



REPORT OF A BRYOPHYTIC CAPSULE FROM THE DECCAN INTERTRAPPEAN SERIES OF MADHYA PRADESH, INDIA.

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ABSTRACT:

A sporophyte measure 5.5 mm long and shows a short, slender seta and an oval erect, capsule. A smooth, hood shaped calyptra covers the top. It contains ten spore sacs (spore chambers) in longitudinal section. The spore sacs measures are 1.7 mm long and 300 to 500 μm in diameter are separated by parenchymatous septae. The apophysis is poorly differentiated. The operculum is seen as an outline. Columella and peristomial teeth are lacking. Spore and spores tetrad are surrounded by pseudo-elaters. The spores are meioogenous, arranged in tetrahedral tetrads. The seta is short and slender. The calyptra is hood-shaped. As it shows close similarities with *Krempegonium mohgaonensis* (Nambudiri, Chitaley & Yawale, 2004) it is kept under the genus *Krempegonium* as a new species *Krempegonium deccanii* sp.nov.

Key Words - Deccan, Intertrappean, fossil, bryophyte, capsule, spores.

INTRODUCTION :-

The present paper deals with the study of a bryophytic capsule form the Deccan Intertrappean beds of Mohgaonkalan, Chhindwara district, M.P. India. From the Deccan Intertrappean beds of India very few bryophytic remains such as thallus and sporangia are reported, these are- *Notothylus* –like sporogonium (Gupta,1956); *Shuklanites deccanii* (Singhai,1964; 1973); *Bharadwajai mahgaonse* (Yawale,1975); *Notothylites nirulai* (Chitaley & Yawale, 1975); *Mohgaonites indica* (Karanjekar,1981); *Riccia chitaleyii* (Sheikh & Kapgate,1982); *Nagpurites jungarmanii* (Sheikh & Kapgate,1981); *Pelliatus deccanii* (Karekar,1990); & *Krempegonium mohgaonensis* (Nambudiri, Chitaley & Yawale,2004). One more bryophytic capsule is being described here from the Deccan Intertrappean beds of Mohgaonkalan, M.P., India.

MATERIAL & METHOD:-

The fossiliferous cherts had been collected from the Deccan Intertrappean beds of Mohgaonkalan, M.P., India. While breaking the cherts the capsule was exposed in oblique longitudinal plane. After etching the specimens with hydrofluoric acid (HF), serial peel sections were taken through its part and counter 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 capsule cut in oblique longitudinal plane.

DESCRIPTION:-

The petrified bryophytic material measures 5.5 mm long comprising a short, slender seta and an oval erect, capsule. A smooth, hood shaped calyptra covers the top one quarter length of the capsule. It shows following detailed anatomical characters -

Capsule :- It is multi-chambered, oval in shape measuring 3 mm in length and 2 mm in width. The capsule contains ten spore sacs (spore chambers) in longitudinal section of the capsule. The spore sacs are 1.7 mm long and 300 to 500 μm in diameter. The spore sacs in the capsule are separated by



parenchymatous septae. Septal cells are 35 μm in diameter. The wall of sporogonium is 160 μm in thickness and made up of 5-8 rows of thin walled parenchymatous cells varying from 25 to 45 μm in size. The narrow apophysis is poorly differentiated. The operculum is seen as an outline. Columella and peristomial teeth are lacking.

Spore:- Spore and spore tetrads are surrounded by pseudo-elaters mostly attached to the spores measuring from 32 to 55 μm in size and lack wall thickening. Spore and spore tetrads are large with a smooth exine. Spore tetrads are about 50 to 60 μm in size while the spores are 25 to 30 μm in diameter. The spores are meioenous, arranged in tetrahedral tetrads. A few are having trilatate mark and with or without triangular arm while many have no such mark. The spore wall is two layered, with some minute cavities at the base of outer layer.

Seta:- The seta is short and slender, measuring 3.2 mm in length and 0.6 mm in width and is twisted comprising of obliquely oriented rows of cells. Seta cells are parenchymatous, polygonal and relatively thick walled.

Calyptra:- The calyptra is hood-shaped measuring 1.7 X 0.1 mm in size covering the top portion of the capsule.

DISCUSSION:-

The following morphological and anatomical characters are used to identify the bryophytic capsule:

- It comprises a short, slender seta and an oval erect, capsule.
- A smooth, hood shaped calyptra covers the top.
- It contains ten spore sacs (spore chambers) in longitudinal section
- The spore sacs are separated by parenchymatous septae.
- The apophysis is poorly differentiated.
- The operculum is seen as an outline.
- Columella and peristomial teeth are lacking.
- Spore and spores tetrad are surrounded by pseudo-elaters.
- The spores are meioenous, arranged in tetrahedral tetrads.
- The seta is short and slender.
- The calyptra is hood-shaped.

From above features the present specimen is confirmed as a bryophytic capsule comprising a short, slender seta and an oval erect, capsule. A smooth, hood shaped calyptra covers the top. All above characters shown by the present specimen indicates that the present specimen is a member of Class- Bryopsida (Musci) of Bryophyta.

