

Polymorphic mantle tissue patterns of *Tridacna* of Burmanallah coast, South Andaman

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We investigated 42 different mantle tissue patterns in *Tridacna* species along the coast of Burmanallah, Andamans. Out of 42 mantle tissue patterns, *T. maxima* showed 18 different mantle patterns, *T. crocea* showed 22 different mantle patterns and *T. squamosa* showed only two patterns. *T. maxima* showed dominance of distribution than *T. crocea* and *T. squamosa*. Mostly *T. maxima* and *T. crocea* were observed in shallow waters and *T. squamosa* was present on the slope edge of reefs.

[**Keywords:** Burmanallah, Clams, Mantle tissue patterns]

Introduction

Clams are commonly found in coral reef communities and are hermaphrodites observed under clear waters acts as bioindicators¹. They are benthic filter feeders as well as depends on the symbiotic zooxanthellae which are embedded on their mantle tissue that absorb light for photosynthesis². The visible mantle surfaces of the clams have different colour patterns due to the presence of the endosymbiotic zooxanthellae that are found to circulate in their circulatory system³ which help them to withstand high intensity of light and Ultra Violet light⁴. These colour patterns may help to warn or confuse potential predators⁵.

Materials and Methods

A survey was carried out for two years to understand the distribution and colour patterns in mantle tissues of *Tridacna* sp. at Burmanallah coast, from 11°34'40.79'N, 92°44'27.41'E to 11°33'34.80'N, 92°43'48.77'E (Fig. a).



Fig. a—Map showing Burmanallah coast, South Andaman.

A total of 42 specimens exhibiting different mantle tissue colour patterns were photographed during the lowest low tides ranging from 0.19 m to 0.23 m occurred in the day time. Photography and observations on rib interstices and valve margins of the specimens were performed in field and were identified based on their rib interstices and valve margins according to Subbarao and Dev (2000).

Results and Discussions

The present survey at Burmanallah coast showed different mantle tissue patterns in *Tridacna* sp. *Tridacna maxima* and *Tridacna crocea* were found in shallow waters whereas *T. squamosa* were found near to slope edge of coral reefs. The approximate size ranges of these specimens *T. maxima*, *T. crocea* and *T. squamosa* observed were found to be 10-15 cm, 5-8 cm and 13-18 cm respectively. Colours of mantle tissues of these three species were blue, bluish brown, green, dark brown with green colour edges, dark brown with blue colour edges, yellowish green and brownish green (Fig. b.1-b.42). Based on visual observations, and collected photographic data, dominant distribution as well as mantle tissue colour patterns were observed in *T. crocea*, *T. maxima* and *T. squamosa* respectively. Among these 42 mantle tissues colour patterns, 22 of *T. crocea*, 18 of *T. maxima*, and 2 of *T. squamosa* were recorded.

