

# Microfossils from the black chert of Bhagwanpura Limestone (Middle Proterozoic), Vindhyan Supergroup, Chittorgarh area, Rajasthan, West India

S. Kumar and Purnima Srivastava

Geology Department, Lucknow University, Lucknow 226 007, India

Microfossils recorded from petrographic thin sections of bedded cherts are considered as very reliable as syngenicity of the microfossils is never in doubt. The Vindhyan rocks are well known for good development of stromatolites but reports of associated microfossils are not many. Here we report well-preserved microfossils, of both coccoid and filamentous forms, from petrographic thin sections of black chert associated with domal stromatolites in the Bhagwanpura Limestone of Chittorgarh district in Rajasthan. The identified microfossils are *Myxococcoides* sp., *Gunflintia minuta* and *Archaeotrichion* sp.

VINDHYAN microfossils from petrographic thin sections have been reported from the stratified stromatolitic cherts and *Conophyton garganicum* belonging to the Kheinjua Formation, Semri Group (the Vindhyan Supergroup) of Son Valley area, Uttar Pradesh<sup>1-3</sup>.

The Bhagwanpura Limestone is the youngest formation of the Satola Group (Vindhyan Supergroup), which has been correlated with the Kajrahat Limestone of Basal stage of the Semri Group of Son Valley area (Figure 1). Table 1 gives stratigraphic position of the Bhagwanpura Limestone. On the basis of the stromatolite assemblage, the Bhagwanpura Limestone has been assigned Lower to Middle Riphean age<sup>4</sup>. The Khairmalia Andesite occurring at the base of the Vindhyan

Table 1. Lithostratigraphy of the Vindhyan rocks in Chittorgarh area, Rajasthan

|                     |                           |                       |
|---------------------|---------------------------|-----------------------|
| Vindhyan Supergroup | Sand Group                | Sawa Sandstone        |
|                     | Satola Group              | Bhagwanpura Limestone |
|                     |                           | Khardeola Sandstone   |
|                     |                           | Khairmalia Andesite   |
|                     | Unconformity              |                       |
|                     | Pre-Aravalli Crystallines |                       |

After ref. 4.

Supergroup in Chittorgarh area has been analysed for age by Rb-Sr method, but the analysis gave discordant results. However, the analyses do suggest<sup>5</sup> that the age of the lavas is at least 1000 myr (million years).

The Bhagwanpura Limestone is siliceous and dolomitic. It shows abundant development of greyish black to black bedded chert, occurring as thin bands and lenses. The fossiliferous black chert is associated with silicified domal stromatolite. The samples were collected from the exposures at Bhagwanpura village, on the eastern side of Binota-Bhagwanpura road (Figure 1). Figure 2 shows the position of the chert samples in the litholog of the Bhagwanpura Limestone. One coccoid form *Myxococcoides* sp. Schopf, and two filamentous forms *Gunflintia minuta* Barghoorn and *Archaeotrichion* sp. Schopf are reported here.

Genus *Myxococcoides* Schopf (ref. 6)

*Myxococcoides* sp., (Figure 3, C & D)

Cells almost spherical, occasionally distorted, solitary and also colonial in habit, cell wall distinct, less than 0.5  $\mu\text{m}$  in width. Cell diameter ranges between 8  $\mu\text{m}$  and 13  $\mu\text{m}$  (29 cells measured).

The colonial nature of the present form distinguishes it from *Huroniospora* Barghoorn. However, isolated

