ASEXUAL REPRODUCTION IN THE GENUS *BASICLADIA*, HOFFMAN AND TILDEN

DOROTHY V. LEAKE
Oklahoma A&M College, Stillwater

Basicladia is a genus of the Cladophoraceae, a family of the green algae. It lives only on the shells of freshwater turtles, but can be cultured in the laboratory if a piece of the horn upon which it grows is placed in the aquarium with it. It is attached to the horn by rhizoids growing from the elongated basal coenocyte, or by a system of sub-rectangular cells in branches which spread out over the substrate. The upright filaments are composed of cylindrical coenocytes, and are very sparingly branched.

Gadow (1901) published a note which is probably the first reference in the literature to this alga. In his book on reptiles and amphibia, he mentions the camouflage value of the algae growing on the shells of snapping turtles. The herpetologists Ditmars (1915), Evermann and Clark (1916) and Schufeldt (1920) have all mentioned the green growths on the backs of several species of water turtles. Collins (1906) described an alga found on painted turtles and musk turtles in Michigan as belonging to the genus *Chaetomorpha*. Collins (1909) reported the same alga from Massachusetts. Tiffany (1915) reported it from Iowa. Hoffmann and Tilden (1930), in their study of specimens collected in Minnesota in 1923, discovered a branching of the basal holdfast cell of the filament. As this was not a characteristic of *Chaetophora*, a new genus, *Basicladia*, with two species, was described. One of the species, *Basicladia chelonum*, was found to be identical with Collins'

Chaetomorpha chelonum, but the other, the coenocytes of which are greater in diameter, Hoffmann and Tilden named *B. crassa*. Tiffany (1937) reported both species from Iowa. Smith (1933) states that "motile reproductive cells have not been observed as yet, but the frequent occurence of empty cells with a small lateral pore indicates this alga forms either zoospores or gametes." Leake (1939) published an account of the production of motile cells in *Basicladia*.

Further observations have been made by the author of the present paper over a period of ten years. Not only has additional material been collected but it has been kept growing on pieces of horn in balanced aquaria and in hanging drop cultures. Biflagellate motile cells and aplanospores have thus been produced repeatedly.

Material collected April 17, 1939, from a mud turtle (probably *Kinosternon subrubrum hippocrepis*) and from a snapping turtle (*Chelydra serpentina*) was studied in hanging drop cultures. Swarmers were produced in large numbers. These biflagellate cells were oval in shape and elongate while actively swarming (Fig. 1). On coming to rest, after swarming for about thirty minutes, they approached a spherical shape (Fig. 2.) At this stage the flagella straightened out radially (Figs. 3 and 4), then, one after the other they suddenly extended themselves along the surface of the cell, seeming to merge with the protoplast. Each swarmer showed lobed chloroplasts and a curvilinear eyespot, which was reddish in color.

The motile cells were studied in germination during the period from April 17 until May 10, 1939. The germling shown in Figures 5 to 9, started germination on April 21 and its growth up to the three-celled stage was observed. Since conjugation was not observed, it was concluded that the germinating cells were either zoospores or parthenospores.

In all hanging drop cultures aplanospores (Fig. 10) were formed. Their germination (Figs. 11, 12) invariably took place along the axis of the filament when there were empty coenocytes next to them. Drawings of aplanospores were made from cultures made in the spring of 1939 and the fall of 1948.

SUMMARY

Specimens of *Basicladia chelonum* and *B. crassa*, collected during the years from 1938 to 1948, from the shells of snapping turtles and mud turtles, formed motile cells which escaped from the coenocytes through lateral pores.

Study of living material in hanging drop cultures showed the swarmers in germination after becoming quiescent.

The germlings were observed in growth up to the three-celled stage.

Formation of aplanospores was observed. Their germination usually took place through adjacent empty coenocytes and along the axis of the filament.

