

SOME NEW PALM FRUITS FROM THE DECCAN INTER-TRAPPEAN BEDS OF MANDLA DISTRICT, MADHYA PRADESH

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Abstract

Three new palm fruits, *Palmocarpon arecoides*, *P. cocoides* and *Palmocarpon* sp. have been described for the first time from the Deccan Intertrappean beds of Mandla District, Madhya Pradesh. *P. arecoides* and *P. cocoides* show near resemblance with *Areca* L. and *Cocos* L. respectively. The occurrence of *Cocos* indicates coastal conditions in Mandla district during Early Tertiary.

Introduction

Palm woods are common in the Deccan Intertrappean flora of Mandla District, Madhya Pradesh. These are: *Palmoxylon parapaniensis*, *P. mandlaensis* (Lakhanpal, Prakash & Ambwani, 1979), *P. shahpuraensis* Ambwani (1983), *P. ghuguensis* Ambwani & Prakash (1983), *P. siltherensis* Ambwani, 1984a) and *P. dilacunosum* Ambwani (1984 c). Besides these woods, a palm peduncle *Palmostroboxylon arengoidum* Ambwani (1984b) and a palm fruit *Hyphaeneocarpum indicum* Bande, Prakash & Ambwani (1982) are also known from here.

In the present paper three palm fruits *Palmocarpum arecoides* sp. nov., *P. cocoides* sp. nov. and *Palmocarpum* sp. have been described. The first one was collected from the Deccan Intertrappean beds of Samnapur near Nainpur of Mandla district while the rest two were collected from the Deccan Intertrappean beds of Ghughua near Shahpura of the same district.

Systematic description

FAMILY—PALMAE

Genus—*PALMOCARPON* Miquel, 1853

1. *Palmocarpum arecoides* sp. nov.

Pl. 1, figs. 1-5

Material—The only specimen of the silicified fruit embedded in the chert was first studied and photographed under reflected light and then two cross sections and one oblique vertical section were prepared in order to study its anatomy. Preservation of the fruit is poor and does not reveal structural details satisfactorily.

Gross Features—The fossil fruit is a single seeded drupe measuring 2.2-2.3. cm. in diameter (Pl. 1, fig. 1). It looks more or less circular but its exact shape is not known as the pericarp is preserved only on 3/4th side of the fruit. *Pericarp* measuring 3-4 mm in radial thickness, can be differentiated into a thick *mesocarp* and a thin *endocarp* (Pl. 1, figs. 2, 3). *Epicarp* is not preserved. A *seed* having a small groove on one side, is present inside the endocarp (Pl. 1, fig. 2).

Anatomy—*Mesocarp* is 2.46-3.23 mm in radial thickness and composed of uniformly scattered fibrous and fibrovascular bundles which are cut in different planes (Pl. 1, fig. 5). Each fibrovascular bundle consists of 1 or 2 vessels which are dorsally enclosed by sclerenchymatous sheath. Vessels are round to oval in shape and measuring 20-140 μm in size. The ground tissue is made up of oval to rounded parenchymatous cells measuring 40-60 μm in size. *Endocarp* is composed of several layers of thick-walled cells (Pl. 1, fig. 4), measuring 220-350 μm in radial thickness. These cells are circular to polygonal in shape and are 16-40 μm in size. *Seed* is more or less circular in shape measuring about 1.5-1.7 cm in diameter. Due to poor preservation, its internal structures could not be seen.

Discussion—The important characters of the fossil fruit, namely small, more or less circular, single-seeded drupe, thick mesocarp composed of fibrous and fibrovascular bundles, thin endocarp made up of thick-walled cells and a seed having a small groove on one side indicate its affinities with *Areca* L. of the family Palmae (Blatter, 1926 ; Lawrence, 1964 ; Hutchinson, 1979).

