

## Unexposed sea turtle breeding sites need protection and conservation

The coasts of Nagapattinam and Chennai in Tamil Nadu (TN) and the beaches of North Kerala are important nesting areas for sea turtles<sup>1</sup> in southern India. Besides, there are some areas which remain unexposed to conservationists; Nallavadu in TN is one such breeding area for sea turtles. It is a coastal village located at a distance of 14 km towards south on the way from Puducherry to Cuddalore, and is bordered by Chunnambur river in the north, Bay of Bengal and Nallavadu in the east, Madalapet (TN) in the south, and Pooranankuppam and Andiarpalayamin in the west. It has a population of 5630 individuals. Its coastal border is 22 km long with breadth ranging from 400 to 600 m and sand dune coverage of about 6 sq. km. The study area experiences a mean annual temperature of 30°C and a mean annual rainfall of about 1311–1172 mm. The mean number of annual rainy days is 55 and the mean monthly temperature ranges from 21.3°C to 29.2°C. The climate is tropical dissymmetric with the bulk of rainfall during the northeast monsoon (October–December), according to the India Meteorological Department, Chennai.

*Ipomoea pes-caprae* (Linnaeus and R. Br. 1818), *Spinifex littoreus* (Burn.f. and Merr. 1855) and *Cyperus arenarius* (Retz, 1786) are predominant species in the coastal sand dunes that serve as the nesting sites for sea turtles, such as the vulnerable Olive Ridley (*Lepidochelys olivacea*), critically endangered Leatherback (*Dermochelys coriacea*; Figure 1) and critically endangered Hawksbill (*Eretmochelys imbricate*) during their breeding season (December–April). During the 2009 breeding season, we found that both the adults and eggs were under threat due to several natural and anthropogenic pressures<sup>2</sup>; including fishing activities. Also, poachers traverse the beach extensively during night to collect



**Figure 1.** Leatherback sea turtle (*Dermochelys coriacea*).

eggs; native local communities consume turtle eggs, nests are predated by domestic dogs and birds, and there is habitat loss due to *Casuarina* plantation and beach erosion. Thus there is an urgent need to protect and conserve breeding areas, and to create awareness among the local communities about conserving sea turtles and their breeding sites.

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## Unregulated trade: a creeping threat to relict plant population of *Ensete superbum* (Roxb.) Cheesman in Kerala, India

*Ensete superbum* (Roxb.) Cheesman is a lesser-known medicinal plant endemic to the Western Ghats, India. Therapeutic potential of its seeds for human ailments such as diabetes<sup>1</sup>, dysuria<sup>2</sup>, measles<sup>3</sup>, etc. is well reported. The plant under rain-forest condition is an evergreen perennial shrub, 300–350 cm tall, with an enormous swollen base approximately 210–250 cm in circumference (Figure 1). Seeds of *E. superbum* are identified as Non Timber Forest Product (NTFP)<sup>4</sup> and are the principal commodity of commerce.

*E. superbum* is non-stoloniferous and does not produce suckers like other Musaceae members; hence seeds are the only source for regeneration and multiplication. Harvest of fruits interferes destructively with the natural plant

propagation and affects its population in the wild. Here we present the results of field/market observations over three years in Kerala to identify unregulated collection of *E. superbum* as a creeping threat.

Field surveys were conducted during 2007–2008, 2008–2009 and 2009–2010 across five representative districts in Kerala in order to estimate the population of *E. superbum*, understand its different uses by indigenous communities and trace the market channels of NTFP sourced from it. NTFP collectors and traders were interviewed to gauge the market demand for the plant.

Kanni, Kurichiyars, Kurumba, Irula and Paniyars are the major ethnic groups in Kerala that collect *E. superbum* from

the wild. Table 1 lists the ethnobotanic uses of *E. superbum* reported in the state. It is evident from Table 1 that seeds are the principal commodities of raw drug commerce in Kerala. The removal of



**Figure 1.** *Ensete superbum* in a garden.

**Table 1.** Ethnobotanical uses of *Ensete superbum* in various sites

Locality	District	Vernacular name	Ethnic community	Part used	Medicinal/other uses
Attappady Kulathupuzha	Palakkad Kollam	Malavazha/Kalluvazha Kalluvazha	Kurumba/Irulas Kanni	Seed Seed	Diabetes and kidney stone Kidney stone, painful urination and leucorrhoea
Vithura Thazechuram	Thiruvananthapuram Kannur	Kalluvazha Kalluvazha	Kanni Paniyars	Seed Seed	Leucorrhoea Leucorrhoea and urinary calci
Kottiyur Tirunelli	Kannur Wayanad	Kalluvazha Kalluvazha	Kurichiyars	Leaves Seed	Religious rituals Leucorrhoea and kidney stone

seeds (harvest of fruits), which is the only means of natural propagation, endangers the native plant population. Our apprehensions were substantiated by the common concern of decline in wild population of the plant species at all locations surveyed.

Collected seeds, leaves, inflorescence and seedlings of *E. superbum* frequently appear for sale in the market and ornamental nurseries. Commercially marketed seeds, seedlings and leaves are exclusively collected from the wild. While leaves and pseudostems are collected throughout the year, trade in inflorescence and seeds takes place from December to April. Live seedling trade, which picks up in July–August, hastens the population cascade in the wild. Although lack of updated inventories impedes precise quantification of the volume of commerce, we estimate that around 20,000 seedlings are sold every year in Kerala. Very low natural germination of seeds complements the population cascade.

Preferred habitat is rocky outcrops and habitat loss is not the primary reason for threat to the plant. Harvesting of unripened fruits is the major threat to the existing wild population.

Seeds of *E. superbum* command a market price of Rs 200–450/kg and leaves Rs 2/unit. The species is still undomesticated. However, with stan-

dardization of agro-techniques, it is a potential candidate to realize sustainable economic returns from degraded barren lands and rocky outcrops<sup>5</sup>. Scientific ignorance on the ecological niche of *E. superbum* is the biggest impediment to its conservation. Unregulated harvest coupled with unique habitat preference can accelerate the slide of this species to extinction. The world conservation monitoring centres have estimated that as many as 25,000 species or about 10% of the world's flora are currently under some degree of threat<sup>6</sup>. Indiscriminate harvesting, and destruction of immature fruits by elephants and monkey have drastically reduced the populations of *E. superbum*, which is already reported as rare and endangered throughout India<sup>7–10</sup>. As a first step towards drawing interest and creating awareness, we recommend inclusion of *E. superbum* (Roxb.) Cheesman as an endangered species in the *Red Data Book of Indian Plants*.

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## ***Bt* brinjal, wild relatives and biodiversity**

In the commentary on *Bt* brinjal and GM crops, Banerji<sup>1</sup> has put forward valid recommendations, some of which relate to pressures on the physical environment. There is another issue that has potentially far-reaching consequences on the living environment. This relates to the release of transgenic crops such as *Bt* brinjal into their centre of origin.

This general concern was highlighted by the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, to which India is a signatory<sup>2</sup>. In 2006, the Independent Expert Committee on *Bt* Brinjal<sup>2</sup> expressed concerns over the possibility of cross-transfer of genes from the GM crop to its wild relatives via hybridization. While conferring

additional pest resistance upon wild relatives, these genes might also induce a selective advantage, encouraging such plants to become overbearing weeds with negative effects on ecological balance and biodiversity. A 'precautionary approach' towards developing this crop variant was therefore recommended.