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Family III: Clastidiaceae

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The *Butler University Botanical Studies* journal was published by the Botany Department of Butler University, Indianapolis, Indiana, from 1929 to 1964. The scientific journal featured original papers primarily on plant ecology, taxonomy, and microbiology. The papers contain valuable historical studies, especially floristic surveys that document Indiana's vegetation in past decades. Authors were Butler faculty, current and former master's degree students and undergraduates, and other Indiana botanists. The journal was started by Stanley Cain, noted conservation biologist, and edited through most of its years of production by Ray C. Friesner, Butler's first botanist and founder of the department in 1919. The journal was distributed to learned societies and libraries through exchange.

During the years of the journal's publication, the Butler University Botany Department had an active program of research and student training. 201 bachelor's degrees and 75 master's degrees in Botany were conferred during this period. Thirty-five of these graduates went on to earn doctorates at other institutions.

The Botany Department attracted many notable faculty members and students. Distinguished faculty, in addition to Cain and Friesner , included John E. Potzger, a forest ecologist and palynologist, Willard Nelson Clute, co-founder of the American Fern Society, Marion T. Hall, former director of the Morton Arboretum, C. Mervin Palmer, Rex Webster, and John Pelton. Some of the former undergraduate and master's students who made active contributions to the fields of botany and ecology include Dwight. W. Billings, Fay Kenoyer Daily, William A. Daily, Rexford Daudenmire, Francis Hueber, Frank McCormick, Scott McCoy, Robert Petty, Potzger, Helene Starcs, and Theodore Sperry. Cain, Daubenmire, Potzger, and Billings served as Presidents of the Ecological Society of America.

Requests for use of materials, especially figures and tables for use in ecology text books, from the *Butler University Botanical Studies* continue to be granted. For more information, visit www.butler.edu/herbarium.

Original specimens have not been available to us for the following names; their original descriptions are here designated as the Types until the specimens can be found:

Chamaesiphon macer Geitler, Arch. f. Protistenk. 51: 331. 1925.

Chamaesiphon curvatus f. *polysporinus* Schirschov, Acta Inst. Bot. Acad. Sci. U. R. P. S. S., ser. 2, Pl. Crypt. 1: 81. 1933.

Chamaesiphon cylindrosporus Skuja, Symholae Bot. Upsal. 9(3): 45. 1948.

Cellulae solitariae primum sphaericae aetate provecta lineari-cylindricae vel lineari-tubaeformes, pulvinis et endosporangiis quaerendis. FIG. 246.

On larger, chiefly perennial, algae and other plants in clear freshwater streams and lakes. The well developed solitary cells have the general aspect of plants of *Lyngbya versicolor* (Wartm.) Gom. and *L. Diguetii* Gom. *Crenothrix polyspora* Cohn may sometimes be confused with this form.

Specimens examined:

NOVA ZEMBLA: Norra Gäskap, *F. Kjellman 29b*, 1875 (Type of *Chamaesiphon gracilis* f. *elongatus* Wille, S [Fig. 246]). NORWAY: Olden in Nordfjord, *O. Nordstedt*, 17 Aug. 1878 (PC). SWEDEN: in *Fontinalis dalecarlica*, Kvarnbaacken, Högsjö, Angermanland, *A. Arvén*, 14 Jul. 1914 (FC). MASSACHUSETTS: with *Chantransia Hermannii* on mosses in brook, Sharon, *F. S. Collins*, May 1890 (in Collins, N. Amer. Alg. 153, D), Massapoag brook, Sharon, *W. A. Setchell 26*, 4 May 1890 (D). QUEBEC: sur les mousses au bord de la Rivière Payne, vers 73° 7′ long. O., Ungava, *J. Rousseau 937*, 6 Aug. 1938 (FC). LOUISIANA: stream near Husser, Tangipahoa parish, *L. H. Flint*, 21 Mar. 1953 (FC).

FAMILY III. CLASTIDIACEAE

Drouet & Daily, Butler Univ. Bot. Stud. 10: 223. 1952. —Type genus: *Clastidium* Kirchn.

Plantae microscopicae, solitariae, epiphyticae, primum sphaericae aetate provecta cylindricae, basim affixae, primum unicellulares demum interne in catenam cellularum sphaericarum, ovoidearum, vel cylindricarum uniseriatim (raro parce pauciseriatim) dividentes; vagina tenue, ad apicem clausa, ad basem incrassata, ad substratum adhaerenre; reproductione a dissolutione vaginae demum catenae cellularum.

Plants of this family are elongate epiphytic unicells contained in thin gelatinous sheaths. The entire protoplast divides into a uniseriate (rarely few-seriate in part) chain of rounded cells which often remain united by their membranes after the hydrolyzation of the sheath. The cells, upon separation from each other, elongate and secrete new gelatinous sheaths.

