REPORT OF A PALM FRUIT FROM THE DECCAN INTERTRAPPEAN SERIES OF MARAIPATAN, CHANDRAPUR DISTRICT (M.S.)

S. P. Patil¹, S. K. Zilpe² and D. K. Kapgate³

¹Dept. of Botany, Bhagwantrao Arts and Science College, Etapalli - 442704
²Dept. of Botany, Janata College, Chandrapur - 442404
³Dept. of Botany, J. M. Patel College- Bhandara

patilsharadkumar@gmail.com

Abstract:
The present paper deals with a monocot palm fruit reported from the Deccan Intertrappean Series of Maraipatan of Chandrapur District (M.S.). It is a sessile, circular to oval, unilocular, drupe with single seed in a locule. It Measures 5.5mm in diameter. Fruit wall differ into three zones. Seed is oval, bitegmic, endospermous with central cavity. It show close resemblance with living fruit of Livistona of family Palmae but not in Toto. Hence it is kept in the same form genus Palmocarpon (Miquel, 1853) and a new species is created to accommodate this fruit as Palmocarpon patnii sp. nov.

Keywords: – Fossil, Fruit, Palmocarpon, Deccan, Intertrapps, Maraipatan.

Introduction

The megafossil flora of angiosperms are very well known from the Deccan Intertrappean series of India. But the present specimen is collected from a very new Deccan Intertrappean locality Maraipatan (N 19° 32.166; E 079° 07.521), of Jivati Taluka in Chandrapur district (M. S.). It is about 80 km. from Chandrapur in the south on Gadchandur-Patan road (Plate fig. 6). So far only Nautiyalocarpon patanii (Dahegaonkar, 2002), Marsilea patanii (Patil et al. 2014), Selaginella homophyllii (Kapgate and Wanjari, 2014) are reported from this locality. So far few fossil palm fruits have been reported from the Deccan Intertrappean series. Palm fruits occur quite commonly from the Deccan Intertrappean series of India. Few forms which compared with modern taxa are Cocos (Kaul, 1951), Nipa (Sahni and Rode, 1937; Lakhanpal, 1952; Chitaley, 1960; Chitaley and Nambudiri, 1969). The Palm fruits are usually placed under genus Palmocarpon (Miquel, 1853) as the fossil fruits of Palmae. These reported fruits are Palmocarpon takliensis, P. bractiatum (Sahni et al., 1934), P. compressum (Sahni and Rode, 1937; Sahni, 1964), P. insigne (Mahabale, 1950), P. mohgaoneanse (Prakash, 1954), P. indicum and P. sulcatum (Prakash,1960), P. splendinidum (Trivedi and Chandra, 1971), P. corphodium (Shete and Kulkarni, 1985), P. arecofoles and P. cocoides (Mehrotra, 1987), P. rodei (Kapgate et al., 2011), Hyphaeniocarpon indicum (Bande et al., 1982), Arecoicarpon kulkarni (Bonde, 1990), A. prismaticum (Agarwal et al., 2007).

Material and Method

The specimen described here is a petrified fossil exposed in transverse plane in fossiliferous chert, collected from Maraipatan of Chandrapur district (M.S.). After etching the material with Hydrofluoric acid, peels are taken from its part and counterpart. The peels are mounted on slide and observed under microscope. Photographs are also taken for detail study. The present fossil fruit shows similarities with living date Palm fruit (Plate Fig. 1).

Description

The detailed description of fossil petrified fruit under consideration of present work is as below. The fruit measures 5.5mm in diameter. It is a sessile, circular to oval, unilocular, drupe with single seed in a locule. Fruit wall differ into three zones.

Pericarp (Fruit Wall)

It is well preserved and differ into thin epicarp, a semifibrous mesocarp and hard endocarp. Thickness varies from top to base and ranges from 0.52mm to 0.56mm. It is more thickened at lower side (Plate figs. 2 &3).

Epicarp-

It is the outermost thin layer of 1 to 2 cells in thickness consist of more or less rectangular, compactly arranged parenchymatous cells. It measures 42 to 45 µm in thickness. Each cell measures 23 to 30µm in size. Epicarp is somewhat wavy in outline.

Mesocarp-

It is the outermost thin layer of 1 to 2 cells in thickness consist of more or less rectangular, compactly arranged parenchymatous cells. It measures 42 to 45 µm in thickness. Each cell measures 23 to 30µm in size. Epicarp is somewhat wavy in outline.
frequency of 5 per mm². Fibrovascular bundles are conjoint, collateral and closed.

**Endocarp** - It is 3 to 4 layered, hard sclerenchymatous forming hard coating around the seed coat. It measures 5.14mm to 4.90mm. The seed stalk is short. It is well preserved with central hallow cavity called endosperm cavity. Seed coat is about 145 to 148 µm thick, consisting testa and tegmen. Testa is 3 to 4 layers in thickness. Tegmen consist of angular cells of 4-5 layers merged with endosperm tissue (Plate figs. 4&5).

**Endosperm** :-
It is surrounded by definite layer of seed coat. Endosperm is massive with embryo and endospermous cavity. It is albuminous and solid nearest to the endospermous cavity. Cells in endospermous cavity are irregular loosely arranged confirming fluidy nature. Endosperm is 4.4mm x 3.6mm in size. Endosperm cavity is variable in size.

**Embryo** :-
It is not clearly preserved in the present specimen but at some places few cells shows embryonic nature.

**Identification and Discussion**
The characters considered for the identification of the fruit are-

- a) Fruit is unilocular single seeded circular to oval in shape.
- b) Fruit wall is wavy, massive where seed is attached by short stalk.
- c) Pericarp differentiated into three zones i.e. Epicarp, Mesocarp and Endocarp.
- d) Epicarp is thin, Mesocarp is thick and massive containing fibres and fibrovascular bundle and Endocarp is Sclerenchymatous and hard.
- e) Seed is oval in shape, bitegmic containing endosperm with endosperm cavity.
- f) Embryo could not been observed but might be one.

