Palynofossils from Pachmarhi Formation, Satpura Basin, Madhya Pradesh

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Key-words– Palynology, Triassic, Pachmarhi Formation, Satpura basin.

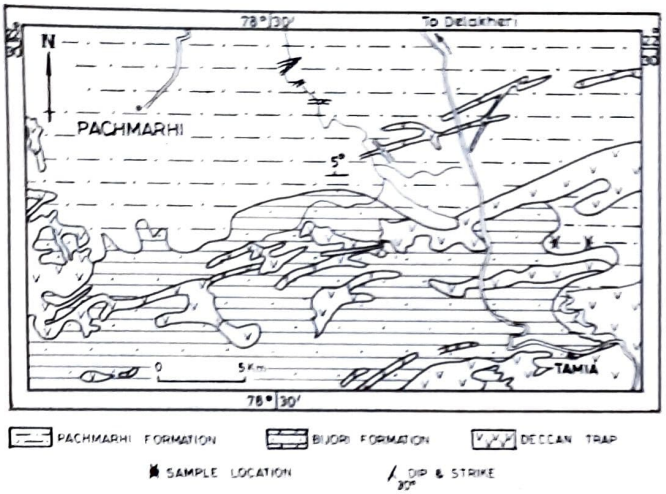
MEDLICOTT (1873) divided the Mahadeva Series of Satpura basin into three Stages viz. Pachmarhi Sandstone (lower), Denwa Clays (middle) and Bagra Conglomerates (upper). Crookshank (1936) stated that the southern boundary of the Pachmarhi Formation extended upto the Tamia cliff. Sastry *et al.* (1977) suggested gradational conformable contact with the overlying Denwa clays and are of late Lower Triassic to Middle Triassic in age. Raja Rao (1983) described the geology of coalfields of Satpura basin.

The record of plant fossils are very scanty as well as the fauna too. This is the first palynological record from the Pachmarhi Formation exposed at Tamia cliff, "near Chota Mahadeva scarp" (22° 21′: 78° 40′) in Satpura basin. The basal buff coloured clays are the source of this palynofloral communication.

Stratigraphic succession described by Raja Rao (1983) is given below:

Age	Formation	Lithology(thickness)
Recent	Alluvium	Basalt.
Upper Cretaceous to Eocene	Deccan Traps Basic flows, dykes and sills	
Upper Cretaceous	Lameta	Conglomerates, limestones and clays.
Lower Cretaceous	Jabalpur	Massive sandstones with jasper, conglomerates, white clays, red clays, carbonaceous shales and coal lenses (50-100 m)
.....	Unconformity	.....
Rhaetic?	Bagra	Predominantly coarse conglomerates with bands of calcareous sandstones, variegated clays, limestone and dolomite (180-240m).
.....	Unconformity	.....
Upper part of Lower Triassic to Middle Triassic	Denwa	Soft variegated clays interbedded with sandstone bands, conglomeratic at places (about 350m).
Lower Triassic	Pachmarhi	White coarse-grained cross bedded sandstones with lenses of subangular quartz pebbles (about 750m)
Permian	Bijori	Micaceous, flaggy sandstones and shales at places micaceous (180-250 m)
	Motur	Buff green and variegated clays with coarse to very coarse grained sandstones (about 600m)

Palynological composition - Some significant palynofossils are listed below with asterisk marked as : *** dominant forms (20-30% and above), (**) subdominant (10-20 %), (*) as common (between 5 and 10%) and (+) below it regarded as Fair/Poor (1-5%) form of the assemblage. Unmarked taxa are rare in the assemblage.



Falcisporites minutosaccus Kumaran & Maheshwari 1980.

(***) *F. snopkovae* Visscher 1966.
F. nuthalensis (Clarke) Balme 1970 (Pl. 1, fig. 8).

Satsangisaccites nidpurensis Bharadwaj & Srivastava 1969. (Pl. 1, fig. 15)

(**) *S. triassicus* Bharadwaj & Srivastava, 1969.
S. royii Bharadwaj & Srivastava, 1969.
Nidipollenites monoletus Bharadwaj & Srivastava, 1969 (Pl.1, fig.13).

(*) *Alisporites indicus* Bharadwaj & Srivastava, 1969.
A. ovalis Kumar, 1973.

(*) *Chordasporites australiensis* de Jersey 1962 (Pl. 1, fig.9)

(*) *Klausipollenites schaubergeri* (Potonié, & Klaus) Jansonius, 1962 (Pl.1, fig.5).
K.staplinii Jansonius, 1962.

