

# Observations on *Nostochopsis lobata* (Cyanoprokaryota; Nostocales; Nostochopsidaceae) in Eastern India.

Jay Mal, Narendra Nath Koley and Jai Prakash Keshri\*

Phycology Laboratory, CAS In Botany, The University of Burdwan,  
Golapbag, 713104, West Bengal, India

\* Corresponding author: keshrijp@gmail.com

## पूर्वी भारत से नोस्टोकोप्सिस लोबाटा (सायनोप्रोकैरियोटा : नोस्टोकेल्स : नोस्टोचोप्सीडैसी) का पर्यवेक्षण

जयमाल, नरेन्द्र नाथ कोले एवं जय प्रकाश केशरी

### सारांश

नोस्टोकोप्सिस वुड एक्स बोर्नेट इट फ्लेहाल्ट एक असामान्य वंश है, जिसका वितरण अउष्णकटिबंधीय और बृहद उष्णकटिबंधीय तक है। प्रस्तुत शोध पत्र में इस वंश की जाति *एन. लोबाटा* वुड एक्स बोर्नेट इट फ्लेहाल्ट, 1886 को प्रथम बार पश्चिम बंगाल के डूअर्स क्षेत्र से अभिलेखित किया गया जिसकी बृहद आकासिकी और चित्रण दिया गया है। यहां इस जाति की खाद्योपयोगिता और इसकी प्राकृतिक अवस्था में विभिन्न हेटरोसिस्ट का पर्यवेक्षण भी उल्लेखित किया गया है।

### ABSTRACT

*Nostochopsis* Wood ex Bornet et Flahault is an uncommon genus with a tropical/ pantropical in distribution. The present paper deals first report of *N. lobata* Wood ex Bornet et Flahault 1886 from Dooars region of West Bengal along with its detailed morphology and an illustration. Observation on various types of heterocysts in its natural form and their importance in context to the edible value have also been highlighted.

**Keywords:** Distribution, Dooars, Eastern Himalayas, New record, *Nostochopsis lobata*.

### INTRODUCTION

*Nostochopsis* Wood ex Bornet et Flahault is an uncommon genus of Nostocales growing mostly in tropical/ pantropical regions. The genus is easily recognized by its unique morphology, branching pattern, nature of the location of heterocysts etc. The edible value of the species has been reported sporadically in India and Thailand (Pandey & Pandey, 2008; Motham & al., 2014). Tiwari & al., (2015) studied the alga in culture for its characterization in polyphasic approach and potential source of food supplement, therapeutic materials and biocosmetics etc.

Out of the seven species known worldwide (Guiry, 2020; Hauer and Komárek, 2020) three species viz: *N. lobata* Wood ex Bornet et Flahault, *N. hansgirgii* Schmidle & *N. radians* Bharadwaja (Bharadwaja, 1934; Desikachary 1959; Dixit 1936) are found in India. During the routine collection, a naturally occurring bloom of *Nostochopsis lobata* has been collected from running water stream

at Raja Bhat Khawa of the Alipurduar district of West Bengal.

### MATERIAL AND METHODS

Sample of cyanobacterial bloom was collected from small stream, at Raja Bhat Khawa, Alipurduar, West Bengal, India. All the environmental parameters (pH - 5.88, temperature - 26°C, salinity - 0.0456 ppt, conductivity - 85.8 µS, TDS - 60.6 ppm) were noted at the time of collection using a multi-parameter device (Multi-parameter PCSTestrt™ 35). The specimens were preserved in 5 % formalin. Co-ordinates of the collection location have been taken from GPS (GPS MAP 78S, GARMIN). The specimens were identified and deposited in the Algae Herbarium of Department of Botany, The University of Burdwan (BURD). The samples were observed using GFW solution & Bando1988. Images were taken using Zeiss Axioscope A1 Microscope with Axiocam 504 model digital camera with standard scale.

