ID: W2805229907

TITLE: Factors controlling the seasonal distribution of pelagic Sargassum

AUTHOR: ['Maureen T. Brooks', 'Victoria J. Coles', 'Raleigh R. Hood', 'J. F. R. Gower']

ABSTRACT:

MEPS Marine Ecology Progress Series Contact the journal Facebook Twitter RSS Mailing List Subscribe to our mailing list via Mailchimp HomeLatest VolumeAbout the JournalEditorsTheme Sections MEPS 599:1-18 (2018) - DOI: https://doi.org/10.3354/meps12646 FEATURE ARTICLE Factors controlling the seasonal distribution of pelagic Sargassum Maureen T. Brooks1,*, Victoria J. Coles1, Raleigh R. Hood1, Jim F. R. Gower2 1University of Maryland Center for Environmental Science, Horn Point Laboratory, PO Box 775, Cambridge, MD 21613, USA 2Fisheries and Ocean Canada, Institute of Ocean Sciences, Sidney, BC V8L 4B2, Canada *Corresponding author: mbrooks@umces.edu ABSTRACT: Pelagic Sargassum (S. fluitans and S. natans) is endemic to the tropical and subtropical North Atlantic, where it provides habitat for a diverse and economically important ecosystem. Here, we investigate what controls the Sargassum seasonal distribution using a coupled modelling approach that integrates output from a data-assimilating 1/12° HYCOM simulation, a 1/4° coupled HYCOM-biogeochemical model, and individual-based Lagrangian Sargassum growth models. Passively advected, buoyant particles with no Sargassum physiology aggregate in the central North Atlantic Subtropical Gyre at annual time scales and do not show distributions consistent with satellite observations of Sargassum. However, at shorter time scales, advection alone can explain up to 60% of the following month observed distribution during some periods of the year. Connectivity between the tropical Atlantic and Sargasso Sea is largely one-way, with the Sargasso Sea acting as a ?dead end? for Sargassum. Adding growth, mortality and a simple formulation of reproduction through fragmentation to the passive advection of Sargassum particles generates distributions that match observations with 65 to 75% accuracy across all seasons. Incorporating both ocean circulation and Sargassum physiology appears to be key in successfully reproducing the seasonal distribution of biomass. We propose a conceptual model of the Sargassum seasonal cycle that incorporates new information about a population in the tropical Atlantic. Additionally, we suggest that the Gulf of Mexico and Western Tropical Atlantic are regions whose Sargassum populations may disproportionately influence the basin-wide biomass. KEY WORDS: Pelagic Sargassum · Macroalgae · Lagrangian transport Full text in pdf format Information about this Feature Article Supplementary material NextCite this article as: Brooks MT, Coles VJ, Hood RR, Gower JFR (2018) Factors controlling the seasonal distribution of pelagic Sargassum. Mar Ecol Prog Ser 599:1-18. https://doi.org/10.3354/meps12646 Export citation RSS - Facebook - Tweet - linkedIn Cited by Published in MEPS Vol. 599. Online publication date: July 12, 2018 Print ISSN: 0171-8630; Online ISSN: 1616-1599 

SOURCE: Marine ecology. Progress series

PDF URL: https://www.int-res.com/articles/feature/m599p001.pdf

CITED BY COUNT: 75

PUBLICATION YEAR: 2018

TYPE: article

CONCEPTS: ['Sargassum', 'Pelagic zone', 'Oceanography', 'Upwelling', 'Ocean gyre', 'Subtropics', 'Geography', 'Environmental science', 'Ecology', 'Biology', 'Algae', 'Geology']