

# *Cheirophyllum maithyi* sp. nov. from the Early Permian of Pench Valley Coalfield, Satpura Gondwana Basin, India

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## ABSTRACT

Pillai SSK 62012. *Cheirophyllum maithyi* sp. nov. from the Early Permian of Pench Valley Coalfield, Satpura Gondwana Basin, India. The Palaeobotanist 61(1): 139-143.

A new species of the genus *Cheirophyllum*, viz. *C. maithyi* is described from the Pench East Incline underground project, Pench Valley Coalfield, Satpura Gondwana Basin, Madhya Pradesh. The species is characterized by absence of apical lobes, obtuse apex and ridges and furrows on lamina. Ridges show a number of thin veins.

**Key-words**—*Cheirophyllum maithyi*, Early Permian, Pench Valley Coalfield, Satpura Gondwana Basin, India.

पेंच घाटी कोयलाक्षेत्र, सतपुड़ा गोंडवाना द्रोणी, भारत के प्रारंभिक पर्मियन से प्राप्त *कायरोफिल्लम मैथयाई* नवजाति  
एस एस के पिल्लै

## सारांश

पेंच पूर्वी आनति भूमिगत परियोजना, पेंच घाटी कोयलाक्षेत्र, सतपुड़ा गोंडवाना द्रोणी, मध्य प्रदेश *स्कायरोफिल्लम* वंश की नवीन जाति *सी. मैथयाई* वर्णित की गई है। जाति शीर्ष पालि, कुंठाग्र शीर्ष की गैर-मौजूदगी और कटकों की मौजूदगी से अभिलक्षणित है तथा पटल, कटकों पर खांचे बहुत-से तनु शिराएं दर्शा रहे हैं।

**केत-शब्द**—*कायरोफिल्लम मैथयाई*, प्रारंभिक पर्मियन, पेंच घाटी कोयलाक्षेत्र, सतपुड़ा गोंडवाना द्रोणी, भारत।

## *Cheirophyllum Maithyi* sp. nov. do Eopermiano do Hulhífero Pench Valley, Bacia de Satpura, India

## RESUMO

Uma nova espécie do gênero *Cheirophyllum* viz. *C. maithyi* é descrita a partir do projeto de sub-superfície Pench East Incline, Hulhífero Pench Valley, Bacia de Satpura, Madhya Pradesh. A espécie é caracterizada pela ausência de lobos apicais, ápice obtuso e presença de cristas e sulcos sobre a lâmina, mostrando as cristas, numerosas veias finas.

**Palavras-chave**—*Cheirophyllum maithyi*, Eopermiano, Hulhífero Pench Valley, Bacia de Satpura, India.

The Genus *Cheirophyllum* was established by Pant and Singh 1978 (Pls 1, 2; Text-figs 1, 2) for leaves showing contracted base and deeply divided narrow lobes on the distal side. The veins are parallel, non-anastomosing, lobes

multi veined with 1-3 medium longitudinal ridges or furrows present in basal part.

Similar leaf was earlier described as *Noeggerathiopsis lacerata* by Feistmantel (1882, Pl. 15, Figs 1-3, 4a; Pl. 17, Figs

2, 3) from the Karharbari Formation of South Rewa Gondwana Basin. This leaf was deeply incised at apical margin, convex in shape and with distinct median grooves. Later, Zeiller (1902, Pl. 7; Figs 2, 3) and Arber (1905) expressed doubt over the inclusion of this specimen under the genus *Noeggerathiopsis*. Arber (1905) enclosed the generic name in square bracket as to indicate that the species should be transferred to some other genus. Seward and Sahni (1920, Pl. 2; Figs 16, 17) considered it as a scale leaf following Feistmantel (1882) who described the leaf as *Squama* forma *lacerata*.

Maithy (1965, Pl. 2; Figs 16-20, Text-figs 11, 12) considered such leaves as protective scales and instituted a new genus *Palmatophyllites*. Pant and Singh (1978) discovered similar leaves from Giridih Coalfield and re-examined the specimen of Maithy and observed that the genus *Palmatophyllites* is not in accordance with the ICBN and renamed the genus *Palmatophyllites* as *Cheirophyllum*. Pant and Singh (1978) observed that the leaves do not have the megasporophyll, rather they represent simple foliage leaves characterized by apical lobes. The lobes are bluntly pointed, lamina tapering towards base end showing one or few ridges and grooves.