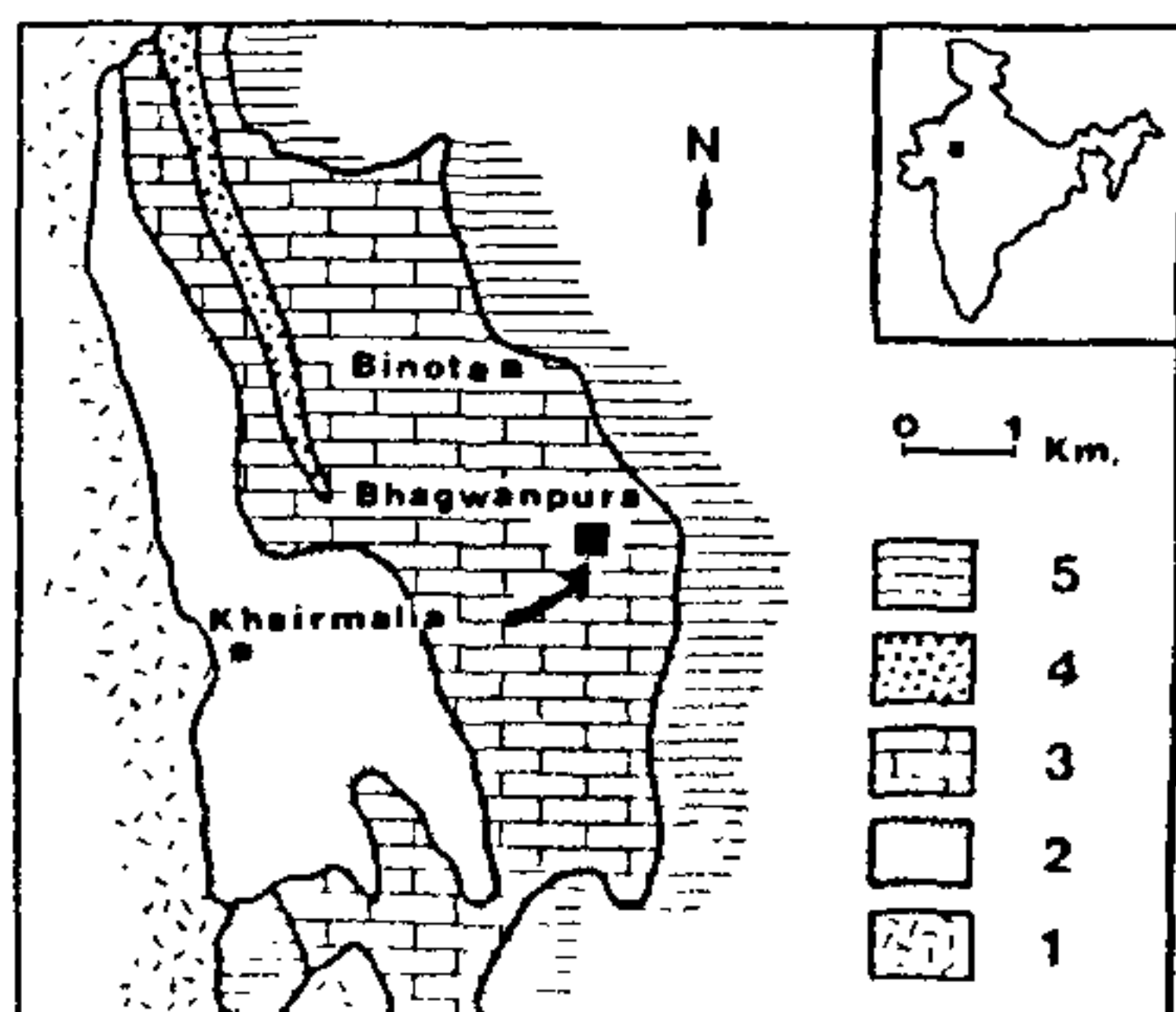


Figure 1. Simplified geological map of Bhagwanpura area, Chittorgarh, Rajasthan. Arrow shows the location of the chert sample 1, Berach Granite, 2, Khardeola Sandstone, 3, Bhagwanpura Limestone; 4, Sawa Sandstone, 5, Binota Shale

