The Bioscan
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
20(2): S.I (2): 198-203, 2025www.thebioscan.com

Triangulocarpon patanii. A new genus of drupaceous fruit from the Deccan Intertrappean Beds of Marai Patan, Tahsil-Jivati, Dist.-Chandrapur, Maharashtra, India.

Rupam H. Nimgade[1], Rajesh R. Dahegaonkar[1] and Sanjay W. Patil[1]

[1]Department of Botany, Dr. Ambedkar College of Arts, Commerce and Science, Chandrapur, 442401

*Corresponding author E-Mail: nrupam10@gmail.com

DOI: 10.63001/tbs.2025.v20.i02.S.I(2).pp198-203

KEYWORDS
Deccan Intertrappean, drupaceous, Unilocular, Dicotyledonous.

Receivedon:

22-03-2025

Acceptedon:

25-04-2025

Published on

30-05-2025

ABSTRACT

The present paper describes a new petrified fruit from the Deccan Intertrappean Beds of Marai Patan, Taluka Jiwati, Dist.-Chandrapur, Maharashtra, India. The fruit is triangular, unilocular, fibrous, dicotyledonous, and indehiscent with basal placentation. The pericarp is differentiated into epicarp, mesocarp and endocarp. The fruit measures about 750 µm in length and 868 µm in width. The pedicel is present and measures about 260.5 µm in length, while a single, oblanceolate stripy outgrowth, the Umbo, is present. The fruit shows a folded embryo with the triangular mass of endosperm. The fruit discussed in this paper is compared with the reported drupaceous fossil flora and the modern living genera from the families like Malvaceae, Sapindaceae, Boraginaceae, Trimeriaceae, Sterculiaceae, Tiliaceae and Convolvulaceae. None of the characters of this fruit shows affinity with that of any fossil or living flora, resulting in the formation of a new genus, *Triangulocarpon patanii*. The generic name signifies the shape of the present material, whereas the specific epithet is derived from the name of the locality the fossiliferous chert was collected from.

INTRODUCTION

The Angiospermic fossil flora of Deccan Intertrappean Beds provides an immense opportunity for detailed investigation of taxonomic affinities and biogeographic relationships of plants that populated the Indian subcontinent in the age of Cretaceous period. The present specimen deals with the detailed morphological and anatomical description of a petrified fruit from the Deccan Intertrappean Beds of Marai Patan, Tahsil-Jivati, Dist.-Chandrapur, Maharashtra, India. Several drupaceous fruits have been reported so far such as*Euphorbiocarpon drypetoids* (Mehrotra et al., 1983), *Biloculocarpon mohgaonse* (Yawale, 1975), *Erythrocarpon intertrappea* (Khubalkar, 1982), *Trapa mohgaonsis* (Paradkar and Patki, 1987), *Grewia mohgaonsis* (Paradkar and Dixit, 1987), *Nautiyalocarpon singhpurii* (Juneja, 1993), *Myrtocarpon ganeshii* (Pundkar S.V., 2020), *Premnocarpon mohgaonii* (S.W. Dighe, 2016), *Drupaceocarpon sheikhii* (Khursel,2022), *Verbenaceocarpon mahabalei* (Dhabarde et al., 2012).

Description: -
Fruit Morphology: - The fruit is triangular, unilocular, fibrous, and cut in the longitudinal plane. The fruit appeared globular in shape and progressively developed into a triangular shape, i.e., the basal portion is broader and slightly tapered towards the apex of the fruit. The fruit measures about 750 µm in length and 868 µm in width.

