

SOME BENNETTITALEANS OF JURASSIC AGE FROM TABBOWA SEDIMENTS, SRI LANKA

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Introduction

Plant fossils are known to occur in some sedimentary rocks of the Tabbowa basin in the Northwestern Province, Sri Lanka. So far, some plant species of Cycadophyta have not been reported in detail. The present study was carried out in the Tabbowa sedimentary basin (Figure 1) with the objective of collecting and describing the plant fossils using evidence from the impressions of leaf fossils. This paper describes the morphological features and the observed evidences of the species of Bennettitales that prevailed in the Jurassic period. Since detailed descriptions on plant fossils of Sri Lanka are lacking, it was also intended to describe the features of the fossils in detail enabling other investigators to identify them easily.

Materials and Methods

Sedimentary rock samples with fossil imprints were collected and identified in the field for laboratory studies. The surface structure was studied for morphological details under strong reflected light and all specimens photographed to reveal surface details. The morphological features of the leaves were also compared with examples given in the literature.

Results

There were two plant genera identified during this study and their features are

described below in a standard format accepted internationally.

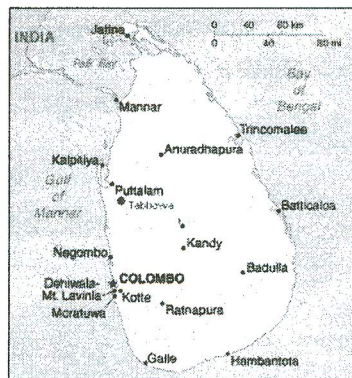


Figure 1. Map showing the location of the study area

Sample No.1: *Ptilophyllum* sp.

Division : Cycadophyta

Order : Bennettitales

Genus : *Ptilophyllum cutchense* Morris (1863)

Material examined: 4 specimens as follows: T1001.1a.i-iv (Figure 2, A-D).

Description: These impressions are well preserved (Figure 2, A-D) in mudstone. Pinnate pinnules are attached alternately at an acute angle of about 60 degrees to the biaxial surface. Rachis is covered by pinnae bases on biaxial side. The points of attachment to the rachis are rounded or curved. The length and the width of the fronds are variable between 10 mm-40 mm and 10-15 mm. There are about 17 pinnules on one side of the frond (Figure 2, A) and other fronds

collected were fragmented with few pinnules on each side. Only one of the fronds collected is complete with the petiole (Figure 2, A). Pinnate pinnule is falcate, lanceolate or linear and narrow, 7 mm long and 1.5 mm wide. The apex of most pinnules is sharp, pointed upward and some are blunt (Figure 2, A). The upper margin is slightly straight and the lower margin is curved upwards. Each pinnule has its entire margin, an acute apex, a flat smooth pinnule blade, and an acute leaf base. Attachments to the rachis are sessile and sharp (Figure 2, A, B). The venation is parallel though not marked clearly (Figure 2, B). The midrib is also not clear. At the base of the pinnae, lower margin of the upper pinnule overlaps with the upper margin of the lower pinnule (Figure 2, B). The width of the pinnae appears to decrease from the middle to the base (narrowing at the base) (Figure 2, A).

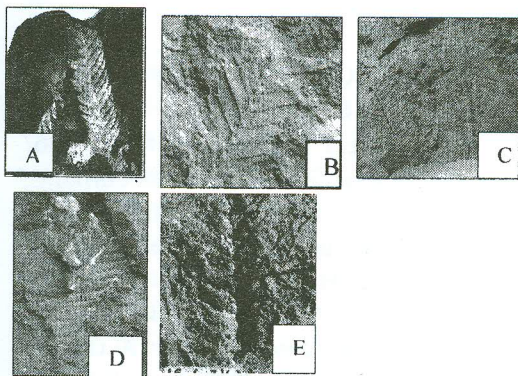


Figure 2. (A-D) Bennettitales fronds from Tabbowa (x2, x1, x1/2x1/2,) E, *Ptilophyllum* sp of Sitholey, (1942) (40 mm x16 mm)

Sample No. 2: *Otozamites* sp.
 Division: Cycadophyta
 Order: Bennettitales

Genus: *Palaeozamia bengalensis* (Oldham, 1863) *Otozamites* sp. (Sitholey, 1942)

Material examined: 3 specimens as follows: T1002.1b.i-iii (Figure 3. A-C).

