Revision of *Callistemonites indicus* Bande, Mehrotra & Prakash from the Deccan Intertrappean beds of Mandla District, Madhya Pradesh

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The description and affinity of the fruiting axis *Callistemonites indicus* Bande, Mehrotra & Prakash 1986 reported from the Deccan Intertrappean beds, Shahpura in Mandla District, Madhya Pradesh have been revised. It is an incompletely preserved cast of the fruit with well preserved seeds and shows close resemblance with that of *Musa* instead a fruiting axis of *Callistemon-Melaleuca* as suggested earlier. It is very similar to the fossil fruit *Musa cardiosperma* Jain which was described from the Deccan Intertrappean beds of Mohgaonkalan, Chhindwara District and hence has been placed in the same species. This provides further evidence of the wider distribution of *Musa* in central India during Late Cretaceous—Early Palaeocene time.

Key-words—Fossil fruit, *Musa cardiosperma*, Deccan Intertraps, Early Tertiary (India).

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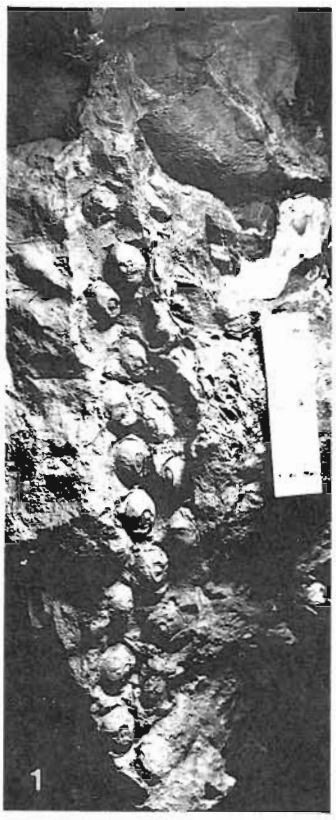
सारांश

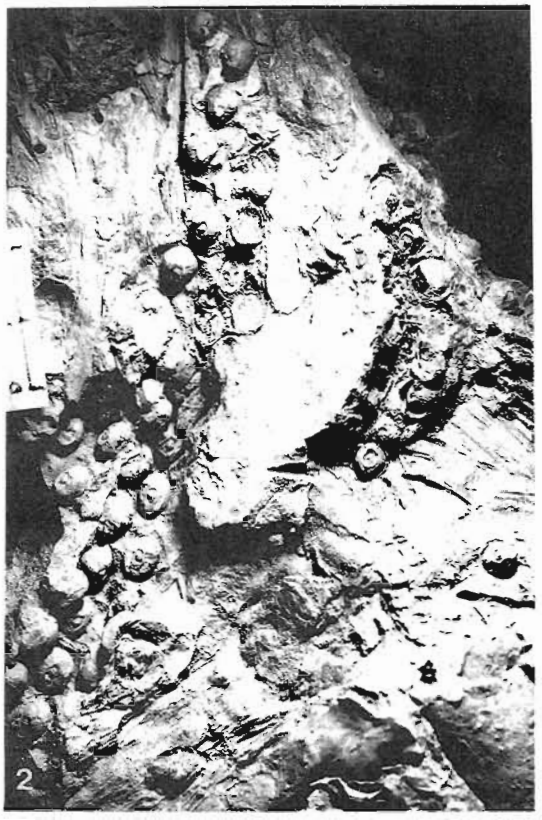
मध्य प्रदेश में मंडला जनपद के दक्खन अन्तर्ट्रेपी संस्तरों से उपलब्ध *केलिस्टीमोनाइटिस इंडिकस* बाँडे, मेहरोत्रा व प्रकाश का पुनर्अध्ययन

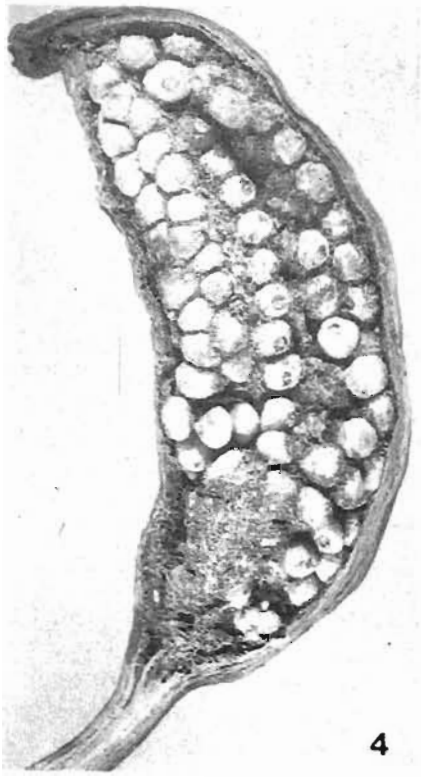
मोहन बलवंत बाँडे, राकेश चन्द्र मेहरोत्रा एवं नीलाम्बर अवस्थी

