

STUDIES ON THE FRESH WATER ALGAE OF SINDH-II, *Vaucheria* SPECIES FROM SALINE AND FRESH WATER RIVERINE PONDS OF HYDERABAD SINDH, PAKISTAN.

S.M. LEGHARI, A. BANO*, M.Y. KHUHAWAR**
AND T.M. JAHANGIR**

*Department of Fresh water Biology & Fisheries,
University of Sindh, Jamshoro, Sindh, Pakistan.*

Abstract

Vaucheria geminata (Vaucher) de Candolle var. *geminata* was found preponderant in the beta-mesosaprobic riverine pond in winter and *V. longicaulis* Hoppaugh in eusaprobic pond in Hyderabad, Sindh, Pakistan throughout the year.

Introduction

Vaucheria is a sparingly branched coenocytic alga, widely spread in fresh water, brackish and marine habitat, often amphibious, living on mud which is periodically immersed in water and then exposed to the air (Bold & Wynne, 1978). In Pakistan, Faridi & Hussain (1977) reported 8 species of *Vaucheria* from N.W.F.P., Pakistan. Nizamuddin (1968) described 3 species of *Vaucheria* from West Wharf polluted water and from the sandy soil Jetty area along the coast of Arabian sea, Karachi. Venkataraman (1961) reported *V. sessilis* from Lahore and *V. terrestris* from Kashmir. The present paper describes the occurrence of *Vaucheria* spp., from fresh water and waste water saline ponds of Hyderabad, Sindh, Pakistan.

Material and Methods

Fresh water algae were collected from fresh water riverian pond Hussainabad and waste water saline pond of Zeal Pak Cement factory, Hyderabad, Sindh, Pakistan. The species were washed with distilled water to remove dust and other organic particles and after treatment with 1% Potassium hydroxide., the specimens were examined under the stereomicroscope and drawings made by camera lucida. Specimens were identified after reference to Faridi & Hussain (1977), Islam (1965), Nizamuddin (1968), Prescott (1962) and Venkataraman (1961).

Water sample was analyzed following the technique described by Framan (1981). pH was measured with Orion 420A pH meter and conductivity and salinity recorded with WTW320 conductivity bridge. Total acid hydrolyzable phosphate was estimated spectrophotometrically using per sulphate acid digestion method. Phosphate was determined after reduction of phosphomolybdic acid with ascorbic acid to molybdenum blue.

*Department of Botany, University of Sindh, Jamshoro, Sindh, Pakistan.

