

2. Rao, R. S. N., Satyanarayana, S. V. V. and Sounderajan, V., *Sci. Cult.* 1981. 47, 98.
3. Kamal, M., *Bull. Soc. Fouad. Ier. Ent.* 1951, 35, 221. (RAE 41:415).
4. Narendran, T. C. and Joseph, K. J., *Insects and host specificity.* (The Macmillan Company of India Ltd) 1977, 85.

### AMTASPORA, A NEW PTERIDOPHYTIC SPORE GENUS RECOVERED FROM THE SUBATHU FORMATION OF HIMACHAL PRADESH

SAMIR SARKAR and H. P. SINGH

Birbal Sahni Institute of Palaeobotany,  
Lucknow 226 007, India.

DURING the course of palynological investigations of the Palaeogene sediments of Banethi-Bagthan area of Sirmur district, Himachal Pradesh, the present authors recovered a large number of specimens of trilete miospores from the upper horizons of Subathu Formation (Upper Eocene) exposed along the Amta-Surla bridle path leading to the village of Banethi. The miospores referred to the newly established spore genus *Amtaspora* and consisting of two new species viz *A. pseudostriata* and *A. Indica* are distinctive and morphologically different from the known spore genera. In morphological characters *Amtaspora* has thin and raised y-rays together with apparently striated exine. A detailed morphological study of the specimens reveals that the pseudostriations are formed due to aggregation and virtual merger of the small-sized grana spread all over the surface. The exine appears to be differentially thickened in close proximity to the haptotypic mark where the placement of grana is rather sparser.

*Amtaspora* represented by *A. pseudostriata* and *A. indica* is an important constituent of the *Todisporites* spp. Cenozone which identifies the upper part of Subathu Formation. It is usually associated with the greyish-to-purple shale horizon of the Subathu Formation.

The type material and the slides are housed at the Birbal Sahni Institute of Palaeobotany, Museum, Lucknow.

*Amtaspora* Gen. nov.

*Type species* – *Amtaspora pseudostriata* sp. nov.

*Generic diagnosis* – Miospores triangular to subtriangular in shape, interapical margin straight to convex,

apices broadly rounded. Trilete, laesurae thin and raised, extending more than 2/3 of the spore radius. Exine 3  $\mu$ m thick, granulose, grana beset closely appearing as pseudostriations in surface view, exine thickened along the trilete mark.

*Generic description* – Miospores tetrahedral, triangular to subtriangular in compressed state, interapical sides straight to convex, apices broadly rounded. Trilete mark distinct, y-rays open or closed, laesurae thin, equal, slightly raised extending more than 2/3 of the spore radius. Exine 1.5 to 3  $\mu$ m thick, thicker along the trilete mark, granulose in ornamentation, grana very small in size and closely placed, forming a pseudostriate pattern.

*Comparison* – *Granulatisporites* (Ibrahim) Potonié and Kremp<sup>4</sup> closely resembles the present genus in having similar shape and granulose exine. *Amtaspora* is, however, distinguished by its thickening along the trilete mark and in having a distinct pattern of pseudostriations formed by  $\pm$  amalgamation of granulose ornamentation. A trilete granulose form described by Franke<sup>2</sup> possesses subcircular to circular amb and lacks pseudostriations and hence it is not comparable.

*Osmundacidites* Couper<sup>1</sup> possesses granulopapillose ornamentation and circular to subcircular amb and hence it does not compare with *Amtaspora*. *Scantigranulites* Kar<sup>3</sup> can be distinguished by its distinctly separated and sparsely distributed grana all over the surface, numbering  $\pm 75$  on the perimeter whereas in the case of *Amtaspora* grana are small, generally fused and simulate a pattern of pseudostriations in surface view. Because of the very close disposition of the grana and their virtual fusion in *Amtaspora*, it is difficult to determine their exact number of the perimeter. Evidently the distinct aggregation at the ornamentation of *Amtaspora* assumes a qualitative dimension which separates it from *Scantigranulites*.

