ALLOCLADUS PAPILLOSUS N. SP. FROM THE SALT RANGE, PAKISTAN

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Abstract

Allocladus papillosus n. sp. differs from all the known species of *Allocladus* in having papillate subsidiary cells. Besides, some of the ordinary epidermal cells on both the surfaces are also papillate.

Introduction

While editing the paper by Sitholey (1984) on *Otozamites pecten* Sahni & Sitholey, one of us (PKP) came across a few fragmentary specimens measuring 0.4-1.5 cm in length, which apparently looked like *Brachyphyllum* Lindley & Hutton. The specimens had well preserved cuticle and on maceration of some of the leaves, the specimens were found to belong to the genus *Allocladus* Townrow. Like *O. pecten* these specimens also formed a part of the collection, made by Mr. E. R. Gee and Mr. N. K. N. Ayengar of the Geological Survey of India, Calcutta from a river tributary about 2.5 km north-east of Sakesar, Salt Range, Pakistan (then part of undivided India).

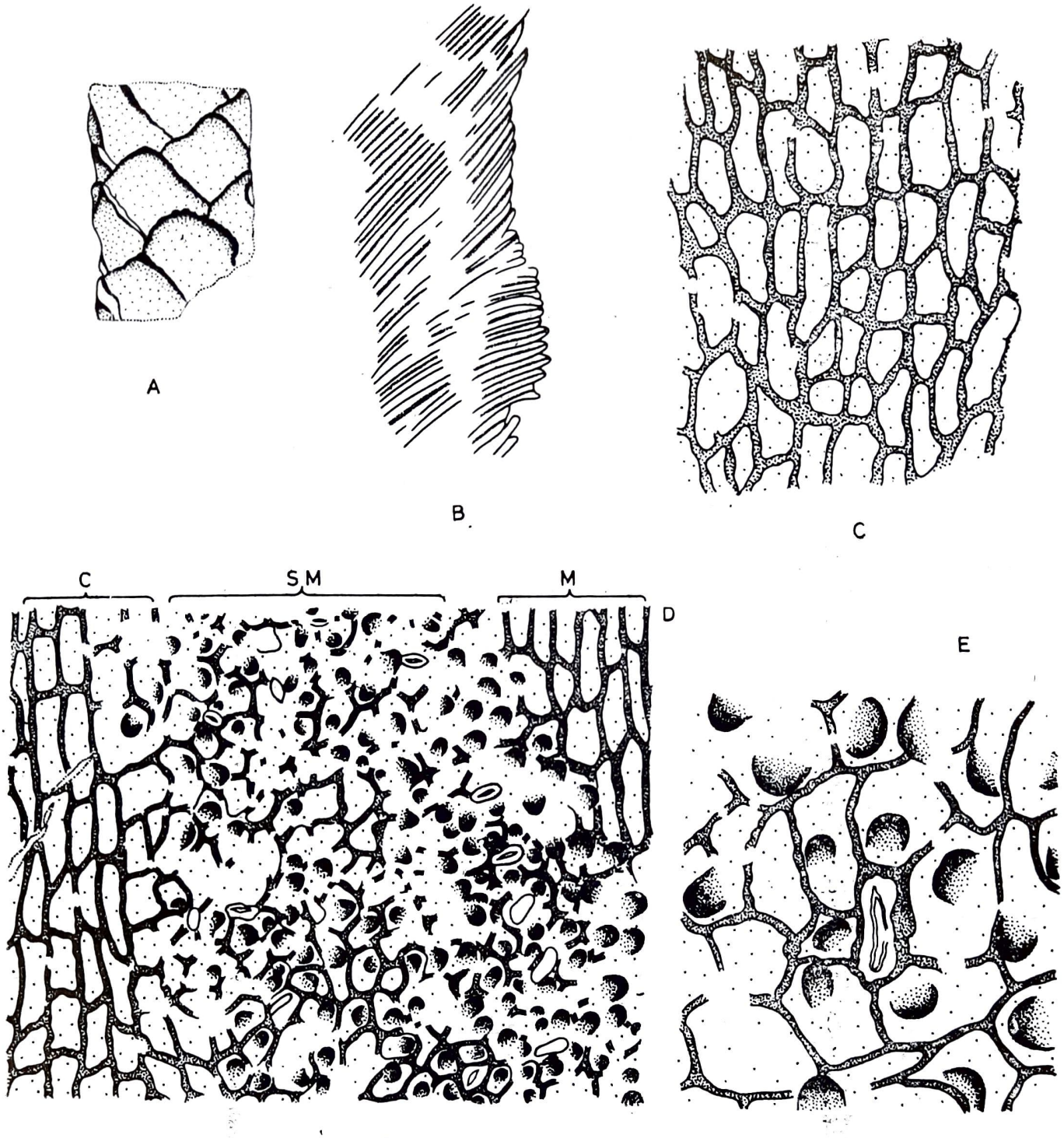
Description

Genus—ALLOCLADUS Townrow, 1967

Allocladus papillosus n. sp.
Pl. 1, Figs. 1-11; Text-fig. 1A-E

Diagnosis—Leafy twig, about 2.5-4 mm in width. Leaves helically borne, rhomboidal, closely appressed, typically 1-3 mm long and 1-3 mm wide, overlapping, basal portion of each leaf hidden by apical portions of leaves lying below; leaf base cushion rhomboidal; apex obtuse, margins scarious and scalloped from base to apex, projections minute.

Leaves epistomatic, upper cuticle having a central triangular astomatic zone, cells within astomatic region squarish or rectangular in shape, having straight or slightly wavy anticlinal walls; periclinal wall even. Cells near base irregular in shape, mostly squarish or polygonal with undulated anticlinal walls; periclinal wall mostly papillate; papillae hemispherical, solid. Cells of stomatal region usually polygonal, sometimes squarish, anticlinal walls more or less straight; periclinal wall usually with a solid papilla; papillae more prominent close to sub-marginal zone, i.e. within stomatal zone. Stomata irregularly distributed, mostly transversely or obliquely orientated, rarely longitudinally placed, at places touching each other. Subsidiary cells 4-6, usually 5 or 6; periclinal wall with a solid papillae covering central region. Guard cells sunken in a cutinized oval or rectangular pit, thinly cutinized, inner wall slightly more cutinized; aperture slit-like. Lower cuticle comparatively much thicker than upper cuticle. Lower cuticle comprising mostly rectangular cells, cells



