

Occurrence of urticaceous fruit from the Deccan Intertrappean beds of Mohgaon Kalan, Chhindwara district, Madhya Pradesh

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The paper reports the occurrence of an achene-type of fossil fruit belonging to the family Urticaceae from the Deccan Intertrappean beds of Mohgaon Kalan, Chhindwara District, Madhya Pradesh. A single specimen in cross section shows anatomical details of the fruit exhibiting hispidate nature of exocarp. The multicellular bristles with broad bases are united to form a continuous cover of the fruit. The mesocarp layer is distinct and made up of horizontal prismatic cells while endocarp layer is two to three cells thick. The seed bears two cotyledons. The affinities of the fossil fruit are assessed with *Boehmeria* Jacq. of the family Urticaceae.

Key-words — Fossil fruit, Deccan Intertrappean, Maestrichtian-Danian, Urticaceae, *Boehmeria*.

INTRODUCTION

THE fossil florule of Mohgaon Kalan (22° 1' N : 79° 11' 30" E) is quite abundant in variety of its components in comparison to other Deccan Intertrappean florules. The assemblage is primarily angiospermous with predominance of dicotyledonous and palm woods, whereas fossils of other plant groups i.e. algae, fungi, bryophytes, pteridophytes (water ferns), conifers and monocots (other than palms) are also represented in lesser numbers.

The Deccan Intertrappean flora is mainly known by fossil woods, however, other well preserved plant organs i.e. leaves, flowers and fruits have also been documented. Apart from palm fruits, a number of other angiospermous fruits are recorded, namely: *Enigmocarpon parijai* Sahni (1943), Patil (1974), Biradar and Mahabale (1976); *E. sahnii* Chitaley and Kate (1977); *Indocarpa intertrappea* Jain (1964); *Graminocarpon mohgaoense* Chitaley and Sheikh (1971); *Daberocarpon gerhardii* Chitaley and Sheikh (1973); *Sahnioocarpon harrisii* Chitaley and Patil (1973), Patil and Karekar (1986), Nambudiri, Tidwell and Chitaley (1987); *Kremnocarpon aquatica* Chitaley and Kate (1974); *Deccanocarpon arnoldii* Paradkar (1975); *Harrisocarpon sahnii* Chitaley and

Nambudiri (1973); *Grewia mohgaonensis* Paradkar and Dixit (1984); *Viracarpon chitaley* Patil (1972); *V. elongatum* Sahni (1944), Chitaley and Patil (1971), *V. hexaspermum* Sahni (1934), Patil (1973), Nambudiri and Tidwell (1978), Bande and Awasthi (1986); *V. sahnii* Chitaley *et al.* (Patil 1973); *Cremocarpon deccanii* Karanjekar (1984); *Wingospermocarpon mohgaoense* Sheikh and Kapgate (1984); *Trapa mohgaoensis* Paradkar and Patki (1987).

The present fossil fruit was observed in random cut chert section recovered from Deccan Intertrappean beds of well known locality Mohgaon Kalan of Chhindwara District, Madhya Pradesh. The small fruit was found dispersed in cross section with the fragments of other plant material. It is well preserved and reveals all the anatomical details of pericarp and the cotyledons.

SYSTEMATIC DESCRIPTION

Family – Urticaceae

Genus – *Boehmeria* Jacq.

Boehmeria intertrappea sp. nov.

Plate 1, figs 1-9

Material: The species is based on a single specimen of minute/small unilocular fossil fruit in a random cut section of a chert piece.

Description: The fruit is an indehiscent achene, more or less circular to oval in cross section enclosing two cotyledons (Pl. 1, fig. 1). The fruit is about 0.3 x 0.4 cm in diameter and is well preserved to reveal anatomical details of exocarp, mesocarp and endocarp layers.

Exocarp: The exocarp of the fruit is hispidate, the bristles or hairs are multicellular and unequal in size, broader at base and tapering towards the apex, the bases of the hairs are united with each other to form a continuous cover of the exocarp (Pl. 1, figs 2, 3). These hairs are stiff and bristly in nature and composed of vertically elongated cells running parallel and are 10-12 or sometimes more cells in thickness at the bases. The size of these hairs ranges from 100-300 μm long and up to 200 μm broad at basal part. Below the hair base a single cell thick epicarp is present. The epicarp cells are small rectangular in shape (longer than broad), thick walled with very small lumen, arranged in a uniform row (Pl. 1, fig 2, 4, 5).

