

# FRESHWATER CHLOROPHYCEAE AND XANTHOPHYCEAE FROM PUERTO RICO

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It was the plan of the late Dr. Marshall Avery Howe of the New York Botanical Garden to publish comprehensive surveys of the freshwater algae of Puerto Rico. Some of these have already appeared. The analysis of the samples of algae collected by the Norwegian algologist, N. Wille, during the last week of December, 1914, and the first three months of 1915, were to have formed a part of these reports. The collection of Professor Wille, submitted to us by Dr. Howe some ten years ago, has now been quite thoroughly explored for recognizable Chlorophyceae and Xanthophyceae. Preliminary reports have been made by Wille (1915) and Tiffany (1936). In the latter, one genus and fourteen species were described as new, and the descriptions of three others were emended.<sup>1</sup>

This paper lists four species and varieties of Xanthophyceae and 228 species and varieties of Chlorophyceae. The latter group includes 35 species and varieties previously listed for Puerto Rico (Lagerheim, 1887; Moebius, 1888), but not found by the present writers; and 11 species and varieties previously listed by the above named and also appearing in Wille's collections.<sup>2</sup> It has seemed best to include these older records here, and names have been changed accordingly to conform with modern synonymy.

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## XANTHOPHYCEAE

### HETEROCOCCALES

#### *Ophiocytiaceae*

##### **Ophiocytium capitatum** Wolle

In pool near park, Santurce, Dec. 25; in brook near the Experiment Station, Rio Piedras, Dec. 28.

##### **O. parvulum** (Perty) A. Braun

In pool near park, Santurce, Dec. 25, Feb. 3; east of Humacao, Jan. 23; in pool about four kilometers north of Mayaguez, Feb. 24.

#### *Botryococcaceae*

##### **Centritractus belonophorus** Lemm.

In pool near park, Santurce, Dec. 25.

### HETEROTRICHALES

#### *Tribonemataceae*

##### **Tribonema bombycinum** var. **tenue** (Hazen) Tiffany

In ditch, Jayuya, Mar. 15.

<sup>1</sup>These algae are indicated in the systematic listing by prefacing an asterisk to each name.

<sup>2</sup>Many of the species recorded by Moebius are too uncertain to be recognized. All of Lagerheim's records of Chlorophyceae are included here, except *Desmidium baileyi* (Ralfs) Nordst. var. *quadrangulatum*, *Staurastrum quadrangulare* Breb. var. *attenuatum* Nordst., and *Cosmarium meneghini* Breb. f. Delp, which we have not been able to place accurately.

## CHLOROPHYCEAE

## VOLVOCALES

*Phacotaceae*

**Phacotus lenticularis** (Ehr.) Stein  
West of Humacao, Jan. 21.

*Volvocaceae*

**Gonium pectorale** Muell.  
Caguas, Jan. 16.

**Pandorina morum** Bory  
In a pool near the park, Santurce, Dec. 25; in pool west of Humacao, Jan. 21.

## TETRASPORALES

*Palmellaceae*

**Gloeocystis ampla** Kuetz.

Caguas, Jan. 17; west of Humacao, Jan. 22; east of Humacao, Jan. 23; in pool near Borinquen Park, Santurce, Feb. 3; in pool about 4 kilometers north of Mayaguez, Feb. 24; in pool between Hatillo and Arecibo, Feb. 27; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**Sphaerocystis schroeteri** Chodat

In stream about 5 kilometers east of Coamo, Jan. 8; east of Humacao, Jan. 23; in pool near Borinquen Park, Santurce, Feb. 3; in pool about 4 kilometers north of Mayaguez, Feb. 24.

(?) **Urococcus insignis** (Hass.) Kuetz.

On water plants, east of Humacao, Jan. 23. Identified only by size and the character of the stratified gelatinous sheath. The red coloration characteristic of the species was not evident in the preserved material.

*Tetrasporaceae*

**Schizochlamys gelatinosa** A. Braun  
At Maricao, Feb. 21.

**Tetraspora gelatinosa** (Vauch.) Desv.  
In stream about 5 kilometers east of Coamo, Jan. 8.

**T. lubrica** (Roth) Ag.  
In stream about 5 kilometers east of Coamo, Jan. 8; in brook west of Humacao, Jan. 21.

## ULOTRICHALES

*Ulotrichaceae*

**Binuclearia tatrana** Witttr.  
In river at Utuado, Mar. 5.

**Stichococcus flaccidus** (Kuetz.) Gay

Reported by Wille but not seen by present writers.

On palm roots in ditch south of Mayaguez, Feb. 11; on wood on way to Monte Montoso, Maricao, Feb. 13; on earth between Hato Arriba and Arecibo, Mar. 1.

**Ulothrix aequalis** Kuetz.

In river at Utuado, Mar. 5.

**U. zonata** (Weber & Mohr) Kuetz.

In Turabo River, Caguas, Jan. 17; in ditch on way to the Playa, Fajardo, Feb. 27; in ditch south of Mayaguez, Feb. 11; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

*Microsporaceae*

**Microspora tumidula** Hazen

In brook on way to San Lorenzo, Jan. 18; in brook west of Humacao, Dec. 21; in stream west of Humacao, Jan. 22.

**M. willeana** Lag.

In stream about 5 kilometers east of Coamo, Jan. 8; in river at Utuado, Mar. 5.

