STACHYOTAXUS SAMPATHKUMARANI SP. NOV. FROM ONTHEA IN THE RAJMAHAL HILLS, BIHAR

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ABSTRACT

An impression collected from Onthea in the Rajmahal Hills in Bihar (Jurassic), India, is described and interpreted as a species of *Stachyotaxus*. The impression shows the sterile part bearing *Elatocladus conferta* type of leaves and the strobilar part bearing oppositely arranged megasporophylls, bearing in the angles of their inward bend two obliquely placed seeds, like those of *Stachyotaxus elegans*. Incidentally this is the first report of *Stachyotaxus* from India and the specimen is placed under a new name *S. sampathkumarani*.

WHILE examining a collection of plant impressions collected from the Rajmahal Hills in 1946 attention was drawn in a preliminary note to the existence of two new interesting types in that flora. One of them identified as a species of *Stachyotaxus* and reported as such (RAO, A. R., 1950) forms the subject matter of this short paper.

DESCRIPTION

The type specimen (ON 14) consists of a fertile impression on a hard grey rock so characteristic of the locality Onthea in the Rajmahal Hills. On account of the irregular fracture of the rock under the hammer the specimen has been rather unsatisfactorily exposed (FIG. 1) and has been injured in the middle. Still the shoot and the strobilus lie in a way suggesting a clear connection between the two (FIG. 2), supported by certain marks on a small chip of the rock (ON. 29) which forms a counter part of the type specimen. The entire specimen measures 5 cm. long and 1 cm. broad. The slightly decurrent leaves have prominent midribs and entire margins and generally conform to the type known as *Elatocladus conferta*. They have narrow twisted bases, spiral phyllotaxis, and measure 5 mm. long by 1 mm. broad. The epidermical features could not be made out. The axis of the shoot extends into a strobilus 2 cm. long by 0·7 cm. broad (FIG. 2). The sporophylls which seem to be oppositely arranged are nearly 8 mm. long and arise almost at right angles from the axis. They are worn out at places and there is a suggestion of parallel venation on them. Each sporophyll is flat, then bent at right angles in the middle (FIGS. 3 & 4) forming a kind of socket or depression in the angle of which are lodged, side by side, two obliquely inverted seeds. Neither the exact shape of the seed nor its attachment to the sporophyll could be clearly made out. The seeds measure 4 mm. long by 1·5 mm. broad. They are not fully preserved but the compressed seed coat and its fibrous texture are seen.

Specimen O.N. 12, when split into two, showed a number of sterile shoots of *Stachyotaxus*.

A specimen similar to the one found on O.N. 14, but with a little bigger but shorter strobilus has been figured by Dr. S. C. D. Sah (THESIS, 1956, PL. 25 FIG. 6) also from Onthea. One of the seeds of that strobilus has been pressed side ways and shows the fibrous seed coat clearly. The basal twist of the leaf and the midrib in each leaf can be seen although Sah states otherwise.

DISCUSSION

Nathorst (1908) instituted the genus *Stachyotaxus* for some dimorphic shoots from the Rhaetic of Scania. The spike-like megastrobili of these are nearly 6 cm. long and bear spoon-shaped sporophylls arising almost at right angles from a stout axis. Each sporophyll has a short stalk and an expanded triangular scale bearing two ovate seeds each being enclosed in a cupule (SEWARD, 1919). Each sporophyll forms an upturned acuminate apex. The specimen described in this paper shows all the above features (except the cupule and the dimor-

phic foliage) associated with *Stachyotaxus*, and its reference to this genus is well warranted. In spite of their bearing two seeds Nathorst compares these strobili with those of *Dacrydium*. Miss Gibbs (1912) also opines that *Stachyotaxus* belongs to the Podocarpaceae. Seward (*loc. cit.*) pointed out the resemblance between the fertile fossil shoot of *Stachyotaxus* and *Podocarpus spicata*. Nathorst (1908) described two species of *Stachyotaxus-St. elegans* and *St. septentrionalis* from Sweden. My specimen resembles the latter to some extent, Rao (1950). Halle (1913, p. 83) pointed out the resemblance between some shoots of *Elatocladus* from Grahamland and *Stachyotaxus*.

