

Lycopersicocarponharisii gen. et.sp.nov. A Petrified Dicotyledonous Berry Fruit from the Deccan Intertrappean Beds of Mohagaonkalan, M.P. India

R. N. Deshmukh¹, Dr. P. S Kokate²

¹Shital Nagar, Arni Road Yavatmal-445001, Maharashtra, India

² Department of Botany, Shri.Shivaji College Art, Commerce and Science, Akola-444005, India

Abstract: The intertrappean exposures of Mohagaonkalan are very rich in fossil flora. The present fossil specimen is an angiospermic, bilocular and dicotyledonous fruit from this locality. The petrified fruit exposed in longitudinal plane. The fruit is spherical, bilocular, and indehiscent. Fruit shows a two different chambers with the help of well-preserved vertical septum. So it is bilocular, many seeded fruit. Embryo not so well preserved while endospermic cells are not well preserved. The present fossil fruit is named as *Lycopersicocarpon* after the genus *Lycopersicon* of family Solanaceae and *harisii* after the name of Great Paleobotanist Harris.

Keywords: Angiosperm, Berry, Deccan, Fossil, Fruit, Intertrappean, Mohagaonkalan

1. Introduction

A large number of angiosperm fruits with seeds have been reported from various localities of India. However the angiosperms dominate the flora and are represented by plant parts viz. roots, stems, leaves, flowers and fruits.

Many fruits were reported from the Deccan Intertrappean beds of Chhindwara district, Madhya Pradesh, India.

Mehrotra *et al.* (1983) reported *Euphorbiocarpon drypetoids*, *Euphorbiocarpon singhpurii* (Bhowal and Sheikh, 2006), *Mohagaoncarpon eydei* (Yawale, 1977); *Kremocarpon indicum* (Upadhye and Patil, 1978); *Erythroxylocarpon intertrappea* (Khubalkar, 1982), *Cucurbitaceocarpon sahani* (Bobade, 2005), *Bicarpelocarpon Singhpurii* (Bhowal and Sheikh, 2008), *Portulacaceaeocarpon jamsavlii* (Meshram *et al.*, 2011 and Kapgate, 2013) *Spinocarpon mohgaense*, (Kokate, 2013). *Solanaceaeocarpon agashi* (Thorat 2015), *Coffeocarpon deccanii* (Dighe, 2017) *Azimocarpon indicum* (Dighe, 2017). are the fossil berries.

2. Material and Method

The present fossil specimen was found embedded in the fossiliferous chert collected from fossiliferous locality. The fruit was exposed in obliquely longitudinal plane in a small piece of chert. The anatomical details were studied by taking serial peels after etching it with 70% Hydrofluoric acid. The study encompasses peels both from part and counterpart, camera Lucida sketches of the fruit in series were also drawn and the slides photographed.

Description

The present dicotyledonous petrified fossil fruit was exposed in longitudinal plane. It is pulpy, spherical, and bilocular also indehiscent fruit. It shows a two chambers due to presence of vertical septum. The whole fruit is measure about 50.4 µm in length and 28µm in breadth. Each locule is separated by septum. The seeds are not well preserved. Fruit shows of stalk

like structure but not clearly seen. (Text Fig. 1, Plate Fig.2)

Pericarp

Pericarp or fruit wall is fleshy and well preserved about 1.65µm thickness and is differentiated into epicarp, mesocarp and endocarp. (Text Fig. 2; Plate Fig.1). Present fruit consist of stalk, but not well preserved.

Epicarp

Epicarp is outermost layer shows 2-3 layers, measuring about 1.33 µm up to 9.99µm in thickness and is made up of thin walled parenchymatous cells. (Text Fig. 1, 3; Plate Fig. 3.) The cells are small, compactly and arranged. In this zone vasculature is not seen.

Mesocarp

Mesocarp is immense and also referred to the mucilage made up of compactly arranged small oval, parenchymatous cells. Which is irregularly arranged with some dark deposition. Mesocarp is measuring 1.32µm in thick in middle part of fruit and at basal part about 66µm thick. Each cell measuring about 0.61µm in size. (Text Fig. 5; Plate Fig. 6).

