

THE GREEN ALGA *ASKENASYELLA* (TETRASPORALES) IN MICHIGAN

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ABSTRACT

The green alga *Askenasyella chlamydomus* is reported for Michigan for the first time. The genus *Chaetochloris* is shown to be a taxonomic synonym of *Askenasyella* and the species described within the former genus are transferred to *Askenasyella*. *Askenasyella*, traditionally placed in the family Palmellaceae, is shown to possess pseudocilia, and thus is more correctly placed in the family Tetrasporaceae.

KEYWORDS: *Askenasyella*; *Chaetochloris*; Tetrasporaceae

INTRODUCTION

The genus *Askenasyella* was described by Schmidle (1902) with the single species, *A. chlamydomus*. The generic name refers to the Russian-German phycologist Eugena Askenasy. The genus was regarded by Schmidle as in the Xanthophyceae. In 1905, West & West described the taxon *Actinobotrys confertus*. Soon after, West & West (1906) recognized that their genus was congeneric with Schmidle's *Askenasyella* and they transferred their species to that genus, as *Askenasyella conferta* (W. West & G.S. West) W. West & G.S. West. Printz (1927) continued to assign *Askenasyella* to the Xanthophyceae, that is, the Botryococcaceae within his "Heterocontae". Printz recognized two species, *A. chlamydomus* and *A. conferta*. Pascher (1939) observed the presence of starch and thus transferred *Askenasyella* to the green algae, placing it in the family Palmellaceae, order Tetrasporales. Pascher stated that *A. conferta* was incompletely or not fully observed and that even if recognized as distinct, it may even be a taxon belonging to the genus *Stichogloea* Chodat. Ramanathan (1968) described a third species from India, *A. randhawai*. *Askenasyella chlamydomus* has been rarely reported from North America (Smith 1950; Woodson & Holoman 1964). The latter record was repeated by Dillard (1989).

The current placement of *Askenasyella* is in question. Some phycologists (Pascher 1939; Smith 1950) place the genus in the family Palmellaceae whereas Bourrelly (1966) assigned it to the Radiococcaceae. Dillard (1989) placed it in the Oocystaceae of the Chlorococcales. Indeed, in the most recent systematic and ecological treatment of nonmotile coccoid and colonial green algae for North America (Shubert 2003), no attempt was made to place *Askenasyella* in a particular order or family. Based on observations of Kansas and Michigan sam-

ples containing *Askenasyella*, I make additional observations on its morphology and present a resolution of ordinal and family placement.

MATERIAL AND METHODS

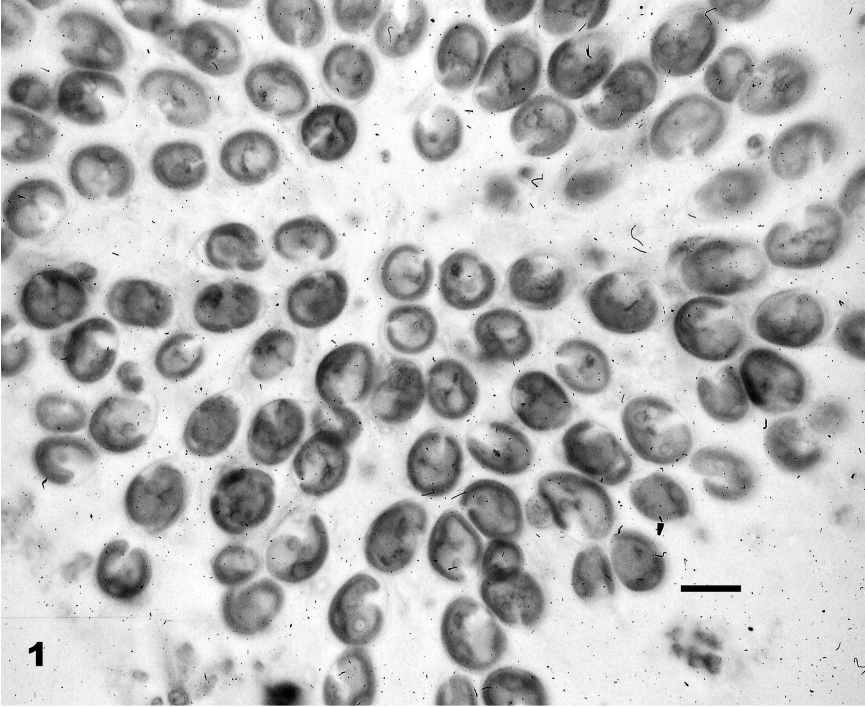
Plankton samples were collected from an I-70 turnpike marsh, Douglas County, west of Lawrence, Kansas, July 1968. Additional samples containing *Askenasyella* were collected from Miller's Marsh, Charlevoix County, Michigan, July, 1990. Maintenance cultures were grown in Bold's Basal Medium (1967) or soil water extract. Cultures no longer survive.

