

# NEW MINERAL TEXTURE IN COPPER SULPHIDES OF SURDA COPPER MINE. SINGHBHUM SHEAR ZONE, BIHAR

R. BHARDWAI

Department of Geology  
Aligarh Muslim University, Aligarh

WHILE examining in detail the copper ores from the 10th level of Surda copper mine, the author met with a conspicuous texture in chalcopyrite ( $\text{CuFeS}_2$ ). The texture under study occurs as exsolution bodies in the porphyroblast of chalcopyrite while examined under reflected light. The exsolution bodies are probably of tetrahedrite ( $\text{Cu}_3\text{SbS}_3$ ). The size of exsolution bodies varies from 0.001 to 0.007 mm. By and large, they are elongated and conical in shape, and consist of multisegments. These segments are broad at one end and gradually become narrower at the other. Thus, the whole body takes a serrated conical shape, like gastropod shell (Fig. 1).

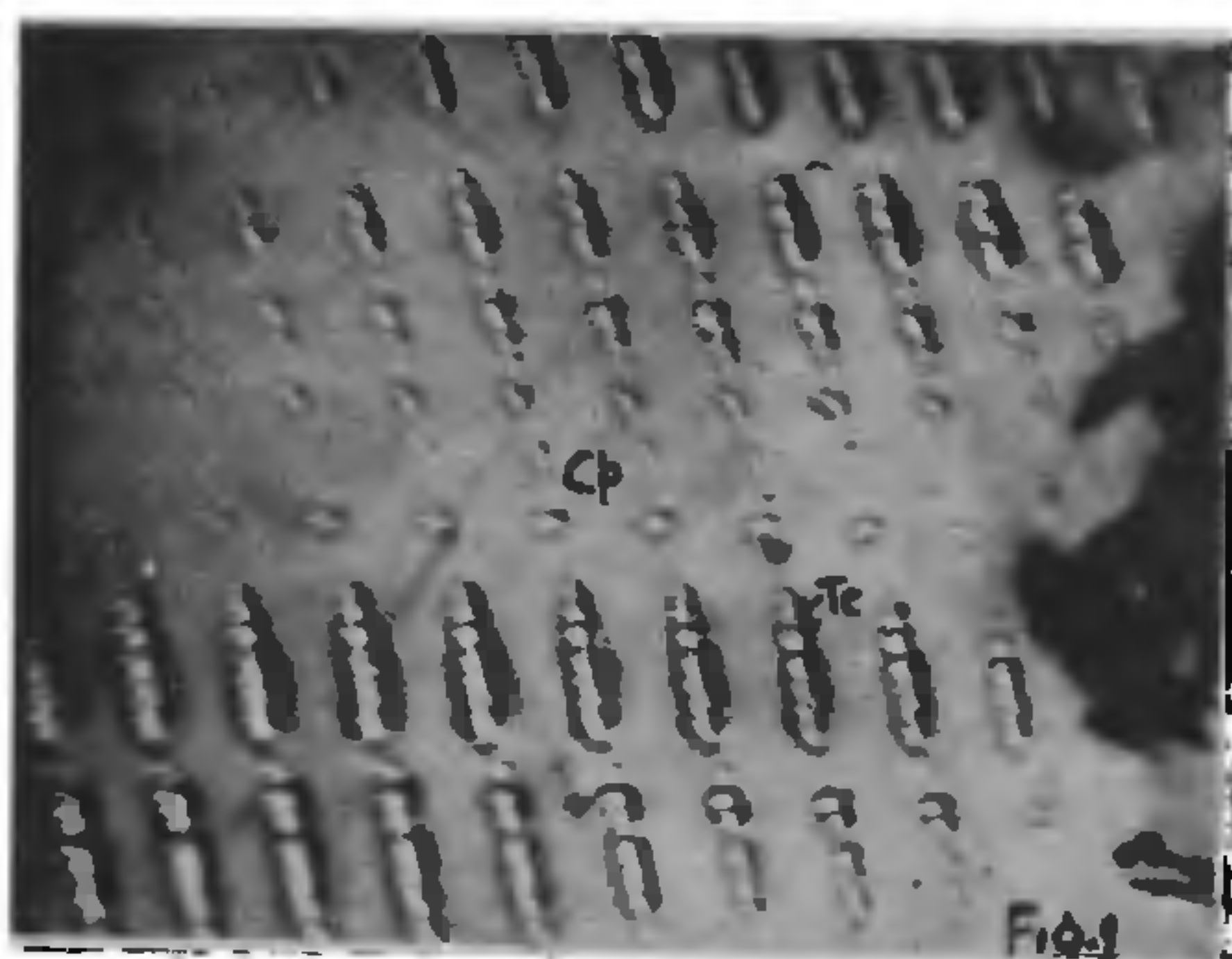


FIG. 1. Serrated exsolution bodies of tetrahedrite (Te) arranged parallel to the axes of chalcopyrite (Cp). 10th level, Surda copper mine,  $\times 100$ .

The serrated form of exsolution bodies are probably the result of torsion produced by complicated tectonic episodes described by Bhattacharya<sup>1</sup>.

The author thanks Prof. S. H. Rasul, Head, Department of Geology, Aligarh Muslim University for discussion and comments on the manuscript, and the Aligarh Muslim University for financial assistance.

September 15, 1980.

1. Bhattacharya, A. C., Contribution to Singhbhum Geology, 1973,

