

New data on the presence of the Aesculapian snake *Zamenis longissimus* (Laurenti, 1768) (Serpentes Colubridae) on Elba Island (Tuscany, Italy)

Matteo Riccardo Di Nicola^{1*} & Angelo Vaccaro²

¹Via Bobbio, 20144 Milano, Italy

²Corso Ara di Giove, 95030 Pedara, Catania, Italy

*Corresponding author, email: matteodinicola86@libero.it

ABSTRACT

We report three new findings of *Zamenis longissimus* on Elba Island (Tuscany, Italy), including two alive adult individuals and one dead young specimen. These records are a confirmation of the presence of an Aesculapian snake population on the island.

KEY WORDS

Aesculapian snake; Elba; Italy; Serpentes; *Zamenis longissimus*.

Received 13.03.2020; accepted 26.05.2020; published online 30.06.2020

INTRODUCTION

Elba Island, with an area of about 223.5 km², is the third largest Italian island.

It is located in the central-northern Tyrrhenian Sea and it is part of the Tuscan Archipelago (which includes 7 main islands and about 20 smaller islands), belonging to the Province of Livorno, Tuscany. Its territory is mainly mountainous and the geology is quite complex (in short, there are metamorphic, magmatic and sedimentary elements). The hydrographic network is poorly developed (mainly with torrential waterways) due to the morphology of the area and the relatively small size of the island. The island has a Mediterranean oceanic pluvistational bioclimate. The current Elba's vegetation is strongly affected by anthropic interventions and afforestations mainly consist of *Pinus pinea* Linnaeus, 1753, followed by *P. pinaster* Aiton, 1789, *Quercus ilex* Linnaeus, 1753, *Castanea sativa* Miller, 1768 and other pine species. However, several reforestations are affected by a good renaturalization rate (Foggi et al., 2006).

From a biogeographical point of view, the fauna of Elba Island has a remarkable affinity with the one of the Tyrrhenian sector of Italy, in particular with Tuscany (cfr. Mertens, 1955). Herpetological colonization is partly linked both to Elba's geological history (for a summary, see Fornasiero & Zuffi, 2006; Vanni & Nistri, 2006; Vaccaro & Turrissi, 2007; Fattorini, 2010) and to anthropic causes, as in the case of terrestrial tortoises and their controversial autochthony (Fornasiero & Zuffi, 2006). Despite the lack of fossil remains (Fornasiero & Zuffi, 2006), recent biogeographical analyses based on the current Elba's fauna have made it possible to formulate some hypotheses on the dynamics of the animal colonization of the Tuscan Archipelago (Fattorini 2009, 2010), during a complex geological period such as the Pleistocene. According to the most accredited theses, during the Wurmian (22.000-18.000 years ago), Elba Island, together with Pianosa and Scoglio d'Africa, were connected to the Tuscan coast by a natural bridge that probably favoured the active passage of many vertebrates from the continent (Masetti & Rustioni, 1996; Fornasiero & Zuffi, 2006; Vaccaro & Turrissi, 2007; Fattorini, 2010).

As for the island's snake fauna, in addition to the Aesculapian snake covered by this study, there are four other taxa: *Coronella austriaca* Laurenti, 1768, *Hierophis viridiflavus* (Lacépède, 1789), *Natrix helvetica* (Lacépède, 1789) and *Vipera aspis francisciredi* (Laurenti, 1768) (Sindaco et al., 2006).

The Aesculapian snake *Zamenis longissimus* (Laurenti, 1768) is a monotypic species with a Siberian-European (European) and Mediterranean chorotype (Sindaco et al., 2013). Its range includes a large part of south-central and eastern Europe, ranging from north-eastern Spain to Asia Minor. In Italy, *Z. longissimus* occupies northern and central regions, reaching Lazio and Molise in the south (Di Nicola et al., 2019). Its presence in Sardinia is doubtful and based on isolated records, some of which attributable to *Z. lineatus* (Camerano, 1891): evidence of populations for both species have never been found there (Sindaco et al., 2006; Sindaco et al., 2013; Di Nicola et al., 2019). In Apulia, there are populations that show intermediate phenotype with *Z. lineatus* (Salvi et al., 2017). This last taxon, previously considered a subspecies of *Z. longissimus* and then raised to a specific rank (Lenk & Wüster, 1999), is endemic to Italy and it is present in southern regions and Sicily (reaching Molise and southern Lazio in the north, where also *Zamenis longissimus* is present) (Corsetti & Romano, 2008; Capula et al., 2018; Di Nicola et al., 2019).

MATERIAL AND METHODS

The presence of the Aesculapian snake on Elba Island was mentioned for the first time by Sochurak (1954) but was not considered reliable by Mertens (1955) and Lanza (1996) as it was not supported by any findings. The species was then mentioned for the island in the books of Bruno (1984, 1998) and Bruno & Maugeri (1990), but also in this case without any finding or precise reference to support it.

