

A LAURACEOUS LEAF IMPRESSION FROM THE SIWALIK BEDS NEAR TANAKPUR, U. P.

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ABSTRACT

A well preserved leaf impression from the Lower Siwalik beds exposed in a road cutting in the Punyagiri Hill, near Tanakpur, U. P. is described. It shows close resemblance with the leaves of *Persea odoratissima* (Nees) Kosterm and *Persea gamblei* (King ex. Hook. f.) Kosterm of the family Lauraceae.

INTRODUCTION

In 1961, Misra and Valdiya reported the occurrence of fossil dicotyledonous leaves in the Lower Siwalik beds (Nahan Series) of Tanakpur, Uttar Pradesh. A preliminary collection of these fossils was made by Dr. N. Awasthi of the Birbal Sahni Institute in 1967 from the road cuttings along the bank of Sharda river, near Punyagiri, Tanakpur. Subsequently, two large collections were made from the same area, first by Dr. Awasthi, Dr. K. P. Jain and one of the authors (R. N. L.) in 1968, and later by Dr. Awasthi in 1972. The fossil leaves are preserved as impressions on calcareous grey shales. Out of the collected samples, one of the leaf impression is very conspicuous and is being described in the present paper.

The authors are thankful to the authorities of the Forest Research Institute, Dehra Dun for permitting them to consult their herbarium for identifying the fossil. They are grateful to Mr. K. C. Sahni, Forest Botanist, F.R.I., for furnishing the latest information about the nomenclature and distribution of the Indian species of *Persea* Mill.

DESCRIPTION

Family—LAURACEAE

Genus—**Persea** Mill.

Persea punyagiriensis sp. nov.

(Pl. 1, Figs. 1-4)

The present species is based on a single well preserved carbonised shining leaf impression. The impression is devoid of cuticle.

Leaf narrow, obovate to elliptic; total preserved length 9.6 cm; lamina length 8.4 cm; maximum width 3.7 cm; apex broken at the tip, most probably acute; base acute, slightly inequilateral; petiole 1.2 cm long; venation unicostate, reticulate; mid-rib prominent, thicker in lower half, thin in the upper half, curved in the upper 1/3rd portion; secondaries 10 pairs, 0.5 to 1.2 cm apart, angle of divergence gradually decreasing from basal to apical region (65° near the base and 40° near the apex), curved up and gradually narrowing towards the margin, connected to the superadjacent secondaries by finer veins without forming prominent marginal loops, tertiaries fine, obliquely arranged, joining

opposite secondaries, rarely joining the primary also, sometimes branched ; quaternaries still finer, forming mostly quadrangular or sometimes polygonal meshes ; areoles well developed ; veinlets in areoles not seen ; margin entire ; texture thick, seemingly chartaceous.

Holotype—B.S.I.P. Museum number 35303.

Locality—Road cutting along Sharda river, Punyagiri hill, Tanakpur, District Naini Tal.

Horizon—Lower Siwalik.

Age—Middle Miocene.

DISCUSSION

Going through the large number of herbarium sheets of different families at Forest Research Institute, Dehra Dun it was found that the fossil shows resemblance with the leaves of three genera of Lauraceae—*Phoebe* Nees, *Litsea* Lamk. and *Persea* Mill.

Leaves of some species of *Phoebe* show fairly good resemblance with the fossil leaf but while the secondaries in *Phoebe* run more or less straight towards the margin, in the fossil specimen they are more curved. Further, the leaves in *Phoebe* are relatively thicker and coriaceous. Two species of *Litsea* show general similarity with the fossil, *Litsea monopeltata* (Roxb.) Pers. and *L. tomentosa* Heyne, but in both of them the leaves are bigger and coriaceous.

On critical examination it was found that the fossil shows better resemblance with the leaves of *Persea*. Only four species of *Persea* come close to the fossil, viz., *Persea duthiei* (King ex. Hook. f.) Kosterm, *P. villosa* (Roxb.) Kosterm, *P. gamblei* (King ex. Hook. f.) Kosterm and *P. odoratissima* (Nees) Kosterm. Leaves of *P. duthiei* are mostly longer and narrower than the fossil. In *P. villosa* the leaves are relatively bigger and usually the middle part of the leaf is broadest whereas in the fossil the broadest part is in the upper half. *P. gamblei* and *P. odoratissima* show the closest possible approach to the fossil. On the basis of leaf morphology alone it is not possible to separate these two species. Hence, it would be difficult to say as to which of these two is closest to the fossil.

