

***Sheikhocarpon pudiyalii* Gen. Et. Sp. Nov. A new genus of capsular fruit from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India.**

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Date of Submission: 10-06-2020

Date of Acceptance: 26-06-2020

ABSTRACT: The present paper deals with a description of a new genus of petrified fruit from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India. The fruit is a dicotyledonous, trilocular, triseriate, obovate, capsular. It shows septicidal dehiscence with three chambers having 6-8 seeds in each locule. The fruit measures 1760.5 μm in length and 744.7 μm in breadth. Pericarp is 536 μm thick, multilayered with epicarp and endocarp are thin and mesocarp is thick. The seeds are obovate and measures about 1.3 x 0.8 mm in size. Seeds are attached to the triseriate septa which forming three locules showing axile placentation. The seed coat is bitegmic, outer seed coat is testa and inner seed coat is tegmen. The embryo is dicotyledonous having two cotyledons with endosperm. Finally summing up the comparison and discussion on the described fossil fruit it can be concluded that the present specimen under investigation does not resemble any of the fossil and living capsular fruits described earlier. The generic name *Sheikhocarpon* signifies the name of renowned Paleobotanist M. T. Sheikh whereas specific name is after the locality from where the sample was collected.

KEY WORDS: Deccan Intertrappea,; Dicotyledonous; Capsular fruit; Trilocular; Septicidal.

I. INTRODUCTION

The present specimen incorporates the detailed morphological and anatomical description of a capsular fruit from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India. From the Deccan Intertrappean beds many dicot trilocular capsular fruits have been reported, such as *Tricoccites* sp. (Sahni & Rode and 1937, Chitley, 1956), *Euphorbiocarpon drypeteoides* (Mehrotra et al., 1983), *Triloculocarpon mahabalei* (Kapgade, 1988), *Phyllanthocarpon singpurii* (Mistri et al., 1992), *Euphorbiocarpon singpurii* (Bhowal and

Sheikh, 2006), *Pantocarpon deccanii* (Kapgade et al., 2007), *Triloculocarpon bhuteriense* (Ramteke A. N. and Gedam Y. B., 2017). The Present capsular fruit is the additional report of capsular fruit from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India.

II. MATERIAL AND METHODS

The material was very well preserved in a black chert collected from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India. Both parts were available after breaking the chert. It was exposed in longitudinal view. After etching with hydrofluoric acid and washing with water obovate fruit with few seeds were visible to the naked eyes. Serial peel sections were taken along longitudinal plane. The peels were mounted on Canada balsam mountant. Thus the fruit revealed details of morphology & anatomy through examination of fractured surface, serial sectioning and successive peels. Sony Camera was used for photography and Capture Pro 4.6.exe software for measurement of material.

III. DESCRIPTION

GENERAL DESCRIPTION

The fruit is trilocular, triseriate, multiseeded, dehiscent, capsular fruit having axile placentation. The fruit measures 1760.5 μm in length and 744.7 μm in breadth (plate I, photo 4). It is a petrified fruit with excellent cellular preservation. The fruit is differentiates in to outer pericarp and inner part containing three locules with seeds.

FRUIT MORPHOLOGY

The petrified fruit is small, obovate in shape (Plate I, photo 4). It is broad in the middle and narrower towards both ends. In the center of the fruit triseriate septation is present which divide

the fruit in to three locules. Along the septation placenta is present to which seeds are attached serially (Plate I, photo 8, 9). The average total number of seeds in each locule is about 6-8. Initially, 1st locule is seen containing two rows of seeds and each row contains 3-4 seeds. 2nd and 3rd locule arises gradually after serial sectioning and successive peeling and increases in size containing single row of seeds in each locule. Because of emergence of 2nd and 3rd locule, 1st locule decreases in size due to which number of seeds in 1st locule decreases gradually and number of seeds of 2nd and 3rd locule increases after each section.

PERICARP- The fruit wall or pericarp is well preserved and moderately thick, measures about 536 μm and is differentiated into outer epicarp, middle mesocarp and inner endocarp (Plate I, photo 5). However the endocarp is very well preserved which encloses the seeds. Three conspicuous notches are distinctly seen on pericarp along septation (Plate I, photo 5).

EPICARP- It is outermost layer of the fruit and is measuring about 10 μm in thickness. The epidermis is made up of single layer of thin walled, horizontally elongated parenchymatous cells (Plate I, photo 5).

MESOCARP- In between epicarp and endocarp parenchymatous mesocarp is present. It appears to be 407 μm in thickness and consist of 5-6 layers of thick walled hexagonal cells (Plate I, photo 5).

