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Biodiversity Record: Cyanobacteria (cf. *Neolyngbya*) on coastal geotextile sandbag revetments

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Subjects: cf. *Neolyngbya* sp. (Cyanobacteria: Cyanophyceae: Oscillatoriales: Microcoleaceae).

Subjects identified by: Aaron Zuyang Fong and Lik Tong Tan.

Location, date and time: Singapore Island / Singapore Strait, East Coast Park, Areas F and G, 5 May 2026 at around 1730 hrs and 12 May 2026 at around 1130 hrs.

Habitat: Marine. Intertidal sandy seashore. On coastal geotextile sandbag revetments.

Observers: Aaron Zuyang Fong and Lik Tong Tan.

Observations: Extensive cyanobacterial mats were observed attached to lower tier rows geotextile sandbag revetments (Fig. 1). These were not found on any adjacent substrate such as on sand, concrete or rock seawalls. This cyanobacteria displays the following features — thallus spreading, flat, forming dark green mats (Fig. 2); filaments single, straight with no false branching, usually 37.5–42.0 µm wide (about 50 cells measured) (Fig. 2); sheath colourless and smooth, about 1.0 µm wide; trichomes occasionally slightly constricted at the cross-walls, granulated (Figs. 2B, F), yellow, light green or brown coloured; cells discoid, typically 32.5–37.5 µm wide and 3.7–5.0 µm long (Fig. 2); apical cells widely rounded with no observable calyptra (Figs. 2A, C); separation discs and necridic cells occasionally present (Figs. 2A, D, E).

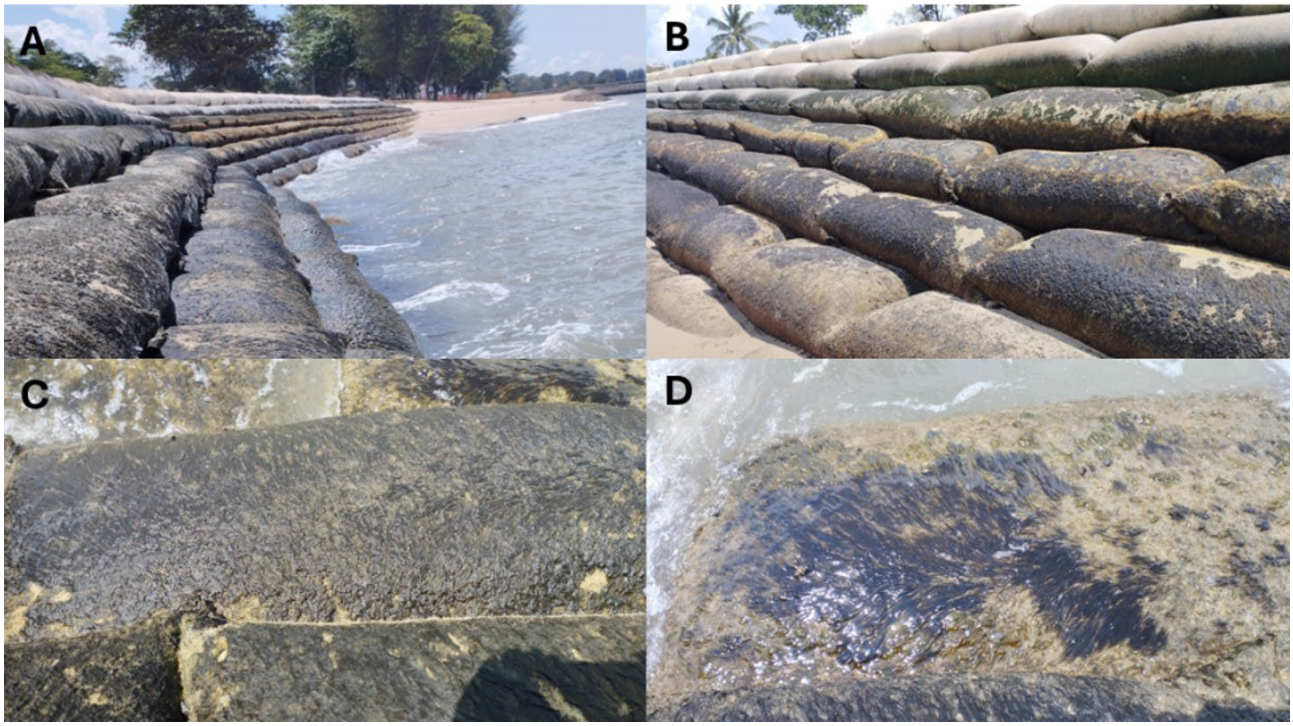

Fig. 1. Extensive benthic mats of cf. *Neolyngbya* sp. on geotextile sandbag revetments in East Coast Park. (A, B) Geotextile sandbag revetments used in coastal protection. (C, D) Establishment and colonisation of cf. *Neolyngbya* sp. on the lower tier geotextile sandbags. (Photographs by: Lik Tong Tan).

