

Tikioxylon Goswami (gymnospermous fossil wood) from the Tiki Formation (Late Triassic) in Shahdol District, Madhya Pradesh, India

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ABSTRACT

Goswami H. K. 2011. *Tikioxylon* Goswami (gymnospermous fossil wood) from the Tiki Formation (Late Triassic) in Shahdol District, Madhya Pradesh, India. *Geophytology* 40(1-2): 93-96.

The generic name *Tikioxylon* Goswami 1973 (non rite publ., ICBN: Art. 37.1) is here validated by designating *Tikioxylon hughesii* as its type. Two species, viz. *T. hughesii* and *T. spiralli*, recorded from the Tiki Formation exposed near Tiki Village, Shahdol District, Madhya Pradesh, are also validated and described.

Key words: *Tikioxylon* Goswami, Tiki Formation, Late Triassic, Shahdol District, Madhya Pradesh, India.

INTRODUCTION

Goswami (1973) proposed a new genus *Tikioxylon* with two species, *T. hughesii* and *T. spiralli*, from the Tiki Formation. This formation is exposed between Neosi (Lat. 23°35'53"N: Long. 81°11'39"E) and Tiki (Lat. 23°56'02"N: Long. 81°21'12"E) villages in Shahdol District, Madhya Pradesh. He also asserted that the genus would offer a connecting link between Taxales and Araucariales on the basis of spiral thickenings on the tracheid walls with typical araucarian pittings. The generic name *Tikioxylon* was not validly published by Goswami (1973), as he did not designate any of the two species as the type of the genus (ICBN: Art. 37.1, McNeill 2006). In order to validate the generic name, *Tikioxylon hughesii* Goswami is here proposed as type of the genus *Tikioxylon*.

DESCRIPTION

Genus: *Tikioxylon* Goswami ex hoc loco

Type species (here proposed): *Tikioxylon hughesii* Goswami ex hoc loco.

Description: The specimens are typical

gymnospermous woods with pycnoxylic secondary wood, growth rings, indistinct in many but also quite distinct in some woods. Resin canals or ducts are absent. Tracheids have spiral thickenings on both the tangential as well as radial sides from simple to very complex or webbed type (Plate 1, figure 1). The araucaroid pittings are uniseriate, biseriate (Plate 1, figure 2) or even multiseriate but always contiguous and compact, never loose or with gaps in between the pits. Cross field bordered pits are always globular with circular aperture. Medullary rays range from 3 to 36 cells in height. The most important diagnostic features of *Tikioxylon* are the spiral thickenings on the tracheid walls sometimes forming webbed network, with araucaroid pitting, and absence of resin canals.

Remarks: Several fossil logs, chocolate to dark brown in colour, measuring 40 to 92 cm long and 15 to 20 cm in diameter, were observed in the area. Transportable wood pieces were collected and got sectioned at the Birbal Sahni Institute of Palaeobotany, Lucknow (Goswami 1973). Revised investigation on recently collected woods have yielded tracheids containing intratracheidal aquatic microfossils which

have been seen in the slides. These microfossils might have entered during the fossilization process.

***Tikioxylon hughesii* Goswami ex hoc loco**

Plate 1, figures 1-2

Diagnosis: Growth rings indistinct; xylem parenchyma and resin canals absent; uniseriate or biseriate compressed pits present on the radial walls of long and wavy tracheids, 12-18 μm with circular pores; tangential walls scarcely pitted. Spiral thickenings prevalent on both sides, may be clockwise or anticlockwise, sometimes forming network enclosing pits. Cross field pits compact and close with circular pores, number of pits not exceeding 6 in one cross field. Medullary rays simple, homogeneous, often uniseriate, 2 to 35 cells in height.

Holotype: Specimen No. T-1/HKG, slide numbers T-1/HKG-1 to 3, stored at the Bionature Collections, Society of Bionaturalists, Bhopal.

Locality: 4 km north-east of Tiki Village, Shahdol District, Madhya Pradesh.