The apex of the fruit is marked by the presence of a stalk, while a single, oblanceolate stripy outgrowth, the Umbo, is present at the base of the fruit (photo plate II photo no.4). Initially, it was blunt. and later it appeared thorny, pointed and measures about 518.4 µm in length and 1055.3 µm in width (when enlarged in 1000x). A deep grooved alternate band pattern is present on this umbo (photo plate II photo no. 5). The folded embryo is clearly seen inside the fruit wall.
Fruit Anatomy: -The anatomical study of the fruit reveals the following characters.
Pericarp: -The pericarp or fruit wall is well preserved, fibrous, leathery, broad and measures about 1010 µm in width and well differentiated into Epicarp, Mesocarp and Endocarp (photo plate II photo no.3). There are many lacunar spaces present on the pericarp (photo plate IIIphoto no.9).
Epicarp: - It is the outer layer, thick and measures about 178.9 µm in width.
Mesocarp: - This middle layer is more fibrous, comparatively broad and measures about 657.9 µm in width.
Endocarp: - Inner fruit wall is distinct, narrow, thick and measures about 157.9 µm in width.
Stalk: - A papillary projection, like a single stalk, is attached to the fruit, which is clearly seen as a continuation of the Pericarp. The pedicel (fruit stalk) is continued inside the fruit as a placenta; thus, placentation is basal. A stalk measures about 260.5 µm in length. A network of vessels is seen inside the fruit.
Locule: - In longitudinal section, a single locule with a well-preserved twisted embryo is present. It measures about 623.7 µm in length and 784.2 µm in width. Two sleets are present on both the sides of base of fruit, while embryo is intruded inside the left slit of fruit (photo plate III photo no. 10). Seed coat is diffused with endocarp and appeared at some places.
Embryo: - A lengthy, distinct, folded, multilayered, dicotyledonous embryo is present.
Endosperm: - A triangular mass of endospermic tissue is present prominently.

Discussion and identification: - The above-described specimen reveals the following important details for its identification.

1. Fruit is triangular, unilocular, single-seeded, fibrous, indehiscent, with basal placentation.
2. Fruit wall is fibrous, broad and differentiated into Epi, Meso and Endocarp.
3. Presence of the Umbo at the base of the fruit.
4. A large, prominent, folded, dicotyledonous embryo is present.
5. Endosperm is present.

Comparison with fossil fruit

A reported fossil drupaceous fruits from the Deccan Intertrappean Beds of India are different from the specimen fruit in the number of characters.

When present fossil fruit is compared with already reported *Euphorbiocarpon drypetoids* (Mehrotra et al., 1983). It differs in having a trilocular single-seeded indehiscent drupe, while the present fossil fruit is unilocular single-seeded drupe.

Biloculocarpon mohgaonse (Yawale, 1975) is a bilocular drupe with canals arising from the seed, locules opening into the mesocarp. Whereas a fossil fruit is unilocular, single-seeded seeded and no such canals are found in present fruit.

Erythrocarpon intertrappea (Khubalkar, 1982) is a drupe that consists of a small stalk, oblong, wedge-shaped, ridged, multilocular fruit with a fibrous endocarp, marginal placentation, small seed per locule, which is totally different from the present specimen.

Trapa mohgaonsis (Paradkar and Patki, 1987) shares characters like drupaceous fruit with pericarp differentiated into three layers, but differs in having an unilocular condition and not having spines surrounding the fruit.

Grewia mohgaonsis (Paradkar and Dixit, 1987) is a small, round, five-lobed, two-pyrene, two-seeded drupaceous, indehiscent fruit that is very different from the present fossil fruit.

Nautiyalocarpon singhpurii (Juneja, 1993) is a bilocular drupe fruit. Besides two fertile chambers, it has dome dome-shaped receptacle, while the present fruit is indehiscent with only one fertile locule.

*Verbenaceocarpon mahabalei (*Dhabarde et al, 2012) It is a single-seeded, bilocular, drupaceous fruit, while the present fruit is thought to be drupaceous but differs in having a single-seeded, unilocular condition.

Premnocarpon mohgaonii(S.W. Dighe, 2016), this fruit is small, dicotyledonous, drupaceous, indehiscent and somewhat triangular in shape. It is ovoid with a pyrene with a single seed. No such pyrene is observed in the present fruit, even it differs in terms of shape and locules.

Drupaceocarpon sheikhii (Khursel, 2022), It is a trilocular, drupaceous fruit with two fertile locules and one sterile chamber, whereas the present fruit is unilocular, drupe fruit.

Myrtocarpon ganeshii (Pundkar S.V., 2020) is a large, fleshy, globose shape, unilocular, single-seeded drupe fruit with prominent apical appendages, whereas the present fruit is large, single-seeded, unilocular, with the presence of a stalk.

