

# *Noctiluca scintillans* bloom and measures to protect marine hatcheries

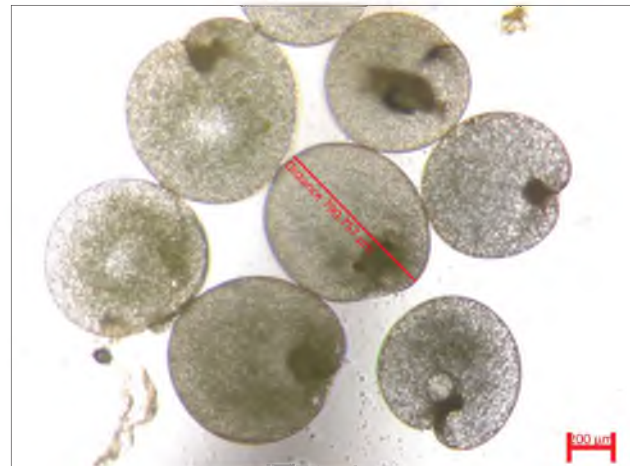
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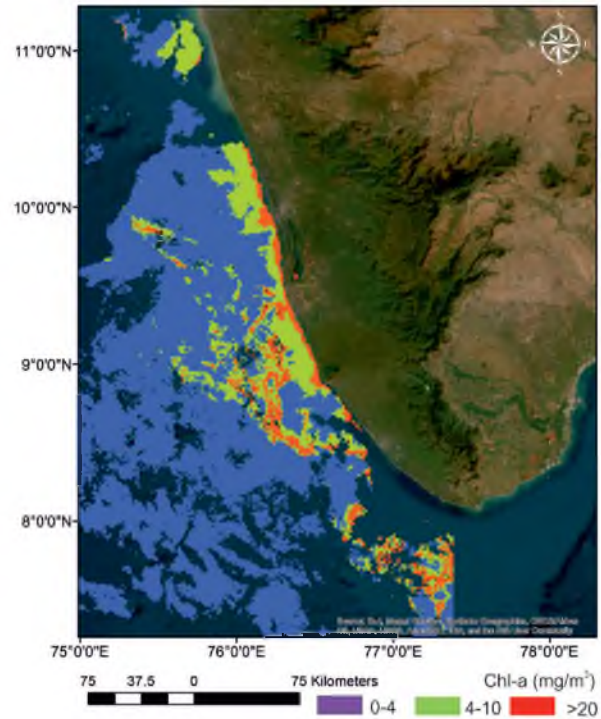
During the third week of November 2022, bloom of *Noctiluca scintillans* (Macartney, 1810) was observed in multiple locations along the coastal waters off Thiruvananthapuram. *Noctiluca* bloom is commonly called as 'sea sparkles', as it produces blue bioluminescence at night. In the present bloom in Vettucaud, Shanghumukham, Valiyathura, Vizhinjam, Azhimala and Pullivila areas along the Thiruvananthapuram coast, *N. scintillans* was identified as the causative organism. This bloom was also observed at the seawater intake point of the Vizhinjam Hatchery complex which put the staff on alert. Even though the dinoflagellate is considered non-toxic, it has been reported to cause 'fish kill', associated with anoxia during the crashing phase of the bloom. Hence, to protect the fish larvae and broodstock in the rearing systems, precautions were taken to ensure the quality of seawater taken for the



*Noctiluca scintillans*–microscopic view

hatchery. A new offshore intake well was constructed, and the 6-inch PVC pipe with 22 mm-sized holes which is primarily used for the seawater input system was covered with two layers of foot valve protecting boring mesh (200 microns mesh size) for effective filtration of the pumped seawater. The stored seawater was aerated to ensure oxygenation of the water. Water quality parameters such as Dissolved oxygen (DO) and ammonia were monitored daily since the detection of the bloom so as to confirm that the levels are normal (DO between 4.04 to 5.1 ppm; total ammonia nitrogen less than 0.001). The precautionary measures were continued for a week after the bloom started crashing which happened three days after the detection of the peak bloom on 16 November 2022.

*N. scintillans* blooms have reportedly become a regular feature in the coastal waters of the Arabian Sea and Bay of Bengal during the winter monsoon period of October – February. Fish kills associated with these blooms are also increasing. Mixotrophic behaviour of the dinoflagellate helps in the sustenance of the bloom in low-nutrient waters as well as in low prey-dense waters. Therefore, with a view to closely monitor the sustenance and spread of the bloom, Sentinel 2 level 1 image were obtained from Copernicus open access HUB and processed using Case-2 regional coast colour processor to derive chl-a concentration for the coastal waters of Thiruvananthapuram. Due to cloud cover, clear chlorophyll images were not available across the region. Hence a mosaic of three S2-A scenes during the first week of November 2022 (1-7) was used for Chl-a extraction, wherein the chl-a concentrations were greater than 4 mg C m<sup>-2</sup>,



Sentinel 2 image of 7 November 2022 showing high chlorophyll in the coastal waters off Thiruvananthapuram

indicating bloom condition. This points to the fact that the bloom was initiated much earlier than it was visible in the form of green discolouration and bioluminescence on 16<sup>th</sup> November 2022. Timely identification of the bloom and the interventions taken to prevent the intake of contaminated water into the hatchery served to protect the broodstock and fish larvae, and in turn, avoid economic loss.