

# Further contribution to the knowledge of *Chitaleypushpam mohgaoense* Paradkar

P.S. KOKATE<sup>1</sup>, G.V. PATIL<sup>2\*</sup>, E.V. UPADHYE<sup>1</sup> AND O.S. SARATE<sup>3</sup>

<sup>1</sup>Department of Botany, Shri Shivaji Science College, Akola, India.

<sup>2</sup>Vyankat Smriti, Pawanskar Layout, Tope Nagar, Camp, Amravati, India.

<sup>3</sup>Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226 007, India.

\*Corresponding author

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## ABSTRACT

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This paper deals with the investigation of the petrified flower *Chitaleypushpam mohgaoense* Paradkar and redescribes the flower in as much detail as possible. The present petrified flower was collected from well known fossiliferous locality Mohgaonkalan, M.P., India, where Deccan Intertrappean beds are exposed. The previous diagnosis of the genus and the species is emended. The additional characters of *Chitaleypushpam* are especially about structure of carpels. In the present fossil flowers gynoecia are seven carpelled and nine carpelled in Specimen-A and Specimen-B, respectively. Besides this, in cross section the ovary reveals stellate structure. From the above discussion it is clear that present fossil flowers closely resemble *Chitaleypushpam mohgaoense* Paradkar in many characters and hence are placed under the same genus and species with emended diagnosis.

**Key-words**—Deccan Intertrappean, Angiosperms, Flower, Lythraceae.

## चितालेपुष्पम मोहगाओंस पराडकर के ज्ञान में और योगदान

पी.एस. कोकाटे, जी.वी. पाटिल, ई.वी. उपाध्ये एवं ओ.एस. सराटे

## सारांश

यह शोध-पत्र अश्मीभूत पुष्प चितालेपुष्पम मोहगाओंस पराडकर के अन्वेषण संबंधी है तथा पुष्प के ज़्यादा से ज़्यादा संभव वर्णन को पुनःवर्णित करता है। वर्तमान अश्मीभूत पुष्प सुप्रसिद्ध जीवाश्ममय उपबस्ती मोहगाँवकलाँ, मध्य प्रदेश, भारत से संगृहीत किया गया था जहाँ दक्कन अंतःट्रेपियन संस्तरें अनावरित हैं। वंश एवं जाति का पूर्व निदान संशोधित किया गया है। चितालेपुष्पम के अतिरिक्त अभिलक्षण विशेषतः अंडप की संरचना के बारे में हैं। मौजूदा पुष्प जीवाश्म में क्रमशः प्रतिदर्श ए व प्रतिदर्श बी में जायांगीय सात अंडप में एवं नौ अंडप में हैं। इसके अलावा, अंडाशय अनुप्रस्थ परिच्छेद में ताराकार संरचना उद्घाटित करता है। उपर्युक्त विवेचन से स्पष्ट है कि मौजूदा पुष्प जीवाश्म चितालेपुष्पम मोहगाओंस पराडकर से कई अभिलक्षणों में मिलते-जुलते हैं अतः संशोधित निदान सहित उसी वंश एवं जाति के अंतर्गत निर्धारित किए गए हैं।

**संकेत-शब्द**—दक्कन, अंतःट्रेपियन, आवृतबीजी, पुष्प, लीथेरेसी।

## INTRODUCTION

Intertrappean exposures at Mohgaonkalan, in the Deccan India, are very rich in fossil flora. *Sahnianthus parijai* Shukla (1944) was the first flower to be described from this area. Later, Shukla (1948) reported a new petrified flower named *Sahnipushpam*

from fossiliferous cherts of Mohgaonkalan. Its detailed description was given by Prakash (1955) under the name *S. glandulosum* and Verma (1956) under the name *S. shuklai*. These workers described the same flower, unknowingly, more or less at the same time (but the publications came out on different dates). Further re-investigation on *S. shuklai* was

done by Ambwani *et al.* (2001). *Sahnianthus parijai* was also further reinvestigated by Chitaley (1950, 1955).

In addition to above dicotyledonous flowers some other flowers like *Chitaleypushpam mohgaense* Paradkar (1971), *Deccananthus savitrii*, Chitaley and Kate (1974), *Raoanthus intertrappea* Chitaley and Patel (1975), monocot inflorescence Lakhanpal *et al.* (1982) are also known. Bonde and Kumaran (1993) reported a liliaceous inflorescence and Bonde (1996) recorded a palm rachilla *Arecoideostrobilus moore* from the Deccan Intertrappean beds. A few years back, unisexual flowers *Flosofemina intertrappea* (female flower) and *Flosovirulis deccanensis* (male flower) were reported by Kar *et al.* (2003).

### MATERIAL AND METHODS

The present fossil flowers were preserved in black cherts and are exposed in oblique transverse plane. These specimens were studied after breaking and cutting the chert. The serial sections were taken by peel method after etching cherts with hydrofluoric acid. The specimens studied have been deposited in the Department of Botany of Shri Shivaji College of Arts, Commerce and Science, Akola (Maharashtra).