Mesocarp: The mesocarp demarcates exocarp and the endocarp layers, 0.05 mm thick (Pl. 1, figs 2, 6). It is broader and distinct in appearance. The cells of this layer are crystalline in nature, translucent and radially elongated. Crystalline cells may provide rigidity to the fruit wall.

Endocarp: The endocarp layer is one to three cells thick, below the mesocarp (Pl. 1, fig.7). The cells are small, dark coloured, somewhat rectangular and are of various shapes arranged in one to three cells thick row. This layer probably provides protection to the seed.

Seed: The seed is attached to the pericarp only at one point (Pl. 1, fig. 1). Endosperm is represented as compact layer outside the seed coat in cross section, probably albuminous (Pl. 1, fig. 8); dicotyledonous. The cotyledons are well preserved, made up of parenchymatous cells. These cells are mostly disorganised, circular to multifaceted at places, (Pl. 1, figs 7-9). Multicellular starch bodies are frequently scattered among parenchymatous cells (Pl. 1, figs 7-8).

COMPARISON AND DISCUSSION

The diagnostic features exhibited by the present fossil fruit are : small to minute size (0.3 x 0.4 cm diameter), achene, round to oval in cross section with hispidate (hairy) exocarp, the crystalline mesocarp, the endocarp enclosing a small dicotyledonous seed inside it with an albuminous endosperm. These characters collectively indicate its affinity with the family Urticaceae (Hooker 1885; Kanjilal *et al.* 1940; Eames & MacDaniels 1947; Esau 1953; Lawrence 1969; and Hutchinson 1979). Extensive study of extant fruits as well as published descriptions and photographs revealed that the fossil fruit can be compared with the two genera of the family Urticaceae, namely, *Boehmeria* Jacq. and *Urtica* Linn. in having minute, small sized fruits ranging from 1 mm to 2.5 cm. Both the genera are hispidate but *Boehmeria* have nonstinging hairs while *Urtica* have stinging hairs. *Urtica* can be eliminated as its hairs have bulb like projections which can be break off along a weak line leaving sharp or sloping surface at bevelled edges. Since the fossil fruit shows nearest resemblance to the genus *Boehmeria*, it is described as *Boehmeria*

PLATE 1

Boehmeria intertrappea sp. nov.

1. Cross section of fossil fruit showing hispidate nature of exocarp and other pericarp layers and dicotyledonous seed attached at one point x10 BSIP slide no. 39018.
2. Magnified cross section showing all the three layers of pericarp, i.e., hispidate exocarp (exp), crystalline mesocarp (mc), cuticular endocarp (end) x 100.
3. Part of exocarp showing continuity of hair bases x 100.
4. Multicellular hair showing elongated parallel running cells x 100.
5. Another hair with smaller cells x 100.
6. Part of fruit wall showing thin walled crystalline mesocarp cells (mc) x 100.
7. Part of fruit wall showing 2-3 layer thick endocarp (end) and multicellular starch bodies (st) x 100.
8. Uniseriate endosperm layer (endosp.) and enlarged multicelled starch bodies (st) scattered among the cotyledonous cells x 150.
9. Part of cotyledons showing disorganised tissue x 150.