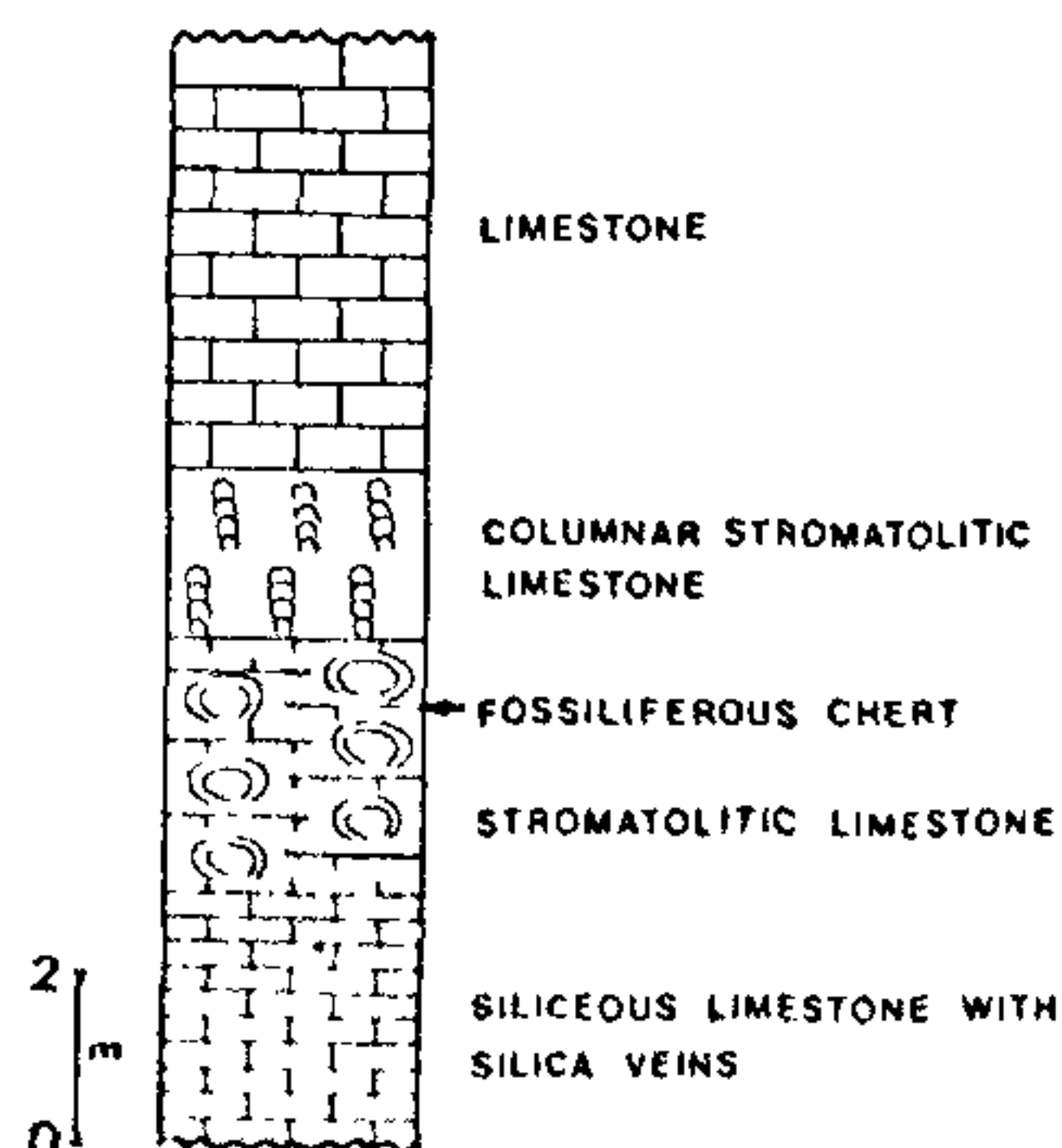
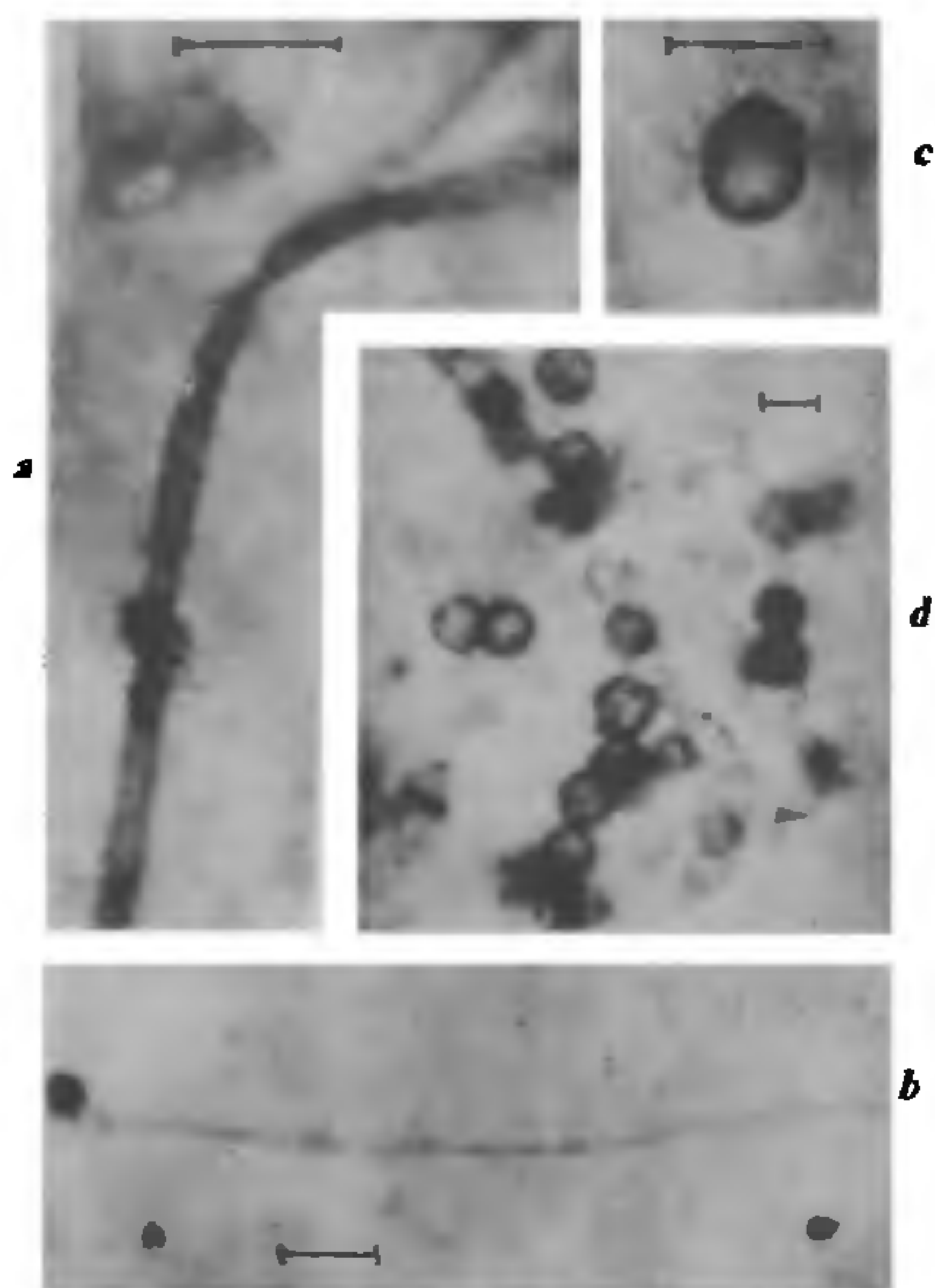


