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REPTILES AND MICRO-INSULAR ENVIRONMENTS OF THE TUSCAN ARCHIPELAGO (ITALY)

SUMMARY

The data presented here come from surveys carried out thanks to a PIM (*Initiative PIM - Initiative pour les Petites Îles de Méditerranée*) mission on the satellite islands, islets and rocks of Elba and Pianosa islands, aimed at improving knowledge of the terrestrial natural heritage of the Tuscan Archipelago. A list of islands, islets and rocks with resident reptiles is provided.

Key words. Mediterranean, islands, list.

RIASSUNTO

Rettili degli ambienti micro-insulari dell'Arcipelago Toscano (Italia). I dati presentati in questo lavoro derivano dalle osservazioni fatte grazie a una missione PIM *(Initiative PIM, - Initiative pour les Petites Îles de Méditerranée*, una ONG internazionale per la promozione e assistenza nella gestione delle aree insulari del Mediterraneo), sulle isole, isolotti e scogli satelliti delle isole d'Elba e Pianosa, al fine di arricchire la conoscenza sul patrimonio naturale terrestre dell'Arcipelago Toscano.

Parole chiave: Mediterraneo, isole, lista.

Introduction

This work aims to update the species of reptiles occurring on the satellite islands, islets, and rocks of Elba and Pianosa islands (Tuscan Archipelago, Italy) by focusing on the extreme habitats that characterise several small islands and rocks. The data presented here are derived from observations

made during explorations carried out thanks to the "Initiative PIM", an international NGO which promotes and supports of the management of the island of the Mediterranean. This mission is part of an interregional approach aimed at improving the naturalistic knowledge of the islands of the western Mediterranean and, where possible, to support their management.

MATERIAL AND METHODS

Study area

Between the 6th and 10th May 2016, herpetological and floristic investigations were carried out on 22 satellite small islands, islets and rocks of the islands of Elba and Pianosa, Tuscan Archipelago (Italy).

Prospecting methods

All surveys took place during the day. All visited islets and rocks were carefully examined. The survey methods applied are the following: • VES (Visual Encounter System) or visual search of active reptiles; • search for inactive animals in possible shelters • and search for traces e.g., faeces, etc. CORTI *et al.* (1999, 2006) have been used as reference literature for the herpetofauna.

As for plants, given the relatively limited surveying time and the difficult geography of some islets, phytosociological studies or a quantitative estimate of plant species was not possible; however, a general assessment of the ecological characteristics of each site was carried out, and a complete list of observed/collected species was also obtained, with the aim of updating the floristic information already available (FOGGI *et al.*, 2009; BALDINI, 2000). The collected plants are deposited at the Natural History Museum of the University of Florence to allow reliable taxonomic identification and serve as comparison samples for further studies. As identification became critical, the most common floristic treatises were used for identification (PIGNATTI, 1982, CONTI *et al.*, 2005; JEANMONOD & GAMISANS, 2007; ARRIGONI, 2006-2015). Furthermore, for the following islets: Islet of Corbella, Scoglio del Liscoli, Scoglio La Nave, Isolotto di Ortano, Isolotto della Paolina, Scoglio dell'Enfola, Scoglio del Frate, Scoglio di Remaiolo, the plant species have been reported here for the first time. The complete list of species [confirmed (C), unconfirmed (NC), listed for the first time (N)] of all the islands visited is reported in CORTI *et al.* (2021). As regards the larger islands of Cerboli and Palmaiola, however, further investigations will be necessary to confirm the actual absence of unconfirmed plant species.

Results and Discussion

Six of the 22 islands visited were completely devoid of plant cover and herpetofauna, for 8 of the remaining 16 a list of plant species was drawn up for the first time; as for reptiles, only 6 islets had never been visited before, and only on 2 of them a single species of reptile occurs, the Leaf toed gecko (*Euleptes europaea*).

In summary, at least one of the 4 reptile species known for the islets studied was found on 11 of the 16 islets that host vascular plants (with the exception of Scoglio La Nave, Isolotto Corbella, Scoglio del Frate and Scoglio del Liscoli, La Scarpa islets) (Table 1). On the Islet La Scarpa two reptile species had previously been reported for the islet. *Podarcis muralis* was already reported as extinct in Corti *et al*. (2006) and the same fate seems to have occurred to *Euleptes europaea*; the latter is the first documented case of extinction of *E. europaea* on an Italian island. It should also be noted that out of the eight plant species known for La Scarpa Islet, only 4 were reconfirmed. On two islets of the aforementioned 11 the presence of reptiles has been reported for the first time, while on one island a species never listed before was reported.

