

RESEARCH ARTICLE

A New Petrified Moncot Capsular Fruit From Deccan Intertrappean Beds Of Singhpur, Chhindwara District, MP, India

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Manuscript details:	ABSTRACT
<p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Chavhan Arvind</p> <p>Cite this article as: Qureshi S Parveen (2016) A New Petrified Moncot Capsular Fruit From Deccan Intertrappean Beds Of Singhpur, Chhindwara District, M.P., India, <i>Int. J. of Life Sciences</i>, A6: 157-160.</p> <p>Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The Intertrappean exposures of Singhpur are very rich in fossil flora. The present paper records, a Angiospermic, unilocular monocotyledonous fruit from this locality. The petrified fruit exposed in longitudinal plane. The fruit is simple elongated oval in shape, sessile, measures 3mm in length and is 2 mm in width. It is unilocular, single seeded fruit, embryo not so well preserved while endospermic cells are well preserved.</p> <p>Key words: Angiosperm, Endospermic, Monocotyledons, Oval.</p>
	<p>INTRODUCTION</p> <p>The Deccan intertrappean flora is comparatively rich in fossil angiosperm. So far a number of fruits have been reported from the Deccan Intertrappean beds of India, particularly from Singhpur and Mohgaonkalan locality in M.P. These include the capsular fruits such as <i>Tricocites</i> spp (Sahni, Rode 1937 and Chitaley 1956), <i>Enigmocarpon parijai</i> (Sahni 1943), <i>Indocarpa intertrappea</i> (Jain 1964), <i>Harrisocarpon Sahnii</i> (Chitaley, Nambudri 1973), <i>Sahnioocarpon harrissi</i> (Chitaley and Patil 1972), <i>Daberocarpon gerhardli</i> (Chitaley and Sheikh 1971), <i>Deccanocarpon arnoldi</i> (Paradkar 1975) etc. Some drupaceous fruits described from the same locality include <i>Biloculocarpon mohgaense</i> (yawale 1975) and <i>Grewia mohgaense</i> (Paradkar and Dixit 1980). There are also record of Leguminous fruits from the Deccan traps described as <i>Leguminocarpon eocenium</i> (Yawale 1973) and <i>Lomentocarpon deccanii</i> (Yawale 1982). The baccate fruits are <i>kremocarpon aquatica</i> (Chitaley and Kate 1975) <i>Mohgaocarpon eyedi</i> (Yawale 1977), <i>Kremocarpon indicum</i> (upadhye 1979), <i>Centrospermocarpon chitaleyi</i> (Sheikh and Khubalkar 1979), <i>Ramanujamocarpon indicum</i> (Kolhe 1980), <i>Tilliaceocarpon intertrappeae</i> (Dixit 1984), <i>Juglandiocarpon agashii</i> (Adhgo 1986), <i>Erythroxylocarpon intertrappea</i> (Khubalkar 1982), <i>Chitaleyocarpon deccani</i> (Kumar 1984), achenical fruits <i>Ceratocarpon spinosa</i> (Adhao 1986),</p> <p>winged seeded unilocular fruits are also reported. <i>Wingospermocarpon mohgaense</i> (Sheikh & Kapgate 1984) and <i>Wingospermocarpon arilis</i> (Sheikh and Kapgate 2000.), <i>Schizocarpon aliformii</i> a shizocarpic fruit by (Bhowal 1998).</p>

MATERIAL AND METHODES

The Petrified single locular fruit described as under was found preserved in a piece of chert which was collected from Singhpur, Chhindwara District, Madhya Pradesh, India. The anatomical details were studied by etching the chert with hydrofluoric Acid and peel sections were prepared without grinding the material. The counter part was lost during breaking, the fruit appeared in longitudinal plane in a complete series of 42 Peels. The important stages of the fruit were photographed and camera lucida sketches were drawn.

Description: The petrified fruit exposed in longitudinal plane. The fruit is simple elongated oval in shape, sessile, measures 3 mm in length and is 2 mm in width. It is unilocular, single seeded fruit, embryo not so well preserved while endospermic cells are well preserved. It has well preserved pericarp differentiated into three zones (Text Figs. 1, 2). Epicarp, Mesocarp and Endocarp. The following anatomical characters can be distinguished in the above fruit.

Pericarp: The fruit wall of the pericarp is broad and smooth 180 μ m thick. It is well differentiated into