DESCRIPTION OF FIGURES 1-12

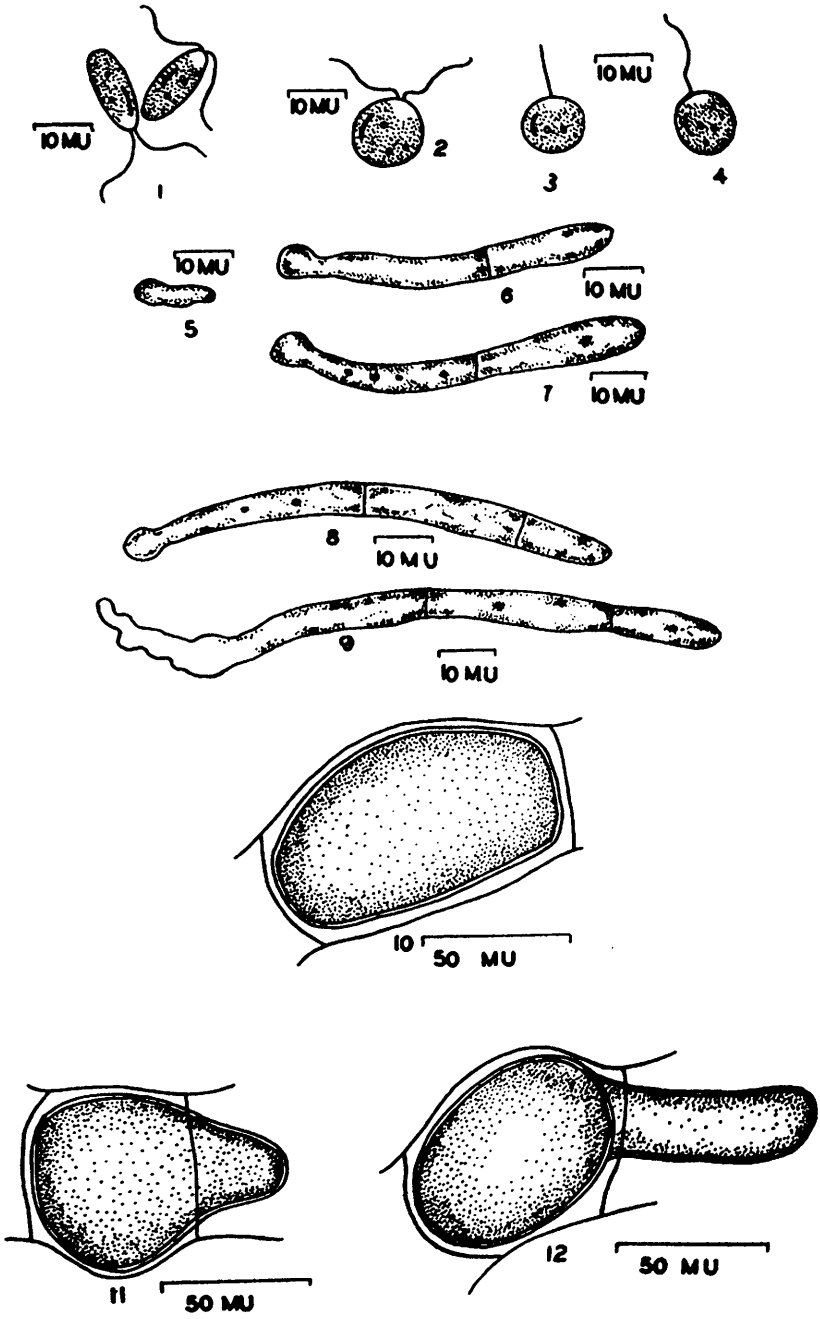
Fig. 1. Swarmers of *Basicladia*. X1000
Figs. 2-4. Swarmers becoming quiescent. X1000
Figs. 5-9. Growth of Germlings. X1000
Fig. 10. Aplanospores. X650
Figs. 11-12. Germination of aplanospores. X650

BIBLIOGRAPHY

COLLINS, F. S. 1907. Some new green algae. Rhodora *9*:198-200.

———. 1909. An algological prophecy fulfilled. *Ibid.* *11*:196-197.

DITMARS, R. L. 1915. The reptile book. New York: Doubleday Doran and Co. p. 14.



FIGURES 1-12. See preceding page for description

EVERMANN, B. W. AND CLARK, H. W. 1916. The turtles and batrachians of the Lake Maxinkukee region. Proc. Indiana Acad. Sci. 477-493.

GADOW, H. 1901. Amphibia and reptiles. New York: Macmillan and Co. p. 340.

HOFFMAN, W. E. AND TILDEN, JOSEPHINE E. 1930. Basicladia, a new genus of *Cladophoraceae*. Botan. Gaz. *89*:374-384.

LEAKE, DOROTHY V. 1939. Preliminary note on the production of motile cells in *Basicladia*. Proc. Oklahoma Acad. Sci. *19*:108-109.

SCHUFELT, R. W. 1920. Observations on the chelonians of North America. VII Aquatic Life *16:* February.

SMITH, G. M. 1933. The freshwater algae of the United States. New York: McGraw, Hill and Co. p. 432.

TIFFANY, L. H. 1926. The filamentous algae of northwestern Iowa with special reference to the Oedogoniaceae. Trans. Am. Microscop. Soc. *45*:78.

TIFFANY, L. H. 1937. The filamentous algae of the west end of Lake Erie. Am. Midland Naturalist *18*:911-951.