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## RESEARCH ARTICLE

**Nypa palm (*Nypa fruticans* Wurmb.) A new record from Kerala.****Lovly M S and Dr. (Sr). Merlee Teresa M V.**

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*Nypa fruticans* Wurmb, commonly known as the Nypa palm, is a species of palm native to the coastlines and estuarine habitats of the Indian and Pacific Oceans. It is the only palm considered adapted to the mangrove biome. This species is the only member of its genus *Nypa* which is in turn, the only member of the subfamily *Nypoideae* forming monotypic taxa (Moore 1973; Uhl & Dransfeld 1987; Whitmore 1973).

Even though the plant is not common in India, except in the Sunderbans and Andaman and Nicobar Islands, fossil pollen grains of the palm genus *Nypa* described under *Spinizonocolpites* have been reported from the west coast of India in the tertiary sediments of the Warkalli and /Quilon formations in Kerala, and in the sediments of Ratnagiri districts in Maharashtra. (Biju Dharmapalan et al 2012). The present report describes *Nypa* palm, a mangrove palm so far not reported from Kerala. Presently it grows in Pattanam a rural hamlet located in the Periyar Delta, 2 km north of North Paravur, 9 km south of Kodungallur and 25 km north of Kochi in Ernakulam district in the Southern Indian state of Kerala.

*Nypa* (*Nypa fruticans* Wurmb.) belongs to the family Palmae (Burkill 1935; Corner 1966; Gee 2001; Jian et al. 2010; Uhl & Dransfeld 1987) or Arecaceae (Gee 2001; Hamilton & Murphy 1988). The genus *Nypa* has been placed in its own subfamily, the *Nypoideae* (Moore 1973; Uhl & Dransfeld 1987; Whitmore 1973) and is the sole species in genus *Nypa* (Jian et al. 2010).

*Nypa* is one of the most common widely distributed and useful palms in the mangrove forests of Southeast Asia. It is known by different names in different countries: *attap palm* (Singapore), *buah atap* (Indonesia), *buah Nypah* (Malaysia), *ging pol* (Sri Lanka), *gol pata* (Bangladesh) and *dani* (Burma). Recently, Malaysian scientists realized the usefulness of *Nypa* again and strategies for effective management of *Nypa* were proposed (Latiff 2008)

In Nigeria, various parts of the Nypa Palm are used for several purposes (Udofia and Udo, 2005). In spite of such usefulness, there is in general a lack of scientific reports on *Nypa* compared with other useful tropical palms such as coconut and oil palm. Despite these uses, it is regarded as a nuisance in Nigeria because of its adverse ecological impacts on waterways and marine lives (Etukudo, 2001). The same plant is regarded as an endangered species in Singapore (Hutton, 1996) where technologies for the utilization for bio-ethanol production has being greatly explored. Lack of scientific technology on the utilization of any species generally results in under utilization and inadequate management. In India, this plant is unknown to common people even though much similar to coconut palm. Kerala, one of the coastal state of India has the ample scope of using this palm along with coconut palm for producing oils, fuels, tuba an alcoholic beverage, and for protecting the coastal area from natural calamities.

Unlike the other palms, it lacks an upright stem, which is the characteristic feature of the palms. The palm also exhibits a colonial growth habit, with its trunk or stem under mud, only the leaves projecting upwards.

The long feathery leaves of Nypa palm is used by local populations as roof material for thatched houses or dwellings. The leaves are also used in many types of basketry and thatching. Large stems or rhizomes are used to train swimming in Burma as it has buoyancy.

On the islands of Roti and Savu, Nypa palm sap is fed to pigs during dry season. This is said to impart a sweet flavour to meat. The young leaves are used to wrap tobacco for smoking.

In the Philippines and Malaysia, the flower cluster or inflorescence can be tapped before it blooms to yield a sweet edible sap collected to produce a local alcoholic beverage called *tuba*, *bahal* or *tauik*. Tuba can be stored in *tapayan* (*balloon vases*) for several weeks to make a kind of vinegar known as *sukang paombong* in the Philippines *cuka Nypah* in Malaysia. Tuba can also be distilled to make arrack, locally known as *lambonag* in Filipino and *arak* in Indonesian.