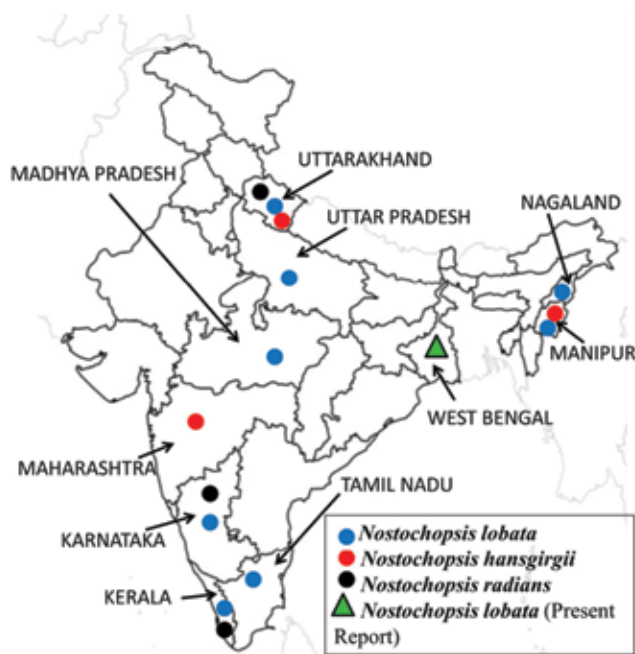


Fig. 1: Showing the distribution of the reported species of *Nostochopsis* in India.

## TAXONOMIC DESCRIPTION

***Nostochopsis lobata*** H.C. Wood ex Bornet & Flahault, Ann. Sci. Nat., Bot., Sept. sér. 5: 51-129. 1886, Desikachary, Cyanophyta 570, pl.120, f1-8. 1959; Komárek, Süßwasserflora von Mitteleuropa. Cyanoprokaryota: 3rd part: heterocystous genera. 19: p. 546, f. 667, 670. 2013.

Thallus mucilaginous, more or less spherical to irregular in outline, big thalli flattened due to the hollow interior up to 4 cm in diameter; growing mostly attached on the rock surface, detached when old, olive green to blue green in colour; filaments more or less radially arranged in the thallus growing mostly parallel to each other, arrangement changed in mature thalli; branching pattern various but mostly unilateral and uniseriate like *Hapalosiphon*, uniseriate branches quite often acropetal in succession, V-shaped and reverse V-shaped branching are not uncommon; cells 2.43 – 4.18 µm in diameter and 7.85 – 18.5 µm long; intercalary heterocysts 4.88 – 9.1 µm in diameter and 8.83-14.14 µm long, terminal (pedicillate) heterocysts 6 – 8.34 µm in diameter and 10.80 – 13.47 µm long and growing on 2 – 7 celled branches; sessile (lateral) heterocysts 4.68 – 7.67 µm in diameter and 4.60 – 07.55 µm long.

**Distribution:** Uttar Pradesh (Singh, 1939), Coimbatore (Desikachary, 1946), Mysore (Govindu & al., 1949), Jharkhand (Thakur & Sahu, 2008), Kerala, Manipur, Nagaland & Uttarakhand (Gupta, 2012), Madhya Pradesh (Tiwari & al., 2015).

