J. Algal Biomass Utln. 2009, **1** (1): 102 – 106

JABU JOURNAL OF ALGAL BIOMASS UTILIZATION
JABU - Copyright © 2009 PHYCOSPECTRUM

ON OCCURRENCE OF THE GENUS *PORPHYRIDIUM* NAGELI: NEW TO INDIA

M. S. Gaikwad, B. G. Meshram and B. B. Chaugule*

Department of Botany, University of Pune, Ganeshkhind, Pune- 411 007, India

E-mail:- mahadev.gaikwad999@gmail.com, balu.meshram@gmail.com, chaugule@unipune.ernet.in

Abstract

The present communication deals with commercially important fresh water red alga namely *Porphyridium purpureum* (Bory de Saint Vincet) Ross in Drew and Ross. The alga was collected from Pune (Maharashtra), India on several occasions from moist soils. Detailed morphological and reproductive features are described along with information on taxonomic status of the species in the genus. This is the first report of the genus *Porphyridium* from India.

Keywords: *Porphyridium purpureum*, Rhodophyta, First report, India.

---

* **Corresponding author:** B. B. Chaugule , Tel +91-20-25601441,

E-mail chaugule@unipune.ernet.in

Introduction

The microalga *Porphyridium* is a member of the division Rhodophyta having therapeutical and nutraceutical applications. The alga has been used biotechnologically for the production of pigments, polyunsaturated fatty acids (PUFA), lipids and polysaccharides (Wang *et al.*, 2007). In addition the alga is extensively used in genetical, physiological and biochemical studies (Barsanti and Gualtieri, 2006). The genus *Porphyridium* was first reported and described by Nageli in 1849. Although

Kumano (2000) mentioned the genus as having worldwide distribution from shady and eutrophic places, it has not been reported so far from India even though habitats promoting occurrence of this alga are not rare.

Materials and Methods

The alga was collected on several occasions from moist soils in Pune (Maharashtra), India. The fresh material was brought to the laboratory and used for morphological observations and for microphotography using Olympus microscope (BX-40). In addition the material was used for isolation and maintaining it in laboratory culture following methods described in Venkataraman (1969) and Andersen (2005). Part of the material was preserved in 4 % formalin.

Results

The alga was growing on the moist soils along with other algae in the Regional Fruit Research Centre, Pune giving red colouration to the soils and forming extensive mucilaginous patches (fig. 1). The younger patches were shining blood red in colouration turning brick red as soils dry. The alga was basically unicellular in nature having tendency to form aggregated masses within mucilaginous cover leading to formation of irregular colonies (Fig. 2).The cells were globular in shape and contained distinctly star shaped chloroplast with a pyrenoid in the centre (Fig. 3). As mentioned by Vonshak (1992) amorphous mucilaginous material secreated by the cell forming a capsule around it could be easily seen. In addition to individual sheath cells are also remain embedded in common mucilaginous envelop (Fig. 4). The diameter of the cells varied from 6-12 µm. The cells were observed to multiply by simple division as inferred from dumbbell shaped dividing cells (Fig. 5 arrow). Among the various media tried the alga exhibited its survival and growth in Koch and ASW media.

Discussion

In its general morphology the alga collected resembles to the genus *Porphyridium* (Kylin, 1956). The genus *Porphyridium* is with species whose nomenclature is in unresolved status. Ott (1972) in his review on the synonyms and the taxonomic positions of *Porphyridium* recognized 5 species namely *P. purpureum* (Bory de Saint Vincet) Ross in Drew and Ross, *P. aerugineum* Geitler, *P. sordidum*

Geitler, *P. violaceum* Kornmann and *P. griseum* Geitler. According to Ott (loc. cit.) these species could be separated from one another by visual colour of plastid. However in 'Algaebase' (2009) only three species have been currently accepted taxonomically as *P. aerugineum*, *P. sordidum* and *P. purpureum.* The Pune *Porphyridium* in its colour, dimensions, nature of chloroplast, position of pyrenoid and mode of reproduction resembles to *P. purpureum* hence it is referred to that species. Fresnel *et al.* (1989) remarked that *P. purpureum* is a euryhaline alga. The Pune *Porphyridium* has exhibited its ability to grow in a medium containing salt concentration up to 30 gm/lit confirming observations of Fresnel *et al*. (loc. cit.). The present report of the genus is the first record on the occurrence of *Porphyridium* in India.

Acknowledgments

Authors are thankful to UGC for providing fund to establish microphotography facility in the Department and to the Head, Department of Botany, University of Pune, Pune for providing necessary facilities.

References

Andersen, R. A. & M. Kawachi 2005 Traditional microalgae isolation techniques. In R. A. Andersen (Ed.), Algal culturing techniques, pp. 83-100 Elsevier Academic Press.

Barsanti, L. & P. Gualtieri 2006 Algae: anatomy, biochemistry and biotechnology 301pp. Taylor & Francis.

Drew, K. M. & R. Ross 1965 Some generic names in Bangiophycidae. *Taxon*14**:** 993-99.