*Chaetophoraceae*

**Chlorotylum cataractum** Kuetz.

In stream about 5 kilometers east of Coamo, Jan. 8; in Coamo River, about 5 kilometers south of Coamo Springs, Jan. 10.

\***Cloniophora capitellata** Tiffany

Near reservoir west of Experiment Station, Rio Piedras, Dec. 31; in brook on the road

northward from Maricao, Feb. 20; in water basin west of Experiment Station, Rio Piedras, Mar. 23; on stone in river north of Maricao, Feb. 22.

**\*C. willei** Tiffany

On the dam by water reservoir, Rio Piedras, Dec. 31.

**Protoderma viride** Kuetz.

In pool, Jayuya, Mar. 15; on Oedogonium in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**Stigeoclonium attenuatum** (Hazen) Collins

In water basin west of Experiment Station, Rio Piedras, Mar. 23.

**S. nanum** (Dillw.) Kuetz.

On water plants in ditch south of Mayaguez, Feb. 11.

**S. stagnatile** (Hazen) Collins

In stream east of Humacao, Jan. 23; on stone in stream, Humacao, Jan. 24; on gutter stone, Mayaguez, Feb. 25.

**S. tenue** (Ag.) Kuetz.

On bark of a stick in water east of Humacao, Jan. 23.

*Protococcaceae*

**Pleurococcus vulgaris** Naeg. non Menegh.

On old bark in railroad station, Naguabo, Jan. 25; on bark in shady wood, Maricao, Feb. 21.

*Coleochaetaceae*

**\*Coleochaete disjuncta** Tiffany

In pool near Borinquen Park, Santurce, Feb. 3.

**C. irregularis** Pringsh.

In pool about 4 kilometers north of Mayaguez, Feb. 24.

**C. pulvinata** A. Braun

In pool about 4 kilometers north of Mayaguez, Feb. 24.

**C. scutata** Breb.

In pool near park, Santurce, Dec. 25; on water plants near reservoir west of Experiment Station, Rio Piedras, Jan. 8; in a stream about 5 kilometers east of Coamo, Jan. 17; on stems of Potamogeton in Turabo River, Caguas, Jan. 23; on water plants in a stream east of Humacao, Jan. 23; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

*Trentepohliaceae*

**Cephaleuros virescens** Kunze

On leaves, Coamo Springs, Jan. 14; on water plants in stream west of Humacao, Jan. 22; on leaves near Laguna Tortuguero, Feb. 5.

**Gongrosira viridis** Kuetz.

In stream about 5 kilometers east of Coamo, Jan. 8.

**Leptosira mediciana** Borzi

On roots in woods, Coamo Springs, Jan. 12. Identified by Wille.

**Phycopeltis epiphyton** Mill. (*Phyllactidium tropicum* Moebius) Moebius (1888)

On tree, Coamo Springs, Jan. 10; on citrus leaves near La Juanita, Feb. 9 (collected by E. G. Britton); on palm leaf at La Juanita, Feb. 9.

**Trentepohlia aurea** (L.) Mart.

On reservoir wall west of Experiment Station, Rio Piedras, Jan. 2; on old wood, Hacienda Catalina, Palmar, Jan. 29; on concrete fountain and bark in woods on way to Monte Montoso, Maricao, Feb. 13; on bark near "Campo," Maricao, Feb. 19; on bark about 5 kilometers north of Utuado, Mar. 8; on bark, Arroyo de los Corchos, Mar. 13.

**T. elongata** (Zeller) DeToni

In a brook near Rio Piedras, Dec. 27; in brook near Experiment Station, Rio Piedras, Dec. 28.

**\*T. santurcensis** Tiffany

On palm bark in park, Santurce, Dec. 24.

**\*T. willei** (Tiffany) Printz (*Nylandera willei* Tiffany)

On leaves north of Maricao, Feb. 22.

*Cladophoraceae*

**Cladophora crispata** (Roth) Kuetz.

Moebius (1888). Collected at Cabo and in river and brook at Coamo.

**C. glomerata** (L.) Kuetz.

Moebius (1888). Collected on rocks in Marillos River at Cayey.

Generally distributed in streams and rivers. About 5 kilometers east of Coamo, Jan. 8; near Coamo Springs, Jan. 11; Caguas, Jan. 16; on way to San Lorenzo, Jan. 18; water basin west of Experiment Station, Rio Piedras, Mar. 23. The species shows considerable variation in appearance and shape of cells, but to try to recognize separate varieties seems unwise.

**Pithophora mooreana** Collins

In water reservoir, Rio Piedras, Dec. 28; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**P. oedogonia** (Mont.) Wittr.

In pool between Hatillo and Arecibo, Feb. 27.

**P. varia** Wille

In water reservoir, Rio Piedras, Dec. 28; in pool about 4 kilometers north of Mayaguez, Feb. 24; in pool, Jayuya, Mar. 15; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**Rhizoclonium fontanum** Kuetz. (*R. fontinale* Wolle)

Moebius (1888). Collected in Morillos River, Cayey.

In brook, Hacienda Catalina, Palmar, Jan. 29; in a cement water-holder, Coral Veijo, 12 kilometers north of Ponce, Mar. 12.

**R. hieroglyphicum** (Ag.) Kuetz.

Generally distributed in pools, brooks and rivers. Near Rio Piedras, Dec. 27, 28; west of Humacao, Jan. 22; in Laguna Tortuguero, Feb. 5; about 4 kilometers north of Mayaguez, Feb. 24; about 5 kilometers north of Utuado, Mar. 8; in ditch between Utuado and Adjuntas, Mar. 10; Jayuya, Mar. 15; water basin west of Experiment Station, Rio Piedras, Mar. 23.

