



The distribution and status of *Lacerta agilis* in Piedmont (NW Italy) (Reptilia, Lacertidae)

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ABSTRACT

Lacerta agilis is an Italian reptile species with a very restricted distribution, living only in two limited areas respectively of the Carnic Alps (Friuli - Venezia Giulia) and the Maritime Alps (Piedmont). The main and apparently stable Italian population is that of the western Alps. At present, only two disjunct *Lacerta agilis* subpopulations are known in the Piedmont Alps, in an area of about 7-8 Km². Data on micro-distribution, habitat preference and population structure were collected in two sites of presence.

KEY WORDS: *Lacerta agilis* - Italy - western Alps - distribution - status.

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INTRODUCTION

According to present knowledge, the presence of the sand lizard, *Lacerta agilis* (Linnaeus, 1758), in Italy is known with certainty only in Piedmont (Stura di Demonte valley, the province of Cuneo) and in Friuli-Venezia Giulia (Fusine in Valromana, the province of Udine) (Lapini *et al.*, 1989; Polidori & Caratti, 1992; Sindaco, 1999); in the latter locality the occurrence of the species has not been confirmed during recent surveys (Lapini & dell'Asta, 2004).

Data quoted in four-year-old bibliography, refer to the surrounding area of Bolzano ("Bozen") and generically to Alto Adige ("Südtirol") (Rahmel, 1991), but these data have not been confirmed during the most recent studies (Societas Herpetologica Italica, 1996). Castanet (1978) reported the species in the south-western French Alps, but the first observation for the Italian slopes (the surrounding area of Colle della Maddalena, Piedmont), has published by Lapini *et al.* (1989). Past research located the species in a new locality in Piedmont (Vallone di Puriac), near the previously known one (Polidori & Caratti, 1992), close to the French area of the south-western Alps where *L. agilis* is distributed. The presence in this latter locality was confirmed in the following years. In the summer of 1995, G. Manganelli took a photo of a specimen by the Colle della Maddalena lake (photo published in Sindaco, 1999). Sindaco *et al.* (2002) then summarised previous knowledge and furnished new localities.

MATERIALS AND METHODS

Field surveys of *L. agilis* were carried out in the most ecologically suitable sites, in the higher valley of Stura di Demonte, in the area surrounding the Argentera municipality (Cuneo province).

In the two areas where *L. agilis* resulted as more densely present, an accurate monitoring by means of capture, marking and release after measuring each specimen was carried out. The research concentrated mainly on the Vallone di Puriac population in 2000, and on the Vallone di Ferrere population in 2001.

The field activity of monitoring covered a total period of 42 days, distributed over two consecutive years: 18 observation days in 2000, between June 4 and September 21, and 24 days in 2001, between July 2 and September 5. Specimens were actively searched for and captured by hand in tall grass, on dry-stone walls and under stones.

In order to obtain information on population structure, data was obtained from the abundant population of the Vallone di Ferrere site, where research was concentrated over a surface of about 4600 square metres.

Altogether, the sample is made up of 50 specimens captured, measured, individually marked and then released. Snout-vent length was measured for all the captured specimens; sex and age class (adult, immature, young) were detected; breeding pattern in males and possible pregnancy in females were also assessed.

Date, time, soil temperature, altitude a.s.l., microhabitat characteristics and type of vegetation were recorded for each capture or observation. All captured specimens were individually marked by means of toe clipping, photographed and released in the same place where captured. Collecting and observation sites were georeferenced on two sheets of the CTR (Regional Technical Map of Piedmont) on a 1:10,000 scale.

RESULTS

Range

At present, two *Lacerta agilis* populations are known in the Piedmont Alps: they appear disjunct, due to the discontinuity of suitable habitats. These populations are located in the Vallone di Puriac and in the Vallone di Ferrere (both in the Argentera municipality). Notwithstanding regular surveys, other populations have no longer been found in those areas where the species was previously cited, in particular in the area around the Maddalena lake (1970 m) and between the lake and the area called Grange (about 1900 m). All observations were concentrated only in an area of about 7-8 Km² (Sindaco *et al.*, 2002).

Habitat

In the Piedmont Alps, the species seems strictly associated to a typical alpine grasslands habitat on calcareous substrate, on high mountain slopes, mostly facing either east or south. The presence of *Festuca paniculata*, *Helictotrichon parlatorei*, *Trisetum flavescens* and other *Festuca* species characterised this ecosystem.

The species does not seem to be strictly associated to the presence of water, rocks or stone heaps due to the removal of stones from pastures, although it was more easily observed close to both streams (Vallone di Puriac) or stone heaps (Vallone di Ferrere).

In particular, in the Vallone di Ferrere, where the population is more concentrated, *L. agilis* prefers the edge of stone heaps and dry-stone walls, hidden among the residual tall grass of pastures, in particular *Urtica dioica* and *Nepeta nepetella* (Di Già & Perona pers. obs.).

Ecological data provided by Capula & Luiselli (1992) for the same areas seem incorrect as the authors refer the habitats of *Nardetum strictae* formations, linked to acidophilous substrates, notwithstanding this alpine area is characterized only by calcareous substrates. The altitudinal distribution along the Italian Alps ranges from 1720 to 2166 m. Data from the Vallone di Puriac site, where the population was not concentrated in a restricted area, recorded the average altitude as 1843 m (SD = 77; *n* = 35).

