
A NEW ICHNOFOSSIL FROM THE BHANDER GROUP, VINDHYAN SUPERGROUP

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It is only in recent years that some of the peculiar markings on sandstones and in limestones of the Vindhyan Supergroup have come to be identified as trace fossils. Due to paucity of body fossils in these Precambrian strata, ichnofossils assume considerable importance in furnishing evidence—though indirect—for the existence of Metazoan life. Before they are taken as trace fossils, all markings have to be evaluated carefully to confirm that they were made by animal or plant living at that time, and that they were not the result of any mechanical process of sedimentation.

Records of trace fossils in the Precambrian Vindhyan sedimentary rocks are so rare as to merit documentation, more so when any marking is so unique that it is not reported in existing literature: Such a trace is described in this note.

Figure 1. Bhanerrichnus damohensis ichnogen et ichno sp. nov.

The slab of a very dusky red-purple quartz-arenite on which the ichnofossil occurs belongs to the Maihar Quartzite formation. It is roughly 13×14 cm in size and is ripple-marked. The morphology of the ripples shows that it is the sole of the layer on which the trace occurs and therefore it is a cast showing convex hyporelief. Since no similar form has been noted in an extensive review of literature, a new ichnogenus *Bhanerrichnus* has been proposed. Systematic description follows.

Ichnogenus Bhanerrichnus Mathur nov.
Ichnospecies *Bhanerrichnus damohensis* Mathur nov.

Derivation of Name. The generic name is derived from the original spelling of the Bhandar Group in which the trace occurs. The specific name refers to the district from which the specimen was collected.

Stratigraphic Horizon. The specimen is a typical example of the Maihar Quartzite of the Bhandar Group. In most parts of the basin this formation is the youngest stratigraphic unit of the Vindhyan Supergroup, except in the Bundi area of Rajasthan where another two formations are developed locally above the Maihar Quartzite. Although no direct isotopic date on this formation is available so far, its age is likely to be of the order of 550 Ma on the basis of its position in the stratigraphic column.

Locality of the specimen. The specimen was collected from the Sagoni dam site in the Damoh district of Madhya Pradesh. Sagoni (23°49′.79°49′; toposheet no. 55M/13) is a railway station on the Bina-Katni section of Central Railway.

Description. The following is the description of the specimen seen from above. Originally the trace must
have been made by the organism on the underlying soft sediment; the trace is now preserved as a cast on the sole of the superjacent sandy layer, and the whole structure as seen now from the top must be viewed as a "negative" of the original. It could partly be a carapace imprint.

It is a convex hyporelief in the form of a reversed L-shaped trail. The base of the trail runs along the crest of a ripple for 5.5 cm and then the trail swerves at right angle to the left with a sharp curve cutting across normal to the ripples for 9 cm; it ends abruptly against the crest of another ripple as if sharply cut off. There is a remnant of another trail along the crest of the same ripple, but it is, unfortunately, broken off just after it takes a turn to the left; it is about 4 cm long. One would now never know whether it also culminated into a bilobate structure or was just a plain trail. If the whole of this marking was also preserved, it could possibly have thrown valuable light on the true origin of the ichnofossil. The second trail starts from the bend of the first one.

The width of the trail along the crest of the ripple is 1.5 mm increasing to 2.5 mm, but after its bend it thickens to 8-9 mm in the main part. The most significant feature of the form is the presence of lobe-like structures placed symmetrically on either side of the main part of the trail. Four pairs of such lobes are seen. Careful scrutiny shows that two pairs occur coupled together, and it could be that these combined pairs are one single structure with two segments, the anterior longer and more clearly marked than the posterior. The larger lobes are about 20 mm long and 9 mm at their widest, while the smaller ones are about 1.7 cm long and 7 mm broad. It is noteworthy that there are no markings or ornamentation on the lobes and the linear trails, whose outlines are clearly defined. The distinctly sharp outlines of the linear trails appear as if they were imprinted before the impression of the lobes was made.

