercalary; spherical, subspherical, or cylindrical to dolioform. Oogonial wall unpitted; smooth or irregular, or sparingly to densely ornamented. Oogonial stalks slender, usually long and tenuous, simple or branched. Oospores centric or subcentric; 1-7 per oogonium. Antheridial branches, when present, androgynous or (seldom) monoclinal. Antheridial cells simple, laterally or apically attached.

Type species: *Aplanopsis terrestris* Höhnk, Veröff. Inst. Meeresf., Bremerhaven 1: 127. 1952.

Since members of this genus can be collected in gross water cultures in which the bait is not in direct contact with soil, they doubtless produce motile spores, possibly from germinating oospores. No planonts or sporangia were seen in the type species and because of this Sparrow (1960:851) regarded the genus as imperfectly known.

Chiou and Chang (1976:37, pl. 1) treated Höhnk's *Aplanopsis terrestris* as a new combination in the genus *Pythiopsis*, and in so doing effectively discarded *Aplanopsis*. Their species, *P. terrestris*, may be rejected because the plant on which the transfer was based was not the same as Höhnk's *A. terrestris*. Moreover, the fungus described by Chiou and Chang may have been parasitized (as their illustration, figure 1 on plate 1, surely suggests), or its description possibly was derived from a mixed culture. The figures of sporangia and oogonia (pl. 1, figs. 2-4, 8, 9) of their *P. terrestris* are of a fungus described by us here as a new species, *P. irregularis*.

Representatives of *Aplanopsis* usually may be recognized easily in hempseed culture by the very diffuse, flexible nature of the mycelium and the small oogonia, smooth to densely warted, positioned on long, slender, sometimes sparingly branched stalks.

*Aplanopsis spinosa*, the second species described in the genus, produces sporangia with achlyoid spore discharge. It has been transferred to *Achlya* under the new name *ornata*.

### *Aplanopsis terrestris* Höhnk

Veroff. Inst. Meeresf., Bremerhaven 1:127. 1952

(Figure 59 D-L)

Monoecious. Mycelium extensive, diffuse, but dense near periphery of colony; hyphae very long, slender, flexuous, sparingly to moderately branched. Sporangia

unknown. Gemmae rare or absent. Oogonia predominantly lateral, occasionally terminal; spherical, subspherical, obovate, obpyriform, oval, apiculate, or orbicular; (18-) 24-28(-37)  $\mu\text{m}$  in diameter, including wall ornamentations. Oogonial wall unpitted; smooth, or provided with one to a few stout papillae, or sometimes with one or two long, cylindrical projections; occasionally or infrequently crenulate; some oogonia may be provided with a hyaline, nongranular, spherical or subspherical membranous covering or envelope that may encompass a part of the stalk and antheridial apparatus; the covering usually collapsing irregularly and lying loosely on the oogonial wall, or deliquescing completely. Oogonial stalks (2-) 3-5 (-7) times the diameter of the oogonium, in length; slender, and often irregular, twisted, bent, loosely coiled, or recurved; unbranched or sparingly branched and sometimes bearing oogonia in a glomerulate fashion. Oospores centric or subcentric; spherical, oval, or flattened at some points from mutual pressure or by the confines of the oogonial wall; 1 (-2) per oogonium, and filling it or not; (15-) 18-24 (-29)  $\mu\text{m}$  in diameter. Antheridial branches, when present, androgynous or rarely monoclinal; short, slender, sometimes irregular and twisted; unbranched or rarely once-branched; persisting. Antheridial cells simple; clavate or cylindrical; persisting; apically or laterally appressed; fertilization tubes not observed.

The mycelium of *Aplanopsis terrestris* is useful as an initial recognition characteristic. Colonies on hempseed in water grow quite large in two or three days, and are conspicuously diffuse. The individual hyphae are very slender and flexuous. No sporangia have been found in *A. terrestris*, and when there are very few oogonia produced -- as occurs in some subcultures after isolation -- the species is difficult to characterize.

In general, the oogonia of *Aplanopsis terrestris* are sparsely though prominently ornamented (Fig. 59 D, I), although smooth ones do occur (Fig. 59 F). In our cultures at least, there was a noticeable tendency for the oogonia to fail to mature, hence oospores were very sparse in some individuals. The very long, slender and flexuous oogonial stalks terminated by rather small oogonia or oogonial initials constitute an additional recognition feature for *A. terrestris*. Like Höhnk (*loc. cit.*), we have found antheridial branches to be scarce, with monoclinal ones (Fig. 59 J) being rare.

