LAURINOXYLON ELLIPTICUM SP. NOV. A NEW PETRIFIED TAXON OF LAURACEAE FROM THE LATE TERTIARY DEPOSITS OF SINDH, PAKISTAN

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Abstract

A fossil stem wood belonging to the family Lauraceae is identified from the late Cenozoic-subrecent deposits exposed near Ranikot Fort area, district Dadu, Sindh. On the basis of xylotomical homology with the genus *Laurinoxylon*, the present species is named as *Laurinoxylon ellipticum* sp.nov. The specific epithet refers to the elliptical nature of vessels.

Introduction

Petrified wood trunks are common in the Cenozoic-subrecent deposits - the Dada conglomerate in Kohistan area of Western Sindh, particularly around the Ranikot fort area. The fossiliferous locality is ca, 22 Km. west of Sunn railway station in district Dadu, Sindh(Lat.25^0.45′ - 26^0.00′.N Long. 67^0. 45′ - 68^0.00′.E).

The general geological succession of the area is as under:-

Subrecent	Dada Conglomerates
Plio-Pliestocene	Manchhar Formation
Miocene	Gaj Formation
Oligocene	Nari Formation
Eocene	Khirthar Formation Tiyon Formation Laki Formation

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Paleocene	Ranikot group	Lakhara Formation Bara Formation Khadro Formation

Hitherto following dicot and gymnospermous fossil woods have been reported from this locality:

Cynometroxylon ranikotensis and *Pterocaryoxylon ranikotensis* Rajput & Khan (1982), *Myristicoxylon ranikotensis* Rajput *et al.* (1985), *Araucarioxylon* sp. Rajput & Khan (1984) and *Cynometroxylon indicum* Saeed *et al.* (1984)

Further studies of the material collected from this locality have brought to light a new species of the genus *Laurinoxylon*, which is described in this communication.

Material and Method

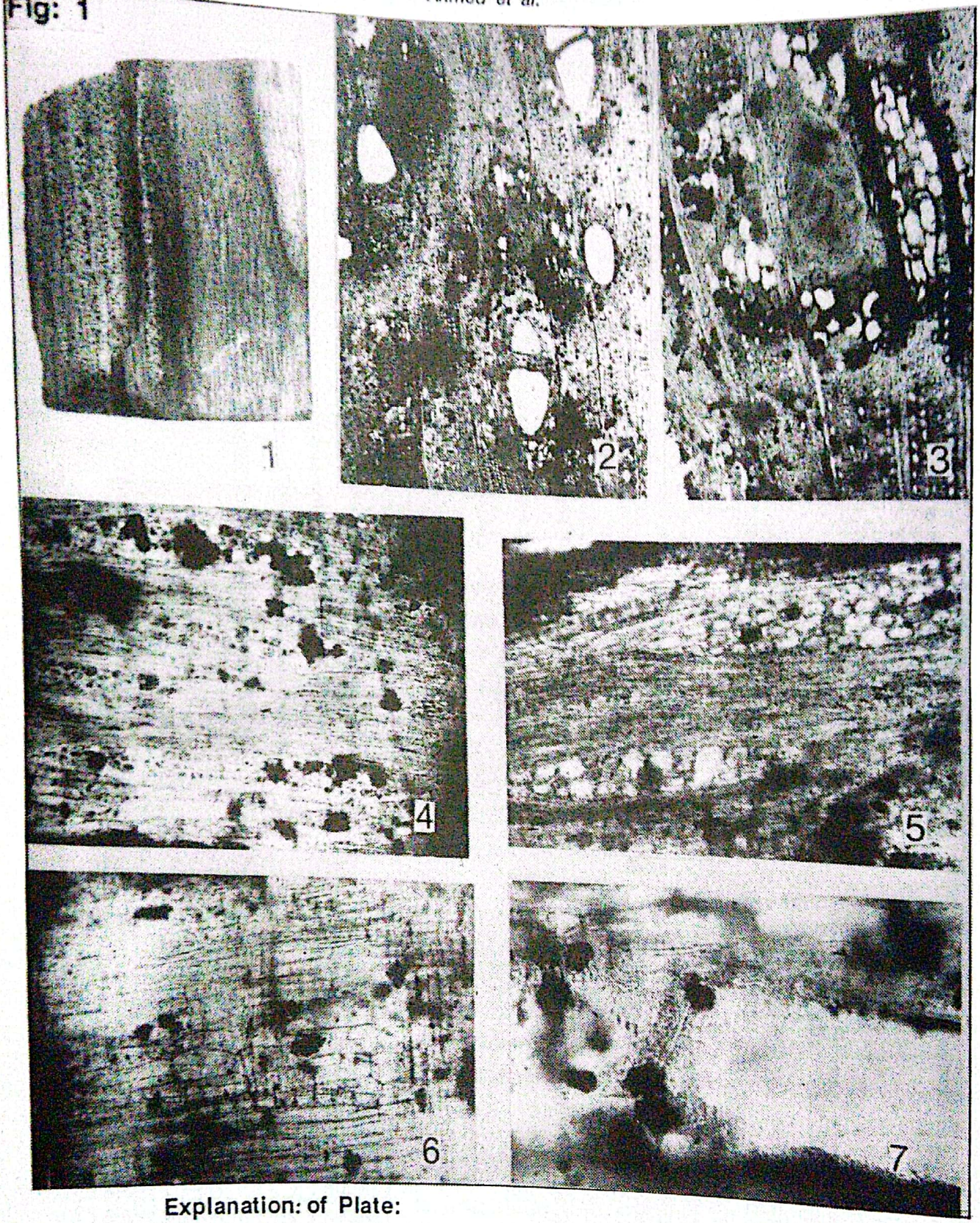
Fossil wood consists of one piece of brown silicified wood which is ca. 13 cm. long and ca. 10 cm. broad, (Fig. 1).

