



News and Views

A newly discovered galagid fossil from Nakali, an early Late Miocene locality of East Africa



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ARTICLE INFO

Article history:

Received 3 April 2015

Accepted 15 February 2017

Available online 17 March 2017

Keywords:

Strepsirrhini

Lorisiformes

Galagidae

Paleoenvironment

1. Introduction

Primate fossils are extremely poorly known in the African fossil record between the late Middle and early Late Miocene. Recent fieldwork, however, has improved the situation (Kunimatsu et al., 2007; Suwa et al., 2007). In particular, the Kenya–Japan Joint Expedition to Nakali in north–central Kenya has discovered various fossil catarrhine primates from the early Late Miocene (10.0–9.8 Ma) of eastern Africa (Kunimatsu et al., 2007; Nakatsukasa et al., 2010). During the field season of 2010, we collected a strepsirrhine fossil during excavations at Nakali site NA60, where numerous rodent and Old World monkey specimens have been recovered (Nakatsukasa et al., 2010; Nakaya et al., 2011; Tanabe et al., 2013). The strepsirrhine fossil, KNM-NA 51145, discovered at NA60 is a right maxillary fragment with M¹–M², which can be securely assigned to a small galagid.

The oldest known fossil galagid is *Saharagalago* discovered from the earliest Late Eocene (~37 Ma) of the Fayum, Egypt (Seiffert et al., 2003). There is also another fossil galagid, *Wadilemur*, from the same locality, which is latest Eocene in age (~34 Ma) (Seiffert et al., 2005). No Oligocene lorisiforms are known from Africa (Seiffert, 2007, 2012). In the Early and Middle Miocene of East Africa, two galagid genera, *Komba* and *Progalago* are known from several localities in western Kenya and Uganda (MacInnes, 1943; Le Gros Clark and Thomas, 1959; Simpson, 1967; Walker, 1974, 1978; Harrison, 2010). At present, however, galagid fossils are hardly known from the Late Miocene, except for a small number of specimens reported from Sheikh Abdallah (11–10 Ma) in Egypt (isolated teeth and postcrania assigned to a new species, *Galago farafraensis* [Pickford et al., 2006]), Harasib 3a (10–9 Ma) in Namibia (two isolated upper molars of Galagidae indet. [Conroy et al., 1993; Rasmussen and Nekaris, 1998]), and Lukeino (6–5 Ma) in Kenya (a mandibular fragment [Pickford and Senut, 2001; Mein and Pickford, 2006]) (Fig. 1).

2. Geological background

The fossiliferous deposits at NA60 are tuffaceous sandy mud, and belong to the Upper Member of the Nakali Formation at a slightly lower level than site NA39, where the majority of the specimens of a large hominoid *Nakalipithecus nakayamai*, including the holotype, were discovered (Kunimatsu et al., 2007). Sedimentological surveys suggest that they are fluvial sediments accumulated by rivers around a lake (Sakai et al., 2013). According to the radioisotopic dating and paleomagnetostratigraphy in Nakali, the fossiliferous deposits at site NA60 are located at the uppermost part of the Chron C5n.1r, that is, ~9.9 Ma (Kunimatsu et al., 2007; Sakai et al., 2013).

3. Systematics

Order Primates Linnaeus, 1758
 Infraorder Lorisiformes Gregory, 1915

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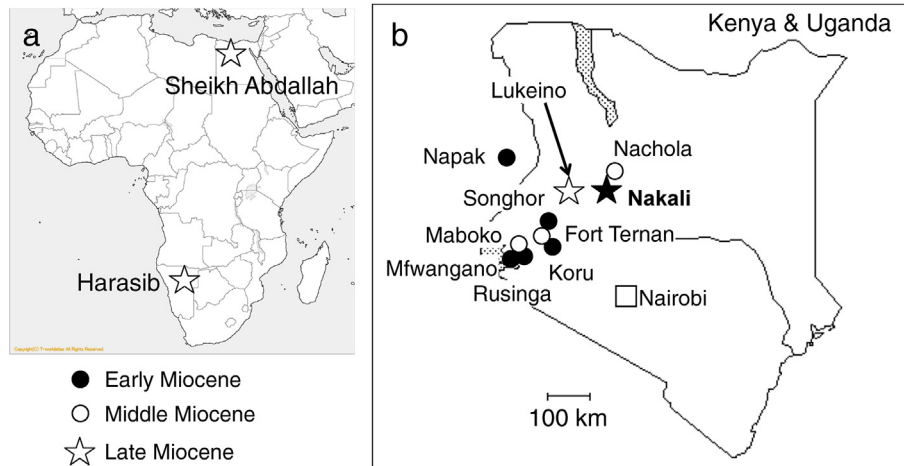


Figure 1. Miocene strepsirrhine localities. **a:** Africa. **b:** Kenya/Uganda.