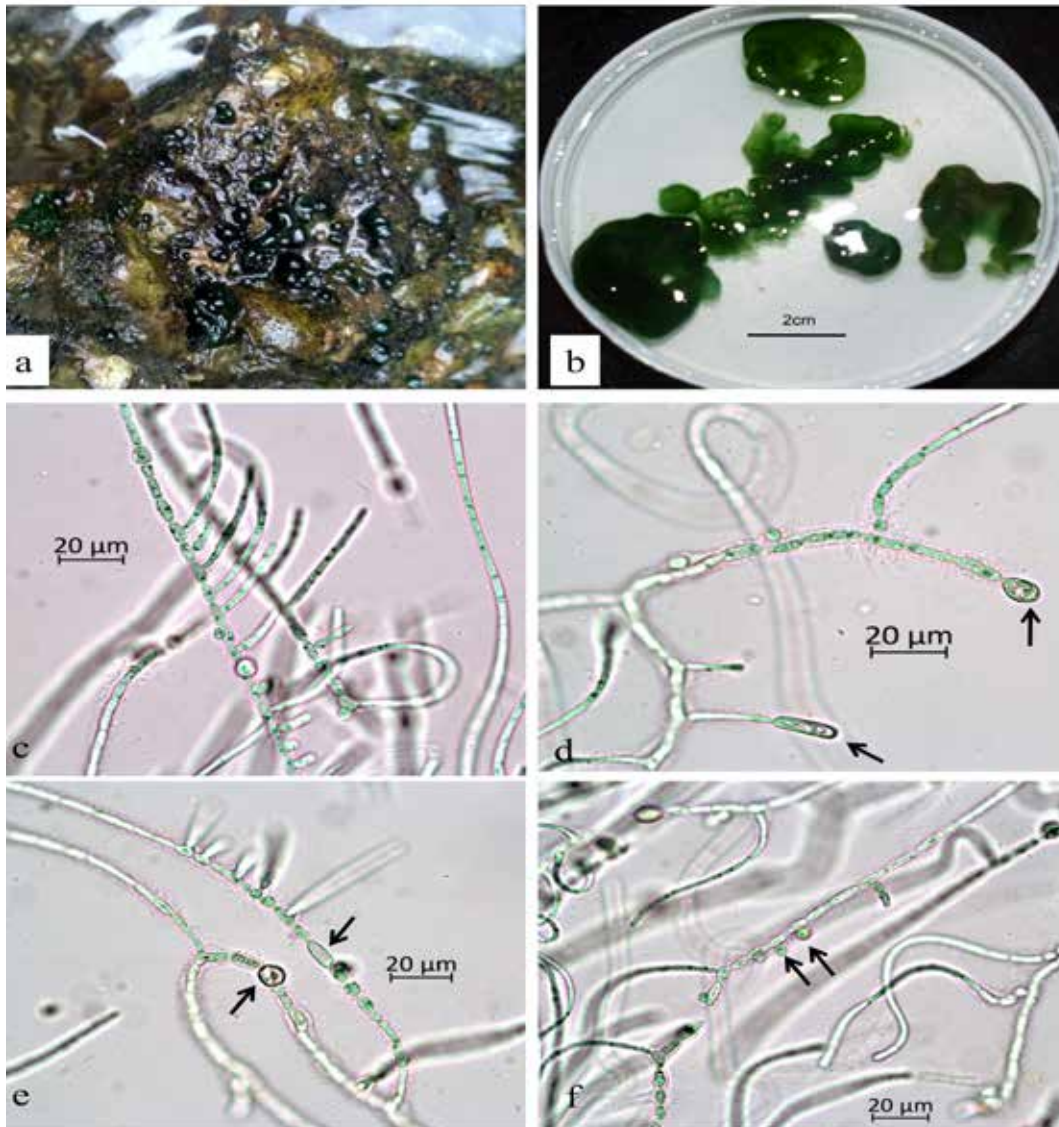
**Notes:** In India, *Nostochopsis lobata* is well studied in culture medium (Tiwari, 1978, Singh & al., 2007, Tiwari & al., 2015), but not recorded very frequently. Reverse V- shaped branching pattern; hormogone & akinete formation etc. have been also been observed in culture medium (Singh & al., 2007); both type of heterocysts were observed when grown in nitrogen deficient medium (Tiwari, 1978). During the present study, both type of heterocysts were observed in natural condition. Therefore, it can be inferred that, nitrogen deficient conditions are not only the precondition for the production of heterocysts. Occurrence of the species can pave a way in Himalayan region for potential commercial exploitation using modern biotechnology measures.

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**Fig. 2:** a. Thallus growing in natural habitat; b. Isolated thalli from natural habitat in Petri dish; c. Branching pattern; d. Pedicellate heterocysts; e. Intercalary heterocysts; f. Sessile heterocysts on the main axis.

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