

Sahniospermum trapii gen. et. sp. Nov: A report of new fossil seed from deccan intertrappean beds of Mohgaonkalan, M.P. India

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Abstract

The fossil chert were collected from Mohgaonkalan M.P. India, a well-known rich fossiliferous locality. Seed small, dicotyledonous, ovate, anatropous, bitegmic, testa thick with longitudinal, elongated fibres, multiplicative, tegmen thin, exarillate, albuminous. The seed is compared with the living and reported fossils but it shows close resemblances with seed of Annonaceae. The elongation of cells into fibres is the original character of Annonaceous seed. Few minor characters are different. Hence the present fossil seed name as *Sahniospermum trapii*. The generic name is after the great eminent palaeobotanist Dr. Birbal Sahni, *Sahniospermum* and specific name is after Deccan Trap.

Keywords: Fossil seed, Deccan Intertrappean Beds, Mohgaonkalan, *Sahniospermum trapii*

1. Introduction

Mohgaonkalan, District Chhindwara, M.P., India is the well-known locality of Deccan Intertrappean beds, is a rich fossiliferous area for all major groups of plant parts but reports of fossil seed are less as compared to other parts. *Deccanosperma arillata*, *Ramakonaspermus chitaleyensis* and *Mahabalespermum minutum* (Juneja, 1993) [3], *Clusiocarpus indicum* (Wazalwar, 1990) [10], *Clusiocarpus arillatus* (Kumar, 1984) [6], *Unonaspermum corneri* (Bonde, 1993) [11]; *Ramakonaspermum singhpurii* (Shaikh and Bhowal, 2003); *Mohgaonspermum deccanii*, *Flacourtiospermum nambudirii*, (kokate, 2006) [4] *Ramakonaspermus chitaleyensis* Martin and Juneja (Shaikh *et al.*, 2009) [8] *Bitegmospermum mohgaonse*, *Orthotropouspermum hookerii*, *Chitaleypermum intertrappea* (Throat 2016) [9], *Unitegmospermum ramanujami* (2017) [5] few fossil seeds are reported from various localities.

2. Material and methods

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

Description: The present fossil seed is well persevered in longitudinal section.

Seed: The present fossil seed is small, round to oval, dicotyledonous and bitegmic. The seed is about 1.73 mm in length and 1.23 mm in breadth, vasculature is not seen. Seed coat is with mechanical layer. The seed coat is differentiated into testa and tegmen (Text Fig. 1 to 5, Plate Fig. 1 to 3).

Testa: Cells of testa are elongated tangentially like layer of fibers. Testa measuring about 73-77 μ in thickness. It is multiplicative and 3-4 cells thick. Testa is clearly differentiated into three regions (Text Fig. 6, Plate Fig. 4).

a) Exotesta: It is outermost layer. Exotesta is tangentially elongated cells, measuring about 12 x 25 μ in size.

b) Mesotesta: It is middle layer of testa, measuring 36 μ in thickness. Cells of mesotesta are fibrous and elongated, measuring about 22 x 33 μ in size.

c) Endotesta: Endotesta is inner most layer of testa. It is single layered. The cells are small in size and not well preserved.

Tegmen: It is single layer, crushed with thin membranous structure. Tegmen is about 0.40 μ thick. It is attached to testa at some places. The cells of tegmen are elongated but not well preserved. Tegmen may be disappearing very soon or may be crushed.

Seed cavity: Seed cavity occupied by seed. Seed cavity is about 1.68 mm length and 1.19 mm in width.

Embryo: Embryo is well preserved. The attachment of embryo not seen. The seed is endospermic. Small trace of tissue is seen, it might be cells of embryo. Embryo is 112.2 μ in length and 9.9 μ in breadth. The endosperm may be utilized during growth of embryo. Two cotyledons are seen, very clearly, thickness of it is about 44 μ . The cells of cotyledons are thin walled and parenchymatous (Text Fig. 5 and 7, Plate Fig. 3 and 5).

3. Discussion and comparison

From the above characters, it is clear that seed is dicotyledonous, bitegmic, mesotestal in nature. So only the families having these characters are Annonaceae, Celastraceae, Hammamelidaceae, Lecythidaceae, Myrtaceae, Rosaceae and Theaceae are taken for comparison (Corner, 1979) [2].