From farm pasture soil near Arnes, Norway, we isolated an unusual representative of *Aplanopsis terrestris*. An occasional oogonium in the Norwegian plant was surrounded by a clear envelope or sheath having a sharply defined outer surface (Fig. 59 G, H, K, L). This structure was usually spherical (Fig. 59 G), but in nearly all instances it subsequently became irregular (Fig. 59 L), and finally "collapsed" entirely or in part (Fig. 59 F) on the oogonium wall proper. The thickened, ornamented oogonial wall was visible in some such "haloed" oogonia (Fig. 59 H), as was the upper portion of the oogonial stalk and a portion of the antheridial branch (Fig. 59 H, K). In a few oogonia, the envelope collapsed until only remnants remained visible on the oogonial wall (Fig. 59 F); such a configuration recalls strongly one of the oogonia illustrated by Höhnk (1953a: pl. 2, fig. 4). We suspect -- from the rather limited observations we have

made, but have only circumstantial evidence to offer in support -- that some of the ornamentations on the oogonia of Höhnk's *A. terrestris* were not wall projections but were remnants of the envelope. It is in any case true that some oogonia of our material of *A. terrestris* are ornamented in the usual sense. Dick (1969b: pl. 2, fig. 6) illustrated a sheath around an immature oogonium of *A. terrestris*, and we are satisfied that what he depicted was identical to the envelope we observed in our specimens.

The nature and origin of the envelope escapes us. We have not followed stages in development -- we have seen it collapse and are impressed by the fact that it does not appear to be associated with all oogonia. The clear zone defined by the envelope remains so around oogonia mounted in nigrosin. Electron micrographs of the envelope show only a very thin, indistinctly defined, electron-dense margin, and no discernible material between that border and the oogonium wall proper.

If Chiou and Chang (1976:37, pl. 1) were meticulous in isolating and describing their single specimen of *Pythiopsis terrestris* then they were correct to merge *Aplanopsis terrestris* with that genus. However, the illustrations of *P. terrestris* generally do not relate well to Höhnk's *A. terrestris*, and this is particularly true of those figures showing oogonia on long, branched oogonial stalks. As illustrated (Chiou and Chang, 1976: figs. 1, 5) the oogonium-bearing hyphae of *P. terrestris* are about  $1/5$  the diameter of the sporangium-bearing ones from which they appear to have originated.

At least some of the oogonia drawn by Chiou and Chang (1976: figs. 7-9) of *Pythiopsis terrestris* can be taken as reasonably accurate illustrations of *A. terrestris*. In addition, the description provided by them refers to conspicuous, mucilaginous layers around immature oogonia. An analysis of the account by Chiou and Chang gives weight to the conclusion that they had in fact (1) collected *A. terrestris*, but (2) described it as a *Pythiopsis* because the culture was not unifungal. Neither a culture nor a preserved specimen of *Pythiopsis terrestris* is now to be had (H.-S. Chang, communication).

Date (1976b) reported that the sporangia of *Aplanopsis terrestris* were rare, and depicted an empty one for the fungus he identified as this species. The illustrations do not support the identification.

The genetics of *Aplanopsis terrestris* should prove highly informative. Win-Tin and Dick (1975) reported that congenital aberrant meiotic divisions (followed by abortion of the meiotic nuclei) occurred in this species yet oospores nonetheless were developed.

CONFIRMED RECORDS: -- GERMANY: Höhnk (1952a:85, pl. 15; 1953a:59, pl. 2).  
RECORDED COLLECTIONS: -- BRITISH ISLES: Dick (1963, 1966, 1969a); Dick and Newby (1961); O'Sullivan (1965). DENMARK: A. Lund (1978). GERMANY: Höhnk (1952d, 1956a, 1958). INDIA: Date (1976b: 79, figs. 1-6)(?). REPUBLIC OF CHINA: Chiou and Chang (1976: 37, pl. 1; as *Pythiopsis terrestris*)(?).

SPECIMENS EXAMINED: -- JAVA (1), NEW HEBRIDES (2), RLS<sup>1</sup>. NORWAY (2), TWJ. TAHITI (2), TRINIDAD (2), RLS. MWD (1)<sup>2</sup>.

EXCLUDED SPECIES

*Aplanopsis spinosa* Dick

Trans. Brit. Mycol. Soc. 43:60, pl. 2; text figs. 1, 2. 1960

Transferred to *Achlya* under the new name *A. ornata* since the epithet *spinosa*, in that genus, is preempted by de Bary's species.

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<sup>1</sup> In the interest of brevity specific collection data and acquisition numbers are not recorded; the figure following the locality is the number of separate isolates examined.

<sup>2</sup> MWD = Culture from the collections maintained by Michael W. Dick, University of Reading, England.