Diagnosis. Clearly marked, straight trail, 8-9 mm wide, with a pair of lobe-like structures placed symmetrically on either side. Anterior lobe about 20 mm long and 9 mm at its widest, and the posterior lobe 17 mm long and 7 mm at its widest. No ornamentation on any part of the structure.

Discussion. The type of animal that could have produced this ichnofossil can only be conjectured now. It is possible that the linear furrows were first impressed on the soft sediment by movement of the animal and the lobe impressions were formed when it possibly rested for a while—or the locomotion was spasmodic. The out lines of the lobate part of the structure indicate some kind of an arthropod, but the free running central trail associated with the lobes appears as if it has been made by a worm (Annelid). It is not proposed here that this ichnofossil has been made by two different organisms, but the preceding observations relate only to the external impression. Observations of activities of living forms have shown conclusively that different organisms can produce similar traces and, conversely, the same organism can give rise to distinctly different markings.

The absence of ornamentation is also noteworthy because if the form was in fact made by the movement of an arthropod there should have been marks of transverse furrows or indentations on the track. This kind of smooth track is more likely to be made by a worm. In this case the lobes could perhaps be explained by assuming that they are impressions of excreta. Further speculation is hampered by the fact that the ichnofossil in its totality is unusual and unrecorded hitherto, and cannot be readily related to the life activity of any known animal. It could possibly be a combination of resting and burrowing trail, if we disregard the premise of excretal impressions. In any case, the trace is of great importance in indicating that in the Precambrian Vindhyan times there did exist an organism capable of producing such a large ichnofossil.

Whatever the organism that created the trace, it is clear that it was a multicellular animal belonging to the subkingdom Metazoa. Metazoan life is generally believed to have first appeared on the Earth during the early Cambrian, but it is now increasingly realised that the Metazoa, along with vascular plants, appeared much before the Palaeozoic. Evidence of this has come in recent years from many parts of the world. In the present case, the Bhandari sandstone which is the host of the ichnofossil described is believed to be about 550 Ma old, and therefore it is of early Lower Cambrian age—an age which would not offend the traditionalists who firmly believe that the advent of Metazoan life occurred only in the Phanerozoic. This would be a further evidence that the Vindhyan Supergroup transgressed right into the base of the Cambrian, starting from the Middle Proterozoic.

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PROTOACHLYA ORYZAE SP. NOV. FROM NAINITAL

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During the studies on aquatic fungi of Kumaun Himalaya, an undescribed species of Protoachlya Coker was isolated from rice fields and this is described in this communication.

Protoachlya oryzae Khalbe sp. nov.
Vegetative growth dense on hemp seed halves, 18-40 μm in dia., at base. Zoosporangium many, primary zoosporangia formed at the tip of hypha and secondary usually formed by cymose branching, below older ones, many papillate; long, cylindrical, 22-52.5×95-600 μm. Zoosporangia liberate through apical pore or through subapical or lateral papillae, doliaplanate, 8-10 μm in diam. Gemmae many. Oogonia many, spherical, wall smooth or papillate, 30-65 μm in diam., papillae 5-13 μm in diam. Antheridia androgynous, rarely dichnous or monoclinitis. Oospore single, rarely 2-3, 18-38 μm in diam., mostly 22.5 μm and eccentric (figure 1).


Figures 1-5. Protoachlya Oryzae: 1. Zoosporangium with liberation of zoospores from different papillae; 2. Primary zoosporangium with saprolegnioid zoosporangium liberation and secondary zoosporangia with achlyoid zoospores liberation. 3. Gemma; 4. Papillate oogonium with dichnous and androgynous antheridia and single, eccentric oospore; 5. Spherical oogonium with androgynous antheridium. Figures 1 & 2 scale A; Figures 3-5 scale B.


The present species is quite different from other species of Protoachlya namely P. benkei Furtado, P. bonariensis Beroqui, P. hypogyna Shanor and Conover, P. mucronulata Ziegler, P. Polysporus (lindstedt.) Apinis and P. paradoxa Coker due to presence of papillate sporangia and oogonia, mainly androgynous antheridia and eccentric oospore1-7.

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