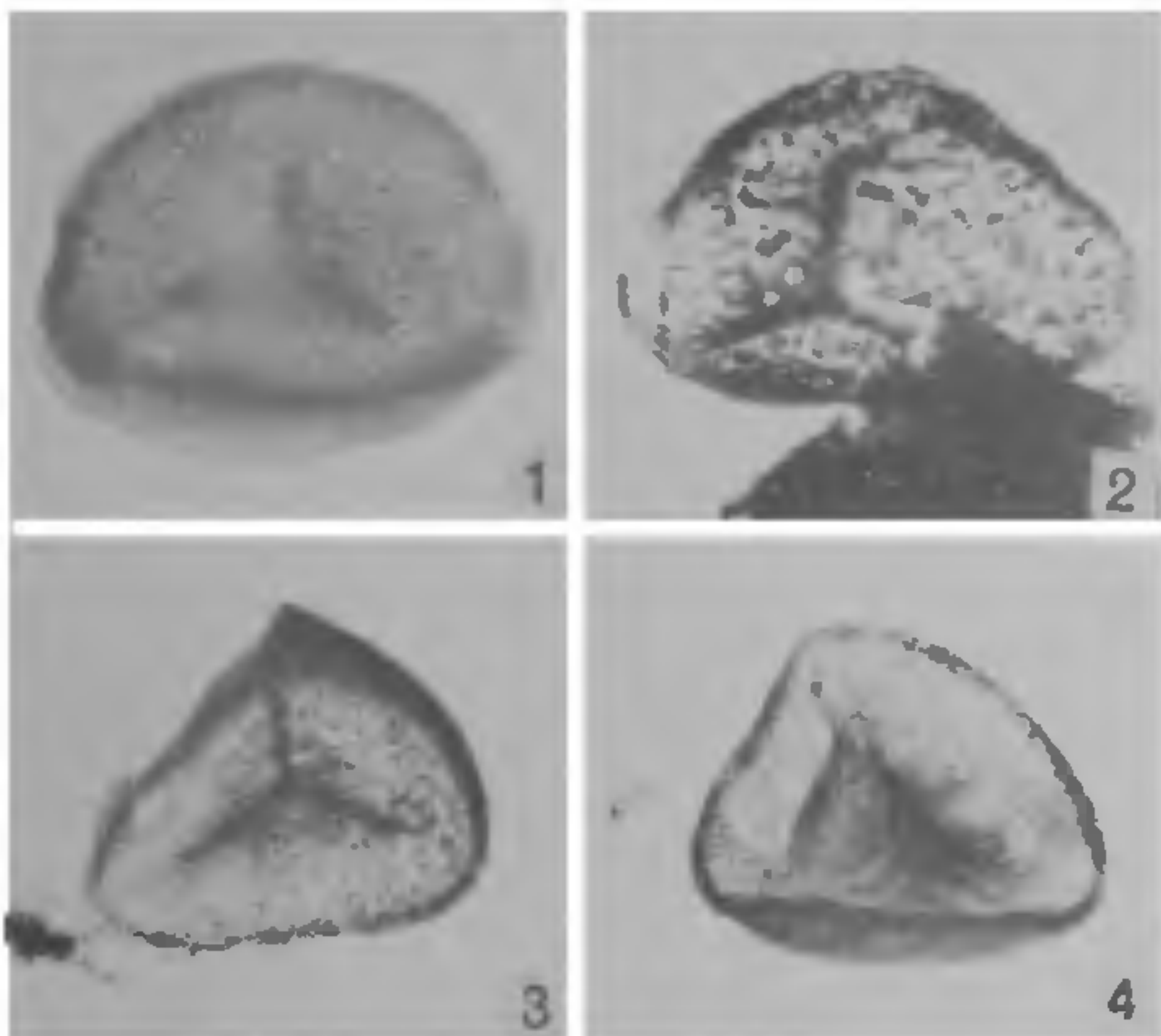
*Amtaspora pseudostriata* sp. nov.

*Holotype* – Figure 1, Size 50  $\times$  60  $\mu$ m, Regd. slide No. 6861, Coordinates 20.4  $\times$  110.5. Birbal Sahni Institute of Palaeobotany, Lucknow.

*Type Locality* – Jhimroti, Subathu Formation, Himachal Pradesh, India.

*Diagnosis* – Miospores subtriangular, interapical margin convex, size range 55 to 65  $\mu$ m. Trilete, laesurae raised, extending upto 2/3 of the spore radius.

Exine  $1.5 - 3 \mu\text{m}$  thick, granulose forming pseudostriations, development of grana more on the distal side than on the proximal one (figures. 1-2, & 5).