# OIDIUM GREWIAE SP. NOV. AND PHAKOPSORA GREWIAE (PAT. AND HAR.) CUMM.—TWO NEW DISEASES OF GREWIA ASIATICA L. FROM JABALPUR<sup>1</sup>

N. D. SHARMA AND A. C. JAIN

Department of Plant Pathology  
J.N. Agricultural University,  
Jabalpur 482 004

## 1. Powdery mildew : *Oidium grewiae* sp. nov.

The mildew affects both the fruits and pedicel. No infection was noticed on leaves or twigs. Small dull white patches appear on the surface of the fruits at all stages. These patches enlarge covering the fruit partly or wholly with a characteristic dull white powdery coating. At first the infected fruits get russeted and their surface is cracked and growth is checked. Later they are discoloured giving the appearance of premature ripening, ultimately the fruits get mummified with shrivelled and wrinkled skin. Because of pedicel infection many fruits drop off. The pathogen was identified as *Oidium grewiae*.

## *Oidium grewiae* sp. nov.

Colonies sparsus, mycelio superficialis, ramosus, hyalina, diametro inaequalibus, usque  $5.8 \mu\text{m}$  crassae; conidiophores simplicibus erectae vel flexuosa, clavatus, usque 3-septatis,  $32-145 \times 7-9 \mu\text{m}$ ; conidii hyalina, ovalis vel ellipticus, semel cellularis, singulatim procreans  $27-36 \times 18-21 \mu\text{m}$  (Fig. 1).

Habit : in fructus viventibus *Grewia asiatica* L. (Tiliaceae), Krishinagar, Jabalpur, M.P., 26-12-1977, leg. A. C. Jain and N. D. Sharma.

Typus positus in Herb. IMI No. 246977.

