

Thalassodendron meadows as sea turtle habitats in the Western Indian Ocean

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CONTEXT

The Western Indian Ocean (WIO) region is one of the world's most species-rich areas for seagrass, which provide forage for the green turtle (*Chelonia mydas*) and feeding habitat for hawksbill turtles (*Eretmochelys imbricata*). In particular, *Thalassodendron ciliatum*, a large and robust climax seagrass species, is a common Indo-Pacific species, but historically has not been considered a favored element in the diet of the herbivorous green turtles. In Seychelles, hawksbill turtles are known to feed on epibiota living in association with *T. ciliatum*.



THALASSODENDRON - TURTLES INTERACTIONS

While mixed-species and intertidal seagrass meadows are known primary as feeding grounds for green turtles in the WIO region, data from green turtles tracked using Fastloc GPS and underwater obervations recently revealed that the species also uses *T. ciliatum*

Seychelles

Analysis of the gut contents of adult green turtles slaughtered in the southern islands in the early 1980s is underway to determine which species of seagrass formed their diet (*Mortimer et al. unpublished data*). This study is complemented by recent satellite tracking studies that tracked adult green turtles from British Indian Ocean Territory to some of the same shallow water sites (3-10m deep) in Seychelles where turtles were killed in the 1980s. Several species of seagrass have been recorded in these sites, including *Thalassodendron ciliatum*.

Hawksbill turtle resting in a *Thalassodendron* meadow (Green & Short, 2003, World Atlas of Seagrasses. University of California Press, USA.)

Bathymetric Lidar

-35 to -20m

- 20 to -15m

15 to -10m

10 to -7m

7 to -6m

6 to -5m

-5 to -4m

-4 to -3m

-3 to -2m

2 to -1m

1 to 0m

+2 to +5m

1 to +2m

+5 to +13m

(2009)

> -35m

subtidal habitats. The value of *Thalassodendron* meadows as a suitable habitat and food item for the green turtle is highlighted in Glorieuses Archipelago, in the Seychelles and in the Great Chagos Bank. This insight enhances our knowledge of the ecosystem services that this poorly documented, yet abundant seagrass species provides for sea turtles.

Great Chagos Bank

Satellite tracking of post-nesting female green turtles has been performed from nesting beaches at Diego Garcia atoll in 2012-2015 (*Hays et al. 2014*). Four of the tracked turtles used *Thalassodendron ciliatum* meadows 26-30 m deep on the Great Chagos Bank, for a tracked period of up to 19 months with a diurnal migration distance of 6 km between seagrass meadow (day) and reef habitat (night) (*Christiansen et al. 2017, Hays et al. 2018*).

Glorieuses Archipelago

Mixed-species and intertidal seagrass meadows occur on small geographic areas around the two small islands, while 36 km² covered by *Thalassodendron* up to 30 m depth. Among 10 juvenile green turtles equipped with a Fastloc GPS in 2015-2016, three of them used the *T. ciliatum* meadows (Figs.1, 2). Further investigations are needed to reveal the functional role of these seagrass habitats.





#Turtle

CCL / SCL (cm) Weight (kg) Tracking duration

ation Habitat use

				Habitat abe
#148234 - Patapouf 🧲	75.5 / 69.5	49.2	6 months (2015-16)	daytime locations
#152026 - Shark	58.5 / 55	21.0	6 months (2015-16)	daytime /nighttime locatio
#152023 - Narguile	61/57	23.5	4 months (2015-16)	three-days locations

Fig.1 Spatial distribution of three juvenile green turtles equipped with a Fastloc GPS (SPLASH10, Wildlife Computers, USA) in the Glorieuses Archipelago, Scattered Islands, French Southern and Antarctic Lands. (CCL/SCL: Curved/Straight Carapace Length) (see Fig.2)

TOWARDS A REGIONAL SEAGRASS NETWORK

In the context of global change, obtaining an overall understanding of seagrass trends is key to provide an early warning of major changes, and measuring the importance of seagrass ecosystems for endangered species reinforces an appreciation of their ecological value.

Supported by a newly EU funded project to reinforce seagrass conservation in the Western Indian Ocean, a regional seagrass advisory and monitoring network is being set up. It will aim to standardize seagrass monitoring protocols, provide a regional overview of seagrass habitats, and facilitate regional cooperation on seagrass-turtle interaction researches.



Fig.2 Temporal pattern of seagrass habitat use by juvenile green turtles in Glorieuses Archipelago (see Fig.1): (a) Daily and (b) hourly distribution of GPS locations in Thalassodendron meadows

Literature cited

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