## OEDOGONIALES

*Oedogoniaceae***Bulbochaete elatior** Pringsh.

On water plants in Turabo River, Caguas, Jan. 17; stream east of Humacao, Jan. 23.

**B. intermedia** DeBary

On water plants in river east of Humacao, Jan. 23.

**\*Oedocladium operculatum** Tiffany

On ground, Juan Martin, Jan. 28; on earth in garden near Sabana Grande, Mayaguez, Feb. 9.

**Oedogonium abbreviatum** (Hirn) Tiffany

On water plants in brook near Rio Piedras, Dec. 24; in Coamo River about 5 kilometers south of Coamo Springs, Jan. 10; in pool between Hatillo and Arecibo, Feb. 27.

**\*O. brittoni** Tiffany

In Coamo River near Coamo Springs, Jan. 11, Mar. 20.

**O. cardiacum** var. **carbonicum** Wittr.

In a stream about 5 kilometers east of Coamo, Jan. 8.

**O. crispum** (Hass.) Wittr.

On water plants in brook west of Humacao, Jan. 21.

**O. cyathigerum** Wittr.

In water basin west of Experiment Station, Rio Piedras, Mar. 23.

**O. decipiens** var. **dissimile** (Hirn) Tiffany

On water plants in Turabo River, Caguas, Jan. 17; in pool near Borinquen Park, Santurce, Feb. 3.

**O. exospirale** Tiffany

On roots of *Eichornia crassipes* in river, Caguas, Jan. 16.

**\*O. figuratum** Tiffany

On roots of *Eichornia crassipes* and other water plants in river, Caguas, Jan. 16; on water plants in brook west of Humacao, Jan. 21; in pool between Hatillo and Arecibo, Feb. 27.

**O. flexuosum** Hirn

On roots of water plants in river at Utuado, Mar. 5; in pool by river about 5 kilometers north of Utuado, Mar. 8.

**O. foveolatum** Wittr.

In brook on way to San Lorenzo, Jan. 18; in pool between Hatillo and Arecibo, Feb. 27; in ditch along the road, about 12 kilometers north of Utuado, Mar. 6.

**O. gracilius** (Wittr.) Tiffany

In water basin west of Experiment Station, Rio Piedras, Mar. 23.

**O. gracillimum** Wittr. & Lund.

On water plants in brook west of Humacao, Jan. 21.

- O. grande** Kuetz.  
On water plants in brook west of Humacao, Jan. 21.
- \***O. howardii** G. S. West  
In stream about 5 kilometers east of Coamo, Jan. 8, 16; in pool near Borinquen Park, Santurce, Feb. 3; in pool between Hatillo and Arecibo, Feb. 27; on rocks, Jayuya, Mar. 15; in Coamo River, Mar. 20.
- \***O. howei** Tiffany  
In pool between Hatillo and Arecibo, Feb. 27.
- O. hystricinum** Transeau & Tiffany  
In pool near Borinquen Park, Santurce, Feb. 3.
- O. illinoiense** Transeau  
On roots of *Eichornia crassipes* in river, Caguas, Jan. 16.
- O. inconspicuum** Hirn  
In pool near park, Santurce, Dec. 25; in a pool near Borinquen Park, Santurce, Feb. 3.
- O. intermedium** Wittr.  
In ditch 12 kilometers north of Utuado, Mar. 6.
- O. inversum** Wittr.  
Laguna Guanica, Mar. 17.
- O. kurzii** G. Zeller  
In pool by river, 5 kilometers north of Utuado, Mar. 8.
- O. laetevirens** Wittr.  
In pool between Hatillo and Arecibo, Feb. 27.
- \***O. lageniforme** Hirn  
In water reservoir west of Experiment Station, Rio Piedras, Jan. 2.
- O. latiusculum** Tiffany  
In water reservoir west of Experiment Station, Rio Piedras, Jan. 2; in Coamo River, about 5 kilometers south of Coamo Springs, Jan. 10.
- O. latviense** (Tiffany) Tiffany  
On water plants near reservoir west of Experiment Station, Rio Piedras, Dec. 31; on water plants by bridge, Caguas, Jan. 16; in stream west of Humacao, Jan. 22.
- O. lemmermannii** Tiffany  
In stream about 5 kilometers east of Coamo, Jan. 28.
- O. macrandrium** var. **hohenackerii** (Wittr.) Tiffany  
In pool between Hatillo and Arecibo, Feb. 27.
- O. macrandrium** var. **propinquum** (Wittr.) Hirn  
In brook on way to San Lorenzo, Jan. 18; in pool between Hatillo and Arecibo, Feb. 27.
- O. monile** Berk. & Harv.  
In pool near Mayaguez, Feb. 24.
- O. nanum** Wittr.  
On water plants in pool between Hatillo and Arecibo, Feb. 27.
- O. obesum** Wittr.  
In pool near park, Santurce, Dec. 25; in brook on way to San Lorenzo, Jan. 18; in brook west of Humacao, Jan. 21.
- O. obtruncatum** Wittr.  
On water plants by bridge, Caguas, Jan. 16; in ditch south of Mayaguez, Feb. 11; on water plants in pool between Hatillo and Arecibo, Feb. 27; in pool, Jayuya, Mar. 15.
- O. paulense** Nordst. & Hirn  
In pool near Borinquen Park, Santurce, Feb. 3.
- O. perfectum** (Hirn) Tiffany  
In ditch south of Mayaguez, Feb. 11.
- O. pringsheimii** Cramer  
On water plants in brook west of Humacao, Jan. 21; in pool between Arecibo and Hatillo, Feb. 27; in river at Utuado, Mar. 5.
- \***O. rugulosum** var. **rotundatum** (Hirn) Tiffany.  
In pool near Borinquen Park, Santurce, Feb. 3; in pool between Hatillo and Arecibo, Feb. 27.
- \***O. santurcense** Tiffany  
In pool near Borinquen Park, Santurce, Feb. 3.
- O. senegalense** (Nordst.) Tiffany  
In pool near Borinquen Park, Santurce, Feb. 3.
- \***O. subareolatum** Tiffany  
In pool near Borinquen Park, Santurce, Feb. 3.

