An Imperfect Fossil Fungi *Dematosporites mahabaleii* from Central India

Kapgate V. D.[1]**and Wanjari M.H.**[2]
1-S.K.K. Arts, Commereand Science College,
Armori (Dist - Gadchiroli)
2-J.M.Patel college, Bhandara
E-mail: -mangeshawesome@gmail.com

Abstract:

This paper deals with fossil fungal spores with mycelium described from the Deccan Intertrappean Beds of Mohgaonkalan, Chindwara district, Madhya Pradesh, India. The fungus has Bicelled to 4-celled conidia with ostiole and mycelial cavities as that of family Dematiaceae viz., *Dematosporites mahabaleii*, found in petrified dicot leguminous fruit and leaf.

Keywords:
Dematiaceae, Fungi , Deccan Intertrappean, Mycellium. Central India.

Introduction:

Fungi are an important plant community but are much less represented as fossils. The fungal remains are generally encountered in palynological assemblages, petrified fossil material, coals, peats and lignites. Various fungal forms in the forms of mycelia or hyphae (Septate or aseptate), sexual and asexual spores and fruiting bodies of Ascomycetes, Basidiomycetes, Phycomycetes and Deuteromycetes have been reported from Deccan Intertrap since 1942 by several authers. Jain 1974 published a complete account on fossil fungi published till then. A present fungal remains described here belongs to Deuteromycetes (Imperfect fungi). Comparision with respective classes have been made to the reported fossil forms from the different horizons of Deccan Intertrap.

Material and methods:

The specimen have been search out from black silicified cherts, exposed in the field of locality Mohgaonkalan a small village of Chindwara district, M.P. Both part and counterpart are available. Peels have been taken by cellulose acetate peel technique for anatomical study and mounted on DPX mountant. For more details the respective stages are photographed and camera lucida diagrams have been drawn.

Systematic position-

Class : Deuteromycetes
Order : Moniliales
Family : Dematiaceae
Genus : *Dematosporites* gen. nov.
Type species : *Dematosporites mahabaleii*sp.nov.

Generic diagnosis-

Fungus parasite on dicot leguminous fruit and leaf; Ostiole, mycellial cavities and spore sacs are in pericarp of the fruit and mesophyll tissue of the leaf. Spore sacs containing Bicelled to 4-celled conidia, 11 to 30 µm insize, sessile on short conidiophores. Conidia deep brown to pale- yellow in colour with rich granular content. Exposures o.56 µm thick and smooth.

Result and discussion:

Discription-

Fruit and leaf are preserved associated on the same chert. Fruit splits into four pieces. Pericarp of the fruit and mesophyll tissue of the leaf heavily infected by the parasite. It is endogenously grown at various places. The parasite breaks fruit wall and formed few cup shaped cavities which open outside in the form of ostiole. Fibrous tissue of meso carp is destroyed by the parasite and forms few rounded cavities in which elongated septae of mycelium (Sterile hyphae) arranged in a circular manner to form mycelia cavities. Seeds are completely destroyed and seed cavities occupied by number of spore sacs with numerous spores. Spongy tissue o f leaf is also destroyed by the parasite and numerous cavities of spore sacs are formed containing similar spores. Ostiole and mycelia cavities are also formed in the spongy tissue of the leaf. Mycelium unbranched, slender and aseptate, dark brown in colour, 18 to 22 µmin length. Spore sacs are rectangular, 22 to 45 µm in breadth. Hyphae produced conidia, characteristic of imperfect fungi. Conidia may either be single or in groups. These are born on short, simple, free, unicellular and hyaline conodiophores which are not much distinguishable from vegetative hyphae and are adjacent to one another or conidia may sessile. Conidia are variously arranged in groups of Bicelled to 4-celled. Bicelled conidia are linear to ovate or T-shaped, septate with thick dark transverse septa, 11 to 18 µmin size. 4-celled, conidia are quadrate to rectangular to tetrahedral, septate with one to two transverse and longitudinal septa, 16 to 30 µm in size. This arrangement seems to be very typical of this fungus.