Text-fig. 1A-E.—*Allocladus papillosus* n. sp., A, holotype showing rhomboidal leaves, G.S.I. negative No. K35/515-4 (7), ×5 ; B, showing scalloped margin of a leaf, G.S.I.Slide no. K35/515-3(1), ×150. C, lower cuticle showing a few cells, G.S.I. Slide no. K35/515-3(2), ×150; D. upper cuticle showing distribution of stomata (C-central non-stomatic zone, SM—papillate stomatal zone, M-marginal zone), G.S I. Slide no. K 35/515-3(2), ×150; and E, showing a stoma, G.S.I. Slide no. K 35/515-2(3). ×400

along middle and marginal regions much longer than width; anticlinal walls usually straight, sometimes slightly undulated; periclinal wall mostly unspecialized, cells near base like those on upper surface. A few stomata also present near extreme base. Stomatal apparatus similar to those on upper surface. At places hypodermal tissue adhering to cuticles of both surfaces.

Holotype—G. S. I. negative no. K35/515-4.

Occurrence—In a river tributary about 2.5 km north-east of Sakesar, Salt Range, Pakistan.

Age—Middle Jurassic (?).

Comparison—*Allocladus papillosus* resembles most *A. townrowii* Sukh-Dev & Zeba-Bano (1979) in gross features. Unlike the present species, in *A. townrowii* the subsidiary and other ordinary cells are non-papillate. Moreover, in *A. townrowii* margins are scalloped only near base. *A. bansaensis* Sukh-Dev & Zeba-Bano (1979) has larger leaves and its cells are non-papillate. Also in *A. bansaensis* stomata are uniformly longitudinally orientated. Leaves of *A. sehoraensis* Sukh-Dev & Zeba-Bano (1979) are somewhat like *A. papillosus*, but in *A. sehoraensis* leaf margins are non-scalloped and its cells are rarely papillate. *A. biswasianus* Bose & Banerji (1984) can be distinguished by the size of its leaves which are larger than *A. papillosus*. In *A. biswasianus* stomata are present only on upper surface; they are mostly obliquely orientated and have 6-7 subsidiary cells. *A. patensis* Banerji (1985) differs from *A. papillosus* in having non-papillate subsidiary cells and here the stomata on upper surface are confined to middle region only.