### DESCRIPTION

The anatomical details of present fossil flowers are given below:

#### Fossil flower Specimen-A

The present fossil is well preserved. The size of flower is 1.89 mm in diameter when measured in cross section. The flower is bracteate, bracteolate, with only one whorl of perianth. It is gamophyllous. It is bisexual with four epiphyllous stamens arranged in one whorl, anthers ditheous, showing dehiscence and gynoecium is heptacarpellary and syncarpous (Fig. 1.1-6; Pl. 1.1-3).

**Bract**—The bract is single, present at the base of flower (Fig. 1.6; Pl. 1.1). The size of bract is 426  $\mu\text{m}$ . The bracteoles are two in number, one is 187  $\mu\text{m}$  and other is 227  $\mu\text{m}$  in length.

**Perianth**—Perianth is monochlamydous, gamophyllous and valvate in nature showing oval outline (Fig. 1.1-6; Pl. 1.1-3). Perianth is 135  $\mu\text{m}$  to 246  $\mu\text{m}$  in thickness. Its thickness varies along the periphery. Epidermis on outer side consists of thick walled cells. The cells of perianth including epidermis are filled with dark brown contents of probably some pigments, showing petaloid nature. On inner side it is single layered with tangentially elongated parenchymatous cells. The inner outline of perianth in cross section shows bulges at places

indicating positions of stamens. The middle mesophyll is made up of parenchymatous tissue (Fig. 1.9; Pl. 1.4, 6, 9). It is difficult to determine the number of perianth members but in cross section of perianth four groups of vascular supply have been found which may suggest that four members of perianth are present. The details of vascular tissues are not seen because of ill preservation (Fig. 1.9; Pl. 1.9).

**Androecium**—The serial sections which were cut in some what oblique transverse plane show four stamens in epiphyllous condition (Fig. 1.1-6; Pl. 1.1-3). Stamens are arranged in one whorl, anthers are ditheous containing mature pollen grains in pollen sacs. In cross section of present flower, an epiphyllous condition is found. It has also been observed that the filaments are composed of some what thick walled, parenchymatous cells (Pl. 1.7).

**Anthers**—Anthers are four and there are two pollen sacs in each anther lobe. They vary between 80  $\mu\text{m}$  and 312  $\mu\text{m}$  in size and broader at the point of attachment. The anther wall consists of four layers, i.e. epidermis, endothecium, middle layer and tapetum. Outermost layer is epidermis which comprises small, elongated cells which are more or less isodiametric. Endothecial cells have banded thickenings. The middle layers are 3-5 and form a massive region of the anther. The innermost layer, the tapetum, lining pollen sac is uniseriate, tangentially elongated and may be glandular in nature. The size of pollen sac measures 60  $\mu\text{m}$  to 80  $\mu\text{m}$ . All the pollen sacs contain well preserved mature pollen grains (Fig. 1.10; Pl. 1.7). In some specimens two locules are seen open, suggesting the mode of dehiscence by longitudinal slits.

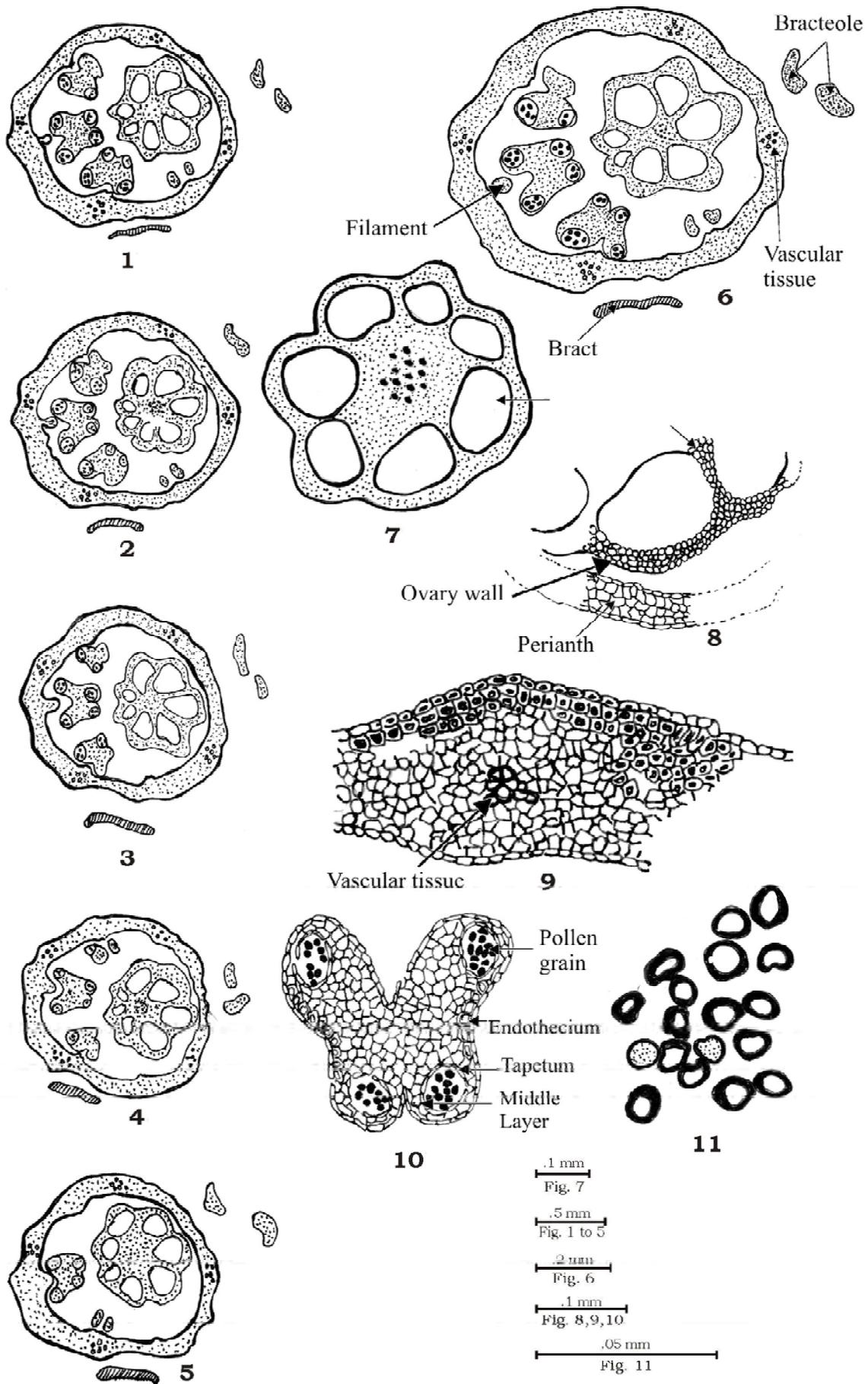
The pollen grains have been found *in situ* inside the anthers range 12  $\mu\text{m}$  to 19  $\mu\text{m}$  in size. They are small, spherical or boat-shaped with well defined exine (Fig. 1.11; Pl. 1.8).