Comparision-

The known imperfect fungi reported from the Deccan Intertrappean viz. *Diplodiarodei* (Mahabale, 1969), bicelled spores with septate hyphae. *Helminthosporites mohgaonse* (Chitley and Sheikh, 1971), from an imperfect monocot grain. *Phomiteseben oxylonii* (Chitley and Patil, 1972), from inside the ebenaceous wood *Ebenoxylon mohgaonse*. (Trivedi and Verma, 1972) described *Heliconites mohgaonsis* resembles with *Helicomina* and in 1973 also reported *Stagonosporainter trappea*. *Tetracoccosporium eocenum* (Birader and Mahabale, 1974), from inside the wood *Sonneratioxylon sp.* (Singhai, 1973–74) described four Imperfect fungi namely *Palaeophomainter trappea, Deccanodiaeocenum, Mohgaonidium deccanii* and *Diplodiasahnii.* (Singhai,

19778) also reported *Palaeopthera mohgaonsis*. (Patil and Singh, 1974), reported *Sirophoma* like fungal fruit bodiesand mycelium from an axis of *Sizygioxylon mohgaonse*. (Paradkar, 1974), Two saprophytic fungi namely *Arbusculites dicotylophylii* and *Dectylosporotes dicotylophylii* from dicot leaf cuticle.(Chitley, 1977) reported *Alterneriates mohgaonse* and *Diplodiasahnii*. *Ascochytites intertrappea* (Barlinge and Paradker, 1978-79) from decaying cortical tissue of an axis. They also described 13 spores in 1978 Sporaedispersae of Deuteromycetes. (Barlinge and Paradkar, 1979), further described *Palaeoleptosphaeria intertrappea* resemble with living form – genus *Helicomina*, from decaying *Salvinia intertrappea* spores. *Botrydioplodia mohgaonsis* similar to living living *Botrydiplodia* from decaying dicot leaf. (Singh and Patil, 1980) described four Coelomycetous fungi viz. *Palaeocytosphaera intertrappeana, Rabenhorstinidium intertrappeum, Hendersonula mohganse* and *Sacrophoma deccanii* from the woods.

Out of all these so far known reported imperfect fungi *Diplodiarodei* and *Diplodia sahnii* Comparable with *Dematosporites* having bicelled conidia and are saprophytic on leaves. *Tetracoccosporium eocenum* shows closer affinity with *Dematosporites* as both having 4-celled conidia on short conidiophores. But *Tetracoccosporium* saprophytic on wood and having chain of septate sterile hyphae while *Dematosporites* saprophytic on dicot leaf and leguminous fruit, bicelled to 4-celled conidia with mycelial cavities and without septate hyphae.

Dematosporites mahabaleii sp.nov.

Holotype –Fu.3 -VDK (Slides 1 to 90), Institute of science, Nagpur.

Type locality –Mohgaonkalan, Deccan Intertrappean, Early tertiary, Chindwara District, Madhya Pradesh.

Specific diagnosis – Mycelium aseptate, unbranched forming mycelial cavities.

Remarks –

Bicelled to 4-celled septate conidia on simple, free, hyaline conidiophores found in moniliales of Deuteromycetes. Various families of moniliales viz., Moniliaceae, Dematiaceae, Tuberculariaceae and Stibaceae (Barnett, 1960; Clement and shaer, 1954; Bessey, 1964) of which family Dematiaceae comparable with the present genus *Dematosporites* because of several celled conidia with cross wall and mycelium and conidia are brown in colour (Bessey, 1964). Four genera of Dematiaceae viz., *Alternaria*, *Cercospora*, *Dictyoarthrium* and *Tetracoccosporium*. In *Alternaria* and *Cercospora*, straight and erect conidiophores with multicellular conidia. Former having crossed walled conidia with beak, latter having elongated conidia with transverse wall only (Edward, 1957; tendon et al, 1955). *Dictyoarhtrinium* and *Tetracoccosporium* both of them have nearly same conidia but sterile hyphae and conidiophores differ from each other. *Dictyoarthrinium* having 4-celled conidia but straight or curved crowded conidiophores with thick dark septa not comparable with