(+) *Platysaccus queenslandii* de Jersey 1962.

(+) *Podocarpidites vermiculatus* Kumar 1973.
P. grandis Sah & Jain, 1965.

Scheuringipollenites maximus (Hart) Tiwari 1973.
S. triassicus (Bharadwaj & Srivastava) Kumar (MS) (Pl, 1, fig. 2.)

(+) *S. royii* (Bharadwaj & Srivastava)Kumar (MS)

(*) *Lunatisporites gopadensis* Bharadwaj & Srivastava, 1969
Lueckisporites crassus Sinha 1972.

(+) *Crescentipollenites fuscus* (Bharadwaj) Bharadwaj, Tiwari & Kar, 1974 (Pl. 1, fig. 16).

(**) *Striatopodocarpites dubrajpurensis* Tripathi, Tiwari & Kumar, 1990 (Pl. 1, fig. 17)
S. nidpurensis Bharadwaj & Srivastava, 1969 (Pl.1,fig.3)

Faunipollenites varius Bharadwaj 1962.
F. bharadwajii Maheshwari 1967

(+) *F. parvus* Tiwari 1965.
F. *gopadensis* Bharadwaj & Srivastava, 1969.
Strotersporites Wilson 1962.

Corisaccites alutas Venkatachala & Kar 1966 (Pl.1, fig. 14)

(+) *Goubinispora morandavensis* (Goubin) Tiwari & Rana 1980.

G. (Trochosporites) sp. Bharadwaj & Srivast. 1969 (Pl.1, fig.6)

(*) *Striatites solitus* Bharadwaj & Salujha, 1964.

S. sidhiensis Bharadwaj & Srivastava 1969 (Pl. 1, fig.10)

Plate 1

Magnified ca 500x from unretouched negatives, Coordinates given in parenthesis, Leitz Laborlux D Trinocular Microscope has been used. Slides are in repository of BSIP. Vide St No. 856.

