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RESEARCH ARTICLE

Phytogeography of lesser known Mimusops andamanensis King & Gamble (Sapotaceae) with special reference to its occurrence in Little Andaman Islands

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Abstract

The Andaman - Nicobar Archipelago in the Bay of Bengal exhibits multi dimensional floristic affinities towards major landmasses of South and Southeast Asia such as Myanmar, Northeast India, Thailand, Malaysia, Indonesia, Philippines, Peninsular India (Western Ghats) and Sri Lanka. From geological point of view, the Andaman - Nicobar Islands are considered as the emergent peaks of a submerged mountain range in continuation with the Arakan Yoma Mountains of the Myanmar towards to the Moluccas Island of the Indonesia. Mimusops andamanensis King & Gamble, is a critically endangered insular botanical entity with disjunct distribution in Sri Lanka and Andaman-Nicobar Islands. The natural history of Mimusops andamanensis King & Gamble is described here with illustrations based on the rediscovery of this taxon from Andaman Islands

INTRODUCTION

The terminology "endangerment" currently referred to biological species is obviously becoming an uncritical cliché in many contexts owing to various causes. Endangerment and extinction of biological species in nature has become a matter of curiosity since Darwin's era and regarded as a natural phenomenon of evolution in regular course of time as denoted by Darwin, ".....Natural selection almost inevitably causes much extinction of the less improved forms of life and induces what I have called divergence of character." (Darwin, 1872). Although, Darwin's concept on rarity is frequently quoted since then, extinction of species has become a global crisis in due course of time owing to causes other than evolutionary progression. Disjunct geographical distribution or fragmentation of range in distribution of biological entities is recognized as one of the natural motivations for rarity and endangerment. According to Drury (1974) 'A rare species is one that occurs in widely separated small sub-populations so that, interbreeding between in the sub-populations is seriously affected or reduced or restricted to a single population'. This definition seemingly very prudent on account of several insular species, since they are characterized by small gene pools, geographical isolation and least possibility for out breeding.

Mimusops andamanensis King & Gamble is one of the endangered insular taxa enlisted in the world list of threatened trees (Oldfield et al., 1998) as well as in red list of threatened plants by IUCN and Ministry of Environment and Natural Resources (MENR) (Anonymous, 2007). Interestingly, the phytogeography of the taxon demonstrates disjunct distribution from Sri Lanka towards Andaman-Nicobar Islands, although these regions are widely separated by the Indian Ocean. The Andaman-Nicobar Archipelago located around 700 nautical miles away from Sri Lanka in the Bay of Bengal is the abode of around 2463 Angiosperm species within a limited geographical region of 8249 sq km, while Sri Lanka is apparently larger than the former cover an area of 65610 sq km and is known to host about 4143 Angiosperm taxa (Senarantna, 2001).

Mimusops andamanensis King & Gamble is rather a lesser known species on account of Andaman flora and Interestingly, this taxon is treated as endemic to Andaman Islands among several literature on Andaman-Nicobar floristics (Balakrishnan and Rao, 1983;Pandey & Diwakar, 2008). This species is originally described by King and Gamble in 1906 based on a specimen procured from Port Mouat Hill jungle of South Andaman Island by one of the King's collectors dated as 16/04/92 . The type specimens have been deposited at herbaria of Botanical Survey of India, Kolkata (acc. no. CAL 0000017649) and the Royal Botanic Garden, Kew (acc. no. K 000777706).

Unlike Andaman-Nicobar Islands, there are detailed investigation reports on rare and endangered plant species of Sri Lanka. According to an official estimation by IUCN and MENR of Sri Lanka on conservation status of 1099 indigenous Angiosperm species belonging to 68 families, recorded as 675 species including 412 endemics have been assessed to be threatened. There are72 species including 43 endemics have already been extinct from the island. This document also enumerated 250 species including Mimusops andamanensis King & Gamble, under critically endangered category and another 188 insular species as endangered (Anonymous, 2007). The National Red List 2012 of Sri Lanka published by the Biodiversity Secretariat of the Ministry of Environment in collaboration with the National Herbarium also included Mimusops andamanensis King & Gamble under endangered category as per the IUCN criteria B1(i,ii,iii) and 2ab (i,ii,iii). Surprisingly, it is found that no detailed investigations on rarity and endangerment of the insular floristic components of the Andaman-Nicobar Islands have so far been done except a preliminary investigation carried out by Balakrishnan and Rao (1983). Balakrishnan and Rao enumerated about 110 endangered endemic Angiosperm taxa from the Andaman-Nicobar Islands; of which 73 species are known only from their type collection and the remaining 37 species reported only from their type locality. According to Balakrishnan and Rao (1983) Mimusops andamanensis King & Gamble is a critically endangered 'endemic species' known only from its type collection deposited at CAL and K. A perusal of literature also confirmed that this taxon has not been reported from Andaman-Nicobar islands after type collection and no further indication has been found about its habitat or ecological niches in Andaman rainforests except the reference given in the protologue. The occurrence of this species in Sri Lanka is reported from dry zone of lower altitude. As regards to Andaman-Nicobar Islands the accurate status quo of several threatened species are lesser known or quite little known. Extinction of a species is the condition where the last living specimen of the species dies. Nevertheless, it may be difficult to determine precisely when it did occur in large diverse and complex rainforests found to occur among Andaman-Nicobar Islands. In general, it is better to be presumed that an insular taxon may be extinct, if it failed to locate for an uninterrupted period of 50 years or more and Mimusops andamanensis King & Gamble was thought to be extinct from the Andaman-Nicobar Islands until the recent discovery from Little Andaman Island.