Comparison with living families

The present specimen shows clear characteristics like unilocular, drupaceous, dicotyledonous, single-seeded fruit. Based on these characteristics, comparisons are made with themodern living families like Malvaceae, Sapindaceae, Boraginaceae, Trimeriaceae, Sterculiaceae, Tiliaceae and Convolvulaceae.

Fruits of the family Malvaceae are trilocular and capsule, while the present fossil fruit is unilocular, drupaceous.

In the family Sapindaceae, the fruit is a capsule, loculicidal, epicarp is durable with or without armature, but the present fruit is bilocular, drupaceous, epicarp is stony without armature.

In the family Boraginaceae, the fruit is a trilocular drupe, while the present fruit is an unilocular drupe.

In the family Trimeriaceae, the fruit is 1 to 10-seeded, epicarp is durable with armature, while the present fruit is unilocular, drupaceous single seeded, epicarp is stony without armature.

In the family Sterculaceae, the fruit is a capsule, with 25 to less than 50 seeds. Epicarp is glabrous with or without armature, while the present fruit is unilocular, drupaceous, and single-seeded. Epicarp is without an armature.

In the family Tiliaceae, the fruit is trilocular, each locule contains 1 or two ovules and loculicidal capsule. But the present fruit is drupaceous, unilocular, and contains a single seed.

The characters of the family Convolvulaceae match with the characters of the present specimen in terms of hard endocarp, but in Convolvulaceae epicarp is crustaceous, while the present material does not reveal any distinguishing characters.

From the above discussion and comparison, it is concluded that, present petrified fruit under investigation neither shows any affinity with the reported fossil fruit nor with the fruits of modern families. Hence, the given fossil fruit is named as *Triangulocarpon patanii* gen. et sp. nov. The generic name signifies the shape of the present material, whereas the specific epithet is derived from the name of the locality from where the fossiliferous chert was collected.

Diagnosis

***Triangulocarpon patanii* gen. nov.**

Fruit is triangular, unilocular, dicotyledonous, single-seeded, endospermic, indehiscent with basal placentation.

Triangulocarpon patanii gen. et sp. nov.

Fruit is triangular, unilocular, single-seeded, fibrous, indehiscent, with basal placentation and measures about 750 µm in length and 868 µm in width. The fruit wall is fibrous, leathery, broad and measures about 1010 µm in width and well differentiated into Epicarp, Mesocarp and Endocarp. The pedicel is present.

The locule is large, measures about 623.7 µm in length and 784.2 µm in width. A large, lengthy, distinct, folded, multilayered, dicotyledonous embryo is present.

Holotype: - RHN/Angi. fruit/Deposited in the Dept. of Botany, Dr. Ambedkar College, Chandrapur.

Horizon: - Deccan Intertrappean Bed of India.

Locality: - Marai Patan, Jiwati, Chandrapur, M.H., India.

Age: -? Upper Cretaceous.

***Triangulocarpon patanii*gen. et sp. Nov.**

Photo plate I (Photos 1 to 8)

Explanation of photo plates1 to 8

Photo 1-2 - A typical fruit in L.S. showing globular shape, unilocular with embryo.

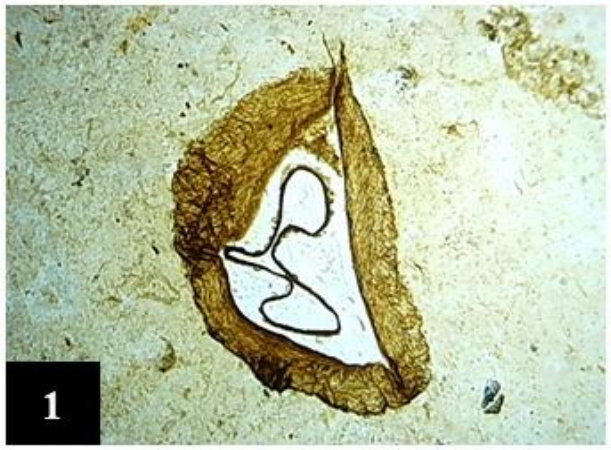
Photo 3-4 - A typical fruit in L.S. showing the development of fruit into a triangular shape. Development of stalk and triangular mass of endosperm.

