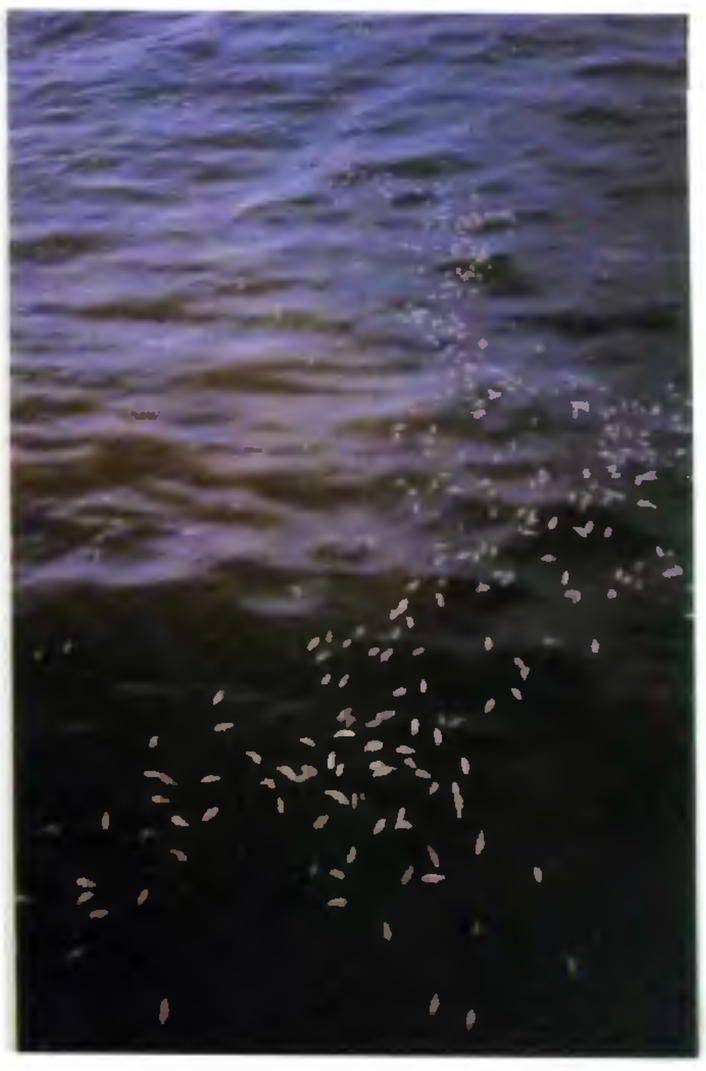
Severe fish mortality associated with 'red tide' observed in the sea off Cochin

'Red tide' is a phenomenon involving blooming of certain phytoplankton species causing discolouration of nutrient-rich coastal waters. Some of these plankton, such as dinoflagellates, produce toxic substances which may cause mass mortality of marine organisms. The toxins may also be concentrated by shellfish which, when consumed by man, may result in paralytic poisoning leading to death.

Blooms of the dinoflagellate *Noctiluca* have been known to occur along the southwest coast of India during the monsoon and post-monsoon periods, imparting a red (sometimes green) colour to seawater[1,2]. However, to our knowledge, there is no photographic evidence of *Noctiluca* 'red tides' from this region so far. Although. *Noctiluca* is generally believed to be non-toxic, there have been reports of mass mortality of fish[1] and rare episodes of paralytic shellfish poisoning to humans[3] along this coast in the past. During a recent cruise of O. R. V. *Sagar Kanya*, we observed frequent *Noctiluca* blooms in open coastal waters (depth less than 40 m) off Kerala from Cochin to Calicut during 8–10 August 1998. The most intense blooms occurred off Cochin and were associated with severe mortality of fish (see the accompanying photographs taken at a station located 28 km from Cochin). The dead fish, almost entirely comprising of the threadfin bream (*Nemipterus japonicus*), were found floating in large numbers (estimated conservatively as 1 animal per 100 m^2).

A 'close-up' of the bloom accumulating against the ship's hull. The sample collected with the bucket looked like thick soup and contained a dead fish weighing about 100 g.

A typical stretch of 'red tide' (bloom of the dinoflagellate *Noctiluca*). Photographed from O. R. V. *Sagar Kanya* at lat. 9.95°N, long. 76.02°E, about 28 km off Cochin. This patch was about 700 m long and 5–10 m wide.



A patch of the bloom with large concentration of dead fish around it. The fish mortality was first observed around 1300 h as the ship approached this hydrographic station (sampled between 1400 and 1750 h on 8 August 1998) and could be seen during the rest of the day after we left the station and approached another at lat. 10.33°N, long. 75.91°E.

It is intriguing that only a single species of fish was killed. As the threadfin bream is a demersal fish, the obvious explanation should be that the death was caused by a severe oxygen depletion. The near-bottom waters at the above station were suboxic and reducing, and even at the sea surface the oxygen content was quite low (1.25 ml/l). However, the concentration of dead fish around patches of the bloom was striking. And unless the effect of oxygen deficiency was accentuated by choking of gills by the thick plankton biomass, the presence of some other toxin-producing organism cannot be ruled out.

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A threatened, endangered, endemic plant: Patwa

A very rare, endangered, endemic plant Patwa which is known as *Butea pellita* Hook. and now renamed as *Meizotropis pellita* (Wall. ex Hook, F & Grev.) Sanjappa is blooming just 12 km from TalliTal (Naini Tal) in a place known as Patwadanger. Patwadanger is known after the plant Patwa and botanists all over the world know this place owing to the existence of this plant here.

Plant Patwa, an angiosperm, belongs to the family Papilionaceae. This plant is a shrub with stout, woody perennial rootstock from which several erect shoots up to 6 feet high and 0.75 inch diameter are annually produced. Stems are ribbed with a large pith. Leaves, stem, inflorescence and pods are densely clothed with spreading white or pale brown tomentum. Leaves are 18–30 inches long. Flowers are 0.5–1 inch long in fascicles of usually 3 or 5, arranged in erect terminal and axillary simple raceme. Corolla has bright red wings, keel changing to orange towards the base inside. The plant will reappear in a year from the same root stock in April/May.

This species occurs more gregariously on flat hill tops as well as on the valley slopes near dry ridges and in open Chir forest at around 5000 feet in May–June. Plant Patwa was first reported by Osmoston in 1925 at Patwadanger (1530 m). He had also seen this plant in Kali Kumaun and subsequently its presence was also reported from Doti district of Nepal.

The population of this rare, endemic and endangered plant is on the decline due to deforestation, habitat fragmentation, forest fires, human interference and ignorance of the people. This species has very small population and grows in a very specialized and sensitive habitat/s, therefore any further change and ecological disturance are bound to cause their total extinction from this region.

According to Y. P. S. Pangtey, an eminent botanist of this region, this plant is a national asset and it is our duty to preserve/protect this plant for prosperity. We should educate the younger generation about its existence and importance. Efforts should be made to preserve this plant at the Forest Department level otherwise this rare plant will vanish from this region within 25 years.

Butea pellita renamed as *Meizotropis pellita*.

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