**Gynoecium**—Gynoecium is heptacarpellary having 7 carpels, syncarpous. It measures about 750  $\mu\text{m}$  in diameter (Fig. 1.7; Pl. 1.5). Ovary apparently seven loculed, deeply furrowed opposite the septa. The ovary wall is 5-6 celled thick measuring 49  $\mu\text{m}$ . The outermost layer of ovary consists of isodiametric parenchymatous cells. The locules are variable in size. The largest locule is 200  $\mu\text{m}$  in diameter and the smallest locule is 120  $\mu\text{m}$ . The cells of septa are also small isodiametric and parenchymatous (Fig. 1.8; Pl. 1.6). The ovary is stellate with seven angles. Seven septae reach the centre of the ovary from seven furrows of ovary wall. From the number of septa in the ovary, the number of carpels can be determined, which appear to be seven. Hence, the ovary is heptalocular. The placentation appears axile because of the septae. The central part of ovary is 340  $\mu\text{m}$  in size. The stigma and style are not seen (Fig. 1.7; Pl. 1.1-5).

Fig. 1—*Chitaleypushpam mohgaense* Paradkar, Specimen-A

1-5. Serial cross sections of a flower from the apex downwards. 6. Enlarged cross section of a flower showing bract and two bracteoles. 7. Cross section of ovary showing seven locules with central differentiated cells. 8. Cross section of ovary wall and septum with perianth. 9. Cross section of perianth wall with vascular tissue. 10. Detailed structure of anther showing pollen sac and pollen grain. 11. Pollen grains.