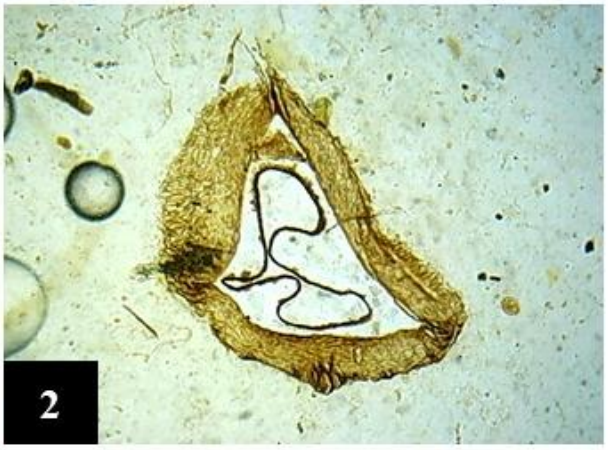
Photo 5-6 - A seed coatstarts to appear.

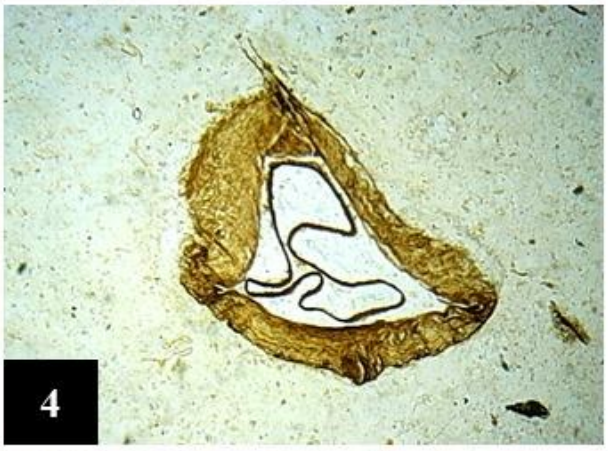
Photo 7 - Reduced the size of the fruit and changed the shape of the embryo. Intrusion of the embryo intothe micropylar end.

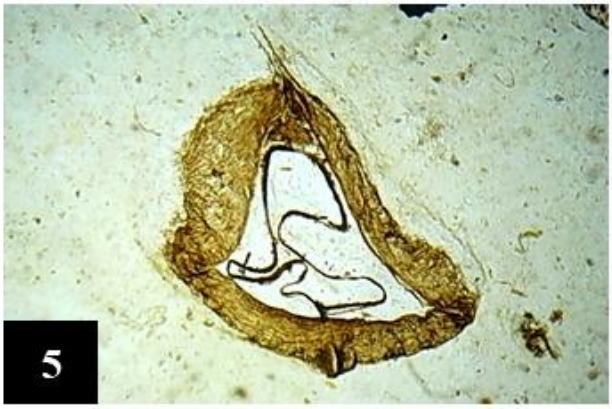
Photo 8 -The Reduced size of the embryo and pericarp is disappearing.