Figures 1-4, 1-2. *Amtaspora pseudostrata* sp. nov. slide nos. 6861, coordinates  $20.4 \times 110.5$  (Holotype); 6862, coordinates  $15.5 \times 93$ ; 3-4. *Amtaspora indica* sp. nov., slide nos. 6862, coordinates  $13 \times 87$  (Holotype); 6860, coordinates  $14 \times 91.5$  (All figures  $ca \times 500$ ).

**Description** - Miospores tetrahedral, subtriangular in compressed state, interapical sides convex, apices broadly rounded, trilete mark distinct, y-rays very well

developed, laesurae thin, straight, slightly raised, extending upto  $2/3$  of the spore radius. Exine  $1.5 \mu\text{m}$  to  $3 \mu\text{m}$  thick, granulose in ornamentation, grana small, very closely placed, forming pseudostriations all over the surface, proximal exine also granulose, grana sparsely distributed around the trilete mark and densely distributed on the peripheral region.

**Dimensions** - Holotype: Size of the miospore  $50 \times 60 \mu\text{m}$ ; length of the laesurae  $23 \mu\text{m}$ ; observed range:  $55$  to  $65 \mu\text{m}$  in equatorial diameter; length of the laesurae upto  $25 \mu\text{m}$ .

**Number of specimens examined** - About 70.

**Occurrence of specimens in a slide** - 35.

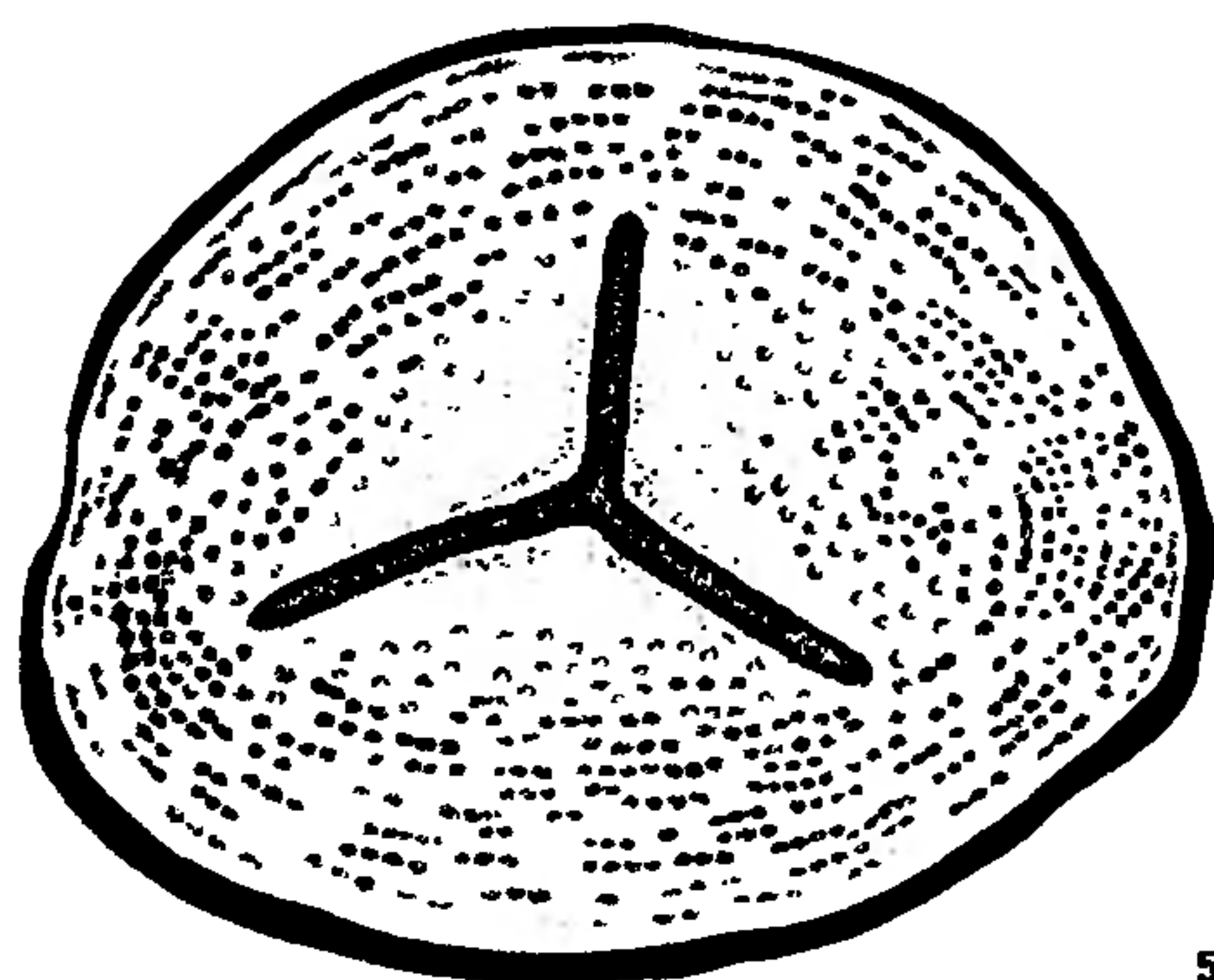
**Affinity** - Schizeaceae.