Activity

Thirty-eight observations (8 captures) were made in 2000 and 55 (50 captures) in 2001, with a total of 88 observations which gave the following results.

Seasonal activity is concentrated in the period that starts from early June to the beginning of September. However, it is probable that the specimens come out from dormancy as early as May, in relation to the melting of the snow.

During the activity period, no particular seasonality emerged, as expected for a species living at high altitudes where a suitable season lasts no more than 3-4

months. As for the daily activity, the species was observed continuously between 9.00 a.m. and 7.00 p.m., with an apparent higher activity in the morning (Fig. 1).

Soil temperature measured during captures or observations resulted between 20° and 40° C (average 30.2° C, SD 4.8, *n* = 76). Most observations were made on clear days, but specimens were also observed during cloudy and rainy days, provided the temperature was warm.

Population structure

Out of 50 captured specimens only 4 were re-captured; this number was insufficient to obtain a reliable estimate of the population, which however seems abundant.

The sex ratio was calculated on both captures and observations, 0.81 in favour of females (*n* = 49). Young specimens born in the same year were scarcely represented, probably due to their small size and secretive habits. Only 4 hatchlings were observed in the second half of August.

The male size (snout-vent length) ranged from 60 to 80 mm (average = 68.3, SD = 7.0, *n* = 19), while that of female from 50 and to 90 mm (average = 72.4, SD = 9.1, *n* = 28). Data collected did not clearly show any size class for adults and subadults.

Associated herpetofauna

Lacerta agilis was observed in sympatry with *Rana temporaria*, *Anguis fragilis*, *Podarcis muralis*, *Coronella austriaca* and *Vipera aspis*. *Hierophis viridiflavus* was observed a few hundred meters downstream. However, *L. agilis* seems the most common species observed in its grassland habitat by far.

DISCUSSION

As indicated previously, despite its very widespread global range, the sand lizard has one of the most restricted distributions among Italian herpetofauna, together with *Podarcis raffonei* and *P. filfolensis* (two in-

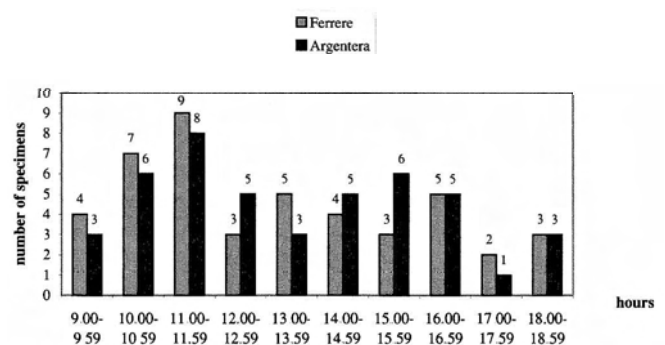


Fig. 1 - Distribution of observations of *Lacerta agilis* in relation to day-time.

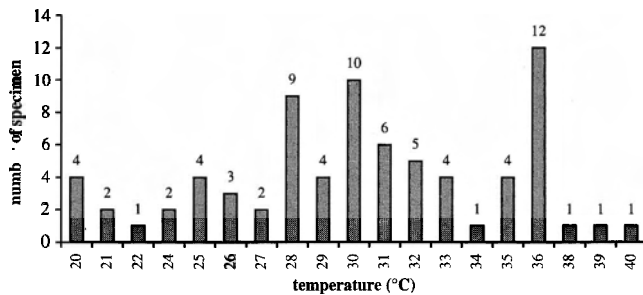


Fig. 2 - Number of observations of *Lacerta agilis* in relation to soil temperature.

sular stenoendemics), and *Psammodromus algirus* (with a wide range in Iberian Peninsula, S France and Maghreb). It is distributed only in two limited areas of the Maritime Alps (Piedmont), and possibly in another area of the Carnic Alps (Friuli-Venezia Giulia) (see Lapini & dell'Asta, 2004). Sindaco (2000) calculated an extent of occurrence inferior to 100 Km², an area of occupancy of 4 UTM 10 × 10 Km squares. As a consequence, its conservation has a mainly national character.

The only confirmed Italian populations are distributed in the Maritime Alps, where the species seems strictly associated to the alpine grasslands.

This study shows that, at least in the western Alps, the species is very localised but with rather abundant populations; at the present, these populations are not very endangered to a great extent.

The threat is mainly cattle and, especially in recent years, sheep overgrazing. Climatic changes can also be considered a possible threat, as it could favour potential more thermophilous competitors (*Podarcis muralis*, *L. bilineata*) or predators (*Hierophis viridiflavus*) and, once in contact with *L. agilis*, they could negatively affect its survival. Another threat for these very local populations could be represented by the excessive collecting by professional or amateur herpetologists.

The construction of large infrastructures (the tunnel in the Colle della Maddalena Pass is the main threat at the

moment) could seriously damage a part of the species' range, threatening botanic rarities as well.

The species is legally protected by the Habitats Directive 92/43/CEE, which forbids the capture and killing of specimens and their habitat deterioration. Moreover, part of the *L. agilis* population in Piedmont lives within the limits of the proposed SIC "Colle e Lago della Maddalena, Val Puriac (code IT1160024)", whose management plan will be carried out in 2003, by the Piedmont Region.

In general, *L. agilis* is to be considered a rare and very localised species in the Italian western Alps, though its future does not seem to be seriously threatened at the moment.

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