

***Bucklandia mucilagica* sp. nov. (*Bennettitales*) from the Mesozoic sediments of Rajmahal Hills, Jharkhand, India**

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ABSTRACT

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Bucklandia mucilagica, a new species of *Bucklandia* J. Presl, is described here. It possesses numerous mucilage canals in association with the protoxylem elements, surrounding the wide pith and in the secondary phloem of the stem. Scattered solitary canals are also visible in the pith and cortex of the stem. The present account of anatomy is based on the study of only cross sections of the stem.

Keywords: Bennettitalean stem, *Bucklandia mucilagica*, mucilage canals, new species, Rajmahal Hills, India.

INTRODUCTION

The extinct bennettitalean stem genus *Bucklandia* was established by Presl (1825) on the basis of material collected from the Wealden flora of Vorwelt (Germany). Bancroft (1913) studied anatomy of the Indian Jurassic plants and noted compact secondary wood in some cycadean stems. Seward (1917) described *Bucklandia indica* in his book 'Fossil Plants' Vol.III. Later, based on morphology and anatomical details, three more species of *Bucklandia* were described from the Rajmahal Hills, viz. *B. sahnii* Bose 1953, *B. guptae* Sharma 1967 and *B. dichotoma* Sharma 1969. Existence of scattered tracheary elements were reported in the pith of a *Bucklandia* sp. collected from the Rajmahal Hills by Sharma (1974). Sharma et al.

(2006, 2013) described distribution of mucilage canals in bennettitalean plants collected from the Rajmahal Hills.

Sahni (1932) associated *Williamsonia seawardiana*, a new species, with the stem of *Bucklandia indica* Seward and suggested a reconstruction. He had noticed similarities in the structure and distribution of the mucilage canals of the *Bucklandia* stem and the peduncle of *W. seawardiana*. Sharma (1974, 2014) confirmed the phylogenetic relationship between the stem *Bucklandia* and the fructification *Williamsonia*. In the present paper, association of mucilage canals with the protoxylems of the vascular strands and occurrence of secondary phloem in horizontal sequence of mucilage canals of the stem in regular sequence is described.

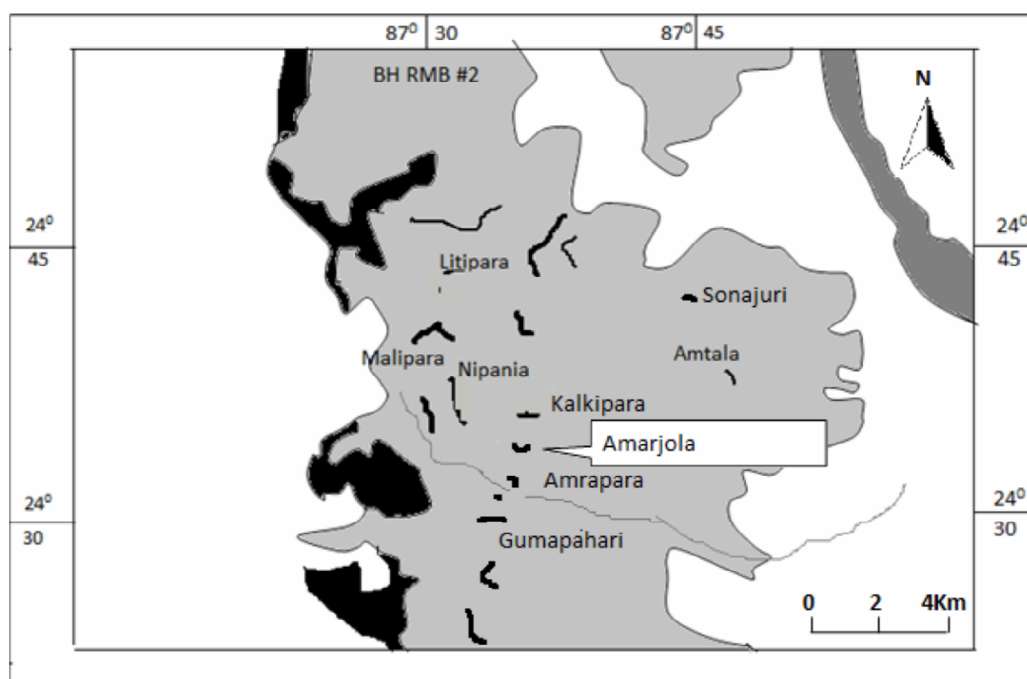


Figure 1. Showing Amarjola locality in Pakur District, Jharkhand, India, from where plant fossil specimens were collected.