**Institute of Chemistry, University of Sindh, Jamshoro, Sindh, Pakistan.

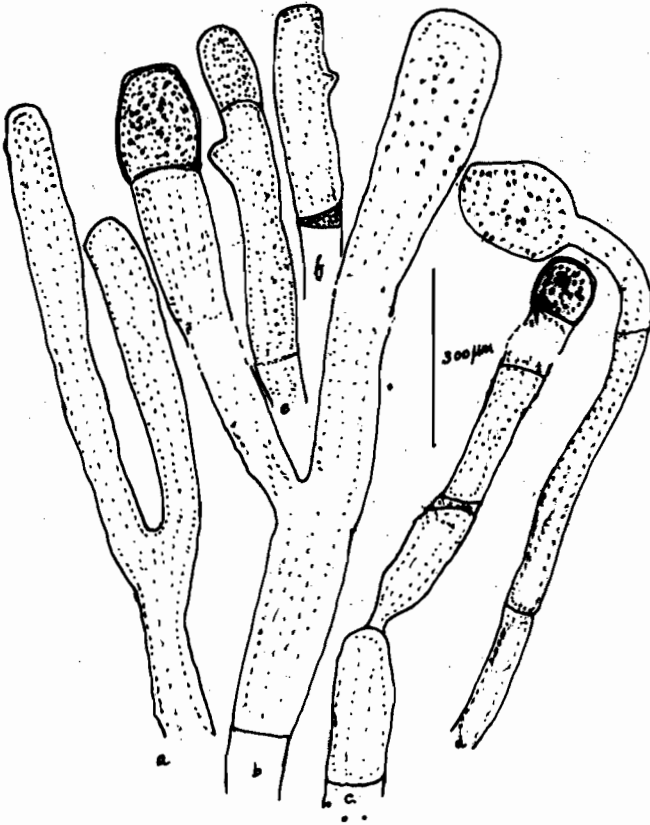


Fig.1. *Vaucheria cf. longicaulis* Hoppaugh

a) Vegetative filament, b,c,d) Oogonia formation, e,f) Antheridia formation.

Systematic Account

Vaucheria cf. longicaulis Hoppaugh, 1930: 30; Venkatarman, 1961: 49; Nizamuddin, 1968: 469; Patel, 1968: 98, (Fig.1).

Thallus 3-6 cm long, black and brown in colour dioecious, with branched, vegetative filament 70-132 μm broad, occasionally inflated at some places. Oogonia terminal on short branches, 80-135 μm broad, 270-399 μm long. Oospores slightly oval with 2.5-3 μm brown thick wall, 126-138 μm broad, 270-300 μm long. Antheridia cylindrical, lanceolate, 96-108 μm broad, 270-500 μm long, terminal aplanospore 90-188 μm broad and 180-285 μm long. Filaments occasionally septate as also observed in old vegetative filament.

Distribution: Bermuda, California, Japan, India and Pakistan.

This species was found in saline polluted water growing on muddy submerged bank of the ponds, forming patches upto 1 meter depth and on sandy soil forming a brown

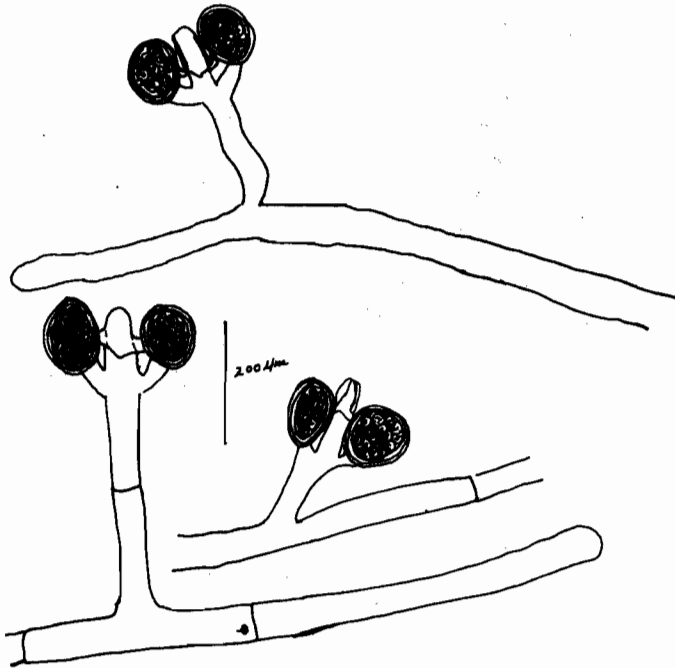


Fig.2. *Vaucheria geminata* (Vaucher) de Candolle var. *geminata* Filament showing the antheridia and oogonia formation.

layer alongwith *Rhizoclonium hieroglyphicum* Kuetz., and *Enteromorpha salina* Kuetz., throughout the year with abundance in winter season and can be classified as eusaprobic (Sladeczek, 1973).

Vaucheria geminata (Vaucher) de Candolle var. *geminata* (Fig.2). Yamagishi; 1985:99.