**O. wolleanum** Wittr.

In water reservoir, Rio Piedras, Dec. 28.

**O. wyliei** Tiffany

On water plants in brook west of Humacao, Jan. 21.

## ULVALES

*Schizomeridaceae***Schizomeris leibleinii** Kuetz.

Generally distributed, often on water plants and stones in pools, ditches, streams and reservoirs. Near Rio Piedras, Dec. 27, 31; 5 kilometers east of Coamo, Jan. 8; Caguas, Jan. 16; on way to San Lorenzo, Jan. 18; west of Humacao, Jan. 21; east of Humacao, Jan. 23; Farjardo, Jan. 27; Hacienda Catalina, Palmar, Jan. 29; South of Mayaguez, Feb. 11; 4 kilometers north of Mayaguez, Feb. 24; Mayaguez, Feb. 25; between Hatillo and Arecibo, Feb. 27; Utuado, Mar. 5; Ponce, Mar. 12; Jayuya, Mar. 15.

In some collections there appeared a *Schizomeris* whose general habit was somewhat unlike that of the species above, but until more data are available, it does not seem desirable to attempt a separation.

## SCHIZOGONIALES

*Schizogoniaceae***Schizogonium murale** Kuetz.

On rocks between Utuado and Adjuntas, Mar. 10.

## CHLOROCOCCALES

*Hydrodictyceae***Pediastrum duplex** Meyen

In pool near park, Santurce, Dec. 25; in a stream about 5 kilometers east of Coamo, Jan. 8; in pool near Borinquen Park, Santurce, Feb. 3.

**P. tetras** (Ehr.) Ralfs (*P. ehrenbergii* A. Br.)

Lagerheim (1887). Collected at Fajardo and Caguas.

Moebius (1888).

In stream about 5 kilometers east of Coamo, Jan. 8; on water plants by bridge, Caguas, Jan. 16; on water plants in Turabo River, Caguas, Jan. 17; in stream east of Humacao, Jan. 23; in pool near Borinquen Park, Santurce, Feb. 3; in Coamo River, Mar. 20; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**P. tetras** var. **tetraodon** (Corda) Hansgirg

In a stream about 5 kilometers east of Coamo, Jan. 8.

**Sorastrum americanum** (Bohlin) Schmidle

In pool near the park, Santurce, Dec. 25; in stream about 5 kilometers east of Coamo, Jan. 8; on water plants in Turabo River, Caguas, Jan. 17; in pool near Borinquen Park, Santurce, Feb. 3.

**S. bidentatum** Reinsch

Lagerheim (1887). Collected at Fajardo.

**S. spinulosum** Naeg.

In a stream about 5 kilometers east of Coamo, Jan. 8; on water plants in Turabo River, Caguas, Jan. 17; in pool near Borinquen Park, Santurce, Feb. 3.

*Coelastraceae***Coelastrum cambricum** Archer

In a pool near park, Santurce, Dec. 25; on water plants in Turabo River, Caguas, Jan. 17.

**C. microporum** Naeg.

In pool near park, Santurce, Dec. 25; on water plants in Turabo River, Jan. 17; in brook on way to San Lorenzo, Jan. 18; Caguas, Jan. 19; in pool near Borinquen Park, Santurce, Feb. 3; in Laguna Tortuguero, Feb. 5; in Coamo River, Mar. 23; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**C. morus** var. **capense** Fritsch.

In rock depression in river near Maricao, Feb. 15; on rocks between Utuado and Adjuntas, Mar. 10.

**C. proboscideum** Bohlin

In river near Maricao, Feb. 15.

*Oocystaceae***Ankistrodesmus falcatus** (Corda) Ralfs (*Raphidium polymorphum* Presen.)

Lagerheim (1887). Collected at Fajardo.

**Dimorphococcus lunatus** A. Braun

In a pool near park, Santurce, Dec. 25; on water plants in Turabo River, Caguas, Jan. 17; in pool near Borinquen Park, Santurce, Feb. 3.

**Gloeotaenium loitlesbergerianum** Hansgirg

In Laguna Tortuguero, Feb. 5.

**Kirchneriella lunaris** (Kirchner) Moebius

In Laguna Tortuguero, Feb. 5.

**Nephrocytium obesum** West

On water plants in Turabo River, Caguas, Jan. 17.

**Oocystis solitaria** Wittr.

Lagerheim (1887). Collected at Fajardo.

Moebius (1888).

**Selenastrum bibraianum** Reinsch

On water plants in Turabo River, Jan. 17.