Dematosporites. In *Tetracoccosporium szabo* conidiophores are numerous may be very short or absent. Conidia arise as a lateral swellings on branched septate mycelium. They are 4-celled quadrate to rectangular, 4-partite conidia on hyphae, dark and smooth. Mycelia hyphae being separate, hyaline and ramosus (Hughes, 1952; Saccardo, 1906). So *Tetracoccosporium* assigned to present *Dematosporites*. But *Dematosporites* having aseptate mycelium forming mycelia cavities, bicelled to 4-celled conidia not assigned to fully *Tetracoccosporium*.

Habitat-

Tetracoccosporium is represented all over the world by six living species, occurring on dead leaves of *Saccharum officinarum*, *Asterina funtumiae* and paddy fields on debris (Saccardo, 1906; Rao and DevRao, 1964; Ghosh and Dutta, 1962).

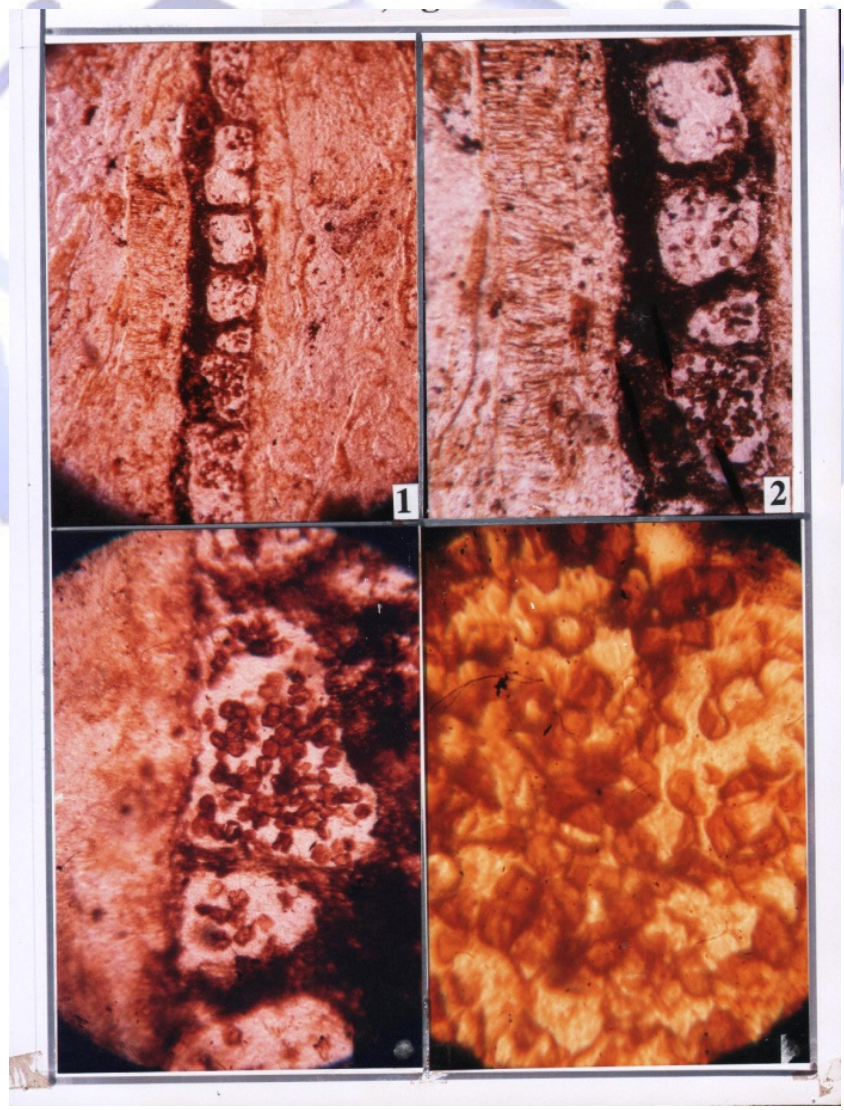

Figure 1: Petrified fruit infected by Dematiaceous fungi

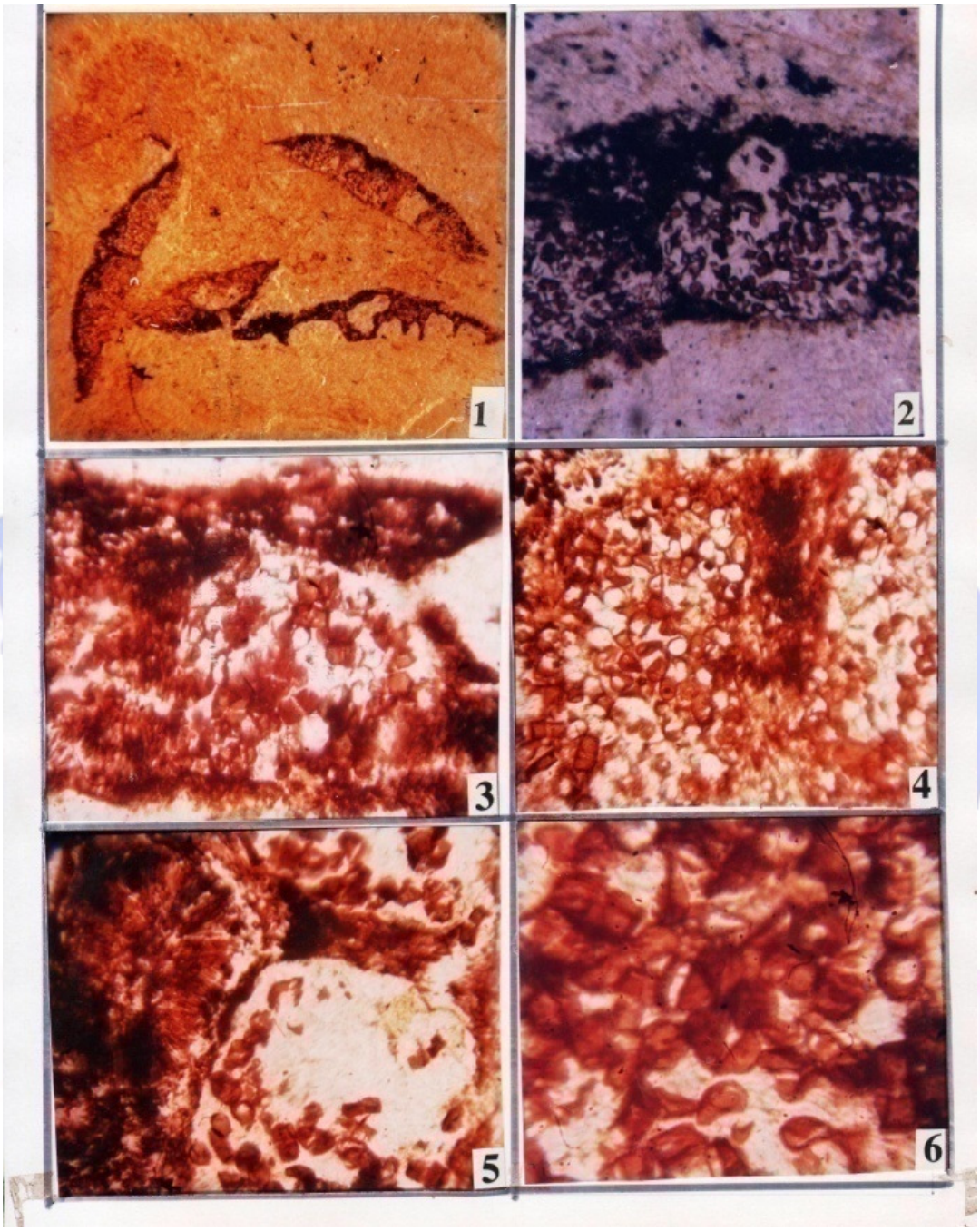

Figure 2: - Petrified leaf infected by Dematiaceous fungi

Referances:

Barlinge S.G. and Paradkar S.A., (1979). Record of new fossil algal and fungal forms from the Deccan Intertrappean beds of India. *Botanique*10(1-4): 163-174.