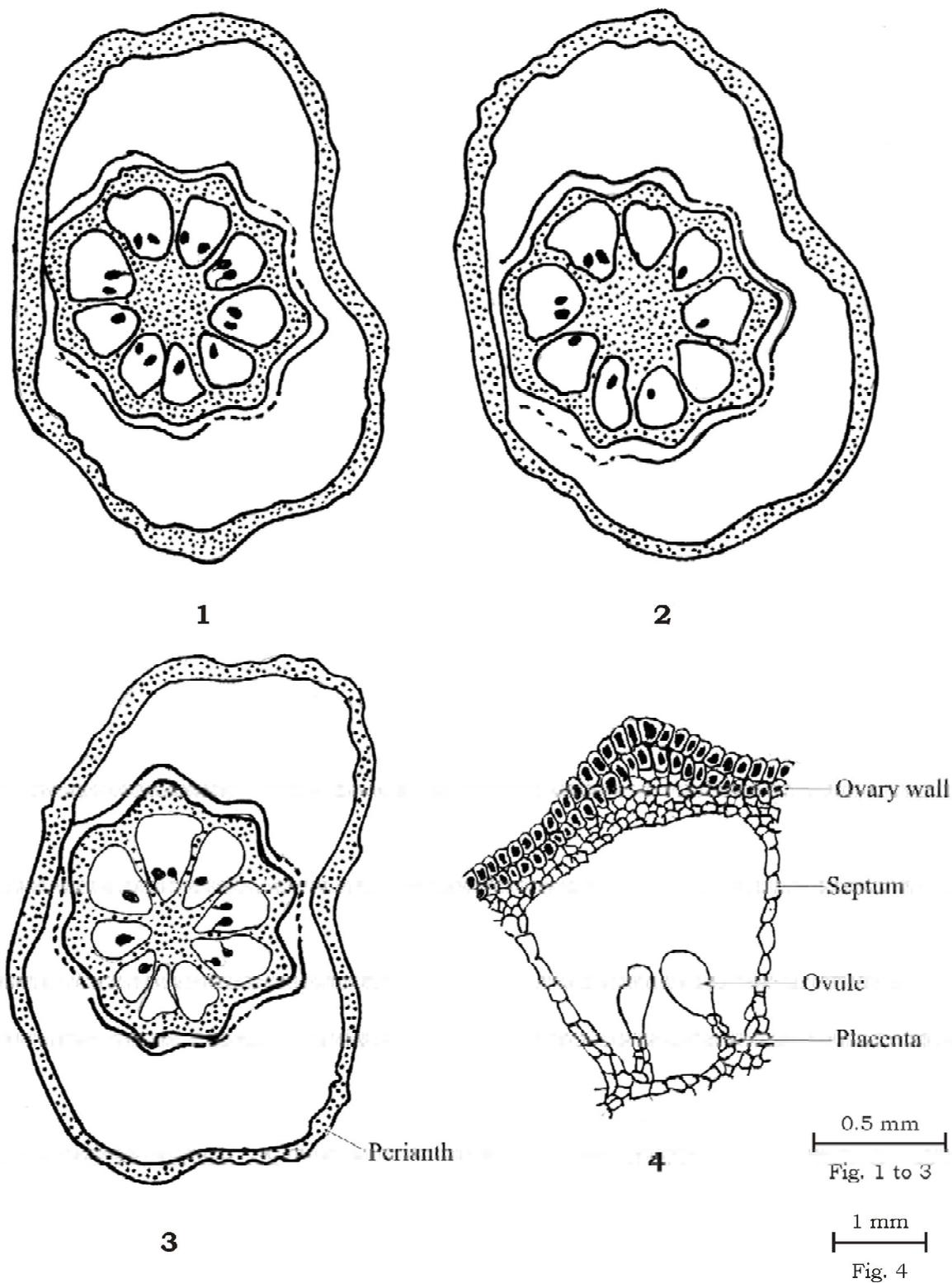


Fig. 2—*Chitaleypushpam mohgaense* Paradkar, Specimen-B  
1-3. Serial cross sections of flower showing nine locular ovary with two ovules in each locule. 4. Cellular details of ovary showing ovary wall, septum and ovules.

Characters	<i>Chitaleypushpam mohgaense</i> (Paradkar, 1971)	Present flower Specimen-A	Present flower Specimen-B
<i>Bract</i>	Not seen	Present	Not seen
<i>Stalk</i>	Present	Not seen	Not seen
<i>Bracteoles</i>	Present	Present	Not seen
<i>Size</i>	2.5 mm	1.89 mm	2.133 mm
<i>Symmetry</i>	Actinomorphic	Actinomorphic	Actinomorphic
<i>Perianth</i>	One whorl, 7, united, valvate	One whorl, 4, united valvate	One whorl, 4, united valvate
<i>Sex</i>	Bisexual	Bisexual	Bisexual
<i>Androecium</i>	7, epiphyllous	4, epiphyllous	Not seen
<i>Anthers</i>	Dorsifixed, 0.70 mm long	Dorsifixed, 0.31 mm long	--
<i>Dehiscence</i>	Longitudinal	Longitudinal	--
<i>Loculi</i>	4	4	--
<i>Pollen grains</i>	12-15 x 19-20 $\mu$ m, tricolporate	12-19 $\mu$ m, spherical or boat-shaped	--
<i>No. of loculi in Gynoecium</i>	5	7	9
<i>Shape in T. S.</i>	5 angular	7 angular	9 angular
<i>Placentation</i>	Axile	Axile	Axile
<i>Ovules</i>	2 rows in each loculus	Not seen	2 rows in each loculus

Fig. 3—Table showing comparison of flower Specimens A and B with *Chitaleypushpam mohgaense*.

#### Fossil flower Specimen-B

The second fossil flower exposed in transverse plane is also found well preserved in the other black chert. The flower is 2.133 mm in diameter in cross section. The flower is dicotyledonous, bisexual, actinomorphic, monochlamydous, gamophyllous. Stamens are not well preserved. Gynoecium is nine carpellary and syncarpous, ovary is nine locular and angular, two ovules are present in each locule in axile placentation (Fig. 2.1-3; Pl. 2.1).

*Perianth*—Perianth is monochlamydous, gamophyllous with valvate aestivation. The outline is oval. The thickness of perianth is 90  $\mu$ m which varies along its periphery. The outermost epidermal layer of perianth consists of thick walled cells, having brownish content (Fig. 2.3; Pl. 2.6). The epidermal layer is followed by parenchymatous tissue which is somewhat elongated and compact. The innermost layer of perianth is lined by simple isodiametric cells. The vascular supply in the perianth is not traced well, but seems to be four in number which indicates four perianth members in the flowers.

*Androecium*—In cross section of flowers the androecium structure is not seen properly which indicates that section of the flowers could have been taken from the base of the flower.