*Amtaspora indica* sp. nov.

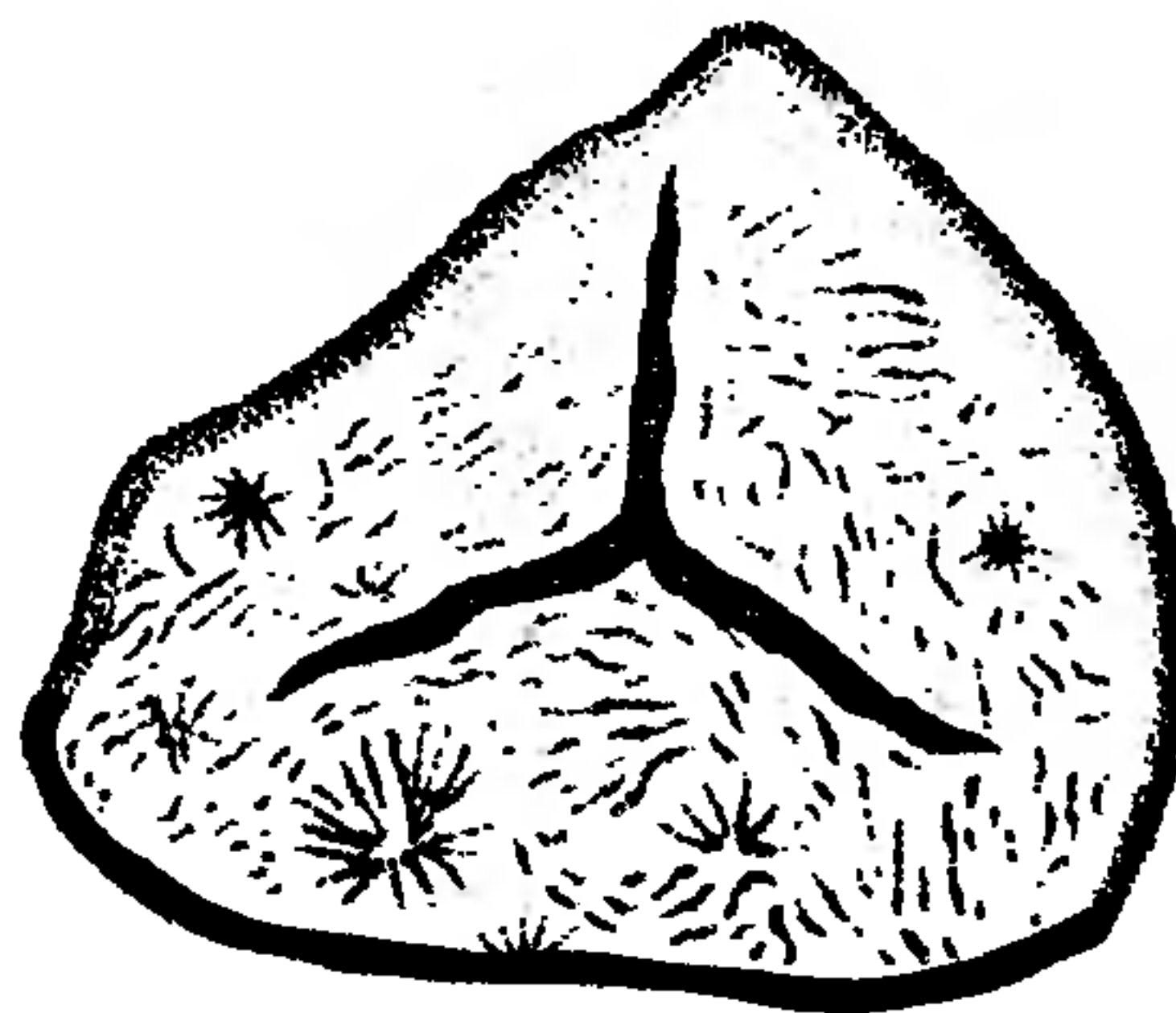
**Holotype** - Figure 3, size  $42 \times 50 \mu\text{m}$ ; Regd. slide No. 6862, coordinates  $13 \times 87$ , Birbal Sahni Institute of Palaeobotany, Lucknow.