The present specimens lack the deeply lobed apex and the ridges show thin parallel running veins. The ridges dichotomize twice as they proceed towards the apex of the leaves. These specimens are therefore, different in morphological features noticed by earlier workers.

## MATERIAL AND METHODS

The carbonized impressions of leaves were collected from Pench East Incline underground project, Pench Valley Coalfield, Satpura Gondwana Basin, Madhya Pradesh. The Pench Valley Coalfield lies between 22°09' and 22°14' north latitude and 78°40' and 78°55' east longitude and is more or less continuous with the Kanhan Valley. The coalfield extends from east-west direction from Sirgora (east) to Datla (west) Colliery in western periphery. In this coalfield, the coal seams occur in thick sequence (250 m) of Barakar sediments. There are 5 coal seams in the sequence of 50-80 m which are numbered as I (top) to V (bottom). Only Seam No. I (top) has workable thickness (3.5-6.5 m) throughout the area. Rest of the seams are thin, discontinuous and occur in patches. The coal seams are associated with white to greyish, coarse to medium grained sandstones, carbonaceous sandstones and carbonaceous shales. The lowest member of the Lower Gondwana namely Talchir rests unconformably on the Archaean and is exposed along the southern portion of the Barakar rocks that occur in a long strip running east-west, but their exposure is generally met with only in the Pench nala section. Rawanwara area of Pench Valley Coalfield of Satpura Gondwana Basin located in the north-east of Parasia township, Chhindwara District, Madhya Pradesh is situated 3 km west of Sirgora on the west bank of the Pench River and lies at about 78°50' N and 22°10' E (Fig. 1). The fossiliferous horizon belongs to the Lower Barakar Formation.