Vegetative filaments septate, with irregular branches, 66-75 μm broad, each septa 700-1800 μm long. Monoecious, reproductive organ borne on the lateral branches of various length with a stalk on the terminal portion; antheridia solitary, with a stalk terminating the branch more or less bent, coiled forming a hook opening by a terminal pore 28.5-30 μm usually longer than the oogonia. Oogonia two or more 90-110 μm broad, 90-130 μm long, three layered; borne laterally below the antheridia with short pedicel on the fruiting branch. Oospore three layered wall completely filling the oogonia. Akinate formed by breaking up of the portion of the filaments into short thick walled cell.

This species was recorded from fresh water riverine pond of Hussainabad along the bank of river Indus as a free floating, entangled with other algal species such as *Spirogyra* sp., *Pithophora oedogonia* and *Cladophora glomerata* Kuetzing. The pond belongs to Beta-mesosaprobic Limnosaprobic (Sladeczek, 1973).

Distribution: Africa, China, France, Greenland, India, Pakistan, U.S.A.

Results and Discussion

Two species of *Vaucheria* were identified in which *V. geminata* (Vaucher) de Candolle var. *geminata* was found in the riverine pond of Hussainabad on the bank of river Indus in winter in association with *Spirogyra* sp., *Pithophora oedogonia* Mont Wittrock, *Cladophora glomerata* Kuetzing and *Closterium* sp. *Vaucheria longicaulis* was found growing in the form of mats and patches with silt and clay particles on muddy marsh banks of the Zeal Pak Cement factory pond. These were found preponderant in association with *Rhizoclonium hieroglyphicum* Kuetzing; *Enteromorpha salina* Kutz., and *Oscillatoria* species. The results of chemical analysis shows that riverine pond Hussainabad is fresh water pond with pH 7.4; conductivity 617 μ S/cm; total phosphate 50 μ g/L, chloride 70 mg/L, hardness 200 mg/L, total alkalinity 10 mg/L with total residue 400 mg/L; whereas Zeal Pak Cement factory pond is brackish in nature with pH 8.2, conductivity 41.6 mS/cm, total phosphate 110 μ g/L, chloride 7976 mg/L, hardness 300 mg/L, total alkalinity 25 mg/L, salinity 28g/L with total residue of 27040 mg/L. Based on the chemical analysis, the riverine pond of Hussainabad may be classified as Beta-mesosaprobic and the Zeal Pak Cement Factory Pond as eusaprobic pond (Sladeczek, 1973).

References

- Bold, H.C. and M.J. Wynne. 1978. *Introduction to the algae. Structure and Reproduction*. Prentice-Hall, Inc. Englewood Cliffs, New-Jersey: 706 pp.
- Faridi, M.A.F. and S. Hussain. 1977. *Vaucheria* in N.W.F. Province of Pakistan, *Sultania*, 3: 5-9.
- Framan, M.A.H. 1981. *Standard method for analysis of water and waste water*. 15th Ed. American Public Health Association, Washington.
- Islam, A.K.M.N. 1965. Taxonomic study of the species of *Dichotomosiphon* and *Vaucheria* found in East Pakistan. *Proc. Pak. Acad. Sci.*, 2: 47-56.
- Nizamuddin, M. 1968. Contribution to the marine algae from the coast of West Pakistan. III. Marine *Vaucheria* from Karachi, *Hydrobiologia* 31: 465-473.
- Patel, R.J. and M.A. Francis. 1968. Observation on *Vaucheria longicaulis* Hopppaugh from India, *Phykos*, 7: 98-101.
- Prescott, G.W. 1962. *Algae of the Western great lakes area*, W.M.C. Brown Company, Iowa: 997 pp.
- Sladeczek, V. 1973. System of water quality from the Biological point of view. *Archiv Fur Hydrobiologie*, 7: 1-218.
- Venkataraman, G.S. 1961. *Vaucheriaceae*: I.C.A.R. New Delhi: 110 pp.
- Yamagishi, T. 1985. *Vaucheria geminata* (Vaucher) de candolle var. *geminata*. In: Yamagishi & Akiyama (Eds.) Photomicrograph of Fresh water Algae, 3: 99.