Therefore, without confirmation of presence, the Aesculapian snake was not considered part of Elba's herpetofauna in the national (Sindaco et al., 2006) and regional (Vanni & Nistri, 2006) atlases. Thereafter, the presence of *Z. longissimus* on Elba Island was confirmed by the discovery of two dead specimens (an adult female and a juvenile, respectively in June 2002 and June 2005) in the same lo-

cation in the north-eastern part of the island (Vaccaro & Turrise, 2007). After these findings, there were no records for the species for several years and sightings of living individuals were missing in any case.

In this note, we report the finding of three further Aesculapian snakes, including living individuals. The first of the new findings was an alive adult female (Fig. 1), 142 cm long, observed near Mount Lentisco, along the path "Cala Mandriola - Cavo" (Municipality of Rio Marina) on June 4th, 2012 at about 6.10 pm (coordinates: 42°51'46.9"N, 10°24'29.7"E; altitude 105 meters a.s.l.). The second finding was an alive adult male (Fig. 2), 135 cm long, observed near Monte Lentisco, along the path above "Cala Forno la Vecchia" (Municipality of Rio Marina) on June 7th, 2012 at about 5.45 pm (coordinates: 42°51'58.4"N, 10°24'26.9"E; altitude 94 meters a.s.l.). The third finding was a young specimen (Fig. 3), about 34 cm long, found dead (roadkilled) along an asphalted road in the locality Vigneria (Municipality of Rio Marina) on September 23rd, 2019 at 1.00 pm (coordinates: 42°49'27.7"N, 10°25'38.5"E; altitude 39 meters a.s.l.).

All three findings were at the edge of a road that crosses a dense holm oak forest, similarly to the location of the first two finds reported in Vaccaro & Turrise (2007). Considering the findings reported in Vaccaro & Turrise (2007), a total of five Aesculapian snakes have been found since 2002 (Fig. 4).

RESULTS AND DISCUSSION

Italian islands are connected daily by numerous naval connections with the mainland, in order to allow a continuous transit of goods and passengers. This can be the cause of involuntary translocations of wild animals including snakes, as it happened for example several times in Sardinia, where individual findings of allochthonous herpetological species have been made, whose origin was attributable to specific peninsular locations (Di Nicola & Mezzadri, 2018). Therefore, on an island, a single observation of an unknown entity should be treated cautiously before talking about the presence of a new species for that territory, at least until further observations.

Otherwise, the finding of adults of both sexes and young individuals of *Z. longissimus* reported in



Figures 1–3. The last three *Zamenis longissimus* findings from Elba Island: alive adult female from June 4th, 2012 (Fig. 1); alive adult male from June 7th, 2012 (Fig. 2); dead young specimen from September 23rd, 2019 (Fig. 3).

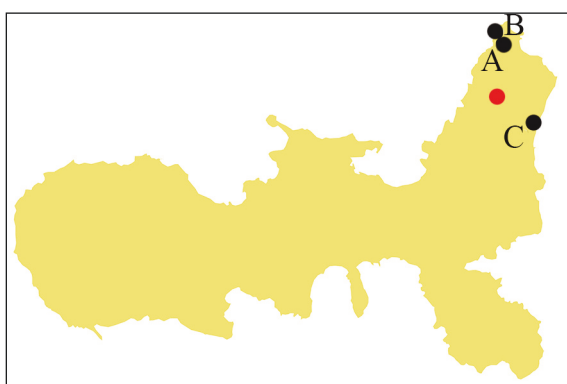


Figure 4. Map of Elba island with all *Zamenis longissimus* findings: the red dot represents the old two findings reported by Vaccaro & Turrisi (2007); the black dots represent the three findings (A, B, C) reported in this note.

this note, added to the two findings reported in Vaccaro & Turrisi (2007), suggests the presence of a stable population of the species on Elba, at least in the north-eastern sector of the island, which is the

most investigated by the authors (lack of reports elsewhere on the island could be attributed to a lack of previous researches).

The authors take advantage of this note to correct the discovery dates of the two specimens of *Z. longissimus* mentioned in Vaccaro & Turrisi (2007) indicated, following a typo, as August 8th, 2002 (adult female specimen) and August 6th, 2005 (young specimen): the correct discovery dates are June 8th, 2002 and June 10th, 2005 respectively. The location of these two first records (occurred in the same point after 3 years) is now also indicated: Case Nardelli (Municipality of Rio Marina) (coordinates: 42°50'18.1"N, 10°24'25.9"E; altitude 173 meters a.s.l.).