Miquel (1853) instituted the genus *Palmocarpon* for including fossil palm fruits whose exact affinities are not known. Several species of this genus are known from India and abroad (Lesquereux, 1878 ; Berry, 1927 ; Mahabale, 1950 ; Prakash, 1954, 1960 ; Trivedi & Chandra, 1973). As none of the species of *Palmocarpon* described so far possesses a groove in the seed, like that of the present fossil, which is being described here as a new species—*Palmocarpon arecoides*. The specific name indicates its resemblance with the genus *Areca*.

Areca L. is a tree or shrub distributed in tropical Asia and Australia. It consists of 40 species out of which three are indigenous to India. These are *Areca catechu* L., *A. nage-nisis* Griff. and *A. triandra* Roxb. In India *Areca* grows in Attapadi Valley of Malabar, Naga Hills and Andaman Islands (Blatter, 1926).

SPECIFIC DIAGNOSIS

Palmocarpon arecoides sp. nov.

Fruit—Single-seeded drupe measuring 2.2-2.3 cm in diameter. *Pericarp* about 3-4 mm in radial thickness and differentiated into 2.16-3.23 mm thick *mesocarp* having uniformly scattered fibrous as well as fibrovascular bundles and 220-350 μm thick *endocarp* made up of several layers of thick-walled, circular to polygonal cells. *Seed* more or less circular in shape, 1.5-1.7 cm in diameter and with a small groove on one side.

Holotype—Specimen no. B.S.I.P. 35942.

Horizon—Deccan Intertrappean beds.

Locality—Samnapur near Nainpur, Mandla District, Madhya Pradesh.

Age—Early Tertiary.

2, *Palmocarpon cocoides* sp. nov.

Pl. 2, figs. 6, 7

Material—The only specimen of the fossil fruit was first studied and photographed under reflected light. It is quite big in size and its surface is very rough. Two cross sections were prepared in order to study its anatomy, but the preservation is very poor.

Description—The fruit is roughly triangular in shape being broad at the base and narrow at the apex, measuring 9 cm in height with a maximum diameter of 10 cm at

the base (Pl. 2, fig. 6). Due to the poor preservation of the fruit, its internal anatomical details could not be studied. However, in the cross section some scattered fibrovascular bundles (Pl. 2, fig. 7) may be seen near its peripheral part. These bundles are cut in various planes and are poorly preserved to reveal satisfactory structural details. They are, however, monocotyledonous in nature.

Discussion—The presence of fibrovascular bundles in the fossil indicates that it is a monocot fruit. On comparison with a large number of monocotyledonous fruits at the Herbaria of National Botanical Research Institute, Lucknow and Forest Research Institute, Dehra Dun it is inferred that the fossil fruit shows near resemblance with *Cocos* L. in its external morphological characters (Blatter, 1926).

As the present fossil fruit is distinct from all the species of *Palmocarpon* due to its large size and triangular shape, it is being described here as a new species—*Palmocarpon cocoides*, the specific name indicating its near resemblance with the modern genus *Cocos* L. Sahni (1946, 1964) described *Palmoxylon sundaram* resembling *Cocos nucifera* from the Deccan Intertrappean beds of Sagar. The present finding confirms the presence of this genus in the Deccan Intertrappean beds and also extends its occurrence upto Mandla district.

Cocos L. is a monotypic genus. Its only species *Cocos nucifera* L. is a coastal tree and found in tropical Asia and Polynesia (Santapau & Henry, 1973; Willis, 1973). In India it is found in Nicobar and Coco Islands of Bay of Bengal (Blatter, 1926). The author in his earlier report (Mehrotra, 1987) showed the presence of *Sonneratia*, a coastal dicot plant, from the Deccan Intertrappean beds of Mandla District. The present finding from the same beds strongly substantiate the prevalence of coastal conditions in Mandla district during Early Tertiary.

SPECIFIC DIAGNOSIS

Palmocarpon cocoides sp. nov.

A large sized, roughly triangular fruit measuring about 9 cm in height with 10 cm diameter at the base.

Holotype—Museum Specimen no. B.S.I.P. 35943.

Horizon—Deccan Intertrappean beds.

