ling fitness are well known and have been reported by several earlier workers[12–15], our results are significant as they hold strong implications for the conservation of vulnerable species in the sacred groves[3,6,7]. The study underscores the importance of protecting the sacred groves from fragmentation if they have to serve as refugia for the vulnerable species.

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Seed-like structure in dinosaurian coprolite of Lameta Formation (Upper Cretaceous) at Pisdura, Maharashtra, India

Lameta Formation (Late Cretaceous) at Pisdura, Maharashtra has yielded a large number of dinosaurian coprolites (faecal mass) (Figure 1). These coprolites generally occur in different shapes and sizes. Depending on their external morphology, the coprolites have been categorized under four main types (A, B, Ba and C)[1]. Type-A coprolites contain exclusively large amount of vegetal parts and their association with titanosaurid skeletal remains in the same bed suggests that the titanosaurs sauropods were the producers. Among the remaining categories not much is known about their producers, though some may belong to chelonians[2–7]. Plant-bearing coprolites are significant from the viewpoint of understanding feeding habits of these animals and their palaeoecology.

Records of megafloral remains in the coprolites are poorly known, except for a few small plant structures of uncertain affinities and some softer parts of pteridophytic and gymnospermous origin[6,8]. In this context the recovery of a large monocotyledonous seed-like structure embedded in the coprolite (Type-A) is noteworthy.

The coprolite measures about 6 cm long and 4.5 cm broad, greyish in colour, ovoid in shape containing two silicified seed-like structures (Figure 2 *b*) measuring 2.0 cm in length and 1.5 cm in width. However, the complete seed partially embedded in the coprolite is slightly smaller, measures 0.9 cm in width (Figures 2 *a* and 3 *a*); light grey in colour; ovoid in shape (as seen in the sectional view; Figures 2 *b* and 3 *b*). It is enclosed in a thin endocarp (about 0.5 mm thick) (Figure 2 *a* and *d*). Endosperm cells are compact and seem to be ruminated (Figure 2 *e*). A degenerated embryo occupies the lateral position in the seed (Figures 2 *b*, *c* and 3 *b*); cellular details of the embryo could not be resolved due to its poor preservation. The seed could not be generically assigned to an extant taxon due to the lack of more recognizable features. However, in extant palms, seeds can be distinguished on the basis of the position of the embryo; in arecoid, borassoid, cocosoid, and coryphoid groups, it is basal or apical; in the lepidocaryoid group it is ventral, while in the phoenicoid group the embryo is always lateral in position[9–12]. Based on the shape, size, presence of single cotyledon and lateral position of the embryo, the seeds indicate close resemblance to the phoenicoid group of Arecaceae.

Records of Upper Cretaceous seeds/ fruits referable to Arecaceae as *Palmocarpon arecoides*, the fruits characterized