IDENTIFICATION:-

The present bryophytic material is compared with modern bryophytic taxa and reported fossil bryophytes;

Comparison with modern bryophytic taxa:-

The present specimen is compared with the sporogonium of Hepaticopsida, Anthocerotopsida and Bryopsida (Musci) particularly of the genera occurring in the Indian subcontinent (Parihar, 1965; Vashista,1979). The Hepaticopsida is comparable with present in small spore size and elaters but differ in having single chambered capsule while the present specimen bears ten chambered capsule. The Anthocerotopsida is comparable with present specimen in small size of spores and elaters but differ in having columella in sporophyte while in present specimen the columella is absent. The



Bryopsida (Musci) is comparable in overall morphology of capsule and seta but differ in small spore size and presence of elaters in present specimen whereas the spore size is quite larger and elaters are absent in Bryopsida (Musci). Hence it means that the present specimen shows the combined characters of Hepaticopsida, Anthocerotopsida and Bryopsida (Musci) but as it resembles more with Bryopsida (Musci) it may be kept under this class.

Comparison with reported bryophytic genera-

The present bryophytic material is compared with the reported bryophytes from the Deccan Intertrappean beds of India such as- *Notothylylus* –like sporogonium (Gupta,1956); *Shuklanites deccanii* (Singhai,1964; 1973); *Bharadwajai mahgaonse* (Yawale,1975); *Notothylytes nirulai* (Chitaley & Yawale, 1975); *Mohgaonites indica* (Karanjekar,1981); *Riccia chitaleyii* (Sheikh & Kapgate,1982); *Nagpurites jungarmanii* (Sheikh & Kapgate,1981); *Pelliatus deccanii* (Karekar,1990); & *Krempongonium mohgaonensis* (Nambudiri, Chitaley & Yawale,2004). *Notothylylus* –like sporangium (Gupta,1956); *Shuklanites deccanii* (Singhai,1964; 1973); *Notothylytes nirulai* (Chitaley & Yawale, 1975) & *Bharadwajai mahgaonse* (Yawale,1975) are different in having the sporophytes of Class- Anthocerotopsida of Bryophyta while the present specimen shows the characters of Class- Bryopsida. *Riccia chitaleyii* (Sheikh & Kapgate,1982) is different in having vegetative thallus of modern genus *Riccia* of Class- Hepaticopsida while present specimen is capsule. *Nagpurites jungarmanii* (Sheikh & Kapgate,1981) & *Pelliatus deccanii* (Karekar,1990) are one chambered capsules of Hepaticopsida while the present capsule is multi-chambered having ten chambers. *Mohgaonites indica* (Karanjekar,1981) is also different in having single chambered capsule while present capsule is ten chambered. *Krempongonium mohgaonensis* (Nambudiri, Chitaley & Yawale, 2004) is comparable in having ten chambered capsule with slender seta and hood like calyptra, absence of columella and peristomial teeth but differ in presence prominent air chambers at the junction between the seta and the capsule.

Hence the present specimen does not show any exact similarities with the reported fossil bryophytes except *Krempongonium mohgaonensis* (Nambudiri, Chitaley & Yawale,2004) and with modern bryophytic taxa except bryopsida. As it shows close similarities with *Krempongonium mohgaonensis* (Nambudiri, Chitaley & Yawale, 2004) it is kept under the genus *Krempongonium* as a new species ***Krempongonium deccanii sp.nov.*** The specific name is after the Deccan Intertrappean beds.

Systematic position

Group	-	Cryptogams
Division	-	Bryophyta
Class	-	Bryopsida (Musci)
Genus	-	<i>Krempongonium gen. nov.</i>
Type Species	-	<i>Krempongonium deccanii sp.nov.</i>

DIGNOSIS:-

Krempongonium deccanii sp. nov.

A sporophyte measure 5.5 mm long and shows a short, slender seta and an oval erect, capsule. A smooth, hood shaped calyptra covers the top. It contains ten spore sacs (spore chambers) in longitudinal section. The spore sacs measures are 1.7 mm long and 300 to 500 µm in diameter are separated by parenchymatous septae. The apophysis is poorly differentiated. The operculum is seen as an outline. Columella and peristomial teeth are lacking. Spore and spores tetrad are surrounded by



pseudo-elaters. The spores are meioenous, arranged in tetrahedral tetrads. The seta is short and slender. The calyptra is hood-shaped.

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PLATE FIGURES



1



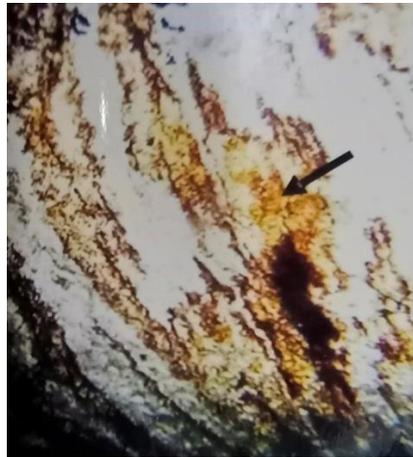
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Explanation of Plate Figures :-

Fig. 1& 2 -Capsule with seta part and counter part

Fig. 3- A capsule

Fig. 4- A Part sporangium showing part of capsule with spores

Fig. 5- Part of capsule with spores in spore sacs & Multicellular sporangial wall

Fig. 6 - sporangium showing sporogenous mass with spore tetrads (arrow)