Locality—Ghughua near Shahpura, Mandla District, Madhya Pradesh.

Age—Early Tertiary.

3. *Palmocarpon* sp.

Pl. 2, figs. 9-11

Material—The fruit was found embedded in a chert piece. It was first photographed under reflected light and then its cross sections were prepared in order to study its anatomy.

Description—The fruit is a drupe, almost circular in shape measuring about 2.5 cm in diameter (Pl. 2, fig. 8). *Pericarp* can be differentiated into a thick *mesocarp* and a thin *endocarp*. *Epicarp* is not preserved. *Mesocarp* is about 3.2–4.1 mm in radial thickness and consists of uniformly scattered fibrous and fibrovascular bundles (Pl. 2, fig. 11). The ground tissue is made up of oval to rounded parenchymatous cells measuring 30–40 μm in size. *Endocarp* measuring 80–100 μm in radial thickness, is made up of several layers of polygonal thick-walled cells; each cell about 20–40 μm in size (Pl. 2, fig. 10)

Seed is one, more or less circular in shape and measures 1.7-2 cm in diameter. It consists of a thin, badly preserved seed coat and an endosperm made up of thin-walled oval to elliptical cells which are about 60-100 μm in size (Pl. 2, fig. 9).

Discussion—The important anatomical characters of the fossil fruit, namely small, about 2.5 cm in diameter, almost circular in shape, single-seeded drupe; pericarp differentiated into a thick mesocarp containing fibrous and fibrovascular bundles and a thin endocarp made up of several layers of thick-walled cells and the seed with homogeneous endosperm made up of thin-walled cells, indicate its affinities with the family Palmae (Blatter, 1926; Lawrence, 1964; Hutchinson, 1979). As the preservation is not satisfactory, its detailed comparison with the modern genera as well as different species of *Palmocarpum* Miquel (1853) is not possible. Therefore, it is being described here as *Palmocarpum* sp.

Specimen—Museum Specimen no. B.S.I.P. 35944.

Horizon—Deccan Intertrappean beds.

Locality—Ghughua near Shahpura, Mandla District, Madhya Pradesh.

Age—Early Tertiary.

Acknowledgements

The author is thankful to Dr Uttam Prakash for useful suggestions during the progress of this work. I am also grateful to Dr B. S. Venkatachala, Director, B.S.I.P., for his invaluable suggestions and constant encouragement.

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Explanation of Plates

Plate 1

Palmocarpon arecoides sp. nov.

1. Enlarged fossil fruit under reflected light showing pericarp enclosing the seed. $\times 3$; Specimen no. B.S.I.P. 35942.
2. Oblique longitudinal section of the fossil fruit showing a thick mesocarp and a thin endocarp enclosing the seed. $\times 3$; Slide no. B.S.I.P. 35942-I.
3. Cross section of the fossil fruit showing mesocarp and endocarp enclosing the seed, $\times 3$; Slide no. B.S.I.P. 35942-II.
4. Enlarged cross section showing a thick mesocarp and a thin endocarp made up of polygonal thick-walled cells. $\times 100$; Slide no. B.S.I.P. 35942-III.
5. Scattered fibrous and fibrovascular bundles of the mesocarp in oblique longitudinal section. $\times 95$; Slide no. B.S.I.P. 35942-I.

