

PRELIMINARY IDENTIFICATION DATA OF *APODEMUS SYLVATICUS* AND *A. FLAVICOLLIS* THROUGH MORPHOLOGICAL AND GENETICAL ANALYSES

AMORI G.<sup>1</sup>, ANNESI F.<sup>2</sup>, CRISTALDI M.<sup>2</sup>, FANFANI A.<sup>2</sup>, LOCASCIULLI O.<sup>3</sup>, REICHEGGER D.<sup>2</sup>, SOLIDA L.<sup>4</sup>, SZPUNAR G.<sup>2</sup>, ZAGHIS I.<sup>2</sup>

<sup>1</sup> Istituto per lo Studio degli Ecosistemi-CNR, Università degli Studi “La Sapienza” di Roma, Via A. Borelli 50, 00161 Roma

<sup>2</sup> Dipartimento Biologia Animale e dell’Uomo, Università degli Studi “La Sapienza” di Roma, Via A. Borelli 50, 00161 Roma

<sup>3</sup> Ente Parco Nazionale del Gran Sasso e dei Monti della Laga, Via del Convento 67010 Assergi-L’Aquila

<sup>4</sup> Dipartimento Biologia Evolutiva e Funzionale, Università degli Studi di Parma

In southern Europe, contrary to what happens in central-northern Europe, the two species of Rodents belonging to the Genus *Apodemus* Kaup 1829 (sub-Genus *Sylvaemus* Ognev, 1924), *A. sylvaticus* (Linnaeus, 1758) and *A. flavicollis* (Melchior, 1834), show, in sympatric condition, a strong morphological convergence that makes their identification very difficult. Moving towards more southern areas a gradual increase in body size in *A. sylvaticus* can be observed, while *A. flavicollis* exhibits a strong decrease in the pectoral collar, accompanied by a less strong decrease of body dimensions.

Among the several hypotheses that were formulated throughout the years to explain this converging trend, that of the “introgressive hybridization” assumed a predominant role.

Human modifications of the environment (deforestation, soil alterations, desertification, etc.) make habitats uniform and, consequently, eliminate ecological isolation between the two species: the resulting contact areas would favour hybridization. Such hypothesis was later confuted in the first half of the 80’s. In fact, electrophoresis studies of the gene-enzyme system, showed that the two species are reproductively isolated and therefore genetically differentiated.

For these reasons, an a-dimensional determination of the animals, based on coat colours and on specimens’ size is often used in the field.

A more precise determination can be made in the laboratory with different methodologies: i) somatic indexes, ii) skull morphometry, iii) biochemical analyses, iv) genetical analyses.

The first aim of this work is to formulate a morphometric index for the identification of the two species, based on the relationships that occur between body measures.

The second goal is to test the degree of reliability of specimens’ determination, based on macro-morphological characters and on the already described indexes.

For those purposes, a sample of about 100 animals from each species was analysed, captured during trapping sessions since the 90’s, in different sites of central Italy (“Tenuta Presidenziale di Castelporziano” – Circeo National Park – Monti Lucretili Regional Natural Park – Monti Lepini Regional Natural Park – “Lago di Penne” Regional Natural Reserve).

For each animal we recorded, at the moment of capture, the following morphological parameters: head-anus length, tail length, foot length, weight. In order to be sure that only adults were considered, only animals whose weight was  $\geq 20$  g were used.

Determination at species level was based upon two techniques: electrophoretic analysis of gene-enzyme system and PCR (Polymerase Chain Reaction) with species-specific primers. Species determination errors in the field, of sympatric *Apodemus* individuals, evidenced by successive genetical analyses, made it desirable the creation of a new index whose reliability could be verified through the comparison with pre-existing indexes. The application of this index could provide an alternative, not destructive and more economical tool for field discrimination of those two sister species, as compared with genetic and electrophoretic analyses.