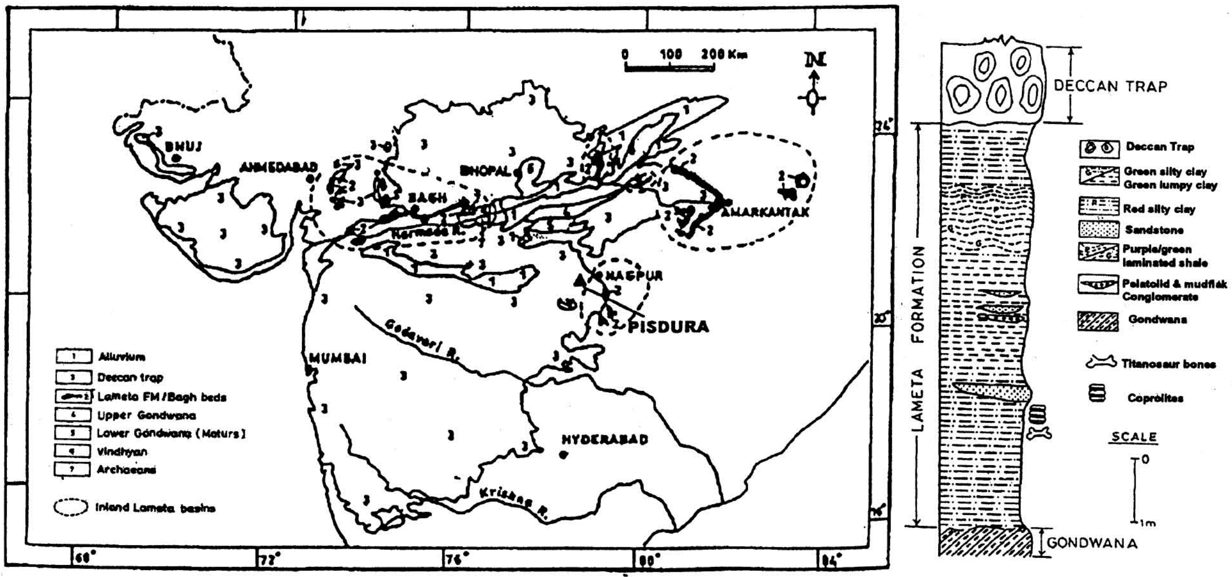

Figure 1. Map and litholog of the location where the specimens were collected (after Mohabey[5]).

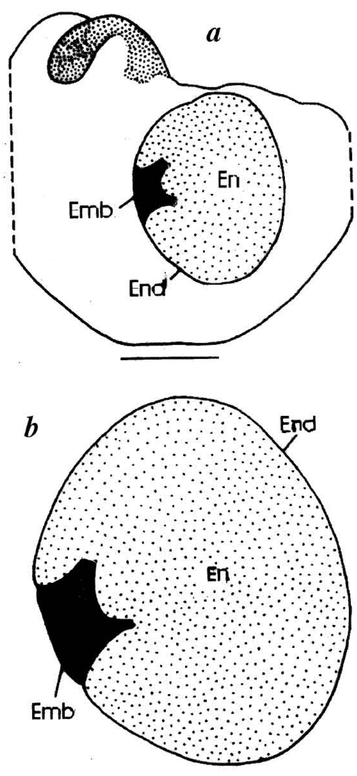

Figure 3. ***a***, Fossil seeds embedded in the coprolite, and one of the seeds in sectional view. ***b***, Enlarged sectional view of the fossil seed showing endocarp, endosperm and lateral position of embryo (bar = 1 cm).

