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245. CHECKLIST OF BENTHIC MARINE CYANOPROKARIOTA OF CHAFARINAS ISLANDS (ALBORAN SEA, WESTERN MEDITERRANEAN)

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Catálogo de cianoprocariontes bentónicas marinas de las Islas Chafarinas (Mar de Alborán, Mediterráneo Occidental)

Keywords: Chafarinas Islands, Cyanoprokariota, marine algae, Alboran Sea.

Palabras clave: Islas Chafarinas, Cyanoprokariotas, algas marinas, Mar de Alborán.

Chafarinas Islands is the smallest Spanish archipelago, which is located less than 3 km far from the Moroccan coast near to the Argelian frontier (south-eastern Alboran Sea, Western Mediterranean). It is constituted by three

small volcanic islands named Isla de Isabel II, Isla del Rey and Isla del Congreso, with the former the only one housing a permanent population of military staff. As a whole they exhibit a perimeter of approximately 7 km and a

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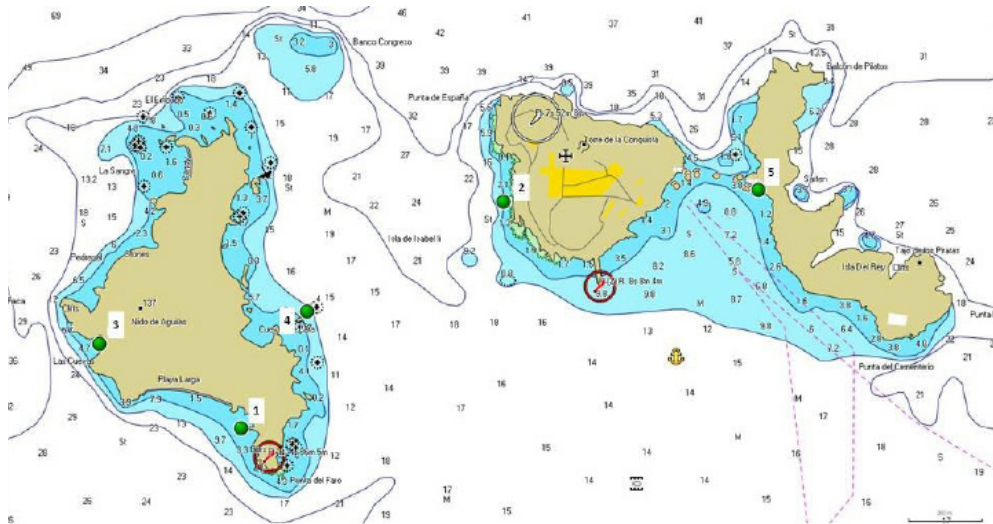


Figure 1. 1. Sampling sites location at Chafarinas Islands. 1. “Playa Larga”, Isla de Congreso; 2. “West-part”, Isla de Isabel II; 3. “Las Cuevas”, Isla de Congreso; 4. “La Piedra”, Isla de Congreso; 5. Harbour, Isla de Rey.

maximum height of 137 m at Isla del Congreso, with a maximum depth of nearly 60 m. depth.

Due to its important biodiversity, this archipelago is considered in the Spanish law National Refuge of Hunting (since 1982), Special Zone for the Protection of Birds (since 1989) and Community Interesting Place (since 2006, 92/42/CEE Directive),. Nowadays, it represents one the few pristine marine environments in the Mediterranean, due to total absence of human disturbing activities.