Thin sections of fossil wood were prepared by conventional method of cutting, grinding and mounting.

Anatomical Description

Topography:- Wood diffuse porous (Fig: 2, Text fig: 1). *Growth rings* absent. *Vessels* medium to large sized, solitary as well as in radial multiples of 2 to 3, unevenly distributed in ground mass and 2-5 per sq. mm. Vessels are mostly empty, rarely filled with deposits (Fig. 2&3. Text fig. 1). Tylosis absent. *Parenchyma* paratracheal vasicentric, parenchyma sheath is 2-5 cell around the vessels, oil cells frequently found in parenchymatous tissue (fig. 2 & 3 Text fig. 1). *Xylem rays* are numerous 2-3 cells and 20-50 μm. wide, partiary filled with deposits. Ray tissue heterogeneous, ray heterocellular, middle portion made up of procumbant cells and oil cells are mostly present as swollen upright cells (fig. No: 4 & 5 Text fig. 3), biseriate rays 7-14 cells and 110-280 μm. high, triseriate rays 12-29 cells and 18-500 μm. high. *Fibres* aligned in more or less distinct radial rows between the two consecutive xylem rays. Oil cells are also present in fibres.

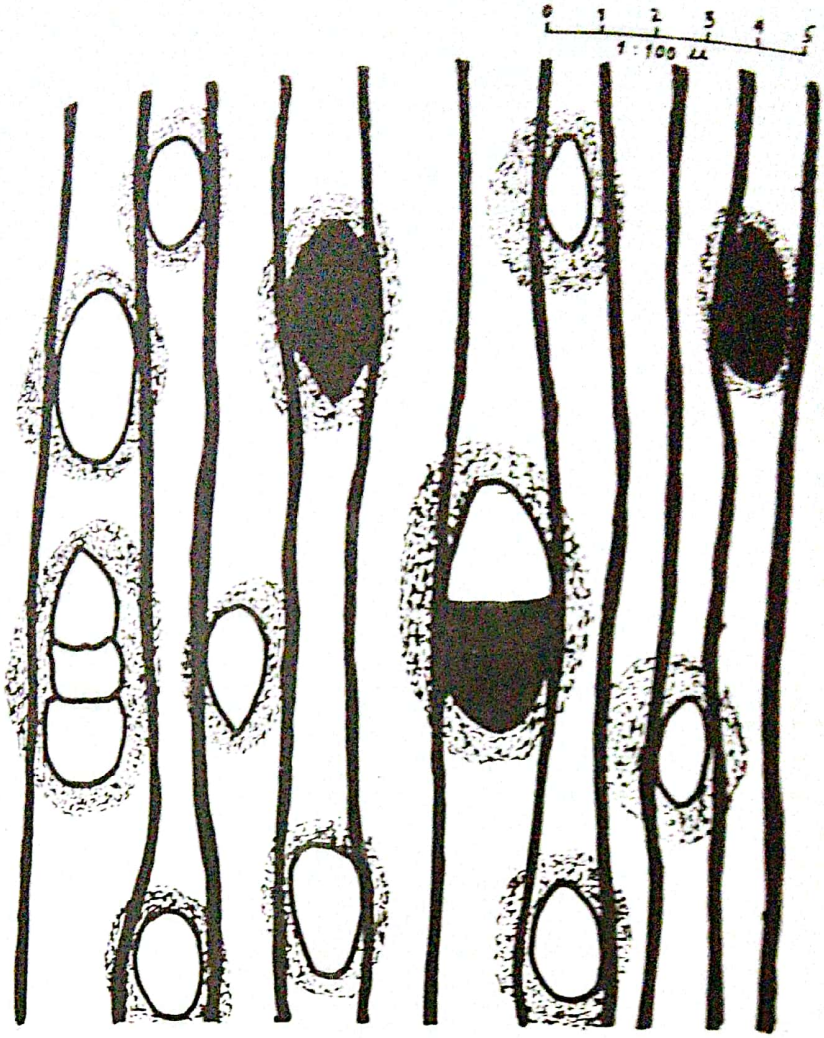
Fig: 1

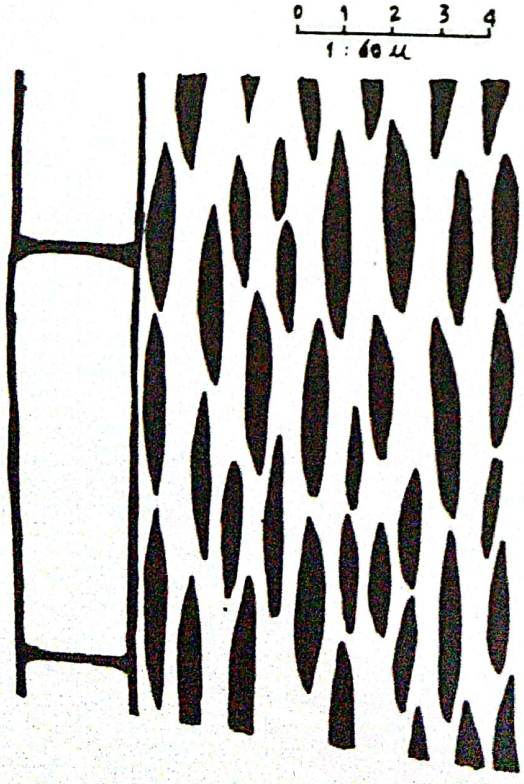


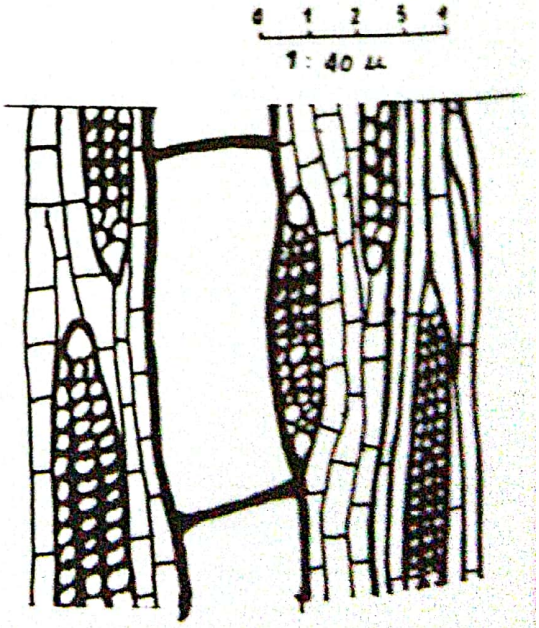
Explanation: of Plate:

