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Miospores of Permian Era Found from Borehole near Hjang Pakistan at the Depth of 2297-2368 Ft

Shahida Khurshid

Botany Department, Government. College for Women, Samanabad, Lahore, Pakistan

Introduction

Geological Survey of Pakistan made a 'Borehole' near Jhang, Punjab, Pakistan. A suit of Borehole core samples from 2297-2368 feet depth was provided to me for palynological studies. Samples were made at 3 feet intervals. The core samples yielded, plant cuticle, pteridophytic, pteridospermous and gymnospermous pollen grains/spores. There is no evidence for the presence of Bryophytic or Angiospermic grains. Out of thousand, isolated specimens only 7960 spore/pollen have been included in this study which are split into following categories and has been produced at the Table 1.

Table 1: The samples obtained from (Geol. Sur. Pak.) borehole near jhang showing the depth and number of different pollen and spores

Depth of sample No.	Counted
2297 = A	577 pollen/spore
2300 = B	720 pollen/spore
2303 = C	562 pollen/spore
2306 = D	900 pollen/spore
2309 = E	680 pollen/spore
2312 = F	915 pollen/spore
2315 = G	590 pollen/spore
2318 = H	568 pollen/spore
2321 = I	908 pollen/spore
2324 = J	560 pollen/spore
2327 = K	710 pollen/spore
2330 = L	270 pollen/spore

Only above mentioned samples have plenty of pollen/spore while rest of the samples were free of these pollen/spore. The isolated 7960 specimens have been assigned to 54 genera and 124 species.

Groups	Genera	Species
Trilete	19	34
Monoletes	2	3
Pseudosaccates	2	3
Monosaccates	11	32
Bisaccate-striate group	5	55
Bisaccate non-striate group	15	31

While studying the pollen/spore of different samples many new species have been found. They are redeposited during different studies in this area of Borehole. These are considered as new species. Some of them are found for the first time in Pakistan are:

New Species

- Lundbladispora* sp. nov.
- Densosporites* type A sp. nov.
- Crybelosporites jhangi* sp. nov.
- Grandispora apiculata* sp. nov.
- Microreticulatisporites majus* sp. nov.
- Striomonosaccatites punjabensis* sp. nov.
- Plicatipollenites unicus* sp. nov.
- Florinites punjabensis* sp. nov.

- Platysaccus* sp. Type A sp. nov.
- Vestigiosporites kosanki* sp. nov.
- Corisaccites juglansis* sp. nov.
- Striatopodocarpites tuberculatus* sp. nov.
- Schofipollenites* sp. Type A sp. nov.
- Retusotriletes punjabensis* sp. nov.

Such as "*Crybelosporites*". Brenner (1963) illustrated this form its distribution throughout *Cretaceous Potomac* group of Maryland. This specimen has been isolated from the Borehole near Jhang, Punjab, Pakistan (Permian region) after a long time for the first time in Pakistan.

Lundbladispora initially recorded by Brenner (1963) from lower cretaceous Potomac group of Maryland. Again Balme (1963) found the dispersed spores of this type from the Triassic of Australia (Balme, 1963; Playford, 1965) and the late Pennsylvanian of Illinois (Pepper, 1964). Same is the presence of *Retusotriletes*, *Punctatisporites*, *Microreticulatisporites* are the elements which show their existence not only in *Carboniferous* but also in Permian era. All these species are found in the 'Borehole' near Jhang, Punjab Pakistan. They are considered to be very rarely present in the samples of Permian era.

By studying different samples from 2297-2330 it is found the percentage of *Bisaccate* is much large as compared to monosaccate and other types of pollen/spores. *Bisaccate* are evenly distributed in all strata.

Tiwari and Singh (1983) studied group of *Bisaccate* containing *Illinites*, *Jugasporites*, *Sahnites* and *Vestigiosporites*. They found that Gondwana forms *Sahnites* and *Vestigiosporites* show the presence of uniformly developed sexine all over the proximal face of the central body while in *Jugasporites*. Sexine is developed only on the lateral ends of the central body leaving a smooth unstructured area in the central body which bears the trilete marking. Many of the genera are redeposited.

Balme (1970) has recognised 3 microfloral assemblages within the Permian succession of Western Australia. But in Pakistan, Balme (1970) has studied palynologically 7 formations out of which Amb Formation is of lower Permian and is significantly comparable with the present microflora such as *Alisporites*, *Cedripites* and *Lunatisporites*.

Kosanke (1950) has described a number of pollen and spores from Pennsylvanian deposits of Illinois. Majority of them closely resembles with the assemblage isolated from the Borehole (Fig.1). *Bisaccate* pollens are also important constituents of lower Gondwana assemblage. The grains exhibits a bilateral construction with a central body having two opposite sacci which may be small, equal or larger in size than the central body.