Nowadays the benthic marine flora of macroalgae of the Chafarinas Islands is acceptably well studied (Conde 1984; Navarro & Gallardo 1989; González & Conde 1994; Flores & Conde 1998; Altamirano 1999, Altamirano *et al.* 2010, 2013 in press). Most of this information has been included as bibliographic references in the checklists of marine seaweeds of Morocco (Benhissoune *et al.* 2001, 2002a, 2002b, 2003), which includes mainly eulittoral collections. However, the cyanoprokariota flora has not been studied yet and is currently nearly unknown. Up to date there is only one record of cyanoprokariota

for the archipelago, provided by Altamirano in 1999. Despite its contribution to marine biodiversity and great ecological significance (Hoffman 1999; Whitton & Potts 2000), the marine benthic cyanoprokariotas are little studied in general. In Alboran Sea, this group of organisms is absence from the main checklists and floras, except from Andalusia coast (De la Rosa 2012).

Continuing with the study of the marine flora of the Archipelago of Chafarinas Islands, the aim of this work is to provide the first checklist of cyanoprokariotes of the archipelago, which includes 15 species of five different families. Taxa indicated with an asterisk, represent new records for the coast of Morocco.

Samples were collected from Isla del Congreso, Isla del Rey and Isla de Isabel II in August 2011 (fig. 1) by SCUBA diving and snorkeling, carried to the laboratory of the Estación Biológica Islas Chafarinas and immediately identified. Coordinates are given in UTM Datum ETRS89. The Cyanoprokariota taxa have been included at the University of Granada Herbarium (GDA-ALGAE).

CLASE CYANOPHYCEAE
CHROOCOCCALES
Entophysalidaceae

**Entophysalis deusta* (Meneghini) F.E. Drouet & W.A. Daily
West part of Isla Isabel II. 30S 551726 3893315. 12.VIII.2011. GDA-ALGAE-4402. Eulittoral. Epilithic.

NOSTOCALES
Rivulariaceae

**Rivularia atra* Roth ex Bornet & Flahault
West part of Isla II. 30S 551726 3893315. 12.VIII.2011. "La Piedra", south-east part of Isla de Congreso. 30S 551197 3893016. 11.VIII.2011. GDA-ALGAE-4392. Eulittoral. Epilithic and epiphytic on *Patella ferruginea* Gmelin.

Rivularia bullata (Poir) Berkeley ex Bornet & Flahault (Figure 2.1)
West part of Isla Isabel II. 30S 551726 3893315. 12.08.2011. Harbor, Isla de Rey. 30S 552452 3893715. 12.VIII.2011. GDA-ALGAE-4383. Eulittoral. Epilithic and epiphytic on *P. ferruginea*. This taxa was recorded by Altamirano (1999) as *Calothrix crustacea* Thuret.

**Rivularia mesenterica* (Kützing) Thuret ex Bornet et Flahault (Figure 2.2)
West part of Isla Isabel II. 30S 551726 3893315. 12.VIII.2011. GDA-ALGAE-4384. Eulittoral.

Scytonemataceae

**Kyrtuthrix maculans* (Gomont) Umezaki (Figure 2.3)
West part of Isla. 30S 551726 3893315. 12.08.2011. Harbor Isla de Rey. 30S 552452 3893715. 12.VIII.2011. GDA-ALGAE-4386. Eulittoral. Epilithic.

OSCILLATORIALES
Oscillatoriaceae

**Lyngbya confervoides* C. Agardh ex Gomont (fig. 3.1)
West part of Isla Isabel II. 30S 551726 3893315. 12.VIII.2011. On harbor of Isla de Rey. 30S

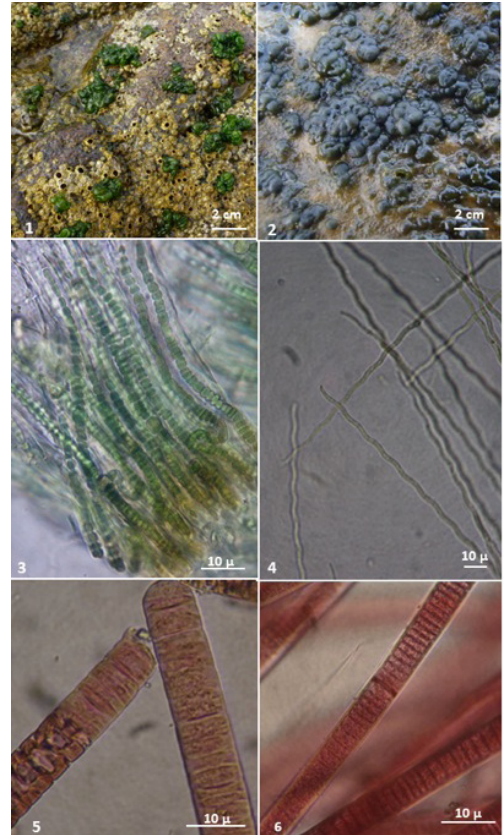


Figure 2. 1. *Rivularia bullata*. 2. *Rivularia mesenterica*. 3. *Kirthutrix maculans*. 4. *Arthrosira miniata*. 5. *Phormidium gracile*. 6. *Phormidium roseum*.

552452 3893715. 12.VIII.2011 GDA-ALGAE-4319. GDA-ALGAE 4327. Eulittoral. Epilithic.

**Lyngbya majuscula* Harvey ex Gomont (fig. 3.2)
West part of Isla Isabel II. 30S 551726 389331. 12.VIII.2011. GDA-ALGAE-4329. Eulittoral. Epilithic and epiphytic on different macroalgae.

**Lyngbya salina* Kützing ex Starmach (Figure 3.3)
"La Piedra", south-east part of Isla de Congreso. 30S 551197 3893016. 11.08.2011. GDA-ALGAE-4344. Eulittoral. Epilithic.

**Oscillatoria funiformis* (Vouk) Komárek in Anagnostidis (fig. 3.4)
"La Piedra", south-east part of Isla de Congreso.



Figure 3. 1. *Lyngbya confervoides*. 2. *Lyngbya majuscula*. 3. *Lyngbya salina*. 4. *Oscillatoria funiformis*. 5. *Oscillatoria margaritifera*. 6. *Oscillatoria pulchra*.

30S 551197 3893016. 11.VIII.2011. GDA-ALGAE-4345. Eulittoral. Epilithic.

**Oscillatoria margaritifera* Kützing ex Gomont (fig. 3.5)

“Las Cuevas”, south-west part of Isla de Congreso. 30S 550639 3892927.11.VIII.2011. GDA-ALGAE-4316. Infralittoral. Epiphytic on *Corallinaceae*. -15 m depth.

**Oscillatoria nigro-viridis* (Thwaites in Harvey) Thwaites ex Gomont

West part of Isla Isabel II. 30S 551726 3893315. 12.VIII.2011. GDA-ALGAE-4399. Eulittoral. Epiphytic on different *Corallinaceae*.

**Oscillatoria pulchra* Lindstedt (fig. 3.6)

“Playa Larga”, north-west part of Isla de Congreso. 30S 551021 3892702. 11.VIII.2011. GDA-ALGAE-4314. Infralittoral. Epiphytic on *Corallinaceae*. -7 m depth.

PHORMIDIALES

Phormidiaceae

**Arthrospira miniata* Gomont ex Gomont (fig. 2.4)

“Playa Larga”, north-west part of Isla de Congreso. 30S 551021 3892702. 11.VIII.2011. GDA-ALGAE-4400. Infralittoral. Epiphytic on *Corallinaceae*. -5 m depth.

**Phormidium gracile* (Meneghini ex Gomont) Anagnostidis (fig. 2.5)

“Las Cuevas”, south-west part of Isla de Congreso. 30S 550639 3892927. 12.VIII.2011. GDA-ALGAE-4316. Infralittoral. Epiphytic on *Aglaophenia* sp.

**Phormidium roseum* (Crouan ex Gomont) Anagnostidis (fig. 2.6)

“Las Cuevas”, south-west part of Isla de Congreso. 30S 550639 3892927. 12.VIII.2011. GDA-ALGAE-4315. Infralittoral. Epiphytic on macroalgae.

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