MATERIAL AND METHOD

The material was collected from Amarjola locality (Lat. 24°32'22.5"N, Long. 87°34'38.1"E), situated 2.4 km northeast of Amrapara on Pakur-Dumka Road (Figure 1). The petrified plant fossils were found embedded in dark brown sandy rock which were taken out by digging with an axe. Being fragile in nature, the specimens were wrapped in a cotton pad. The material was boiled in canada balsam prior to sectioning with a wire band saw. Slides were prepared by the usual technique of cutting, grinding and polishing method and mounting in dilute canada balsam.

This locality has yielded fossil plants belonging to *Osmundales* (Gupta 1970, Sharma 1973, Sharma et al. 1979), *Matoniaceae* (Sharma & Bohra 1978), cycads, *Bennettitales*, *Pentoxylales* and conifers belonging to *Podocarpaceae* and *Araucariaceae*.

DESCRIPTION

Bucklandia mucilagica B.D. Sharma, Harsh & Suthar **sp. nov.**

Figure 2.1–4

Holotype: Type slide number BD245/RajA. Repository: Museum, Birbal Sahni Institute of Palaeosciences, Lucknow, India.

Diagnosis: Stem piece unbranched, leaf bases in spiral, decurrent with oval or little circular upper ends, wide pith with scattered mucilage canals, protoxylem points many, dark coloured each associated with 2–4 mucilage ducts. Secondary wood compact and well developed, secondary phloem has 4–6 horizontal rows of mucilage canals, solitary or in small groups. Each leaf base has 5–7 bundles arranged in typical bennettitalean type.



Figure 2. *Bucklandia mucilagica* B.D. Sharma, Harsh & Suthar **sp. nov.** 1. Cross section of type specimen, showing a wide pith surrounded by many protoxylems associated with numerous mucilage canals (M). Secondary wood is compact, outside which secondary phloem (PH) is present $\times 36$. 2. A distinct phloem has six horizontal rows of mucilage canals undisturbed by the phloem rays $\times 90$. 3–4. Distinct, wide, compact secondary wood and association of mucilage canals with the protoxylem points $\times 90$. (M: mucilage canal, PH: secondary phloem, SX: Secondary xylem, P: pith).