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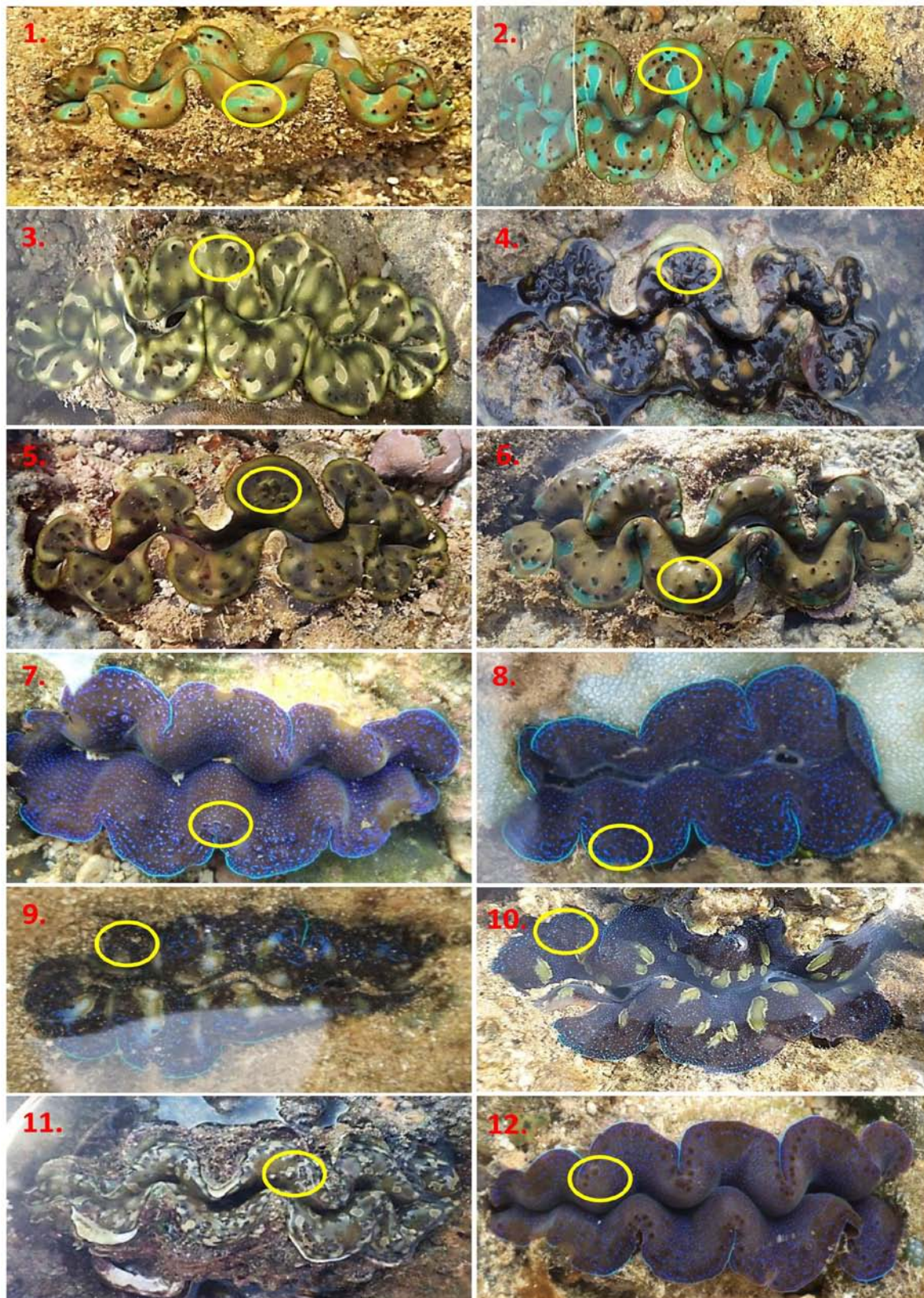


Fig. b.1-b.12—*Tridacna maxima* mantle tissue patterns.

