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## Research Article

### SYSTEMATIZE ASSAY OF THE FAMILY NOSTOCACEAE FROM GIRNA RIVER NEAR JALGAON REGION MAHARASHTRA, INDIA

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#### ABSTRACT

A systematize assay was performed to better understanding the taxonomy and diversity of Nostocaceae from Girna river near Jalgaon regions of Maharashtra, India. Sample were collected from different Locations at Girna river near Jalgaon region. Some Nostoc species were observed under light microscopic (LM) in a laboratories some genus of Nostoc were identified to the species and variety level. The goal of this investigation is to improve the knowledge of Nostoc genus in Jalgaon region. Mostly Nostoc species were determined and described as well as taxonomically in first time from these areas. They were morphologically listed and presented with detail descriptions; dimensional information and taken a photographic information in the research.

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#### INTRODUCTION

Cyanophyceae are successful in a wide range of environments because they have a versatile and unlike features. They are very common and important members of stream algal communities, in which many species have been ascribed as dominant or major functional components in several river system throughout the world.

Information about ecological distribution ranges of species complete the taxonomic knowledge with data on ecological requirements of each species. That is especially important for the taxonomy of blue-green algae. This research was made with the intention to improve our poor knowledge of the broad scale distribution patterns of stream and river blue-green algae in tropical and subtropical regions and to compare the environmental aspects of different regions have different ecological and biological conditions to determining distinct vegetation types and water chemistry to blue-green algae occupy different types of aquatic, benthic and surface for living and non-living substrates.

Girna river water is perhaps the most valuable habitat and mostly changeable by the activities of nearest basin residential human being. The river originates in the western hills of Kalwan sub-division of Nasik district. Total length of Girna river in Jalgaon district is approximately around 174 Km. Now

a days this river has also got polluted and Nostocales members grown abundantly in the bay-basin and wall of the river freshwater ecosystems.

There are many thousands of taxa with diverse ecologically requirements their functional components in several river systems (Aboal, 1989), (Branco and Necchi, 1998), (Sheath and Cole, 1992), (Sheath et.al. 1996), (Whiton, 1984), the oncoming student of researchers are confused instead of getting benefits of research work. In this paper Cyanophyceae group have been given morphological, description scathes and photographs of total taxa with identification in which there are some species and variety of genus Nostoc.

#### MATERIAL AND METHODS

Monthly samplings were carried out in Girna river bank near the Jalgaon city in Maharashtra from Oct.2013 to June 2014 and located between North latitude and East longitude. Hence, the collection stations are designed as respectively. The area varied from throughout the year. The collected specimens were preserved in 4% formalin for further taxonomic investigation and specimens were studied under a compound as well as light microscope. The sample carried out in the month of July, August and September as during this time the depressions were merged with the main course of the river monthly abundance of all the existing algal population photographs taken by Nikon

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camera and sketches were made by using camera Lucida and identification of Cyanophyceae genus Nostoc was mostly based on the key given by (Prescott, G. W, 1982) and (T. V. Desikachary, 1959).

**Family- Nostocaceae**

**Genus- Nostoc Vaucher, 1803**

**Nostoc linckia** (Roth) Bornet ex Born. et Flash v. **arvense** Rao, C. B. (fig. 6)

T. V. Desikachary, 1959, p. 377, Pl. 67, Fig. 1

Thallus gelatinous, expanded, presenting an uneven surface, yellowish brown to blue-green; filamentous numerous, flexuous; Trichomes 4-5.6µ broad, frequently enveloped by a lamellated and yellowish brown mucilaginous sheath that follows their contour; cells spherical or barrel-shaped, 4.8-6.4 µ long; heterocysts almost spherical, 4.8-7.2 µ broad, usually not enveloped by any mucilage; spores in long chains, more or less spherical, 7-8 µ broad, outer wall brown.

**Nostoclinckia v. arvense** Rao (fig. 4)

T. V. Desikachary, 1959, p. 377, Pl. 67, Fig. 1

Thallus varying in size, sometime punctiform. Sometime tuberculate, at first globose later irregularly expanding, torn gelatinous, blue green to violet, or blackish green or brown; filament densely entangled, flexuous or highly coiled; sheath diffluent and colourless inside, distinct only in the peripheral portion; trichome 3.5-4 µ broad, pale blue green; cells short barrel shaped; heterocyst subspherical; spores subspherical, 6-7 µ broad, 7-8µ long, episore smooth.