*Gynoecium*—Gynoecium is nine carpellary, syncarpous. It measures 1.120 mm in diameter. In transverse section it is revealed that the ovary contain nine locules (Fig. 2.1-3; Pl. 2.2). The ovary wall is divided into two regions. The cells of outer region are thick walled and of inner region are thin walled, parenchymatous. The epidermal cells are tangentially elongated. Just below the epidermis there are few layers of dark brown rectangular cells (Fig. 2.4; Pl. 2.3, 5). These are followed by polygonal parenchymatous thin walled cells. The vascular supply in ovary wall is not seen.

The ovary has nine locules formed by nine septae measuring 220  $\mu$ m in length reaching the centre of ovary from nine furrows of ovary wall. The septae are very thin and mostly uniseriate in nature. The cells of septae are elongated and rectangular. The ovary is stellate with 9 locules. The largest locule measures 380  $\mu$ m in size while smallest locule is 160  $\mu$ m in size. In each locule there are two ovules which are attached to placenta by funicle. The size of ovule is about 88  $\mu$ m. The ovules seem to be orthotropous with short funicle. The placentation is axile. The central part of ovary is cylindrical, about 306  $\mu$ m in diameter. The vascular supply in central part of ovary is not seen (Fig. 2.3, 4; Pl. 2.3, 4).

The ovary is surrounded by thin membranous structure which is also angular and is 1-2 celled in thickness. This structure may be hypanthium present as in case of family Lythraceae (Fig. 2.1-3; Pl. 2.2, 3).

### DISCUSSION AND COMPARISON

The present fossil flowers show a single whorl of perianth which is comparable with the class Monochlamydae, Bentham and Hooker (1862-83). These fossil flowers show affinities with the flowers of Rhizophoraceae, Samydaceae, Sonneratiaceae and Lythraceae Gamble (1957). In Rhizophoraceae the calyx is adnate to the ovary which is 2-5 celled or 1 celled by suppression of septa which are not seen in present fossil flowers. In Samydaceae, calyx is sometimes adnate to the ovary which is one celled having parietal placentation, while in present fossil flower placentation is axile. In family Sonneratiaceae the stamens are indefinite, ovary many celled and adnate to calyx Gamble (1957); these features are not seen in present fossil flowers. The family Lythraceae shows close similarities with present flowers. *Chitaleypushpam* flower Paradkar (1971) was compared with living genera like *Ammania*, *Woodfordia*, *Lagerstroemia* in having small sized flowers. It is observed that pollen grains of *Ammania* are very small in size, i.e. 12 x 15 µm, while *Woodfordia* has 18 x 20 µm sized pollen grains. *Lagerstroemia* pollen grains are 32 x 54 µm in size with clear exine stratifications. The pollen grains of present fossil flower "A" are thus somewhat comparable with lythraceous pollen. Some other genera of Lythraceae also show similarities with the present fossil flower in having monochlamydous perianth, the number of stamens as many as members of perianth, epiphyllous stamens and ovary with axile placentation and numerous ovules. Fossil flower Specimen-B shows similarity with flowers of family Lythraceae in having axile placentation with 2 ovules in each locule. However, the presence of seven and nine carpellary gynoecium in present fossil flowers is not seen in family Lythraceae. In the same family gynoecium is characterized by 2-6 carpels. The presence of multilocular ovary with thin septa like fossil flower B is seen in family Sonneratiaceae Hooker (1879).

It is thus seen that the present fossil flowers though similar to the flowers of Lythraceae in some characters, are still different from them. Therefore, they may belong to an extinct

dicotyledonous family which shows relationship with the family Lythraceae.

*Comparison with fossil flowers*—The present flowers are compared with *Sahnipushpam shuklai* Verma, 1956 syn. *S. glanulosum* Prakash (1955) which is bisexual, monochlamydous, usually quadrangular in cross section, gamophyllous, with probably four stamens (as presence of stamens are in poor condition), 4 celled anthers, longitudinal dehiscence, syncarpous gynoecium and 5 to 6 carpels having glands on external surface of ovary (Chitale, 1964; Prakash & Jain, 1964). The present specimens differ from it in not only having glands on the external surface of ovary but also in size of the flower. Moreover, outline of ovary is circular in *Sahnipushpam*, whereas, it is 7 and 9 angular in the present flowers. After further reinvestigation of *Sahnipushpam shuklai* by Ambwani *et al.* (2001) from Deccan Intertrappean sediments of M.P., it is interpreted as the female flower with post fertilized ovary in various stages of fruit formation.

When compared with *Sahnianthus parijai* Shukla (1944) and Chitale (1950, 1955), it shows some similar characters, but it differs in many characters like size of perianth, number and position of stamens, number of carpels, absence of nectary, etc. Similarly, its angular ovary is very much different from the rounded or circular outline in *Sahnianthus parijai*.

*Deccanianthus savitrii* Chitale and Kate (1974) in having tricarpellary syncarpous ovary with two whorls of perianth is different from present flower.

*Raoanthus intertrappea* Chitale and Patel (1975) shows similarity with the present fossil flower Specimen-A, in having seven carpels, but differs in number of stamens.

