



## REPORT OF A BICARPELLARY FLOWER FROM THE DECCAN INTERTRAPPEAN SERIES OF MOHGAONKALAN, INDIA.

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### ABSTRACT :-

The present flower from its oblique transverse section appears to be the smaller in size among the flowers reported from the Deccan Intertrappean series. It is 1.00 X 1.22 mm in diameter. Swollen at middle and tapering at its ends indicate its companulate shape. The flower is actinomorphic, hermaphrodite, pentamerous and hypogynous. The perianth lobes are ten in numbers arranged in two whorls of 5+5 each. The outer whorl contains five tepals may be termed as calyx while the inner five may be as corolla. Stamens are five in number, polyandrous giving pentamerous appearance to the flower. Pollen grains are tricolpate and psilate without any external outgrowth. The anther is basifixed. Gynoecium is bicarpellary, syncarpous with superior, bilocular ovary. Each locule contains single ovule in it with axile placentation. Ovary wall is multilayered and smooth. The present flower is totally different from the reported fossil flowers and living genera of modern families. Hence it is kept under separate form genus *Mohgaoanthus deccanii* gen. et sp. nov.

Key Words :- Daccan, Intertrappean. beds, dicot, flower, pertified.

### INTRODUCTION:-

This chapter deals with the study of a new bicarpellary polypetalous flower, collected from the Deccan Intertrappean series of Mohgaonkalan, M.P., India. From the Deccan Intertrappean series only few flowers so far have been reported, they are- *Sahanianthus parijaii* (Shukla,1944; Chitaley,1955; Dayal,1967); *Sahnianthus dinecterum* (Shukla,1958); *Sahanipushpum shuklaii* (Prakash,1955; Verma,1956; Prakash & Jain,1963; Chitaley, 1964); *Deccananthus savitri* (Chitaley & Kate,1972); *Chitaleypushpum mohgaonse* (Paradkar,1973); *Raoanthus intertrappea* (Chitaley & Patel, 1975); *Carpolianthus seriatus* (Jain & Dayal 1966); *Martynianthus spinosa* (Ainopore,1994); The present flower described here is from the Deccan Intertrappean series of Mohgaonkalan, India. It is well preserved and considered for further study.

### MATERIAL AND METHOD:-

The fossiliferous cherts had been collected from the Deccan Intertrappean beds of Mohgaonkalan, M.P., India. While breaking the cherts the flower was exposed in oblique transverse plane, unfortunately the counter part was missing. After etching the specimens with hydrofluoric acid (HF), serial peel sections were taken through its part with Cellulose Acetate peel Technique. The peels were mounted in DPX mountant and photographed. The camera lucida sketches of the slides were drawn for detailed study of flower cut in oblique transverse plane.

### DESCRIPTION:-

**Flower morphology:-** The present flower from its oblique transverse section appears to be the smaller in size among the flowers reported from the Deccan Intertrappean series. It is 1.00X1.22 mm in diameter. Swollen at middle and tapering at its ends indicate its companulate shape. The flower is actinomorphic, hermaphrodite, pentamerous and hypogynous. The perianth are ten in numbers arranged in two whorls of 5+5 each. The outer whorl contains five tepals may be termed as calyx while the inner five may be as corolla. Stamens are five in number, polyandrous giving pentamerous appearance to the flower. The anther is basifixed. Gynoecium is bicarpillary, syncarpous with



superior, bilocular ovary. Each locule contains single ovule in it with axile placentation. Ovary wall is smooth. The flower shows following anatomical details-

**Pedicel:-** as the counter part is missing the pedicel is not found.

**Bracts:-** as the counter part is missing the pedicel is not found.

**Perianth:-** The perianth are ten in numbers arranged in two whorls of 5+5 each. The outer whorl contains five tepals may be termed as calyx while the inner five may be as corolla.