Allocladus milneanus Townrow (1967) and *A. cribbii* Townrow (1967) reported from the Jurassic of Talbrager and Walloon Coal Measures differ by their larger size of leaves and details of the nature of the cuticle. In the Australian species subsidiary and other ordinary cells are non-papillate.

Acknowledgements

Our thanks are due to Professor Y. Lemoigne, University of Lyon, France for allowing one of us (J. B.) to study the cuticle under SEM.

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Explanation of Plate

1-3. *Allocladus papillosus* n.sp. showing fragmentary twigs, G.S.I. Nos. K35/515-1, K35-515-2 and K35/515/3 × 1.

4. Holotype, showing rhomboidal leaves under SEM, G.S.I. Negative No. K35/515-4, × 10.

5. Leaf margin under SEM, G.S.I. Negative No. 6.

6. Upper cuticle showing papillae and stomatal pits under SEM, G.S.I. Negative No. 12.

7. Inner view of a few stomata belonging to upper cuticle under SEM, G.S.I. Negative No. 11.

8. A stoma from upper side further enlarged under SEM, G.S.I. Negative No. 1.

9. Inner view of a stoma under SEM, G.S.I. Negative No. 8.

10. Upper cuticle showing distribution of stomata, G.S.I. Slide no. K35/515-3(2) × 150.

11. A stoma showing papillate subsidiary cells, G.S.I. Slide no. K 35/515-3/(2) × 500.


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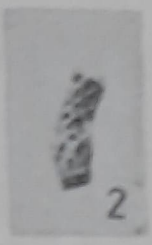
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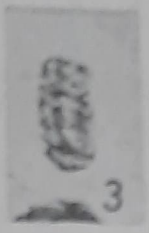
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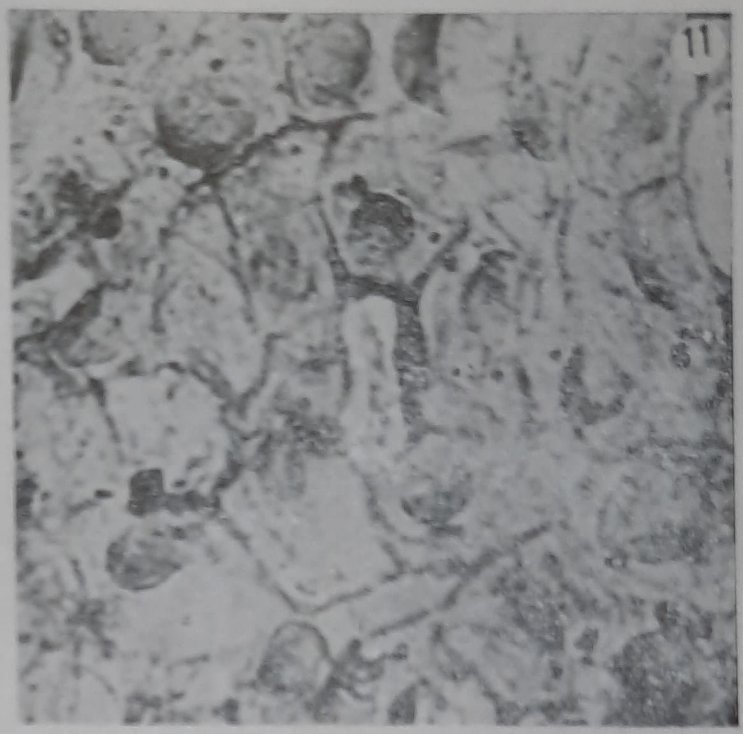
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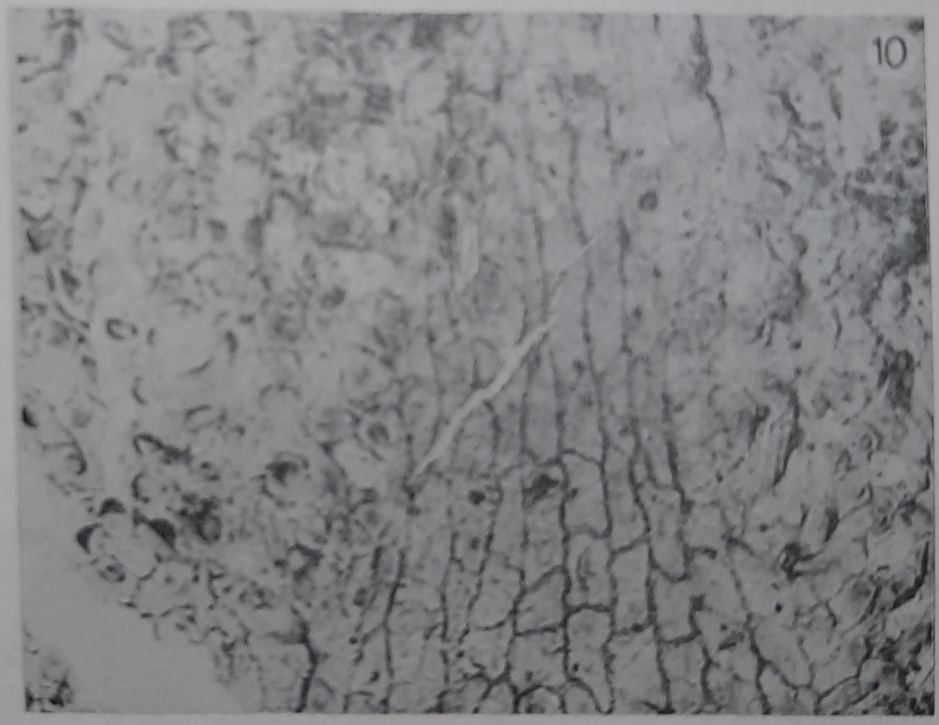
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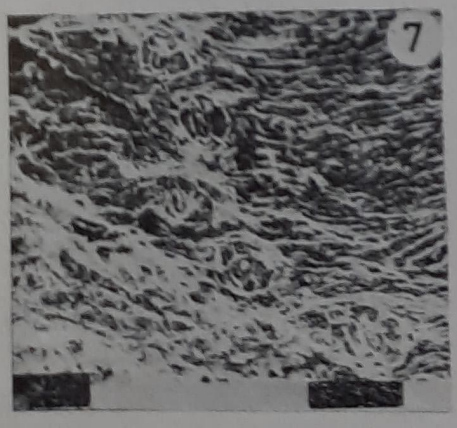
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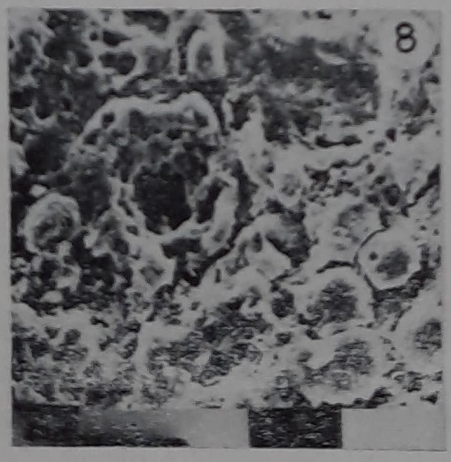
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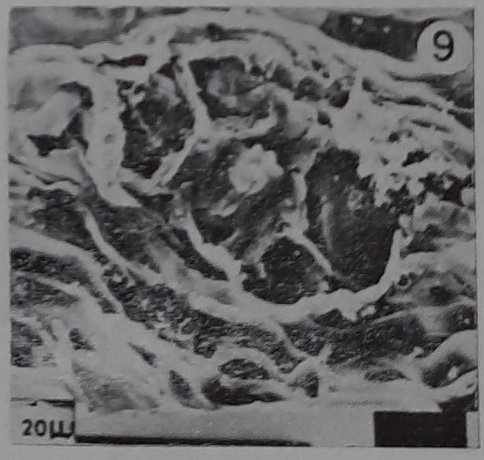
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