


Multilocus phylogeny and taxonomy of East Asian voles *Alexandromys* (Rodentia, Arvicolinae)

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Phylogenetic relationships, taxonomy and nomenclature issues within East Asian voles *Alexandromys* were addressed using comprehensive species samples, including all 12 valid species of the genus, and multilocus analysis. We examined the mitochondrial cytochrome b (*cytb*) gene and three nuclear genes in 36 specimens. Additionally, we examined a data set of 106 specimens using only the *cytb* gene. Our results did not confirm the aggregation of *A. kikuchii*, *A. montebelli* and *A. oeconomus* into a separate clade, namely the subgenus *Pallasinus*. Analysis of incomplete lineage sorting using JML software highlighted both the cases of mitochondrial introgression and incomplete lineage sorting within the genus. Thus, the sister position of *A. sachalinensis* and *A. maximowiczii* in mitochondrial trees could be explained by mitochondrial introgression, while the sister position of *A. limnophilus* and *A. fortis* in mitochondrial trees could be successfully explained by incomplete lineage sorting. Very short genetic distances, together with an absence of monophyly, of the three species, *A. evoronensis*, *A. mujanensis* and *A. maximowiczii*, is supported by multiple morphological data, which indicates that these three taxa should be one species—*A. maximowiczii*. Analysis of genetic distances and tree topology revealed that three species of short-tailed voles—*A. middendorffii*, *A. mongolicus* and *A. gromovi*—are more closely related to each other than to other established species of *Alexandromys*. The lacustrine vole, *A. limnophilus*, is closely related to the group of short-tailed voles. Analysis of the type specimens of *limnophilus* and *flaviventris* confirmed that these taxa form one species together with *A. l. malygini*. Our results suggest that the mountains of western Mongolia are inhabited by a new taxon of short-tailed voles of the same rank as *middendorffii*, *mongolicus* and *gromovi*—*A. m. alpinus* ssp. n.

KEYWORDS

Alexandromys, multilocus analysis, phylogeny, taxonomy,

1 | INTRODUCTION

Voles of the *Alexandromys* Ognev, 1914 genus are widely distributed in the Eastern Palaearctic. One species, the root vole *A. oeconomus* (Pallas, 1776) penetrates to Western Europe, and east to the Alaska Peninsula and adjacent regions of

North America. East Asian voles generally prefer wet habitats along rivers or lake shores, wetlands within taiga, steppe, semidesert and desert zones, often inhabiting higher elevations in mountains. Such discontinuous distributions can potentially lead to separation of various geographical forms, including those worthy of a taxonomic rank.