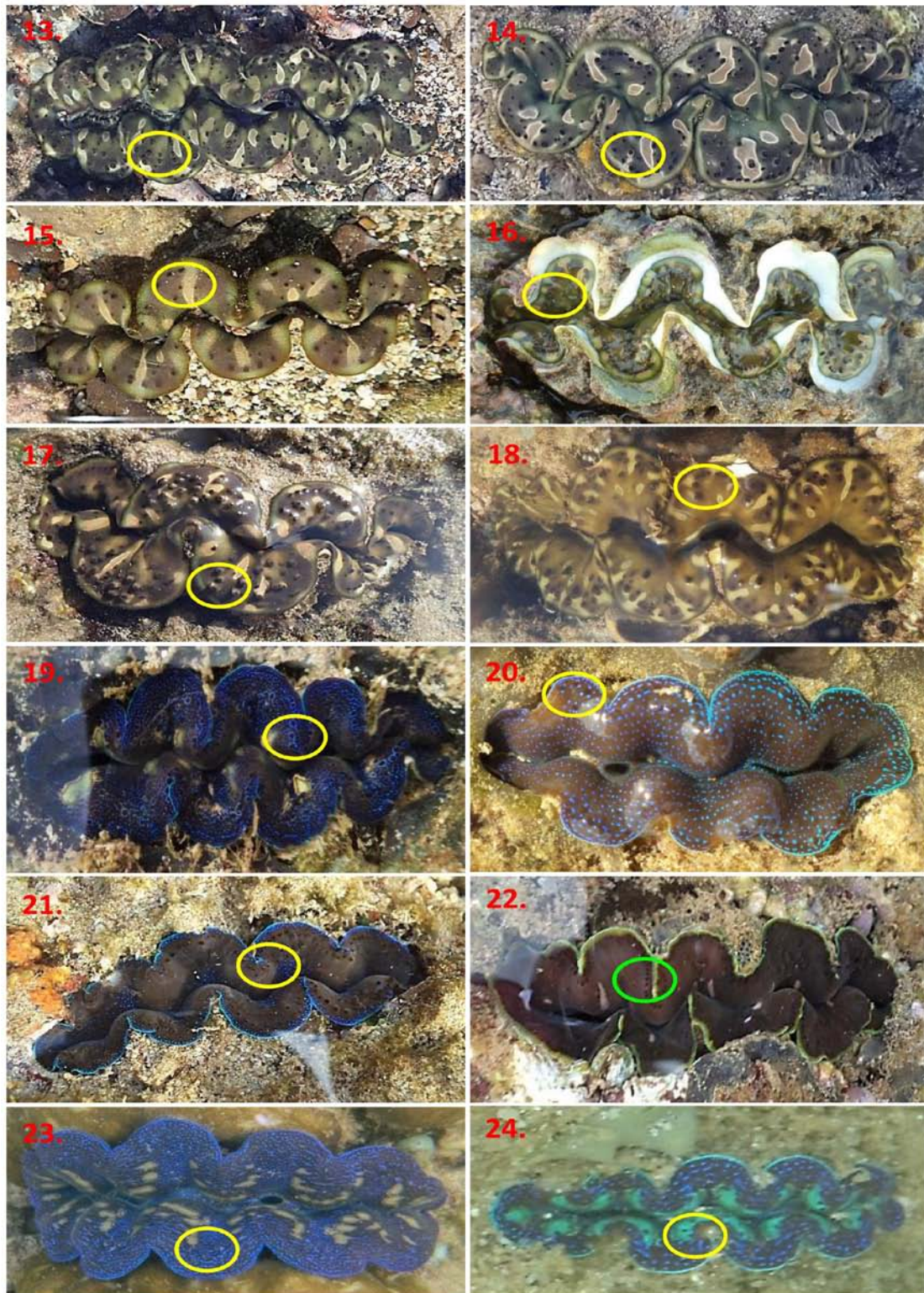


Fig. b.13-b.18—*Tridacna maxima* mantle tissue patterns; b.19-b.24—*Tridacna crocea* mantle tissue patterns.

