



Traditional food and medicinal uses of *Cycas sphaerica* Roxb. and *Cycas beddomei* Dyer (Cycadaceae)

Solomon Raju AJ¹✉, Venkata Ramana K², Suvarna Raju P³, Dileepu Kumar B⁴, Lakshminarayana G⁵, Sravan Kumar S¹

1. Department of Environmental Sciences, Andhra University, Visakhapatnam 530 003, India
2. Department of Botany, Andhra University, Visakhapatnam 530 003, India
3. Department of Health and Safety Environmental Management, International College of Engineering and Management, P.O. Box 2511, Pc III, Muscat, Sultanate of Oman
4. Department of Botany, M.R. College (Autonomous), Vizianagaram 535002, India
5. Department of Environmental Sciences, Gayathri Vidya Parishad College for Degree & P.G. Courses (Autonomous), M.V.P. Colony, Visakhapatnam 530 017, India

✉ **Corresponding author:**

A.J. Solomon Raju,
Mobile: 91-9866256682,
Email: solomonraju@gmail.com

Article History

Received: 28 September 2018
Accepted: 09 November 2018
Published: January 2019

Citation

Solomon Raju AJ, Venkata Ramana K, Suvarna Raju P, Dileepu Kumar B, Lakshminarayana G, Sravan Kumar S. Traditional food and medicinal uses of *Cycas sphaerica* Roxb. and *Cycas beddomei* Dyer (Cycadaceae). *Species*, 2019, 20, 24-27

Publication License



This work is licensed under a Creative Commons Attribution 4.0 International License.

General Note

Article is recommended to print as color digital version in recycled paper.

ABSTRACT

Cycas sphaerica and *C. beddomei* are traditionally important for food and medicine in their distributional areas. They are indiscriminately exploited in the most unscientific manner and this has resulted in the reduction of their living populations. In this paper, the traditional uses of these two species are described with a view to impress the researchers to explore scientific methods to use them rightfully.

Key words: *Cycas beddomei*, *Cycas sphaerica*, leafy vegetable, medicine, food, ornamental.

1. INTRODUCTION

The genus *Cycas* represents about six species in India. They include *C. beddomei*, *C. circinalis*, *C. indica*, *C. pectinata*, *C. sphaerica* and *C. zeylanica* (Pant, 1973, 2002; Donaldson, 2003). Of these, *C. sphaerica*, *C. beddomei* and *C. circinalis* are naturally distributed in the Eastern Ghats forests. *C. sphaerica* and *C. circinalis* fall under data-deficient category and are included in CITES Appendix II that allows trade in wild-cultivated seeds or plants as long as there is no detrimental impact on the survival of wild populations (Donaldson, 2003; Hill et al. 2003). *C. sphaerica* is distributed along the hilly tracts of Eastern Ghats of Northern Andhra Pradesh and Orissa. In Andhra Pradesh, it occurs in dry forests and woodlands on hills of Palakonda, Donubayi and Seetampeta areas in Srikakulam District. In Orissa, it is distributed in the woodlands of Mahendragiri hills, Chandaka Wildlife Sanctuary, southern part of Similipal Biosphere Reserve (Sudhakar Reddy et al. 2006; 2007). *C. beddomei* is a critically endangered species and included in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Appendix I that prohibits trade in wild-collected plants, except for scientific or conservation purposes. It is restricted to Seshachalam Hills of Chittoor and Kadapa districts of Andhra Pradesh State, and north-west of Chennai in the eastern Peninsular India. In Seshachalam hills, this species is well protected due to peculiar ecological conditions existing there. It is characteristically a species of dry and open hill slopes. Both *C. sphaerica* and *C. beddomei* are native to India and have botanical, ecological, food, medicinal, and ornamental values. In this paper, the traditional food and medicinal uses of these two species are described. Further, their ecological and ornamental importance is also discussed.

2. MATERIALS AND METHODS

Field studies were conducted in forest areas, especially Jalantrakota Reserve Forest of Srikakulam District for *Cycas sphaerica* and Seshachalam hill range in Chittoor District for *C. beddomei*; both the districts are integral parts of Andhra Pradesh. The studies were made to record traditional uses of these two species by local communities and also to document their ecological and ornamental importance for further research. *C. beddomei* is a small palm-like shrub while *C. sphaerica* is a medium-sized palm-like shrub; both have an erect solitary stem and are dioecious, the sex of each individual is identifiable only during coning stage. The leaves and male cones of *C. sphaerica* were found to have food and other values; the locals were found to use the leaves as a source of food, bouquets, and the male cones as a mosquito repellent. The locals were found to cut the male cones of *C. beddomei* prior to their maturation for use in the Ayurveda system of medicine and also as a cure for certain human ailments. The pithy material of stem and seeds of both the species was also found to have food value for the locals. The details of traditional uses of these two species are provided in the next section.

