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BLOOM OF *NOCTILUCA SCINTILLANS* IN GULF OF MANNAR, SOUTHEAST COAST OF INDIA

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Gulf of Mannar, which extends from Rameswaram to Kanyakumari, has a chain of 21 islands (area of each island 0.95 to 130 ha) along the 140 km stretch between Tuticorin and Rameswaram (Lat 8° 55'- 9° 15' N and Long 78° 0'- 79° 16'E). The coastal waters have fringing coral reefs and patch reefs rising from shallower areas of sea shore. Fringing reefs are located mostly at a distance of 50-100 m from the islands and are narrow. Patch reefs arise from depths of 5 to 9 m and are 1-2 km in length with width up to 50 m. The Gulf of Mannar Marine Biosphere Reserve is India's first Marine National Park. The biosphere includes coral reefs, seagrasses and mangroves. This ecosystem supports wide spectra of flora and fauna of taxonomic and economic importance.

From 2.10.08 to 12.10.08 an intense bloom of *Noctiluca scintillans* (Macartney) was observed for the first time in the coastal areas of Gulf of Mannar near Appa Island, Thalaiyari Island and Valai Island. The bloom later intensified into a dense bloom in Muthupettai area and spread from Kilakarai to Pamban. The bloom resulted in very low oxygen levels which led to loss of biodiversity in the most densely affected region, resulting in the death of organisms in the higher as well as lower trophic levels.

The coastal water appeared dark green. Microscopic examination of the water samples revealed the presence of *Noctiluca scintillans*. The organism is bioluminescent, inflated and sub-spherical. The size of the organism ranged from 400-1200 microns. Though the species is colourless, the presence of photosynthetic green endosymbionts makes the water green. As the depth of the water where the bloom occurred was very shallow (0-6m) and the wind velocity less, the bloom intensified. The current was in clockwise direction in the Gulf with water flow nearly still just before the change of season from the southwest monsoon to northeast monsoon. The high temperature, salinity and low pH aided the spread of the bloom to adjacent waters off Muthupettai. During the intense period of the bloom, the cell concentration of *Noctiluca scintillans* was around 13.5 lakh cells /l, the dissolved oxygen level was below detectable level and the total suspended solids was 510 mg/l, thereby increasing the turbidity and penetration of light to the bottom. This resulted in the biodiversity

loss in the intensely affected area from Valai Island to Muthupettai coast. The dead animals noticed ashore in the islands and shores of Muthupetai, Periappatinam, Pudumadam were rabbitfishes, moray eels, goatfishes, serranids, carangids, silverbellies, barracudas, halfbeaks, seabass, flathead, surgeonfishes, threadfin breams, snappers, breams, silverbiddies, theraponids, anchovies, lesser sardines, *Psammorperca* sp., lizardfishes; endangered animals such as seaturtles, seahorses etc; ornamental fishes like chaetodontids, parrotfishes, damselfishes, squirrelfishes, clownfishes, sea snakes, molluscs (cuttlefishes, squids, *Trochus* sp., *Cypraea* sp, clams (*Cardium* sp, *Donax* sp. etc), crabs (*Portunus pelagicus*, *Charybdis natator*), jellyfishes, sea anemones, sea cucumbers and polychaetes. Underwater observations immediately after the bloom showed that the corals were bleached and there were no associated reef fishes in the severely affected Valai Island. During the waning phase of the bloom, the surface water temperature was 29.5° C, salinity 34.2 ppt, dissolved oxygen 4.86 ml/l, phosphate 50 µg at/l and ammonia 85 µg at/l. Further investigations indicated the resilience of the ecosystem to recover from the sudden natural damage.