1:- Macrophotograph of fossil wood.
2:- Cross section showing distribution of vessels, rays and Parenchyma, x 100.
3:- Cross section showing vessel filled with deposits, oil cells in Parenchyma and fibres, x 200.
4:- Tangential section showing distribution of multiseriate hetrogeneous xylem ray, x 200.
5:- Tangential section showing enlarged xylem ray, x 300.
6:- Radial section showing nature of ray cells, x 400.
7:- Radial section showing perforation plate and pits on wall of vessel, x 400.

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0 1 2 3 4 5
1 : 100 µ


0 1 2 3 4
1 : 60 µ


0 1 2 3 4
1 : 40 µ

Elements: Vessels oval to elliptical in shape thick walled, the wall ca. 6-8 μm. thick, tangential diameter 90-150 μm radial diameter 120-320 μm., vessel members 240-1400 μm. long with truncate ends, perforation simples, perforation plate transverse (fig: 7 Text fig: 3); intervessel pits pairs are tiny bordered which are arranged in rows; (fig: 7); vessel-parenchyma and vessel-ray pits are not observed. Parenchyma cells are thick walled, round to oval in shape in cross section, 15-35 μm. wide and 30-35 μm. long. Ray cells thin walled, procumbant cells are round to oval in shape in tangential section, tangential diameter 16-25 μm., radial length 20-35 μm., upright cells elongated 22-35 μm. long in tangential section. Fibres moderately thick walled, elongated, libriform, septate with tapering ends,130-250 μm in length and 5-10 μm. in diameter, interfibre pits are not observed.

Comparison and Discussion

The most important diagnostic feature of the specimen under investigation is the presence of oil cells in parenchyma, fibres and the xylem rays. According to Metcalf & Chalk (1950), 15 dicot families mostly have the oil cells. But taking into consideration the septate nature of the fibres found in the fossil wood under investigation, only following eight families need be considered for comparison:

Burseraceae		Magnoliaceae	Piperaceae
Hernandiaceae		Monimiaceae	Rutaceae
Lauraceae	and	Myristicaceae	

The families Burseraceae and Rutaceae can be easily distinguished from the present fossil wood by having exclusively simple perforation and intercellular canals.

The fossil wood in question contains oil cells in Xylem rays, wood parenchyma and fibre cells. Whereas family Hernandiaceae contains oils cells in parenchyma only and families Magnoliaceae, Piperaceae and Monimiaceae contain oils cells in xylem rays only. Therefore, the above cited families can easily be eliminated.

The family Myristicaceae is also quite distinct from the present fossil wood in possessing oil cells only in parenchyma and xylem rays. In addition to this, the family Myristicaceae possess lanniniferous tubes in xylem.