**Outer whorl (Calyx):-** It contains five number of tepals (sepals) which are free showing polysepalous condition. The first and fourth lobe is external, second is partially external and third & fifth are internal in position showing its quincuncial aestivation. Each lobe is swollen at middle and tapering at its ends measuring 1.00 mm in length and 77  $\mu\text{m}$  in breadth and is made up of thin walled parenchymatous cells bounded by epidermis, showing few vascular elements with some canal like cavities.

**Inner whorl (Corolla):-** It contains five numbers of tepals (petals) which are free showing polypetalous condition. The first and fourth lobe is external, second is partially external and third & fifth is internal in position showing its quincuncial aestivation. Each lobe is swollen at middle and tapering at its ends measuring 0.88 mm in length and 55  $\mu\text{m}$  in breadth and is made up of thin walled parenchymatous cells bounded by epidermis, showing few vascular elements.

**Androecium:-** The stamens are five in number, showing polyandrous nature. All stamens are at equal length from its base. Filaments are placed alternate to the perianth lobes. Attachment of filaments to the anther lobes is at the base indicating basifixed nature of the stamens. Each anther lobe measures 150 X 66  $\mu\text{m}$  in diameter and are bilobed. Anther tissue is thin walled rectangular parenchymatous measuring 10 X 20  $\mu\text{m}$  in size. The pollen sacs are filled with free isolated pollen grains without any tetrad, indicating its mature nature. Pollen grains measuring 25 to 30  $\mu\text{m}$  in diameter along their equatorial to pollar axis. Pollen grains are tricolpate and psilate without any external outgrowth. The exine is thick without any ornamentation and the intine is thin. Some of the pollen grains are dehisced through the wall of anther indicating the loculicidal dehiscence.

**Gynoecium:-** It consists stigma, style and ovary. Stigma is capitate measuring 220 to 225  $\mu\text{m}$  in diameter made up of thick walled parenchymatous tissue, covered by single layered epidermis. Style is circular and thick measures 156 to 160  $\mu\text{m}$  in diameter made up of thick walled parenchymatous cells covered by single layered epidermis. Ovary is small, oval in shape measuring 385 to 390  $\mu\text{m}$  in diameter. The ovary wall measures 77  $\mu\text{m}$  in thickness and consist of three zones. Outer zone measures 30 to 35  $\mu\text{m}$  in size made up of thick walled parenchyma tissue. Middle zone is 20 to 25  $\mu\text{m}$  thick made up of thick walled parenchymatous cells. Inner zone is 18 to 20  $\mu\text{m}$  in thickness with thick walled parenchymatous cells. The ovary wall is smooth and without any projections or outgrowths. The septa or dehiscence zone is not seen indicating the immature nature of the ovary. Each locule is equal in size and measures 235 to 245  $\mu\text{m}$  in size and consisting of single ovule. Septa is 65 to 70  $\mu\text{m}$  in thickness made up of thin walled parenchymatous cells, separating the two locules giving bilocular nature to the ovary.

The ovules are attached to the central axis of the flower indicating the axile placentation. Each single ovule measures 76 X 65  $\mu\text{m}$  in size and immature. The ovary wall is smooth and without any external outgrowths.

## **DISCUSSION :-**

As evident from the above description, the present flower shows following important characters-

- The perianth lobes are ten arranged in two whorls of 5+5 each.



- The outer whorl and inner whorl shows quincuncial aestivation.
- Stamens are five and polyandrous and are of equal length.
- Anthers are basifixed with two lobes.
- Pollen grains are tricolpate and psilate.
- Gynoecium with bicarpillary, syncarpous, superior ovary.
- Stigma is capitate, style short and solid.
- Ovary wall is multilayered and differentiated into three zones and smooth.
- Ovary is bilocular with one ovule in each locule showing axile placentation.