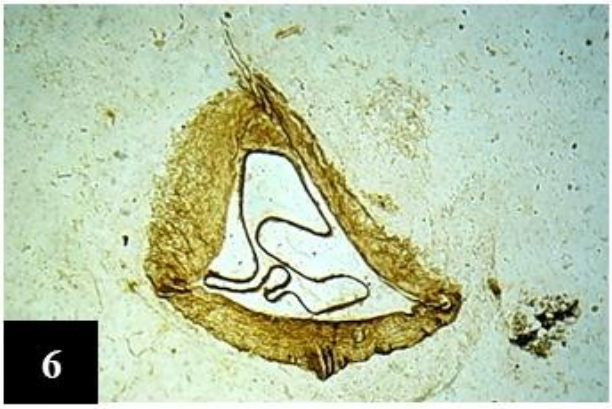
PHOTO PLATE I: 1 - 8

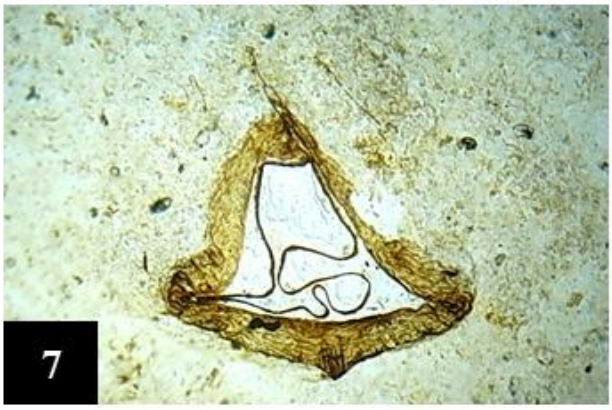






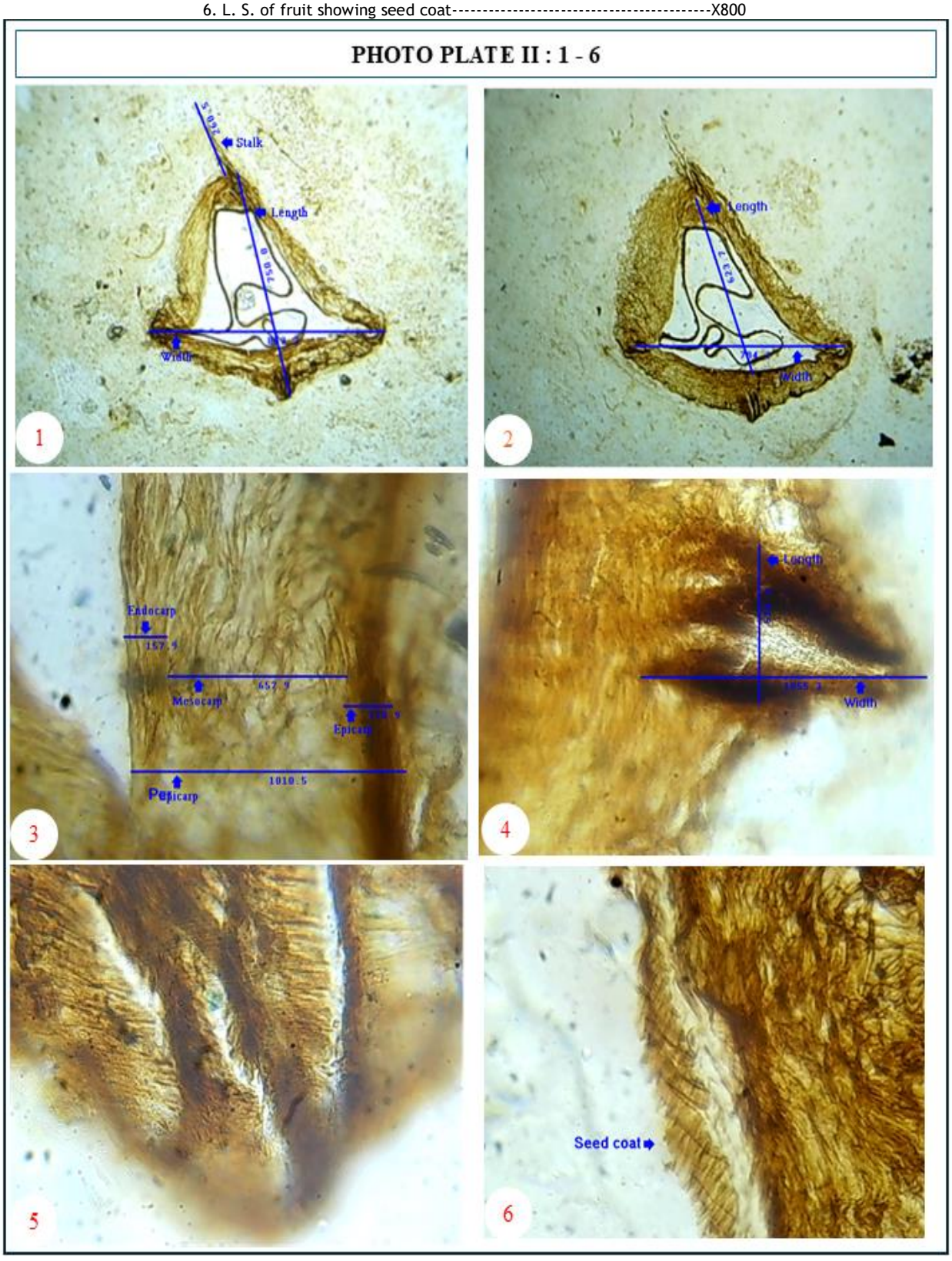






Explanation of photo plate II (photos 1 to 6)

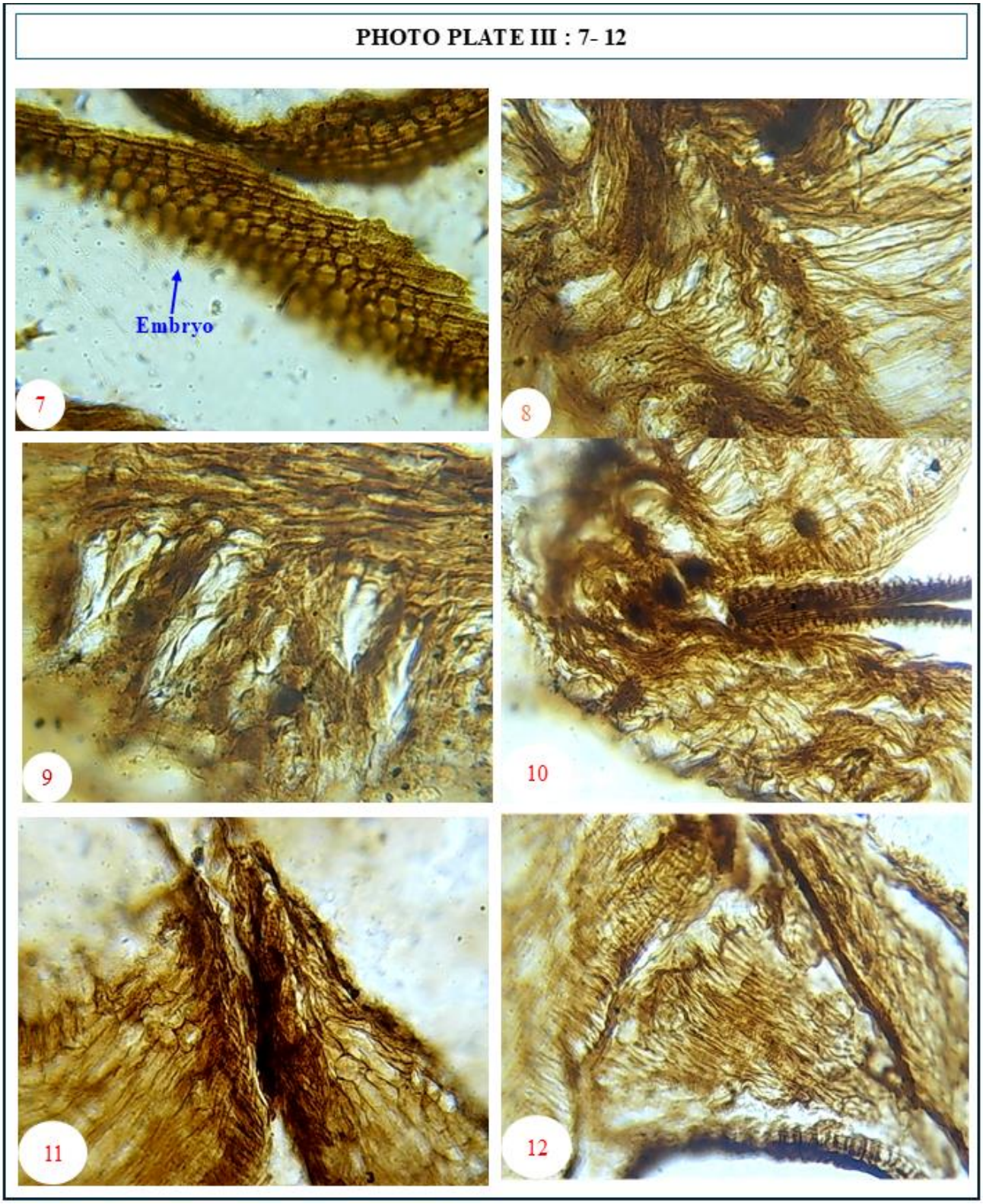
1. L.S. showing length and width of fruit and length of stalk ----------X40
2. L.S. of fruit showing length and width of locule----------X40
3. L.S. of fruit showing Epicarp, Mesocarp and Endocarp----------X400
4. L.S. of fruit showing measurement of Umbo----------X1000
5. L.S. of fruit showing band pattern of umbo----------X1000
6. L. S. of fruit showing seed coat----------X800



