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FRAGMENTOS TAXONÓMICOS, COROLÓGICOS, NOMENCLATURALES Y FITOCENOLÓGICOS (85-94)

85. RECORD OF THE CYANOBACTERIA PRESENT IN THE HAMISAR POND OF BHUJ, INDIA

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Datos sobre cianobacterias presentes en la laguna de Hamisar, Bhuj, India.

Key words. Cyanobacteria, Bhuj, India.

Palabras clave. Cyanobacteria, Bhuj, India

Cyanobacteria are oxygenic, photosynthetic, micro-organisms and are widely distributed over a diverse range of habitats (Nagarkar, 1998). Remaining in the oblivion, uncared and unrecognised, it has shot into fame and popularity owing to a host of their innate properties that make them ideal organisms for use in a variety of ways to meet our needs and to promise us a bright future. Howsoever it is essential to explore new species of cyanobacteria existing in the nature, isolate and purify it and subsequently establish a collection which then could be a door for the biotechnological exploitation (Thajjudin & Subramanian, 1992). Fresh water forms have carried attention of interested workers all along. Extensive literature survey have shown no records from the Bhuj and near by area of Kutch district of India which are situated very near the Rann of Kutch desert. The place experiencing extreme climate, with maximum summer temperature of around 45°C and winter temperature of around 10°C, may find a flora having unique properties and characteristics. Therefore an attempt has been made in this direction.

Samples of cyanobacteria were collected from different locations of Hamisar pond, Bhuj, Gujarat, India (fig. 1). The chemical characteristics of the water were carried out

Fig. 1. Location of the study area at Gujarat, India.

according to standard methods (APHA, 1995). Benthic, epiphytic and epilithic and other visible cyanobacteria specimens were collected in polythene bags and plastic vials and were later transferred to Erlenmeyer flasks containing BG11 medium (Allen, 1968). Cyanobacteria were isolated by dilution plate and surface plating techniques. Cyanobacteria were made free of diatoms and green algae by adding 0.16 mM of cyclohexamide final concentration for 24 hours with incubation in light. Antibiotic combination of ampicillin and streptomycin was used at a final concentration of 40μg.ml^{-1} and 100μg.ml^{-1} respectively to make it free of the bacterial flora. The characteristics of the water of pond at the time of isolation are shown in Table 1.

Identification of the taxa was done with the help of classical manuals (Geitler 1932; Desikachary, 1959; Starmach, 1966 and Fremmy 1929, 1933). For each taxon a description is given together with the place in the pond from which it was isolated and its general habitat as given in the literature (Desikachary, 1959; Geitler, 1932; Sandgreen 1988).

pH	7.72
O/R potential	- 025
Total solids	600 ppm
Total suspended solids	200 ppm
Total dissolved solids	400 ppm
Total volatile solids	100 ppm
Total fixed solids	300 ppm
COD	2400 ppm
Total N	140 ppm
Total P	1400 ppm
Total alkalinity (Bicarbonate)	200 ppm
Volatile fatty acids	360 ppm
Na^+	700 ppm
K^+	127 ppm

Table 1. Characteristics of the water of Hamisar pond, Bhuj, India.

1. ***Chrococcus minutus*** (Kutz) Nag (fig. 2 a)

(Desikachary, 1959 p. 103, pl. 24, fig. 4 & pl. 26, fig. 4,15; Geitler, 1932 p. 232, fig. 112 a, 113 c; Fremy, 1933 p. 24, pl. 4, fig. 6)

It was isolated from soils around the pond.

Common habitat : Very common subdominant planktonic genus in mesotrophic to hypertrophic waters; often associated with bloom genera, but seldom forming bloom itself.

2. ***Chrococcus cohaerens*** (Breb). Nag (fig. 2 b)

(Desikachary 1959, p. 111, pl. 26, fig. 3,9; Geitler 1932, p. 238, fig. 116 c; Fremy 1929, p. 44, fig. 47)

Isolated from the mud around the lake.

Common habitat : This species is common in dirty ponds.