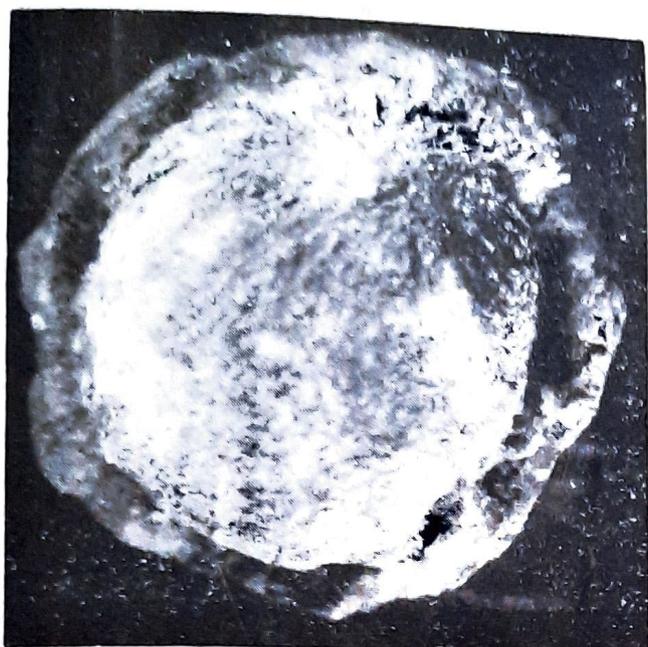
Plate 2

Palmocarpon cocoides sp. nov.

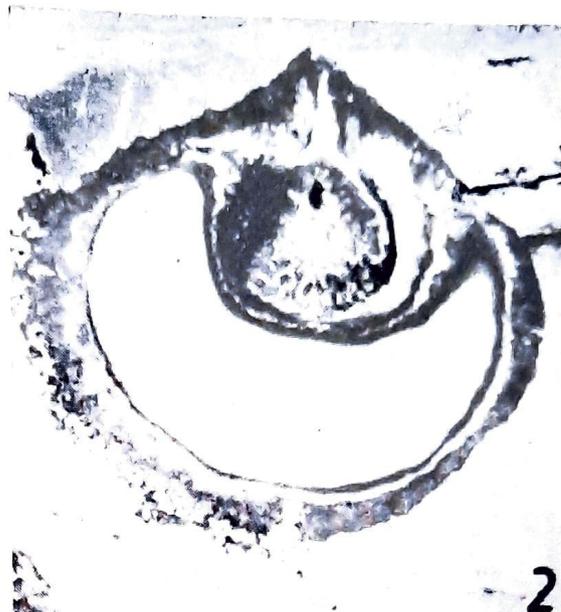
6. Fossil fruit under reflected light showing its shape and size. $\times 1$; Specimen no. B.S.I.P. 35945:I.
7. An enlarged fibrovascular bundle of the fossil fruit. $\times 55$. Slide no. B.S.I.P. 3

Palmocarpon sp.

8. Fossil fruit under reflected light showing its shape and size. $\times 1$; Specimen no. B.S.I.P. 35944.
9. Cross section of the fossil fruit showing thin-walled cells of the endosperm. $\times 140$; Slide no. B.S.I.P. 35944-I.
10. Cross section of the fossil fruit showing a thick, badly preserved mesocarp and a thin endocarp made up of thick-walled cells. $\times 180$; Slide no. B.S.I.P. 35944-II.
11. Scattered fibrous and fibrovascular bundles of the mesocarp. $\times 120$; Slide no. B.S.I.P. 35944-III.



