

Dispersal of *Calamus rotang* (Linn) and its ecological implications in Sriharikota Island, Andhra Pradesh, South India

J. Patrick David¹, Ranjit Manakadan² and B. Senthil Murugan³

Introduction

Seed dispersal is an important ecological process that helps a plant to colonise new areas. In addition, seed dispersal helps seeds escape the deleterious effects of seed and seedling predators, avoid fungal pathogens and reduces competition below parent plant (Janzen 1970). It also helps in the germination success of seeds as the seed coat gets softened, thus breaking the dormancy period as the seeds pass through the gut. However, in some cases this important ecological process has had negative impacts, especially when the species dispersed is invasive (Balasubramanian & Bole 1993; Zarri *et al.* 2006). In this paper, we discuss the dispersal of Cane *Calamus rotang* in Sriharikota Island and its impact on habitats and wildlife.

Calamus, popularly known as cane is a genus of about 370 species of palms, distributed in tropical and subtropical regions. Canes are mostly found in semi-evergreen, moist deciduous and riverine patches with high moisture content. They have multiple rhizomes and stems, as a result of which new plants are continuously produced vegetatively. In this way, they spread and form impenetrable cane brakes. The stems of many species of *Calamus* form the canes or rattans of commerce (Anon 1950). *Calamus rotang* is recorded from Sriharikota and is distributed in moist deciduous and riverine ecosystem, mainly in the Deccan Peninsula of India and in Sri Lanka (Suryanarayana *et al.* 1998). They are either scandent shrubs or climbers. Fruits are globose, with a delicate white fruit coat, a transparent white pulp and single seed. Seeds are flat, round and very hard.

Calamus rotang and its dispersal agents in Sriharikota

Sriharikota is a spindle-shaped Island located in the south-east corner of Andhra Pradesh in Nellore district. It is bounded on the west by the Bay of Bengal and on the other sides by the Pulicat Lake. Cane was introduced into Sriharikota by the forest department of the British Era in 1882-83 (Reddy 1981). Since then, it has attained invasive proportions encroaching most of the freshwater streams (vagus), lakes (guntas) and ponds (doruvus) within the island, some connected to each other and others isolated. Their spread along the freshwater bodies is understandable (as the seeds are light, float in water and also propagate vegetatively). However their presence in isolated (man-made and natural) freshwater lakes and ponds within dense evergreen forest patches is intriguing. The seeds should have crossed land barriers before reaching these isolated

freshwater bodies, suggesting that there are biotic agents in the island to transport the seeds from one place to another. (There are waterbodies in the Island which are not connected to the streams. We feel that *calamus* seeds would not have reached these inland waterbodies without the help of animals). The seeds could have been transported accidentally by humans or by other animals in the island.

During our study on fruit-frugivore interactions in Sriharikota Island from April 2005-October 2007, we recorded *Calamus rotang* seeds in the droppings of Golden Jackal *Canis aureus*, Small Indian Civet *Viverricula indica* and Bonnet Macaque *Macaca radiata* (Table 1, David *et al.* 2011). Seeds germinated successfully from 60% of Jackal scats and 28% of Macaque droppings (n=10) (David 2010). These are the most abundant and widespread of mammalian species found in the island (Manakadan & Sivakumar 2004), and hence, might have played an important role in the spread of *Calamus* into interior parts of the island.

The impact of *Calamus rotang* on wildlife habitats and native species

In Sriharikota, it has formed impenetrable brakes blocking the water flow of streams and choking freshwater ponds and lakes in many areas. This has reduced or destroyed the habitat for many species of resident and migrating wetland birds. Especially at risk, is the resident Spot-billed Duck *Anas poecilorhyncha* which breeds in the island. Another major threat is to the dense evergreen forest patches close to ponds. In these areas they have grown rampantly over adjacent vegetation, thus competing with them for light and other resources. From the frugivory point of view, in some places, the extensively spreading *Calamus* branches have physically denied birds and mammals access to fruits.