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Table I **Comparison**

Species	Vessels	Parenchyma	Ray	Growth Ring
1. *Laurinoxylon* cf. *hasenbergense* Suss (1960)	Solitary as well as in radial multiples of 2 to 4, diameter ranges from 100-200 μm. walls have very dense tiny bordered pits.	cells are either single and dispersed or located terminaly.	2-4 cells wide, 10-13 cells high, heterogeneous.	Present
2. *Laurinoxylon* cf. *californicum* (Platen.) Suss (1960)	Generally solitary, only a few in radial multiples of 2-3, diameter ranges from 70-90 μm.	— — — —	2,4 cells wide, 5-20 cells high.	Present
3. *Laurinoxylon daberi* Suss (1960)	Solitary as well as in radial multiples of 2-3 (6), diameter ranges from 60-70 μm.	Paratracheal	1-3 cells wide, 5-20 cells high.	Present
4. *Laurinoxylon sussi* Greguss (1969)	Mostly solitary, diameter ranges from 140-150 μm., wall provided with tiny bordered pits.	— — — —	2-3 cells wide, 3-16 cells high, heterogeneous.	Absent
5. *Laurinoxylon palfalvyi* Greguss (1969)	Solitary as well as in radial multiples of 2-3 (4), diameter ranges from 140-150 μm.	Paratracheal	Generally 2 rarely 3 cells wide, 10-15 cells high, heterogeneous.	Absent
6. *Laurinoxylon oligocenicum* Prakash, Brazinova & Awasthi (1974)	Solitary as well as radial multiples of 2-4, diameter ranges from 60-225 μm. pits pair bordered.	Paratracheal vasicentric	Generally 2-3 cells wide, rarely uniseriate, 6-20 cells high heterogeneous.	Present
7. *Laurinoxylon tertiarium* & Parakash, Tripathi (1974)	Solitary as well as *radial multiples of* 2-4, diameter ranges from 60-200 μm. Bordered pits present.	Paratracheal *scanty to* vasicentric	Ray 1-3 mostly *2, seriate, 1-2* cells high, heterogeneous.	Present
8. *Laurinoxylon rehmanense* Khan & Rajput (1976)	Solitary as well as in radial multiples of 2-3, diameter ranges from 81-145 μm, wall provided with tiny bordered pits.	Paratracheal vasicentric	3-5 cells, wide, 17-33 cells high homogeneous.	Absent
9. *Laurinoxylon ellipticum* sp.nov.	Solitary as well as radial multiples of 2-3, diameter ranges from 90-320 μm.	Paratracheal vasicentric	Generally 2-3 mostly 3 cells wide, 7-27 cells high, heterogeneous.	Absent

Taking into consideration the following anatomical characters, paratracheal

vasicentric parenchyma, septate fibres and multiseriate rays and presence of oil cells in parenchyma, fibres and xylem rays, it shows resemblance with the family Lauraceae (Metcalfe & Chalk, 1950).

According to Stern (1954) and Desch (1957) the modern woods of family Lauraceae are remarkably uniform, as there is no clear-cut anatomical difference among different genera of this family, due to which it is difficult to separate them from one another; hence the family Lauraceae can be considered as the significant taxon. For this reason Suss (1958) assigned all the fossil woods showing affinities with the family Lauraceae to a single genus *Laurinoxylon*. Family Lauraceae consists of about 40 genera and ca. 1000 species of trees and shrubs, widely distributed over the tropical and sub-tropical regions of the world with a few representative in the temperate zone, mainly distributed in South East Asia and Brazil (Willis 1957). In Pakistan 8 species of this family are present, while in Sindh only three species are reported (Stewart 1972, Kostermans 1978).

Comparison with fossil record:

Owing to close resemblence, the present fossil is being compared with reported species of *Laurinoxylon* felix (Table 1).

Detailed comparative studies with the known fossil species of *Laurinoxylon* indicate that the fossil specimen under investigation differs from all others in many respect and hance it is erected as a new species viz. *Laurinoxylon ellipticum*. The specific epithet refers to the elliptical nature of vessels.

Diagnosis:

Laurinoxylon ellipticum sp. nov.

Wood diffuse porous; growth ring absent; vessel elliptical, solitary as well as in radial group of 2-3, medium to large, t.d. 90-250 μm; r.d. 120-320 μm, 2-5 per sq. mm. Vessels member 240-1400 μm. long, perforation simple, perforation plate transverse, intervessel pits bordered and tiny. Tylosis absent. Parenchyma paratracheal vasicentric. Xylem rays 2-3 seriate, 10-15 per mm., rays multiseriate heterogeneous, with terminal swollen oil cell. Fibres thick walled angular in cross section and libriform, septate, oil cells present in the wood parenchyma, wood fibres and xylem rays.

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Holotype:- Ranikot fort area,
District Dadu, Sindh, Pakistan:
K.M.Khan & M.T.M.Rajput, R.K. 22 (1974).
Paleobotany museum, University of Sindh,
Jamshoro, Sindh, Pakistan.

Horizon:- Dada Conglomerates.

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