Famiy Celastraceae is anatropous, bitegmic arillate but present fossil seed differ in having exarillate structure. Hammamelidaceae family is having seed with characters anatropous, bitegmic, exarillate, testa multiplicative, mesophyll composed of sclerotic cells. Tegmen non-multiplicative are similar to present fossil seed but having albuminous and winged seed is different character.

In family Annonaceae seed is anatropous, bitegmic exarillate, tegmen non multiplicative but differ in having albuminous, tritegmic mesophyll divided into several layers of transverse or oblique fibres.

Lecythidaceae is also anatropous, bitegmic, exarillate, exalbuminous seed but seed hairy, testa outer epidermis palisade and lignified cells and mesophyll is arechymatous this characters takes away the present fossil specimen.

Mesophyll thin walled and testa non-multiplicative in family Myrtaceae, Rosaceae and Theaceae is anatropous, bitegmic testa multiplicative but non-multiplicative seed coat with presence of abturator and mesophyll supplied with crystal cells differs from present fossil specimen, respectively.

Present fossil seed shows close affinities with family Annonaceae.

Comparison with fossil seeds: *Deccanosperma arillata* (Juneja, 1993) [3] of family Connaraceae shows difference in not having arillate and cordate shaped seeds. While *Ramakonospermus chitalegnis* (Juneja, 1993) [3] and *Ramakonospermus chitalegnis* Matin and Juneja (Shaikh *et al.*, 2009) [9] are pear shaped, large seed with curved and membranous cotyledons differ from present fossil specimen. *Clusiocarpus arillatus* (Kumar, 1984) [6] and *Clusiocarpus indicum* (Wazalwar, 1990) [10] both having arillate seed but present fossil seed is exarillate.

When present fossil specimen compared with *Unonospermum corneri* (Bonde, 1993) [1] of family Annonaceae is similar in having inner fibrous layers of testa but differs in not having rumination of equal dimensions formed of tegmen.

Flacourtiospermum nambudirii and *Mohgaospermum decanii* (Kokate, 2006) [4] having disc like hypotesta and seed with lateral wing like structure different from present fossil specimen respectively.

When present fossil specimen compared with *Bitegmospermum mohgaonse* (Thorat, 2016) [9] of family Myrtaceae is similar in having dicotyledonous, bitegmic, mesotestal, seed-coat differentiated into outer testa and inner tegmen, but differs in not having testa thick with longitudinal, elongated fibres, multiplicative, tegmen thin, exarillate, albuminous.

When present fossil specimen compared with *Orthotropouspermum hookerii* (Thorat, 2016) [9] of family Polygonaceae is similar in having dicotyledonous, bitegmic, mesotestal, seed-coat differentiated into outer testa and inner

tegmen, but differs in not having ellipsoidal shape, orthotropous and at chalazal end of the seed, unligified massive hypostase like structure.

Chitaleyspermum intertrappe (Thorat, 2016) [9] of family Polygalaceae is shows difference in not having unitegmic, orthotropous type seed, outer layer of seed coat is thin and consisting small angular cells with micropylar opening.

Unitegmospermum ramanujami (Kokate, 2017) [5] is shows similarities in having Small oval, dicotyledonous seed but differs in not having bitegmic seed.

On the basis of above discussion, the present fossil seed shows close resemblances with seed of Annonaceae. The elongation of cells into fibres is the original character of Annonaceous seed (Corner, 1979) [2]. Few minor characters are different. Hence the present fossil seed name as *Sahniospermum trapii*. The generic name is after the great eminent palaeobotanist Dr. Birbal Sahni, *Sahniospermum* and specific name is after Deccan Trap.

Diagnosis

Sahniospermum gen. nov.

