

A PETRIFIED SEED *JUNEJOSPERMUM INTERTRAPPEA* GEN. ET. SP. NOV. FROM THE DECCAN INTERTRAPPEAN BEDS OF MOHGAONKALAN, M.P., INDIA

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ABSTRACT

The fossil chert were collected from Mohgaonkalan, District Chhindwara, M.P. India, a well known rich fossiliferous locality of Deccan Intertrappean beds for all major groups of plant parts but reports of fossil seed are less as compared to other parts.

The present fossil specimens is exposed in longitudinal plane. Seed is oval, small in shape and size. It is dicotyledonous and unitegmic in nature. Micropylar region is clearly seen. Embryo is large well preserved with two cotyledonous. Vasculature is not seen. Seed coat is differentiated into testa and tegmen. Testa not clearly seen, tegmen thick walled. The seed is compared with the living and reported fossils but this fossil seed shows close resemblance to the seeds of family Piperaceae. Therefore, it can assigned to the Piperaceae family. It is named as *Junejospermum intertrappea*. The generic is after the eminent paleobotanist Dr. C. D. Juneja and specific name given after series of Deccan name Intertrappean.

Key words: Fossil, Dicotyledon, Seed, Deccan, Intertrappean beds.

INTRODUCTION

Deccan Intertrappean beds of India is a rich fossiliferous locality. The reports of fossil seed are less as compare to other plant parts. They are *Deccanosperma arillata*, *Ramakonaspermuschitaleyensis* and *Mahabalespermum minutum* (Juneja, 1993), *Clusiocarpus indicum* (Wazalwar, 1990), *Clusiocarpus arillatus* (Kumar, 1984), *Unonaspermum corneri* (Bonde, 1993); *Ramakonaspermum singhpurii* (Shaikh and Bhowal, 2003); *Mohgaonspermum deccanii*, *Flacourtiospermum nambudirii*, *Unitegmospermum ramanujani* (Kokate, 2006) are reported *Ramakonaspermuschitaleyensis* Martin and Juneja (Shaikh *et al.*, 2009). *Bitegmospermum mohgaonse*, *Orthotropouspermum hookerii*, *Chitaleypermum intertrappea* (Thorat, 2016); *Unitegmospermum ramanujani* (Kokate, 2017); *Coccolobospermum ramanujanii*, *Iiexospermum chitaleyensis* (Dighe, 2017) *Monocoteospermum hookerii* (Deshmukh, 2019) are already reported.

MATERIAL AND METHODS

The present fossil specimen is embedded in the black chert. The seed is well preserved, it was studied anatomically by taking serial peel sections after etching in Hydrofluoric acid.

DESCRIPTION

The present fossil specimens exposed in longitudinal plane. Seed is oval, small in shape and size. It is dicotyledonous and unitegmic in nature. The structure of seed gradually increases in size. The present fossil specimen is 0.249 mm long and 0.153 mm broad. The cavity of seed is measuring 0.22 mm in length and 0.13 mm width. Micropylar region is clearly seen. Embryo is large well preserved with two cotyledonous. Vasculature is not seen. Seed coat is differentiated into testa and tegmen (Text Fig. 2, Plate Fig. 1 & 2).

Seed coat

In present specimen unitegmic seed, seed coat is differentiated into two layers, testa and tegmen but not well persevered. The seed coat is differentiated into outer testa and inner tegmen. The thickness of seed coat is measuring about 148 μ (Text Fig. 4, Plate Fig. 4).

Outer a layer of seed coat is very thick, it may be testa not clearly seen. This layer followed by thick walled tegmen. The thickness of tegmen layer is about 45 μ . These cells are compactly arranged cuboid in shape. At the micropylar region of the seed tegmen is 3-4 celled in thickness, while at the chalazal end it is 2-3 celled in thickness (Text Fig. 4 & 5, Plate Fig. 2).

In present fossil specimen, seed cavity is oval containing an embryo. Embryo is well preserved. It is large and occupies about half the space of seed cavity. The embryo consist of two cotyledons and radical at the micropylar end. The development of radical and micropylar opening is clearly seen in the present fossil specimen.

The cotyledonous measuring about 539 μ to 720 μ in size. In the present fossil specimen the cotyledonary region at the micropylar end is about 1.3 mm in breadth. Each cells of cotyledon measures 6 to 10 μ in size. The cells of radical is thick and parenchymatous measuring about 4 to 6 μ in size (Text Fig. 2, 3 & 6, Plate Fig. 3).

Endosperm tissue is not observed, it might be absorbed during the development of embryo.

COMPARISON AND DISCUSSION

The present fossil specimen is dicotyledonous, unitegmic seed, therefore it can be compared with dicotyledonous living families having unitegmic seeds only. Seed coat in dicotyledons shows wide variations in anatomical structure. Corner (1979) used structure of seed coat as main criteria for classification of dicotydon.

Corner (1979) has mentioned out of 350 families of dicotyledons, only 105 families having unitegmic seeds. We have considered some families having orthotropus ovules which are Fagaceae, Salicaceae, Rosaceae, Anacardiaceae, Burseraceae, Monimiaceae, Piperaceae, Rafflesiaceae.