मध्य प्रदेश में मंडला जनपद में शाहपुरा की दक्खन अन्तर्ट्रेपी संस्तरों से उपलब्ध ***केलिस्टीमोनाइटिस इंडिकस*** बाँडे, मेहरोत्रा व प्रकाश 1986 नामक फलन अक्ष के वर्णन एवं सजातीयता में संशोधन किया गया है। यह फलन अक्ष सुपरिरक्षित बीजों से युक्त फल का अपूर्ण परिरक्षित आकृति स्वरूप है तथा पूर्व प्रस्तावित ***केलिस्टीमोन-मिलाल्यूका*** की फलन अक्ष के बजाय यह ***म्यूसा*** के फल से घनिष्ठ समानता व्यक्त करता है। चूँकि यह छिंदवारा जनपद में मोहगाव कला की दक्खन अन्तर्ट्रेपी संस्तरों में वर्णित ***म्यूसा कार्डिओस्पर्मा*** जैन नामक अश्मित फल से अत्याधिक समानता प्रदर्शित करता है अतएव इसे इसी जाति में रखा गया है। इस प्रमाण से अनंतिम क्रीटेशी-प्रारम्भिक पुरानूतन कल्प में केन्द्रीय भारत में ***म्यूसा*** का दूर-दूर तक वितरण प्रदर्शित होता है।

BANDE *et al.* (1986) had described a fossil infructescence *Callistemonites indicus* from the Deccan Intertrappean beds of Ghughua near Shahpura, Mandla District, Madhya Pradesh. The material on which this species was based consists of three incomplete specimens, measuring about 11.5 cm long and 2.5 cm wide exposed on two pieces of the intertrappean chert and was interpreted as spike-like infructescences with 6-34 small (8/4 mm) fruits arranged spirally. In the absence of anatomical details the specimens were deceptively similar to a fruiting axis of the myrtaceous genera—*Callistemon* and *Melaleuca* (Bande *et al.*, 1986, pl. 3, figs 23, 24). Another reason which led to suggest its affinities with these genera was the finding of a fossil wood similar to *Melaleuca-Callistemon* from the same bed (Bande *et al.*, 1986). Accordingly, the fossil was described as *Callistemonites indicus* suggesting its affinities to the fruits of *Callistemon-Melaleuca*. However, a critical reinvestigation of this material has revealed that the structures which were interpreted as 'fruits' arranged spirally on an axis, are in fact vertical rows of seeds inside the fruit. The seeds are very similar in their external morphology to the seeds of *Musa* (Pl. 1, fig. 4) and the fossil specimens represent incomplete fruits of banana where the pericarp and the pulp seem to have squeezed out during fossilization leaving behind only casts of seeds and partly the fruit wall. Under the circumstances, the material has been redescribed and a detailed







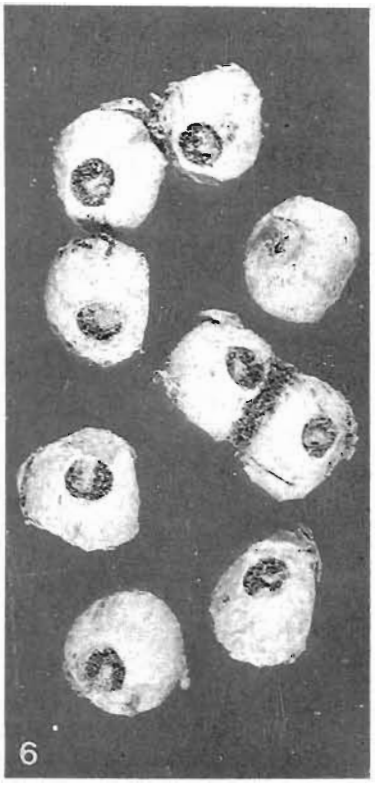


PLATE 1

comparison has been made to trace out its affinities with the extant fruit of *Musa* of Musaceae.

