First field observation of a *Thalassodendron ciliatum* bed on the Nazareth Bank, Mascarene Plateau

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Seagrass meadows are one of the most productive marine ecosystems in the world (Duarte and Cebrian, 1996). They play key ecological roles in providing important services such as nursery and feeding grounds for juvenile fish and other marine organisms, thus maintaining populations of commercially exploited fishery resources (Jackson *et al*., 2001). Seagrass has strong linkages with coral reefs and mangroves, forming one of the most productive coastal habitats, and can play a critical role in buffering the effects of ocean acidification on adjacent coral reefs (Anthony *et al*., 2011). They often form extensive meadows which can be of mono- or multi- specific species. They are commonly situated in shallow areas of lagoons up to 20 meters depth, or deeper if the environmental conditions permit photosynthesis. There are about 60 species of seagrasses worldwide and 13 species are known to occur in the Western Indian Ocean (Gullstrom *et al*., 2002), making up an important habitat in coastal waters (Gullstrom *et al*., 2002; Duarte *et al*., 2012). While it has been reported that 5 seagrass species prevail in Mauritian waters (Jagtap, 1993), very few studies have been carried out on seagrasses and their associated organisms (Paupiah *et al*., 2000; Daby, 2003; Nakamura *et al*., 2006; Ramah *et al*., 2014), and even less on their occurrence on distant fishing banks, creating a significant knowledge gap on this important ecosystem in the waters of the Republic of Mauritius.

During the EAF-Nansen Indian Ocean Research Expedition 2018, two shallow locations over the Nazareth Bank were explored; location SS45 (14° 10.852'S; 60° 56.465'E) and SS46 (14° 24.848'S; 61° 02.659'E) on the northeast of the bank with a depth range of 35-36 m and 34-38 m, respectively. The Nazareth Bank is found within the Exclusive Economic Zone of the Republic of Mauritius and is characterised by a surrounding slope of about 150 m with a shallow central part of about 50 - 60 m deep (Mees, 1996). With the aid of the Argus Remotely Operated Underwater Vehicle (ROV) attached to the Video-Assisted Multi-Sampler (VAMS), SS45 and SS46 were explored for 11 minutes along a transect of 37 m and 30 minutes along a transect of 110 m, respectively. Both areas were covered with the seagrass *Thalassodendron ciliatum* or mixed with organisms such as *Halimeda* spp. and sponges, among others (Fig. 1). Both locations indicated the occurrence of one dominant species of seagrass of approximately 90 – 100 % coverage within the studied area, similar to the Saya de Malha Bank. This observation provides new information on seagrass beds occurring on the Mascarene plateau, notably on the Nazareth Bank.

One of the very important services that seagrass beds provide, besides being important as nursery grounds for fish and other juvenile benthic organisms, is its blue carbon storage capacity. While seagrasses have been recognised for their carbon sequestration capacity since the 1980s (Smith, 1981), this topic has received very little attention until recently where they have been recognised as a blue carbon ecosystem that could potentially contribution in addressing climate change impacts (Duarte *et al*., 2005, 2013; Mcleod *et al*., 2011; Fourqurean *et al*., 2012; Gullstrom *et al*., 2018; Bedulli *et al*., 2020). Indeed, seagrass can absorb carbon dioxide from the atmosphere and the ocean for the process

