

Phylogenetic relationships among European ratsnakes of the genus *Elaphe* Fitzinger based on mitochondrial DNA sequence comparisons

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Abstract

In order to elucidate the phylogenetic relationships in European ratsnakes of the genus *Elaphe*, we analyzed a 597 bp part of the mitochondrial cytochrome b gene of eight West Eurasian and one East Asian species. *Lampropeltis* served as outgroup. Maximum parsimony and maximum likelihood suggest the existence of four lineages: 1) *E. scalaris*; 2) the *E. longissima* species group comprising *E. longissima*, *E. lineata*, *E. situla*, *E. hohenackeri*, and *E. persica*; 3) *E. quatuorlineata* and 4) *E. dione* as a sister group to 3). *Elaphe scalaris* is basal and shows no closer affiliation with any other analyzed species. The Middle Eastern *E. persica* and *E. hohenackeri* appear basal within the *E. longissima* group. *Elaphe lineata* differs by 8% nucleotide substitutions from *E. longissima*, supporting the hypothesis that both taxa represent distinct species. *Elaphe situla* is associated with *Elaphe longissima* and *E. lineata*. Three analyzed subspecies of *E. quatuorlineata* are represented by distinct haplotypes. The extent of divergence gives reason to assign species status to the taxon *sauromates*. Besides, we found two very distinct haplotypes within the range of *E. (q.) sauromates*, indicating the existence of a third, so far unidentified, species within the *E. quatuorlineata* complex. The East Asian *E. porphyracea* clusters with the *E. longissima* group. This, as well as comparisons with supplementary sequences of Asian *Elaphe* species, document the multiple origins of European *Elaphe*.

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