mate shift at 3.5 ka might be one of the reasons for the decline of Indus Valley Civilization.

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Precambrian–Cambrian boundary microbiota from the Chert Phosphorite Member of Tal Formation in the Korgai Syncline, Lesser Himalaya, India

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Abundant and well preserved organic walled microfossils are recorded from the Chert–Phosphorite Member of the Tal Formation, in the Korgai Syncline, Lesser Himalaya. Two principal categories of microfossils including spheromorphic acritarch and small acanthomorphic acritarchs are present in the assemblage. Interesting among these two categories are *Leiospheridea* sp., *Micrhystridium regulare*, *M.* sp. A, *M.* sp. B, *M.* sp. C, *M.* sp. D and *Veryhachium* sp. The appearance of large *Micrhystridium* population together with small shelly fauna has been used as a criterion to demarcate the Precambrian–Cambrian boundary in China[1] where these microfossils have been discovered from the black chert in the phosphatic rocks of the lowest Kuanchuanpu Member in Ningqiang of southern Shaanxi.

THE Korgai syncline is one of the five major synclines of the Krol belt where the Blaini–Krol–Tal sequence is well exposed. It is located 15 km southeast of Nigalidhar syncline and comprises an area of about 23.50 sq km. Prior to this communication no microbiota was reported from this syncline. The material for this study was collected from a trench located in the NE of Sataun (Figure 1) approximately 4 km from Bargaun on the mule track from Bargaun to Banana village (30° 35′ 16″ : 77° 40′ 44″). Here, the Lower Tal Formation

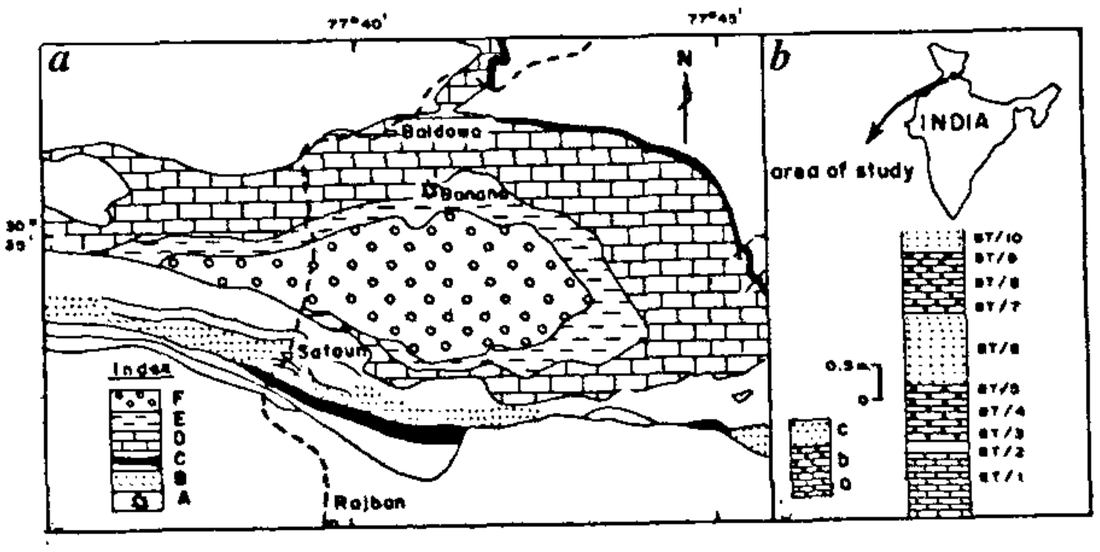

Figure 1 *a*, *b*. ***a***, Geological map of the area (after Auden, 1934) showing the fossil locality. A = Fossil locality, B = Chandpur and Nagthat formations, C = Blaini Formation, D = Krol Formation, E = Lower Tal Formation, F = Upper Tal Formation; ***b***, Litholog showing sample interval. a = dolomitic limestone, b = cherty phosphorite, c = sandy unit.

consists of thin-bedded cherty phosphorite with intercalated sandy units. Dolomitic limestone of the Krol Formation underlies the cherty shale. The present microfossils are preserved in the phosphatic chert. These fossiliferous cherts are aphanitic and non-laminated. The chert is composed predominantly of cryptocrystalline and microcrystalline quartz with lesser amounts of fibrous calcedony, amorphous organic matter, well preserved microfossils (acritarchs) and minor opaque fine-grained pyrite crystals and orange hematite framboids. All specimens discussed here are observed in petrographic thin sections.