From the above characters it is clear that the flower is polypetalous, actinomorphic, pentamerous, hermaphrodite and hypogynous in nature. Perianth lobes are arranged in two whorls of 5+5 each. Pentamerous character of flower shows its dicotyledonous nature. Ovules are not fully developed showing immature nature of the ovary. As the anthers are dehisced indicates protrandrous condition of flower suitable for the cross pollination.

#### **IDENTIFICATION:-**

The present flower is compared with the flowers of modern angiospermic taxa and reported dicot flowers.

#### **Comparison with flowers of modern angiospermic taxa-**

The present fossil flower is compared with the flowers bearing bicarpillary, syncarpous, superior flowers with polypetalous condition. These conditions are seen in families like - Rutaceae, Meliaceae, Anacardiaceae, Asclepiadaceae, Caryophyllaceae, Chenopodiaceae, Amaranthaceae, Convolvulaceae and Apocynaceae (Hooker,1961; Cook,1967; Saldanha & Nicolson, 1978; Mathew, 1981). Family Rutaceae (*Murraya exotica*) is comparable in bicarpillary nature of ovary but differs in having fused calyx and ten anthers. Family Meliaceae (*Melia azadirach*) differs from present flower in having 8-10 numbers of anthers. Family Anacardiaceae (*Rhus parviflora*) differs from present flower in having trilocular nature of ovary. Family Asclepiadaceae differs from present specimen in having epipetalous nature of anthers and gamopetalous nature. Family Caryophyllaceae (*Dianthus caryophyllatus*) differs from present flower in having ten anthers. Family Chenopodiaceae (*Chenopodium sp.*) differs in having fused calyx and presence of bracts. Amaranthaceae closely resembles with present flower in having minute flowers but differ in having five perianth lobes. Convolvulaceae and Apocynaceae are massively different in having gamopetalous condition of the flower.

#### **Comparison with reported dicot flowers-**

The present flower is compared with the reported fossil flowers - *Sahianthus parijai* (Shukla,1944; Chitale,1955; Dayal,1967) differs in its unique character of 5-10 locular ovary and epipetalous condition of the stamens. *Sahnianthus dinecterum* (Shukla,1958) differs in presence of nectory glands at the base of ovary wall and 5-10 locular ovary. *Sahnipushpum shuklai* (Prakash,1955; Verma,1956; Prakash & Jain,1963; Chitale, 1964) also differs in multilocular ovary while present specimen has bilocular ovary. *Deccanathus savitri* (Chitale & Kate,1972) differs in gamopetalous condition of flower. *Chitaleypushpum mohgaonse* (Paradkar,1973), *Raoanthus intertrappea* (Chitale & Patel,1972) & *Martynianthus spinosa* (Ainopore, 1994) shows gamopetalous condition with multilocular ovary, hence could not be compared with the present polypetalous flower with bilocular ovary. *Carpolianthus striatus* (Jain & Dayal 1966) differs in having monocotyledonous nature of the flower and also a gamopetalous flower.

Thus the present flower is totally different from the reported fossil flowers and living genera of modern families. Hence it is kept under separate form genus *Mohgaoanthus deccanii* gen. et sp.



nov. Generic name is after the the locality from where it is collected and specific name after the Deccan Intertrappean beds.

#### DIAGNOSIS:-

*Mohgaoanthus* gen nov.

The flower is polypetalous, actinomorphic, pentamerous, hermaphrodite and hypogynous in nature. Perianth lobes are arranged in two whorls of 5+5 each. Pentamerous character of flower shows its dicotyledonous nature.

*Mohgaoanthus deccanii* gen. et sp. nov.