The present fossil specimen compared with seed of family Rosaceae showing anatropus, hypotesta present. Testa with thick sclerotic mesotesta and tegmen lignified. The seed having connate integuments to make pachychalazal end is differ from present fossil specimen.

When compared with families Burseraceae, Fagaceae and Monimiaceae the seeds are unitegmic but seed coat consist of testa and tegmen. Testa is multiplicative while tegmen layer of seed coat in all these families get soon crushed which is different character from present fossil specimen.

In family Anacardiaceae, the seed is large in size with integument often crushed and tegmen often persistent. It differs from present fossil specimen in having large size and embryo is occupying whole seed cavity, which is considered as more advanced among the forest families (Corner, 1979).

The present fossil specimen, when compared with family Piperaceae, most of the characters resembles i.e. size of seeds, oval in shape, exarillate, non multiplicative seed coat. Testa crushed without trace. Tegmen is distinct at the micropylar end. All these above mentioned characters are also well observed in present fossil specimen.

Comparison with fossil seeds

The present seed can be compared with the earlier described *Clusiocarpus arillatus* (Kumar, 1984) but differs in having aril. *Ramakonaspemus chitaleyensis* (Juneja, 1993) is bitegmic and mesotestal seed is also different from present fossil specimen. *Deccanosperma arillata* (Juneja, 1993) is having arillate and bitegmic seed character differing from present fossil specimen seed.

Unonaspemus corneri (Bonde, 1993) is having ruminant seed coat with elongated, ellipsoidal and bitegmic seed take away from present fossil specimen.

Unitegmospermum ramanujani (Kokate, 2006) is unitegmic seed. Seed coat with testa and tegmen. Cells of tegmen is thick walled, cuboid and at some places lignified are totally different from the present fossil specimen.

Coccolobospermum ramanujanii (Dighe, 2017) is small, ellipsoidal dicotyledonous, orthotropous, nonarillate seed. Testa multiplicative angular thick cells which is differ from present fossil specimen.

Ilexospermum chitaleyensis (Dighe, 2017) is having small, dicotyledonous, oval, unitegmic seed. Testa thick with elongated fibers, multiplicative and tegmen thin, exarillate, albuminous seed take away from present fossil specimen.

Monocoteospermum hookerii (Deshmukh, 2019) is elliptical, albuminous and exarillate, monocotyledonous seed are totally differ from the present fossil specimen

The present fossil seed is dicotyledonous unitegmic from Deccan intertrappean beds of Mohgaonkalan. It is different from all previously described fossil seeds. But this fossil seed shows close resemblance to the seeds of family Piperaceae in having some characters. Therefore, it can be assigned to the Piperaceae family. It is named as *Junejospermum intertrappea*. The generic name is after the eminent palaobotanist Dr. C. D. Juneja and specific name given after series of Deccan Intertrappean.

