

Impact of abrupt weather change on benthic life: a note on sea hare in a tropical coast, Gujarat, India

The genus *Aplysia* (Gastropoda: Opisthobranchia) with reduced shell and exposed body unlike other gastropods is an inter to sub-tidal herbivore, also commonly known as sea hare. It is widely distributed between 40°N and 40°S lat.¹ and controls benthic primary production of macrophytes. Of the 34 *Aplysia* species found in the world oceans, 7 have been reported from the Indian coastline,

including *Aplysia oculifera*^{2,3}. This species is known to be seasonal, with adults occurring in large numbers from December onwards and massive deaths occurring in April–June with the disappearance of green algae¹ and exposure to strong currents⁴. Surprisingly, massive death of *A. oculifera* was encountered in January 2017, in the intertidal coast of Okha, Gujarat, India. An oceanographic survey

was undertaken in the said region on 7 and 8 January 2017 (Figure 1a). The study area represents 115–120 m wide stretch of low-slope intertidal zone with a mix of various small-scale habitats, i.e. algal bed, rocky surface, rock pools and sand. On 7 January (afternoon), live *A. oculifera* adults were observed only in the low tide zone (their known habitat) in the northern segment of the surveyed

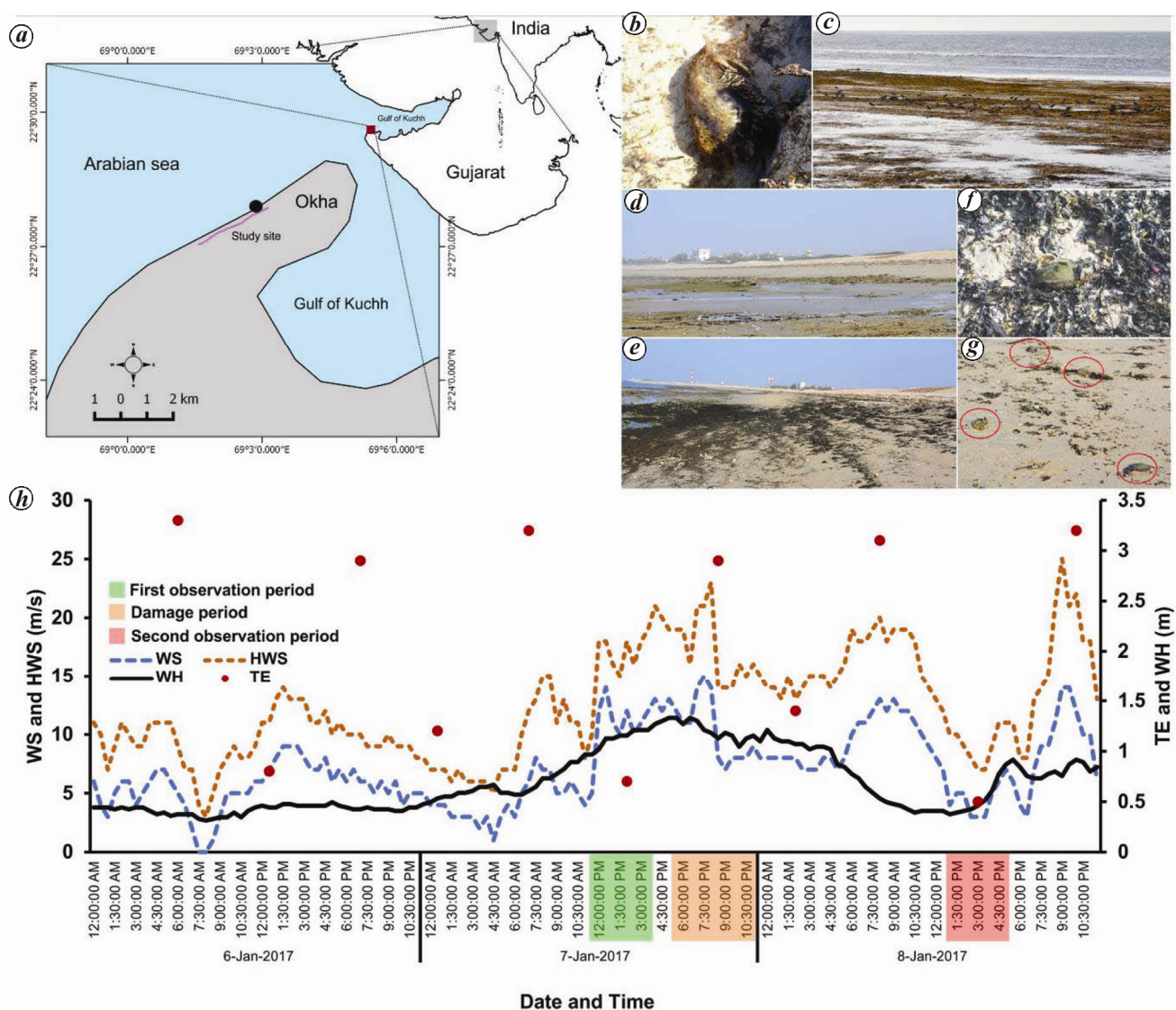


Figure 1. a, Location map of the study area. b, Photograph of live *Aplysia oculifera* at low intertidal zone. c, Preferable habitat of *A. oculifera* with various macrophytes. d–g, Photographs showing high tide zone of the study site during low tide period. d, Before impact representing normal condition (7 January 2017). e, After impact showing washed-off algal mass (8 January 2017). f, Dead *A. oculifera* lying on high tide zone along with algal mass (8 January 2017); g, Dead *A. oculifera* (red circle) on sandy high tide zone. h, Atmospheric and oceanographic parameters of Okha: WS, Mean wind speed; HWS, Highest wind speed; WH, Wave height; TE, Tidal elevation.

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region, where green algal beds (*Ulva* sp., *Enteromorpha* sp., *Padina* sp., *Caulerpa* sp.) dominated (Figure 1 a and c). The mid to high tide zone was devoid of *A. oculifera* (Figure 1 d). However, on 8 January, mass mortality of *A. oculifera* (219 dead adult individuals within 500 m stretch) along with macrophytes (majorly *Sargassum* sp.) was observed in the entirely sandy high tide zone of the same segment (Figure 1 e–g), although January is known to be favourable for adults of the species. Water quality (e.g. pH, salinity, DO, BOD, nutrients, PHc) along the near-shore region and sediment chemistry (e.g. heavy metals and PHc) in the intertidal zone did not show any significant values which could harm the biota in the study area. We also analysed the atmospheric and other oceanographic parameters such as wind speed, wave height, tidal elevation and tide-time in the region for over a period of three days (6–8 January 2017) to understand the cause behind the event. We observed an abrupt change in weather marked by sudden increase in wind speed and wave height, coupled with high tide during late evening of 7 January (Figure 1 h). Generally, mollusks are not strongly attached to the substrata while foraging⁵. *Aplysia* has night-time feeding habit due to energetic benefit⁶ or to avoid direct exposure to sunlight⁴. Considering the nocturnal activity which has coincided with abrupt