Barnett H.L., (1960). *Illustrated genera of Infected fungi.* Minneapolis: 1-225.

Bessey E.A., (1964). Morphology and Taxonomy of fungi. New York and London : 1-791.

Biradar N.V. and Mahabale T.S., (1974). On the occurrence an imperfect fungus *Tetracocosporium* obtained from a fossil belonging to the Deccan Intertrappean beds of M.P. India. *Paleaobotanist*21(2): 223-226.

Chitaley S.D. and Patil G.V., (1972). Ebenaceous fossil wood infected with Deuteromyceteous fungus from the Deccan Intertrappean beds of India. *BotaniqueIII*(2): 99-105.

Chitaley S.D., (1977). Petrified sporocap of Salviniaceae. *Current science*46: 25.

Clement R.E. and Shear C.L., (1954).*The genera of fungi*. New York: 1 - 496.

Edward, J.C., (1957). Leaf and Inflorescence blight of *Tagetuserecta* (Marigold) caused by *Alternaria zinnia*. *Science and culture*22: 683-684.

Ghosh G.R. and Dutta B.J., (1962). Soil fungi from the paddy fields of Orissa. *Proc. 49th Indian Science Congress.*Pt. 3: 244.

Hughes S.J., (1952). Notes on fungi from Gold coast India. *Mycological Paper*48: 1-91.

Jain R.K., (1974). A fossil fungi in aspects and appraisal of Indian palaeobotany. *Birbal Sahni Institute of Palaeobotany*, Lukhnow : 328.

Kalgurkar R.M.,Nambudiri E.M.V. and Tidwell W.D., (1993). *Diplodites sweetie* sp. nov. from the Cretaceous (Maastrichtian) Deccan Intertrappean beds of India. *Review of Palaeobotany and Palynology,* 77(1-2): 107-118.

Mahabale T.S., (1968-69). On the species of *Diplodia* from the Deccan Intertrappean beds of M. P. India. *Palaeobotanist,* 17(3): 295-297.

Paradkar S.A., (1974). Pollen and fungal spore association on fossil leaf from the Deccan Intertrappean beds of India. *Jour. Palynol.* 10(2): 119-125.

Patil G.V. and Singh R.B., (1974). An infected stem from Deccan Intertrappean beds of Mohgaonkalan. *The Botanique*5: 141-145.

Rao and Dev Rao, (1964). Some allied Dematiaceae - Dictyospore from India. *Mycopathologia*23: 23-28.

Saccardo P.A., (1906). *Sylloge Fungorum*18 : 617.

Singh R.B. and Patil G.V., (1980). On remains of Coelomycetes in M.K. Intertraps M.P. India. *The Botnique* 9: 13-19.

Singhai L.C., (1972). *Deccanosporium eocenum* gen. et sp. nov.A petrified fungus from the Deccan Intertrappean beds. *J. Ravishankar Uni. Raipur* 1(1): 28.

Singhai L.C., (1974). Fossil fungi from the Deccan Intertrappean beds of M.P.India. *J. Bio. Sci.* 17: 92-102.

Singhai L.C., (1978). *Palaeopthera mohgaonsis*, a fossil fungus from Deccan Intertrappean Beds of M.K.The *Palaeobotanist*.25 : 481-485.

Tandon R.N., Das P. And Shrivastava, J.P., (1955). Black point diseases of wheat. *Utter Bharti*1: 1-11

Trivedi B.S. and Verma C.L., (1972). Occurance of *Ebenoxylon mohgaonsis* gen. et sp. nov.from early Eocene of Deccan Intertrappean Series of M.P., India. *Palaentographica* 132 B: 78-82