Family Galagidae Mivart, 1864
gen. et sp. indet.

4. Description

KNM-NA 51145 is a right maxillary fragment with M^1 – M^2 (Fig. 2). The molar crowns are much broader than long, with a concave distal margin in occlusal view. The M^1 is damaged, missing the paracone. The protocone is a sharp cusp. There is a short, weak cingulum on the mesiolingual aspect of the protocone, but it does

not extend onto the lingual aspect of the cusp. A small paraconule is developed on the mesial margin of the crown, at the base of the preprotocrista. The postprotocrista runs distally from the apex and turns distobuccally to end at a small and mesiodistally compressed metaconule. The metacone is also a sharp cusp, and is similar in height to the protocone. The postmetacrista runs distobuccally and ends at a weakly developed metastyle. The hypocone is smaller and lower than the protocone, and is located slightly distolingual to the latter cusp. There is a fine prehypocrista running from the hypocone tip to the postprotocrista. In occlusal outline, the distolingual distention of the hypocone region is weak.

The M^2 is slightly larger than the M^1 . The crown morphology is basically similar to that of M^1 , but the hypocone is less developed and more compressed, and is more widely separated from the protocone, compared to the conditions in M^1 . In addition, there is no prehypocrista unlike on the M^1 . The metastyle is better developed than in M^1 . The cingulum on the mesiolingual aspect of the protocone is more reduced, being a very faint depression. The M^2 preserves the paracone. It is a sharp cusp, similar in size and height to the metacone. The preparacrista runs mesially to end at a distinct parastyle, from which a short vertical groove runs up on the buccal aspect of the crown. Otherwise, the buccal cingulum is not developed. In occlusal view, the postparacrista and premetacrista make a very broad V shape with its trough facing buccally.

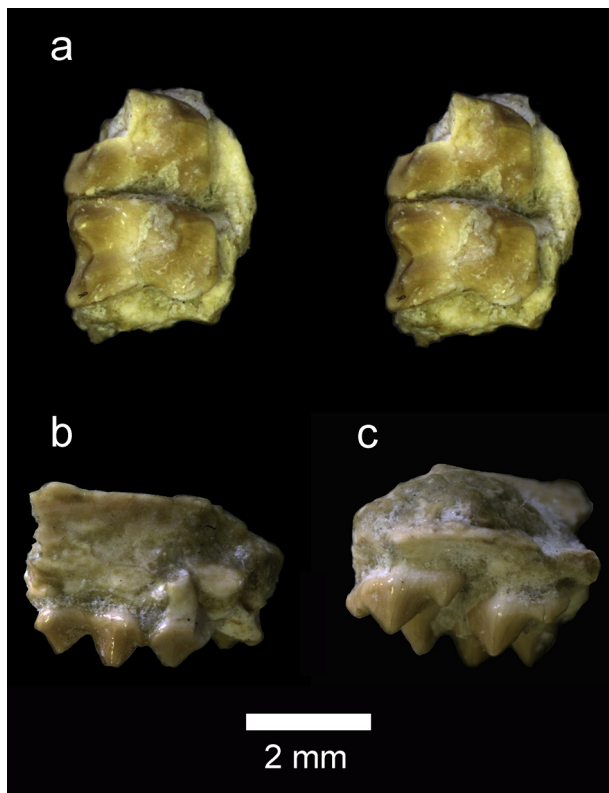


Figure 2. Right maxilla with M^1 – M^2 of KNM-NA 51145 (Galagidae gen. et sp. indet.) from Nakali. **a:** stereo occlusal view, mesial side to the top of the page. **b:** buccal view. **c:** lingual view.

5. Discussion

5.1. Affinities of the Nakali galagid

Only a few galagid samples are known from the early Late Miocene of Africa, hence the importance of KNM-NA 51145. The mesiodistal length and buccolingual breadth of the Nakali galagid molars are similar to those of *G. farafraensis* from Sheikh Abdallah (Table 1), with both being tiny galagids as small as the extant Demidoff's galago (*Galagoide demidoff*)¹ (Fig. 3). *Galagoide demidoff* is one of the smallest extant primates in mainland Africa, with a body mass of 60 g (range: 44–97 g), head and body length of 12 cm (range: 7.3–15.5 cm) and tail length of 18 cm (range: 11–21.5 cm) (Kingdon, 2015). Apart from the similar dental size, the Nakali galagid resembles *G. farafraensis* in having a relatively small

¹ The specific epithet *demidoff* is used here instead of *demidovii*, following Groves (2001).

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