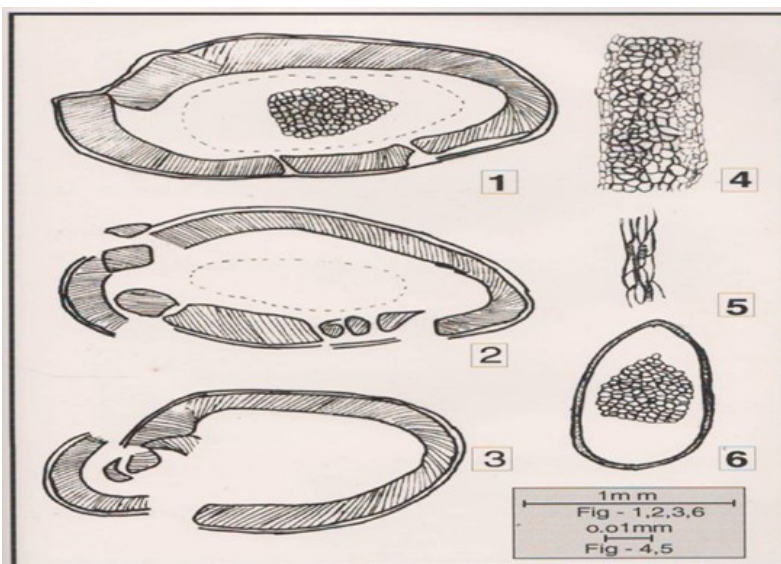
three well defined zones. The outer epicarp, the middle mesocarp and the inner endocarp (Text Fig. 4) are well demarcated.

Epicarp : This is the outer most well preserved layer of the fruit wall. The epicarp is made up of 2 to 3 layered of polygonal cells, measures 45 μ m in thickness (Text Fig. 4)

Mesocarp : This is the middle layer of the fruit wall and lies just below the epicarp. This zone is the broadest zone of the fruit wall, multilayered measures 120 μ m thick. It consist of thick walled angular parenchymatous cells with some depositions in it. Vascular supply is present which shows spiral thickening (Text Figs. 4, 5).

Endocarp : This is the innermost layer of the pericarp measuring 15 μ m in width . It is made up of a single row of thin walled rectangular cells (Text Figs. 4, 5).

Locule : The fruit has a single locule measuring 2.5 mm along its length and 1.5 mm along its breadth. This fertile locule is with a single prominent seed, Endosperm cells appear polygonal in shape and soft in nature (Text Figs.1, 6), forming a well developed layer. The cells measure 2-3 mm in diameter.



A MONOCOT FRUIT

Uniloculocarpon singhpurii gen. et sp. Nov.

Explanation of Text, Figs. 1 to 6

Fig. 1: L. S. of fruit wall showing single locule , single seed with endosperm cells. **Fig. 2-3:**L.S. of fruit showing Loculicidal dehiscence. **Fig. 4 :** L.S. of fruit wall showing epicarp, mesocarp and endocarp **Fig. 5:** L.S. of fruit wall showing vascular supply with scalariform reticulate thickening. **Fig. 6:** Seed showing preservation of polygonal endosperm cells.

Seed : A single seed is found enclosed by the endocarp in the chamber of the fruit. The seed occupies the entire available space (Text Fig. 1). It measures about 875 μm x 480 μm and appears orthotropous in nature. Micropyle is situated distally at the apex, the chalaza and hilum lie close together at the base. The funicle is absent. The seed shows axile placentation.

Seed coat : The seed coat is differentiated in two layers. The outer testa and inner tegmen. Both the layers are very clear. Thus the seed coat is bitegmic in nature (Text Fig. 6). Outer layer consists of small compact roundish cells. While the inner layer is made up of very minute cells.

Embryo : Not preserved.

Dehiscence : The fruit is a capsule showing loculicidal dehiscence. There is a split on the lateral side of the locule as well as upper and lower arms of the pericarp presumably to facilitate the release of the seed (Text Fig 1, 2, 3).

DISCUSSION & IDENTIFICATION

The important characters for the identification of the present fruit are

- Unilocular, single seeded fruit
- Fruit is elongated oval in shape.
- Sessile / without stalk.
- Fruit wall (pericarp) is broad and smooth differentiated into epicarp, mesocarp and endocarp.
- Single seed, orthotropous in nature with axile placentation.
- Endosperm cells are well preserved.

It is monocot from the above characters. The present fruit is compared with the living genera of the Monocot families and also with the fossils fruit showing similar characters. The present fruit is compared with the unilocular capsular fruits of modern living monocot families like. Orchidaceae, Zingiberaceae, Marantaceae, Stemonaceae, Liliaceae, Xyridaceae, Aracaceae, Lemnaceae, Najadaceae, Gramineae (Matthew 1983), Pontederiaceae, Commelinaceae, Juncaceae, Typhaceae, Ericaulaceae, Urticaceae, Burmanniaceae (Cooke 1967).

In the following families fruit are dry capsular dehiscent but differs from the present in following respect. In family Orchidaceae the fruits are capsular