The present fossil flowers show close similarities with *Chitaleypushpam mohgaense* Paradkar (1971) in having bracteate, bracteolate, bisexual, monochlamydous and actinomorphic flowers. They also show similarity in the nature and structure of stamens and carpels. The stamens are as many as the members of perianth, epiphyllous, anthers 2-lobed and four locular. The pollen grains are *in situ*, small, spherical or boat-shaped and separate (not in tetrads). This comparison is given in Fig. 3.

Further contributions made to knowledge of *Chitaleypushpam mohgaense* Paradkar are based on the study of two different specimens of fossil flowers. The additional characters of *Chitaleypushpam* are specially about the structure of carpels. In the present fossil flowers gynoecia

### PLATE 1

*Chitaleypushpam mohgaense* Paradkar, Specimen-A



- |  |  |
|--|--|
| 1. Cross section of flower with bract. x 20.                                   | 5. Transverse section of ovary showing seven locules. x 100.               |
| 2. Enlarged cross section of flower showing anthers and ovary. x 40.           | 6. Cross section showing ovary wall and perianth. x 100.                   |
| 3. Cross section of whole flower. x 20.  | 7. Transverse section of complete anther lobe with filament tissue. x 100. |
| 4. Cross section of ovary wall showing thick walled cells on outer side. x 40. | 8. Pollen grains. x 400.   |
|  | 9. Perianth with vascular tissue. x 100.                                   |

Abbreviations: a-anther; b-ovary; c, d & e-ovary wall; f-perianth; g-anther lobe; h & i-pollen grains; j-vascular tissue.

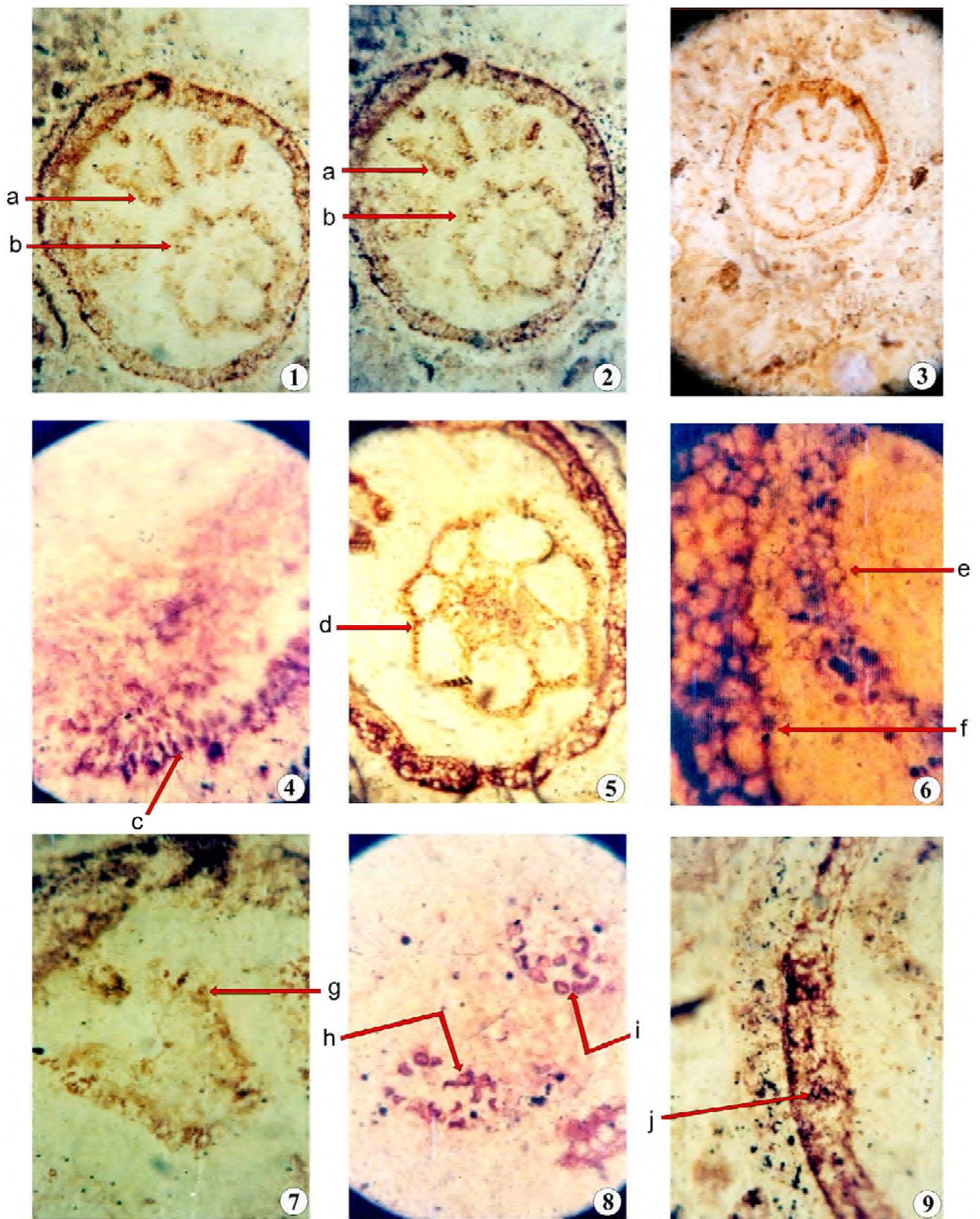


PLATE 1

are seven carpelled and nine carpelled in Specimen-A and Specimen-B, respectively. In addition to this, in cross section, the ovary reveals stellate or angular structure with septae reaching the centre of the ovary from furrows of ovary wall instead of angles as in case of *Chitaleypushpam mohgaoense*. The septa in the ovary are very thin and non-seriate in fossil flower Specimen-B. In the same specimen the other interesting character is the presence of a thin covering around the ovary, which may be interpreted as hypanthium as in the case of *Sahnipushpam* Prakash and Jain (1964). This covering is also present in the genera of family Lythraceae.

