

THE FOSSIL FLORA OF THE JABALPUR GROUP— 1. *PTILOPHYLLUM INSTITACALLUM* N. SP.

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ABSTRACT

Ptilophyllum institacallum n. sp. is characterized by its thick lower cuticle with cells having variously shaped papillae. The stomata are irregularly scattered over the lower cuticle which shows no distinction between stomatiferous and non-stomatiferous bands.

INTRODUCTION

LIKE the Yorkshire species (*see*, HARRIS 1949), the Indian species of *Ptilophyllum* may also be placed into two groups, the first having the cuticle like that of *P. acutifolium* Morris described by Seward & Sahni (1920) and the other like that of *P. oldhami* Jacob & Jacob (1954). In the former group the papillae are rare on the lower surface and there is clear distinction between stomatal and non-stomatal bands, but in the latter group the lower side is densely papillate and the stomata are irregularly scattered, without forming any stomatiferous and non-stomatiferous bands. While in the first group species like *P. acutifolium* Seward & Sahni (1920), *P. amarjolense* Bose (1953), *P. indicum* Jacob & Jacob (1954), *P. distanse* (FEISTMANTEL) Jacob & Jacob (1954), *P. cutchense* Morris by Jacob & Jacob (1954), *P. jabalpurensis* Jacob & Jacob (1954) and *P. gladiatum* Bose & Sukh Dev (1957) are included, in the second group we have, so far, only *P. oldhami* Jacob & Jacob (1954) and *P. sakrigaliensis* Sah (1958). *P. nipanica* Vishnu-Mittre (1956) may at present be regarded as a transitional form as it shows resemblance with both the groups. It resembles the first group in having only a few papillate cells on the lower side, the second group in having stomata scattered on the entire lower surface (leaving only a few cells of the marginal and apical region) without the distinction between the stomatiferous and non-stomatiferous bands.

The species described here is included in the second group. The description is based on two fragmentary leaves collected by me and Mr. K. Suryanarayana in March 1957 from

Sher river cutting near the village Sehora, Narsinghpur District, Madhya Pradesh.

DESCRIPTION

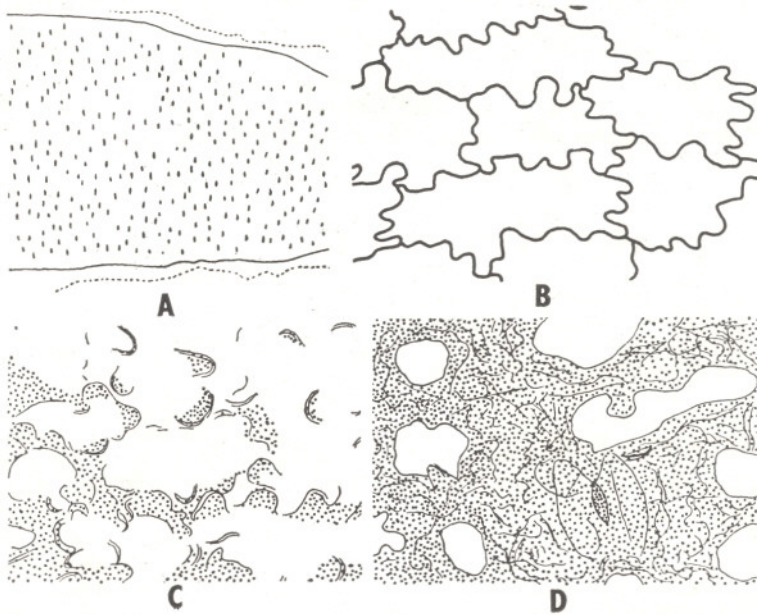
Ptilophyllum institacallum n. sp.

