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A New Petrified Bilocular Capsular Fruit *Capsulocarpon mohgaonese* gen. et sp.nov From The Deccan Intertrappean Beds of Mohgaonkalan, M.P., India

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Abstract

A pale botanical study wholly and solely depend upon the presence of plant fossil. Fossils are the prehistoric remnants of plants and animal which were formed due to dead or decay of plant and animal or it can be called as any evidence of prehistoric life. They are the imprint of the nature present in the womb of earth. So, we can have remains of a whole organism or some part of the organisms. Also presence of fossils are restricted to a particular locality. In this paper a plant fossil is studied. After visiting and exploring various fossiliferous localities, the present fossil chert was collected from Mohagaonkalan area of Chhindwara District of Madhya Pradesh. This locality belonging to upper most cretaceous period. Through peel technique the present chert was analysed. On the basis of both morphological characters and anatomical characters the bilocular petrified fruit is described. The bilocular capsular fruit is sessile (i.e. without stalk) & shows dicotyledonous in nature. The whole fruit is separated by single transverse septa and giving the '8' shaped structure to the fruit. Each locule possess single prominent seed and showing loculicidal dehiscence. The upper locule is smaller and the lower locule is bigger in size. The whole fruit measures 2250µm in length and 2750µm in breadth. The fruit is then compared with earlier reported bilocular capsular fruit and also with the fruits of modern living families.

Keyword: *Intertrappean, Angiosperm, Petrified Bilocular Capsular Fruit.*

Introduction

The present investigation deals with another new petrified dicotyledonous, bilocular capsular fruit collected from the deccan Intertrappean beds of Mohgaonkalan, M.P, India. Many bilocular capsular have been investigated so far, some of them are *Biloculaire intertrappea* (Kate,1974), *Biloculocarpon intertrappea* (Yawale,1975), *Oleaceocarpon nagpurensis* (Mahajan, 1987), *Mahabalecarpon deccani* (Sakundarwar,1987), *Nautiyalocarpon singhpurii* (Ju neja,1993), *Schizocarpon Aliformii* (Bhowal, 2002), *Bicarpelarocapon singhpurii* (Bhowal, 2008) and *Rodeocarpon deccanii* (Saxsena,2004)

Thus, the present fruit specimen is considered as new one and it gives additional information to the knowledge of bilocular capsular fruit from the deccan intertrappean flora of India.

Material & Method

The specimen under investigation has been collected from the deccan Intertrappean beds of Mohgaonkalan, M.P, India. The specimen is preserved in black chert which after breaking showed the fruit in transverse plane. Unfortunately the counter part is missing. Hence, serial sections along possible planes are taken by peel technique and detail study of the present specimen is worked out.

Description

Fruit Morphology

The fruit was cut in transverse section. It shows somewhat oval to elliptical shape, measures 2250µm in length and 2750µm in breadth. The fruit is sessile (without stalk) and bilocular capsule. Each locule possess single prominent seed. The bilocular fruit is seprated by single transverse septa and giving the '8' shaped structure to the fruit. The upper locule is smaller and the lower locule is bigger in size. (Plate I, Fig. 1 to 5, Text Fig. 1 to 6)

Fruit Anatomy

On the basis of anatomical study the present petrified capsular fruit is described in details under following heads:-

Pericarp: The pericarp or fruit wall measures 120µm in thickness. It is differentiated into two zone: - Outer zone and Inner zone.

Outer zone consist of single layer called outermost limiting layer of fruit which cover or surrounds whole fruit and composed of thin walled parenchymatous cells. Later on this outermost limiting layer of fruit starts disappearing and at the end it is totally absent. It measures 37µm in thickness. Inner zone composed of two to three layer of thick walled, elongated parenchymatous cells which are compactly arranged without any intercellular space, with some dark depositions. It measures 79µm in thickness. (Plate II, Fig 7, Text Fig, 8)

Locule: The fruit is bilocular capsule with two well differentiated locules. Both the locules are fertile with a single prominent seed in each locule. The locules of fruit is separated by single transverse septa and giving '8' shaped structure to the fruit. The tissues of transverse septa are ill preserved. The upper locule is smaller in shape and measures 600µm in length & 1400µm in width. While the lower locule is bigger in shape and measures 1150µm in length and 2400µm in width (Plate II, Fig 6, Text Fig, 7)

Seed: Seed is oval to oblong in shape. The seed present in upper locule measures about 459µm to1198µm in size while seed in lower locule measures 987µm to 2307µm in size. The seed coat is clearly visible and is differentiated into outer testa & inner tegmen. It means seed coat is bitegmic in nature. (Plate II, Fig 6, Text Fig, 7) Inside the seed endosperms cells appears which is soft in nature.