**S. bibraianum** var. **gracile** (Reinsch) Tiffany & Ahlstrom

On water plants in Turabo River, Caguas, Jan. 17.

**Tetraedron minimum** (A. Br.) Hansgirg

In stream about 5 kilometers east of Coamo, Jan. 8; on water plants by bridge, Caguas, Jan. 16; on water plants in Turabo River, Caguas, Jan. 17; on water plants in brook west of Humacao, Jan. 21; in rock depression in river near Maricao, Feb. 15; in pool about 4 kilometers north of Mayaguez, Feb. 24; on rocks on way to Jayuya, Mar. 15.

**T. minimum** f. **tetralobulatum** Reinsch

In stream about 5 kilometers east of Coamo, Jan. 8; in rock depression in river near Maricao, Feb. 15; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**T. muticum** (A. Br.) Hansgirg

In pool about 4 kilometers north of Mayaguez, Feb. 24.

**T. pentaedricum** W. & G. S. West

On water plants in Turabo River, Caguas, Jan. 17.

**T. regulare** Kuetz.

In pool near park, Santurce, Dec. 25; in rock depression in river near Maricao, Feb. 15.

**T. regulare** var. **bifurcatum** Wille (*Polyedrium tetraedricum* var. *bifurcatum* Wille)

Lagerheim (1887). Collected at Fajardo.

**T. regulare** var. **torsum** Turner

In a pool near the park, Santurce, Dec. 25.

**T. trigonum** (Naeg.) Hansgirg

In pool about 4 kilometers north of Mayaguez, Feb. 24.

*Scenedesmaceae***Scenedesmus abundans** (Kirchner) Chodat

In a pool near park, Santurce, Dec. 25, Feb. 3.

**S. acuminatus** (Lag.) Chodat

In pool near Borinquen Park, Santurce, Feb. 3.

**S. acutiformis** Schroeder

In pool near park, Santurce, Dec. 25; in Turabo River, Caguas, Jan. 17; in stream east of Humacao, Jan. 23; in pool near Borinquen Park, Santurce, Feb. 3; in pool near river, 5 kilometers north of Utuado, Mar. 8.

**S. arcuatus** var. **platydisca** G. M. Smith

On water plants in Turabo River, Caguas, Jan. 17; in pool about 4 kilometers north of Mayaguez, Feb. 24.

**S. armatus** (Chodat) G. M. Smith

In pool about 4 kilometers north of Mayaguez, Feb. 24.

**S. armatus** var. **bicaudatus** (Guglielmetti) Chodat

In brook on way to San Lorenzo, Jan. 18.

**S. armatus** var. **exaculeatus** Chodat

In stream about 5 kilometers east of Coamo, Jan. 8; on water plants east of Humacao, Jan. 23; in river, Fajardo, Jan. 26; in Laguna Tortuguero, Feb. 5; in water basin west of Experiment Station, Rio Piedras, Mar. 23.

**S. bijuga** (Turp.) Lagerheim

In pool near park, Santurce, Dec. 25; in water reservoir, Rio Piedras, Dec. 28; in stream about 5 kilometers east of Coamo, Jan. 8; in pool near Borinquen Park, Santurce, Feb. 3; in pool about 4 kilometers north of Mayaguez, Feb. 24; in pool by river, about 5 kilometers north of Utuado, Mar. 8.

- S. bijuga** var. **alternans** (Reinsch) Borge  
Lagerheim (1887). Collected at Fajardo.  
In a stream about 5 kilometers east of Coamo, Jan. 8; in a river near Maricao, Feb. 15.
- S. brasiliensis** Bohlin  
In pool near park, Santurce, Dec. 25; on water plants in Turabo River, Caguas, Jan. 17; on water plants in river, Fajardo, Jan. 26; on stone in river, Fajardo, Jan. 27; in pool near Borinquen Park, Santurce, Feb. 3; in rock depression in river near Maricao, Feb. 15; in pool by river, about 5 kilometers north of Utuado, Mar. 8.
- S. brasiliensis** var. **norvegicus** Printz  
In pool near Borinquen Park, Santurce, Feb. 3.
- S. dimorphus** (Turpin) Kuetz.  
In stream about 5 kilometers east of Coamo, Jan. 8; in rock depression in river near Maricao, Feb. 15; in pool by river about 5 kilometers north of Utuado, Mar. 8; on rocks on way to Jayuya, Mar. 15; in pool, Jayuya, Mar. 15; in swamp, Jayuya, Mar. 15; in pool, Jayuya, Mar. 15.
- S. hystrix** Lagerheim  
Lagerheim (1887). Collected at Fajardo and Caguas.
- S. incrassatus** var. **mononae** G. M. Smith  
In stream about 5 kilometers east of Coamo, Jan. 8; in rock depression in river near Maricao, Feb. 15.
- S. obliquus** (Turp.) Kuetzing  
In pool near park, Santurce, Dec. 25; in stream about 5 kilometers east of Coamo, Jan. 8; on water plants in Turabo River, Caguas, Jan. 17; in pool near Borinquen Park, Santurce, Feb. 3; in pool by river about 5 kilometers north of Utuado, Mar. 8.
- S. quadricauda** (Turp.) Breb.  
In pool near Borinquen Park, Santurce, Dec. 25, Feb. 3; in stream about 5 kilometers east of Coamo, Jan. 8; on water plants in Turabo River, Caguas, Jan. 17; in Laguna Tortuguero, Feb. 5; in pool about 4 kilometers north of Mayaguez, Feb. 24; in pool between Hatillo and Arcibo, Feb. 27; among water plants in pool, Jayuya, Mar. 15.
- S. quadricauda** var. **maximus** W. & G. S. West  
In Laguna Tortuguero, Feb. 5.
- S. quadricauda** var. **quadrispina** (Chodat) Smith  
In pool near Borinquen Park, Santurce, Dec. 25; in stream about 5 kilometers east of Coamo, Jan. 8; in pool about 4 kilometers north of Mayaguez, Feb. 24.