REVISED DESCRIPTION AND AFFINITIES

Family—Musaceae

Musa cardiosperma Jain 1964a

Syn.

Callistemonites indicus Bande, Mehrotra & Prakash 1986

Pl. 1, figs 1-3, 5

The material consists of three incomplete specimens exposed on two pieces of the chert. The sections of the specimens were made through the seeds but anatomical details could be observed.

Description—Fruit about 11.5 cm in length, 2.5 cm in maximum width through the median portion, oblong, indehiscent, seemingly fleshy, berry (Pl. 1, figs 1-3); pericarp indistinct, pulp not seen. Seeds numerous, arranged in 2-5 vertical rows in displaced manner, subglobose, somewhat compressed laterally, surface smooth, up to 12 seeds in each row, each seed 4-6 mm in width and 3-4 mm in length, a shallow depression (about 2-3 mm in diameter) present at the centre with a prominent hilum (Pl. 1, fig. 5).

The oblong, indehiscent and seemingly fleshy fruit having several rows of subglobose seeds each with a prominent hilum in a shallow depression at the centre indicates its close resemblance with the fruit of the genus *Musa* Linn. (Pl. 1, figs 4, 6) of Musaceae (Cheesman, 1947b, 1948). The other closely allied genus *Ensete* differs from it in having relatively few seeds per fruit which are bigger in size (exceeding 1 cm in diameter) than those in the fossil (Cheesman, 1947a). Amongst the known fossil fruits, a fruit of more or less same size with similar seeds is already known as *Musa cardiosperma* from the Deccan Intertrappean beds of Mohgaonkalan in Chhindwara District, Madhya Pradesh (Jain, 1964a). In the subsequent years, a pseudostem *Musocaulon indicum* (Jain, 1964b) and a leaf showing affinities with Musaceae (Prakash *et al.*, 1979) were also described from the same beds. Since the fruit under reinvestigation is a cast exhibiting only general outline with numerous seeds inside, no anatomical details could be studied for detailed comparison with the earlier described fruit. Nevertheless, these external features, particularly shape, size and number of seeds suggest its close similarity with *Musa cardiosperma* Jain 1964a. The only difference between the two is in the mode of fossilization. The former is a cast while the later is a petrifaction exhibiting all cellular details of the fruit and seeds. In view of this *Callistemonites indicus* Bande, Mehrotra & Prakash is merged with *Musa cardiosperma* Jain.

The genus *Musa* is wide in geographical distribution, ranging approximately in longitude from 75°E to 150°W and in latitude 30°N to the tropic of Capricorn. The area so defined comprises tropical rain forests of India, Myanmar, Thailand, southern China, Indo-China, the Malay Peninsula, the whole of East Indian Archipelago, Queensland and many Islands of the Pacific Ocean (Cheesman, 1947a). Although Willis (1973) includes 35 species under this genus, according to Santapau and Henry (1973) the genus comprises about 50 species, out of which 14 are found in India, especially in the Western Ghats, Nepal, Assam and eastern Himalaya.

The Assam-Myanmar-Thailand region in South East Asia has been considered by Simmonds (1962) as the centre of origin for the ancestral stock of banana and from this ancestral stock *Musa* spread widely in the eastward direction. The finding of banana fossils in the Deccan Intertrappean beds of India led Jain (1965) to suggest that the central India must have been a part of the native place of this genus. Its occurrence in Mandla District provides yet another evidence in support of Jain's view.

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PLATE 1

1. *Musa cardiosperma* Jain (Syn. *Callistemonites indicus* Bande *et al.*)—A compressed fossil fruit specimen-1 showing shape, size and arrangement of the seeds, x 1; Specimen no. BSIP 35885.
2. *Musa cardiosperma*—Another fossil fruit showing shape, size and arrangement of seeds, x 1; Specimen no. BSIP 35885.
3. *Musa cardiosperma*—Fossil fruit specimen—3, x 1; Specimen no. BSIP 35885.
4. *Musa balbisiana* Colla—Fruit of the modern genus showing seeds similar in shape, size and arrangement as that of fossil, x 1
5. *Musa cardiosperma*—Seeds enlarged to show hilum, x 3; Specimen no. BSIP 35885.
6. *Musa balbisiana* Colla—Seeds of modern genus enlarged to show similarity with that of fossil, x 3.

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