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NOTA BREVE / BRIEF NOTE

ECOLOGÍA MARINA

FLOATING *Sargassum* IN SERRANILLA BANK, CARIBBEAN COLOMBIA, MAY JEOPARDIZE THE RACE TO THE OCEAN OF BABY SEA TURTLES

Sargassum flotante en Cayo Serranilla, caribe colombiano, puede perjudicar la llegada al oceano de las tortugas marinas recién nacidas

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ABSTRACT

We report for the first time great quantities of floating *Sargassum* to Serranilla Bank, in the Central Caribbean. The island is an important nesting site for sea turtles, and by the time the *Sargassum* wave arrived, the baby turtles were disclosing. Due to the thick mat of *Sargassum* along the beach, the baby turtles may have troubles to reach the ocean.

Keywords: baby turtles, floating *Sargassum*, nesting site.

RESUMEN

Se reporta por primera vez una gran cantidad de *Sargassum* flotante en Cayo Serranilla, en el Caribe central. La isla es un sitio importante para anidamiento de tortugas marinas, y al momento de la llegada del *Sargassum*, los nidos estaban eclosionando. Debido al espeso tapete de algas en la playa, las tortuguas puede tener problemas en llegar al mar.

Palabras clave: *Sargassum* flotante, sitios de anidamiento, tortugas marinas.

Floating *Sargassum* has been known since Christopher Columbus to occur in the Atlantic Ocean, off the east coast of Florida, in a region named Sargasso Sea (Djakouré *et al.,* 2017). It consists of two pelagic species, *Sargassum fluitans* and *Sargassum natans*, which conform a floating ecosystem with a high diversity of species associated to and dependent onto it (Hoffmayer *et al.,* 2005); the Sargasso Sea is unique because it is the only self-sustaining community of holopelagic algae (Trott *et al.,* 2010). Most species associated to *Sargassum* are highly adapted, with appendages and coloration mimicking the alga (Sterrer, 1992). Ten species of invertebrates and one species of fish are endemic to the Sargasso Sea (Trott *et al.,* 2010). Many other species, including a diverse array of juvenile and migratory fishes, and at least four species of sea turtles, all endangered, use the ecosystem as nursery habitat or as feeding ground (Manzella and Williams, 1991; Mansfield *et al.*, 2014).

It has been estimated that the Sargasso Sea harbors about ten million tons of wet biomass (Johnson *et al.,* 2013). Despite the fact that drift *Sargassum* has historically been reported on the shores along the Gulf of Mexico and the Caribbean Sea (Taylor, 1960), since 2011 the biomass of seaweeds washed ashore has reached unprecedented amounts and has been observed at localities where it was uncommon or unreported before this date (Smetacek and Zingone, 2013; Gavio *et al.,* 2015, Rodriguez-Martinez *et al.,* 2016, Louime *et al.,* 2017). Several hypotheses have been proposed to explain such events, including an excess of nutrient loads, a change in trade currents, and unusually high sea surface temperatures (Lopez *et al.,* 2008; Djakouré *et al.,* 2017). Wrack *Sargassum* biomass may be beneficial to the environment at moderate densities, because it provides food and shelter to several species, it may help fight beach erosion and provide nutrients to beach habitats (Lopez *et al.,* 2008). However, when biomass is very high, it may have negative effects: the accumulation of algae on the water surface precludes light penetration, and affect corals, seagrasses and benthic macroalgae (Lopez *et al.,* 2008). The drift algae on the beach may become a barrier to nesting turtles and/or to baby turtles finding their way to the ocean (Maureer *et al.,* 2015; Azanza-Ricardo and Pérez-Martín, 2016). Cleaning up the excessive biomass along the beaches may enhance

beach erosion (Louime *et al.,* 2017), and decomposition of many tons of seaweed on the shore may change water chemistry, induce anoxia and produce hydrogen sulphide, which is harmful to most organisms, with consequent fish die-off (Cruz-Rivera *et al.,* 2015).

Furthermore, deposits of large quantities of algae are not well-seen by beach users, and tourists have been reported to avoid resorts affected by golden tides, with negative impacts on the tourism industry (Milledge and Harvey, 2016).

Serranilla Bank is an ancient atoll in the Caribbean Sea, at 15° 50' N and 79 ° 50' W (Fig. 1). It has several small cays emerging from the water to form some permanent islands. These oceanic cays, isolated from other emerged territories, have been recognized only recently as important nesting areas for sea turtles (Barrientos-Muñoz and Ramirez-Gallego, pers. comm.). In September 2017, the Colombian Commission for the Ocean (CCO), with the financial support of Colciencias and Dimar, and the logistic support of the Colombian Navy (Armada de Colombia), organized a scientific expedition (*Seaflower* Expedition 2017) to Serranilla bank, to study the biodiversity of this remote area of the country. During this expedition, we observed great amounts of floating *Sargassum* reaching the beaches of Beacon Cay, the largest island in Serranilla Bank (Fig. 2). The algae accumulated on the beaches, and formed a thick mat to 40 cm high. Along the beach, a great number of sea turtle nests were reported (Barrientos-Muñoz and Ramirez-Gallego, pers. comm.) which, by the time of the *Sargassum*

Figure 1. Location of Serranilla Bank in the Caribbean Sea (yellow dot).

Figure 2. Aerial photo of floating Sargassum reaching Beacon Cay. Photo credits: Santiago Estrada-Robledo.

wave, were ready to disclose. We were able to observe some baby turtles having troubles passing the barrier posed by the *Sargassum* mat (Fig. 3), and were vulnerable to predation by ghost crabs, rats and other predators.

At other Caribbean localities, it has been reported that baby turtles may have problems to pass through *Sargassum* mat and reach the sea (Maureer *et al.,* 2015); also adult turtles may be negatively affected by seaweed wrack: in Cuba, there was a decrease of nesting success during *Sargassum* influx: the most affected species was loggerhead turtle, which is smaller and weaker than green turtle (Azanza-Ricardo and Pérez-Martín, 2016). Considering that all the species of sea turtles in the Caribbean are at extinction risk, large amount of *Sargassum* in Serranilla Bank may pose an additional threat to the survivorship of these organisms.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

Figure 3. A baby turtle struggling in the *Sargassum* mat.

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