**Nostoc spongiaeforme** Agardh ex Born. Et Flash.v. **varians** Rao, C. B.(fig.7)

T. V. Desikachary, 1959, p. 381, Pl. 67, Fig. 3

Plant mass thin, spreading blue-green; Trichomes loosely entangled, sometime individually enveloped by yellowish brown mucilage, 3-3.5µ broad; cells barrel-shaped, 2-3.5µ long, end-cell conical with a rounded apex; heterocysts barrel-shaped or cylindrical with rounded or flat ends, broader than the Trichomes, 4.8-6.4µ broad and 5.6-8µ long; spores in long chains, cylindrical with rounded ends, sometimes ellipsoidal, rarely spherical, 4-4.8µ broad and 4.8-10µ long, with a smooth hyaline outer wall.

**Nostoc muscorum** Ag. ex Born. Et. Flah (fig. 9)

T. V. Desikachary, 1959, p. 385, Pl. 70, Fig. 4

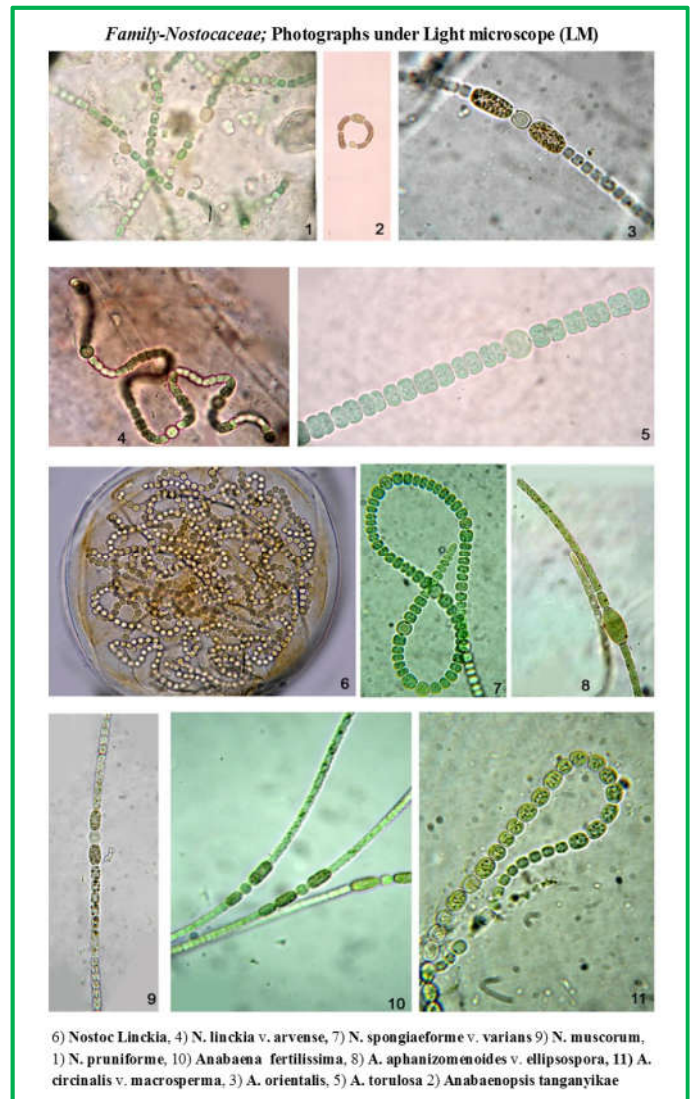
Thallus gelatinous-membranous, irregularly expanded, attached by the lower surface, tuberculate, dull olive or brown, 2-5µ diameter; filaments densely entangled; sheath distinct only at the periphery of the thallus, yellowish brown; trichom 3-4 (-5)µ broad; cells short barrel shaped to cylindrical up to twice as long as broad; heterocysts nearly spherical, 6-7µ broad; a spores oblong, many in series, 4-8µ broad,(7-) 8-12µ long, episore smooth and yellowish.