## SIPHONALES

*Vaucheriaceae*

- Vaucheria sessilis** (Vauch.) DC.  
In ditch between Utuado and Adjuntas, Mar. 10.

## ZYGNEATALES

*Zygnemataceae*

- Mougeotia calcarea** (Cleve) Wittrock  
In Laguna Tortuguero, Feb. 5.
- M. globulispora** Jao  
In stream about 5 kilometers east of Coamo, Jan. 8.
- M. tumidula** Transeau  
In ditch near Laguna Joyuda, Mayaguez, Feb. 18.
- \*Pleurodiscus borinquenae** Tiffany  
In river near Hacienda Catalina, Palmar, Jan. 29, 31; in Laguna Tortuguero, Feb. 5; near Maricao, Feb. 13; near Jayuya, Mar. 15.
- Sirogonium sticticum** (Engl. Bot.) Kuetz.  
On moist earth by brook west of Humacao, Jan. 22.
- Spirogyra daedalea** Lagerheim  
In a stream about 5 kilometers east of Coamo, Jan. 8.
- S. decimina** (Mueller) Kuetz.  
In pool near park, Santurce, Dec. 25; in stream about 5 kilometers east of Coamo, Jan. 8; in alluvial slime in Coamo River, about 5 kilometers south of Coamo Springs, Jan. 10; in ditch, Humacao, Jan. 20; in pool about 4 kilometers north of Mayaguez, Feb. 24; in river at Utuado, Mar. 5; in pool by river, about 5 kilometers north of Utuado, Mar. 8.
- S. discreta** Transeau  
In a stream about 5 kilometers east of Coamo, Jan. 8.



**S. emilianensis** Bonhomme

In brook on way to San Lorenzo, Jan. 8; in stream west of Humacao, Jan. 22; in Rio Grande, near Sabana Grande, Feb. 9; in Coamo River by Coamo Springs, Mar. 19.

**S. farlowii** Transeau

In a stream about 5 kilometers east of Coamo, Jan. 8; in pool 5 kilometers north of Utuado, Mar. 8.

**S. fluviatilis** Hilse

In stream west of Humacao, Jan. 22; in pool about 4 kilometers north of Mayaguez, Feb. 24.

**\*S. hatillensis** Transeau

In pool between Hatillo and Arecibo, Feb. 27.

**S. hyalina** Cleve

In brook on way to San Lorenzo, Jan. 18; in ditch south of Mayaguez, Feb. 11.

**S. inflata** (Vauch.) Rabenhorst

In stream about 5 kilometers east of Coamo, Jan. 8.

**S. majuscula** Kuetzing

In pool between Hatillo and Arecibo, Feb. 27.

**S. minor** (Schmidle) Transeau

In stream about 5 kilometers east of Coamo, Jan. 8.

**S. neglecta** (Hassall) Kuetzing

In Coamo River near Coamo Springs, Jan. 11.

**S. nitida** (Dillw.) Link

In brook, Hacienda Holm, Mayaguez, Feb. 17.

**\*S. quadrilaminata** Jao

In a stream about 5 kilometers east of Coamo, Jan. 8.

**S. schmidtii** W. & G. S. West

In pool about 4 kilometers north of Mayaguez, Feb. 24.

**S. subrecticulata** Fritsch

In water reservoir, Rio Piedras, Dec. 28; in stream about 5 kilometers east of Coamo, Jan. 8; in ditch south of Mayaguez, Feb. 11; in river north from Maricao, Feb. 22.

**S. triplicata** (Collins) Transeau

In Coamo River near Coamo Springs, Jan. 11; in brook on way to San Lorenzo, Jan. 18.

**S. tropica** (W. & G. S. West) Transeau

In stream about 5 kilometers east of Coamo, Jan. 8; in Coamo River near Coamo Springs, Feb. 11; in brook on way to San Lorenzo, Jan. 18; in ditch south of Mayaguez, Feb. 11; in pool between Hatillo and Arecibo, Feb. 27; in pool by river, about 5 kilometers north of Utuado, Mar. 8.

**S. varians** (Hass.) Kuetzing

In pool by river, about 5 kilometers north of Utuado, Mar. 8.

**S. weberi** Kuetzing

In stream about 5 kilometers east of Coamo, Jan. 8.

*Mesotaeniaceae***Gonatozygon monotaenium** DeBary

In water reservoir west of Experiment Station, Rio Piedras, Jan. 2.

*Desmidiaceae***Arthrodesmus subulatus** f. *americana* (Turn.) W. & G. S. West (*A. incus* var. *americanus* Turn.)

Lagerheim (1887). Collected at Fajardo.

**Closterium diana** Ehr.

Lagerheim (1887). Collected at Fajardo.

**C. ehrenbergii** Menegh.

On water plants in brook near Rio Piedras, Dec. 27.