The Talchir formation of India and Tobra Formation of Pakistan is the oldest horizon of Lower Gondwana, where scar bearing bisaccate pollen grains are significantly distributed. They are insignificant in upper Permian and rarely known in Jurassic. Presence of *Parasacites* and *Plicatipollinites* is an interesting complex which is again known to occur in Lower Permian. Most probably there were 2 distinct climatic belts in Pakistan during Gondwana time and two different types of pollen spore flora complex are known to occur.

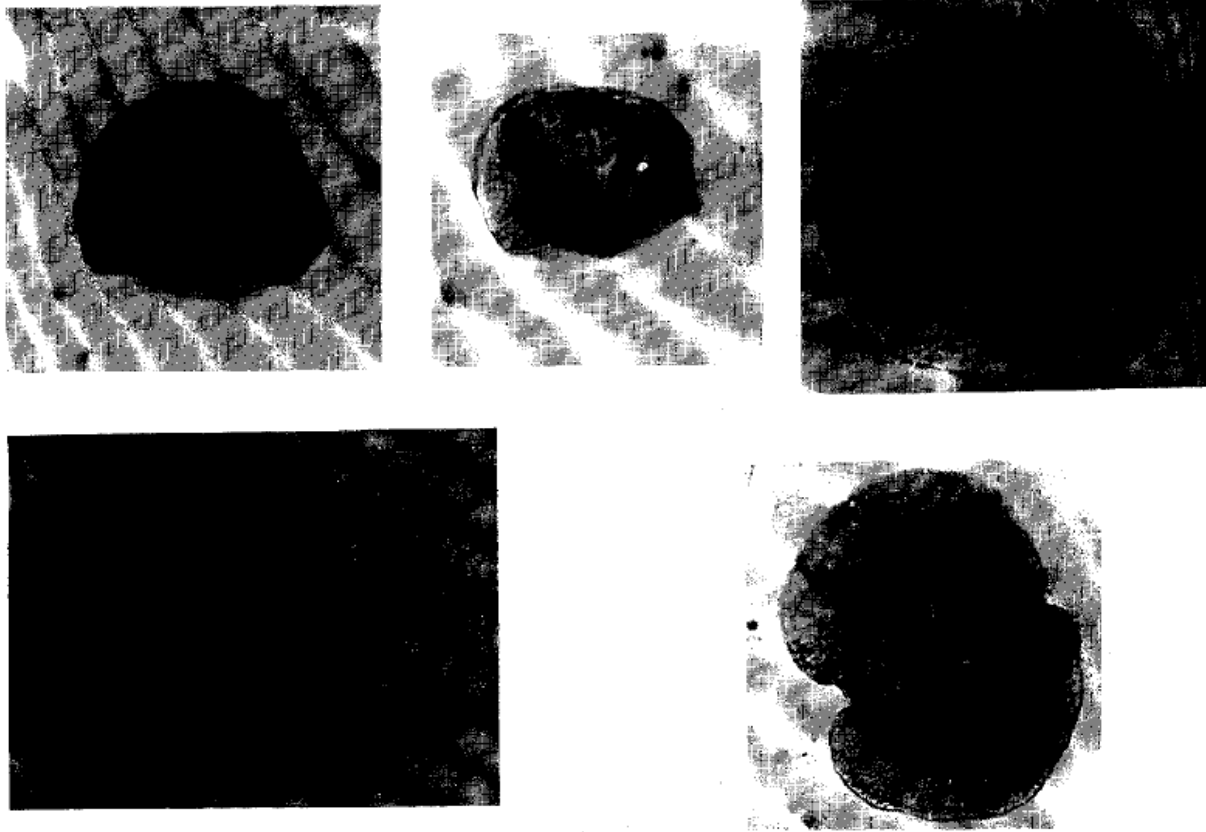


Fig. 1: Miospores of permian era from borehole near Jhang Punjab

Bharadwaj (1964) made a comparative study of the miospores of some early Permian conifers with *Potonisporites*. He concluded that *Vestigiosporites* and *Sahinites* were the junior synonym of *Potonisporites*. But some workers have regarded these 3 genera having their independent importance. Disaccate pollen are also important constituents of lower Gondwana sporae dispersae. The general organization of these grains exhibit a bilateral construction with central body having two opposite sacci which may be smaller, equal or longer in size than the central body. For this reason terms haploxytonoid, diploxytonoid have been introduced. Many other characters like striation, grooves, vestigial trilete, scar, cappa and cappula morphology has made possible for the palynologists to go into greater details for the identification of *Bisaccate* pollen. The further details can be, however, borrowed from Hart (1965). Tiwari (1974) says, "recently Balme (1970) has given a comprehensive amount of palynological of Triassic and Permian from the Salt Range. Very recently Masood (1964) has presented certain palynostriatigraphical units which are somewhat similar to Balme (1970).

It is interesting to note that the microflora is predominately Gymnospermic with certain Pteridophytic spores. It closely resembles with the flora of Pennsylvanian deposits of Illinois and Talchir beds of India and stands at the junctions of Permocarboniferous boundary.

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