From the above discussion it is clear that the present fossil specimens resemble closely in many characters with *Chitaleypushpam mohgaoense* Paradkar (1971) and hence, they are placed under *Chitaleypushpam mohgaoense* Paradkar.

#### Extended diagnosis of *Chitaleypushpam mohgaoense*, Paradkar

Flower dicotyledonous, bisexual, actinomorphic, monochlamydous, gamophyllous, androecium epiphyllous, 4 stamens in single whorl, pollen grains boat or spherical in shape and mature, gynoecium 5 to 9 carpellary, syncarpous, ovary angular with axile placentation, two ovules in each locule. Flower bisexual, monochlamydous, actinomorphic, size 1.89 x 2.133 mm in cross section, perianth 4, oval in outline, gamophyllous, 90 µm in thickness with poorly developed vascular tissue, stamens 4, epiphyllous, bilobed, 4-locular, anther size 180 µm to 312 µm, pollen sac 60-80 µm in size, pollen grains 12 µm to 13 µm in diameter, exine well developed, gynoecium 7 to 9 carpellary, syncarpous, ovary 750 µm to 1120 µm in diameter, locules 7 to 9, largest locule 200 µm to 380 µm and smallest locule 120 µm to 160 µm in size, ovules two in each locule measuring 88 µm, septae seven to nine, 220 µm in length, central part measuring 306 µm to 340 µm in diameter, nectary absent.

*Figured Specimen*—MOH/PSK/ANG-FLW-I

*Locality*—Mohgaonkalan, District Chhindwara, M.P., India.

*Horizon*—Deccan Intertrappean beds.

*Age*—Maastrichtian-Early Palaeogene.

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#### REFERENCES

- Ambwani K, Kar RK & Sahni A 2001. Reinvestigation of *Sahnipushpam shuklai* from Deccan Intertrappean beds of Madhya Pradesh, India. *Ameghiniana* 38: 393-398.
- Bentham G & Hooker JD 1862-83. The evolution and classification of seed plants. *Genera Plantarum* Vol. 1-3. London.
- Bonde SD 1996. *Arecoideostrobus moorei* gen. et sp. nov. – a palm rachilla from the Deccan Intertrappean beds of India. *Palaeobotanist* 43: 102-109.
- Bonde SD & Kumaran KPN 1993. A liliaceous inflorescence from the Deccan Intertrappean beds of India. *Current Science* 65: 776-778.
- Chitale SD 1950. Fossil flower from the Mohgaonkalan beds of Chhindwara, C.P., India. *Science & Culture*: 446-447.
- Chitale SD 1955. A further contribution to the knowledge of *Sahnianthus*. *Journal of the Indian Botanical Society* 34: 121-129.
- Chitale SD 1964. Further observation of *Sahnipushpam*. *Journal of the Indian Botanical Society* 43: 69-74.
- Chitale SD & Kate UR 1974. *Deccananthus savitrii* a new petrified flower from the Deccan Intertrappean beds of India. *Palaeobotanist* 21: 317-320.
- Chitale SD & Patel MZ 1975. *Raoanthus intertrappea* - A new petrified flower from India. *Palaeontographica* 158B: 141-149.
- Gamble JS 1957. (Rep. Ed.). *The Flora of the Presidency of Madras III: 1347-2017*.
- Hooker JD 1879. *The Flora of British India*. II. L. Reeve & Co. Ltd., NR. Ashford, Kent, England.
- Kar RK, Ambwani K, Sahni A & Sharma P 2003. Unisexual flowers from the Deccan Intertrappean bed of Madhya Pradesh, India. *Palaeobotanist* 52: 73-79.
- Lakhanpal RN, Prakash U & Bande MB 1982. A monocotyledonous inflorescence from the Deccan Intertrappean beds of India. *Palaeobotanist* 30: 316-324.
- Paradkar SA 1971. *Chitaleypushpam mohgaoense* gen. et sp. nov. from the Deccan Intertrappean beds of India. *Palaeobotanist* 20: 334-339.
- Prakash U 1955. On the structure and affinities of *Sahnipushpam glandulosum* sp. nov. from the Deccan Intertrappean series. *Palaeobotanist* 4: 91-100.
- Prakash U & Jain RK 1964. Further observation on *Sahnipushpam shuklai*. *Palaeobotanist* 12: 128-140.
- Shukla VB 1944. On *Sahnianthus* a new genus of petrified flower from Intertrappean beds of Mohgaonkalan and its relation with fruit *Enigmocarpon parijai* Sahni from the same locality. *Proceedings of the National Academy of Sciences, India* 14: 1-39.
- Shukla VB 1948. *Palaeobotany in India - IV*. *Journal of Indian Botanical Society* 26: 258-259.
- Verma JK 1956. On a new petrified flower *Sahnipushpam shuklai* sp. nov. from the Intertrappean beds of Mohgaonkalan in the Deccan. *Journal of the Palaeontological Society of India* 1: 131-141.