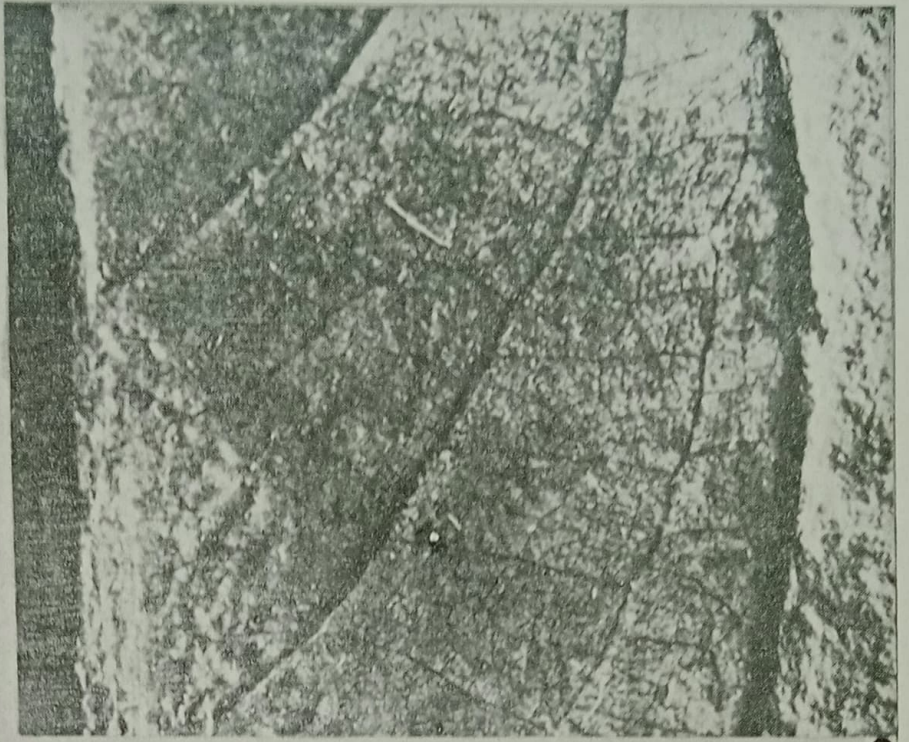
Presently *Persea* with its 150 spp. is distributed in the tropical countries of the world (WILLIS, 1973, p. 876). *P. gamblei*, a large or moderate sized tree, is found in the Sub-Himalayan tract and outer hills from Chamba eastwards and in Assam up to 1500 m. *P. odoratissima*, a moderate sized tree, is distributed throughout the outer Himalaya and Khasi hills up to 2100 m.

Comparison with previous records of fossil Persea from India :—There are no previous records of fossil *Persea* as such from India. However, two species of *Machilus* have been reported which should now be considered as *Persea* because the previously known Indian genus *Machilus* Nees. has now been included under *Persea* Mill. (WILLIS, 1973, p. 876). The two fossil species were (i) *Machilus villosa* (Pathak, 1969) from the Upper Tertiary (Middle Siwalik) from the Mahanadi river section near Darjeeling, West Bengal and (ii) *Machilus* sp. (PURI, 1949) from the Pleistocene (Lower Karewa) of Kashmir.

