

QUATERNARY FLORA OF MAHARASHTRA—1. THE PRAVRA RIVER BASIN DISTRICT AHMEDNAGAR, MAHARASHTRA

D. R. MAHAJAN* AND T. S. MAHABALÉ**

ABSTRACT

The paper gives an account of the leaf impressions of two species of *Ficus*, *Ficus glomerata* Roxb. and *Ficus arnottiana* Miq., found in the calcareous tufaceous strata in the hills around Sangamner (District Ahmednagar, M. S.). Here the strata from the late Pleistocene to Recent are exposed but the specimens described are from the sub-Recent beds. They are almost similar to the leaves of modern species. This suggests that they were present in the Deccan flora for over a very long period.

A small fossiliferous locality belonging to the sub-Recent period was found on the banks of the Pravra River near Sangamner (District Ahmednagar), Lat. 19° 27' and Long. 74° 14'. A number of leaf impressions were obtained from it, on highly calcareous tufaceous rocks buried under a considerable depth of recent alluvium. They contain 8-10 different types of leaves, of which two have been described here. The specimens contain no organic matter, but the impressions are well preserved on the dehydrated Calcium carbonate, forming main ingredient of the rock, mixed with some clay and silica. Both the specimens described here belong to the genus *Ficus* (Family-Urticaceae). The midrib, lateral veins and the network of tertiary veins are well preserved in them and compare well with two living species of *Ficus*, *Ficus arnottiana* Miq. and *Ficus glomerata* Roxb. They look very much similar to them, almost identical; and hence the same names have been retained for them.

Ficus arnottiana is found in the ledges of rocks in ghat sections of the Sahyadris in high rainfall areas in Western India, and the other species occurs on plains anywhere on the Deccan plateau. They are not conspicuous members of the living flora.

DESCRIPTION

***Ficus glomerata* Roxb.**

Pl. 1, Figs. 1-3

Three well preserved complete specimens bearing Nos. MA/K/SAN/2/71, MA/K/SAN/3/71, MA/K/SAN/4/71, and several fragmented ones of the same, were collected from two localities near Sangamner in Ahmednagar District. The complete ones measure 6.5 × 4 cms having elliptico-lanceolate leaf with a blunt apex. Their margins are entire and base acute. Midrib is prominent 0.1 cm thick and gives rise to 6 to 8 pairs of lateral veins. Each lateral vein bifurcates below the margin at an angle of 60°, and two bifurcating veins arising from successive laterals unite to form inconspicuous submarginal loops. They further ramify and form a network of tertiary veins. These characters of this leaf very well agree with those in the leaves of the living species *Ficus glomerata* Roxb.

Holotype—MA/K/SAN/2/71 }
MA/K/SAN/3/71 } Botany Museum, Department of Botany,
MA/K/SAN/4/71 } University of Poona, Poona (India)

* Sangamner College, Sangamner

** M.A.C.S. Research Institute, Poona-4

Locality—19 Km. to the East of Sangamner (Dist. Ahmednagar, M.S.)

Horizon—Sub-Recent

***Ficus arnottiana* Miq.**

Pl. 1, Figs. 4, 5

A number of fragments of leaf impressions of this species also were obtained; but two of them were very well preserved. They form the basis of the following description. The most complete specimen, bearing No. MA/M/SAN/49/69, measures 9.5 × 6 cms. It is ovate acuminate. Its basal part is cordate, not narrow. Apical portion though tapering is not very long as in *Ficus religiosa*, nor sharply acuminate. The margin is entire and the midrib prominent. It is 3/4 mm at the base and continues upwards towards the apex. Seven pairs of secondary veins arise from it at an acute angle of 58°. Each secondary vein branches below the margin. One of its limbs turns upwards and joins the counterpart coming down from the next successive upper vein, forming conspicuous arches below the margin between two lateral veins. The loops are distinct and sub-marginal. A fine reticulation of the tertiary veins is formed by numerous anastomosing tertiary veins, but the reticulum formed is not so fine as in *Ficus religiosa*.

The secondary veins below the apex are crowded at about 1/2 to 1/3 distance, compared with those that lie between the two secondary veins arising from the midrib in the middle part of the leaf. Midrib measures 0.5—0.3 cm. Petiole was not seen.

The principal characters of the leaf thus are:—

- (1) Broad ovate triangular leaf, narrowing to a blunt acuminate apex, but not as long as in *F. religiosa*.
- (2) Margin entire.
- (3) Midrib prominent giving rise to 7 pairs of secondary veins, forming further fine reticulation of tertiary veins. Loops formed by the lateral veins, submarginal.
- (4) Base not narrowing into a petiole.

All these characters agree with those found in the living species *Ficus arnottiana* Miq

