

An integrative systematic revision of the European southern birch mice (Rodentia: Sminthidae, *Sicista subtilis* group)

Tamás Cserkész¹, Mikhail Rusin² and Gábor Sramkó^{3,4}

Abstract

1. The systematics of the genus *Sicista* is unclear, mostly because of the high level of chromosomal variability within the genus. One of the most challenging groups for systematists is the steppic *Sicista subtilis* species group that extends from central Europe to Lake Baikal. We present a systematic review of these European southern birch mice using an integrative taxonomic approach.
2. In this review, we evaluate the degree of genetic and morphological differentiation of the *Sicista subtilis* complex by analysing 12 European populations, and propose a new taxonomic treatment for the *subtilis* group based on an integrative approach combining phylogenetic and morphometric analyses with a review on previously published cytogenetic and morphological data.
3. The phylogenetic relationship was reconstructed using sequences of the whole mitochondrial cytochrome *b* (CytB) and the nucleus-encoded interphotoreceptor binding protein (IRBP) under the maximum parsimony and maximum likelihood criteria. Based on whole CytB sequences, genetic distances were reconstructed and visualised among the taxa. These data were supplemented with multivariate analysis of the morphology of the baculum and of the penile spike of museum specimens.
4. Based on the genetic and the morphological data set, we suggest that the subspecies *trizona* and *nordmanni* should be raised to the species rank. We suggest *Sicista trizona* (Frivaldszky, 1865) and *Sicista nordmanni* (Keyserling and Blasius, 1840) as names for these species, respectively.
5. The species status of *Sicista severtzovi* is not supported by our results, so we recommend reclassifying it as a subspecies of *Sicista subtilis*.
6. Finally, the large genetic distance between the Hungarian and Romanian populations of *Sicista trizona* led us to describe the Romanian population as a new subspecies.

Author Information

1. Department of Systematic Zoology and Ecology, Eötvös Loránd University, Budapest, Hungary
2. Department of Evolutional and Genetical Systematics, Schmalhausen Institute of Zoology, Kiev, Ukraine
3. Department of Botany, University of Debrecen, Debrecen, Hungary
4. MTA-ELTE-MTM Ecology Research Group, Budapest, Hungary