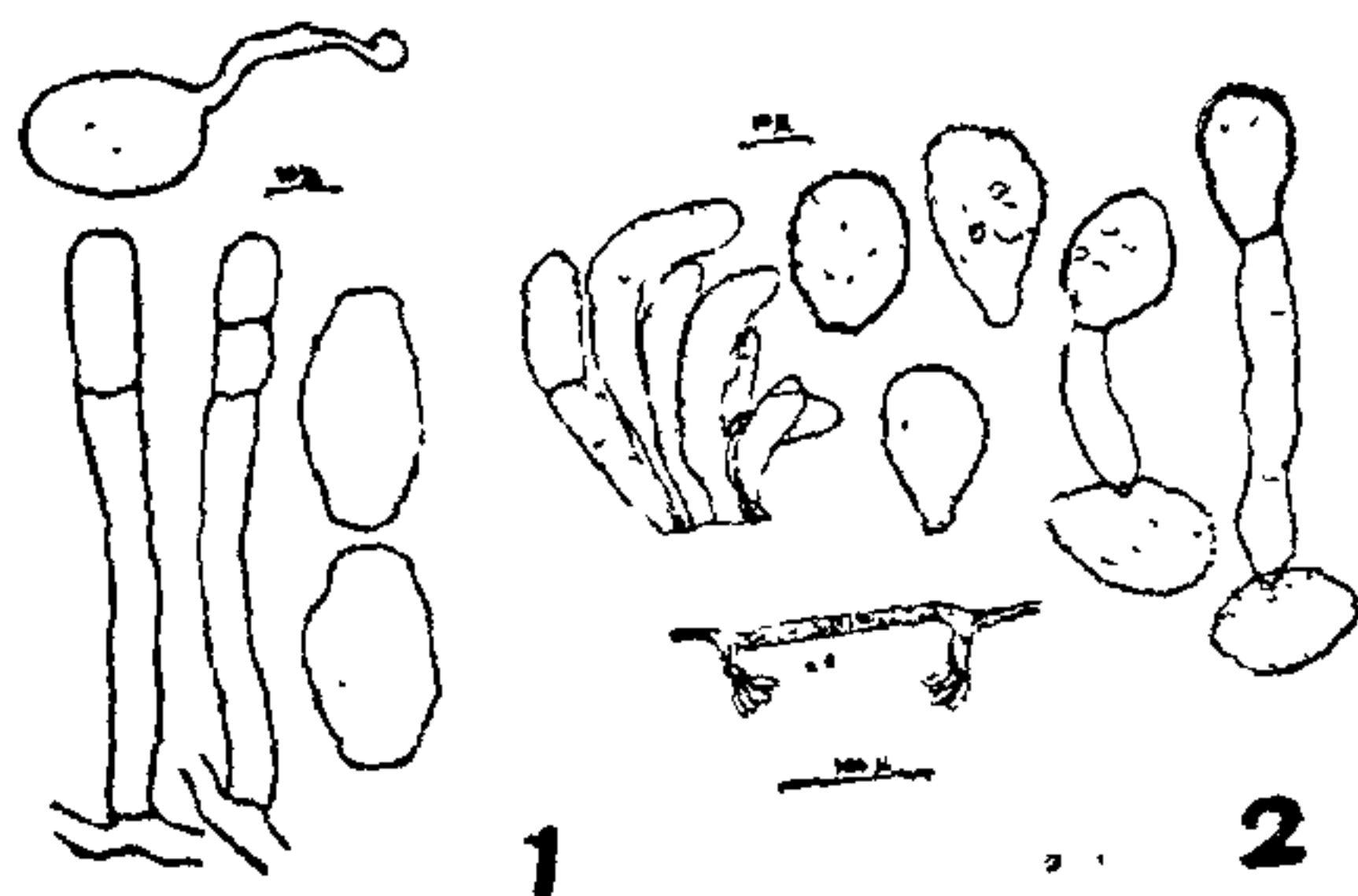
## 2. Rust: Uredo state of *Phakopsora grewiae* (Pat. and Har.) Cumm.

Amphigenous, minute, roundish to irregular, blackish brown spots are formed on the leaf irregularly. In the case of severe infections several adjacent spots may coalesce, thus premature drying of leaves and small underdeveloped fruits result. Sporulation occurs on corresponding lower surface. The spread of the disease was quite rapid and it captured major part of the leaf within a short time.

The causal organism was somewhat similar to *Phakopsora* genus. There is no previous record of this rust from India<sup>1</sup>.

Spermatia, necia and telia were not observed. Uredia hypophyllous scattered, minute, abundant, covering the whole leaf, 0.2 mm in diam. with peripheral incurved hyaline to pale golden paraphyses  $24-45 \times 4-6 \mu\text{m}$ . Urediospores obovoid, ellipsoid or broadly ellipsoid  $24-33 \times 9-21 \mu\text{m}$ , wall pale brownish to nearly hyaline





FIGS. 1-2. Fig. 1. *Acrosporium greviae* sp. nov. Fig. 2. *Phakopsora greviae* (Pat. & Har.) Cumm.

finely echinulate, 1-1.5  $\mu$ m thick with lateral pore, obscure first but visible after germination (Fig. 2).

Urediospores germinate within 24 hr in tap water at 13°-19°C, germination by lateral germ tubes, septate or nonseptate and form a club-shaped or clavate appressoria sometimes equal to the size of spore.

