

NOTA BREU

Detection of *Chrysonephos lewisii* (W.R. Taylor) W.R. Taylor (Pelagophyceae: Sarcinochrysidales) in northern Catalonia (Northwestern Mediterranean)**Detecció de *Chrysonephos lewisii* (W.R. Taylor) W.R. Taylor (Pelagophyceae: Sarcinochrysidales) al nord de Catalunya (Mediterrània nordoccidental)**

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Macroalgal blooms of filamentous algae are one of the threatening effects for well-developed erect macroalgal, seagrass and macroinvertebrate beds, as they can suffocate its dominant species by depriving them of light or preventing suspension feeding (Mistri & Ceccherelli, 1997; Boddi *et al.*, 1999; Giuliani *et al.*, 2005; Lorenti *et al.*, 2005; Schiaparelli *et al.*, 2007). Causes of these blooms are still far to be understood although they seem related to the physical and chemical environment as well as on the climatic conditions (Rinaldi *et al.*, 1995). Whatever the cause is, it is accepted that these events are being increasingly common in the Mediterranean (Hoffman *et al.*, 2000; Sartoni *et al.*, 2008), raising the concern on their effects (Sartoni & Sonni, 1992; Welker & Bressan, 1994; Innamorati, 1995; Calvo *et al.*, 1995; Olianas *et al.*, 1996; Hoffman *et al.*, 2000; Lorenti *et al.*, 2005; Schiaparelli *et al.*, 2007). Three main species are reported to form these blooms (Sartoni *et al.*, 2008): *Acinetospora crinita* (Carmichael ex Harvey) Kornmann, *Nematochryopsis marina* (J. Feldmann) Billard and *Chrysonephos lewisii* (W.R. Taylor) W.R. Taylor. Although the first two species were reported in Catalonia from long time ago (Ballesteros, 1990) [as *Acinetospora vidovichii* (Meneghini) Sauvageau and *Tribonema marinum* J. Feldmann, respectively], no records existed so far for *Chrysonephos lewisii*. Here we report on first sights of *Chrysonephos lewisii* from Catalonia (Northwestern Mediterranean), these records being also the first ones for Spanish coastal waters.

Chrysonephos lewisii was found in August 29th 2022 at Punta Falconera (Roses, Girona, 42.232229°N, 3.218959°E) and at El Gat, Cap Norfeu (Roses, Girona, 42.23901°N, 3.264498°E), inside the Parc Natural del Cap de Creus. We recorded the abundance of *C. lewisii* only in the first site, and we identified the main species defining the habitats where it was found. Habitat codes follow Ballesteros (2019).

Chrysonephos lewisii was present in Punta Falconera between 5 and 33 meters depth, occurring as an epiphyte of different algal species and gorgonians. In deep waters

Chrysonephos lewisii was usually seen trapped to the gorgonian *Paramuricea clavata* (Risso, 1827) where it was presumably brought there by the currents (Figure 1a). In these deep waters (24 to 33 meters) the seascape could be assigned to a coralligenous bottom, with patches of the two habitats «Coralligenous outcrops with *Paramuricea clavata*» (LPRE code 0302022501) and «Algal-dominated coralligenous outcrops without Fucales or kelps» (LPRE code 03020104). At medium depths (12 to 23 meters) *Chrysonephos lewisii* was attached to different erect algae, mainly *Dictyota* spp., *Halopteris ficilina* (Grateloup) Kützinger, *Padina pavonica* (Linnaeus) Thivy, *Codium bursa* (Olivi) C. Agardh, *Laurencia chondrioides* Børgesen and *Caulerpa cylindracea* Sonder. The dominant habitat at these depths was «Infralittoral rock, moderately illuminated, without Fucales» (LPRE code 03010414) and *Chrysonephos lewisii* was extremely abundant, with estimated covers higher than 50 %, being the most evident organism at these depths (Figure 1b). In shallower water, above 12 meters depth, *Chrysonephos lewisii* became decreasingly abundant, although still attached to algae such as *Ellisolandia elongata* (J. Ellis & Solander) K.R. Hind & G.W. Saunders, *Padina pavonica* or *Halopteris scoparia* (Linnaeus) Sauvageau (Habitat «Sheltered infralittoral rock, well illuminated, without Fucales», LPRE code 03010307).

Samples were collected for their identification in the laboratory, since confusion with other filamentous blooming algae such as *Acinetospora crinita* or *Nematochryopsis marina* is easy in the field (Figure 1c). Microscopic view confirmed the identification of *Chrysonephos lewisii* (Figure 1d), which is characterized by the thin, easy to break apart filaments, measuring around 10 µm at the upper parts, with some terminations typically dichotomously divided, with the appearance of two rabbit ears.

Chrysonephos lewisii was described by William Randolph Taylor from Florida and Bermuda (Taylor, 1951, 1952) and was first collected in the Mediterranean by Marc Verlaque from Corsica (France) (Verlaque, 1990) and Tuscany (Italy)