1. *Densipollenites densus* Film. No. 138/24, BSIP. Sl. No. 11270, (29x111).
2. *Scheuringipollenites triassicus* Film No. 138/20, BSIP, Sl. No. 11270. (32.5 x 111.5)
3. *Striatopodocarpites nidpurensis* Film No. 138/16, BSIP, Sl, No. 11270 (34.5 x 172.5
4. *Guttulapollenites hannonicus*, Film No. 138/36, BSIP. Sl. No 11270. (11 x 111)
5. *Klausipollenites schaubergeri*, Film No. 138/9, BSIP. Sl. No. 11270 (47 x112).
6. *Goubinispora* sp., Film No. 138/15, BSIP. Sl. No. 11270 (41 x 112).
7. *Playfordiaspora cancellosa*, Film. No. 303/36, BSIP. Sl. No. 11271(30 x 110).
8. *Falcisporites nuthalensis*, Film No. 138/30, BSIP. SL. No. 11270 (15 x 111.5)
9. *Chordasporites australiensis*, Film No. 138/2, BSIP. Sl. No. 11270 (16 x 114).
10. *Striatites sidhiensis*, Film No. 138/31, BSIP. Sl. No. 11270 (15 x 111.5).
11. *Callumispora gretensis*, Film No. 138/29, BSIP. Sl.No. 11270 (15 x 111.8).
12. *Osmundacidites pilatus*, Film No. 138/26, BSIP SL. No. 11270 (27 x 111.7).
13. *Nidipollenites monoletus*, Film No. 138/22, BSIP Sl. No. 11270 (30 x 111.5).
14. *Corisaccites alutas*, Film. No. 138/17, BSIP Sl.No. 11270 (31.5 x 112.5).
15. *Satsangisaccites nidpurensis*, Film No. 138/34, BSIP Sl. No. 11270 (8 x 109.5).
16. *Crescentipollenites fuscus*, Film No. 138/21, BSIP. Sl. No. 11270 (31.5 x 111.5).
17. *Striatopodocarpites dubrajpurensis*, Film No. 138/3, BSIP Sl. No. 11270 (29 x 113.5).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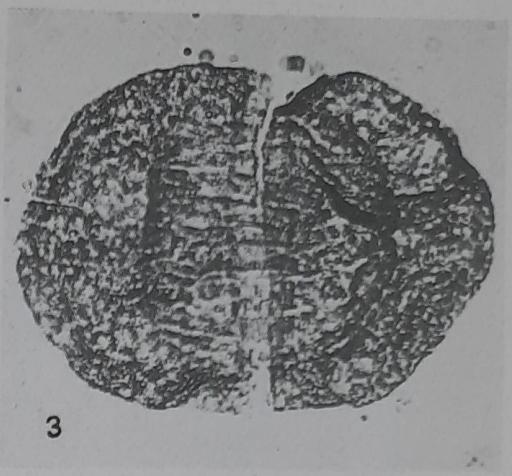
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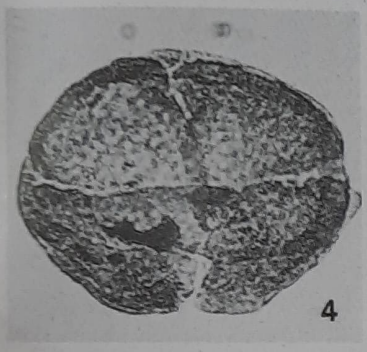
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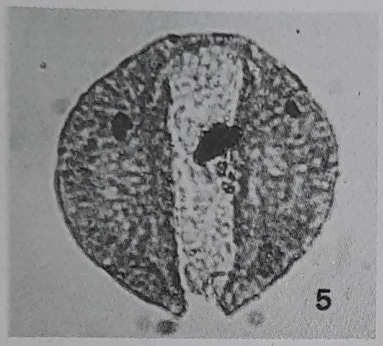
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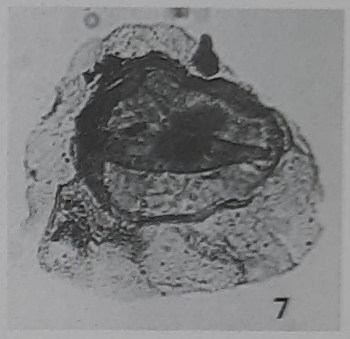
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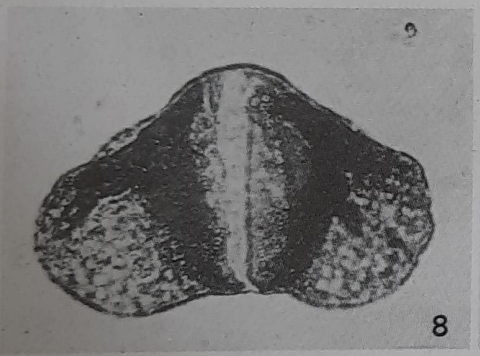
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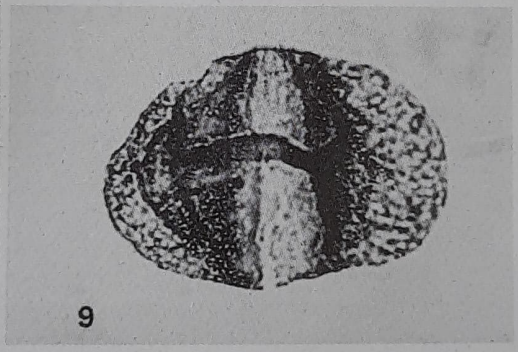
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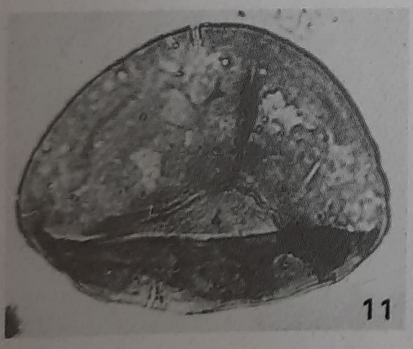
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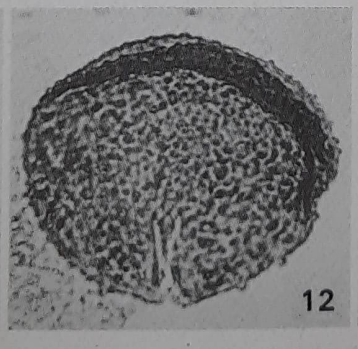
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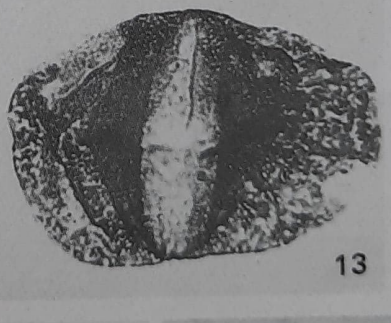
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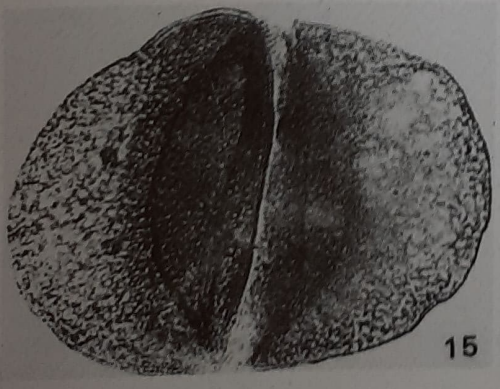
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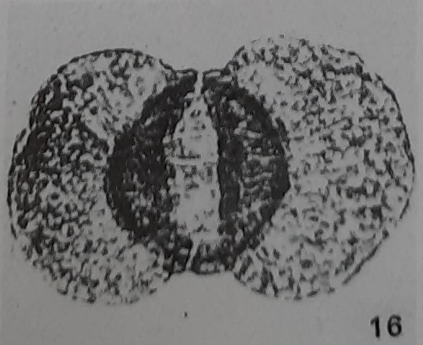
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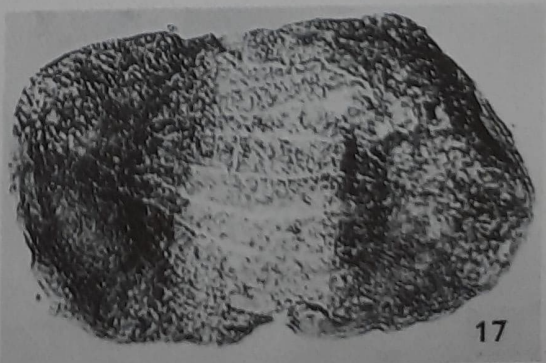
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PLATE 1