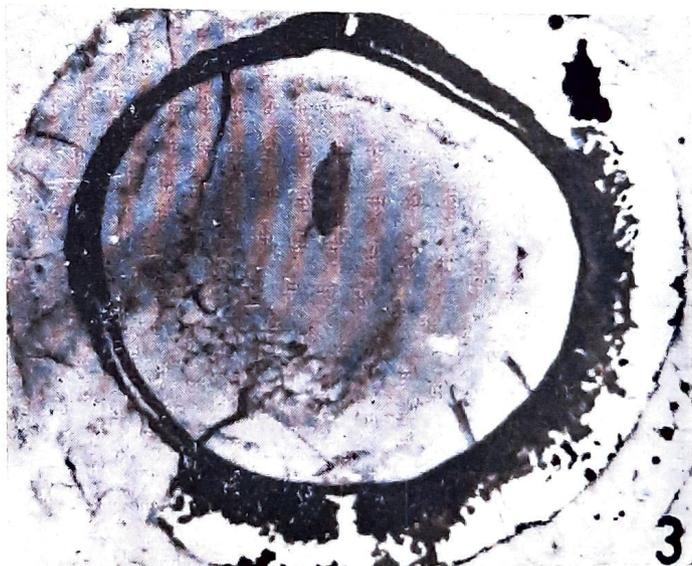
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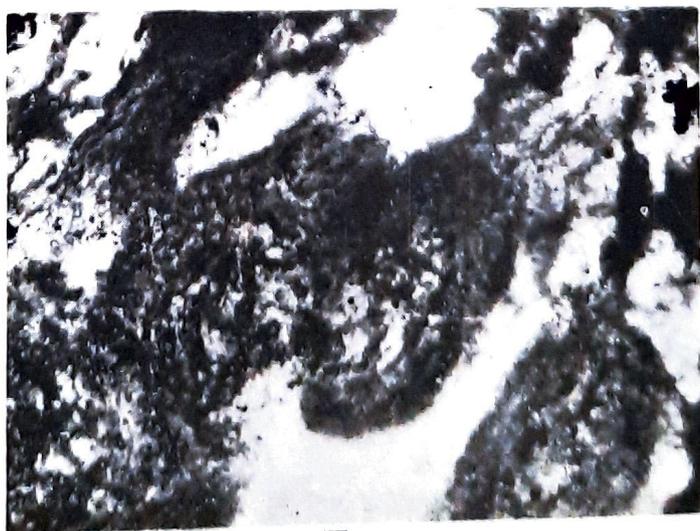
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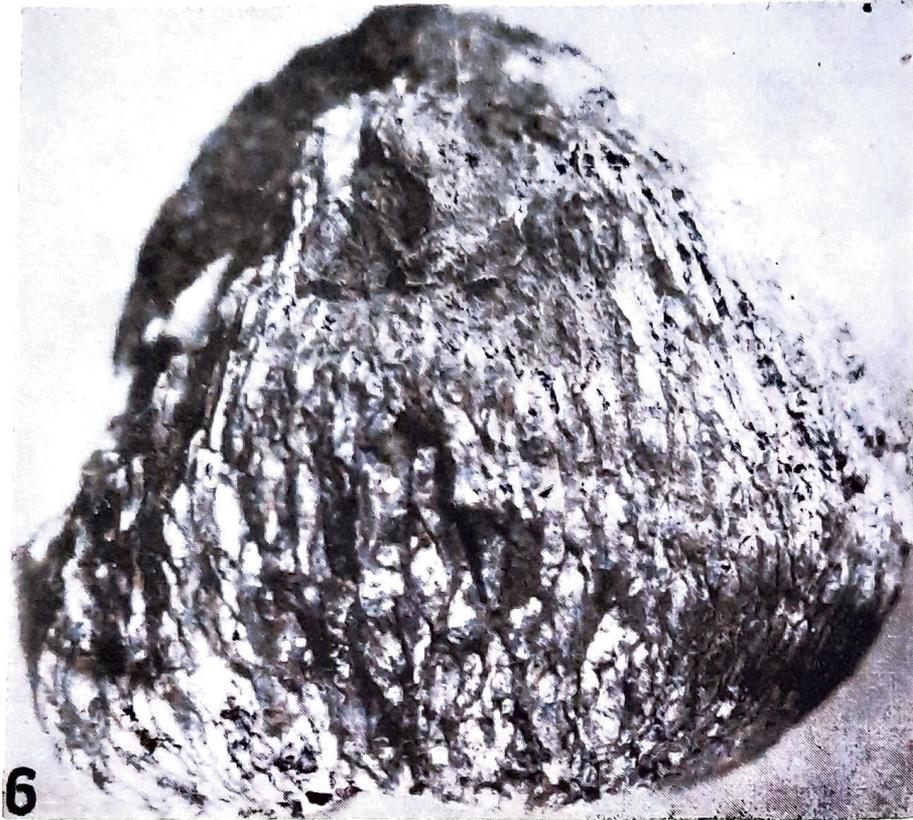
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4



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