Habitat : On leaves of *Grewia asiatica* L. (Tiliaceae), Krishinagar, Jabalpur, 20-12-1977, leg. N. D. Sharma and A. C. Jain. The type specimen has been deposited in Herb. IMI No. 217529.

The authors express their thanks to Mr. A. Johnston, Director, Drs. J. E. M. Mordue and B. L. Brady of the Commonwealth Mycological Institute, Kew, England, for their generous help in the identification of the species.

February 2, 1978.

1. Bilgrami, K. S., Jamaluddin and Rijwi, M. A., *Fungi of India—1 (List and References)*, Today and Tomorrow's Publisher and Printers, 1979, pp. 467.

## SEROLOGIC RELATIONS AMONG SOME BLUE GREEN ALGAE

B. D. KAUSHIK, C. R. SHARMA,

G. S. VENKATARAMAN AND A. N. SEN

Division of Microbiology, Indian Agricultural Research Institute, New Delhi 110 012

THE traditional taxonomy of blue green algae has been well epitomised by Geitler<sup>6</sup> and Desikachary<sup>8</sup> who have also drawn attention to the inherent limitations in the delimitation of generic and species boundaries in some cases. The confusion is particularly more in Chroococcales, which was further

accentuated by the taxonomic revision proposed by Drouet and Dally<sup>4</sup>. Stainer *et al.*<sup>10</sup> attempted to use the major internal divergences of DNA base composition to obtain clues for the development of a more satisfactory system of classification and based on this they grouped the unicellular blue green algae into three major typological groups. Based on the variations in cellular dimensions of the strains grown in different culture media, Padmaja and Desikachary<sup>9</sup> employed interquartile ranges (IQR) to delimit various forms of coccoid blue green algae. These studies suggested that the commonly designated *Anacystis nidulans* was really a *Synechococcus* (*S. elongatus*)<sup>9</sup> and also supported Hollerbach's merging of *Gloeocapsa* and *Chroococcus*<sup>8</sup>.

In the present investigation, immune-diffusion technique is used to examine the serologic relationship between *Anacystis nidulans* and 9 Chroococcalean and 3 Nostocalean members as well as one eucaryotic unicellular green alga (Table I). Table II summarizes the most important taxonomic characters of the algal forms. The genus *Chlorogloea* is placed in Entophysalidaceae by Geitler<sup>6</sup> and Desikachary<sup>8</sup>. The formation of heterocysts in this alga led to the suggestion for its transfer to Nostocales<sup>5</sup>. It was subsequently raised to a new genus, *Chlorogloeopsis* and assigned to the order Stigonematales<sup>7</sup>.

*A. nidulans* was grown in Bothe medium<sup>1</sup>. *Chlorogloea fritschii* in Detmer medium<sup>12</sup>, *Spirulina platensis* in Zarrouk medium<sup>13</sup> and other forms in Chu 10<sup>2</sup>. Liquid cultures were grown without aeration in Erlenmeyer flasks of 250 ml capacity at 28  $\pm$  1°C. Illumination was provided by two white fluorescent tubes and the light intensity was usually adjusted to lie in the range of 2000-3000 lux at the surface of the culture vessel as measured with Luxomet illumination meter, Model 300. *Gloeocapsa* ARM 338 required low light intensities of about 500 lux for normal growth. Rabbit antisera were prepared with whole cell antigen of *A. nidulans* (10<sup>7</sup> cells/ml) with a titre value of 12,800 according to the modified schedule of Sharma and Sen<sup>11</sup>. The antigen used for immunodiffusion tests were subjected to repeated freezing and thawing.

With its homologous antiserum, *A. nidulans* ARM 336 developed two precipitin bands—a slow diffusible band of somatic antigen and a fast diffusible band of internal (intracellular) antigen. *Synechococcus* ARM 343 (Fig. 1 A, b), *S. cedrorum* ARM 337 (Fig. 1 C, e) and *S. elongatus* ARM 345 (Fig. 1 B, c) also showed homology with respect to the two bands, although *S. cedrorum* ARM 337 showed an additional band of somatic antigen. *S. cedrorum* ARM 344 (Fig. 1 C, f) showed identity with *A. nidulans* with respect to the internal antigen only.