**C. lanceolatum** Kuetz.

In Coamo River near Coamo Springs, Jan. 11.

**C. leibleinii** Kuetz.

Lagerheim (1887). Collected at Fajardo.

In water reservoir west of Experiment Station, Rio Piedras, Jan. 2; on water plants in Turabo River, Caguas, Jan. 17.

**C. moniliferum** (Bory) Ehr.

On water plants in brook near Rio Piedras, Dec. 27; by water reservoir west of Experiment Station, Rio Piedras, Dec. 31, Jan. 2; on water plants by bridge, Caguas, Jan. 16; in river, Caguas, Jan. 16; in brook on way to San Lorenzo, Jan. 18; in brook west of Humacao, Jan. 21, 22.

- C. parvulum** Naeg.  
In a pool near park, Santurce, Dec. 25; on water plants in brook near Rio Piedras, Dec. 27, 28; on water plants in river, Caguas, Jan. 16.
- C. rostratum** Ehr.  
In brook on way to San Lorenzo, Jan. 18.
- C. tumidum** Johnson  
In pool near park, Santurce, Dec. 25.
- C. turgidum** var. **giganteum** Nordst.  
Lagerheim (1887). Collected at Caguas.
- Cosmarium arctoum** var. **tatricum** Racib.  
Lagerheim (1887). Collected at Fajardo.
- C. biauratum** Nordst.  
Lagerheim (1887). Collected at Fajardo.
- C. bireme** Nordst.  
Lagerheim (1887). Collected at Fajardo.
- C. circulare** Reinsch  
On water plants in brook and near reservoir near Rio Piedras, Dec. 27, 31; in brook west of Humacao, Jan. 21.
- C. circulare** f. **minor** W. & G. S. West  
On water plants near reservoir west of Experiment Station, Rio Piedras, Dec. 31.
- C. contractum** Kirch.  
In Turabo River, Caguas, Jan. 17.
- C. cucumis** (Corda) Ralfs (*Pleurotaeniopsis cucumis* Lagerheim)  
Lagerheim (1887). Collected at Fajardo.
- C. granatum** Breb.  
Lagerheim (1887). Collected at Caguas.  
In brook and water reservoir near Experiment Station, Rio Piedras, Dec. 27, 28, 31, Jan. 2; in stream about 5 kilometers east of Coamo, Jan. 8; on water plants by bridge, Caguas, Jan. 16; on water plants in Turabo River, Caguas, Jan. 17; in brook on way to San Lorenzo, Jan. 18.
- C. humile** var. **substriatum** (Nordst.) Schmidle  
On water plants in Turabo River, Caguas, Jan. 17.
- C. laeve** Rab.  
In stream 5 kilometers east of Coamo, Jan. 8.
- C. lundellii** var. **ellipticum** West  
In stream about 5 kilometers east of Coamo, Jan. 8.
- C. margaritatum** (Lund.) Roy and Biss. (*C. latum* var. *margaritatum* Lund.)  
Lagerheim (1887). Collected at Fajardo and Caguas.
- C. meneghini** Breb.  
In pool near park, Santurce, Dec. 25.
- C. meneghini** f. **latiuscula** Jacobs  
Lagerheim (1887). Collected at Caguas.
- C. moniliforme** (Turp.) Ralfs  
Lagerheim (1887). Collected at Fajardo and Caguas.
- C. moniliforme** f. **punctata** Lagerheim  
Lagerheim (1887). Collected at Fajardo.
- C. obtusatum** Schmidle  
In stream about 5 kilometers east of Coamo, Jan. 8.
- C. phaseolus** Breb.  
Lagerheim (1887). Collected at Fajardo.
- C. pokornyanum** (Grun.) W. & G. S. West (*Euastrum angustatum* Wittr.)  
Lagerheim (1887). Collected at Fajardo.
- C. portianum** Arch.  
On water plants in Turabo River, Caguas, Jan. 17.
- C. pseudoconnatum** Nordst. (*Pleurotaeniopsis pseudoconnatus* (Nordst.) Lag.)  
Lagerheim (1887). Collected at Fajardo.  
On water plants in Turabo River, Caguas, Jan. 17.
- C. pseudoexiguum** Racib. (*Pleurotaeniopsis pseudoexigua* (Racib.) Lag.)  
Lagerheim (1887). Collected at Fajardo.
- C. pseudonitidulum** Nordst.  
In a stream about 5 kilometers east of Coamo, Jan. 8.
- C. punctulatum** Breb.  
On water plants in Turabo River, Caguas, Jan. 17.