Embryo: It is not well preserved, hence no comment could be made on the embryonic nature of the seed.

Dehisence: The fruit is a capsule showing loculicidal dehiscence. The fruit shows split on both the fertile locule suggest that the dehiscence of the fruit takes place loculicidally. (Plate I, Fig 1,5 Plate II, Fig 6. Text Fig 1/1)

Discussion & Identification

After having studied the important anatomical characters, it becomes evident that the present petrified fruit is bilocular probably formed from bicarpellary syncarpous ovary with single seed in each locule. Pericarp is differentiated into two zones: - Outer zone and Inner zone. Fruit shows '8' shaped structure due to the transverse septa. Presence of bitegmic and endospermic nature of seed and with loculicidal dehiscence along its locule make the study more intresting. Thus, it is bilocular, capsular fruit with loculicidal dehiscence.

Hence, it is compared with the earlier reported bilocular capsular fruit for its identification. *Biloculaire intertrappea* (Kate, 1974), differs due to its schizocarpic nature of fruit and presence of resin ducts in percarp region. *Biloculocarpon intertrappea*(Yawale,1975), is differ in having drupaceous type of fruit.*Oleaceocarpon nagpurensis* (Mahajan, 1987), vary in having two seeds in each locule and seed with axile placentation. *Mahabalecarpon deccani* (Sakundarwar, 1987), differs in having drupaceous type of fruit with irregular outgrowth on fruit wall. *Nautiyalocarpon singhpurii* (Juneja,1993), vary in having drupaceous type of fruit. *Schizocarpon aliformii* (Bhowal, 2002), is differ in having irregular eye shaped bilocular fruit with two fertile chambers and with middle empty space. *Bicarpelarocapon singhpurii* (Bhowal, 2008), is vary in having empty air chamber in the septa and pericarp is differentiated into epicarp mesocarp & endocarp. *Rodeocarpon deccanii* (Saxsena, 2004), differs in having bilobed septicidal capsule with numerous seeds.

All the above discussion reveals that the present petrified fossil fruit is incomparable with any of the above earlier reported fossil one.

Now, comparisons are made with the modern (Living) families like *Acanthaceae*, *Bignoniaceae*, *Columelliaceae*, *Gesneriaceae*, *Lentibulariaceae*, *Orobanchaceae*, *Pedaliaceae*, *Scrophulariaceae*, *Solanaceae*, *Hydrophyllaceae and Boraginaceae.* (Hutchinson, 1959, Rendle, 1963 and Bhattacharyya & Johri, 1998) The fruit of the family *Acanthaceae*, *Bignoniaceae*, *Columelliaceae*, *Gesneriaceae*, *Lentibulariaceae*, *Orobanchaceae*, *Pedaliaceae & Scrophulariaceae* are characterized by the presence of bicarpellary ovary with loculicidal capsule, which is similar in present one but no relationship can be established between the present petrified fruit and the above families as in these families families the number of ovules is generally numerous which is not the case in the studied fossil. Fruit of *Solanceae*, differ in having berry type of fruit. In *Hyrophyllaceae* fruit is a loculicidal capsule but differ in having carunculate or sculptured seed. Family *Boraginaceae* is basically bilocular bicarpellary but usually becomes tetralocular by false septation with a single ovule in each locule, fruit is generally one seeded nutlet.

Conclusion

From the above comparison, it comes to the conclusion that the present studied fossil fruit neither shows any close resemblance with the reported fossil one nor with the living one. Hence, for time being it is named as *Capsulocarpon mohgaonese* gen. et sp. nov The generic name is after the capsular fruit and specific name is after the locality Mohgaonkalan from where it was collected.

Diagnosis

Capsulocarpon gen. nov

Fruit dicotyledonous bilocular capsule. It is sessile and showing loculicidal dehiscence. Both locule are fertile with single prominent seed in each locule. Pericarp differentiated into two zones: - Outer zone and Inner zone and shows bitegmic and endospermic nature of seed.

Capsulocarpon mohgaonese gen. et sp. nov

Fruit oval to elliptical in shape, sessile and measures 2250µm in length and 2750µm in width. It is bilocular capsule showing loculicidal dehiscence. The bilocular fruit separated by single transverse septa and giving the '8' shaped structure to the fruit. Both the locules are fertile with a single prominent seed in each locule. The upper locule is smaller in shape and measures 600µm in length and 1400µm in width. While the lower locule is bigger in shape and measures 1150µm in length and 2400µm in width. Pericarp differentiated into two zones: - Outer zone and Inner zone. The seed present in upper locule measures about 459µm to 1198µm in size while seed in lower

locule measures 987µm to 2307µm in size. The seed coat differentiated into outer testa & inner tegmen. Inside the seed endosperms cells are present. Embryo not preserved.