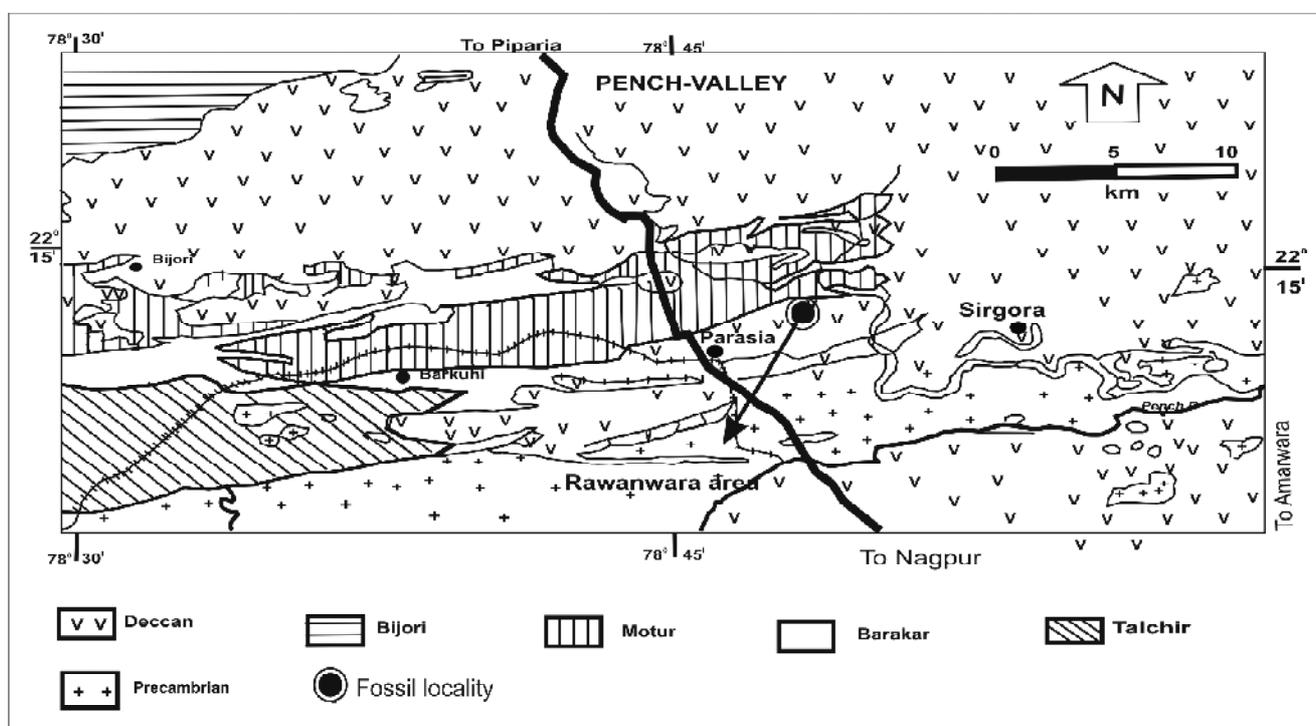


Fig. 1—Geological map of Pench Valley Coalfield, Satpura Gondwana Basin showing fossil locality (After Singh & Shukla, 2004).

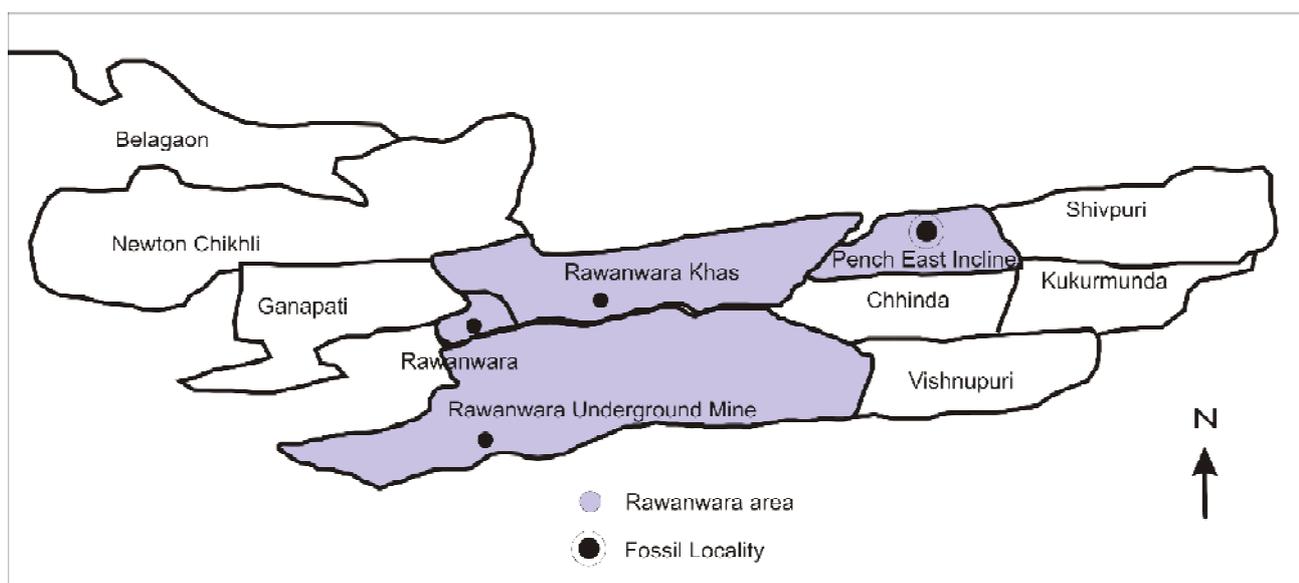


Fig. 2—Map showing different Collieries of Rawanwara area.

There are four specimens in the collection. The specimens were collected from Seam No. V (2.74-11.95 m) of Pench-East incline- underground project (Fig. 2). The leaves are preserved in carbonaceous shale exposed above the coal seam. The specimens belong to the Lower Barakar Formation. The morphological features were examined under Low power binocular microscope (Wilo Herbrugg IX) under incident light.

#### SYSTEMATICS

**Genus**—*CHEIROPHYLLUM* (Fiestmantel) Pant & Singh, 1978

**Type Species**—*Cheirophyllum laceratae* (Fiestmantel) Pant & Singh, 1978

*Cheirophyllum maithyi* Pillai sp. nov.

(Pl. 1.1, 2, 3; Fig. 3)

**Diagnosis**—Leaves simple, lamina spatulate, contracted towards base, apical lobes absent, apex wide, obtuse, lamina with longitudinal ridges, ridges dichotomize twice before reaching the apex, veins fairly thin, 3-4 per ridge, dichotomize, do not anastomose, midrib absent, one distinct median longitudinal ridge present up to middle part of the lamina.

