

Bamboo seeds as a means to sustenance of the indigenous community

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Bamboo is a natural gift for human livelihood. Bamboo has the peculiarity of flowering and seeding only after a long vegetative phase, and it varies from species to species. The present paper deals with the use of seeds of *Bambusa arundinacea* Willd. by the *Kani* tribes of Kanyakumari district, southern western Ghats. Method of seed collection, storage and mode of consumption by indigenous people have been described. The indigenous community not only uses the seeds as a food, but also as commercial commodity to improve the economy. The *Kani* tribes believe that the seeds of *Bambusa arundinacea* enhance the fertility, so that there is great demand of seeds of this species in pharmaceutical industry to manufacture drugs to improve fertility.

Key words: *Bambusa arundinacea*, Bamboo, Fertility, Indigenous community, *Kani* tribes, Traditional knowledge

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Bamboo is one of the precious plant resources of the earth. It has played a significant role in human civilization since ancient times, and is still contributing to the subsistence of over two billion people living in the tropical and sub-tropical belts in Asia, Latin America and Africa. Traditional uses of bamboo are differing from region to region and people to people. Since time immemorial, bamboo is being used in fuel, food, housing and shelter by indigenous communities¹⁻³. 26 bamboo species are used for edible purposes in pacific region of Asia⁴. Southern western Ghats of Kanyakumari district, because of its geographical location, stable geological history, favorable agroclimate, heavy rainfall and good soil conditions, support a gregarious growth of two bamboo species, *Bambusa arundinacea* Willd. and *Dendrocalamus strictus* Nees.^{5, 6}. The tribals have a vast knowledge about the utilization of these bamboo resources for their day-to-day life. However, there is lack of information about the uses of bamboo seeds. Hence, an attempt has been made to explore the indigenous knowledge about the use of bamboo seeds by the tribals of Kanyakumari district.

The present study was conducted at Kodayar and its vicinity located in the southern western Ghats of

Kanyakumari district (77°15'E, 8°29'N) at an elevation of 250-700m. It is a part of Agastyamalai hill range and falls in the Veerapuli forest reserve of Tamil Nadu⁷⁻¹⁰. Rainfall varies from 103-310 cm^{11, 12}. The climate of the district is favorable for agricultural purposes¹³. The Forests in Kanyakumari district is verdant and virgin forests and said to be about 75 million years old. Of the total district area of 167130 ha Government forests occupy an area of 50486 ha, which comes to about 30.2 % of the total geographic area of the district¹⁴. Fourteen types of forests from luxuriant tropical wet evergreen to tropical thorn forests occur in this district because of diverse locality factors and edapho-climatic conditions¹⁵. *Kanis*, the tribals commonly called, as *Kanikaran* or *Kanikars* are basically agriculturists, living in forests of Kanyakumari and adjoining Kerala forests. There are 47 *Kani* settlements in Kanyakumari forest division with an extent of 1250.05 ha of forestland allotted to 927 families¹⁶ (Table 1). They have good knowledge about natural resources as they chiefly depend on the forest for fuel wood, food and medicines. They also have a rich cultural heritage that is closely associated with nature. The deity of the *Kani* tribe is called *Malai Devadai* (Forest Goddesses). Hunting and gathering is an important activity of their daily life.

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Table 1—Distribution of tribal settlements in the study area

Name of the Reserve Forests	Settlements	Number of families	Total population	Total area in which settlement is made (ha)
Kilamalalai	15	415	1812	475.15
Veerapuli	31	466	2240	734.33
Asambu & Veerapuli	1	46	176	40.57
Total	47	927	4228	1250.05

Methodology

The study was conducted during February 2006 among the *Kani* tribes of southern western Ghats of Kanyakumari district. Interestingly, it is found that the indigenous people were actively involved in the collection of the bamboo seeds, while they are in the carnivores' census in the study area (Pechiparai to Kodayar via Mothiramalai). From the indigenous people, the information was gathered about the uses of bamboo seeds. The plant specimen were collected for detailed taxonomic and ecological investigation and identified with the help of the regional and local floras^{17,18} and housed in the Department of Botany, Scott Christian College, Nagercoil, Tamil Nadu.

