

A STUDY OF VARIATION IN MANDIBLE SHAPE  
IN TWO SPECIES OF WATER SHREWS (*NEOMYS*) USING  
TRADITIONAL AND GEOMETRIC MORPHOMETRICS

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Two species of water shrews (*Neomys fodiens* and *Neomys anomalus*, Mammalia: Insectivora) occur in Hungary. They are very similar morphologically and cranially. There appears to be a slight dietary niche segregation, therefore it is of interest to compare variation in shape of the mandible.

Distance, landmark and outline data were digitized from images of mandibles of 256 specimens of the two species in the collection of the Hungarian Natural History Museum. Landmark data were analysed as Bookstein shape coordinates, outlines were modelled using Fourier harmonic coefficients. Traditional distance measurements followed Büchler's (1964) variables. Discriminant analyses were carried out on the three data sets using positively identified specimens as training sets. Unknowns were classified using the obtained discriminant functions.

The traditional distance measurements and the geometric morphometric methods provided similar results for identifying the knowns. Fourier coefficients yielded poor results. However, using principal component analysis the outline method was shown to be very sensible to fractures on the bone. Repeating the discriminant analysis using only completely intact mandibles the outline method was found to perform better than the other two.

PHYLOGENETIC IMPLICATIONS OF  
NEUROGENESIS PATTERN IN MOLLUSCS

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In the bivalve *Mytilus* at the end of gastrulation two bilaterally symmetrical sensory-like neurons are localized postero-dorsally behind the blastopore in the future rudiment of the foot. Their pioneering axons elongate in anterior direction and establish the posttrochal nervous system as two lateral cords of neuroblasts. In the advanced trochophore these cords give origin to the rudiments of visceral, parietal and pleural ganglia, and the first differentiated posterior neurons to the pedal ganglia. As shown by preliminary results in the gastropod *Patella*, this neurogenesis pattern is not determined by the reduction of the cephalic region and adult sessile life of bivalves, but can be general of molluscs. It is comparable with that of annelids, then suggests a common ancestor for the two phyla. Owing to the anopodial flexure, however, which during development shifts the foot rudiment with the pedal ganglia from a postero-dorsal to an antero-ventral position, the body plan of a mollusc might be compared to a bent metatrochophore. These observations support the relationship between blastopore and nervous system in protostomes, but not the leading role of the cerebral ganglia in their neurogenesis. Also, they conflict with the theory of a primitive tetra-neury of molluscs and their origin from an ancestor similar to platyhelminthes, among other things, show their ventral surfaces are not homologous.