Harris (1926, 1935) working on the Rhaetic Greenland flora has pointed out that the above two species of *Stachyotaxus*, as noticed there, are distinct from each other in just a few points. He has drawn attention to the existence of specimens or parts of specimens of *St. elegans* approaching *St. septentrionalis*. He has however pointed out that the latter species is distinguished by its smaller cone, smaller seeds and smaller leaves, not more than one mm. broad. In 1950 I pointed out that my specimen resembles *St. septentrionalis*. But subsequent closer examination reveals that there is a resemblance also with some of the specimens figured as *St. elegans* by Nathorst (*loc. cit.*). The strobilus in my specimen resembles that of *St. elegans* rather than that of *St. septentrionalis*. A comparison can be made between Nathorst's Fig. 9 (TABLE 2) and Figs. 2 & 3 in this paper, showing the abrupt bend of the seed-bearing scale. But the comparison stops here as the cuticular features are known in the above two species and not in my specimen. Harris is also of the opinion that *Stachyotaxus* does not fit into any of the known families of conifers although he admits that the individual megasporophyll can be compared with that of *Dacrydium*. He suggests that *Stachyotaxus* should be kept apart as a separate genus by itself. He has added to our knowledge of the cuticle of the microsporophylls, seed structure and pollen features of this genus. The ovule shows a nucellus which is free to the base, a rather primitive feature not seen in any of the living conifers. Florin (1940) is of the opinion that both *Elatocladus conferta*, (comparable to *Eupodocarpus* of *Podocarpus*) and *Stachyotaxus* belong to the Podocarpaceae.

My specimen resembles to some extent *Beaniopsis rajmahalensis* Ganju (1947), part of a strobilus, also described from the Rajmahal hills. Each sporophyll bears two seeds whose micropylar part is slightly elongated. The longer axes of the two seeds diverge from each other but their principal planes are in continuation with each other. This is the main point of difference between my specimen and *B. rajmahalensis*. In fact there is some resemblance between the sporophyll marked with an arrow in Fig. 3 and parts of Ganju's photo 10. At the same time this may be due to just an accident in preservation. The foliage of *B. rajmahalensis* is not known. It may be that it is after all a *Stachyotaxus*, a genus with which it shows a close comparison as Ganju himself admits.

From the foregoing discussion it will be seen that my specimen can be referred only to *Stachyotaxus* and that this is the first species of the genus to be reported from India, and differs from other known types.

In view of the above facts the specimen described in this paper has been placed under a new specific name *Stachyotaxus sampathkumarani* in memory of my old teacher.

DIAGNOSIS

***Stachyotaxus* Nathorst**

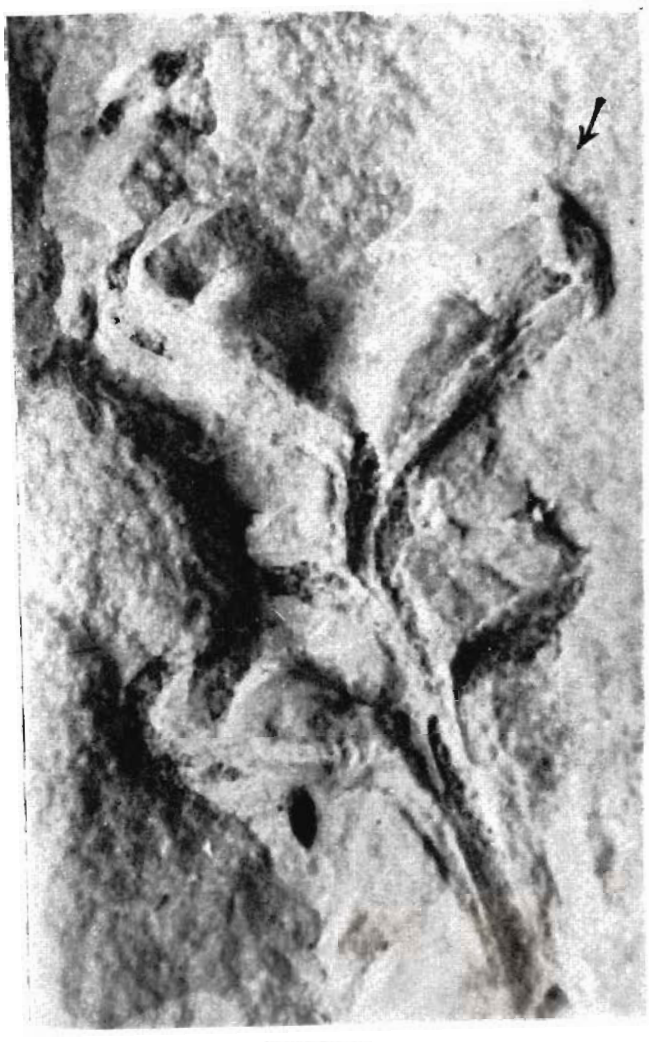
S. sampathkumarani sp. nov.