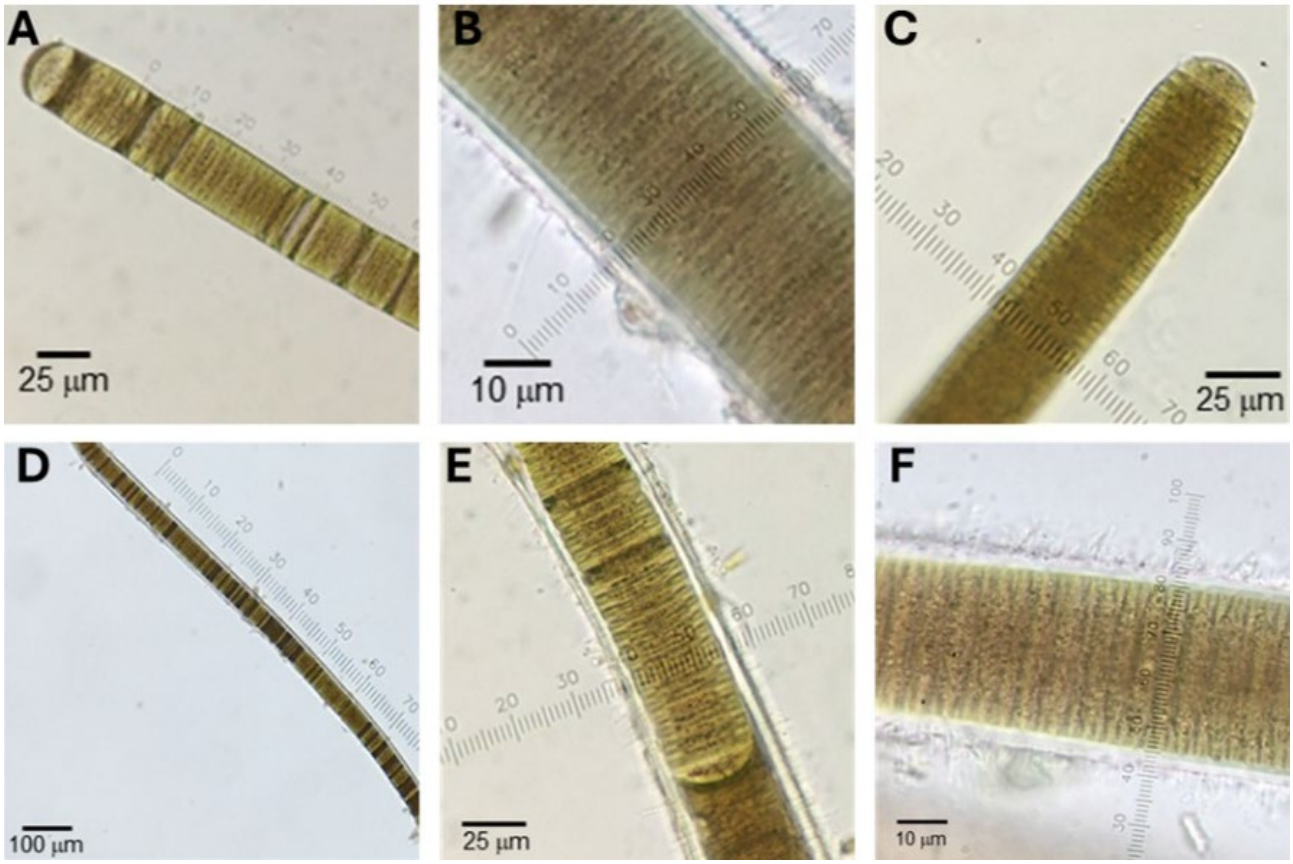

Fig. 2. Microscopic images of cf. *Neolyngbya* sp. obtained from sandbag revetments from various sites at East Coast Park. A, ×400 magnification from area F; B, ×1000 magnification from area F; C, ×400 magnification from area F; D ×100 magnification from area G; E, ×400 magnification from area G; and F, ×1000 magnification from area G. (Photographs by: Lik Tong Tan)

Remarks: Morphological examination of cf. *Neolyngbya* sp. collected from three coastal sites at East Coast Park, Areas F and G possibly represent the largest occurrence of filamentous marine cyanobacteria on geotextile sandbags. The current cyanobacterial samples from East Coast Park share several morphological features with known *Neolyngbya* species, including presence of gas vesicles, cross-wall granulation, discoid cell morphology, and apical cells that are usually rounded or conical-rounded and typically lack a calyptra (Fig. 2).

To date, ten *Neolyngbya* species have been described, and they are mostly found in the intertidal zone, often exposed to intense sunlight and desiccation during low tide (Curren & Leong, 2018; Caires et al., 2018a; Lefler et al., 2021; Nuryadi & Suda, 2022; Ginn et al., 2025). The filament/cell dimensions of cf. *Neolyngbya* sp. are significantly larger than any of the known *Neolyngbya* species. For instance, *N. biscaynensis* and *N. tenuis* cell widths were reported to be 16.1–21.3 µm and 18.2–24.3 µm, respectively (Caires et al., 2018a; Lefler et al., 2021).

Although *Neolyngbya* sp. has previously been documented in Singapore's coastal habitats (Curren & Leong, 2018; Lefler et al., 2021; Curren et al., 2025), the favorable colonisation on geotextile substrates of engineered shoreline protection structures at East Coast Park has not previously been reported. The fibrous and porous nature of geotextile materials used in these structures may provide a more favorable substrate for filamentous cyanobacterial attachment and proliferation compared to conventional surfaces, such as concrete or rock seawalls, which typically lack comparable microstructural complexity.

This observation suggests that geotextile-based revetments may inadvertently facilitate the establishment of benthic cyanobacterial mats, with implications for both ecological succession and potential cyanotoxin risks as certain *Neolyngbya* species are known to harbor cyanotoxin biosynthetic gene clusters (Caires et al., 2018b). Varello et al. (2021) demonstrated that the incorporation of geotextile fabrics into coastal ecosystems can influence benthic community development, highlighting the need to evaluate how such substrates shape microbial colonisation dynamics in tropical urban shorelines. To date, the ecological consequences of geotextile colonisation by filamentous cyanobacteria remains unexplored in Singapore, highlighting a critical research gap at the interface of coastal engineering and microbial ecology.

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