**Holotype**—BSIP Museum Specimen No. 39895.

**Horizon**—Barakar Formation.

**Age**—Permian.

**Locality**—Pench East Incline Underground Project, Pench Valley Coalfield, Satpura Gondwana Basin, Madhya Pradesh, India.

**Etymology**—After Dr PK Maithy, eminent Gondwana worker of Birbal Sahni Institute of Palaeobotany, Lucknow.

**Description**—There are 4 well preserved leaf impressions in the collection, of which one is almost complete. The size of the leaves varies from 4.2-6.5 cm in length and 2.2-2.5 cm in width. The leaves are spatulate in shape, tapering towards base. Lamina shows 12-14 ridges and grooves

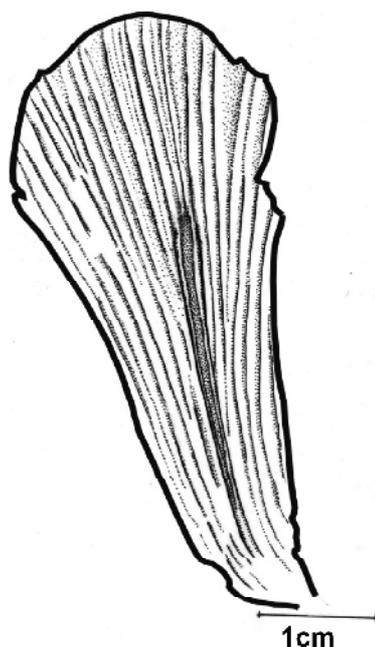
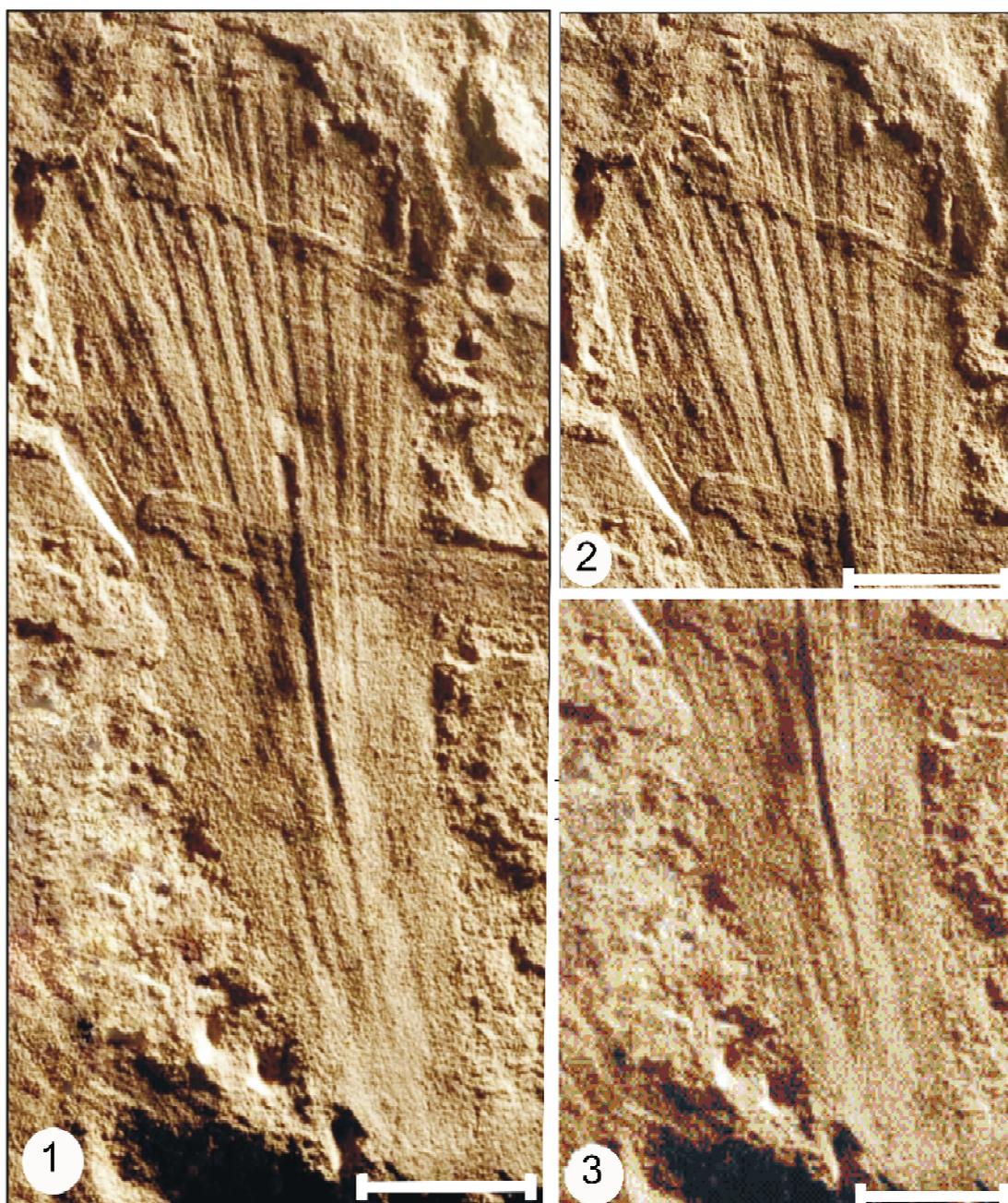