From these characters the present fruit represents indehiscent monocot drupaceous fruit containing single large seed. It is compared with reported fossils and fruits of modern plant of monocot families.

**Comparison with Modern Taxa** :-
The classification suggested by (Rendle, 1963; Hutchinson, 1959; Bentham and Hooker, 1961; Englar and Prantle, 1898) are referred and it is concluded that the present fruit belongs to monocot family. Further, it is compared with unilocular, single large seeded indehiscent fruit of Palmae (Cook, 1958; Uhl and Drasfield, 1987). The family includes genera like- Phoenix, Arenga, Caryota, Borassus, Areca, Cocos, Calamus, Nannorrhops and Corypha. The genus Caryota, Arenga resembles with the present fossil specimen on account of Drupaceous, fibrous fruit but differ due to trigonous structure, three celled ovary and compressed endocarp structure. The fossil specimen also comparable with fruit of Phoenix but differ in oblong seed, fleshy pericarp and membranous endocarp. The present fruit is also compared with Nannorrhops and resembles in having small drupe, globose or oblong, one seeded fruit with hollowed, uniform albumen but differ in having trigonous ovary. The genus Calamus closely resembles but differ in thin pericarp, three celled ovary. Some non-indigenous palms are studied and compared with fossil specimen. It is nearly comparable to fruit of Livistona chinensis, a garden fan palm where the fruit is drupe, tricarpellary with marking of furrows.

**Comparison with Fossil Plants** :-
The present fruit is compared with known species of Palmocarpum. On comparison it does not show close resemblance to any known species of Palmocarpum. P. compressum (Sahni and Rode, 1937; Sahni, 1964), differs in size of the fruit and seed, in absence of aborted carpels. Palmocarpum insigne (Mahabale, 1950), another palm fruit also differs considerably from the present fossil in size and shape and presence of stellete fibres. In the Palmocarpum sulcatum (Prakash, 1960), fruit is quadrangular with a slight groove, membranous epicarp and are not comparable with the present fossil fruit. In Palmocarpum indicum (Prakash, 1960), fruit is ovate with 4-6 longitudinal ridges on surface, hard endocarp. These characters are not seen in the present fossil fruit. Palmocarpum takliensis (Sahni, 1964), is known from the Takli, Nagpur, differs from the present fruit in the shape of the fruit and the presence of numerous very fine ribs on the surface radiating from the apical umbo. Palmocarpum bracteatum (Sahni, 1964), differs in the shape of the fruit i.e. sub-spherical and attachment on an axis bearing short, thick, broad, rounded, longitudinal ribbed bracts. Palmocarpum mohgaoense (Prakash, 1954), is different in trigonous shape with four longitudinal ridges on the surface of fruit. Palmocarpum splendidum (Trivedi and and Chandra, 1973), is also different from the present fruit. The differences are in having a
slight groove from the anterior to posterior end and without fibre zone in mesocarp. *Nypa sahnii* (Lakhanpal, 1952) having a typical umbo on the fruit cannot be compared with present fruit. In *Cocos intertrappeansis* (Patil and Upadhye, 1984) the size of fruit and surface mark of three distinct blunt projections of carpels are not comparable with present fossil fruit. *Arecocarpon* (Bonde, 1990; Agarwal et al., 2007) also differs from the present fruit in having canals in endosperm, endocarp differentiated in three zones and presence of stegmata. *Palmocarpon rodei* (Kapgate et al., 2011), differs from present specimen in having apical opening which is not found in present specimen.

Since the present fossil fruit does not show affinities with any of the fossil but nearly resemble with living fruit of *Livistona* of family Palmae with some differences. Hence, it is kept in the same form genus *Palmocarpon* (Miquel, 1853) and named as *Palmocarpon patanii* sp. nov. The specific name is after a locality Marai Patan where it is collected.

**SYSTEMATIC POSITION**

Angiosperms
Monocotyledons
Palmae (Arecaceae)

*Palmocarpon patanii* sp. nov.

Monocot palm fruit, unilocular single seeded drupe; fruit size 5.5 mm in diameter; fruit wall measure 0.52 mm to 0.56 mm in thickness and divided into thin epicarp, massive mesocarp and thick endocarp; epicarp 42-45 µm thick, parenchymatous; mesocarp fibrous; fibrovascular and with stalk vascular bundles; mesocarp measured 408 to 442 µm in the thickness, sclerenchymatous; endocarp measured 73-78 µm thick contains sclerenchymatous tissue; endosperm solid measured 4.4 mm x 3.6 mm with central endospermous cavity, endosperm cavity is variable in size and fluid in nature; seed covers with bitemic seed coat measuring 145 to 148 µm thick; size of the seed 5.14 mm to 4.90 mm in diameter; Embryo is not clearly observed.

**Holotype**: Department of Botany, Bhagwantrao Arts & Science College, Etapalli.

**Locality**: Marai Patan, Jiwati taluka, District – Chandrapur M.S., India

**Horizon**: Deccan Intertrappean Bed.

**Age**: Late Cretaceous
Explanation of PLATE Figures 1 to 6.

1. Complete view of fruit in Transverse Plane. 2. Pericarp showing three zones i.e. epicarp, mesocarp & endocarp and cavities. 3. Attachment of seed to pericarp. 4. Bitegmic seed coat and edosperm. 5. Seed coat enlarged. 6 Google map of the Locality.

References