In Lesser Himalaya, spheromorphic acritarchs have previously been recorded from the Chert Phosphorite Member of the Tal Formation[2]. Tiwari and Knoll[3] described acanthomorphic acritarchs from the stratigraphically lower Infrakrol Formation. However, this is the first report of acanthomorphic acritarchs from the Tal Formation. The present microbiota is characterized by a unique assemblage. The forms are assigned to *Leiospheridea* sp., *Micrhystridium regulare*, *M.* sp. A, *M.* sp. B, *M.* sp. C, *M.* sp. D and *Veryhachium* sp. (Figure 2) associated with rare filamentous forms. *Micrhystridium* has been known in the lowest Cambrian non-trilobite bearing Meishucun Formation[4–8]. However, *Veryhachium* sp., which is larger in size in comparison to those species reported from Paleozoic, has not been previously reported from the Precambrian–Cambrian boundary level or the underlying sediments, with the exception of some rare specimens from Proterozoic rocks[9,10]. This genus is commonly found in the lower Paleozoic which generally is smaller in size.

This communication mainly deals with the discovery of abundant *Micrhystridium* and *Veryhachium* from the Chert Phosphorite Member of the Tal Formation. The occurrence of *Micrhystridium* is very rich in the samples.

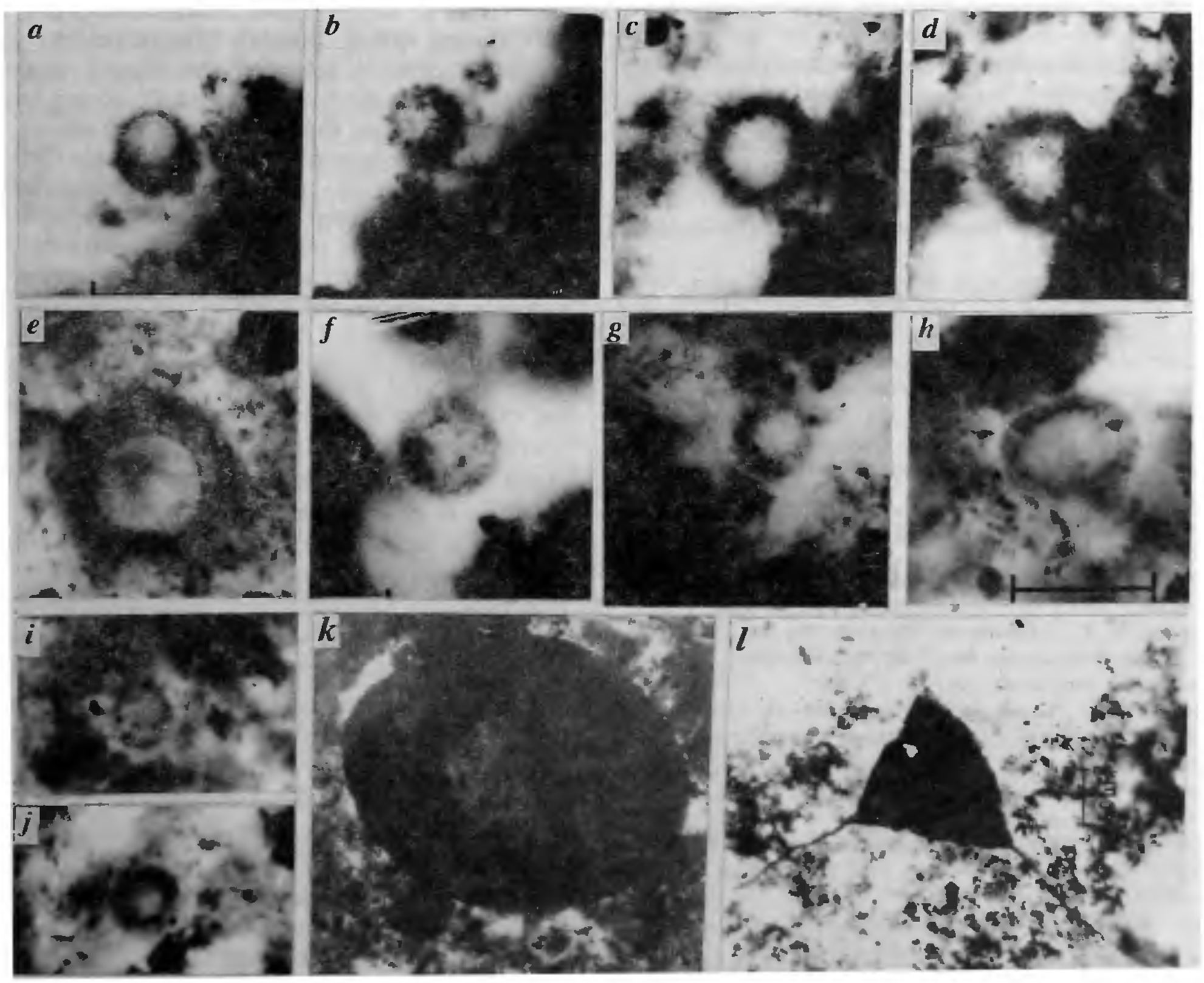

Figure 2 *a–l*. *a*, *b*, *Micrhystridium* sp. A in two different foci, *c*, *d*, *M. regulare* in different foci; *e*, *h*, *M.* sp. B; *f*, *M.* sp. C; *g*, *i*, *j*, *M.* sp. D; *k*, *Leiospheridia* sp.; *l*, *Veryhachium* sp. Scale bar for Figure *h* is 10 µm and for Figure *l* is 50 µm. (Scale bar for *a–j* is shown in *h* and for *k* is shown in *l*).

It is closely comparable to the *M. regulare* reported from southern Shaanxi and also resembles with *Micrhystridium* sp. of Lo described from the Lower Yudoma suite of eastern Siberia[11]. The presence of *Veryhachium* is unique in the assemblage. Small shelly fossils are not reported from this locality so far, but the acritarchs-yielding level in the Korgai syncline has also yielded SSFs in Mussoorie and Garhwal synclines[12–15] and also in Nigalidhar Syncline[16]. This study shows a close similarity in the microfossil yield of the basal Meishucunian levels in the Lesser Himalaya and the Chinese section. Simple *Micrhystridium* population also occur in the lower Yudoma Formation in Siberia[11]. Besides, the acritarchs of basal Tal Formation differ greatly from those of Infrakrol Formation[3], where large acanthomorphic acritarchs (> 100 μm in diameter) predominate. The presence of smaller acanthomorphic acritarchs in the basal Tal (Cambrian) in comparison to the older Infrakrol Formation (Precambrian) strengthens the concept of decrease in the size of acanthomorphic acritarchs from the Precambrian to the Cambrian[17].

