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Original article

Amphibians and squamates from the middle Eocene of Namibia, with comments on pre-Miocene anurans from Africa

Amphibiens et squamates de l'Eocène moyen de Namibie. Remarques sur les anoures anté-miocènes d'Afrique

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Abstract

Three middle Eocene localities (Silica North, Silica South, Black Crow) recently discovered in Namibia have produced terrestrial faunas that rank among the few known from the period of insulation of Africa (Aptian-early Miocene). Collectively, the three localities have yielded anuran amphibians (one pipid frog, the earliest assemblage [three taxa] of ranoid frogs in Africa, one indeterminate family) and squamate reptiles (an amphisbaenian 'lizard', a snake that likely represents a colubroid, and two indeterminate 'lizards'). These Eocene faunas suggest that ranoids, colubroids and African pipids are autochthonous to Africa. However, whereas pipids are vicariants inherited from West Gondwana, ranoids and colubroids (if really autochthonous) originated in Africa from unknown stems. Silica North and Silica South correspond to aquatic environments, permanent fresh water being present in the first locality; the environment of Black Crow was drier.

Keywords: Anura; Squamata; Eocene; Namibia; Africa

Résumé

Trois gisements de l'Eocène moyen (*Silica North*, *Silica South*, *Black Crow*), découverts récemment en Namibie, ont produit des faunes terrestres qui comptent parmi les rares trouvées en Afrique et datant de la

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période d'isolement du continent (Aptien-Miocène inférieur). À elles trois, elles ont fourni des anoures (un pipidé, la plus ancienne faune de ranoïdes [trois taxons], une famille indéterminée) et des squamates (un amphisbaenien, un serpent qui correspond probablement à un colubroïde, deux « lézards » indéterminés). Ces faunes éocènes suggèrent que les pipidés africains, les ranoïdes et les colubroïdes sont autochtones en Afrique. Cependant, alors que les Pipidés africains sont des vicariants issus du Gondwana occidental, les ranoïdes et les colubroïdes (s'ils sont réellement autochtones) sont nés en Afrique de souches inconnues. *Silica North* et *Silica South* correspondent à des environnements aquatiques, de l'eau douce étant présente en permanence à *Silica North*. L'environnement de *Black Crow* était plus sec.

Mots clés : Anura ; Squamata ; Eocène ; Namibie ; Afrique

1. Introduction

Africa was isolated from other continents from the late early Cretaceous to the early Miocene, i.e. after the Africa-South America split up to the establishment of the Africa-Eurasia terrestrial contact. This interval represents a key period in the palaeobiogeographical history of the continent (Gheerbrant and Rage, 2006). Unfortunately, as far as terrestrial faunas are concerned, the African fossil record from this period is very poor, both in terms of fossiliferous sites and diversity of taxa. Therefore, the discovery of any fossiliferous locality from this time interval may provide a significant contribution to the knowledge of African faunas and their history.

Recently, amphibians and squamates were recovered from the middle Eocene of Namibia (Pickford et al., 2008a); they come from three localities: Silica North, Silica South and Black Crow. Whereas squamates from the localities are poorly diversified, the assemblage of anuran amphibians ranges among the richest known from Africa. These Namibian faunas represent an important landmark in the history of herpetofaunas in Africa.

2. The localities

The three fossiliferous localities are located in the Sperrgebeit, southwestern Namibia (Pickford et al., 2008a), where Cainozoic non-marine carbonate rocks occur in dolines and kamenitzas eroded into Proterozoic dolomites of the Gariep Group.

Silica North is an outcrop of siliceous limestones that yielded vertebrates, ostracods, terrestrial and mainly freshwater gastropods, and plants. Mammals indicate an early Lutetian age (Pickford et al., 2008b).

Silica South, close to Silica North, is a deposit of limestone that produced vertebrates, freshwater gastropods and plants. Its age is similar to that of Silica North.

Black Crow, located about 10 km south of the other two localities, is an outcrop of dolomitic limestone from which were recovered vertebrates and terrestrial molluscs. Black Crow appears to be slightly younger than Silica North and Silica South, it may be middle Lutetian (Pickford et al., 2008a,b).

However, it should be noted that Pickford et al. (2008b) did not definitely discard an older, Ypresian age for these three Namibian localities.