- C. regnesii** Reinsch  
Lagerheim (1887). Collected at Fajardo.
- C. subcostatum** Nordst.  
Near reservoir west of Experiment Station, Rio Piedras, Dec. 31; in stream about 5 kilometers east of Coamo, Jan. 8; in Coamo River about 5 kilometers south of Coamo Springs, Jan. 10; in Coamo River near Coamo Springs, Jan. 11; on water plants in brook west of Humacao, Jan. 21; in stream west of Humacao, Jan. 22.
- C. subtumidum** Nordst.  
Lagerheim (1887). Collected at Fajardo.  
On water plants in Turabo River, Caguas, Jan. 17.
- C. tinctum** Ralfs  
Lagerheim (1887). Collected at Fajardo.
- C. zygomorphicum** Taft  
West of Experiment Station, Rio Piedras, Dec. 31; in river, Caguas, Jan. 16; on water plants in Turabo River, Caguas, Jan. 17; in brook on way to San Lorenzo, Jan. 18.
- Desmidium swartzii** var. **quadrangulatum** (Ralfs) Roy  
In pool near park, Santurce, Dec. 25, Feb. 3.
- Euastrum attenuatum** Wolle  
Lagerheim (1887). Collected at Fajardo.
- E. bidentatum** Naeg.  
On water plants in Turabo River, Caguas, Jan. 17.
- E. denticulatum** (Kirch.) Gay  
Lagerheim (1887). Collected at Fajardo.
- E. divaricatum** Lund.  
Lagerheim (1887). Collected at Fajardo.
- E. elegans** (Breb.) Kuetz.  
Lagerheim (1887). Collected at Fajardo.
- E. gemmatum** Breb.  
Lagerheim (1887). Collected at Fajardo.
- E. sibiricum** Boldt.  
Lagerheim (1887). Collected at Fajardo.
- E. subintegrum** Nordst.  
Lagerheim (1887). Collected at Fajardo.
- E. sublobatum** Breb. (*Cosmarium sublobatum* (Breb.) Arch.)  
Lagerheim (1887). Collected at Fajardo.
- Micrasterias sol** (Ehr.) Kuetz.  
On water plants in Turabo River, Caguas, Jan. 17.
- Onychonema laeve** var. **latum** W. & G. S. West  
In stream about 5 kilometers east of Coamo, Jan. 8.
- O. laeve** var. **micracanthum** Nordst.  
Lagerheim (1887). Collected at Fajardo.  
On water plants in Turabo River, Caguas, Jan. 17.
- Penium margaritaceum** (Ehr.) Breb.  
In stream west of Humacao, Jan. 22.
- Pleurotaenium coronatum** (Breb.) Rab.  
In pool near park, Santurce, Dec. 25.
- P. indicum** (Grun.) Lund. (*P. indicum* var. *crassius* Lagerheim)  
Lagerheim (1887). Collected at Fajardo.
- P. maximum** (Reinsch) Lund.  
In pool near park, Santurce, Dec. 25; on water plants in Turabo River, Caguas, Jan. 17.
- P. trabecula** (Ehr.) Naeg.  
On water plants in Turabo River, Caguas, Jan. 17; in brook west of Humacao, Jan. 21.
- Sphaerosma granulatum** Roy & Biss. (*S. excavatum* f. *javanica* Nordst.)  
Lagerheim (1887). Collected at Fajardo.  
On water plants in Turabo River, Caguas, Jan. 17.
- Staurostrum bacillare** Breb.  
Lagerheim (1887). Collected at Fajardo.
- S. denticulatum** (Naeg.) Arch.  
On water plants in Turabo River, Caguas, Jan. 17.
- S. dickiei** var. **circulare** Turn.  
On water plants in Turabo River, Caguas, Jan. 17.

- S. polymorphum** Breb.  
Lagerheim (1887). Collected at Fajardo.
- S. rotula** Nordst.  
Lagerheim (1887). Collected at Fajardo.
- S. trifidum** var. **glabrum** Lagerheim  
Lagerheim (1887). Collected at Fajardo.

## REFERENCES

- Britton, M. E.** 1937. The freshwater algae of Puerto Rico. Master's thesis, Ohio State University.
- Chodat, R.** 1926. Scenedesmus. Rev. d'Hydrologie 3: 71-258.
- Collins, F. S.** 1909. The green algae of North America. Tufts College Series 2(3): 79-480.  
1918. The green algae of North America (Second Supplement). Tufts College Series 4(7): 1-106.
- Hazen, T. E.** 1902. The Ulotrichaceae and Chaetophoraceae of the United States. Memoirs Torr. Bot. Club 11(2): 135-250.
- Lagerheim, G.** 1887. Ueber einige Algen aus Cuba, Jamaica, und Puerto Rico. Bot. Notiser 1887: 193-199.
- Moebius, M.** 1888. Ueber einige in Portorico gesammelte Susswasser- und Luft-Algen. Hedwigia 27: 221-249.
- Printz, H.** 1939. Vorarbeiten zu einer Monographie der Trentepohliaceen. Nytt Mag. Naturvidenskapene 80: 10-210.
- Smith, G. M.** 1916. A monograph of the algal genus Scenedesmus based upon pure culture studies. Trans. Wisconsin Acad. of Sci., Arts and Letters 18: 422-531.  
1920. Phytoplankton of the inland lakes of Wisconsin. Wis. Geol. and Nat. Hist. Survey. Bull. No. 57, Pt. I; 1924, *ibid.*, Pt. II.
- Tiffany, L. H.** 1934. Plankton algae of the west end of Lake Erie. Contrib. Stone Laboratory, Ohio State Univ., No. 6.  
1936. Wille's collection of Puerto Rican freshwater algae. Brittonia 2(2): 165-175.  
1937. Monograph of North American Oedogoniales. North American Flora 11(1): 1-185.  
1937. The filamentous algae of the west end of Lake Erie. Amer. Midl. Nat. 18(6): 911-951.
- West, W.** and **G. S. West.** 1904-1912. A monograph of the British Desmidiaceae. Ray Soc. of London. Vol. I-IV. Vol. V by N. Carter, 1923.
- Wille, N.** 1915. Report on an expedition to Puerto Rico for collecting freshwater algae. Jour. N. Y. Bot. Gard. 16: 133-146.
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