Holotype : APS. / Fruit -4. Department of Botany, Institute of Science, Nagpur
Locality : Mohgaonkalan, M.P. India.
Horizon : Deccan Intertrappean Series of India.
Age : ? Upper Cretaceous

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Conflicts of Interest
The Authors Declare That There Are No Conflicts Of Interest Regarding The Publication Of This Paper.

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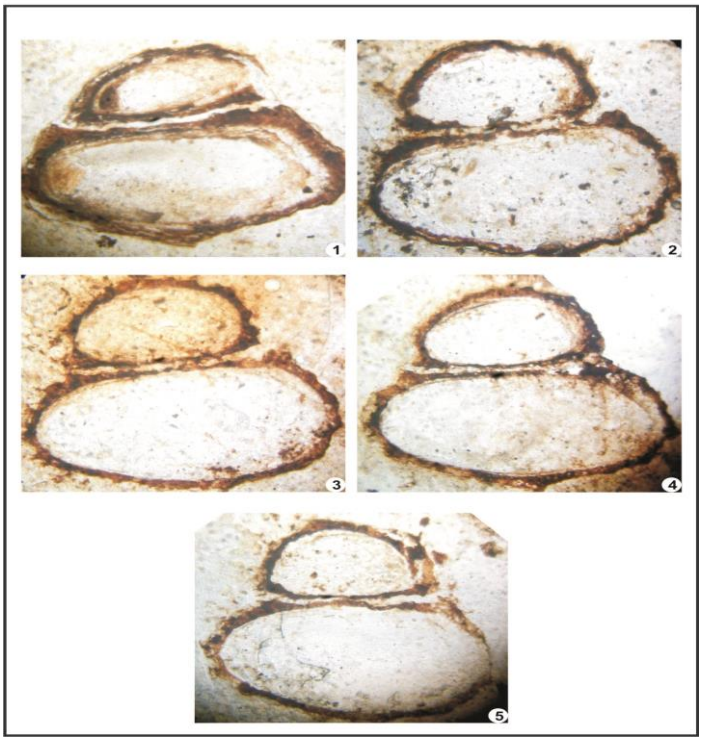
PLATE-I

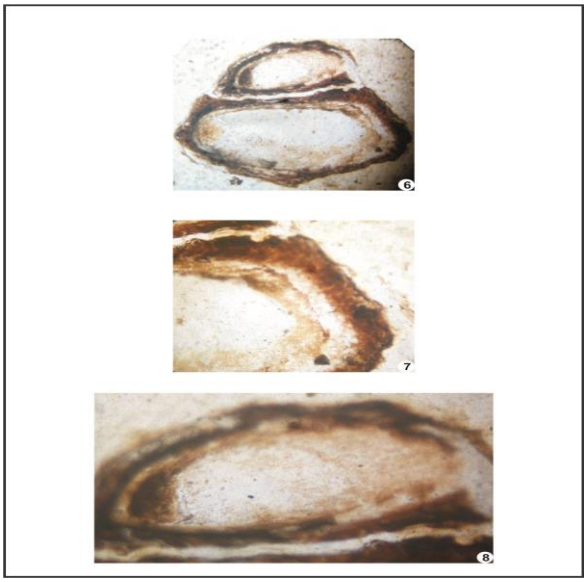


Capsulocarpon mohgaonese
gen. et sp. nov

Explanation of Plate-I, Figs. 1 To 5

Figs. 1 to 5 : Serial section of the fruit showing different stages of the fruit cut transversally. 25X