with one locule but they differ from the studied fossil in having many minute seeds and parietal placentation. In family Marantaceae fruits are loculicidal capsules but they differ in having three locules but in rare cases 1 or 2 are abortive, having one seed in each locule. In family Stemonaceae the fruits are one loculed but differ in having 2 or more seeds. Liliaceae shows much resemblance with present fruits in having loculicidal capsules, generally they have 3 locules but in rare cases single locule that brings the family closer to the present fruit that have single locule with single seed and loculicidal dehiscence. In family Xyridaceae the fruits are capsular, loculicidal, single locule but differs in having many seeds. Aracaceae also resemble having one loculed one seeded with various placentae but the fruits are generally berry rarely a dehiscent capsules are found. In families Lemnaceae and Najadaceae fruits are unilocular, One seeded but differs in having basal placenta. Gramineae single loculed but the fruits are caryopsis. This being a major point of divergence, therefore the fossil being a member of Gramineae is totally ruled out. The family Pontederiaceae show resemblance having loculicidal capsules but differs in having 1 locule with parietal placentae. Commelinaceae resemble in having loculicidal capsules, seed albuminous but differs in having more than one locule. Juncaceae show resemblance in having loculicidal capsule one to three locules. Seeds many erect, testa membranous, albumen dense. In Typhaceae the fruits are one to two locular having single seed pendulous but the fruit show drupaceous nature. In Ericaulaceae and Burmanniaceae the fruits are loculicidal capsules two to three locules rarely one locule with many seeds. In Urticaceae the fruits are unilocular with solitary seed but the fruits are indehiscent drupe. The fossil fruit though comparable with the modern monocotyledonous families. But is not comparable with any genera of these families. The present unilocular, one seeded capsular fruit with axile placenta, seed bitegmic having smooth testa shows close affinity to family Pontederiaceae the only difference is that the family show parietal placentation with one locule and axile placentation in three locule. Although there are great similarities with fruit characteristics of above families but because of substantial divergence as enumerated above, it cannot be conclusively traced to any family. The studied fossils fruit shows great variation from the previously described unilocular fossil fruits in number of characters. Mohgaoncarpon eyedii (Yawle 1977) is a unilocular many seeded berry with epicarp forming

parenchymatous rind to which the seeds are attached parietally. *Kremocarpon aquatica* Kate (1974) and *Kremocarpon indicum* (Upadhye 1979) are unilocular fibrous berries with papillate projections on the tough epicarp in the later. *Centrospermecarpon chitaley* (Sheikh & Khubalkar 1979) is small, stalked unilocular baccate fruit with free central placentae, bearing two concentric rows of small funicled, perispermous seeds arranged in five tiers. *Ceratocarpon intertrappea* (Dixit 1984) is an oval to subglobose, indehiscent baccate fruit 8-10 seeded with flesh pericarp having mucilage canals, seeds oval endospermic exarillate with straight embryo. *Chitaleyocarpon deccanii* (Kumar 1984) is a stalked, unilocular berry with small seeds. *Ceratocarpon spinoso* (Adhao 1986) achenial with one locular one seeded fruit with spines all over the surface. *Juglandicarpon agashii* (Adhao 1986), single locular, one seeded fruit with feathery wings. Fruit wall shows epicarp with air chamber, fibrous mesocarp and stony endocarp. *Wingospermocarpon mohgaoense* (Sheikh & Kapgate 1984) unilocular capsular, winged seed, free central placentation of the seed. *Mahabaleocarpon deccanii* (Chawhan 1987), unilocular one seeded, pulpy, indehiscent, baccate fruit. *Paradkarocarpon indicum* (Wazalwar 1990), fruit unilocular, seed coat soft with arenchyma and made up of parenchymatous cell. *Wingospermocarpon arillies* (Kapgate & Sheikh 2000) is a unilocular, dicot, pedicellate capsular fruit with arillated seeds. The discussion above point out no resemblance of the fossil to any of the living families. The reported fossil fruits also do not compare favourably with the studied fossil. Hence the fossil fruit is named as *Uniloculocarpon singhpurii* gen. et sp. nov. This has been done on the basis of morphological characters of the fruit. The generic name signifies the nature of fruit whereas specific goes after the locality from where the sample was collected.

DIAGNOSIS

Uniloculocarpon gen. nov

Fruit simple elongated oval in shape, sessile, unilocular, one seeded, orthotropous bitegmic, axile Placentae, endospermic, embryo ?

Uniloculocarpon singhpurii gen. et sp. nov

Fruit simple elongated, oval in shape, sessile, unilocular, one seeded capsular fruit loculicidal dehiscence measure 3mm in length & 2 mm in

breadth. Pericarp three layered, epicarp 2 to 3 layered of polygonal cells measure 45 uu in thickness. Mesocarp is the broadest zone of the fruit wall thick walled angular cell measures 120 um endocarp single layered with elongated cells measures 15 um, vascular supply of thick walled cells showing spiral thickening between mesocarp and endocarp. Single seeded bitegmic in nature, pendulous albuminous, embryo ?

REFERENCES

- Sheikh MT and Kapgate DK (1984) *A Fossil capsule with winged seeds from the Deccan Intertrappean of India current sci.* 5(12): 657-682.
- Chawan NJ (1987) *Contributions towards paleocene flora from the Intertrappean series of India.* Ph.D. Thesis Nagpur University, Nagpur.
- Kate VR (1974) *Study of Deccan Intertrappean Flora of India.* Ph.D. Thesis Nagpur University, Nagpur.
- Upadhye EV (1979) *Morphological study of Deccan Intertrappean flora of Mohgaonkalan India.* Ph.D. Thesis Nagpur university, Nagpur.
- Wadia DN (1968) *Geology of India.* Third Edition, Macmillan co. Ltd. London. 190-200.
- Yawle NR (1975) *Investigation of plants fossils from Intertrappean series of India.* Ph.D. Thesis Nagpur university, Nagpur.