**Type locality** - Amta, Subathu Formation, Himachal Pradesh, India.

**Diagnosis** - Miospores subtriangular, size range  $44 - 58 \mu\text{m}$ , interapical margin  $\pm$  straight to convex. Trilete, laesurae sinuous, extending upto  $3/4$  of the spore radius. Exine upto  $2.5 \mu\text{m}$  thick, ornamentation granulose, grana forming several concentric rings on the distal surface (figures. 3-4 & 6).



5



6

150  $\mu$ .

Figures 5 & 6. 5. Text-figure of *Amtaspora pseudostrata*  $\times 1500$  6. Text-figure of *Amtaspora indica*  $\times 1500$ .

**Description**—Miospores subtriangular in shape, apices rounded, interapical margin  $\pm$  straight to convex. Trilete, y-rays distinct, laesurae long, sinuous, extending upto  $\frac{3}{4}$  of the spore radius, lips of the laesurae slightly thickened. Exine  $\pm 2.5 \mu\text{m}$ , ornamentation granulose, grana small in size, very closely placed forming pseudostriations, grana more densely present on the distal surface than on the proximal surface. Several concentric rings of pseudostriations perceptible on the distal surface.

**Dimensions**—Holotype: Size of the miospore  $42 \times 50 \mu\text{m}$ , length of the laesurae upto  $22 \mu\text{m}$ ; observed range: Size of the miospores  $44\text{--}58 \mu\text{m}$  in equatorial diameter, length of the laesurae up to  $25 \mu\text{m}$ .

**Comparison**—*Amtaspora indica* sp. nov. can be distinguished from *A. pseudostriata* by its longer sinuous laesurae and pseudostriations arranged in several concentric rings on the distal surface.

**Number of specimens studied**—About 45.

**Occurrence of specimens in a slide**—About 28.

**Affinity**—Schizeaceae.

18 January 1983; Revised 5 August 1983

1. Couper, R. A., *N. Z. Geol. Surv. Palaeont. Bull.*, 1953, 22, 1.
2. Franke, Fr., *Inaug. Diss. Freie Univ.*, 1965, 1.
3. Kar, R. K., *Palaeobotanist*, 1979, 26, 16.
4. Potonié, R. and Kremp, G. *Geol. Jb.*, 1954, 69, 111.

### A NEW SPECIES OF PSEUDOCERCOSPORA ON BHELU (*TETRAMELES NUDIFLORA* R. Br.)

A. N. SHUKLA and P. C. SARMAH

Forest Pathology Branch, S. F. S. College-cum-Research Centre, Burnihat 793 101, India.

DURING investigation of pathogenic fungi on the forest trees of Assam, a hitherto unreported species of *Pseudocercospora* was found on the leaves of *Tetrameles nudiflora*<sup>1</sup>. No other member of *Datiaceae*, to which this tree belongs, was found to be affected by this pathogen<sup>2</sup>. All the trees surveyed around Burnihat were infected, 80–90% leaves showed infection. The symptoms appear in June, a month after the emergence of a new flush of leaves and remain upto Jan.–Feb., the leaf fall season.

*T. nudiflora* is a fast growing, deciduous, tall tree distributed throughout Assam. The wood is white, soft and very light and is used in the match and plywood industries.

*Pseudocercospora tetramelis* Shukla & Sarmah sp. nov.

