LELESTROBUS: A NEW MICROSPORANGIATE ORGAN FROM THE TRIASSIC OF NIDPUR, INDIA

SHYAM C. SRIVASTAVA
Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226 007, India

ABSTRACT

Lelestrobus pennatus gen. et sp. nov. is a compact strobilus having spirally arranged quill-like microsporophylls. Each microsporophyll is composed of an expanded base bearing abaxially inserted sporangium, and an attenuated distal portion. A sporangium is ovoid in shape and contains nonstriate-bisaccate pollen grains. This has close affinity to Coniferales.

Key-words — Lelestrobus, Strobilus, Microsporophyll, Coniferales, Triassic (India).

INTRODUCTION

Since a compressed cone (Conites sp.) from the Indian Triassic was first recorded by Srivastava (1971) from the Dicroidium-bearing bed of Nidpur, several pollen producing organs, namely, Nidistrobus Bose & Srivastava, 1973; P. nidpurensis Srivastava, 1974; Pteruchus indicus Pant & Basu, 1973; Bosea Srivastava, 1975; Rugatheca Pant & Basu, 1977; and Nidpuria Pant & Basu, 1979 have been discovered and described.

A few more fructifications, viz., Satsangia Srivastava & Maheshwari, 1973; Chakrea Srivastava, 1976; Pteruchus thomasi; and P. gopadensis Pant & Basu, 1979 have also been reported but these have not yielded any pollen grains.

This paper records an additional strobilus bearing quill-like microsporophylls having broad expanded base with an attenuated distal portion. Sporophyll base with an abaxially inserted median sporangium, sporangium oblong-ovoid, accentuated by flap or wing-like structure. Sporophyll cuticle differentiated into non-stomate and stomate sides, thinner surface bearing a few longitudinally oriented stomata, marked in tapering part of sporophyll. Sporangial wall thin, composed of smooth rectangular-polygonal cells; pollen grains bisaccate, non-striate.

Type Species — Lelestrobus pennatus sp. nov.

Derivation of Name — After late Dr K. M. Lele.

Lelestrobus pennatus gen. et sp. nov.

Pl. 1, figs 1-16; Text-figs 1A-Q

Diagnosis — Detached strobilus, 1.5 cm long, consisting of spirally arranged sessile microsporophylls, microsporophylls abaxially with an inserted oblong-ovoid sporangium accentuated by flap or wing-
TEXT-FIG. 1 — Lelestrobus pennatus gen. et sp. nov. — A, a microstrobilus showing spirally arranged microsporophylls with its attenuated distal portion, Holotype no. 35469, × 4; B, counterpart of Holotype no. 35469, × 4; C, a broken microsporophyll showing a part of sporangium containing pollen grains associated with attenuated distal portion in broken state, slide no. 6598/35469, × 40. D-E, an approximately complete microsporophyll exhibiting conspicuously midpart broken, but expanded basal portion bearing abaxial sporangium with a few pollen grains and attenuated distal portion preserved respectively, slide nos. 6600/35469, × 20, 6598/35469, × 20; F, a part of sporangium with both surfaces associated with pollen grains, slide no. 6599/35469 × 50; G, an empty sporangium where the entire pollen mass is shed off, slide no. 6598/35469, × 20. H, non-stromatic surface showing serially arranged epidermal cells, slide no. 6601/35469, × 75; I, thinner surface showing a single stoma with feebly developed papillae projecting over stomatal pit, slide no. 6598/35469, × 500. J, a typical nonstriate, bilateral, disaccate grain showing zone of saccus attachment associated with vertically ovoid-circular c.b. distally saccus free area (where sexine not free from intine) bearing linear diffused saccus-like area (tenuits) in the centre, slide no. 6599/35469 ca. × 400; K-M, varied forms of pollen grains respectively showing: K — central body with horizontal or two parallel folds, L — one pollen diploxylonoid with circular central body in distal focus, M — a pollen grain in monosaccoid condition, slide no. 6599/35469 ca. × 500; N-P, showing variation in saccus attachment, slide no. 6599/35469 ca. × 500; Q, a diagrammatic restoration of a microsporophyll.
like structure. Sporophyll cuticle differentiated into stomatic and non-stomatal surfaces, non-stomatal surface slightly thicker than the central body; but in a few specimens they are equal to the central body. Sacci are usually continuous laterally round the central body and sometimes there are notches at the meeting points. Occasional diploxylonoid pollen grains with circular central body have also been marked. One or two folds have also been observed on proximal surface of some monosaccoid grains. These grains are variants of the same general type. Variation in pollen grains is known in some coniferous cones (Grauvogel-Stamm, 1969, 1972, 1973, 1976) as well as in other fossil plant groups.

Such type of dispersed pollen grains have earlier been recorded from the Nidpur shale as a variable form of \textit{Alisporites indicus} Bharadwaj & Srivastava, 1969.

**COMPARISON AND DISCUSSION**

In general, \textit{Lelestrobus pennatus} is a compact strobilus bearing abaxial sporangia with nonstriate-bisaccate pollen grains. These characters are suggestive of its relationship with Coniferales. In having quill-like microsporophylls, \textit{L. pennatus} seemingly approaches the genus \textit{Isoetes} but it is clearly different because of the aforesaid characters.

\textit{Lebachia pimjormis} described by Florin (1938-45) differs in having two microsporangia on each sporophyll and monosaccate pollen grains with balloon-like sacci completely surrounding the central body except at distal pole.

\textit{Lelestrobus pennatus} markedly differs from the extant conifers in its microsporophylls exhibiting only a single sporangium abaxially inserted in the basal region while in the latter the microsporophylls bear two to many, fused or free sporangia.

Because of a single sporangium \textit{Lelestrobus pennatus} probably represents an early phase in the evolutionary history of conifers.

**ACKNOWLEDGEMENTS**

Grateful appreciations are expressed to Dr Sukh Dev for critically going through the manuscript and to Dr R. S. Tiwari for his useful discussions dealing with the morphology of pollen grains.
SRIVASTAVA—LELESTROBUS: A NEW MICROSPORANGIATE ORGAN FROM TRIASSIC

REFERENCES


EXPLANATION OF PLATE

Lelestrobus pennatus gen. et sp. nov.

1. Holotype: BSIP specimen no. 35469, x nat.
2. Counterpart of the holotype, x nat.
3. Holotype showing spirally clasped microsporophylls, x 6.
4. Holotype (counterpart), x 4.
5. A part of microsporophyll showing a portion of sporangium containing pollen grains associated with a broken attenuated distal portion. BSIP slide no. 6598/35469, x 40.
6. A broken microsporophyll showing an embedded abaxial sporangium placed in middle of expanded basal part. BSIP slide no. 6600/35469, x 40.
7. An under macerated incompetent sporangium filled with pollen grains. BSIP slide no 6599/35469, x 100.
8. An empty sporangium from which the pollen have been shed off. BSIP slide no 6598/35469, x 40.
9. Spirally clasped microsporophylls. BSIP slide no. 6597/35469, x 100.
13. A dissected sporangium with liberated pollen grains adhering to its thin cuticle. BSIP slide no. 6599/35469, x 100.
14. Non-stomatic thicker surface. BSIP slide no. 6601/35469, x 150.