

DYNAMICS AND MANAGEMENT OF PELAGIC *SARGASSUM* SPP. IN THE MEXICAN CARIBBEAN

Valeria Chávez, Instituto de Ingeniería UNAM, vchavezc@iingen.unam.mx

Abigail Uribe-Martínez, Harte Research Institute Furgason Fellow - Kalanbio, A.C., abigail.uribemartinez@tamucc.edu
Eduardo Cuevas, Consejo Nacional de Ciencia y Tecnología, Universidad Autónoma del Carmen, amir.cuevas@gmail.com

Brigitta I. van Tussenbroek, Instituto de Ciencias del Mar y Limnología UNAM, vantuss@cmarl.unam.mx

Rodolfo Silva, Instituto de Ingeniería UNAM, rsilvac@iingen.unam.mx

INTRODUCTION

Sargassum fluitans and *S. natans* (sargasso) are species of brown floating algae. They are found in the Atlantic, concentrated the Sargasso Sea, and also, since 2011, in the Great Atlantic Sargassum Belt (Wang et al., 2019). Floating masses of sargasso offer resting, reproduction and feeding areas for many species (some of economic interest), and serve as a biological connectivity vector. However, since late 2014, massive quantities of sargasso have appeared on the coasts of the Mexican Caribbean. This has brought serious negative impacts, such as mortality of nearshore benthic flora and fauna, beach erosion, pollution, a decrease in tourism and high costs in managing the impacts (Chávez et al., 2020).

SARGASSO DYNAMICS

Depending on hydrodynamic conditions, sargasso is transported to the coasts (beaching) or remains offshore, carried away by the ocean currents of the Atlantic. One of the main challenges in understanding sargasso dynamics has been the unpredictability of the influx, as sargasso concentrations in the ocean vary seasonally and interannually, and the ocean concentrations of sargasso and the beached biomass do not always coincide. Field observations, satellite imagery analysis and numerical modelling have been used in various studies to understand the dynamics of sargasso. Using Landsat 8 images for 2014 to 2020, we determined the seasonal and interannual spatial distribution of sargasso coverage, relating those results to wave and wind conditions for the open-sea along the Mexican Caribbean coast, obtained from Era5 reanalysis. The greatest coverage was observed in the northern Mexican Caribbean, an area of major tourism (Figure 1).

SARGASSO MANAGEMENT IN MEXICO

To date, Mexico does not have an official national legal strategy for Sargasso management, to include harvesting, storage, valorization and disposal, (López-Miranda et al., 2021). Examples of harvesting activities and explored uses of sargasso in Mexico are shown in Figure 2, many of which have also been explored in other Caribbean countries. Mexico has the technical, scientific, industrial and marketing capacity to generate effective and lasting solutions that can be followed/adapted in many countries facing the same challenge. Unfortunately, lack of a legal framework in Mexico has sometimes led to undesirable side effects of the strategies currently in use. The multidisciplinary challenge of dealing with the massive influx of sargasso must be addressed by comprehensive management plans, to move towards the consolidation of a circular economy for the sustainable and regulated use of sargasso.

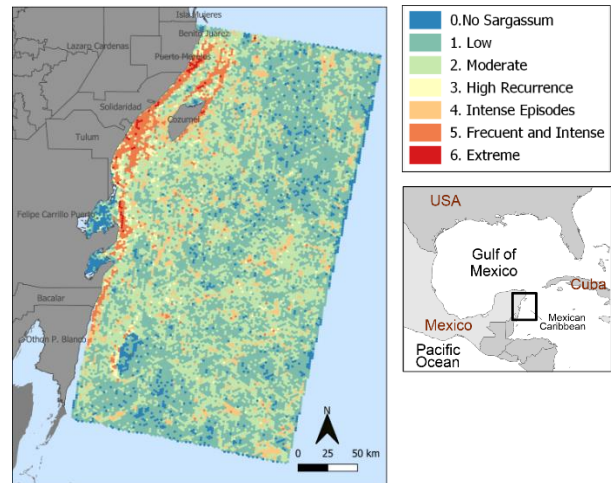


Figure 1 - Mexican Caribbean, indicating areas with different classes of sargasso coverage (2014-2020).

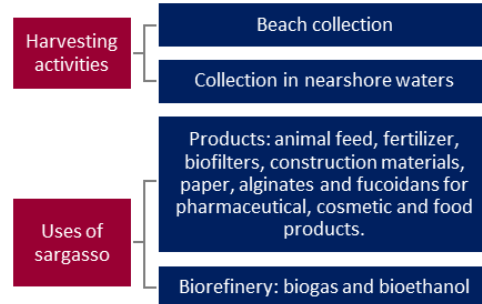


Figure 2 - Harvesting activities and explored uses of sargasso in Mexico.

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