Table 1

Surveyed islands with at least one plant species and resident reptile species [confirmed (C), not confirmed (NC), recorded for the first time (N)].

Island	Area (ha)	Elevation (m a.s.l.)	Reptiles	No. of plant species
Scoglio La Nave	>0,07	14,2	no reptiles	2 (N)
Isolotto La Scarpa	>0,31	11	*Euleptes europaea* (NC) *Podarcis muralis* (NC)	4 (C), 4 (NC)
Isolotto La Scola	1,6	34	*Euleptes europaea* (C) *Podarcis muralis* (C)	38 (C), 42 (NC), 9 (N)
Isola Corbella	>/=0,15	9	no reptiles	3 (N)
Scoglio di Remaiolo	>0,15	16	*Euleptes europaea* (N)	5 (N)
Isolotto Gemino di Fuori	1,4	42	*Euleptes europaea* (C) *Podarcis muralis* (C)	13 (C), 11 (NC), 11(N)
Isolotto Gemino di Terra	1,5	23	*Euleptes europaea* (C) *Podarcis muralis* (C)	16 (C), 15 (NC), 8 (N)
Scoglio del Liscoli	>0,11	10	no reptiles	9 (N)
Isolotto d'Ortano	>0,8	22	*Euleptes europaea* (C) *Podarcis muralis* (C)	37 (N)
Isola di Cerboli	5,7	71	*Euleptes europaea* (C) *Podarcis siculus* (C) *Hierophis viridiflavus* (N)	27 (C), 63 (NC), 9 (N)
Isola di Palmaiola	10,9	84	*Euleptes europaea* (C) *Hemidactylus turcicus* (C) *Podarcis muralis* (C)	50 (C), 86 (NC), 12 (N)

Scoglio del Frate	>0,28	17	no reptiles	4 (N)
Isola dei Topi	1,2	34	*Euleptes europaea* (C) *Podarcis muralis* (C) *Hierophis viridiflavus* (NC)	12 (C), 17 (NC), 6 (N)
Scoglietto dell'Enfola	>0,31	13,9	*Euleptes europaea* (N)	8 (N)
Scoglio della Paolina	>0,21	16	*Euleptes europaea* (C) *Podarcis muralis* (C)	44 (N)
Scoglietto di Portoferraio	>0,58	20	*Euleptes europaea* (C) *Podarcis muralis* (C)	7 (C), 4 (NC), 6 (N)

Euleptes europaea is reported here for the first time for the islets Scoglietto dell'Enfola, and Scoglio di Remaiolo, while *Hierophis viridiflavus* is reported for the first time for the Island of Cerboli. *Euleptes europaea* could also be present on the Scoglio del Frate as this islet seems to offer a suitable habitat for this species. However, the short exploration time spent on this island did not allow us to carry out an in-depth search. We have not detected *Hierophis viridiflavus* on the Isola dei Topi and therefore we cannot confirm its presence, however, the Green whip snake may not have been noticed, given the dense vegetation covering part of this small island or, as already observed for other Mediterranean islands (CORTI *et al.*, 2014; MONTES *et al.*, 2021), it may be that *H. viridiflavus* visits the island only occasionally by swimming from the nearby Island of Elba. The presence of the species reported in CORTI *et al.* (2006) on the remaining islands is confirmed here (Table 1).

We noticed that *Euleptes europaea* has only been found on islands where at least 5 plant species are present. An exception is the Scoglio del Liscoli islet for which 9 plant species have been found but on which adequate shelters for this gecko are lacking.

Furthermore, we have observed that on some islets, among those slightly smaller or slightly larger than one hectare, for which a plant census is already available (FOGGI et al. 2009; BALDINI, 2000) that the number of plant species found was sometimes lower than that reported by the census. Although new species have been found on some of these islets, their number was found to be less than that of plants whose presence has not been confirmed, this could also be due to the fact that our investigation was limited to a single season. However, what has been observed for the islet La Scarpa gives rise to the question: could the drastic reduction of plant species have played a role in the disappearance of *E. europaea*? In an extreme habitats, even small environmental changes can have a big impact.

It would be of great importance to understand how the number and quality of plant species, together with the quality and structure of the substrate, influence the survival of reptiles in such poor and extreme ecosystems, as *E. europaea* often experiences in islands of the central-western

Mediterranean (CORTI *et al.*, 2014; DELAUGERRE *et al.*, 2019; DELAUGERRE & CORTI, 2020). The disappearance of this endemic gecko, as well as that of other species, would be a great loss for the Mediterranean fauna. It is therefore necessary to guarantee maximum protection for all endemic species, also considering the current unfavourable climatic trend characterized by torrential downpours and prolonged droughts (DELAUGERRE & CORTI, 2020).

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