

ON A GINKGOALEAN LEAF FROM THE TRIASSIC OF MADHYA PRADESH

HARI K. MAHESHWARI & JAYASRI BANERJI

Birbal Sahni Institute of Palaeobotany, Lucknow-226007, India

ABSTRACT

The paper records the first definite ginkgoalean leaf from the Indian Triassic sediments. The leaf is petiolate with semiorbicular lamina, basal angle about 200° and veins generally 1 mm apart. As the leaf is quite different from the known ginkgoalean species, it has been given a new name, viz., *Ginkgoites goiraensis* sp. nov.

INTRODUCTION

THE specimen described in the present paper is from a collection of fossil plants from the Triassic formations of the South Rewa Gondwana Basin. This particular specimen was collected from a very hard, compact, ferruginous sandstone exposed on the left bank downstream of the Kamrai (also known as the Ghorari) Stream at Bardahighat ($23^\circ 25' N$. lat.: $81^\circ 06' E$. long.), north-east of Goira Village (probably same as Kamtadand or Kamtatora), Shahdol District, Madhya Pradesh. The other fossils collected from this locality include equisetalean axes, ?*Glossopteris*, *Dicroidium hughesii* (Feistmantel) Gothan and *Dicroidium* sp.

To our knowledge, there are only two earlier reports of fossil plants from this locality (Saksena, 1952, published in detail in 1962, and Lele, 1962). Lele could find only fern remains, such as, *Sphenopteris* sp., *Cladophlebis ?shensiensis* P'an and *Marattiopsis* sp. On the other hand, Saksena's collection comprised only gymnospermous remains, viz., *Glossopteris ?indica* Schimper, *Vertebraria indica* Royle and *Dicroidium hughesii* (Feistmantel) Gothan along with a solitary equisetalean axis. Our collection also does not contain any fern remains.

Lele (1969) places the rocks exposed at the Bardahighat locality (his Kamtadand) in the Parsora 'Stage' as defined by Fox (1931). The stratigraphical position of the Parsora 'Stage' is a highly controversial problem and has been discussed by Lele (1969) and Shah, Singh and Sastry (1971). The latter authors consider the Parsora 'Stage' to be younger than the Tiki 'Stage' which has a vertebrate fauna of Carnian-Norian age and assign a Rhaetian age to the

former. Bose (1974, p. 291), however, has pointed out that the Rhaetic floras all over the world are in general rich in bennettitalean remains whereas the Parsora flora has only one doubtful bennettitalean fossil, viz., *Pterophyllum sahnii* Lele. He rather seems to agree that the Parsora 'Stage' may be Middle to Upper Triassic in age.

DESCRIPTION

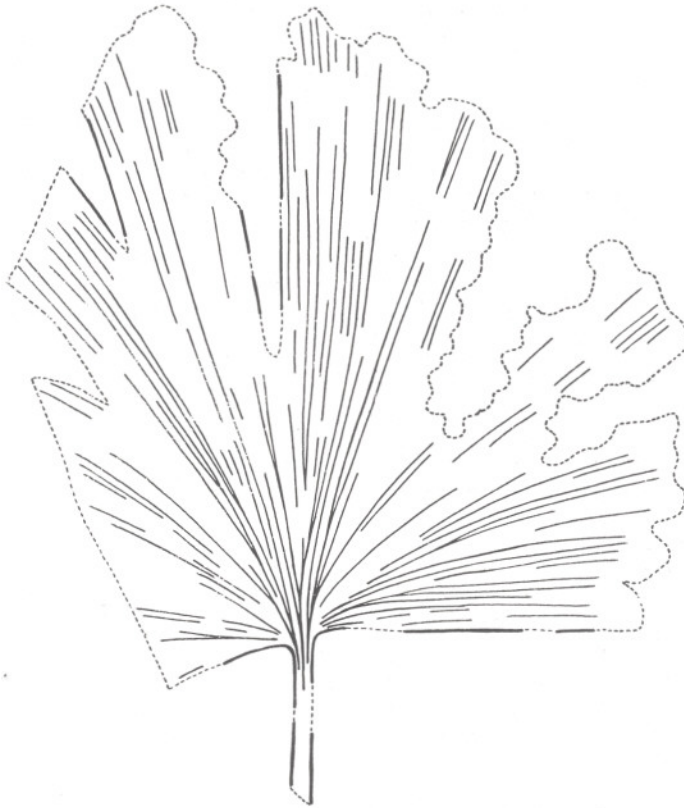
Solitary incomplete specimen with counterpart, preserved as impression on a dark red ferruginous sandstone. Leaf petiolate, petiole 2 cm long, 2 mm broad but slightly broader at the attachment region. Lamina semiorbicular, basal angle about 200° , lamina radius 8.5 cm, probably divided into four linear-cuneate segments, incision up to half length of lamina radius; segments 1.6-2.8 cm broad, apical region indistinct, margin entire. About three veins (probably four) enter base of lamina, repeatedly dichotomise and run straight up to apical margin without anastomosing, veins generally 1 mm apart in basal 1/3rd region but slightly more sparse towards the apical region.