Fig. 3—*Cheirophyllum maithyi* sp. nov., line drawing showing the details of venation pattern of leaf. BSIP Specimen No. 39895.



**PLATE 1**

1-3. *Cheirophyllum maithyi* sp. nov. ( scale bar = 1 cm)

1. *Cheirophyllum maithyi* sp. nov., showing the complete leaf. BSIP Specimen No. 39895.
2. *Cheirophyllum maithyi* sp. nov., Leaf shown in Fig. 1 enlarged to show the details of venation pattern at upper part of leaf. BSIP Specimen No. 39895.
3. *Cheirophyllum maithyi* sp. nov., Leaf shown in Fig. 1 enlarged to show the details of venation pattern at lower part of leaf. BSIP Specimen No. 39895.

running longitudinally from base towards apex. The ridges dichotomize twice as they proceed towards apex. There are 3-4 fairly thin veins per ridge, veins run parallel to ridges. A median arises from base to the middle part of the leaf and is 4.4 cm long. Base of leaves is 0.7-2.2 cm wide. The basal part

of leaves shows 2-4 ridges, ridges 0.9-1.2 mm wide alternating with 4-5 grooves of 0.2-0.5 mm width. Median ridge is distinct, 0.6-1.5 mm wide and terminates near the middle part of the leaf. The vein density is 22-24 per cm.

**Comparison**—Only one more species of the genus *Cheirophyllum*, viz. *C. lacerata* is known from the Karharbari Formation of the Giridih Coalfield (Pant & Singh, 1978, Pls 1, 2; Text-figs 1, 2). Present leaves have ridges and furrows with distinct median ridge and are comparable with the leaves of *Cheirophyllum lacerata* but they differ from *C. lacerata* as the apical lobes are absent. The apex is wide obtuse (Pl. 1.1-3; Fig. 3). Hence, the leaves here described are placed under a new species viz. *Cheirophyllum maithyi*.

**Discussion**—The genus *Cheirophyllum* has been reported for the first time from the PENCH VALLEY COALFIELD. This is the second record from the Indian Gondwana after its institution by Pant and Singh (1978, Pls 1, 2; Text-figs 1, 2) from the Karharbari Formation of the Giridih Coalfield. All the earlier described specimens related to this genus, i.e. *Noeggerathiopsis lacerata* (Feistmantel, 1882), *Palmatophyllites lacerata* (Maithy, 1965) and *Cheirophyllum lacerata* (Pant & Singh, 1978) are recorded from the Karharbari Formation. Recently, Iannuzzi *et al.* (2010, Fig. 4E) described another species of this genus, i.e. *Cheirophyllum speculare* from Parana Basin, Brazil from the Itarare Group (Sakmarian). All these records of *Cheirophyllum* suggest that this taxon is characteristically found in Early Permian horizons. Till date it is not recorded from younger horizons of Lower Gondwana.

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