Results and discussion

There are 15 *Kani* settlements in Kilamalalai spanning over an area of 475.15 ha with 415 families having a total population of 1812. In Veerapuli the settlements (31) placed over an area of 734.33 ha, consisting of 466 families and a total population of 2240. In Assambu and Veerapuli reserves, there is only one settlement having 46 families with a total population of 176. This settlement is spread over an area of 40.57 ha. Seeds of *Bambusa arundinacea* Willd. (Gramineae), was found to be utilized as a food grain among the tribals of Kanyakumari district. This is the commonest bamboo in the region, commonly called *Moongil* (in Tamil), attains a height of 8-30 m and a diameter of 18 cm; inter nodes up to 45 cm long and walls are thick. Thorns and large yellow culms sheaths easily identify *Bambusa arundinacea*. The culms are green and attain a straw yellow colour on drying. Indigenous through India (except North) Burma and Ceylon, ascending the hills to 915 m and abundant in the plains¹⁷. Commonly, *Bambusa arundinacea* flowers gregariously (Figs.1 & 2), at long intervals and then dies down completely, reproducing itself from seed. Often cultivated in traditional home gardens of Kanyakumari district.

The grains of the bamboo are locally known as

Mungil Arisee (in Tamil) that means bamboo rice (Fig. 3). When the bamboo seeds are matured, the tribals clean the ground around the plant and patch the floor by using cow dung. Every morning and evening, they collect the seeds that fall from plants on this clean floor. For protecting the seeds from the rodents they use a traditional trap called *Elipori* (Rat trap). Mostly women and children are actively engaged in the collection of bamboo seeds. Excess seeds are sold in the adjoining forest areas. Seeds of *Bambusa arundinacea* collected in Sampaji range of Karnataka by villagers are sold to the forest department, as well as for domestic consumption¹⁹. It helps to empower and improve the economy of the tribal women. Edible bamboo shoots generate self-employment and ultimately reduce the unemployment problems in the North East region of Indian Peninsula²⁰.

After collection, the seeds are sun dried before storage. For long-term storage of large quantities, they use huge earthen bins commonly called *Kulukukai*. The mouth of the storage bin is plastered by using mud and cow dung to protect against rodent attack. Mostly, they use the leaves of *Azadirachta indica* A. Juss. and *Pongamia pinnata* Vent as insect repellent. They have some common belief due to which they do not disclose the name of the plant species used for this purpose. For Less quantity of grain storage, they prefer small size earthen bins, *Manpanai* and hang it in the kitchen premise. It has been reported that the indigenous people of Meghalaya use mud and cow dung for plastering the storage bin and plant materials as insect pest repellents²¹. The study proved that the traditional knowledge largely remained with local tribal communities as a secret treasure.

The collected seeds were cleaned in water and boiled like rice and consumed with fish curry and vegetables by indigenous peoples as a substitute of rice. The studies conducted among the tribals of North East India revealed that the *Bambusa arundinacea* shoots was consumed by the indigenous community of Assam as a vegetable with fish curry²². This shows