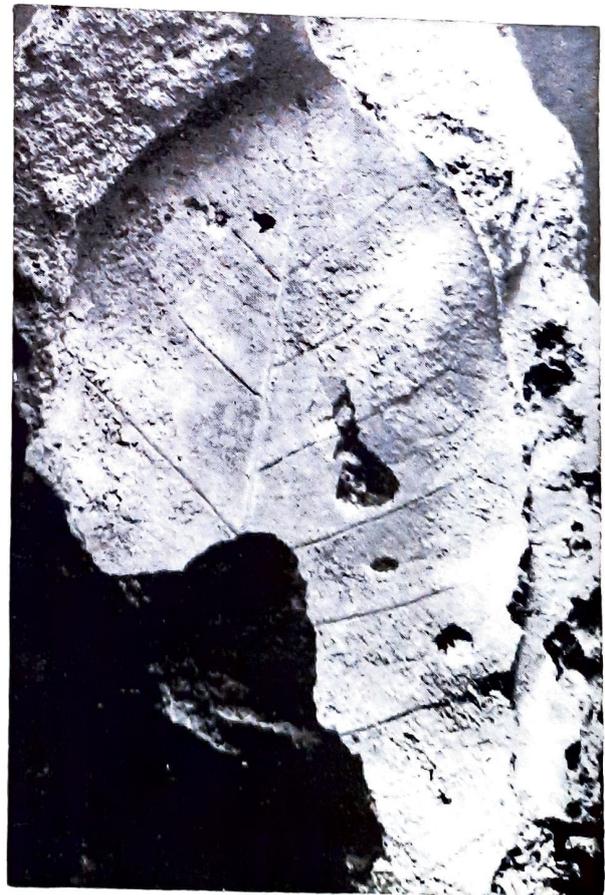
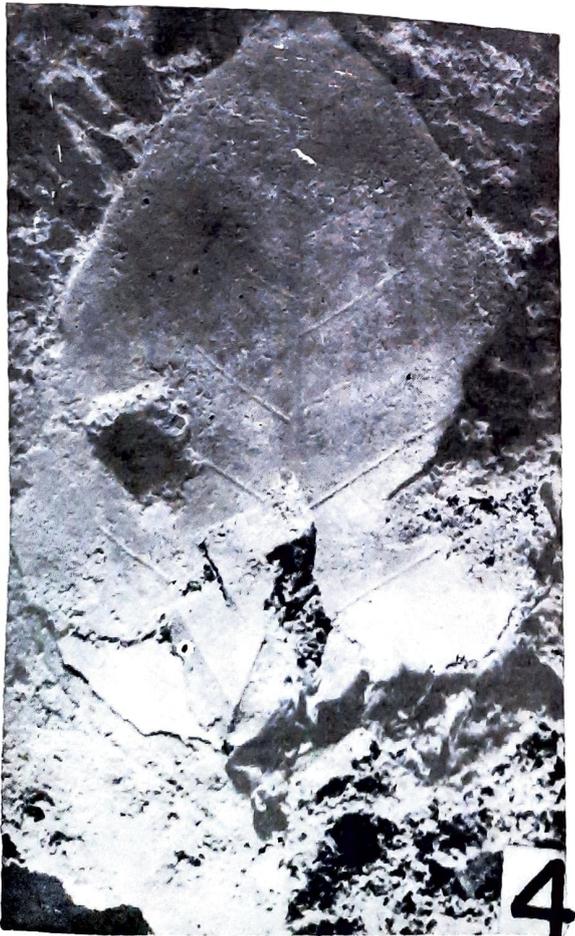
Holotype—MA/M/SAN/49/69 Botany Museum, Department of Botany,
University of Poona, Poona

Locality—Mojalwadi, 22.4 Km. East of Sangamner (Dist. Ahmednagar, M.S.)

Horizon—Sub-Recent

GENERAL REMARKS

The family Urticaceae is a large one consisting of 109 genera and 1500 species spread mostly in Tropics. The genus *Ficus* is an old one and has got about 600 species, mostly in tropical regions. Some of them occur in the Cretaceous and Tertiary rocks of South America and North America (ANDREW³, 1961, 1970). In Maharashtra State the genus is represented by 18 living species of *Ficus* including the two described above (HOOKER, 1872—1897; COOKE, 1908). Both these species grow wild in Maharashtra State. *Ficus arnottiana* Miq. grows in moist rocky situations having heavy precipitation in Western India. It is a species of high rainfall region, and is a petrophyte. *Ficus glomerata*, on the other hand, grows near springs, rivers, and water courses in the plains. It is believed to be a tree indicating underground water.



The occurrence of both these species in this area suggests that the rocky escarpment must have been present here in this region, on which *Ficus arnottiana* must have been growing since long. Some trees of *Ficus glomerata* also should have been growing near by river side and along nallahs having calcareous banks and rocks. In the solid mud of them, the leaves of both species must have fallen and drifted to the present site and got preserved. The same situation is even now available in parts of Ahmednagar district, Konkan and Goa, where these two species occur in the vicinity of each other in nearly the same kind of habitat as the fossil plants had. It should, however, be noted that both these species are not moisture loving. One is the inhabitant of semiarid regions and the other a petrophyte on mountain ledges and coastal rocks. They appear to be very ancient species compared to others, inhabiting semi-arid or rocky areas from the Quarternary to present. The genus *Ficus* is represented from the Cretaceous period onwards (ARNOLD, 1947; ANDREWS, 1970), but is more abundant in the Tertiary formations of South America. In India it has been known from the Siwalik beds, the specimens there being similar to those of *Ficus precunia* (LAKHANPAL, 1968).

REFERENCES

- ANDREWS, H. N. (1961). *Studies in Paleobotany*. John Wiley and Sons.
ANDREWS, H. N. (1970). *Index of Generic names of Fossil Plants*. Geological Survey Bulletin, 1300. U.S.A. Printing Office, Washington.
ARNOLD, C. A. (1947). *An Introduction to Paleobotany*. Mc-Graw Hill, New York.
COOKE, T. (1908). *Flora of Bombay Presidency*. Reprint, 1967. Botanical Survey of India, Calcutta.
HOOKER, J. D. (1872-1897). *Flora of British India*. Govt. of India Publication.
LAKHANPAL, R. N. (1968). A new fossil *Ficus* from Siwalik beds near Jawalamukhi, Himachal Pradesh. *Centre Advanced Studies Geol. Punjab Univ., Chandigarh*, 5: 17-19.

EXPLANATION OF PLATE 1

- 1-3. Leaf impressions of *Ficus glomerata* Roxb. $\times 2/3$
4-5. Leaf impressions of *Ficus arnottiana* Miq. $\times 2/3$