Endocarp

Below the mesocarp 2-3 layered endocarp is present, which is innermost zone of pericarp. Endocarp consisting of rectangular, elongated parenchymatous cells. The cells are not highly thickened, the term fleshy layer cannot be used being berry type of fruit, measuring 9.9µm in thick.

The average size of locule is 49.5µm-2.66µm long and 132µm-99µm broad. Each locule might be consists of many prominent seeds. But seeds are not seen clearly. The septum are curved, one side vertically straight. The average thickness septum is about 9.9µm. Septum is joined at the wall of endocarp at one side.

Comparison with d Fossil Fruit

Kremocarpon aquatica (Kate; 1974; Chitaley and Kate 1975). is fibrous berry with epicarp fleshy, mesocarp fibrous

with vascular supply having unilocular with three seeds and parietal placentation. While the present fossil fruit is fleshy, and bilocular which shows dissimilarity. So, the present fossil fruit is different from already reported fossil fruit *Kremocarpon aquatica* having bilocular stricter.

Mohagaonkalan eydei (Yawale, 1977) is unilocular many seeded berry and Globular in shape. Present fossil fruit is spherical in shape, bilocular and seeds are not seen clearly.

Kremocarpon indicium (Upadhye and Patil 1978). It shows the similarities with present berry fruit but differ in bilocular condition observed in longitudinal plane and also differ in shape and size.

Cucurbitaceocarpon Sahani (bobde, 2005). When compared with present specimen shows the similarity in having berry type of fruit is different but present Fossil fruit differ in Pulpy mesocarp and may be mass of seeds.

Solanoceocarpon agashi (Thorat, 2015) is spherical in shape globus and fleshy in nature but present Fossil fruit differ in stony endosperm.

Coffeocarpon deccanii (Dighe, 2017) it is spherical in shape Globus and fleshy in nature, fruit broadly divided into the fruit wall, while present fossil fruit is spherical in shape but stalk like projection shown on pericarp. Mesocarp is fibrous in nature, fleshy of the berry fossil fruit hence it is differ from present fossil fruit.

Azimocarpon indicium (Dighe, 2017) fruit is ellipsoidal in shape with 2 projection near the base of the embryo with two cotyledons, single seed in horizontal position but in present fossil fruit many seeds are preserved in mass of the seeds so the present Fossil fruit is differ from the present for fossil fruit.

Comparison with modern families

After studying all the important characters of fossil fruit, it is concluded that, the present fossil fruit is unilocular with seed. It is berry type. It is compared with modern families like *Violaceae*, *Solanaceae*, *Apocyanaceae*, *Rubiaceae*, *Musaceae*, *Sapotaceae*, *Vitaceae*, *Rutaceae*, *Verbenaceae* and *Salvadoraceae*.

When present fossil fruit is compared with family *Violaceae*, fruit is either loculicidal or berry, seed winged in some species, which is not seen in present fossil fruits. In family *Solanaceae*, fruit is berry but seeds are many which is different from present fossil fruit.

When present fossil fruit is compared with the *Apocynaceae* family which is having follicle type of fruit but only the genus *Carrisa* resembles in fruit type i.e. berry, 1-2 celled, globose to ellipsoidal but differs in fruit size smaller than present fossil fruit.

When present fossil fruit is compared with family *Rubiaceae* shows affinities in having fruit type berry which is globose with axile placentation but differs in having large fruit size of fruit.

In family *Sapotaceae* fruit is having 1-8 locular berry with one ovule in each locule. Which is different from present fossil fruit.

In family *Vitaceae* fruit is berry with 1-6 chambered having 1-2 seeds in each locule while in present fossil specimen fruit is single chambered, trilocular berry.

When family *Rubiaceae* is compared with present fossil fruit. It shows similarities in having berry type of fruit but differs in having one to many ovules in family *Rubiaceae*.

In family *Verbenaceae*, the fruits either berry or drupe, ovary 2-4 locular with 1-2 ovules in each locule, which is not seen in present fossil specimen.

In family *Solanaceae*, fruit is berry, only genus *Lycopersicum* shows close resemblances in structure with present fossil fruit having berry and pulpy mesocarp.

From the above discussion and comparison it is observed that the fossil fruit is more or less similar to fruit of family *Solanaceae* affinities with the genus *Lycopersicum*. Thus the name of present berry fruit is *Lycopersicocarpon harisii*.