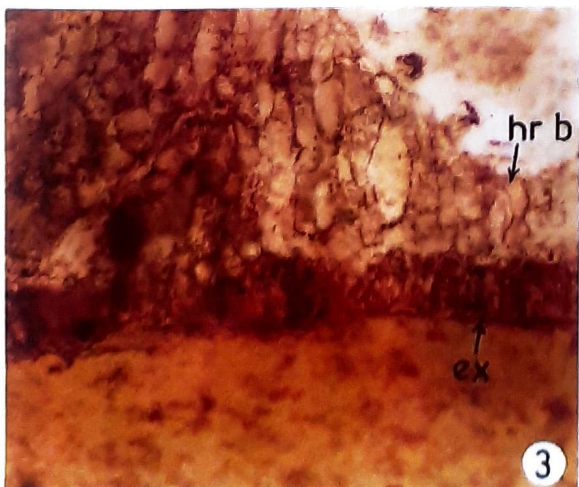
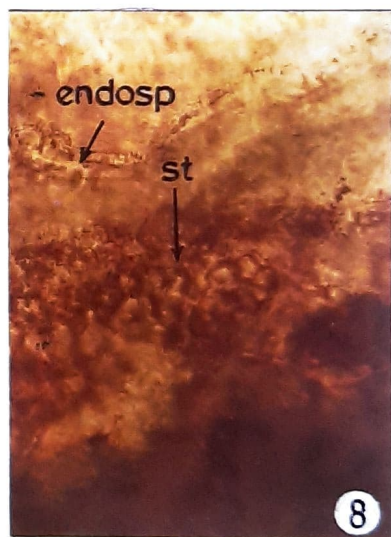
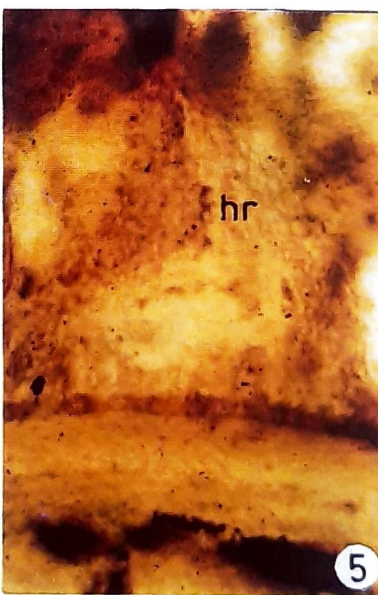
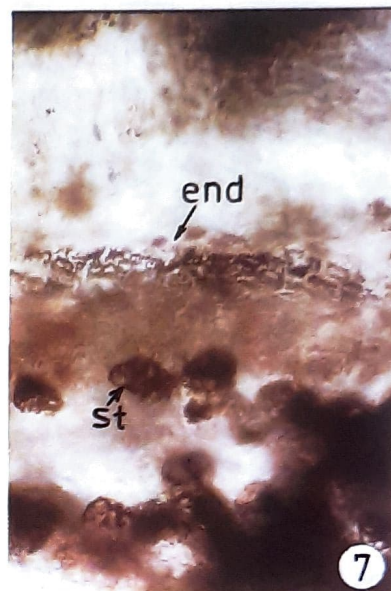
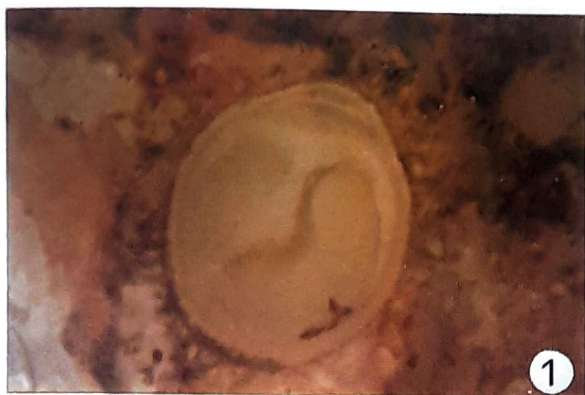


PLATE I

intertrappea sp. nov. The specific epithet indicates its occurrence in Deccan Intertrappean beds.

Distribution: The genus *Boehmeria* Jacq. of the family Urticaceae consists of about 80 species distributed in tropical and northern subtropical regions of the world (Willis 1966, p. 142; Mabberley 1997, p. 92). Amongst them, 12 species of herbs, shrubs and small trees are widely distributed in warmer parts of India in Uttar Pradesh, Bihar, Andhra Pradesh, Western Ghats, West Bengal and north eastern states (Assam, Khasi and Jaintia Hills, Sikkim, etc.). Bark of stems of some of the species yield good fibres (Santapau & Henry 1973).

Holotype : BSIP Museum No. 39018.

Repository : Birbal Sahni Institute of Palaeobotany, Lucknow.

Locality : Mohgaon Kalan, Chhindwara District, Madhya Pradesh, India.

Horizon : Deccan Intertrappean Beds.

Age : Maestrichtian-Danian.

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