

# Geographic differences in the setal pattern of *Eisenia fetida* (Savigny, 1826) in Iran

(Oligochaeta: Lumbricidae)

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**Abstract.** The intra-specific variations of the setae arrangements was evaluated in three populations of *Eisenia fetida* (Savigny, 1826), e.g., to apply and test of the usefulness of setal formula at the intra-specific (population) level. The results confirm the role of the expected geographic isolation on the inter-population variability, and the results showed that variability in the setal formula (variability in paired setae groups *aa*, *ab*, and *dd*) could be used in the study of the intra-specific variations.

**Key words.** Iran, earthworm, setae, *Eisenia*.

## Introduction

In earthworms, setae are arranged in a single ring around the periphery of each segment. In the family Lumbricidae, to which the species *Eisenia fetida* (Savigny, 1826) belongs, there are eight setae per segment. The setae are designated by letters *a*, *b*, *c*, and *d*, beginning from the most ventral to the most dorsal setae on each side. The setae are arranged in paired groups. If the distance between the setae in each pair is very small, they are termed “closely paired”; if they are wider apart, they are termed “widely paired” and if the pairing is not obvious, they are termed “distant” (EDWARD & BOHLEN 1996). The distances between each pair of setae were used for species description already by BEDDARD (1892), MICHAELSEN (1900) and ROSA (1901); but with no numerical expression. Later, the setal (numerical) formula was applied in the study of the inter-specific variations OMODEO & ROTA (2004), ZICSI & CSUZDI (1999), and RIGHI (1995). MORENO et al. (2005, 2008) expressed the setal distances for the first time as a percentage of the body circumferences in an effort to identify different earthworm species. I applied the setal formula to study variability distance between setae at the intraspecific (population) level to separate three natural populations of *Eisenia fetida*.

## Material and methods

Earthworms were collected from the following three localities in central Iran: 1) Lar Dam, a small grassland in the mountains (35°51'N, 52°03'E); 2) Siah-bishe, in the vicinity of a farm (36°12'N, 51°19'E), and 3) Arak City, in a garden (34°04'N, 49°42'E). 36, 35, and 21 earthworm specimens collected in Arak, Lar Dam, and Siah-bishe, respectively.