**Nostoc pruniforme** A.C. Agarth (fig. 1)

Prescott, G. W. 1982, p. 524, Pl. 120, Fig. 7

Thallus globose or ellipsoidal, up to the size of a hen's egg, olivaceous or blue-green later blackish brown, soft and hollow

inside, outer surface leathery; filaments loosely entangled, radiating from a centre; sheath mostly distinct, hyaline or seldom yellow; trichome 4-6 µ broad, cells short barrel-shaped or sometimes longer than broad; heterocysts 6-7 µ broad, subspherical; spores spherical up to 10µ broad.



**Genus- Anabaena Bory, 1822**

**Anabaena fertilissima** Rao, C. B. (fig.10)

T. V. Desikachary, 1959, p. 398, Pl. 74, Fig. 1, 3

Trichome single, straight or bent, with almost rounded end cells, up to 350 µ long, 5-5.6µ broad, at the apex 4µ broad; cells barrel-shaped, 4.8-8 µ long; heterocysts almost spherical, 6.4-8.4 µ broad; spores in long chains, often making the whole trichomesporogenous, adjoining the heterocysts but formed centrifugally, almost spherical, with a smooth hyaline outer wall, 4.8-8µ broad and 3.2-8.8µ long.

**Anabaena circinalis** Rabenhorst ex Born. Et Flash. (fig.11)

T. V. Desikachary, 1959, p. 414, Pl. 77, Fig. 3

Thallus frothy, floating; trichome mostly circinate, seldom straight, mostly without a sheath, 8-14µ broad; cell barrel-shaped or spherical, sometime shorter than broad, with gas vacuoles; heterocyst subspherical, 8-10µ broad; spore cylindrical, sometime curved, end rounded, 16-18µ broad up to

34  $\mu$  long, ordinary way from the heterocystepispore smooth and colourless.

**Anabaenaorientalis**Dixit(fig. 3)

T. V. Desikachary, 1959, p. 405, Pl. 77, Fig. 6

Trichome single, straight or slightly curved, 2.5-4 $\mu$  broad, cells quadrate or cylindrical, rarely slightly barrel-shaped, up to twice (or even thrice) as long as broad, 3.7-4.8 $\mu$  long, end-cell conical with rounded apex; heterocysts single, intercalary, cylindrical or slightly ellipsoidal with rounded end-walls, 4.8-5.5 $\mu$  broad, and 7.4-9.2 $\mu$  long; spores one on each side of a heterocyst, ellipsoidal, 7.4-9.2 $\mu$  broad and 14.8-16.6 $\mu$  long.

**Anabaenatorulosa** (Carm.) Lagerh. Ex Born. Et. Flash. (fig.5)  
D. A. Kumawat, 2002, p. 152, Pl. 25, fig. 6

Thallus mucilaginous, thin, blue-green; trichome 3.3-3.5  $\mu$  broad; apical cell conical with rounded tip; cell barrel-shaped, as long as or somewhat shorter than broad; heterocyst subspherical or ovoid, 4.7  $\mu$  broad and 6-7  $\mu$  long; spore on both side of the heterocyst, subcylindrical with rounded end, smooth pale brown in colour, 4-4.5  $\mu$  broad , 6-8  $\mu$  long.

**Anabaenaaphanizomenoides v. ellipsospora** Rao, C. B. (after Rao)(fig. 8)

T. V. Desikachary, 1959, p. 405, Pl. 78, Fig. 9

Trichomes 3.3-4  $\mu$  broad, apical cell 1.6  $\mu$  broad, cells 3.3-11  $\mu$  long; heterocysts 6-6.6  $\mu$  broad and 6-11.6  $\mu$  long; spores one or two together on either side of the heterocyst, 9.6-13.5  $\mu$  broad and 11.6-19.8 (-23)  $\mu$  long.

**Genus- Anabaenopsis** Miller, 1938

**Anabaenopsis tanganyikae** (West, G.S.) Wolosz. et Miller(fig. 2)

T. V. Desikachary, 1959, p. 354, Pl. 63, Fig. 4, 8

Trichome free-swimming, very short, spirally coiled,1-2 (-3)  $\mu$  mostly 1-1/2 spirals, without Sheath; Trichomes not constricted at the cross-wall 2.4-2.6  $\mu$  broad; cells cylindrical, 2-3 times longer than broad, 3.8-8.5 $\mu$  long, without gas-vacuoles;heterocysts ellipsoidal, 3 $\times$ 5.5  $\mu$  spores ellipsoidal, single away from the heterocyst, 7 $\mu$  broad, 13  $\mu$  long, with colourless smooth membrane.

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