Pl. 1, Figs. 1-8; Text-fig. 1A-D

Fronde — Leaf incomplete both at the apex and base. Leaf length unknown, maximum breadth 1.6 cm. Pinnae closely set or usually overlapping, attached by their full breadth over the rachis, entirely concealing it. Upper basal corner rounded, lower mostly concealed by the pinna below, apex obtusely pointed. Pinnae typically 1.1-2 cm. long, 2-2.5 mm. broad, upper margin nearly straight, lower slightly curved. Veins inconspicuous, nearly parallel, sometime dividing.

Cuticle — RACHIS: Cuticle thick on both the sides. Epidermal cells on the upper side rectangular or rhomboidal. Lateral- and end-walls straight or undulated, surface unspecialized. Cells of lower cuticle square or rectangular. Lateral- and end-walls sinuous, folds not deep, surface unspecialized.

LAMINA: Cuticle thick, lower much thicker than the upper. Upper devoid of stomata, veins not indicated, composed of more or less rectangular cells with sinuously folded walls. Folds occupying more than one-third of the breadth of the cell. Surface-wall flat. Lower cuticle showing a marginal and apical region with non-papillate cells like those of the upper cuticle, and an inner region of stomates and papillate cells. The inner region, devoid of stomatal and non-stomatal bands. Stomata irregularly scattered, mostly transversely orientated, few slightly oblique. Marginal and apical cells rectangular to irregular, forming longitudinal rows; cell outline sinuous as on the upper side but with less folds. Except for the few cells near the marginal region, the cell-walls of the inner region not clearly marked due to the irregular development of the papillae. Almost all the cells bearing more than one large thickly cutinized, hollow papillae. Papillae near the marginal area dome- or



TEXT-FIG. 1 — *Ptilophyllum institacallum* n. sp. A, fragment of lower cuticle, showing the distribution of stomata, No. 28719. $\times 25$. B, lower cuticle, showing the non-papillate cells of the marginal region, No. 28832A/1. $\times 300$. C, lower cuticle, showing papillate cells towards the outer region, No. 28719. $\times 300$. D, lower cuticle, showing the development of papillae near the centre, No. 28832A/1. $\times 300$.

crested-shaped, or conical or mushroom-shaped. But little further inwards papillae of each cell develop around the cell-wall, mostly they join or overlap each other so as to form a 'frill like' structure. They are even overlapped by the papillae of the adjoining cells, ultimately giving an appearance of a raised thick sheet over the entire inner surface, showing in the centre of each cell a hollow pit representing the non-cutinized area of each cell. Development of papillae in each cell rather variable, when strongly developed cell outlines are almost invisible, but when feebly developed, cell outlines are conspicuous (mostly near the marginal region).

Stomata sunken, almost concealed by overhanging cell papillae. Guard cells crescent-shaped, well cutinized subsidiary cells devoid of papillae. Subsidiary cells more thickly cutinized than the ordinary cells.

Locality — Sher river, near Sehora.

Collection — Type specimen No. 28832 of the Birbal Sahni Institute of Palaeobotany Museum.

Age and Horizon — Jurassic, Jabalpur series.

COMPARISON AND DISCUSSION

The cuticle of *P. institacallum* is essentially of the type described by Jacob & Jacob (1954) as *P. oldhami*. Except for the papillae the cuticle of these two species is very similar. While in *P. oldhami* on the lower side each cell has a single large papilla, in *P. institacallum* each cell of the papillate region has more than one papillae and the papillae here join and overlap each other in such a way that they almost form a somewhat raised sheet over the lower cuticle. Moreover, the pinnae in *P. oldhami* are short and broad and their apex is roundly obtuse. Whereas, in *P. institacallum* the pinnae are narrow and their apex obtusely pointed. *P. institacallum* differs greatly from *P. sakrigaliensis* Sah in the general form of the pinnae. In *P. sakrigaliensis* pinnae are linear-lanceolate and are separate. The cells of the lower cuticle in *P. sakrigaliensis* have a single large papilla and the stomata are sparse. From *P. nipanica* Vishnu-Mittre present species can readily be distinguished by their papillae alone. In *P. nipanica* papillae on the lower side are not

so distinct, but the subsidiary cells are papillate. Pinnae of *P. nipanica* are falcate with pointed apex. In *P. pecten* (Phill.) Morris described by Thomas & Bancroft (1913) and Harris (1941, 1949) the lower cuticle shows distinction between stomatal and non-stomatal bands. Each cell has

only one papilla which is round. *P. hirsutum* Harris (1949) differs from *P. institacallum* in having cells with single papillae which are oval and often divided, lower cuticle shows stomata forming bands between the veins and the subsidiary cells are papillate.