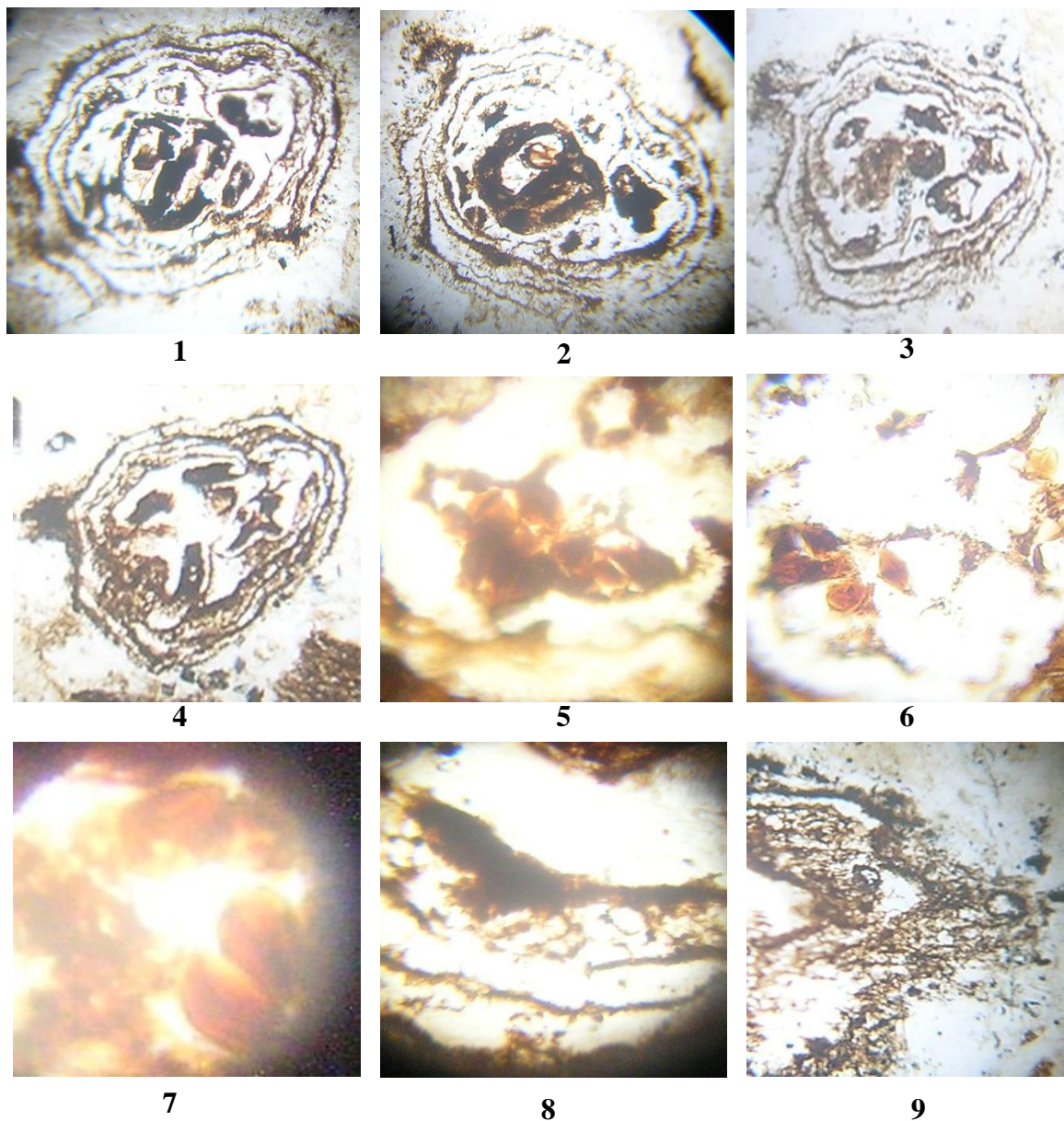
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### PLATE FIGURES



#### **Explanation of Plate Figures :-**

- 1- 4 - Various stages of Flower in T. S. exposed on fossiliferous chert.
- 5-6- Anther in T. S. with Pollen grains
- 7- Pollen Grains Magnified .
- 8- Ovary in T.S. with immature ovule magnified.
- 9- Perianth lobe showing cavities.