During the recent explorations in Andaman-Nicobar Islands carried out by the authors had relocated this taxon from the lowland evergreen forests of the Little Andaman Island. There are three individual trees found growing within an area of one sq km in the reserve forest at southern part of the island. All the trees were under fruiting and bearing ripened fruits during the month of February. Surprisingly, no seedlings of this taxon have been found at the vicinities of these trees indicates its natural regeneration has been curtailed owing to some reasons. The Little Andaman Island constitutes the southernmost island in the Andaman group of islands cover an area of 734.39 sq km, partially denuded the natural forest coverage with manmade vegetation of oil palm plantation; nevertheless, around 70005 hectares of virgin forest coverage is protected under reserve forest category in this island. Another exploration in Great Nicobar Island during the month of February by a group of scientists from the Botanical Survey of India had located Mimusops andamanensis from the lowland rainforests of the island. They have located one more tree in fruiting condition and collected mature fruits. It indicates the living relics of this species extend up to the southernmost island of the Andaman-Nicobar Archipelago.

According to Bustard (1971) "a species is endangered when its numbers are consistently being depleted more rapidly that they can reproduce themselves, absolute number may not be relevant to its threatened status, since large populations can be reduced catastrophically by adverse factors". Range in geographical distribution of many insular taxa in Andaman-Nicobar Archipelago becoming shrunken owing to isolation, catastrophic events, alterations in special ecological micro-niches, barriers in natural regeneration and anthropogenic interventions. Therefore they are presently confined their occurrence to a few isolated fragments of their former range and becoming more vulnerable on the road of extinction. Interestingly, a few individuals of Mimusops andamanensis King & Gamble, a taxon thought to be extinct from the insular habitats of the Andaman-Nicobar Islands are still surveying in small population as relics of its glorious past, invites great attention for its long term conservation measures.

Being an interesting rediscovery, a taxonomic description of the species is given below.

Mimusops andamanensis King & Gamble, J. Asiat. Soc. Bengal 74: 201. 1906.

Type: S. Andaman Is., near Port Mouat, King's Collector s.n. (CAL, holotype; K, isotype).

Evergreen tree ca. 7m tall. Branchlets adpressed puberulous. Leaves 5-10 x 4-7 cm, elliptic to ellitic-obovate, cuniate at base, acute to shortly acuminate at apex, pubescent when young, slightly pubescent beneath on mature leaves, coriaceous, glabrous, 10-14 pairs of inconspicuous lateral veins; petiole 1- 2 cm long. Inflorescence axillary with 1- 3 flowered fascicles; flower buds ovoid; pedicel slender 1-2 cm long; calyx lobes 8 in two series of 4 each, ca. 7 x 3 mm, lanceolate, acuminate at apex, corolla lobes 24, white, ca. 8 x 3 mm, oblong lanceolate, obtuse re-curved at apex. Stamens 8, filaments slender, anthers linear-sagittate, sataminods alternate with stamens, pubescent. Ovary pubescent with subulate style. Fruit ellipsoid, 3 x 2 cm or globose up to 2.5 cm across with persistent style, orange turning bright red in colour.

Distribution : Andaman – Nicobar Archipelago (South Andaman, Little Andaman & Great Nicobar) and Sri Lanka.

CONCLUSION

The phytogeography of Andaman-Nicobar Islands characterized with a unique transitional zone of floristic elements with remarkable degree of intraspecific variations between the South Asian and Southeast Asian floristic regions. Interestingly, it also demonstrates multi-dimensional affinities to other nearer and far-off geographical regions such as Myanmar, Northeast India, Thailand, Vietnam, Malesia, Sri Lanka, Peninsular India (Western Ghats) and even towards African Continent to some extent. The climetological features and geographical isolation of these islands from the major landmasses of South and Southeast Asia over millions of years have resulted into remarkable degree of distinct plant diversity and endemism. According to geological evolution, the Andaman-Nicobar Islands are recognized as the continuation of Arakan Yoma Mountains of the Myanmar to the Moluccas Island of the Indonesia. It is believed that these islands have been isolated from the major continental land masses during the course of 'Continental Drift', most probably during the Early Tertiary or Late Cretaceous period (Renvoize, 1979). Therefore the biological entities of the Andaman-Nicobar Islands are obviously 'continental' in origin and have evolved into the present status through evolution over millions of years. Hence, the present insular bio-system may be referred to as a 'sub-continental bio-system'. Melville (1973) suggests that the Indian Ocean Islands were formerly fractions of 'Gondwana Continent' during the Paleozoic and Mesozoic periods. Rao and Chakraborti had also highlighted the floristic affinities of the littoral species of the Andaman-Nicobar Islands towards Indo-African, Indo-Pacific and Indo-Malaysian regions which obviously highlights its Gondwana connections in the remote past. The Western Ghats of the Peninsular India, Sri Lanka and the Andaman- Nicobar Archipelago have remarkable similarities in climetological features and distribution of floristic elements. The fragmented distribution of several floristic elements such as Cleidion nitidum (Müll.Arg.) Thwaites ex Kurz, Polyalthia rufescens Hook.f. & Thomson, Salacia reticulata Wight, Mimusops andamanensis King & Gamble, Nageia wallichiana (Presl.) O. Ktze. etc among Andaman-Nicobar Archipelago, Sri Lanka and the Western Ghats demonstrates the previous geological connections of these widely separated regions at present.

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LEGENDS

A. Mimusops andamanensis King & Gamble – A view of live specimen from Little Andaman

B. Fruits – Variation in fruit shape and size

C. Ripened fruits

D. Seeds

E. Isotype of Mimusops andamanensis King & Gamble deposited at Kew