COMPARISON AND REMARKS

As is evident from its fan-shaped lamina and venation pattern there is little doubt that the specimen described represents a ginkgoalean type of leaf. Such leaves were usually placed under the genus *Ginkgoites* Seward 1919, instituted for fossil leaves which were either generically identical or very closely allied with *Ginkgo* Linn. Florin (1936) modified the usage of the name *Ginkgoites* retaining it for those leaves which were either very much different from

Ginkgo or were too imperfectly known. Tralau (1968) differentiated the Mesozoic ginkgoalean genera on the basis of extent of incisions in the leaf lamina. Thus, leaves divided by shallow notches were placed under *Ginkgo* and *Ginkgodium* and those dissected by deep incisions were referred to *Ginkgoites* and *Baiera*. If Tralau's grouping is to be taken then our specimen should be placed in the genus *Ginkgo* Linn. which has a stratigraphical range from Lower Jurassic to modern times. Recently Harris and Millington (1974) have dropped the genus *Ginkgoites* pointing out that *Ginkgo biloba* is also known to produce many deeply divided leaves which would fall in the genus *Ginkgoites* as defined by Tralau. On this ground the genus *Ginkgodium* could also be included under *Ginkgo*. However, as is seen from associated fertile parts, not all the *Ginkgo*-like leaves belong to true Ginkgoaceae, e.g.

Karkenian incurva Archangelsky attributed to *Ginkgoites tigrensis* Archangelsky, *Karkenian* sp. attributed to *Sphenobaiera* sp. (Krassilov, 1970) and *Antholihes wettsteinii* attributed to *Ginkgoites lunzensis* (Stur) Kräusel (1943). It, therefore, means that all such leaves not only do not belong to a natural genus but may even represent families of Ginkgoales other than Ginkgoaceae. Harris (1976, p. 123) has recently said that "... plainly the fossil *Ginkgo* or *Ginkgoites* leaf genus must be regarded as the similar-looking leaves of considerably different plants". We are hence inclined to agree with Seward (1919) and Florin (1936) that fossil *Ginkgo*-like leaves, but with insufficient data, should be referred to the artificial genus *Ginkgoites*. This at least is true for our specimen of which neither the cuticular structure nor the associated fructifications are known.



TEXT-FIG. 1 — *Ginkgoites goiraensis* sp. nov.: a line drawing from the photograph of the holotype in Plate 1, figure 1 \times 1.

Among all the known species of Ginkgoales from India, the present species has the largest size. *Ginkgo lobata* Feistmantel 1877 recorded from Jabalpur Formation of Sher River differs in having a wedge-shaped lamina with shallow incisions and relatively smaller basal angle and in lacking a definite petiole. *Ginkgo crassipes* Feistmantel 1879 while having a petiolate leaf is readily distinguished by its undivided lamina and a larger concentration of veins. *Ginkgoites feistmantelii* Bose & Dev 1959 can be distinguished by its much smaller size and a lamina with entire or slightly notched margins and having very few veins. *Ginkgoites rajmahalensis* Sah & Jain 1965 differs in having a deeply divided lamina having veins which are generally simple and slightly converging towards the apex. On the other hand the veins in our specimen diverge towards the apical region. *Ginkgo digitata* (Brongniart) Heer is the closest comparable

species in shape, basal angle and petiole. It, however, differs in size and incisions of lamina. Hence, the present specimen is named as a new species, viz., *Ginkgoites goiraensis* after the village Goira, near which this specimen was collected.

Ginkgoites goiraensis sp. nov.

Pl. 1, figs. 1-3; Text-fig. 1

Diagnosis—Leaf large, petiolate, semi-orbicular, basal angle of lamina $\pm 200^\circ$, lamina segmented, incisions up to half radius deep; veins about 1 mm apart, dichotomising at various levels.