3. ***Synechococcus elongatus*** Nag. (fig. 2 c)

(Desikachary 1959, p. 143, pl. 25, fig. 7,8; Geitler 1932, p. 273, fig. 133a-c)

Present and isolated from the submerged stones.

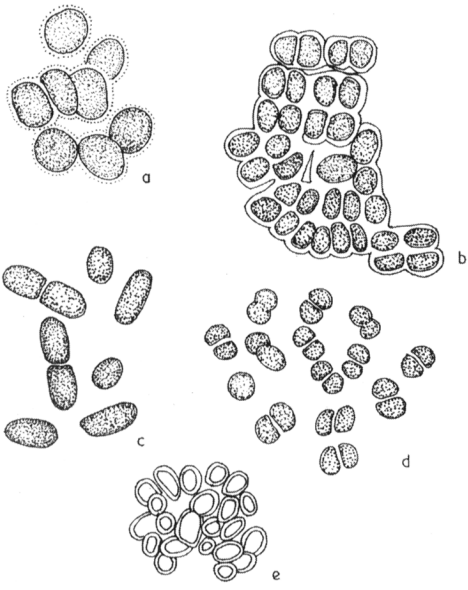

Fig. 2. (a) *Chrococcus minutus* (Kutz) Nag (b) *Chrococcus cohaerens* (Breb). Nag (c) *Synechococcus elongatus* Nag (d) *Synechocystis pevalekii* Ercegovic (e) *Dermocarpa flahaultii* Sauvageau

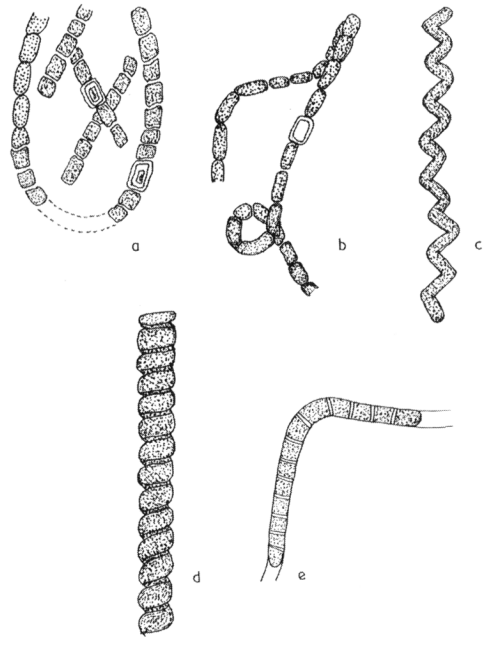

Fig. 3. (a) *Anabena naviculoides* Fritsch (b) *Nostoc muscorum* Ag. ex Born. et Flah. (c) *Spirulina meneghiniana* zanard.ex Gomont (d) *Spirulina subsalsa* Oerst. ex, Gomont (e) *Phormidium corium* (Ag.) Gomont

Common habitat: Extremely common but seldom dominant in plankton of oligotrophic lakes and ponds. Can form appreciable portion of phytoplankton biomass in deep hypolimnetic waters where it thrives under low light levels.

4. ***Synechocystis pevalekii*** Ercegovic (fig. 2 d)

(Desikachary 1959, p 145, pl. 25, fig. 11; Geitler 1932, p. 269, fig. 133 f)

Found amongst the floating algal biomass.

Common habitat : Found amongst other algae in lakes, prefers stagnant waters, on bricks with a thin film of water,

5. ***Dermocarpa flahaultii*** Sauvageau (fig. 2 e)

(Desikachary 1959, p. 174, pl. 33, fig. 18,19; Geitler 1932, p. 1403, fig. 230; Fremy 1929, p. 65, fig.69)

Found epiphytic on *P. corium*

Common habitat : Epiphytic with other fresh water algae.

6. ***Anabena naviculoides*** Fritsch. (fig. 3 a)

(Desikachary, 1959 p. 410, pl. 72, fig. 2)

It was found amongst the blooms floating on the water.