3. OBSERVATIONS AND DISCUSSION

C. sphaerica and *C. beddomei* are ecologically well adapted to dry and rocky hilly areas in the Eastern Ghats forests. In both, the leaf flushing and coning are not annual events; the leaf flushing event occurs in coning trees only. The coning and leaf flushing events occur in quick succession in both male and female trees during April-June. The locals use the leaves of *C. sphaerica* as a leafy vegetable and as the main constituent of bouquets. They collect the fresh and tender leaves from male and female trees as soon as they are formed after coning event (Figure 1a,b). The collected leaves are pooled up and the main rib of each leaf is removed prior to cutting them into small pieces (Figure 1c). The leaf pieces thus obtained are thoroughly washed in water and placed in a container with fresh water. The container is then kept on fire-lit stove and cooked for about half-an hour. Some consumers even add red or green gram to the leaf pieces to enhance the taste. The cooked or boiled leaf material is now separated from the water still remaining in the container. This cooked leaf together with onion, fresh or dry chillies, garlic, mustard seeds, jeera, salt and chilly powder is fried in edible oil in another container for about 15 minutes. The leaf fry dish thus prepared is eaten as such at any time of the day (Figure 1e) or is used as a curry for rice meal. Since *C. sphaerica* leaf is a free resource, most of the locals living in the surroundings of this plant use it as an important vegetable item. The leaf fry is locally called as "oruguna". The locals also use the

leaves for making bouquets; the leaves are even sold in local markets at a throw-away price, especially in the villages bordering Orissa State. The stems of young trees contain pithy material; this material is cut into pieces and then ground into flour. This is commonly called "sago flour". Locals use this flour for making "dosas". They also use dry seeds to make flour for making edible items (Figure 1g). Male cones produce strong odour and it is detectable at least 500 m away from the plant (Figure 1f). The locals cut these cones and keep them in their houses to prevent mosquito bites; the volatile chemicals responsible for the emission of strong odour appear to have repellent action against mosquitoes. In view of these various uses of *C. sphaerica*, Sudhakar Reddy et al. (2007) stated that it has botanical, economic, ornamental and distributional interest.



Figure 1 *Cycas* species: a-g. *C. sphaerica* – a. Fresh and tender leaves, b. Leaves cut into pieces, c. Container with cut leaf pieces, d. Container with leaf fry, e. Leaf fry being eaten by locals, f. Male cones, g. Seeds without coat; h-j *C. beddomei* – h. & i. Male cones, j. Pollen powder. @ Prof. A.J. Solomon Raju.

The locals use male cones of *C. beddomei* for medicinal purposes. They collect male cones prior to pollen shedding for use in Ayurveda system of medicine (Figure 1h,i). The pollen appears to be the essential ingredient and each cone produces a huge amount of pollen (Figure 1j). Naturally, the male trees far outnumber female trees and hence, they attract the locals to earn a few

desperately needed rupees. The medicinal value of male cones made them a trafficable commodity. The collection of male cones before pollen shedding is an effective block to sexual reproduction through which only seed is produced. Local herbalists also use male cones as a cure for rheumatoid arthritis and muscle pains. Leaves, stem and seeds do not have food or medicinal value. Leaves are bright green and pretty looking and hence have been considered to have ornamental value. Erect stems being very small do not contain extractable amount of pithy material for use as food. Seeds are starch-rich but are not used to obtain flour for use as food. However, they attract squirrels, bears and rodents which use them as food and in the process act as seed-dispersers.

4. CONCLUSION

C. sphaerica and *C. beddomei* are not common plants but they are important for locals living in their vicinity. In *C. sphaerica*, tender leaf collection after coning for curry preparation and also the collection of well grown leaves for use in bouquet making is affecting the growth and survival of the plant. The extraction of pithy material from young stems for food preparation is another factor limiting the population size. Further, the collection of male cones for use as a repellent against mosquitoes is limiting the pollen availability for female trees to set seed. In *C. beddomei*, the collection of male cones due to their demand for medicinal purposes is the limiting factor for the expansion of population size. The presence of less number of female trees in comparison to male trees is another factor restricting the population size. Locals create fire in the areas of this plant for cooking or other purposes. Quite often, the fires burn the area burning the seeds and seedlings of this plant and hence blocking reproduction to some extent. Therefore, there is a great threat to both the species of *Cycas*; in view of this, effective measures are required for their conservation and management in their own natural areas. Further research is urgently required to utilize them scientifically and commercially without affecting the distributional areas and population size of these two species.

Acknowledgements

We thank the Andhra University, Visakhapatnam, for providing physical facilities to carry out this work. The first author is thankful to CSIR for financial support through a Major Research Project. All other authors acknowledge thanks for the facilities provided to do this work.

Authors contributions

All six authors contributed almost equally.

Conflicts of interests

No conflicts.

Funding source

First author received grant from CSIR. The study was self-funded by all other authors.

REFERENCE

1. Pant, D.D. (Eds.), 1973. *Cycas and the Cycadales*. Central Book Depot, Allahabad, India.
2. Pant, D.D. 2002., *An Introduction to Gymnosperms, Cycas and Cycadales*. Monograph No. 4, Birbal Sahni Institute of Palaeobotany, Lucknow.
3. Donaldson, J., 2003. *Cycads – Status Survey and Conservation Action Plan*, IUCN/SSC Cycad Specialist Group, IUCN Cambridge, UK.
4. Hill, K.D., Chen, C.J. and Loc, P.K., 2003. *Regional Overview: Asia*. In: Donaldson (ed.), *Cycads: Status Survey and Conservation Action Plan*, pp. 25-30, IUCN/SSC Cycad Specialist Group, IUCN-The World Conservation Union, Cambridge, UK.
5. Sudhakar Reddy, C., Reddy, K.N., Pattanaik, C. and Raju, V.S., 2006. *Ethnobotanical observations on some endemic plants of Eastern Ghats, India*. *Ethnobotanical leaflets* 10: 82-91.
6. Sudhakar Reddy, C., Rao, K.S., Pattanaik, C., Reddy, K.N. and Raju, V.S., 2007. *Cycas sphaerica* Roxb.: A little known endemic species from Eastern Ghats, India. *J. Plant Sci.* 2: 362-365.