ENDOCARP- It is the innermost layer of pericarp and measures about 131 μm in thickness and consists of 2-3 layers of thick walled hexagonal cells (Plate I, photo 5).

LOCULES- In longitudinal section three locules are seen with well preserved seeds (Plate I, photo 7). The diameter of locule is 2.0 x 0.8 mm in size.

PLACENTA- The placentation is axile, the seeds are attached with their funicle to the placenta on triseriate septa (Plate I, photo 8, 9, 11).

SEED- Seeds are arranged in axile placentation (Plate I, photo 8). The average total number of seeds in each locule is about 6-8. Initially, 1st locule is seen containing two rows of seeds and each row contains 3-4 seeds. 2nd and 3rd locule arises gradually and increases in size containing single row of seeds in each locule. Because of emergence of these 2nd and 3rd locule, 1st locule decreases in size due to which number of seeds in 1st locule decreases gradually and number of seeds of 2nd and 3rd locule increases after each section. The seeds are obovate, gradually becomes narrower towards the apex (Plate I, photo 10) and measures 1.3 x 0.8 mm in size.

SEED COAT- The seed coat is bitegmic, outer seed coat is testa and inner seed coat is tegmen. The

testa is made up of single layer of elongated cells measuring about 242 μm in thickness. The tegmen is two cells in thickness and measures about 460 μm in thickness (Plate I, photo 6).

EMBRYO- Embryo appears to be made up of thin walled cells with single layered epidermis. It is well preserved, relatively large and curved; embryo cut in different plane is seen inside the seeds. The embryo is dicotyledonous having two cotyledons with endosperm (Plate I, photo 10).

DEHISCENCE- Parenchymatous central axis forms triseriate septation in the center of the fruit. Triseriate septa reach from center to pericarp of fruit and form three locules. Along the attachment of septa to pericarp wall shows septicidal dehiscence (Plate I, photo 8).

IV. DISCUSSION AND IDENTIFICATION

The above described specimen revealed following important details for its identification.

1. Fruit is obovate, trilobular, triseriate, multiseeded, dry and dehiscent.
2. Fruit wall is differentiated in to Epicarp, Mesocarp and Endocarp.
3. Presence of three notches on fruit wall.
4. Total number of seeds is 21-24.
5. Seed coat is thick and differentiated into testa and tegmen.
6. Embryo is large, curved with two cotyledons and endosperm.
7. Septicidal dehiscence of fruit.

From these characters it is evident that the described fruit was formed from trilobular, triseriate, axile placentation having many ovules. Nature of the fruit appears capsular due to fleshy pericarp and septicidal dehiscence.

V. COMPARISON WITH FOSSIL FRUITS

The previously described fossil trilobular fruits from Deccan Intertrappean Beds of India differ from the present fruit in number of characters, the differing characters are as follows – *Tricoccites* sp. (Chitley and Rode, 1937; Chitley, 1956) is monocotyledonous, trilobular fruit having one seed in each locule. Pericarp is fleshy and seed coat is multilayered. *Euphorbiocarpon drypeteoides* (Mehrotra et al., 1983) is trilobular, dicotyledonous drupe of size 2.5 mm long & 1.2 mm broad i.e. much smaller than the present fruit having one seed in each locule. *Triloculocarpon mahabalei* (Kapgate, 1988) is a monocotyledonous trilobular fruit having two seeds in each locule with loculicidal dehiscence. *Phyllanthocarpon singpuri*

(Mistri et al., 1992) is a trilocular, dicotyledonous capsule having two seeds in each locule with septicidal dehiscence. *Trialata malpighicea* (Dixit, 1998) is a dicotyledonous samara with one winged seed in each locule. *Euphorbiocecarpon singhpurii* (Bhowal and Sheikh, 2006) is a trilocular, dicotyledonous capsule with one seed in each locule with septicidal dehiscence and have glandular hairs on epicarp of fruit wall. *Pantocarpon deccanii* (Kapgata et al., 2007) is a trilocular, dicotyledonous capsule with one seed in each locule. *Triloculocarpon bhuteriense* (Ramteke, A. N. and Gedam Y. B., 2017) is trilocular, obovate capsule showing loculicidal dehiscence with two chambers having one seed in each and the third chamber is quite larger and without any seed showing axile placentation.