PLATE-II



Capsulocarpon mohgaonese
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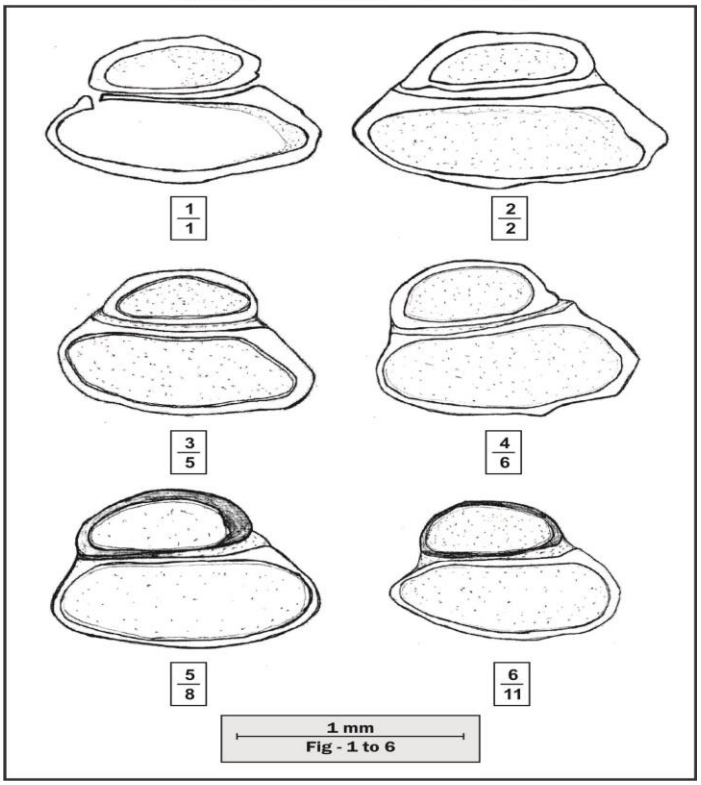
Explanation of Plate-Ii, Figs 6 To 8

Fig. 6 : Enlarged bilocular fruit with upper smaller & lower bigger locule consisting of single prominent seed in each locule. 25X

Fig. 7 : Showing enlarged view of fruit wall & seed coat. 400X

Fig. 8 : Fruit showing loculicidal dehiscence. 400X

TEXT FIGS. - 1 TO 6

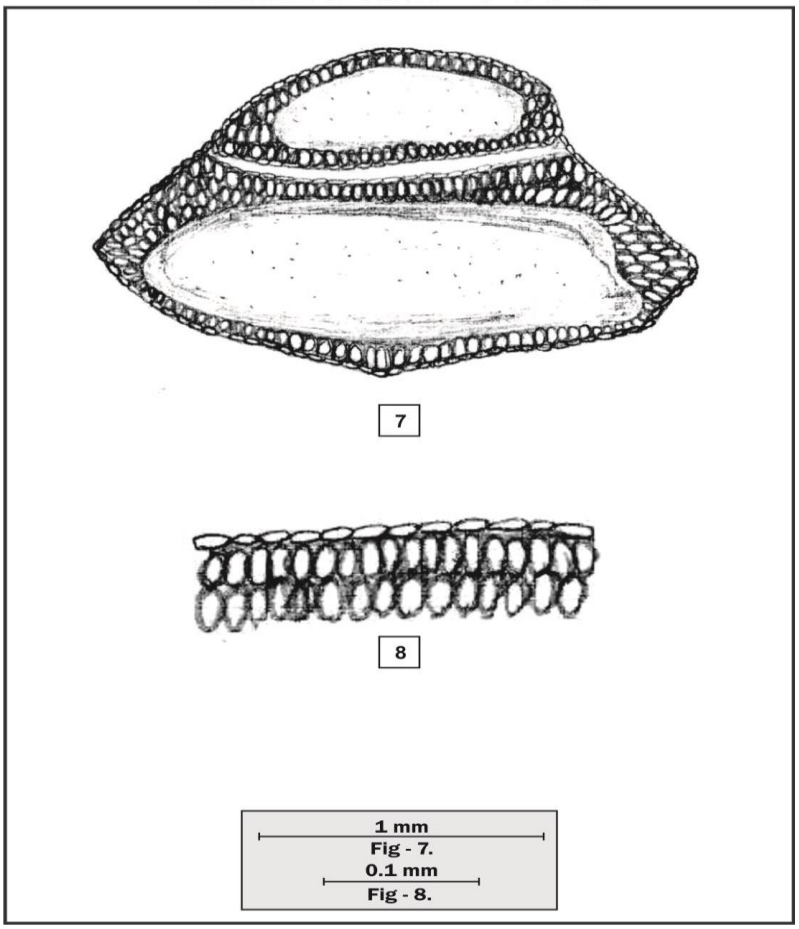


Capsulocarpon mohgaonese
gen. et sp. nov

Explanation of Text Figs 1 To 6

Figs. 1 to 6 : Serial section of the fruit showing different stages of the fruit cut transversally.

TEXT FIGS. - 7 TO 8



Capsulocarpon mohgaonese
gen. et sp. nov

Explanation of Text Figs 7 To 8

Fig. 7 : Enlarged bilocular fruit which is separated by single transverse septa with upper smaller & lower bigger locule consisting of single prominent seed in each locule.

Fig. 8 : Showing enlarged view of fruit wall or pericarp.