#### PLATE 2

*Chitaleypushpam mohgaoense* Paradkar, Specimen-B



1. T.S. of flower with nine locular ovary. x 20.
2. Enlarged ovary showing hypanthium like structure. x 40.
3. Ovary with nine locules and central part. x 40.
4. Magnified ovary showing two ovules and septum. x 100.
5. Magnified ovary wall. x 100.
6. Cellular details of perianth and ovary wall. x 100.
- 7-8. Pollen grains of Specimen-A showing detailed structure. x 400.

Abbreviations: k-enlarged ovary; l-ovary wall; m-central part of the ovary; n-septum; o-ovule; p-magnified ovary wall; q-perianth; r-ovary wall.

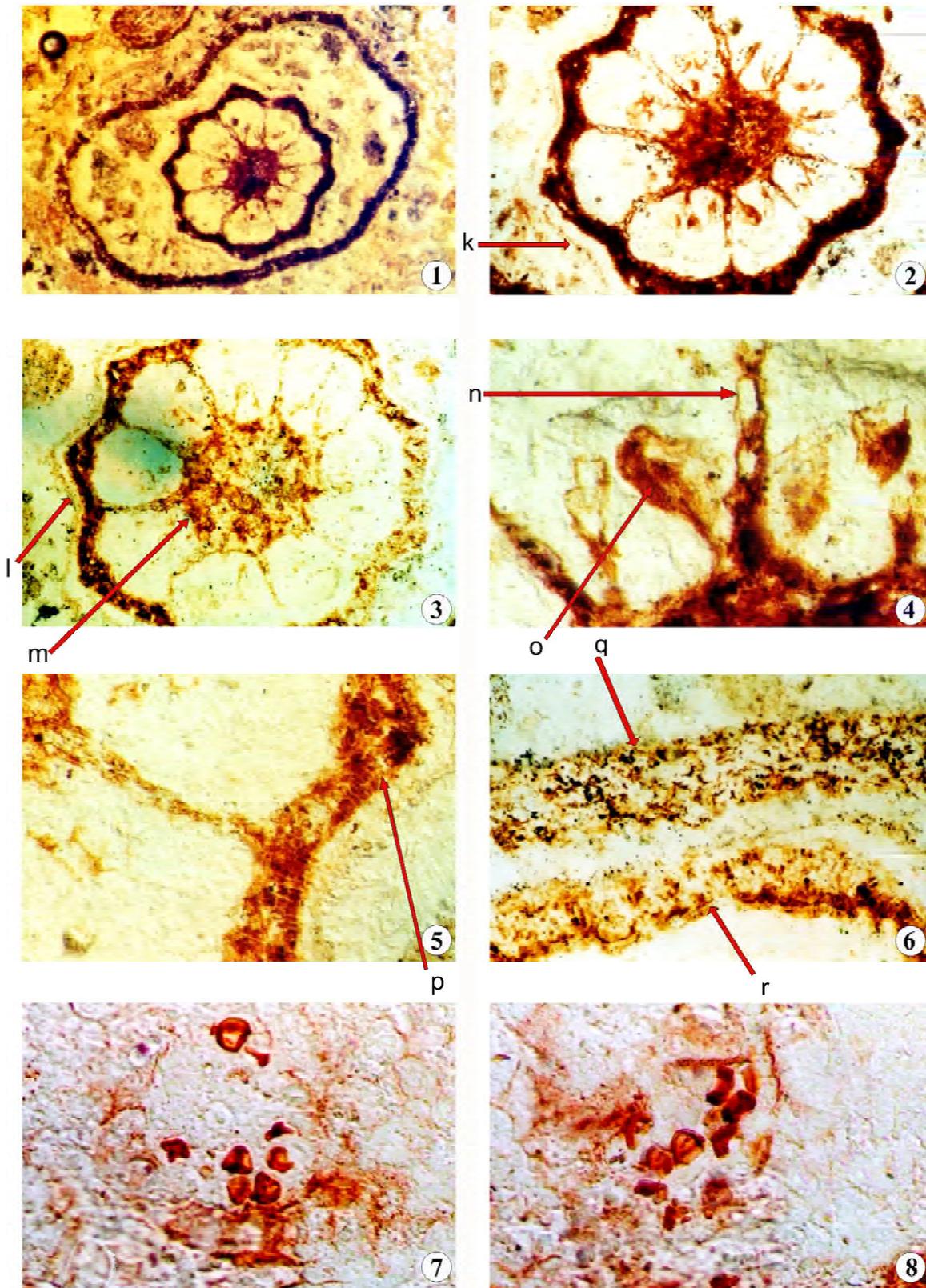


PLATE 2