Common habitat : Mainly planktonic subdominant in oligotrophic to eutrophic lakes, rivers and ponds; prefers stratified stagnant waters during calm warm periods for maximum bloom development, also found in rice fields.

7. ***Nostoc muscorum*** Ag. ex Born. et Flah. (fig. 3 b)

(Desikachary 1959, p. 385, pl. 70, fig. 2;

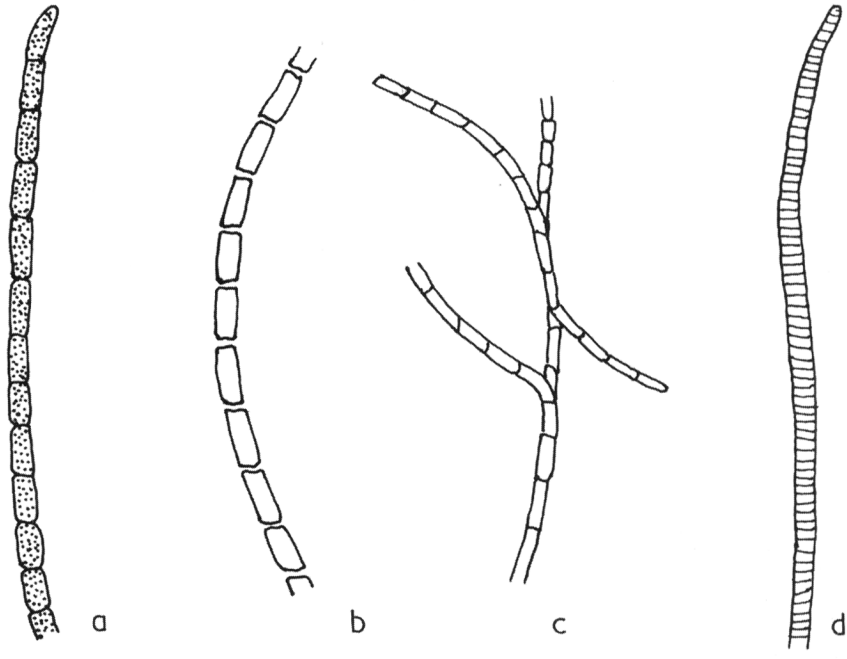

Fig. 4. (a) *Phormidium tenue* (Menegh) Gomont (b) *Phormidium fragile* (Meneghine) Gomonot (c) *Plectonema terbrens* Bornet ex Gomont (d) *Oscilatoria laete-virens* (Crouan) Gomont var. minimus Biswas

Geitler 1932, p. 844, fig. 535; Fremy 1929, p. 340, fig. 281)

The culture was found amongst the floating wooden substrata.

Common habitat : Occurs both planktonically and attached. Found as subdominant in oligotrophic to eutrophic ponds, lakes and streams. Often attached to submerged macrophytes and wooden structures, seldom dominant as blooms.

8. ***Spirulina meneghiniana*** zanard.ex Gomont (fig. 3 c)

(Desikachary 1959, p. 195, pl. 36, fig. 8; Geitler 1932, p. 928, fig. 593d; Fremy 1933, p.131, pl. 31, fig.17)

S. meneghiniana was found freely floating in the water

Common habitat : Mostly planktonic in ponds and beach pools, usually subdominant with other bloom forming cyanobacteria in mesotrophic to eutrophic waters including shallow ponds and streams.

9. ***Spirulina subsalsa*** Oerst. ex, Gomont (fig. 3 d)

(Desikachary 1959, p. 194, pl. 36, fig. 3,9; Geitler 1932, p 927, Fig 593 a; Fremy 1933, p. 133, pl. 31, fig. 24)

This cyanobacteria was found amongst dead leaves.

Common habitat : Mostly planktonic, although some species can inhabit in benthic algal mats, usually subdominant with other bloom forming cyanobacteria in mesotrophic to eutrophic waters including shallow ponds

and streams but sometimes can form blooms on its own. It has also been reported from hot springs.