Key to genera:

Plant terminating above in a hair-like extension of the sheath ..... 1. CLASTIDIUM

Plant smooth at the apex ..... 2. STICHOSIPHON

GENUS I. CLASTIDIUM

Kirchner, Jahresh. Ver. Vaterl. Naturk. Württemberg 36: 195. 1880. —Type species: *C. setigerum* Kirchn.

Plantae microscopicae, solitariae, erectae, epiphyticae, primum sphaericae aetate provecta cylindricae, basim affixae, unicellulares demum interne in catenam

cellularum sphaericarum uniseriatim dividentes, vagina tenue, ad apicem clausa et in setam producta, ad basem incrassata et ad substratum adhaerente.

One species:

CLASTIDIUM SETIGERUM Kirchner, Jahresh. Ver. Vaterl. Naturk. Württemb. 36: 195. 1880. —Specimen presumably seen by the author from Malmagen in Herjedalia, Sweden (MIN), designated as the Type. Specimens from Bessvatn, Sweden (DA), photographed: FIGS. 251, 252.

Plantae microscopicae, aerugineae, solitariae, erectae, primum sphaericae aetate provecta cylindricae, diametro 2—5μ crassae, ad 15(—38)μ altae, ad apicem acutae vel rotundae, basim affixae, primum unicellulares demum interne in catenam cellularum sphaericarum uniseriatam dividentes, vagina hyalina tenue, ad apicem clausa et in setam producta, ad substratum adhaerente; protoplasmate aerugineo, homogeneo. FIGS. 251, 252.

Epiphytic on larger algae, mosses, etc. in freshwater lakes, ponds, bogs, and streams. This species has been confused with solitary cells of *Entophysalis Lemaniae*, *Characium* spp., and *Characiopsis* spp., also with young filaments of *Amphithrix janthina* (Mont.) Born. & Flah., *Lyngbya versicolor* (Wartm.) Gom., and various bacteria.

Specimens examined:

SWEDEN: ad folia emortua Fontinalis in amne ad Malmagen in Herjedalia, *G. Lagerheim*, 28 Jul. 1897 (designated as Type of *Clastidium setigerum* Kirchn. in Wittr., Nordst., & Lagerh., Alg. Exs. no. 1536, MIN); on Dichothrix, Bessvatn, *K. Thomasson*, 18 Jul. 1951 (DA [Figs. 251, 252]). MISSISSIPPI: on Chantransia in swift water, stream between Cherow and Sandy Hook, Marion county, *L. H. Flint*, 11 Oct. 1946 (FC). LOUISIANA: in a stream near Blood, St. Tammany parish, *Flint*, 7 Mar. 1953 (FC). ALASKA: Karluk lake, Kodiak, *D. Hilliard 11*, 1955 (D).

GENUS 2. STICHOSIPHON

Geitler, Rabenh. Krypt.-Fl. 14: 411. 1931. —Type species: *S. regularis* Geitl.

Plantae microscopicae, solitariae, erectae vel curvatae, epiphyticae, initio sphaericae aetate provecta cylindricae, basim affixae, primum unicellulares demum interne in catenam cellularum sphaericarum, ovoidearum, vel cylindricarum uniseriatam (vel raro parce pauci-seriatam) dividentes, vagina tenue, ad apicem clausa et rotunda, ad basem incrassata et ad substratum adhaerente.

One species:

STICHOSIPHON SANSIBARICUS Drouet & Daily, Butler Univ. Bot. Stud. 10: 223. 1952. *Chamaesiphon sansibaricus* Hieronymus in Engler, Pflanzenwelt Ostafr. C: 8. 1895. —Type from Zanzibar (BM). FIG. 253.

Chamaesiphon filamentosus Ghose, Journ. Linn. Soc. Bot. 46: 337. 1924. *Stichosiphon filamentosus* Geitler, Rabenh. Krypt.-Fl. Eur. 14: 411. 1932. —Type from Lahore, Pakistan (in the collection of F. E. Fritsch). FIG. 254.

Chamaesiphon Willei Gardner, Mem. New York Bot. Gard. 7: 34. 1927. —Type from Rio Piedras, Puerto Rico (NY).

Stichosiphon regularis Geitler, Rabenh. Krypt.-Fl. 14: 411. 1932. —Type from Lake Ranau Bedali, east Java, Indonesia (in the collection of L. Geitler).

Original specimens have not been available to us for the following names; their original descriptions are here designated as the Types until the specimens can be found:

Stichosiphon indicus B. Rao, Proc. Indian Acad. Sci. 3: 167. 1936.