Young shoots are also edible and the flower petals can be infused to make an aromatic tisane. *Attap ghee* is a name for the immature fruits, its endosperm that is sweet translucent gelatinous balls used as a desert ingredient in Thailand, Malaysia and Singapore.

Nypa palm inhabits estuarine habitats, grows up to 10 m tall and produces large buoyant propagules that are dispersed with ocean currents. The genus *Nypa* is monotypic with *Nypa fruticans* Wurm. being its only species. It is one of the ancient angiosperms and probably the oldest species of palm (Paivake 1996 in Teo et al.2010).

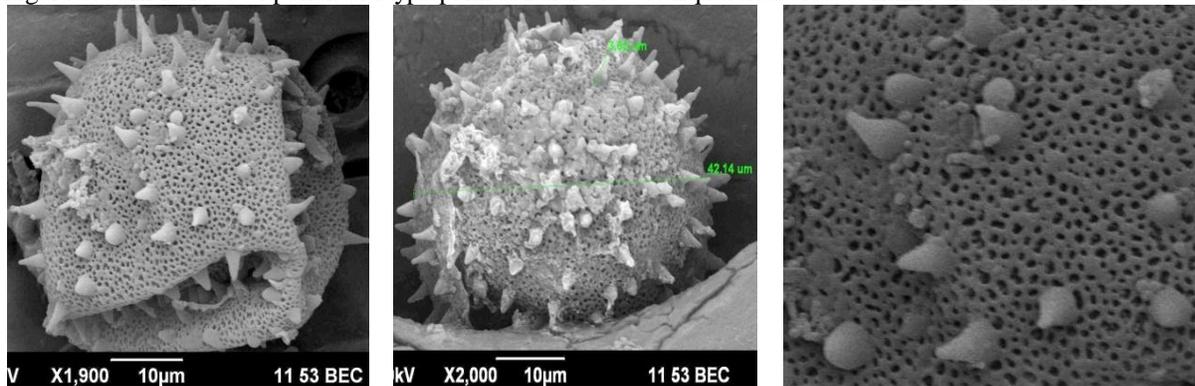
Its thick prostrate, rhizomatous stem branches dichotomously underground and new plants grow vegetatively from each branch, often creating dense strands. Leaves pinnatisect, leaflets lanceolate, plicate. Spathes many, sheathing. Spadix terminal, branched, erect, fruiting drooping; flowers monoecious, male in catkin like lateral branches of the spadix, female in a globose terminal head, perianth glumacious (figure 1 and 2)

Figure 1:-Nypa palm with leaves, inflorescences and fruits Figure 2:-Male and female Inflorescence of Nypa palm



Male flowers minute mixed with setaceous bracteoles; sepals linear, with broad truncate inflexed tips, imbricate; petals smaller; stamens 3, filaments cuneate, anthers linear basifixed; pistillode 0, female flowers much larger; sepals 6 rudimentary, displaced; staminodes 0, carpels 3, tips free, each with an oblique stigmatic line; ovules 3, erect (figure 1).

SEM analysis of pollen shows Polar length 60.27  $\mu\text{m}$ , equatorial diameter 47.01  $\mu\text{m}$ , P/E ratio 1.28, subprolate in shape. Echinate pollen with spine length 3.62  $\mu\text{m}$ . 1-zonosulcate, sulci meridional ring like, ornamentation echinate, interspinal area perforate or reticulate. Exine thickness 0.9  $\mu\text{m}$ . Nypa palm is one of the oldest angiosperm and the spiny pollen is a character shown by primitive plants (figure 3).

Figure 3:- SEM views of pollen of *Nypa* palm a. Polar view b. Equatorial view c. Exine ornamentation

Fruit large globose, syncarp of many obovoid hexagonal 1-celled 1-seeded carpels with pyramidal tips and infra-apical stigmas. (Figure 4)

Figure 4:- Young and Mature infructescence of *Nypa* palm

Individual fruits are dispersed by the tides and currents (figure 6). As an adaptation to the submerged environment, the fruit is designed to float, and this buoyancy is attributed to its thick fibrous mesocarp (figure 6). Seed erect grooved on one side, testa coriaceous and viscid within and adherent to the endocarp, hilum broad; albumen equable, hollow; embryo basilar, obconic (figure 7).