ACKNOWLEDGEMENTS

We are grateful to Elisabetta Spadaro (Scicli, Italy) for her important support; Thomas Zabbia

(Orsenigo, Italy) and Francesco Paolo Faraone (Palermo, Italy) for a preliminary review of the manuscript.

REFERENCES

- Bruno S., 1984. Guida ai Serpenti d'Italia. Giunti Martello, Firenze, 192 pp.
- Bruno S., 1998. Serpenti. Giunti, Firenze, 256 pp.
- Bruno S. & Maugeri S., 1990. Serpenti d'Italia e d'Europa. Editoriale Giorgio Mondadori, 224 pp.
- Capula M., Di Tizio L., De Lisio L., Carafa M. & Brugnola L. (Eds.), 2018. Anfibi e Rettili del Molise - Atlante e Guida. Societas Herpetologica Italica Sezione Abruzzo e Molise. Ianieri Edizioni, Pescara, 278 pp.
- Corsetti L. & Romano A., 2008. On the occurrence of the Italian Aesculapian snake, *Zamenis lineatus* (Camerano, 1891), in Latium (Central Italy). *Acta Herpetologica*, 3: 179–183.
- Di Nicola M.R., Caviglioli L., Luiselli L. & Andreone F., 2019. Anfibi & Rettili d'Italia. Edizioni Belvedere, Latina, 568 pp.
- Di Nicola M.R. & Mezzadri S., 2018. Anfibi e rettili di Sardegna, guida fotografica. Libreria della Natura, Milano, 175 pp.
- Fattorini S., 2009. Both recent and Pleistocene geography determines animal distributional patterns in the Tuscan Arcipelago. *Journal of Zoology*, 277: 291–301.
- Fattorini S., 2010. Influence of Recent Geography and Paleogeography on the Structure of Reptile Communities in a Land-Bridge Arcipelago. *Journal of Herpetology*, 44: 242–252.
- Foggi B., Cartei L., Pignotti L., Signorini M.A., Viciani D., Dell'Olmo L. & Menicagli E., 2006. Il paesaggio vegetale dell'Isola d'Elba (Arcipelago Toscano). Studio di fitosociologia e cartografico. *Fitosociologia*, 43: 3–95.
- Fornasiero S. & Zuffi M. A.L., 2006. Anfibi e Rettili dell'Arcipelago Toscano. I Quaderni del Parco, volume 2, Pisa, 64 pp.
- Lanza B., 1996. Gli Anfibi e i Rettili. In: Isola d'Elba: Geologia, Flora, Fauna, Storia, Arte, Ambiente. Giubelli G. (Ed), Pro.gra.ms. Italia, pp. 48–57.
- Lenk P. & Wüster W., 1999. A multivariate approach to the systematics of Italian rat snakes of the *Elaphe longissima* complex (Reptilia, Colubridae): revalidation of Camerano's *Callopeltis longissimus* var. *lineata*. *Herpetological Journal*, 9: 153–162.
- Masetti M. & Rustioni M., s.d. La paleontologia e la paleogeografia. In: Giubelli G. (Red.), Isola d'Elba: Geologia, Flora, Fauna, Storia, Arte, Ambiente. Pro.gra.ms. Italia: 16–19.
- Mertens R., 1955. Die Amphibien und Reptilien der Insel Elba. *Senckenbergiana biologica*, 36: 287–296.
- Salvi D., Lucente D., Mendes J., Liuzzi C., Harris D.J. & Bologna M.A., 2017. Diversity and distribution of the Italian Aesculapian snake *Zamenis lineatus*: A phylogeographic assessment with implications for conservation. *Journal of Zoological Systematics and Evolutionary Research*, 00: 1–17.
- Sindaco R., Doria G., Razzetti E. & Bernini F. (Eds.), 2006. Atlante degli anfibi e dei rettili d'Italia / Atlas of Italian amphibians and reptiles. Societas Herpetologica Italica, Edizioni Polistampa, Firenze, 792 pp.
- Sindaco R., Venchi A. & Grieco C., 2013. The Reptiles of the Western Palearctic. 2. Annotated checklist and distributional atlas of the snakes of Europe, North Africa, Middle East and Central Asia, with an Update to Volume 1. Edizioni Belvedere, 543 pp.
- Vaccaro A. & Turrise G.F., 2007. Ritrovamento di *Zamenis longissimus* (Laurenti, 1768) (Reptilia, Colubridae) sull'Isola d'Elba (Toscana, Italia). *Acta Herpetologica*, 2: 59–63.
- Vanni S. & Nistri A., 2006. Atlante degli Anfibi e dei Rettili della Toscana. Regione Toscana, Museo di Storia Naturale dell'Università degli Studi di Firenze, Sezione di Zoologia "La Specola", 379 pp.