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Potential threat to reservoir fishery by fungi in Kumaun Himalaya, India

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Zoosporic fungi are among the most destructive fish pathogens. Eighteen species belonging to *Achlya*, *Aphanomyces*, *Dictyuchus*, *Saprolegnia* and *Pythium* were isolated from Nanak Sagar, which has witnessed mass mortality of fish fauna during 1991–94. Of these, 8 species were also detected from diseased and moribund fish. Species of the parasites and the hosts demonstrated differential pathogenicity and immunity respectively. *Achlya flagellata* and *Saprolegnia parasitica* appeared virulent, while scaly-fish were more vulnerable to fungal infection than the non-scaly fish. The occurrence of fungal species, zoospore density and severity of mycoses was primarily governed by temperature. A water temperature between 22 and 25°C during spring stimulated fungal activity whereas, at above 28°C it retarded the disease process. All the species, except *A. inflata* and *P. vexans* have been reported virulent fish pathogens elsewhere; this is cause of great concern. By virtue of a wide distribution and potentiality to parasitize eggs, fingerlings and adult fish, these fungi along with anthropogenic pressure are most likely to pose threat to reservoir fishery. Thus, research on integrated management of fish mycoses is warranted.

RESERVOIRS, the artificial ecosystems characterized by the existence of both lentic and lotic components, constitute the prime inland fisheries resource in South and South-east Asia. A major increase in inland fish yield in India is expected from reservoirs because of construction of new dams and the improvement in reservoir fisheries management[1]. Beside wide diversity of fish, reservoirs also harbour diverse microorganisms including fungal species which occur as opportunistic pathogens of aquatic organisms, specially of fish[2,3]. Watermolds, the zoosporic fungi, are a constant and ubiquitous component of aquatic environments and a continual challenge to fish[4–6]. The ability of these fungi, particularly of those belonging to *Achlya*, *Aphanomyces* and *Saprolegnia* to parasitize eggs, fry, fingerlings and adult fish has been well documented[5–19]. As a general rule, infection starts when the host gets injured either mechanically[9,10] or as a result of infection other than fungal, which often results in epidemic, causing 100% mortality of the infected hosts[10,13,18]. However, the clinical and pathological investigations have revealed that several members of Saprolegniales often act as primary pathogens[5,6,11–19], thereby play a vital role in minimizing the total output