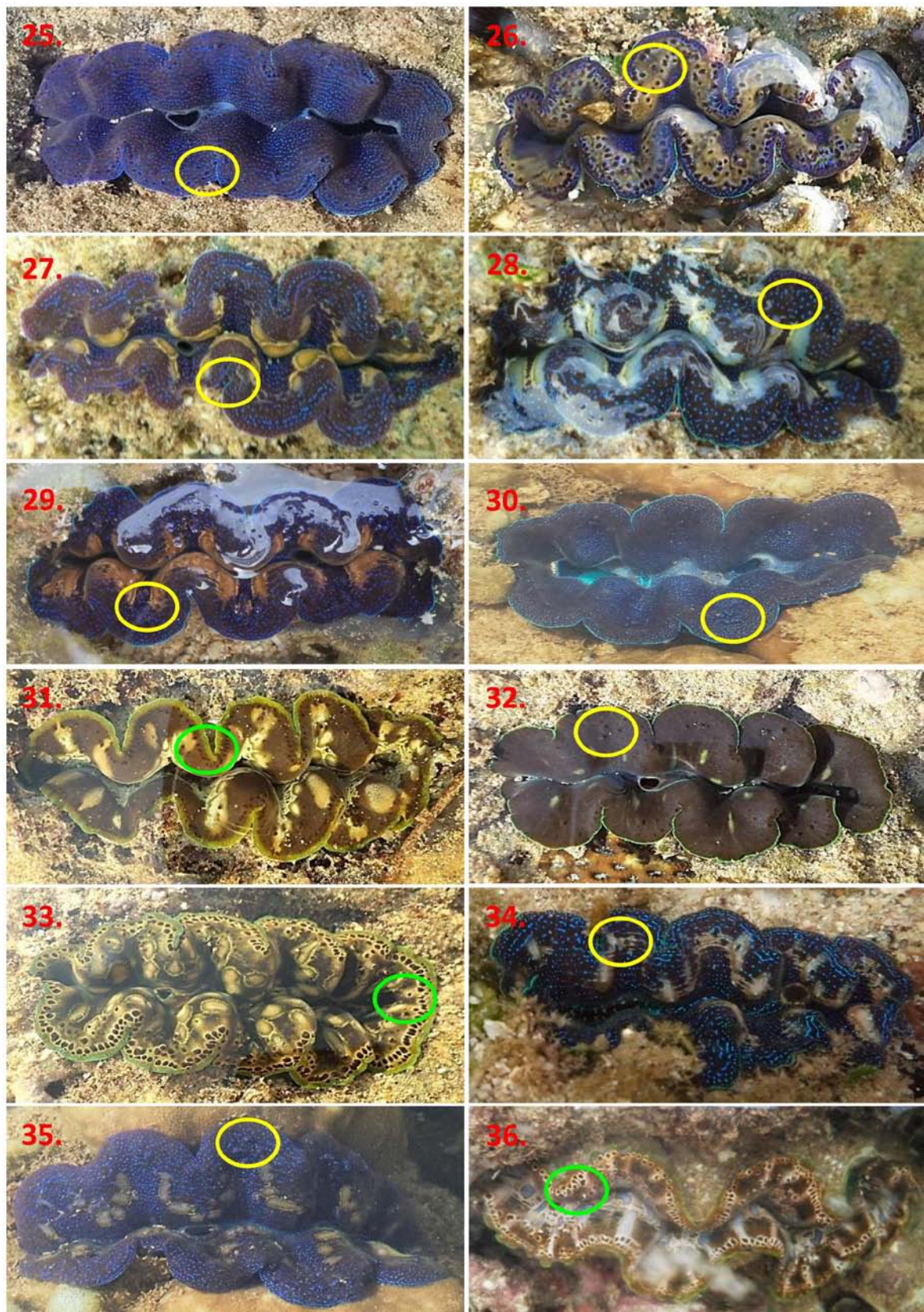


Fig. b.25-b.36—*Tridacna crocea* mantle tissue patterns.