Horizon and age: Tiki Formation (Late Triassic).

***Tikioxylon spiralli* Goswami ex hoc loco**

Diagnosis: Growth rings distinct, spring wood generally wider than summer wood. Tracheids 15 to 61 μm in diameter, with typical araucarian pittings; pits often uniseriate with circular pores; multiseriate pits rare. Spirals simple, running across the length, never forming webbed network. Cross field pits 1 to 5 in number in one cross field, possess circular pores. Medullary rays often uniseriate, rarely biseriate, 1 to 16 cells in height.

Holotype: Specimen No. T1, slide numbers T1-1 to 5, stored at the Bionature Collections, Society of Bionaturalists, Bhopal.

Validating illustration: "*Tikioxylon spiralli* Goswami" in Acta Bot. Acad. Sci. Hungaricae 18: 296, plate 2, figures A-E. 1973.

Locality: 4 km north-east of Tiki Village, Shahdol District, Madhya Pradesh.

Horizon and age: Tiki Formation (Late Triassic).

COMPARISON

Comparison with Pinaceae: *Tikioxylon* woods

do not show resin ducts, abietinean pitting and pineoid cross field pits and therefore cannot be compared with any living or fossil wood of Pinaceae.

Comparison with Taxaceae: Both the species of *Tikioxylon* possess spirals on the tracheid walls and show occasional presence of 1-2 pits in the cross field. These features indicate its resemblance with some extant species of *Taxus*, viz. *T. baccata* and *T. canadensis*, but spirals on the walls of *Tikioxylon* are simple to complex type, even forming a webbed structure (Plate 1, figure 1) with biseriate and multiseriate araucaroid pittings. None of the living (Greguss 1955) or fossil (Prasad 1982, Nishida & Oishi 1982) members of Taxaceae have been recorded with contiguous araucaroid pitting on the tracheid walls.

Comparison with woods possessing spirals: Among fossil woods with simple or common spirals, there are some comparable taxa, viz. *Taxaceoxylon*, *Palaeotaxus rediviva*, *Taxopitys*, *Prototaxoxylon*, *Prototaxoxylon intertappeum*, *Parataxopitys*, *Bracyphyllum spiroxylon* and *Taxoxylon*. None of these woods possess typical araucarian pittings. Prasad (1982) compared many fossil genera with spirals, including the genus *Prototaxoxylon*, with quite variable features. Typical characteristics of *Prototaxoxylon*, as discussed by Nishida and Oishi (1982), are absent in *Tikioxylon*. There are no gaps between the pits and cross field pits do not have lenticular pores. Although, the genera discussed by Prasad (1982) do have spiral thickenings but these are distinctly different from the spirals of *Tikioxylon*. Here in these woods, spiral thickenings sometimes appear as annular and also at many a places, spirals become too complex as a webbed assemblage of thickenings (Plate 1, figure 1) on the radial walls of tracheids. The webbed net of spirals (Plate 1, figure 1) extends the entire length of the tracheid covering much of the width on radial walls along with parallel medullary rays. Additionally, no spirals are seen passing through pits as are often observed in *Prototaxoxylon* (Prakash & Srivastava 1961, Prasad 1982, Nishida & Oishi 1982).

Comparison with Araucariaceae: The uniseriate, biseriate and multiseriate compact/contiguous pittings in the tracheids of *Tikioxylon* are directly comparable