Description: The specimen (Figure 3, A-C) is a fragment of pinnae with pinnately compound pinnules. Size 15x14 mm. The pinnate pinnules contain the entire margin. Each pinnule is 8 mm long and 2 mm wide. There are six pinnules on either side of the pinnae and are linear or lanceolate, bearing on the adaxial surface alternately or sub oppositely inserted acutely at an acute angle, of about 30°. The rachis is thick and well-developed. The adaxial surface (Figure 3, A) of pinnae, prominent, though the biaxial surface (Figure 3, B, C) appears only as a line.

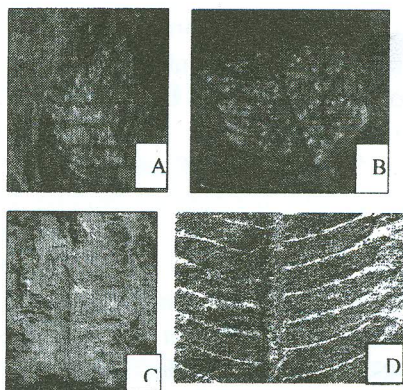


Figure 3. (A-C) *Otozamites* sp from Tabbowa (x 1/2, x 1/2, x 1). D, *Otozamites* sp. of Sitholey, (1942) (25 mm x 10 mm)

The pinnae are concave or deltoid shaped. Apices are rounded to obtuse, and leaf bases slightly auriculate on the acroscopic margin and contracted on the basisopic margin. The angle between the left and right pinnule is

about 170°. The apex of pinnule is acute to point; slightly recurved apex and the bases of the pinnules are sessile. The parallel venations can be seen in the pinnules (Figure 3, C).

Discussion

The fronds grouped as *Ptilophyllum* and *Otozamites* are widely distributed species in the Jurassic period and recorded from many locations in Europe, India, Australia and elsewhere in the world. Identifications were based on apparent textural features belong to two genera of the plant division Cycadophyta and positioned in order Bennettitales.

Remarks

The generic name *Ptilophyllum* was first used by Oldham and Morris in 1863 for certain pinnate fronds from Cutch, India. Also, this species was the first recorded genus from Sri Lanka, as a Jurassic fossil plant found from Tabbowa sedimentary beds (Sitholey, 1942). Seward and Shani (1920) collected fragments of similar fossil, confirmed that the species belongs to genus *Ptilophyllum*. Comparing existing morphological features with Sitholey's specimen, present specimens confirm that this species belongs to genus *Ptilophyllum* in plant group Bennettitales. The genus *Otozamites* was first described by Oldham and Morris (1863) as *Palaeozamia bengalensis*. (1969). In Sri Lanka the first description of *Otozamites* (Figure 3, D) was documented by Sitholey (1942) from the Early Jurassic flora from Tabbowa. Therefore the present fossil specimen

is similar in several ways to the *Otozamites* described by Sitholey (1942) as shown in Figure 3, D. The difference in these two genera, *Otozamites* is signified by an auriculate leaf base, broader pinnules and by more spreading veins than in *Ptilophyllum*.

Conclusions

In the present study, it was possible to identify a two plant fossil genera *Otozamites* and *Ptilophyllum* belonging to division of Cycadophyta. Since there are no previous detailed morphological description on the Bennettitales plant fossils from Sri Lanka, we consider that the present study provides the first description of the above two plants genera of the Jurassic period of Sri Lanka. Findings thus encourage further studies on discovering new species of Jurassic flora.

References

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