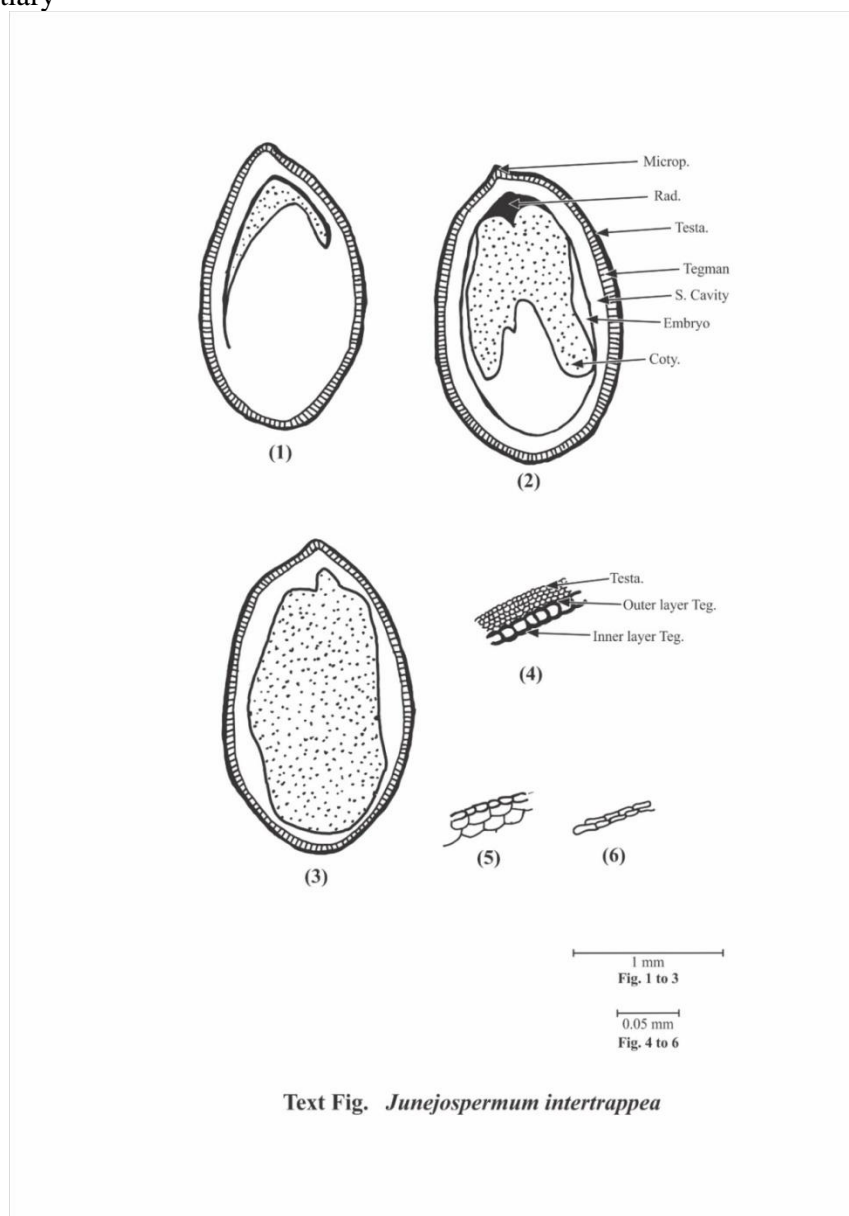
DIAGNOSIS***Junejospermum* gen. nov.**

Fossil seed small, oval, dicotyledonous, unitegmic, exarillate. Seed coat differentiated into testa and tegmen. Embryo large, well preserved with two cotyledons, testa not clearly seen, tegmen thick walled. Micropylar opening clearly seen.

***Junejospermum intertrappea* gen. et. sp. nov.**

Seed is small, oval, unitegmic measuring 0.249 mm long and 0.153 mm broad. Seed cavity measuring about 0.22 mm in length and 0.13 mm in width. Seed coat differentiated into testa and tegmen layer measuring 45 μ in thickness, compactly arranged cuboid cells. Micropylar region 3-4 celled in thickness, while chalazal and 2-3 celled in thickness. Embryo well preserved with two cotyledons, measuring about 539 μ to 720 μ in size. Thin walled parenchymatous cells of cotyledons measuring 6 to 10 μ in size. Endosperm not seen.

- Holotype - MOH/SVP/DICOT - SEED - II
 Department of Botany, Shri. Shivaji College, Akola
- Locality - Mohgaonkalan, District Chhindwara, M.P. India
- Horizon - Deccan intertrappean series of India
- Age - Early Tertiary



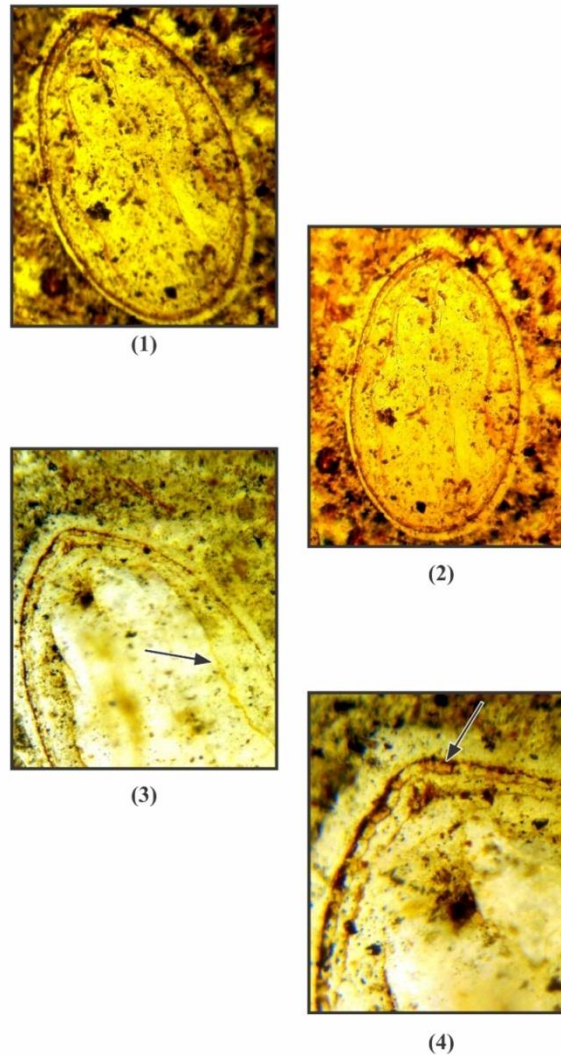


Plate Fig. *Junejosperrum intertrappea*

Junejosperrum intertrappea gen. et. sp. nov.

Explanation of Text Figures 1 to 6

- 1 to 3. - Diagrammatic sketch of L.S. of seed showing embryo and cotyledons (Coty.)
 4. - Cellular details of seed coat showing Testa and Tegmen (Teg.)
 5. - Cells of seed coat
 6. - Cells of embryo

Explanation of Plate Figures 1 to 4

- 1 and 2. - L.S. seed showing embryo with cotyledons x40
 3. - L.S. Seed showing immature embryo x40
 4. - L.S. seed showing micropylar end x100

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