Holotype—Birbal Sahni Institute of Palaeobotany no. 21/1660.

Locality—Bardahighat on Kamrai Stream, north-east of Goira Village, Shahdol District, Madhya Pradesh.

Horizon & Age—Parsora 'Stage', Upper Triassic.

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EXPLANATION OF PLATE

PLATE 1

Ginkgoites goiraensis sp. nov.

1. Holotype showing the petiolate leaf with radiating dichotomous veins. $\times 1$.
2. A part of the holotype showing the petiole distinctly. $\times 1$.
3. Counterpart of the holotype. $\times 1$.

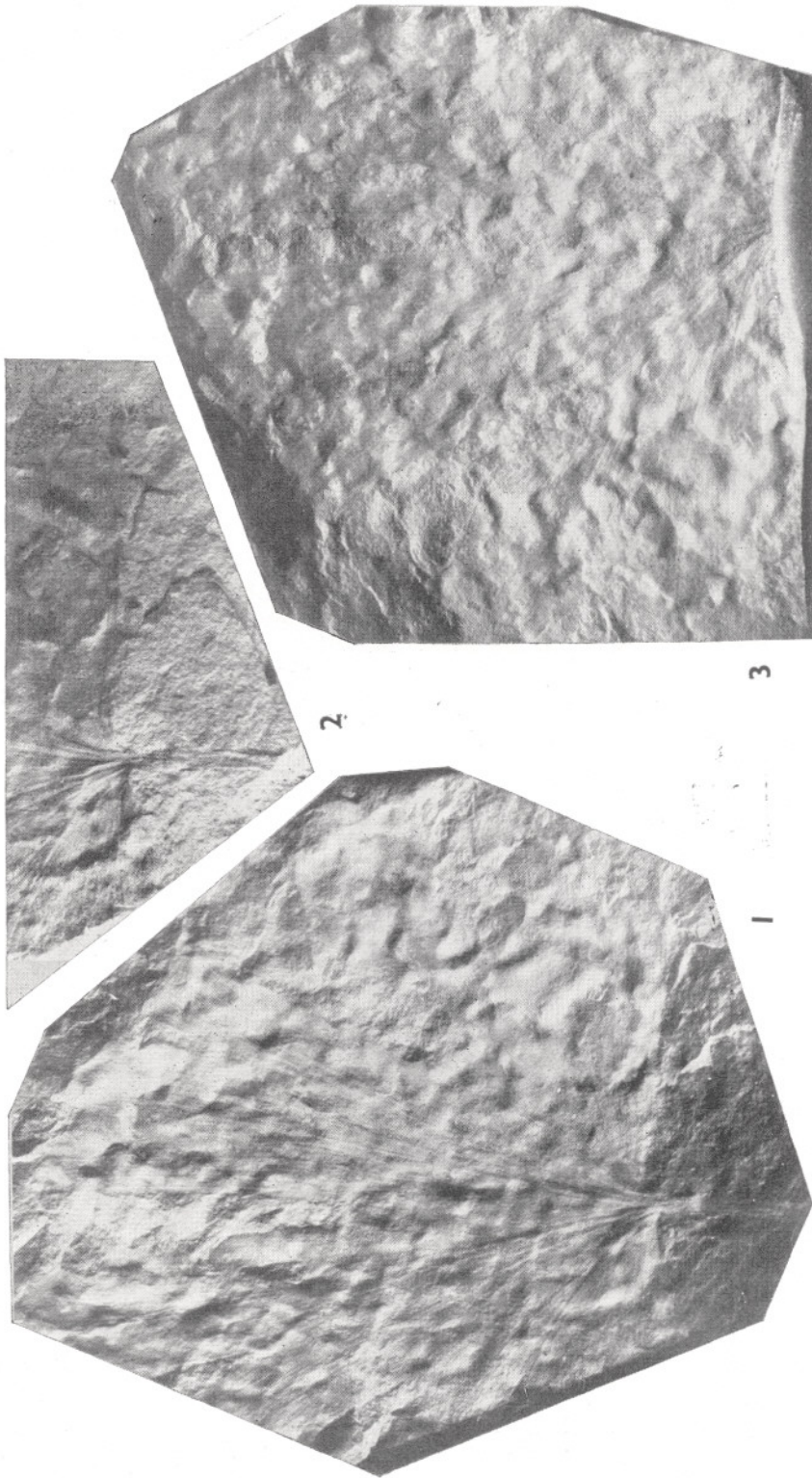


PLATE 1