VI. COMPARISON WITH MODERN TAXA

It is compared with trilocular fruits of modern families like- Caryophyllaceae, Myrtaceae, Malpighiaceae, Portulacaceae, Sapindaceae, Malvaceae, Sterculiaceae, Rutaceae, Lythraceae, Podostemaceae, Tiliaceae, Portulacaceae and Euphorbiaceae which resembles in trilocular, 2 – 5 chambered loculicidal capsular fruits [Cook (1958); Bentham and Hooker (1961); Rendle (1971)]. Sapindaceae is similar in having trilocular, septicidal capsule with arillate seeds but such type of arillate seeds are absent in present specimen. Lythraceae is similar with loculicidal capsule but present specimen is with septicidal capsule. Podostemaceae having septicidal capsule with many small seeds and seeds are without endosperm but present specimen is with limited number of seeds with endosperm. Loculicidal or Septicidal dehiscence of the fruit is also observed in family Myrtaceae, but it is usually crowned with persistent calyx; its seeds are angular in shape; showing marked difference from the described fruit. The present fruit is also different from family Malpighiaceae in having winged seeds. In family Geraniaceae also contains trilocular fruit with one to two ovules in each locule but the present specimen contains 6-8 seeds. Family Portulacaceae and Caryophyllaceae differ in having valvular dehiscence. Family Malvaceae differs in having

loculicidal dehiscence of fruit. Family Rutaceae differs in having one to two ovules in each locule. Family Sterculiaceae differs in having caruncle and leafy cotyledons while family Tiliaceae has leafy cotyledons. Euphorbiaceae is similar in having trilocular capsule with one seed in each locule but the present specimen contains 6-8 seeds.

Finally summing up the comparison and discussion on the described fossil fruit it can be concluded that the present specimen under investigation does not resemble any of the living family fruits as well as recorded fossil flora of Intertrappean beds. Hence the given fossil fruit is named as *Sheikhocarpon pudiyalii* Gen. Et. Sp. Nov. This has been done on the basis of morphological characters of the fruit. The generic name signifies the name of renowned Paleobotanist M. T. Sheikh whereas specific name is after the locality from where the sample was collected.

VII. DIAGNOSIS

Sheikhocarpon pudiyalii Gen. Et. Sp. Nov. is a dicotyledonous, trilocular, triseriate, obovate, capsular fruit. It shows septicidal dehiscence with three locules having 6-8 seeds in each locule. The fruit measures about 1760.5 µm in length and 744.7 µm in breadth. Pericarp is 536 µm thick, multilayered; epicarp and endocarp are thin and mesocarp is thick. The seeds are albuminous and obovate, gradually becomes narrower towards the apex and measures 1.3 x 0.8 mm in size. Seeds are attached to the triseriate septa forming three locules showing axile placentation. The seed coat is bitegmic, outer seed coat is testa and inner seed coat is tegmen. The testa is made up of single layer of elongated cells measuring about 242µm in thickness. The tegmen is two cells in thickness and measures about 460µm. Embryo is dicot type and well preserved. Endosperm tissues are in the form of angular to oval parenchymatous patches at places.

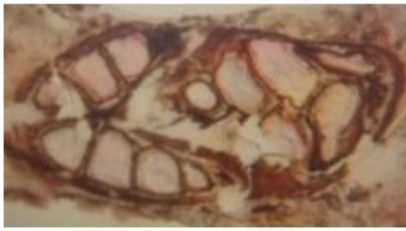
Holotype : SWP/Ang. Fruit/Deposited in Botany Department, Dr. Ambedkar College, Chandrapur.

Horizon : Deccan Intertrappean beds.

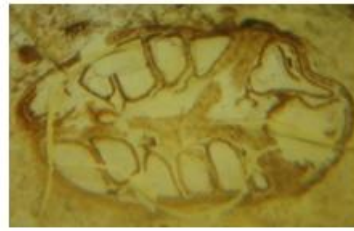
Locality : Pudiya Mohada, Tahsil- Jiwati, Dist.- Chandrapur, Maharashtra, India.