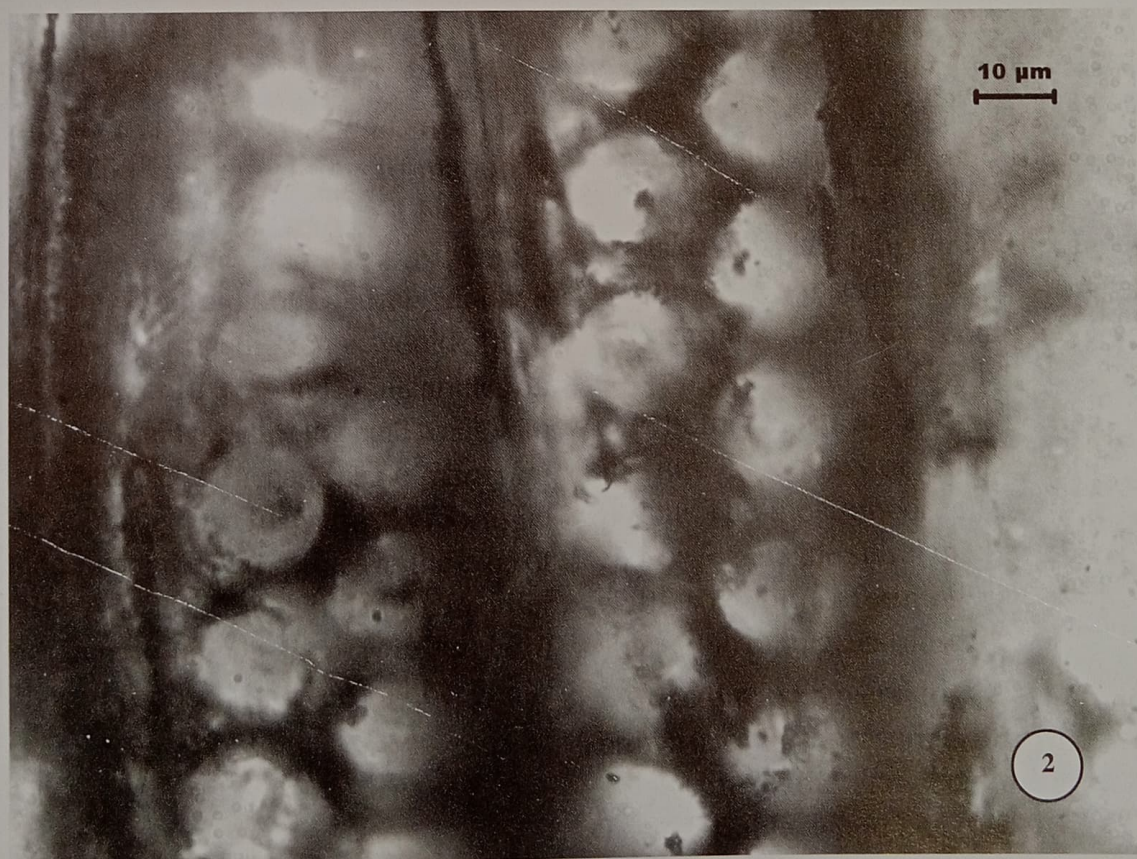
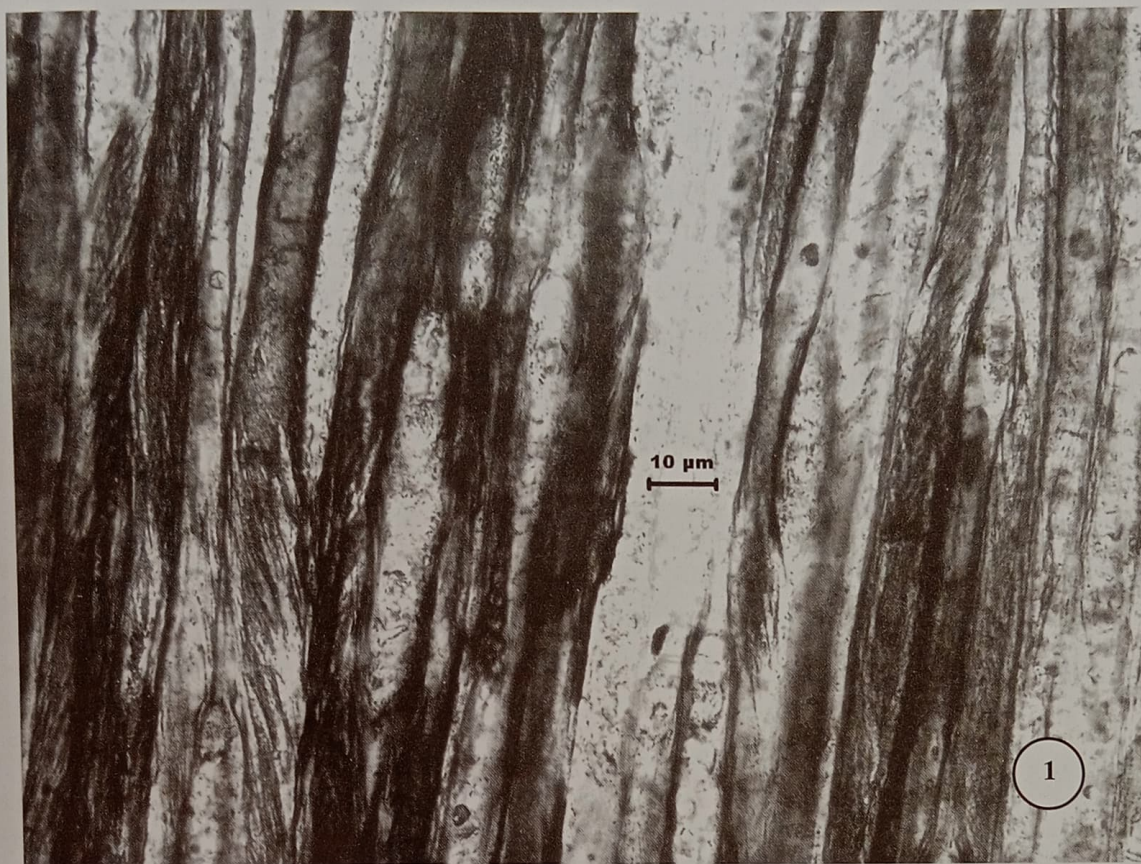