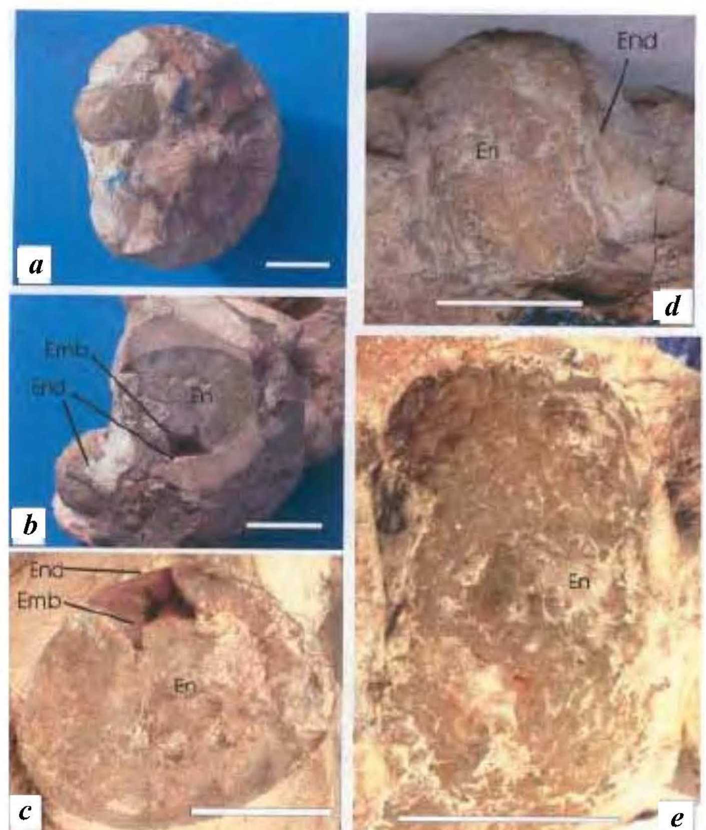

Figure 2. ***a***, Fossil seeds embedded in coprolite. ***b*** and ***c***, Same seed in sectional view showing thin endocarp and endosperm with remnant of embryo. ***d***, Seed partially covered in a thin endocarp. ***e***, Seed showing ruminated endosperm. End, Endocarp; En, Endosperm; Emb, Embryo (bar = 1 cm).

by small size (2.2–2.3 cm) and diameter, more or less circular in shape and seeds with small groove on one side are also known from the Deccan Intertrappean beds of Mohgaon-Kalan, Chhindwara and Mandla districts of Madhya Pradesh[13–16]. However, other records from Lower Middle Eocene of Northeast India and Miocene of Himachal Pradesh are also known[13–19].

Coprolites provide direct evidence of solid food intake comprising pteridophytes, gymnosperms as well as angiosperms, and micro-biota through ingested water has been recorded by earlier workers[4–8]. Occurrence of the diatom (*Aulacoseira*) representing the oldest non-marine records from the Deccan Intertrappean and from Upper Cretaceous coprolites themselves is striking evidence for this[6–8].

Arecoid plants are well established in tropical regions of the world. They are entirely absent in the Arctic and hot or cold deserts, except the Arabic deserts and are related to hydrophilic soil properties, while some are restricted to limestone[9–12,20]. Phoenicoid palms chiefly grow in western Asia, Arabia and throughout India from the desert to the Himalayan region[10].

The present paper constitutes the first record of a fossil phoenicoid seed in a coprolite from the Upper Cretaceous at Pisdura, Maharashtra. It also indicates that these plants were growing in the region and were consumed by the dinosaurs.

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Population size, feeding, forearm length and body weight of a less known Indian fruit bat, *Latidens salimalii*

India is one among the 25 hotspots of the richest and highly endangered eco-regions of the world[1]. It also harbours diverse chiropteran species numbering over one hundred, including 12 fruit bats[2,3]. The status, distribution and ecology of several bat species are still poorly known[3]. Here, we present data on the population, feeding and forearm length and body mass of Salim Ali's fruit bat, *Latidens salimalii*, considered to be one of the world's rarest bats and the only species found in the genus *Latidens*[3,4]. This medium-sized bat was first collected in 1948 by a British naturalist, Angus Hutton[5], who misidentified it as the commonly occurring short-nosed fruit bat, *Cynopterus sphinx*. The specimen was re-examined by Kitty Thonglongya, who recognized it as a new species and named it in honour of the legendary Indian ornithologist, Salim Ali[6].

Between 5 July 1997 and 30 December 1999, we conducted field surveys to investigate the population, distribution and diversity of fruit bats such as flying fox, *Pteropus giganteus*, short-nosed fruit bat, *Cynopterus sphinx* and *L. salimalii* in Tamil Nadu, South India[7–11]. During the surveys we discovered a cave roosting site of the *L. salimalii* for the first time[7,8] and estimated the population size using roost counts[12]. In addition, visual counts were carried out while the bats emerged by positioning two or three observers. Mist net was used to capture and release bats and for each capture, we attached a wing band and recorded the location, habitat type, date, time, sex, age class, forearm length and body weight. Nocturnal observations of bats were done by moonlight as well as using dim red lights and data were recorded using the all-occurrences sampling method[13]. We presented all mean values ± 1 standard deviation. We conducted all statistical analyses through Statistical Analysis System (SAS) software[14]. We used analysis of covariance (ANCOVA *F* test) within General Linear Models to test the effects of independent variable (forearm length) and categories (sex and age) on body mass[14].

A total of 46 individuals (19 males and 27 females) were captured near a coffee and cardamom estate, at an altitude of about 1000–1175 m, adjacent to Megamalai Forest Reserve. Body weight and forearm measurements were taken from all the