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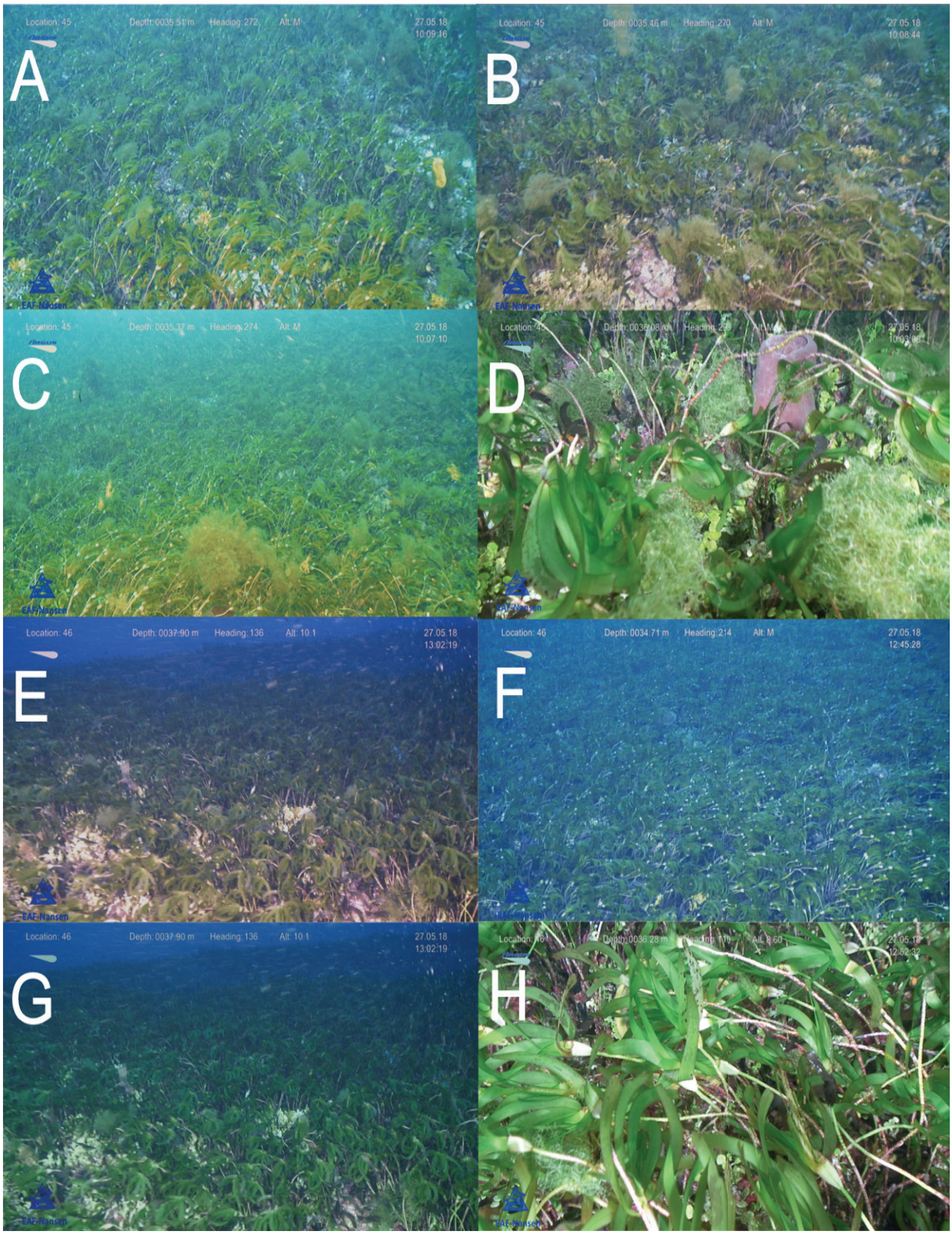

Figure 1. Presence of large seagrass beds (*T. ciliatum*) on the Nazareth Bank. A-D: Location 45 at a depth range of 35-36 m. E-H: Location 46 at a depth range of 34-38 m. D and H represents a closer view of the seagrass species at Location 45 and 46, respectively. Photographs were taken using the Argus Remotely Operated Underwater Vehicle (ROV).

of photosynthesis and store the organic carbon for a long time in the underlying sediments (McKenzie and Unsworth, 2009). Globally, they have been estimated to sequester between 27-44 Tg (approximately 10-18 %) of organic carbon per year in the ocean. This is comparable to terrestrial and mangrove forests (Duarte *et al*., 2005; Fourqurean *et al*., 2012). A study in 2012 by Gullstrom *et al*. (2018), conducted on the Eastern African coast of Tanzania and Mozambique, demonstrated that of the four species of seagrass meadows targeted, *Enhalus acoroides*, *Thalassia hemprichii*, *Cymodocea* spp., and *T. ciliatum*, meadows of both *E. acoroides* and *T. ciliatum* had a significantly higher organic carbon stock (approximately 7305 gm^{-2}) as compared to the other two species.

Research carried out on the Nazareth Bank is extremely limited and has been concentrated mainly on its fisheries resources (Caussy *et al*., 2019), primary productivity (Ramchandur *et al*., 2017) or oil and gas prospects (Meyerhoff and Kamen-Kaye, 1989), while no research has been carried out on its benthic habitats, especially on the presence of seagrass beds with potential for blue carbon sequestration. This first field observation on the presence of large *T. ciliatum* meadows at two shallow water areas within the Nazareth Bank brings forth new knowledge on the distribution of this species in the waters of the Republic of Mauritius. More work is however warranted to thoroughly explore the distribution of such meadows within the Bank as well as their potential for carbon capture.

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