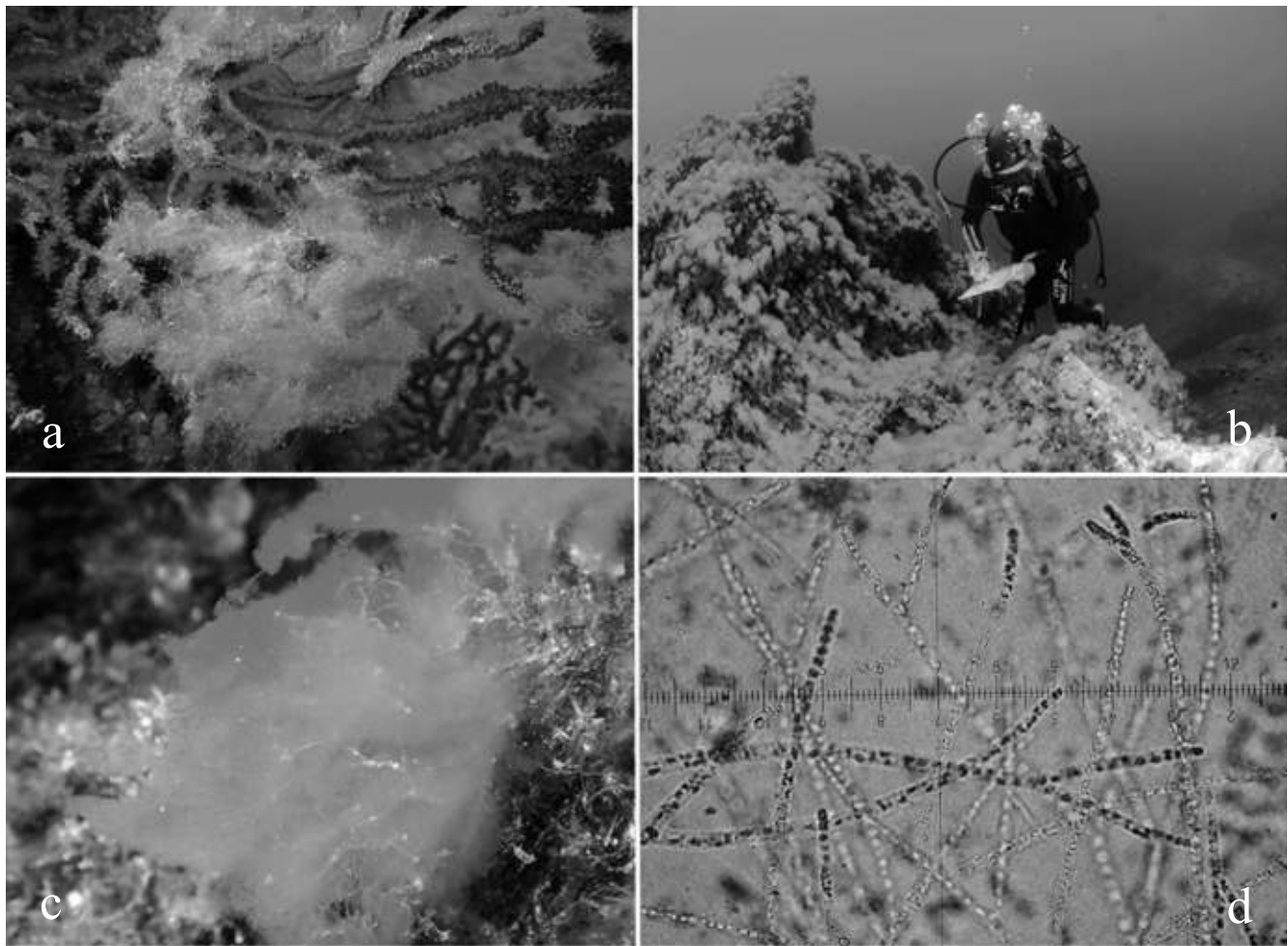


Figure 1. a) Filaments of *Chrysonephos lewisii* trapped amongst branches of *Paramuricea clavata*. b) Cover of *Chrysonephos lewisii* at 15 meters depth. c) Close up of *Chrysonephos lewisii* growing attached to different algae around 18 meters depth. d) Microscopic image of the apical parts of the filaments of *Chrysonephos lewisii*. The micrometer smallest division measures 5 μm .

by Gianfranco Sartoni and co-workers (Sartoni *et al.*, 1995). Subsequently, this presumably introduced species has been considered a nuisance, as it participates in mucilaginous aggregates that suffocates the sea bottom, together with *Acinetospora crinita* and *Nematochryopsis marina* (Hoffman *et al.*, 2000; Giuliani *et al.*, 2005). Outside the Mediterranean Sea, *C. lewisii* has also been reported from Guam (Lobban, 1995), Puerto Rico (Ballantine & Aponte, 1997) and Hawaii (Huisman *et al.*, 2007). In Tuscany *C. lewisii* seems to develop later than *Acinetospora crinita*, showing its maximum development in July (Giuliani *et al.*, 2005). *Chrysonephos lewisii* also seems to be the most harmful alga when trapped amongst the branches of three species of gorgonians [*Paramuricea clavata*, *Eunicella singularis* (Esper, 1791) and *Eunicella cavolini* (Koch, 1887)], resulting in the development of the partial mortality after the blooming periods of these filamentous aggregates (Giuliani *et al.*, 2005). Bearing in mind that these three species of gorgonians are already suffering recurrent mass mortality events in the Northwestern Mediterranean associated to the ongoing warming context (Garrabou *et al.*, 2022), the detection of *C. lewisii* as a

big player in filamentous aggregates in Cap de Creus increase the sources of severe perturbations for these key gorgonian species. Overall, we expect that this context will undermine the survival and recovery of gorgonian populations driving them to collapse trajectories (Garrabou *et al.*, 2021). We suggest monitor algal blooms on regular basis along the Catalan coast where gorgonian populations are abundant such as the marine protected areas of Parc Natural del Cap de Creus and Parc Natural del Montgrí, Illes Medes i Baix Ter, in order to track their cumulative impact in the decay of the once spectacular gorgonian gardens in these areas.

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