Age : ? Uppermost Cretaceous

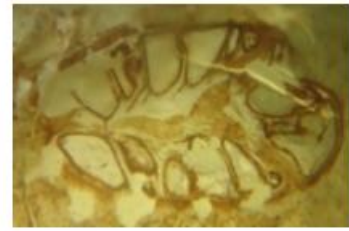
PLATE I PHOTO 1 – 12



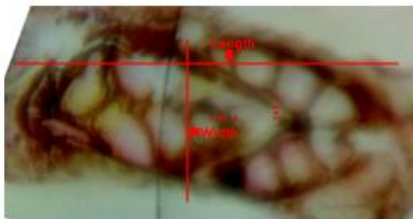
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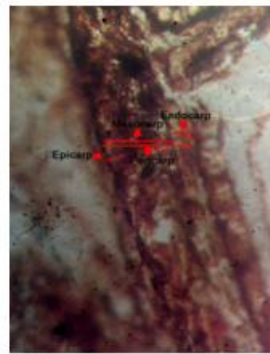
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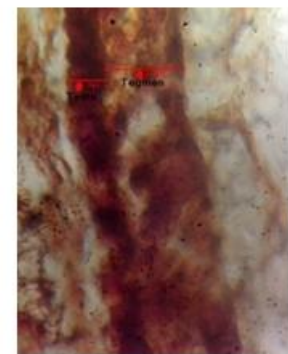
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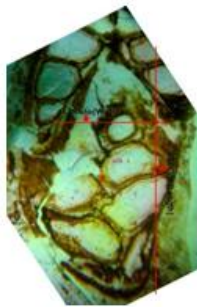
4 (Fruit-X20)



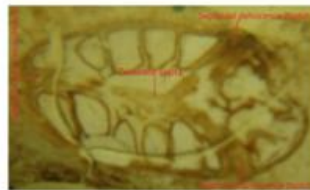
5 (Pericarp- X100)



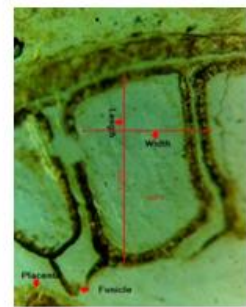
6 (Seed Coat- X400)



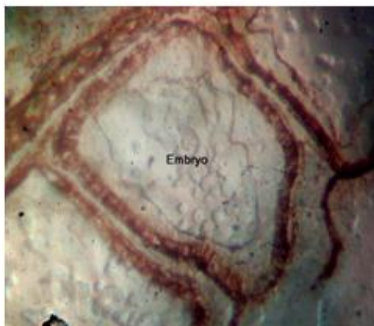
7 (Locule- X40)



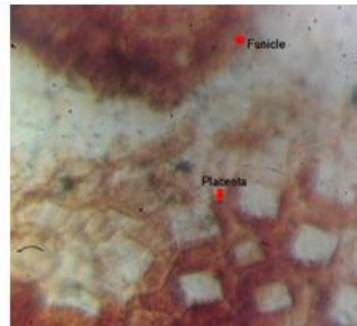
8 (Triseriate septa, Septicidal dehiscence- X20)



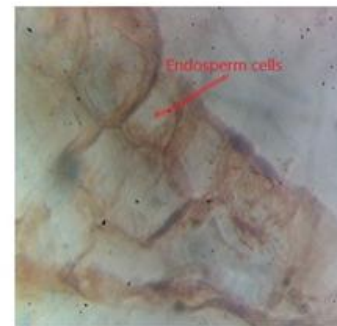
9 (Seed- X40)



10 (Embryo- X50)



11 (Placenta, Funicle-X400)



12 (Endosperm cells- X400)

Sheikhocarpon pudiyalii Gen. Et. Sp. Nov.

PLATE PHOTO 1 TO 12

EXPLANATION OF PLATE PHOTO 1 TO 12

- Photo 1-3. L. S. of fruit showing structure of fruit..... X20
Photo 4. L. S. of fruit showing length and width..... X20
Photo 5. L. S. of fruit wall (Pericarp) showing epicarp, mesocarp & endocarp.....X100.
Photo 6. Seed coat showing testa & tegmen.....X400
Photo 7. Single locule containing seeds.....X40
Photo 8. L. S. of fruit showing triseriate septa & septical dehiscence..... X20
Photo 9. Seed attached with funicle to placenta.....X40
Photo 10. Two cotyledons containing embryo present inside the seed.....X400
Photo 11. Funicle attached to hexagonal Sclerenchymatous cells of placenta.....X400
Photo 12. Parenchymatous endospermous cells.....X400

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Sanjay W. Patil, et. al. "Sheikhocarpon pudiyalii Gen. Et. Sp. Nov. A new genus of capsular fruit from the Deccan Intertrappean beds of Pudiyal Mohada, Tahsil-Jiwati, Dist.-Chandrapur, Maharashtra, India." *International Journal of Advances in Engineering and Management (IJAEM)*, 2(1), 2020, pp. 257-261.



**International Journal of Advances in
Engineering and Management**

ISSN: 2395-5252



IJAEM

Volume: 02

Issue: 01

DOI: 10.35629/5252

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