***Triangulocarpon patanii* gen. et sp. nov.**

Explanation of photo plate III (photos7 to 12)

7. Multilayered embryo----------X1000
8. L.S. of fruit showing fibrous pericarp----------X1000
9. L.S. of fruit showing Lacunar spaces on pericarp----------X1000
10. Intrusion of embryo into slit----------X1000
11. Vasculature supply from stalk ----------X400
12. Triangular mass endospermic tissue. ----------X400



REFERENCES

- Cooke, C. I. E. (1958). The flora of the presidency of Bombay. Bot. Survey of India, Calcutta.
- Corner, E. J. H. (1976). *The seeds of dicotyledons* (Vol. 1). Cambridge University Press.
- Dhabarde, P. F., Sheikh, M. T., & Kolhe, P. D. (2012). A petrified bilocular fruit from the Deccan Intertrappean beds of Singpur, Madhya Pradesh. *J. Bio. Innov*, *1*(1), 1-5.
- Dighe, S. W., & Kokate, P. S. Premnocarpon Mohgaoanii Gen. Et. Sp. Nov. A Report of Fossil Drupe Fruit from Deccan Intertrappean Beds of Mohgaonkalan, Dist. Chhindwara, MP India.
- Hooker, J. D. (1961). The Flora of British India. Vol.I,II and III L. Recev. and Co. England.
- Juneja, C.D., 1993. Study of the Uppermost Cretaceous Intertrappean flora of Central India. Ph.D. Thesis, Nagpur University, Nagpur,1993.
- Khubalkar, N.V., A petrified plants from the Mohgaopnkalan beds of India Ph.D. Thesis, Nagpur University, Nagpur,1982
- Khursel, A. S. (2022, Nov-Dec). A New Petrified Trilocular Drupaceous Fruit Drupaceocarpon shekhii Gen. Et. Sp. Nov From The Deccan Intertrappean Beds of Moagaonkala, M. P., India. *International Journal of Advance and Applied Research*, *3*(8), 159-165.
- Mehrotra, R.C., Euphorbiocarpon drypetoids gen. et sp. nov. a new Euphorbiaceous fruit from the Deccan Intertrappean beds of Mandla district, M.P. Geophytology, 13: 127-133,1993.
- Paradkar, S.A and Patki, S. P. (1987) Trapa mohgaonsis, A new petrified Dicotyledonous fruit from the Deccan Intertrappean beds of Mohgaonkalan, M.P. India. Geophytology, 17(1): 21-27.
- Paradkar, S. A. and Dixit, V. P. 1984. Grewia mohgaoensis sp. nov. A new petrified dicotyledonous fruit from the Deccan Intertrappean beds of Mohgaonkalan, M.P. India. Proc. V India Geophytology, Conf. Lucknow (1983).
- Pundkar, S. V., Kokate, P. S., & Thorat, K. M. (2020). A Dicotyledonous Drupaceous Fossil Fruit Myrtocarpon Ganeshii Gen. Et. Sp. Nov. from Mohgaonkalan, MP, India. *RESEARCH JOURNEY*, 96.
- Yawale, N.R., Investigation of plant fossil from the Intertrappean Series of India Ph.D. Thesis, Nagpur University, Nagpur,1975.