RESULTS AND DISCUSSION

The anterior end of the cell is at first truncated presenting a flat surface of contact with the substratum (Figs. 1–2). As a colony becomes crowded, the mutual pressure forces the cells away from the surface and the anterior position of the cell envelope becomes pointed. With further secretion of gel the individual cells come to lie remote from one another. The contiguous portion of the two pseudocilia from protoplast to apex is clearly evident (Fig. 2). This condition also arises in small colonies under observation with the microscope. It is thought that here both the pressure of the cover slip and subsequent additions of distilled water to the mount produce the change. In this condition if one failed to observe the pseudocilia, and they are nearly invisible when unstained, one could only determine their material as *Askenasyella*. The only clearly distinguishable portion of the pseudocilia is that which traverse the anterior part of the cell. Bourrelly (1966) was aware of the presence of pseudocilia and stated that “perhaps pseudoflagella” (French translation) were present as was Dillard (1989; called delicate threads). Neither author, however, acknowledged their presence in their systematic placements of the genus.

The writer is certain that just such a failure in observations led to the earlier reports of *Askenasyella* in Kansas (Thompson, in Smith 1950) and Virginia (Woodson & Holoman 1964). The writer is further of the opinion that the description of *Askenasyella* was also based on such an incomplete observation. Because there are no other differences between this genus and *Chaetochloris* Pascher & Korshikov (in Korshikov 1932) and because *Askenasyella* has priority, the species of *Chaetochloris* are transferred to it. Furthermore, as the only morphological feature which can be used to separate *Askenasyella randhawai* and *A. chlamydopus* is size, the latter being ca. 2 μm shorter and narrower, I conclude that those two taxa are conspecific.

- A. chlamydopus* Schmidle 1902: 154, 157, figs. 1–3; the generitype
=Synonym: *A. randhawai* Ramanathan (1968: 116, figs. 1–10)
- A. consociata* (Pascher & Korshikov) Wujek nov. comb.
=Basionym: *Chaetochloris consociata* Pascher & Korshikov (in Korshikov 1932: 594, figs. 67, 68)
- A. asocialis* (Pascher) Wujek nov. comb.
=Basionym: *Chaetochloris asocialis* Pascher (1940: 144, figs. 7–8, 9d)



FIGURES 1-2. *Askenasyella chlamydropus*. 1. Whole colony. 2. Cells each with two pseudocilia. Scale bar = 10 μ m.

- A. depauperata* (Pascher) Wujek nov. comb.
 =Basionym: *Chaetochloris depauperata* Pascher (1940: 143, figs. 1, 3, 5, 9c)
- A. scherffeliana* (Pascher) Wujek nov. comb.
 =Basionym: *Chaetochloris scherffeliana* Pascher (1940: 144, figs. 4, 9b)
 =Basionym: *Chaetochloris indica* Iyengar: 1975, 29, fig. 1)

Calcite may be crystallized out in the colonial gel and in such quantity that individual cells come to lie in pockets or deep wells in the mass. When stained with methylene blue the colony gel shrinks. Before that it stains bright red-violet and exhibits a radiate structure. Through this gel run the pseudocilia which seem to take very little of the stain and become only slightly more visible. The pseudocilia and the striae of dense gel became more apparent when stained with potassium iodide.

In summary, based on the morphology of the above newly described presence of pseudocilia in *Askenasyella*, it is best placed in the order Tetrasporales, family Tetrasporaceae and not as previously treated (Table 1). Molecular data on *Askenasyella* and other members of the family including the closely related genus *Polychaetochloris* (Pascher 1940) are needed to establish if this is a natural family.

Key to the species of *Askenasyella*:

1. More than two pseudocilia per cell *Polychaetochloris*
1. Only two pseudocilia per cell 2.
 2. Papilla at bases of pseudocilia not conspicuous *A. chlamydropus*
 2. Conspicuous papilla between bases of pseudocilia 3.
3. Colony four or fewer cells *A. asociatis*
3. Colony multicellular. 4.
 4. Cells lacking stigmata and pyrenoids (stigmas present in zoospores) *A. depauperata*
 4. Cells with stigmata, with or without pyrenoid 5.
5. Cells longer and more slender than in other species, stigma large in upper-third of cell *A. scherffeliana*
5. Cells broadly elliptical-egg shaped to almost spheroidal, axial pyrenoid; zoospores lack stigma *A. consociata*

TABLE 1. Systematic placement of *Askenasyella*.

Author	Class/Order	Family
Schmidle (1902)	Xanthophyceae	
West & West (1906)	Confervales	Chlorotheciaceae
Printz (1927)	Xanthophyceae	Botryococcaceae
Pascher & Korshikov (1932)	Tetrasporales	Pseudociliaceae
Pascher (1939)	Tetrasporales	Palmellaceae
Smith (1950)	Tetrasporales	Palmellaceae
Bourrelly (1966)	Chlorococcales	Radiococcaceae
Ramanathan (1968)	Chlorangiales	Chlorangiaceae
Dillard (1989)	Chlorococcales	Oocystaceae
This study	Tetrasporales	Tetrasporaceae

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