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## Description of a new species of the *Miniopterus aelleni* group (Chiroptera: Miniopteridae) from upland areas of central and northern Madagascar

STEVEN M. GOODMAN<sup>1,2,9</sup>, BEZA RAMASINDRAZANA<sup>2,3,4,5</sup>,  
KATE M. NAUGHTON<sup>6</sup> & BELINDA APPLETON<sup>7,8</sup>

<sup>1</sup>Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago, Illinois 60605, USA. E-mail: [sgoodman@fieldmuseum.org](mailto:sgoodman@fieldmuseum.org)

<sup>2</sup>Association Vahatra, BP 3972, Antananarivo (101), Madagascar. E-mails: [sgoodman@vahatra.mg](mailto:sgoodman@vahatra.mg), [ramasindrazana@gmail.com](mailto:ramasindrazana@gmail.com)

<sup>3</sup>Département de Biologie Animale, Faculté des Sciences, Université d'Antananarivo, BP 906, Antananarivo (101), Madagascar

<sup>4</sup>Centre de Recherche et de Veille sur les maladies émergentes dans l'Océan Indien, 2 rue Maxime Rivière, 97490 Sainte Clotilde, La Réunion, France

<sup>5</sup>Institut de Recherche pour le Développement, 97492 Sainte Clotilde, La Réunion, France

<sup>6</sup>Marine Invertebrates, Sciences Department, Museum Victoria, GPO Box 666, Melbourne 3001, Victoria, Australia. E-mail: [kmnaughton@gmail.com](mailto:kmnaughton@gmail.com)

<sup>7</sup>Department of Genetics, University of Melbourne, Victoria 3010, Australia. E-mail: [b.appleton@unimelb.edu.au](mailto:b.appleton@unimelb.edu.au)

<sup>8</sup>Life and Environmental Science, Deakin University, Victoria, 3216, Australia. E-mail: [belinda.appleton@deakin.edu.au](mailto:belinda.appleton@deakin.edu.au)

<sup>9</sup>Corresponding author

### Abstract

Recent molecular genetic work, combined with morphological comparisons, on Malagasy members of the bat genus *Miniopterus* (Family Miniopteridae), has uncovered a number of cryptic species. Based on recently collected specimens and associated tissues, we examine patterns of variation in *M. aelleni*, the holotype of which comes from Ankarana in northern Madagascar. Using molecular genetic (mitochondrial cytochrome *b*) and morphological characters we describe a new species, *M. ambohitrensis* **sp. nov.** In northern Madagascar, *M. ambohitrensis* and *M. aelleni* are allopatric, but occur in relatively close geographical contact (approximately 40 km direct line distance) with *M. ambohitrensis* found at Montagne d'Ambre in montane humid forest and *M. aelleni* sensu stricto at Ankarana in dry deciduous forest. Morphologically, this new taxon is differentiated from *M. aelleni* based on pelage coloration, external measurements, craniodental differences, and tragus shape. Comparisons using 725 bp of cytochrome *b* found a divergence of 1.1% within *M. aelleni* sensu stricto, 0.8% within *M. ambohitrensis*, and 3.3% between these two clades. The two sister species do not demonstrate acoustical differences based on recordings made in a flight cage. *Miniopterus ambohitrensis* is known from four localities in the northern and central portions of Madagascar, all from montane regions and across an elevational range from about 800 to 1600 m; its calculated "Extent of occurrence" is 15,143 km<sup>2</sup>. It is possible that this species is at least partially migratory.

**Key words:** taxonomy, morphology, molecular genetics, new species, montane, humid formation forest, cryptic species

### Résumé

Les études morphologiques et moléculaires récemment entreprises sur les espèces du genre *Miniopterus* (Famille des Miniopteridae) ont révélé la présence de diverses espèces cryptiques. Dans la présente étude, nous avons analysé des spécimens récemment collectés et les tissus associés afin de déterminer la variation de *M. aelleni* dont l'holotype vient du Parc National d'Ankarana, situé dans la partie Nord de Madagascar. En se basant sur les données moléculaires (cytochrome *b*) et morphologiques, nous avons décrit une nouvelle espèce, *M. ambohitrensis* **sp. nov.** Dans la partie nord malgache, *M. aelleni* et *M. ambohitrensis* vivent en allopatrie. Ces deux espèces sont réparties dans des zones géographiquement proches (distances d'environ 40 km à vol d'oiseau) avec *M. ambohitrensis* dans des zones de forêts humides de montagne du Parc National de la Montagne d'Ambre et *M. aelleni* sensu stricto, dans des zones dominées par des forêts sèches caducifoliées du Parc National d'Ankarana. Du point de vue morphologique, cette nouvelle espèce de *Miniopterus* se distingue de *M. aelleni* par la couleur du pelage, les mensurations externes et cranio-dentaires ainsi que la forme du tragus. L'analyse des 725 pb du cytochrome *b* montre une divergence génétique de 1,1 % chez *M. aelleni* sensu stricto et de 0,8

months (June through August) ranged from 9.7 to 11.2°C (Langrand 1995). We have found bats at the site in torpor, but no evidence of deep hibernation.

In a more practical sense, the species described herein, *M. ambohitrensis*, can be separated from its sister species, *M. aelleni*, by a number of morphological characters, including size, coloration, tragus shape, and craniodental features. These two species have allopatric distributions. As has been shown for several genetically distinct cryptic species of small to moderate size Malagasy *Miniopterus*, tragus shape can be diagnostic to distinguish taxa and can be used to diagnose different clades (Goodman *et al.* 2007, 2008, 2009a, 2009b, 2010, 2011). *Miniopterus ambohitrensis* possesses a number of mensural and phenotypic characters, including tragus shape, which allows it to be distinguished from *M. aelleni*. A detailed study overlaying clade allocation with a variety of different genetic markers and morphological variation, specifically tragus shape, as well as bioacoustic characteristics is needed to resolve the affinities of animals currently placed in the P-group.

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