Fig. 1 A *Bambusa arundinacea* bloom

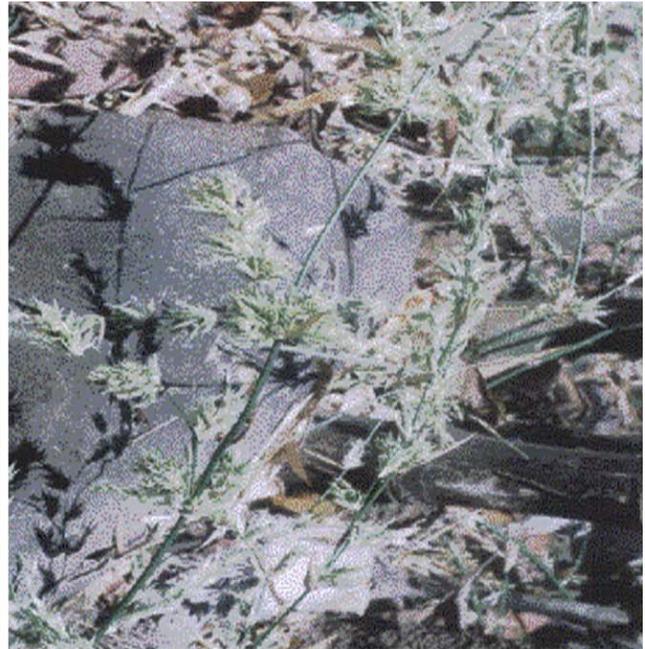


Fig. 1 B *Bambusa arundinacea* culm blown up



Fig.1 C *Bambusa arundinacea* seeds (Bamboo rice)

the diversification of traditional knowledge from region to region and community to community. Raw and roasted bamboo shoots are extensively used as supplementary food during famine, when there was mass flowering of bamboos in Mizoram^{22, 23}.

Bamboo seeds are nutrient rich, the overall nutritive quality slightly greater than rice and wheat. The percentage composition of the husked bamboo

seeds are: moisture 10.0, crude protein 12.0, ether extractive 0.9, ash 1.1, fibre 2.6, carbohydrate (by difference) 73.4, calcium 25.0 mg %, phosphorus 218.0 mg %, iron 9.2 mg %, vitamin B₁ 0.1 mg (33.3 International Unit) %, Nicotinic acid 2.03 mg %, riboflavin 36.3 µg %, carotene 12.0 µg % (20 International Units of Vitamin A) and calorific value 98.0 (calorie per ounce)²⁴. Fractionation studies

revealed that the major proteins of the seed were glutelins with isoelectric point at pH 4.6. The amino acids make up the proteins. The two-dimensional paper chromatographic showed that, the bamboo seeds were well provided with all the essential amino acids²⁴. It is evident from the above results that the biological value of the bamboo seed protein is as high as that of rice proteins and higher than that of wheat proteins. In the matter of protein content, the seeds are comparable with wheat but superior to rice. Thus in overall nutritive value, the bamboo seeds excel both rice and wheat. It has been reported that thousands of people sustained themselves on bamboo seeds in times of scarcity in the past. Normally it is only consumed by the hill and forest tribes²⁵. From the above observation it is clear that the bamboo seeds are nutrient rich indigenous food, and it can be used as a substitute of rice and wheat during availability by the city dwellers also.

It is evident that the people in North East India and elsewhere in the world believe that the bamboo flowering is the harbinger of famine. The popular belief is that the gregarious flowering of bamboo produces large quantities of seeds, resulting in a population explosion of rats feed upon other food commodities thus damaging stored produce leading to famine^{26, 27}. The *Kani* tribes believe that the bamboo seeds increase the fertility and reproducing capacity of the tribe.

Conclusion

Based on the above-mentioned facts, it has been stated that the consumption of bamboo seeds by the indigenous tribal is reducing the demand of other food grains, especially rice at least during a particular period. It has also improved the economic status of the tribal women. If proper storages systems are available and bamboo rice is removed soon after it is shed, it is possible to manage rodents and their population explosion could be avoided. This is essential to prevent famine in tribal belts.

The present study was an attempt to enumerate the mode of consumption of *Bambusa arundinacea* seeds by *Kani* tribes of Kanyakumari district. Undoubtedly, this traditional wisdom may some day constitute the traditional heritage of the people of Kanuakumari district. Scientifically, there is ample scope for studies pertaining to nutrient status, chemical and biological active components of bamboo seeds in future research. The studies on biotechnology, molecular biology and phytochemistry of bamboo seeds must be

given due importance. Such biochemical analysis of the seeds may provide information to the pharmaceutical companies regarding the fertility-enhancing component of *Bambusa arundinacea* seeds to produce fertility drugs. The out come of such studies will be useful in determining the nutritional status of bamboo seeds. It could further provide appropriate measures for improving the seed viability of *Bambusa arundinacea*. The proper utilization of *Bambusa arundinacea* seeds, as potential non-timber forest produce can be a boon for ecological and economical sustenance of the district.

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