change in weather, *A. oculifera* was washed-off along with macrophytes (majorly *Sargassum* sp.) to sandy supralittoral zone (unsuitable habitat) (Figure 1 e) on 7 January 2017. The next morning (8 January 2017) was calmer with low wave height; therefore, water level was not sufficient to bring it back to its suitable habitat. This caused prolonged exposure to direct sunlight in supralittoral zone which led to desiccation and subsequent mortality of *A. oculifera*. No other faunal deaths have been observed in the area.

The region in question has patchy corals. *A. oculifera* feeds on macrophytes. Absence of this sea hare can lead to an uncontrolled growth of macrophytes, which in turn may reduce the viability of corals in the region. Although the present report is based on short-term observation of weather impact, repeated observations of such events can be useful in evaluating how weather and climate change impact coastal biodiversity.

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DBT Star College Scheme: a positive intervention in capacity building in colleges

India is aiming to be a global leader in the field of science and technology (S&T) and all the stakeholders are already at work to bring about a paradigm shift in science education. Technology Vision 2035, an official document prepared by the Government of India (GoI) and associated agencies, has clearly specified that S&T is going to play an important role in the progress of our country. Changes are happening at all levels of teaching. Quality interventions at all steps of the educational ladder, right from the primary level, are taking place. We are a nation with the youngest population, where a major percentage of the population opting for higher educa-

tion is studying at the undergraduate level. So the role of research and quality of science education is being increasingly recognized at the college level.

The Department of Biotechnology (DBT), GoI has always played a pivotal role in the implementation of key government initiatives and taking them forward in the right direction with reasonable success. Recognizing colleges as the foundation stone of the science education pyramid, the department has initiated the DBT Star College Scheme that seeks to build research capacity by giving students an opportunity to gain vital research-related skills and concept-building by DIY (do it yourself). The

programme has been initiated by inviting ideas from various people and brainstorming by the proponents and executors of the scheme. DBT gave the go-ahead to the scheme after understanding the fact that funding colleges was in the public interest, as it will give science students a deep understanding of the world and develop their critical faculties that are required to work in any scientific arena. The scheme has also helped the faculty to experiment more in classrooms, as earlier students were engaged in the learning process that was confined to the walls of classrooms with lecture courses that offer almost no novelty, no monitoring, and little support and