Fresnel, J., C. Billard, F. Hindak & B. Pekarkova 1989 New observations on *Porphyridium griseum* Geitler = *Rhodella grisea* (Geitler) comb. nova (Porphyridiales, Rhodophyceae). *Pl. Syst. Evol*. 164:253-262.

Kumano, S. 2002 Freshwater red algae of the world 375 pp. Biopress Ltd., Bristol.

Kylin, H. 1956 Die Gattungen Der Rhodophyceen 673 pp. CWK Gleerups Foerlag. Lund.

Ott, F. D. 1972 A review of the synonyms and taxonomic position of the algal genus *Porphyridium* Nageli 1849. *Nova Hedwigia* 23:237-289.

Venkataraman, G. S. 1969 The cultivation of algae 319 pp. ICAR New Delhi.

Vonshak, A. 1992 *Porphyridium*. In M. A. Borowitzka & L. J. Borowitzka (Ed.), Microalgal biotechnology, pp. 122-134 Cambridge Uni. Press.

Wang, J., B. Chen, X. Rao, J. Huang & M. Li 2007 Optimization of culturing conditions of *Porphyridium cruentum* using uniform design. *World J Microb. Biotech.* 23: 1345-1350.

http://www.algaebase.org/search/genus/detail/?genus_id=33123&session=abv4:C401

72F01b6511E419jpUy624E33 (Accessed on 20-11-2009).

Plate:

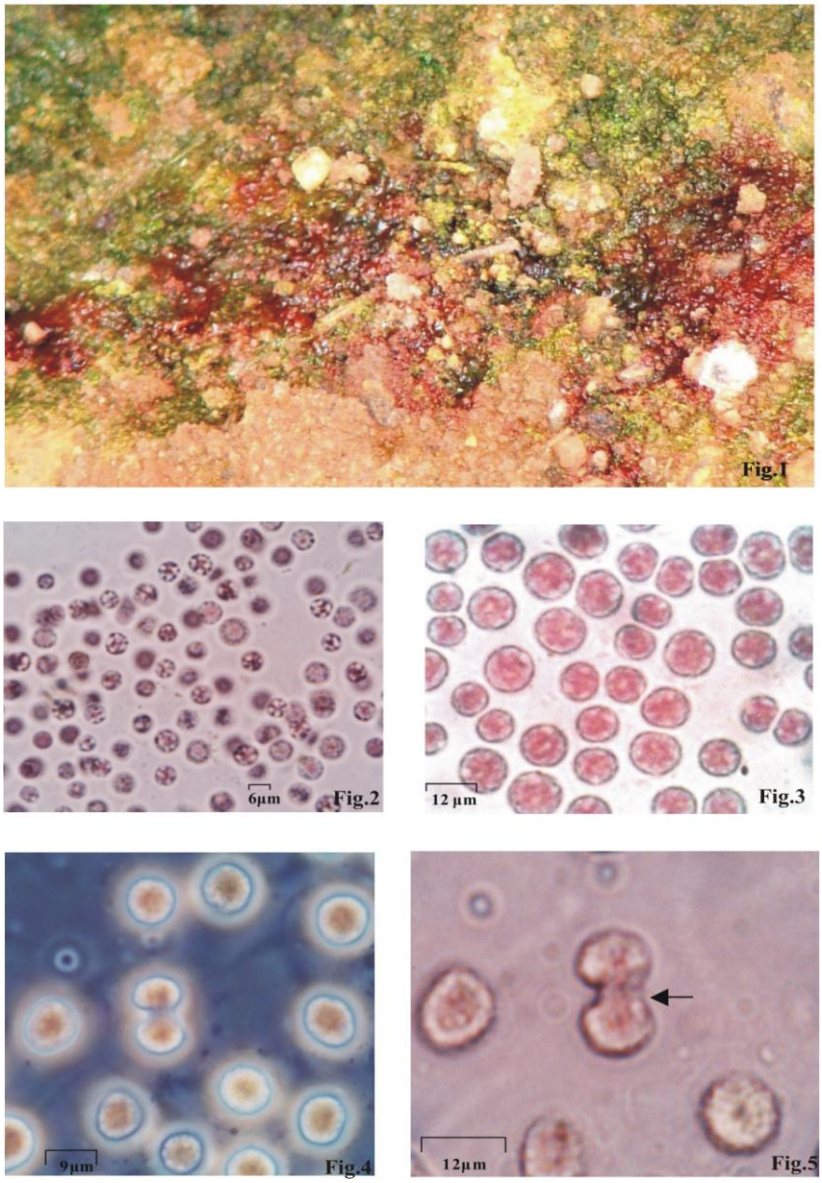

Plate 1: *Porphyridium purpureum* (Bory de Saint Vincet) Ross in Drew and Ross.

Fig.1: Habit of the alga: red-blood colored patches on soil; Fig.2: Aggregated mass of cells. Fig.3: Magnified view of cells showing axile star shaped chloroplast with pyrenoids in the center; Fig. 4: Phase contrast picture of the cells to show individual mucilage sheath; Fig. 5: Dividing cell (arrow).