

## ORIGINAL ARTICLE

# Using presence signs to discriminate between similar species

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## Abstract

The Lusitanian and the Mediterranean pine voles (*Microtus lusitanicus* Gerbe, 1879 and *Microtus duodecimcostatus* de Selys-Longchamps, 1839) are fossorial sister species and have an allopatric pattern of distribution in Portugal, which includes a potential sympatry area in the centre of the country. The present study aimed to determine the validity of using presence signs in the field for discrimination of the two species in an area of sympatry (Northern Alentejo) and the characteristics that achieve the best classification accuracy. A total of 175 trapping plots were sampled across the study area. Prior to the set up of traps, ten presence signs were randomly selected for measurements of four variables: proportion of soil mounds, mean diameter of mounds, proportion of burrow openings and mean diameter of burrow openings. On the basis of a classification tree analysis, results showed that presence signs can be used to discriminate plots inhabited by one or the other species in the studied sympatry area. The characteristic that most accurately enables species identification is the proportion of burrow openings: for every ten presence signs found in a plot, if more than eight have an opening, then it is inhabited by *M. lusitanicus* (i.e. mostly burrow openings with few or no mounds present); if eight or fewer have an opening, *M. duodecimcostatus* is present (i.e. mostly mounds with few or no burrow openings).

**Key words:** *Microtus duodecimcostatus*, *Microtus lusitanicus*, presence signs, species identification.

## INTRODUCTION

The Lusitanian and the Mediterranean pine voles (*Microtus lusitanicus* Gerbe, 1879 and *Microtus duodecimcostatus* de Selys-Longchamps, 1839) are fossorial sister species (Jaarola *et al.* 2004) with similar and marked burrowing behavior and a restricted European distribution (Giannoni *et al.* 1993; Cotilla & Palomo 2002; Mira & Mathias 2002). In Portugal, these species have a mainly allopatric distribution pattern, with a narrow area of po-

tential sympatry in the centre of the country (Madureira 1984; Santos SM, unpublished data). Both species can become agricultural pests (Vinhos 1993; Mira & Mathias 1994), although no cyclic populations are known for either species (Cotilla & Palomo 2002; Mira & Mathias 2002). Other similarities between the species include occurrence in the same type of habitat: open areas such as meadows, pastures and agricultural areas (Mathias 1999). In the area of sympatry, it is often uncertain which species is responsible for the reported damages, because of their morphological similarity (Madureira 1982, 1984) and the need for specific trapping techniques for the survey of these voles (Guédon *et al.* 1992; Mira 1999). Some morphological features of skulls and teeth have been used with a relevant degree of accuracy in species discrimination (Madureira 1982; Brunet-Lecomte *et al.* 1987; Mathias 1996), but frequently require the killing of animals.

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