Recommendation

Cane is a commercially important resource and is widely harvested to make furniture, and ISRO has started extraction of cane in Sriharikota in 2002. In spite of this, *Calamus* is still rampant in the island, and considering the negative impacts it has on wetlands and the native flora and fauna, there should

¹Senior Research Fellow, ²Assistant Director and ³Senior Research Fellow
Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Mumbai. Email:
¹patdavid28@gmail.com (corresponding author),
²ransan5@rediffmail.com, ³sentreron@rediffmail.com

Table 1. *Calamus* seeds recorded in mammal droppings

Mammal	Number of droppings with seeds	Mean number of seeds/scat	Range
Golden Jackal (n=473)	16	28	1-35
Bonnet Macaque (n=95)	4	39	27-46
Small Indian Civet (n=134)	1	-	-

be concerted efforts (continuous removal) to control its spread in the Island.

Reference

Anon (1950). Wealth of India. Dictionary of Indian Raw Materials and Industrial Products. CSIR, Gouvenment of India Press. New Delhi. Vol (II): 215 pp.

Balasubramanian, P & P.V. Bole (1993). Seed dispersal by mammals at Point Calimere Wildlife Sanctuary. *J. Bombay Nat. Hist. Soc.* 90(1): 33-44.

David, P. (2010). Frugivory by birds and mammals in Sriharikota Island, southern India. Ph.d

Thesis. Mumbai University. Mumbai.

David, P., B. Senthil Murugan & R. Manakadan (2011). Frugivory by birds and mammals in Sriharikota Island, southern India. *J. Bombay Nat. Hist. Soc.* 108(1): 24-40.

Jansen, D.H (1970). Herbivores and the number of tree species in tropical forests. *Am. Nat* 104: 501-528.

Manakadan, R. & S. Sivakumar (2004). An ecological account of faunal diversity of Sriharikota Island and its environs. Final Report: Part I- Birds and

Mammals. Bombay Natural History Society. Mumbai.

Reddy, P.S (1981). The displaced Yanadis of Sriharikota Island. Ph.d. Thesis. Sri Venkateswara University, Tirupati.

Suryanarayana, B., A.S. Rao, A.V. Rao & V. Veeraraju (1998). Flora of Sriharikota Island. Indian Space Research Organisation, Bangalore, India.

Zarri, A.A., A.R. Rahmani & M.J. Behan (2006). Habitat modification by Scotch Broom *Cystisus scoparius* invasion of Grasslands of the Upper Nilgiris Plateau. *J. Bombay Nat. Hist. Soc.* 103 (2-3): 356-365.

Acknowledgements

The authors wish to thank the Indian Space Research Organisation (ISRO) for funding the project on plant-animal interactions which led to this interesting finding.

Announcement: CMS Vatavaran 2014



The 7th CMS VATAVARAN is set to be staged at the IGNCA Lawns, New Delhi from 30th January - 03

February, 2014. The theme for this year is **mainstreaming**

biodiversity conservation at different levels to promote living in harmony with nature. The theme is also significant in the context of recently held 11th Conference of Parties (CoP-11) to the United Nations Convention on Biological Diversity (CBD) at Hyderabad, India and UN Decade on Biodiversity 2011 -2020 (65th session of United Nations General Assembly resolution 65/161).

This year promise a kaleidoscope of more than 150 films, best of biodiversity cinema, experts sessions, talks, deliberations, contemporary discourses, eco-trips, film store, music festival, organic green haat and organic food festival. All this will be organised to promote environment sensitivity at a large scale. The footfall is expected to be more than one lakh.

CMS VATAVARAN is a pioneering enterprise initiated to:

1. Encourage environment films and forums that result in perception, practice and policy change.
2. Enhance understanding of natural world and its conservation.
3. Increase space for environmental issues in the mass media.
4. Strengthen collaboration between individuals, government, corporate, scientific and academic institutions on environment, conservation and sustainability issues.
5. Nurture a new generation of 'alternate filmmakers' to widen public dialogue and debate.
6. Stimulate production of high-quality films on wildlife, nature, environment and other related concerns.