Dermocarpa olivacea var. *gigantea* B. Rao, Proc. Indian Acad. Sci. 3: 167. 1936.

Plantae microscopicae, aerugineae, olivaceae, violaceae, vel roseae, solitariae, erectae vel varie curvatae, epiphyticae, initio sphaericae aetate provecta cylindricae, diametro 3—7μ crassae, ad 400μ altae, primum unicellulares demum inrerne in catenam cellularum sphaericarum, ovoidearum, vel cylindricarum uniseriaram (vel raro parce pauci-seriaram) dividentes, vagina hyalina tenue, ad apicem rotunda, primum clausa deinde aperta, ad basem incrassata saepe brevi-stipitata, ad substratum adhaerente; protoplasmate aerugineo, olivaceo, violaceo, vel roseo, homogeneo. FIGS. 253, 254.

Epiphytic on larger algae and other plants in freshwater lakes, ponds, and streams. Well developed plants of *Stichosiphon sansibaricus* are reminiscent in habit of young filamenrs of *Anabaena* and *Calothrix* spp. Smaller plants can be confused with large solitary cells of *Entophysalis Lemaniae.*

Specimens examined:

ZANZIBAR: auf Cladophora an einer undichten Stelle der Wasserleitung etwas nördlich der Stadt Sansibar, *Stuhlmann 21,* 31 May 1891 (Type of *Chamaesiphon tanzibaricus* Hieron., BM [Fig. 253]). VIRGINIA: James river, Richmond, *W. E. Wade,* Jul. 1951 (DA). FLORIDA: on *Plectonema Wollei* and *Rhizoclonium hieroglyphicum,* Rock Springs, Seminole county, *E. M. Davis,* 1939 (FH); on Cladophora in the spring-pool, Wakulla Springs, Wakulla county, *F. Drouet, G. Madsen, & D. Crowson 11506,* 27 Jan. 1949 (FC, T); on *Plectonema Wollei* and *Rhizoclonium fontanum* in wet place at Rock Spring Park, Orange county, *P. O. Schallert 2500,* 1 Jun. 1951 (FC). TENNESSEE: on *R. hieroglyphicum,* Cumberland river at Clarksville, Montgomery county, *A. E. Clebsch 2023,* 1 Oct. 1949 (FC, TENN); on Pithophora in Blue Basin, Reelfoot lake, Lake county, *H. Silva 1156,* 2 Jul. 1949 (FC, TENN). ARKANSAS: on *Rhizoclonium hieroglyphicum* in Buffalo river, St. Joe, Searcy county, *D. Demaree 25307Aa,* 1 Oct. 1944 (FC). PUERTO RICO: on Oedogonium in a reservoir, Rio Piedras, *N. Wille 119b,* Dec. 1914 (Type of *Chamaesiphon Willei* Gardn., NY; isotypes, FH, UC). PHILIPPINES: Los Baños, Laguna, *E. Quisumbing 5434,* 13 Oct. 1929 (FC, UC); on Cladophora in little spring at base of Igkaras hill, Alimodian, Iloilo, *J. D. Soriano 1538,* 7 Dec. 1952 (FC, PUH). CHINA: on *Plectonema Wollei,* Wuhsien (Soochow), Kiangsu, *C. C. Wang 312,* 14 Oct. 1930 (FC, UC). INDONESIA: auf Lyngbya aus 3.6 m. Tiefe, Ranau Bedali-See, Ost-Java, *Ruttner,* 20—22 Nov. 1928 (Type of *Stichosiphon regularis* Geitl., slide no. KB28 in slide collection of L. Geitler). INDIA: on Oedogonium, McPherson lake, Allahabad, *P. Maheshwari 21,* Jul. 1939 (FH). PAKISTAN: on Pithophora in a stagnant pool in the Botanical Gardeos, Lahore, *Ghose,* 13 Oct. 1918 (Type of *Chamaesiphon filamentosus* Ghose in the collection of F. E. Fritsch; isotype, D [Fig. 254]).

NOMINA EXCLUDENDA

The following names have been described on the bases of material not included in the families treated above. Most of these names were originally described as members of the Chroococcaceae, Chamaesiphonaceae, or Clastidiaceae; or were transferred into those families at one time or another; or have been suspected as being members of those families. Where the original specimens have not been available for study, we have designated the original description as the temporary Type, to serve until specimens seen by the author can be found.

The alga most frequently mistaken as one of the coccoid Myxophyceae is that classically referred to in the literature since 1849 as one or another species of Gloeocystis. In this study we could not obviate special efforts to understand the large numbets of specimens of this group from all parts of the world that have come to our attention. The genus and its single species are therefore treated here separately: