

## NOTA BREU

**On the presence of a small population of *Sargassum trichocarpum* J. Agardh (Phaeophyceae: Fucales) in Catalonia (Northwestern Mediterranean)****Sobre la presència d'una petita població de *Sargassum trichocarpum* J. Agardh (Phaeophyceae: Fucales) a Catalunya (Mediterrània nord-occidental)**

Enric Ballesteros\* &amp; Boris Weitzmann\*\*

\* Centre d'Estudis Avançats de Blanes-CSIC. Acc. Cala Sant Francesc, 14. 17300 Blanes, Girona.

\*\* PNMMBT. Passeig del Port, Espigó de Llevant, s/n. 17258 L'Estartit, Girona.

Corresponding author: Enric Ballesteros. A/e:kike@ceab.csic.es

Rebut: 17.07.2021. Acceptat: 28.08.2021. Publicat: 30.09.2021

Members of the order Fucales (Phaeophyceae) are canopy-forming algae that constitute different marine habitats at the intertidal, infralittoral and upper circalittoral zones from all the oceans and main enclosed seas on Earth (Boudouresque *et al.*, 2017). The genus *Sargassum* C. Agardh is one of the genera with more described specific entities. Besides being a major component of the flora from tropical to subtropical marine environments, the genus *Sargassum* is also present in the Mediterranean Sea, where up to nine species have been reported (Cormaci *et al.*, 2012; Aouissi *et al.*, 2018). Amongst those species, *Sargassum trichocarpum* J. Agardh is considered a Mediterranean endemism (Giaccone, 2003) with a very restricted distribution in the western Mediterranean basin (Thibaut *et al.*, 2016; Aouissi *et al.*, 2018). Here we report on a new population of this species found in northern Catalonia, which adds a new locality for this scarce taxon in the northwestern Mediterranean.

The population was found in July 12<sup>th</sup> 2021 at the northern side of Cala Montgó in the MPA of the Parc Natural del Montgrí, illes Medes i Baix Ter (L'Escala, Girona, 42.107124°N, 3.175160°E) growing over a flat calcareous rocky bottom surrounded by sediment, between 20.4 and 21.1 m depth. Most specimens were heavily covered by silt (Fig. 1). The rocky bottom hold a dense population of *Ericaria zosteroides* (C. Agardh) Molinari-Novoa & Guiry (habitat: «Algal-dominated circalittoral rock with *Ericaria zosteroides* and *Gongolaria montagnei*», LPRE code 0302010101) (Ballesteros, 2019) with other common species including the erect algae *Dicthyota* sp., *Phyllophora crispa* (Hudson) P.S. Dixon, *Zanardinia typus* (Nardo) P.C. Silva, *Arthrocladia villosa* (Hudson) Duby, *Dudresnaya verticillata* (Withering) Le Jolis and *Chrysomenia ventricosa* (J.V. Lamouroux) J. Agardh, and the encrusting red algae *Mesophyllum alternans* (Foslie) Cabiocch & M.L. Mendoza, *Neogoniolithon mamillosum* (Hauck) Setchell & Mason, *Peyssonnelia rosa-marina* Boudouresque & Denizot and *Lithophyllum stictiforme* (Areschoug) Hauck. *Sargassum trichocarpum* was absent inside the dense cano-

py of *E. zosteroides* and was mainly present in the margins of the rocky outcrop, in places partially covered or situated very close to the sediment. We counted approximately 200 specimens, most of them reduced to the main axis and small branches with divided leaves. Only a few individuals showed long primary branches with fertile structures.



Figure 1. In situ aspect of the specimens of *Sargassum trichocarpum* found in Cala Montgó.

Completely developed individuals measured 25-40 cm long, with one to three cylindrical main axis of 2-3 cm arising from a basal disc 8-12 mm in diameter, strongly attached to rock (Fig. 2). Primary branches cylindrical, smooth, non muriculate, up to 35 cm long. Leaves with a conspicuous midrib, those present in the basal part of the primary branches always divided up to five times, 4-6 mm wide, up to 8 cm long, wavy, denticulate with blunt tips. Leaves from the upper part of the branches were much smaller and thinner, usually undivided. Aerocysts spherical, usually pedicellate, 3-5



Figure 2. Specimen of *Sargassum trichocarpum* collected in Cala Montgó. Bar = 5 cm.

mm in diameter, sometimes mucronate. Fertile branches 2-6 cm long, with cylindrical receptacles 1 mm in diameter, up to 2 cm long, divided 1-4 times (Fig. 3). Three vouchers have been deposited at the Herbarium of the University of Girona (HGI-A 20877, HGI-A 20878, HGI-A 20879).



Figure 3. Close-up of aerocysts and receptacles heavily epiphytized by hydroids.

The closest records of *Sargassum trichocarpum* come from Martigues-Ponteau (Provence, France) (Verlaque, 1977) and Sausset les Pins (Verlaque & Boudouresque, 1981) situated 200 km away, where it was extremely rare around forty years ago and has not been collected again since 1982 (Thibaut *et al.*, 2016). The only other northwestern Mediterranean records are located in Columbretes islands (Gómez-

Garreta *et al.*, 2001) where, although uncommon, the species has been observed in different diving spots (EB, unpublished data). No other localities are known from the northwestern Mediterranean, which indicates the rarity of this species. In fact, *S. trichocarpum* is included in the Annex II of the Barcelona Convention (Verlaque *et al.*, 2019), which establishes a list of Mediterranean endangered or threatened species. Given that most species of the genera *Sargassum* seem to be in steady decline across most of the Mediterranean Sea (see Thibaut *et al.*, 2016) and the rarity of *S. trichocarpum* in the northwestern Mediterranean, the monitoring of this population through time and the searching for other possible localities in the nearby rocky outcrops is highly recommended.

### Acknowledgements

Funding was provided by Fundació Alive. Thanks are due to Andreu Pujades and Patricia Besem for their assistance during the scuba surveys.

### References

- Aouissi, M., Sellam, L. N., Boudouresque, C. F., Blanfuné, A., Derbal, F., Frihi, H., Perret-Boudouresque, M., Rebzani-Zahaf, C., Verlaque, M. & Thibaut, T. 2018. Insights into the species diversity of the genus *Sargassum* (Phaeophyceae) in the Mediterranean Sea, with a focus on a previously unnoticed taxon from Algeria. *Mediterranean Marine Science*, 19: 48-57.
- Ballesteros, E. 2019. *Llista dels hàbitats marins presents a Catalunya i la seva correspondència amb altres classificacions*. Generalitat de Catalunya. Departament de Territori i Sostenibilitat. Barcelona. 40 p.

- Boudouresque, C. F., Blanfuné, A., Harmelin-Vivien, M., Personnic, S., Ruitton, S., Thibaut, T. & Verlaque, M. 2017. *Where seaweed forests meet animal forests: the examples of macroalgae in coral reefs and the Mediterranean coralligenous ecosystem*. P. 369-396. In: Rossi, S.; Bramanti, L.; Gori, A.; Orejas C. J. (eds.). *Marine animal forests*. Springer International Publishing. Switzerland. 1366 p.
- Cornaci, M., Furnari, G., Catra, M. & Alongi, G. 2012. Flora marina bentonica del Mediterraneo: Phaeophyceae. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 45: 1-508.
- Giaccone, G. 2003. Biodiversity of the Mediterranean Sea: an introductory speech to the Marine algae Symposium. *Bocconeia Palermo*, 16: 182-192.
- Gómez-Garreta, A., Barceló-Martí, M. C., Pérez-Ruzafa, I. M., Ribera-Siguan, M. A. & Rull-Lluch, J. 2001. *Flora Phycologica Iberica. Vol. 1. Fucales*. Universidad de Murcia. Murcia. 192 p.
- Thibaut, T., Blanfuné, A., Verlaque, M., Boudouresque, C. F. & Ruitton, S. 2016. The *Sargassum* conundrum: highly rare, threatened or locally extinct in the NW Mediterranean and still lacking protection. *Hydrobiologia*, 781: 25-42.
- Verlaque, M. 1977. *Étude du peuplement phytobenthique au voisinage de la centrale thermique de Martigues-Ponteau (golfe de Fos, France)*. Ph. D. Thesis. Université d'Aix-Marseille II. France. 172 p.
- Verlaque, M. & Boudouresque, C. F. 1981. Végétation marine de la Corse (Méditerranée). V. Documents pour la flore des algues. *Biologie: Écologie méditerranéenne*, 8: 139-156.
- Verlaque, M., Boudouresque, C. F. & Perret-Boudouresque, M. 2019. Mediterranean seaweeds listed as threatened under the Barcelona Convention: a critical analysis. *Scientific Reports Port-Cros national Park*, 33: 179-214.