Figure 2. Litholog of the Bhagwanpura Limestone showing the position of fossiliferous chert bearing horizon, Bhagwanpura, Rajasthan



**Figure 3.** Microfossils from the Bhagwanpura Limestone. **a**, *Archaeotrichion* sp. Schopf (thin section B/1/89, coordinates 2.1/56.5); **b**, *Gunflintia minuta* Barghoorn (thin section B/1/89, coordinates 5.2/55.8); **c & d**, *Myxococcoides* sp. Schopf (thin section B/1/89, coordinates for **c**, 5.1/56.2; for **d**, 8.7/48.3). Scale bars for all specimens are 10  $\mu$ m. Slide has been deposited in the Museum of the Geology Department, Lucknow University, Lucknow.

individual cells can also be compared with *Huroniospora* Barghoorn.

Genus *Gunflintia* Barghoorn (ref. 7)

*Gunflintia minuta* Barghoorn, (Figure 3, b)

Unbranched, thin, straight or curved filament with faint remnants of transverse septae. Width of filament varies from 1.5  $\mu$ m to 2  $\mu$ m. Generally shows uniform width throughout the length (two specimens measured).

Width of filaments falls within the range given by Barghoorn<sup>7</sup> but transverse septae are not very clear.

Genus *Archaeotrichion* Schopf (ref. 6)

*Archaeotrichion* sp. Schopf, (Figure 3, a)

Narrow tube-like structures, sinuous, nonseptate, unbranched, flexed, twisted and compressed, solitary, irregularly entangled filaments. Length measured up to 350  $\mu$ m. Maximum width 4  $\mu$ m (six filaments measured).

Width of filaments is more compared to forms

described from the Bitter Springs Formation by Schopf<sup>6</sup>, but at the same time Hofmann<sup>8</sup> reported filaments of much greater width assigned to *Archaeotrichion* sp. from the Belcher Islands. It may represent a deformed and twisted form of either *Gunflintia* or *Eomycetopsis*.

The Bhagwanpura microfossil assemblage shows more or less same size range as given for the Kheinjua microbiota. The significant aspect of the present assemblage is its association with domal stromatolite, whereas the Kheinjua microbiota is associated with stratified stromatolites. Detailed work is under progress.

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## A spontaneous genetic mosaic in *Drosophila ananassae*

B. N. Singh and Sujata Mohanty

Centre of Advanced Study in Zoology, Banaras Hindu University, Varanasi 221 005, India

We detected a spontaneous genetic mosaic (bilateral) in *Drosophila ananassae* while scoring the progeny of a testcross between heterozygous males (+ + +/*cu e se*) and homozygous females (*cu e se/cu e se*). The mosaic was characterized by all three mutant characters (curled wings, ebony body colour and sepia eye colour) on the left side and all normal characters on the right side. The fly was male but sterile. Its probable cause of origin is attributed to mitotic recombination in the zygote which was genotypically heterozygous for *cu e se* genes located on chromosome 2.

ORGANISMS that are composed of cells of at least two different genotypes are known as genetic mosaics. They have been detected in a number of organisms and are useful tools for studies of genetically controlled phenomenon, i.e. development<sup>1-3</sup>. Morgan<sup>4</sup> discovered for the first time sex mosaics (gynandromorphs) in