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EXPLANATION OF PLATE 1

Ptilophyllum institacallum n. sp.

1. *P. institacallum* n. sp. No. 28902. $\times 1$.
2. *P. institacallum* n. sp. Type specimen No. 28832A. $\times 1$.
3. Upper cuticle of the rachis. Slide No. 28832A/4. $\times 200$.
4. Lower cuticle of the rachis. Slide No. 28832A/4. $\times 200$.
5. Lower cuticle of the lamina, showing the non-papillate marginal cells. Slide No. 28832A/3. $\times 200$.
6. Upper cuticle of the lamina. Slide No. 28832A/2. $\times 200$.
7. Lower cuticle of the lamina, showing cells of papillate region. Slide No. 28832A/1. $\times 200$.
8. A stoma. Slide No. 28832A/1. $\times 500$.



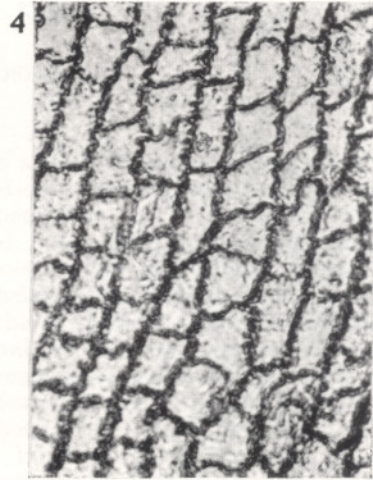
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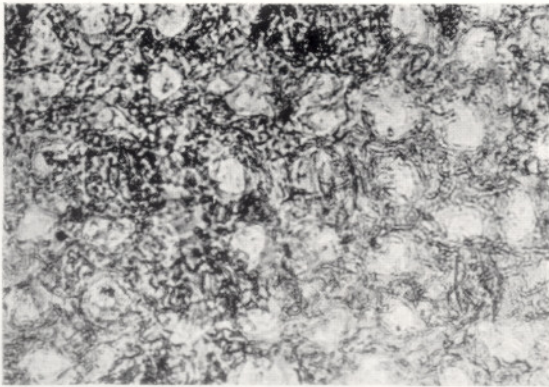
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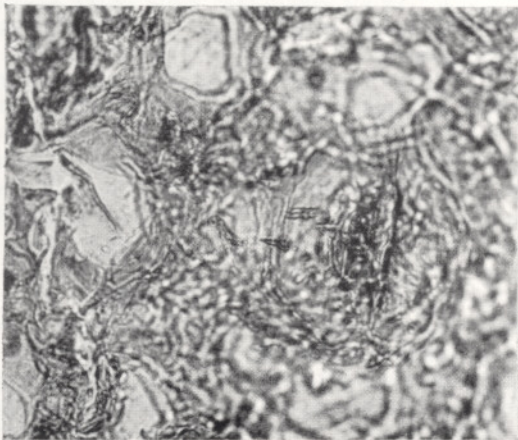
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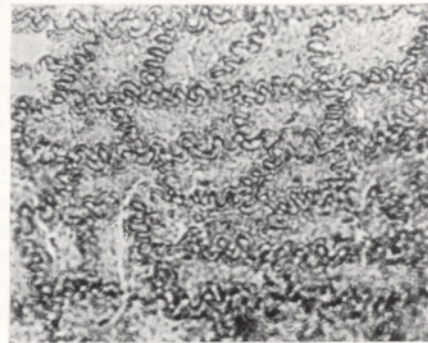
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