Plate 1

1-2. *Tikioxylon hughesii* Goswami. 1. A part of the radial section of the wood to show webbed network of spirals in tracheids and medullary rays; slide no. T-1/HKG-2. 2. A part of the adjoining tracheids to show alternate round biseriate compact pits; the dark areas in between pits are preservation artifacts not natural spaces in between pits; slide no. T-1/HKG-3.

to the araucarian wood. However, none of the distinctly araucaroid species shows complex webbed spirals in tracheids. Therefore, *Tikioxylon* is the only fossil gymnospermous wood which is characterized by typical araucarian pitting with true spiral thickenings on tracheid walls.

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REFERENCES

- Goswami H. K. 1973. New gymnosperms from the Triassic (Gondwana) beds of Tiki, Madhya Pradesh, India. *Acta Bot. Acad. Sci. Hungaricae* 18: 295-301.
- Greguss P. 1955. Identification of living gymnosperms on the basis of xylotomy. *Akademiai Kiado, Budapest*.
- McNeill J., Barrie F. R., Burdet H. M., Demoulin V., Hawksworth D. L., Marhold K., Nicolson D. H., Prado J., Silva P. C., Skog J. E., Wiersema J. H. & Turland N. J. (Editors) 2006. International Code of Botanical Nomenclature (Vienna Code), adopted by the Seventeenth International Botanical Congress Vienna, Austria, July 2005. A. R. G. Gantner Verlag, Ruggell, Liechtenstein. *Regnum Veg.* 146.
- Nishida M. & Oishi T. 1982. Some petrified plants from the Cretaceous of Kwanto Mountains, Central Japan. *J. Jap. Bot.* 57: 343-350.
- Prakash U. & Srivastava S. K. 1961. On a gymnospermous fossil wood from Sitapuri, Distt. Dhar, M.P. *Palaeobotanist* 10: 10-17.
- Prasad M. N. V. 1982. An annotated synopsis of Indian Palaeozoic gymnospermous woods. *Rev. Palaeobot. Palynol.* 38: 119-156.