10. ***Phormidium corium*** (Ag.) Gomont (fig. 3 e)

(Desikachary 1959, p. 269, pl.44, fig. 10-11; Geitler 1932, p. 1018, Fig 649; Fremy 1929, p. 150, fig. 133)

Associated with weeds present in the lake.

Common habitat : On moist soil, walls , in paddy fields, planktonic in fresh water and brackish water; in open sea, stagnant sea water, back waters, salt pans.

11. ***Phormidium tenue*** (Menegh) Gomont (fig. 4 a)

(Desikachary 1959, p 259, pl 43, Fig 13 – 15 & pl 44, Fig 7a; Geitler 1932, p 1004, Fig 642 d,e; Fremy 1929, p. 146, fig. 131)

Attached to soil surfaces on the walls around the pond.

Common habitat : On moist surfaces, freshwater and salt water bodies, hot springs, planktonic in open sea, in microbial mats, salt pans.

12. ***Phormidium fragile*** (Meneghine) Gomonot (fig. 4 b)

(Desikachary 1959, p 253, pl 44, Fig 1–3; Geitler 1932, p 999, Fig 636 b; Fremy 1933, p. 86, pl. 22, fig. 6)

Species is isolated from the soils from the bottom of lake.

Common habitat : On moist soil, on the walls of ponds, planktonic in fresh water and brackish water, in open sea, stagnant sea water, back waters, salt pans, marine, in microbial mats.

13. ***Plectonema terbrens*** Bornet ex Gomont (fig. 4 c)

(Desikachary 1959, p 435, pl 61, Fig 4,5; Geitler 1932, p 683, Fig 437 a; Fremy 1933, p. 99, pl. 25, fig. 5)

It was found from the rough stones present near the ends of the lakes.

Common habitat: Almost always found attached as felt like colonies and mats on submerged rock, vegetation and wood. Quite common in flowing waters of diverse trophic states.

14. ***Oscilatoria laete-virens*** (Crouan) Gomont var. ***minimus*** Biswas (fig. 4 d)

(Desikachary 1959, p. 213, pl. 39, Fig 2,3)

Common habitat : Common in mesotrophic to eutrophic lakes, ponds and stagnant waters. Often subdominant during other algal blooms, but can for extensive blooms under nitrogen and phosphorus enriched waters. It is common in extreme environments.

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86. NUEVAS ADICIONES AL CONOCIMIENTO DE LAS MACROALGAS MARINAS DE LA ISLA DE ALBORÁN (MEDITERRÁNEO OCCIDENTAL)

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Contribution to the knowledge of the seaweeds of Alboran Island (Western Mediterranean).

Palabras clave. Algas marinas, *Dictyosphaeria ocellata*, *Gastroclonium ovatum*, Isla de Alborán

Key words. Alboran Island, *Dictyosphaeria ocellata*, *Gastroclonium ovatum*, Seaweeds

La composición específica de la flora de macroalgas marinas de la isla de Alborán es conocida a través de los trabajos de Soto-Moreno y Conde-Poyales (1993) y Rindi & Cinelli (1995), así como por las contribuciones sobre los géneros *Phyllariopsis* (Izquierdo *et al.*, 1995) y *Predaea* (Conde *et al.*, 1998). A partir de estos trabajos se conocen un total de 160 taxones específicos e infraespecíficos de macroalgas marinas de Alborán.

Con el objeto de aumentar el conocimiento sobre la flora de macroalgas marinas de Alborán, se han identificado las muestras recogidas en cuatro campañas, desde 1994 a 1996: 1) abril de 1994 (Departamento de Biología Vegetal de la Universidad de Málaga); 2) septiembre de 1994 (Instituto Español de Oceanografía, IEO); 3) junio y julio de 1995 (IEO); 4) julio de 1996 (Proyecto Fauna IV, Museo Nacional de Ciencias Naturales, Madrid). Todas las muestras se recogieron desde la zona litoral hasta alrededor de 100 m