Verticipollenites finitimus Bharadwaj & Salujha 1964

Distriatites insculptus (Playford & Dettmann) Bharadwaj & Srivastava, 1969.

(+) *Staurosaccites tharipatharensis* Maheshwari & Kumaran, 1979.

(+) *Tetrasaccus* sp.

Densipollenites densus Bharadwaj & Srivastava, 1969 (Pl.1, fig.1)

(**) *D. indicus* Bharadwaj & Srivastava, 1969.

D. invisus Bharadwaj & Srivastava, 1969.

Playfordiaspora cancellosa Maheshwari & Banerji, 1975 (Pl.1,fig,7)

P. annulata Tiwari & Rana 1980.

(+) *Guttulapollenites hannonicus* (Goubin) Venkatachala, Goubin & Kar, 1967. (Pl.1,fig.4)

Weylandites minutus Bharadwaj & Srivastava, 1969.

Osmundacidites pilatus Tiwari & Rana 1981 (Pl.1, fig.12)

Verrucosisporites bosei Maheshwari & Banerji 1975.

Callumispora gretensis (Balme & Hennelly) Bharad. & Srivast., 1969 (Pl.1,fig.11).

The playnoassemblage contains some older Lower Gondwana forms of Bijori Formation (Bharadwaj *et al.* 1978) viz. *Densipollenites, Callumispora, Scheuringipollenites, Verticipollenites, Striatopodocarpites, Lunatisporites, Lueckisporites, Corisaccites, Guttulapollenites, Weylandites, Trochosporites, Distriatites, Faunipollenites, Striatites.* etc. which are continued into the Pachmarhis. Some of younger forms described by Bharadwaj and Srivastava (1969), Tiwari and Ram-Awatar (1990,1992) from Nidpur Beds and Mahadeva Formation of South Rewa Basin; Tiwari *et al.* (1984), Tripathi *et al.* (1990) from Assemblage- A of Rajmahal Basin; Tiwari and Rana (1980, 1983, 1984), Singh and Tiwari (1982), Singh (1984) from Ranigani coalfield of Damodar Basin, Srivastava and Jha (1988, 1990) from Mailaram and Budharam areas in Godavari Graben, and Prasad and Jain (1994) from wells of Kommugudem and Mandapeta areas in Krishna-Godavari Basin are *Satsangisaccites, Falcisporites, Nidipollenites, Goubinispora, Chordasporites, Klausipollenites, Alisporites, Podocarpidites, Playfordiaspora, Osmundacidites,* etc are also present.

The overall palynoassemblage exhibits prominence of non-striated disaccates with haploxylonoid forms which are followed by striated disaccates and monosaccate elements. Plicates, taeneate and cavate-cingulate components are represented either as poor or rare, yet they are significant assemblage.

This palynoassemblage is tentatively assigned to Early Triassic in age and supports the view putforth by Raja Rao (1983) for Pachmarhi Formation.

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