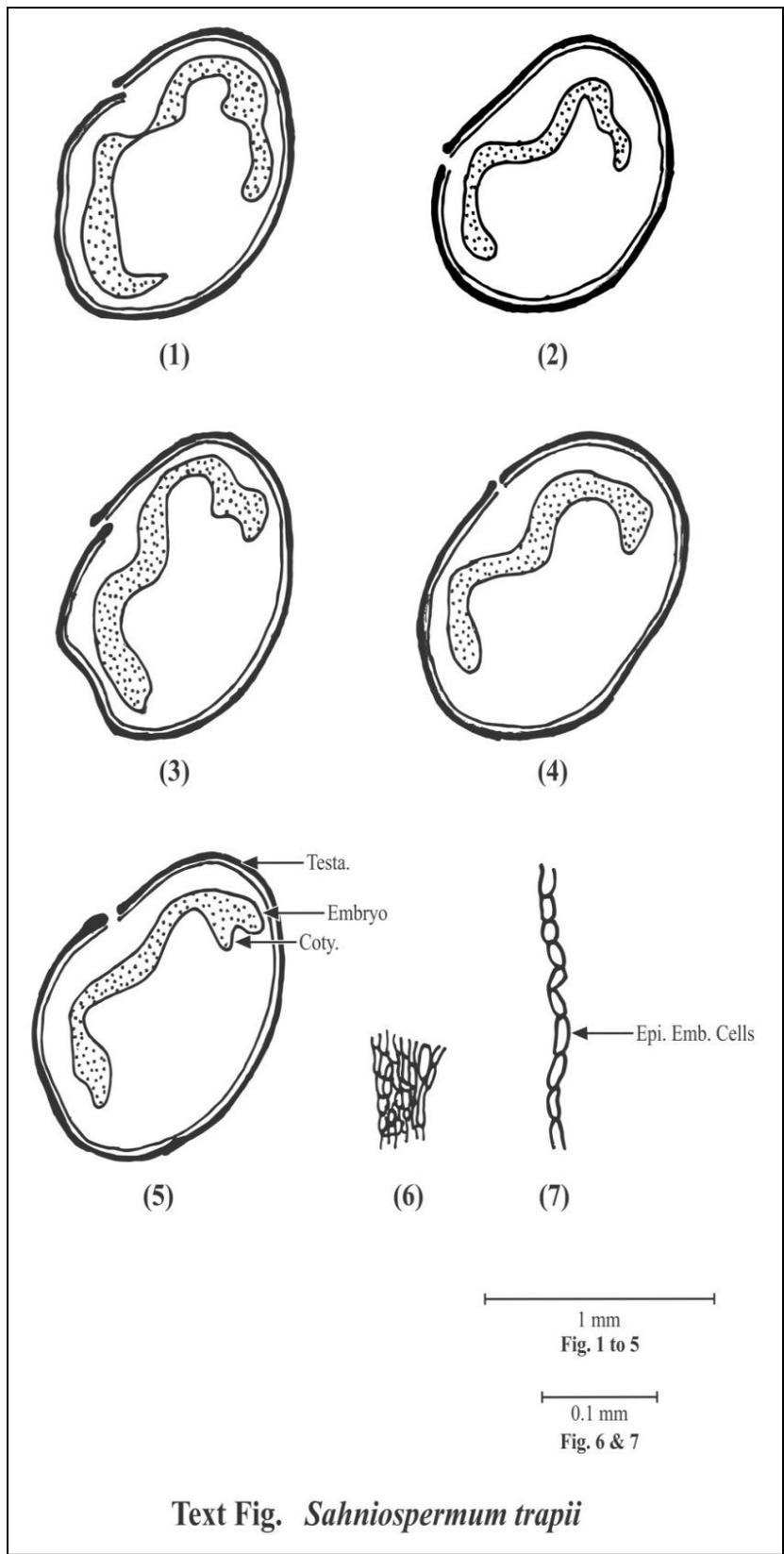
Seed small, dicotyledonous, ovate, anatropous, bitegmic, testa thick with longitudinal, elongated fibres, multiplicative, tegmen thin, exarillate, albuminous.

