

## Juvenile knobbly sea stars on Singapore shores

**Subjects:** Knobbly sea star, *Protoreaster nodosus* (Echinodermata: Asteroidea: Oreasteridae).

**Subjects identified by:** Contributors.

**Locations, date and time:** Singapore Island - Changi Beach Park on 22 January, 2 July & 30 October 2015; Berlayer Creek on 1 October 2015; East Coast Park on 10 February 2016; before sunrise and after sunset at low tide.

**Habitat:** Estuarine and marine. Rocky shore, seagrass meadow and sandy shore. Seagrass meadow and sandy shore located along reclaimed land.

**Observers:** Contributors, with Tan Zhi-en, Law Ing Sind, Ian Siah, Stanley Quek, Tang Yong Jen & Raphael Siah.

**Observations:** Five separate records over 2015 and 2016 -

- 1) At a reclaimed stretch of Changi Beach on 22 January 2015, a green juvenile of about 5 cm (arm-to-arm) was found among spoon seagrass (*Halophila ovalis*). The poorly developed knobs were a slightly darker shade of green from the rest of the body (Fig. 1).
- 2) At a reclaimed stretch of Changi Beach on 2 July 2015, a greenish-brown juvenile of about 7 cm (arm-to-arm) with brown knobs was found amongst needle seagrass (*Halodule uninervis*) (Fig. 2.). Part of one arm was broken. A larger juvenile of about 15 cm (arm-to-arm) with greyish-blue body and brown knobs was also found (Fig. 3). This individual had approximately 30 small snails, possibly parasitic eulimids, on both aboral and oral sides.
- 3) At the mouth of Berlayer Creek on 1 October 2015, a brown juvenile of about 15 cm (arm-to-arm) with greyish-blue knobs was found on natural rocky shore (Fig. 4). The end of one arm had been severed, and the tube feet were reddish in colour. A second, completely brown juvenile (under 5 cm arm-to-arm) with only slightly raised knobs was also found (Fig. 5).
- 4) At a reclaimed stretch of Changi Beach on 30 October 2015, a grey coloured juvenile of about 7 cm (arm-to-arm) with brown knobs was found amongst spoon seagrass (*Halophila ovalis*) (Fig. 6).
- 5) At East Coast Park along a reclaimed stretch of beach on 10 February 2016, a green juvenile (estimated 5 cm arm-to-arm) was found on a sandbank (Fig. 7). A second juvenile of about 5 cm (arm-to-arm), brown with blue knobs, was also found (Fig. 8). The two individuals may have been washed up from the seagrass meadow just beyond the sandbank.

**Remarks:** The knobbly sea star is regarded as an endangered species in Singapore (Lane, 2008). Due to reclamation and possibly over-collection, it is now rarely found on the shores of mainland Singapore. The presence of juveniles along the mainland is an encouraging sign for the recovery of our reclaimed shores.

**Reference:** Lane, D., 2008. Echinodermata. In: Davison, G. W. H., P. K. L. Ng & H. C. Ho (eds.). *The Singapore Red Data Book. Threatened plants and animals of Singapore*. The Nature Society (Singapore). p. 129-133.

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Fig 1. Green-coloured juvenile knobbly sea star of about 5 cm arm-to-arm at Changi Beach.



Fig 2. Juvenile knobbly sea star of about 7 cm arm-to-arm at Changi Beach seagrass meadow with greenish-brown coloration, and a broken arm.

Photographs by Tan Yong How Jonathan





Fig. 3. Dorsal (left) and ventral (right) views of juvenile knobbly sea star of about 15 cm arm-to-arm at Changi Beach seagrass meadow covered in snails, possibly parasitic eulimids.



Fig. 4. Dorsal (left) and ventral (right) views of juvenile knobbly sea star of about 15 cm arm-to-arm at Berlayer Creek rocky shore with a broken arm.

Photographs by Tan Yong How Jonathan





Fig. 5. Dorsal view of juvenile knobbly sea star, under 5 cm arm-to-arm, at Berlayer Creek rocky shore.



Fig. 6. Dorsal view of juvenile knobbly sea star of about 7 cm arm-to-arm at Changi Beach seagrass meadow.

Photographs by Tan Yong How Jonathan





Fig. 7. Dorsal (left) and ventral (right) views of juvenile knobbly sea star of about 5 cm arm-to-arm at East Coast Park sandbank.



Fig. 8. Dorsal view of juvenile knobbly sea star of about 5 cm arm-to-arm at East Coast Park sandbank.

Photographs by Tan Yong How Jonathan