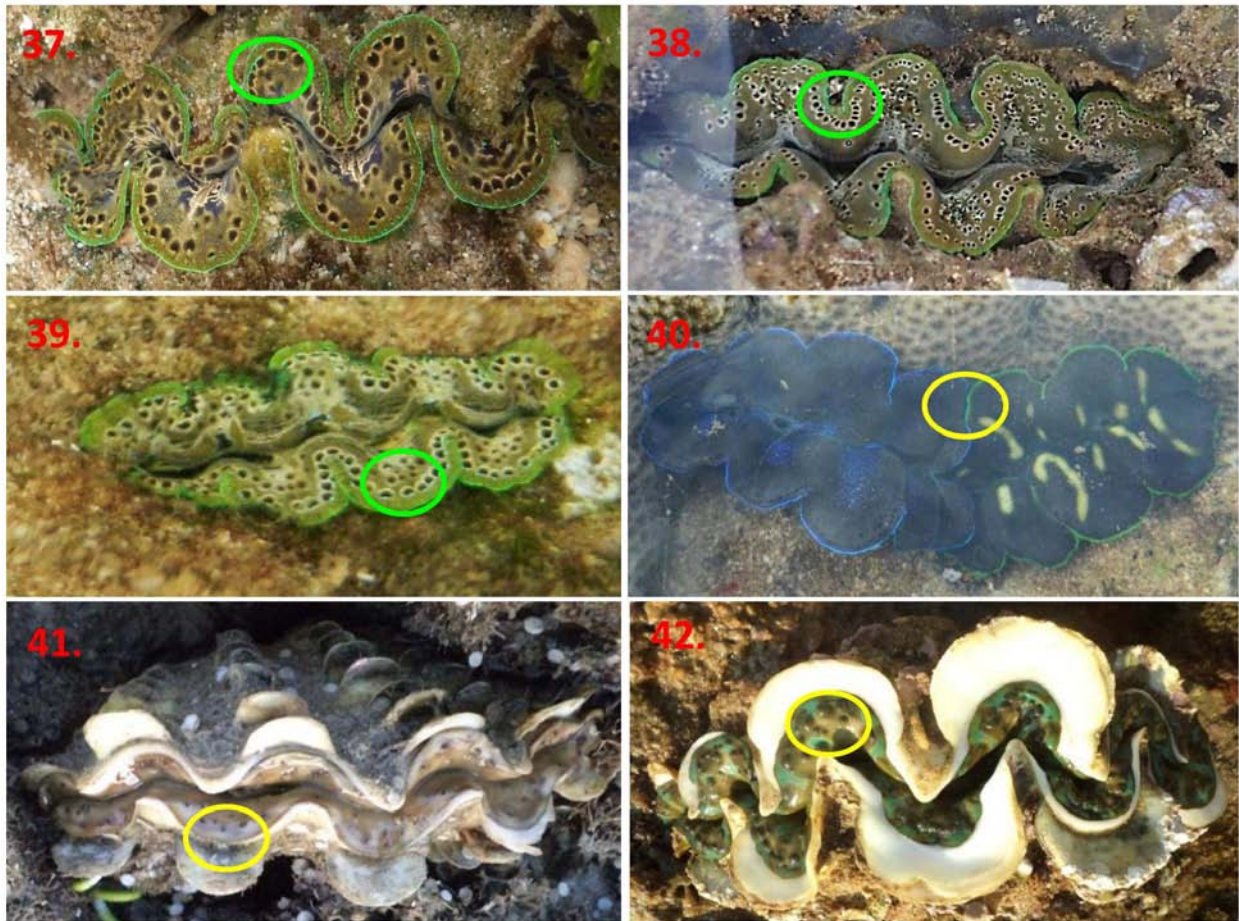


Fig. b.37-b.40—*Tridacna crocea* mantle tissue patterns; b.41 & b.42—*T. squamosa* mantle tissue patterns. Yellow circles showing irregular arrangement of hyaline organs, while green circle showing regular arrangement of hyaline organs.

The mantle tissue patterns of all these three species were found to be similar and further observations of the shell valves, byssal orifice, hinge line and hyaline organs was carried out. Studies by Naguit (2009) found that based on the hyaline organ arrangement *T. maxima* and *T. crocea* can be differentiated partly. Whereas in the present study, the hyaline organs arrangement in *T. maxima* and *T. squamosa* were found to be irregular arrangement (Fig. b.1-b.18 & b.41-b.42). While *T. crocea* exhibited both regular and irregular arrangement of hyaline organs (Fig. b.19-b.40), indicating that the hyaline organs arrangement may vary in these species. Similarly the mantle tissue patterns were also found to resemble other species (Fig. b.1, 2 & 42; b.7, 8, 25 & 30). Among the observed mantle colour patterns, one pattern of *T. crocea* (Fig b. 38) was reported by Naguit (2009), while remaining colour patterns were seems to be very similar in appearance (b.13 and b.14; b.17 and b.18; b.37 and b.38). But our close observations revealed that they differ in their mantle colours and arrangement of hyaline organs (b.13 and b.14; b.17 and b.18) and hyaline organs surrounded by

yellow (b.37) or white (b.38) colours. In this coast alone finding this many colour patterns is a noticeable event that may be triggered by several unknown abiotic and biotic factors. Recent studies on the phenotype and genotype correlation on mantle colour did not provide any additional information for these variations in colour⁷. According to our observations, the physical factors in Burmanallah coast, such as flat bottom topography with clear waters allowing high light illumination and temperature increase might trigger the mantle tissues of *Tridacna* sp.

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