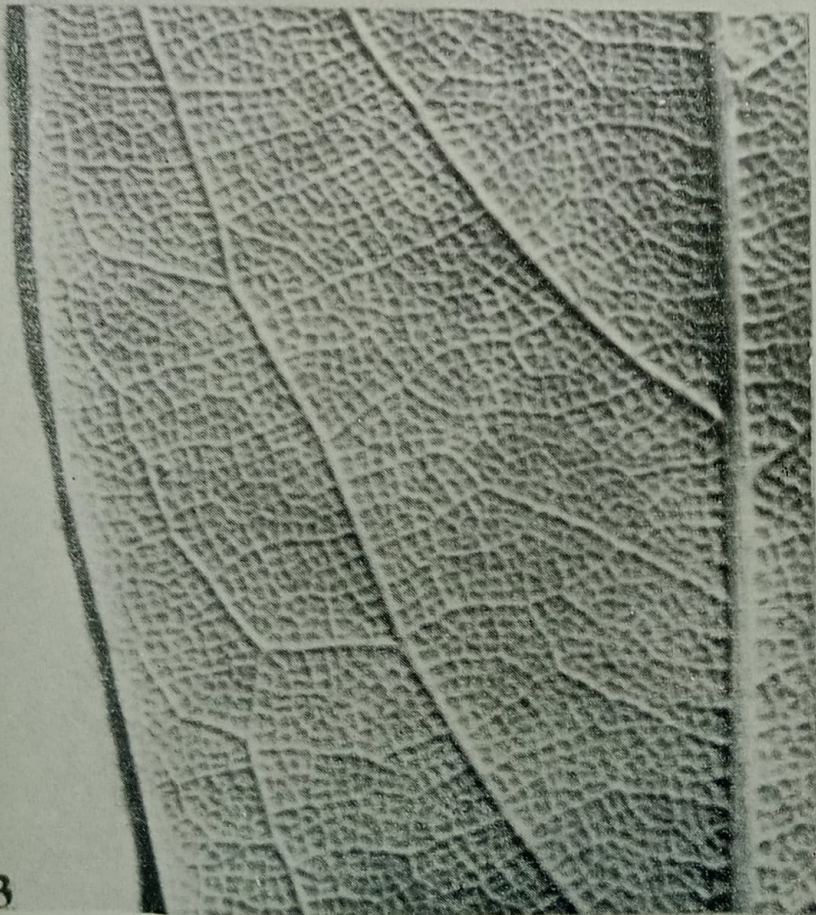
Since the specimen described as *Persea (Machilus) villosa* (Pathak, 1969) is incomplete and its photograph not very clear, it is not possible to compare the present fossil with Pathak's species. Moreover, the leaf of *P. villosa* differs in having oblong-lanceolate shape whereas the present fossil is narrow obovate to elliptic. *Machilus* sp. described by Puri (1949) differs from the present fossil in having almost double the number of secondaries.



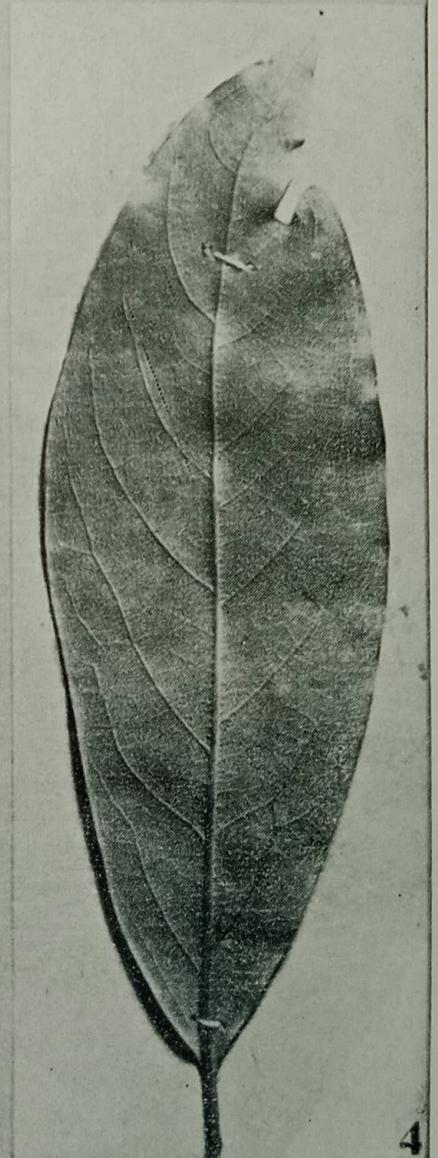
1



2



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4

Further, it appears to be almost double in size besides differing in shape. Puri's species most likely represents *Persea (Machilus) duthiei* instead of *P. (M.) odoratissima*, keeping in view the size and number of secondaries present in it. Puri (1949, p. 60) himself admits that his specimen is not quite identical with "*M. odoratissima*" and is also comparable to "*M. duthiei*".

Thus, it is evident that the present fossil is distinct from the two earlier records. It is, therefore, being described here as a new species, *Persea punyagiriensis*, named after the locality Punyagiri from where it has been collected.

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EXPLANATION OF PLATE 1

Persea punyagiriensis sp. nov.

1. *Persea punyagiriensis* leaf, natural size.
2. Part of Fig. 1 enlarged $\times 4$ showing details of venation.
3. *Persea odoratissima* leaf, natural size.
4. Part of Fig. 3 enlarged $\times 4$ showing details of venation.