Figure 6:-A single fruit with viviparous seed



Figure 7:-L.S of Young *Nypa* Fruit

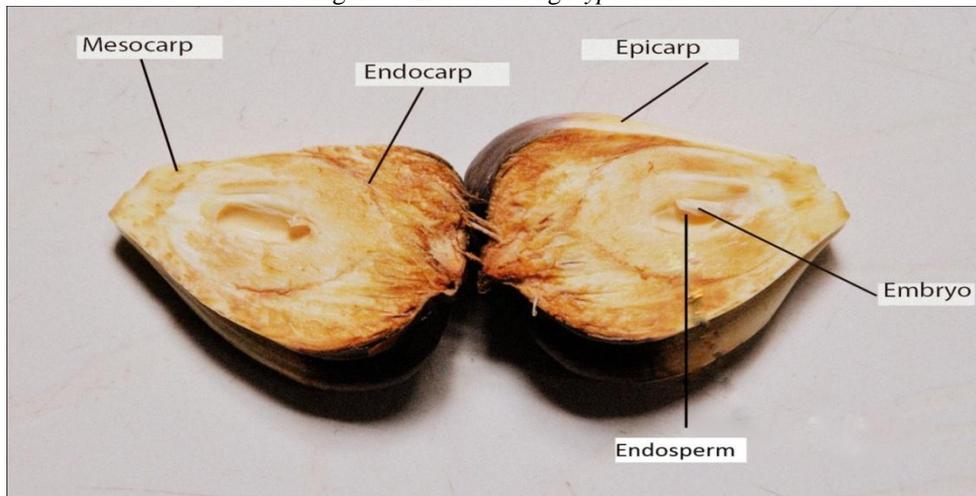
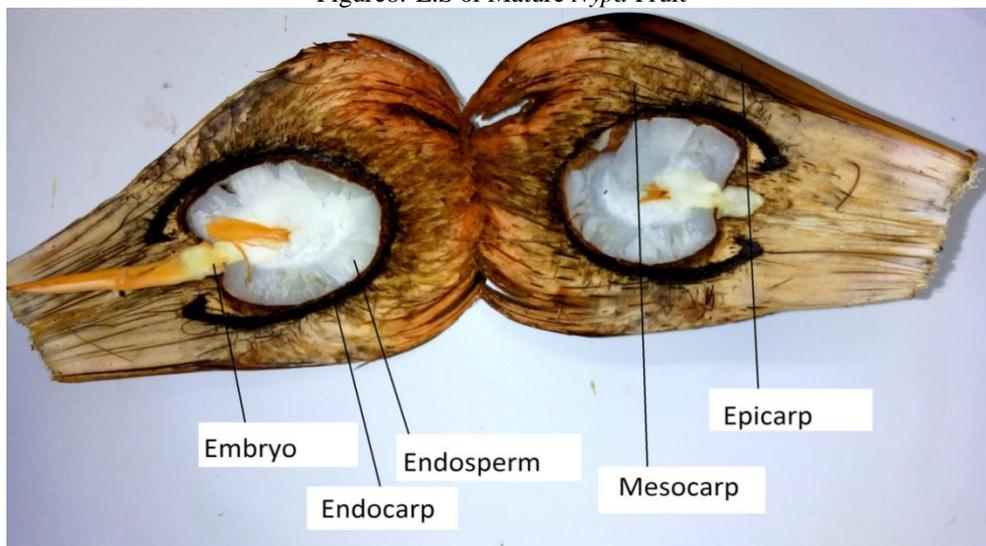


Figure8:-L.S of Mature *Nypa* Fruit



Seed of *Nypa* is endospermous with translucent gelatinous balls acts as endosperm. Pericarp is fleshy and fibrous with three layers of outer epicarp, middle mesocarp and inner endocarp (Figure 7 and 8). The endocarp is spongy and flowery. Germination percentage of seeds is very low. Seeds show vivipary as true mangroves.

Viviparous seeds show high germination rate. Viviparous seeds collected from the site, germinated and seedlings were raised and one is planted in the botanical garden of St'Teresa's College, Ernakulam (figure 9).

Figure 9: 10 month old plant of *Nypa* palm and branching of leaves



This oldest Angiosperm species is reported and illustrated with a view that the material will be useful at the time of the revision of the flora of India – a scheme undertaken by the Botanical Survey of India.

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