3. Diagnosis

Lycopersicocarpon harisiigen. et. sp.nov

Fruit berry, dicotyledonous, spherical shape, bilocular with well-preserved locales. Pericarp differentiated into epicarp, mesocarp and endocarp. Epicarp thick walled parenchymatous, mesocarp made fleshy made up of thick walled parenchymatous, and endocarp is rectangular, slightly thin walled layered. Locales are separated by vertical septa. Size 50.4 µm long, 28 µm broad, single locule horizontal in position, size vary from each other.

Pericarp 165µm thick shows epicarp 13.3µm-9.99µm thick, each cell.

Measures 0.56 µm in thickness, mesocarp 1.32 µm thick in middle part and at basal part 66µm thick, and each cell of mesocarp measures 0.61 µm. Endocarp measure about 1.69µm is long and 132-2.64 µm in broad. Each cell of endocarp measures about 99µm in thick. Embryo is not well preserved. Two locule are separated from each other by vertical septum, it varies in size but same in shape. Its measured 49.5µm-2.66µm long and 132µm-99µm broad.

Holotype - MOH /RND /DICOT- FRUIT-II
Department of Botany, Shri. Shivaji
College, Akola.
Locality - Mohagaonkalan
Horizon - Deccan Intertrappean Series of India
Age - Uppermost Cretaceous

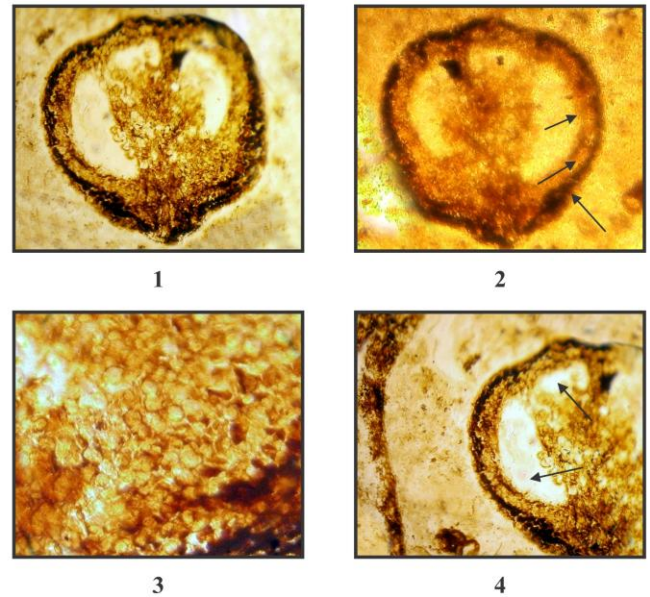
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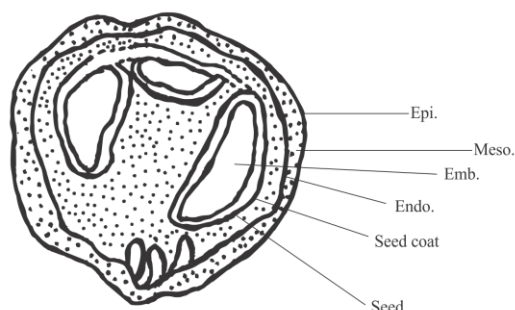
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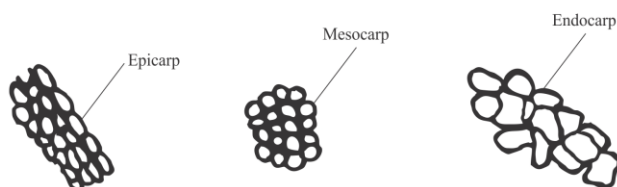
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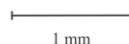
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Explanation of Text Figure 1 - 4

- 1 : T.S. of fruit showing serial section; 2 : Cellular details of epicarp;
3 : Part of fruit wall showing mesocarp; 4 : Cells of endocarp

Explanation of Plate Figure 1 - 5

- 1 : *Lycopersicorpon harisii*; 1&2 : T.S. of fruit in serial section showing pericarp and embryo, 20X; 3 : Cellular details of fruit, 100X; 4 : Cellular details of chambers, 40X;
5 : Living fruit of *Lycopersicum*.