Conifer shoot bearing terminal megastrobilus with loosely and possibly oppositely disposed megasporophylls. Each megasporophyll attached at right angles to axis, almost sessile, slightly decurrent, elongated, flat, and the apical part upturned abruptly forming at the angle a depression in which are lodged two pyramid-shaped seeds with fibrous integument and a sharp pointed micropyle. Leaves bifacial, uninerved with basal twist and conforming in general to the type *Elatocladus conferta*. Fst., found abundantly in Onthea and other localities in the Rajmahal Hills.

Locality— Onthea.

Age — Middle Jurassic.

I wish to express my grateful thanks to Dr. M. N. Bose who has helped me in various ways.



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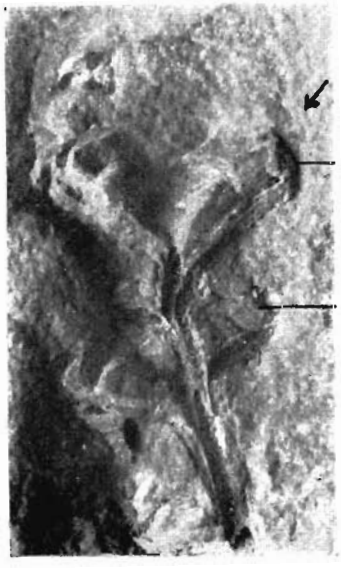

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REFERENCES

FLORIN, R. (1940). The Tertiary fossil conifers of South Chile and their phytogeographical significance. *K. Svenska Vet. Akad. Handl.* **43** (2).

GANJU, P. N. (1947). On *Beanopsis rajmahalensis* gen. et. sp. nov., a new type of gymnosperm female fructification for the Jurassic of Bihar. *Proc. Nat. Acad. Sci.*, **25**: 95.

GIBBS, (1912). On the development of the female strobilus in *Podocarpus*. *Ann. Bot.* **26**: 515.

HALLE, T. G. (1913). The mesozoic flora of Graham Land. *Wiss. Ergeb. Schwed.* südpolar Exped. 1901-1903, **3**: 14.

HARRIS, T. M. (1926). The Rhaetic flora of Scoresby Sound, East Greenland. *Medd. om Grønland* **68**: 43.

Idem (1935). The Rhaetic flora of Scoresby Sound, East Grønland. *Ibid.* **112**: (1).

NATHORST, A. G. (1908). Uber *Palissya, Stachyotaxus* and *Palaeotaxus*. Palaobot. Mitteil 7. *K. Svenska Vet. Akad. Handl.* **43** (6).

RAO, A. R. (1950). Two hitherto unreported plant fossils from the Rajmahal Hills, Bihar. *Curr. Sci.* **19**: 378-380.

SAH, S. C. D. (1956). Contributions to Jurassic Palaeobotany (Mss).

EXPLANATION OF PLATE 1

1. Photograph of the entire impression showing the strobilus (str) slightly removed from the shoot × 1.

2. Upper part of the above magnified to show the possible connection between the shoot and the strobilus × 1·5.

3. A part of the strobilus showing four sporophylls, arranged in two opposite rows. The distal upturned part of the sporophyll (sp) and the seed (s) placed in the angle can be made out × 4.

4. Further magnified view of the part seen in photo 3 showing the above mentioned features as well as the seemingly fibrous nature of the seed coat, the slightly decurrent base of the sporophylls and the cut end of the strobilar axis × 7.