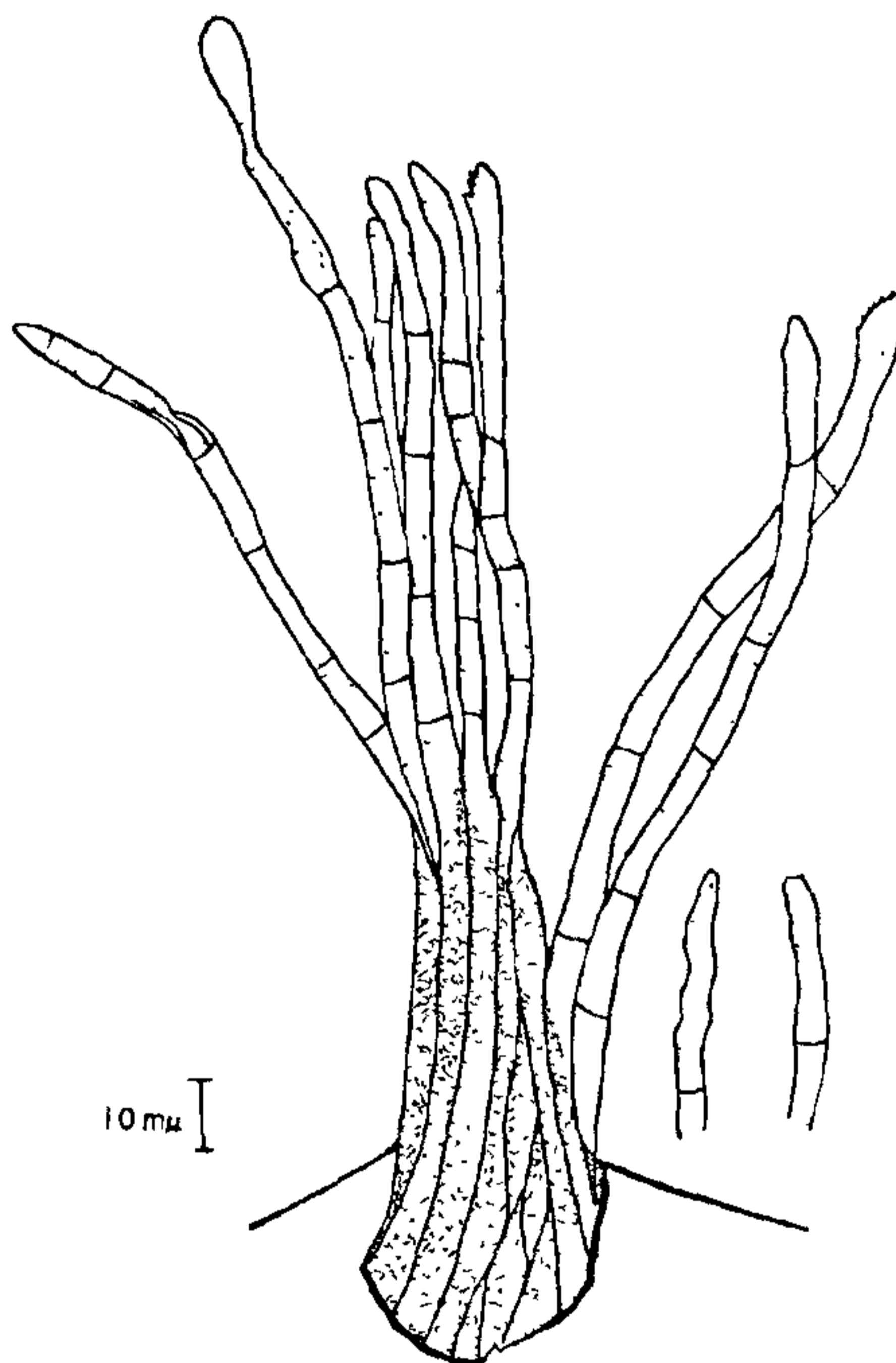


Figure 1. Conidiophores of *P. tetramelis*

Maculae in follis 2–4 mm diam., angulares vel semicirculares, dispersae per totum folium, coalescentes prorovecta aetate, cum margine distincta, circumdatae corona flava ineunte aetate. Color fusce brunneus in facie dorsali et rava brunneus in ventrali. In foliis maturis vel deciduis maculae fere albicantes. Mycelium septatum, ramosum et brunneum, immersum. Conidiophora macronematosa, synnematosata, fila singularia non ramosa, elongata, septate, pars basalis adpressa, liberi in extrema parte brunnea vel olivaceo-brunna, laevia,  $94.6\text{--}189.2 \times 4.26\text{--}14.2 \mu\text{m}$ . Cellulae conidiogenae integratae, in ultima parte minute denticulatae. Conidia solitaria, arida,