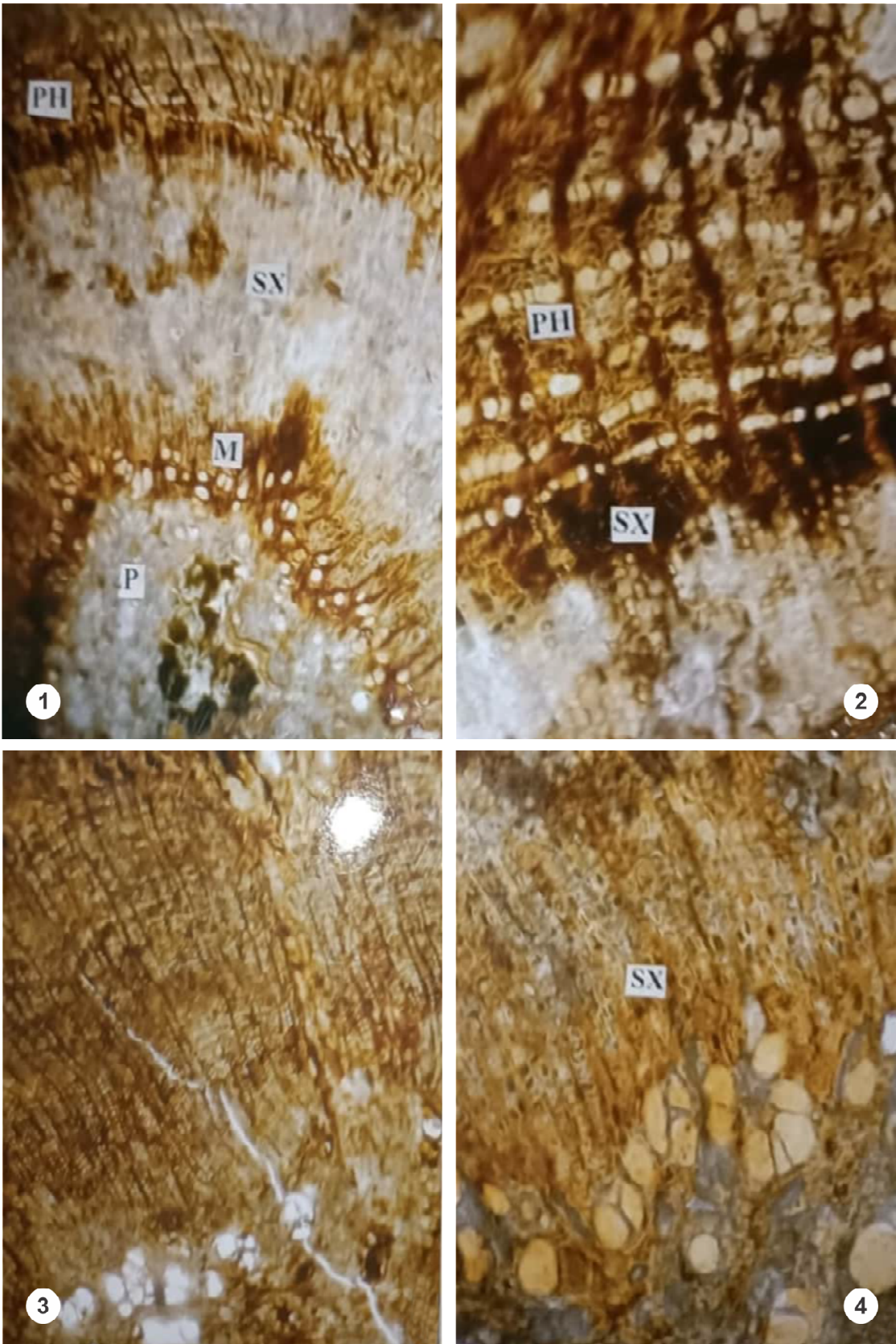


Figure 2

Description: Stem size 6.3 cm in length, 3 cm in diameter, surface covered with spirally arranged decurrent leaf bases. The cross section of the stem shows a wide parenchymatous pith (P) bearing only few scattered mucilage ducts. Surrounding the pith, there are many dark coloured protoxylem points, each one is associated with distinct solitary or in groups of 2–4 mucilage canals (M). The secondary wood is compact made up of rows of squarish tracheids (in cross section) (Figure 2.3–4). Outside the secondary wood, there is a distinct wide secondary phloem (PH) (Figure 2.1–2). There are 5–6 horizontal rings of mucilage canals showing variation in size from inner to the peripheral side (Figure 2.2). The inner most ring has smaller size ducts but more in number while the outer ring have lesser in number and bigger in size of the canals. All canals develop in a regular sequence (Figure 2.2). The phloem rays become wider towards the cortex without disturbing the horizontal lines of the mucilage ducts.

Comparison: The present species was compared with *Bucklandia guptae* Sharma 1967 and *Bucklandia dichotoma* Sharma 1969 but in none of them such type of occurrence and distribution of mucilage ducts were noticed as in *B. mucilagica* proposed here.

Etymology: The species is named after presence of mucilage canals in protoxylem, pith and in the secondary phloem of the stem.

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