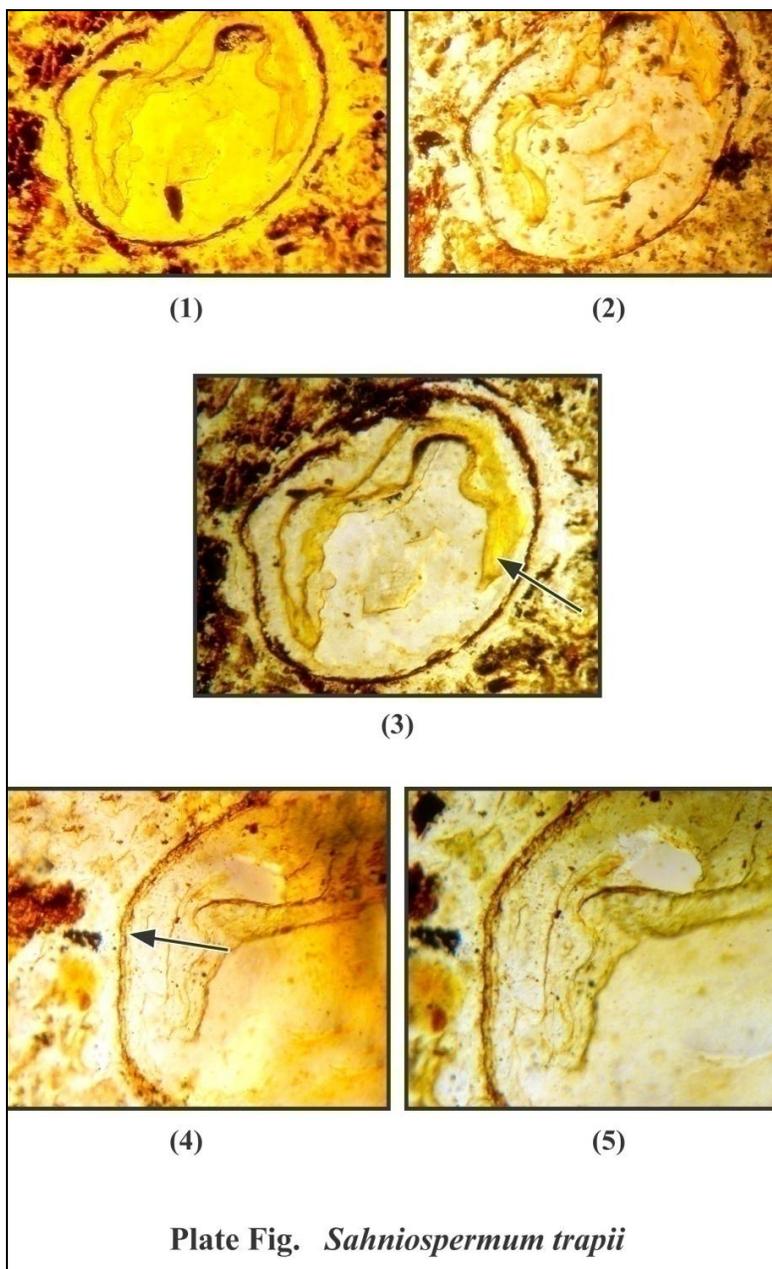
Sahniospermum trapii gen. et. sp. nov.

Seed small, bitegmic, anatropous. The seed about 1.23 mm length and 1.73 mm in breadth. The seed cavity 1.19 mm x 1.68 mm in width. The seed coat differentiated into testa and tegmen. Testa consists of tangentially elongated with layer of fibres, measuring about 73-77 μ in thickness and multiplicative with 3-4 cells thick. Three layer testa clearly seen i.e. exotesta, mesotesta and endotesta. Exotesta consists of tangentially elongated cells, measuring about 11 x 25 μ in size. Mesotesta 36 μ in thickness. Cells of mesotesta are fibrous and elongated, measuring about 22 x 33 μ in size. Endotesta comprises inner most layer of testa and single layered with small cells in size.

Tegmen single layered, non-multiplicative crushed, about 0.40 μ in thick and not well preserved. Embryo present in seed cavity with two distinct cotyledons about 44 μ in thickness. The cells of cotyledons thin walled parenchymatous. Seed endospermic with embryo is about 112.2 μ in length and 9.9 μ breadth.

Holotype	-	MOH/SVP/DICOT - SEED - I Department of Botany, Shri. Shivaji College, Akola
Locality	-	Mohgaonkalan, District Chhindwara, M. P. India.
Horizon	-	Deccan Intertrappean Beds
Age	-	Upper Cretaceous





<i>Sahniospermum trapii</i> gen. et. sp. nov.		
Explanation of Text Figures 1 to 7		
1 to 5.	-	Serial section of L.S. of seed
6.	-	Cells of seed coat
7.	-	Epidermal cells of embryo
Explanation of Plate Figures 1 to 5		
1 to 3.	-	L.S. of seed showing embryo with cotyledons x20
4.	-	Testa x100
5.	-	L.S. of seed showing cotyledons x100

4. References

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