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Atlas of amphibians and reptiles of Sardinia - state of the art and general considerations.

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Introduction

Sardinia and its satellite islands are known to be inhabited by 10 species of Amphibians (8 endemics) and 18 species of Reptiles (4 endemics) (Tab. 1) (Lanza, 1983, Borri *et al.*, 1988, Poggesi *et al.*, 1995; S.H.I., 1996; Corti *et al.*, 2000, 2006; Carranza *et al.*, 2007).

The project "Atlante Erpetologico Italiano" which started in 1994 led first to the publication of the *Atlante provvisiorio degli Anfibi e dei Rettili d'Italia* (S.H.I., 1996) and later to the *Atlante degli Anfibi e dei Rettili d'Italia / Atlas of Italian Amphibians and Reptiles* (Sindaco *et al.*, 2006). From that time the island started to be systematically searched in order to determine the distribution of Amphibians and Reptiles. Despite the big bulk of data available in both the above mentioned books, those regarding Sardinia showed the need to be improved particularly regarding the main island, while those regarding the circum-Sardinian islands are relatively exhaustive (Poggesi *et al.*, 1995; Corti *et al.*, 2006).

Sardinia is one of the largest regions of Italy and is mainly characterized but a mountainous territory which, of course, does not allow quick and easy surveying. The island includes 310 meshes referred to the U.T.M. grid, each of 10 × 10 km. Most of them have been surveyed one or more times but still many data are lacking. Therefore, beside the ordinary surveying activity and data recording which is still ongoing, lastly a 4 year project was submitted to the Regione Sardegna ad-

Table 1. List of Amphibians and Reptiles present in Sardinia.

Amphibians	Endemic = E
Euproctus platycephalus	E
Speleomantes flavus	E
Speleomantes genei	E
Speleomantes imperialis	E
Speleomantes sarrabusensis	E
Speleomantes supramontis	E
Bufo viridis	
Discoglossus sardus	E
Hyla sarda	E
Pelophylax ld. *esculentus*	
Reptiles	
Emys orbicularis	
Trachemys scripta	
Testudo hermanni	
Testudo graeca	
Testudo marginata	
Euleptes europaea	
Hemidactylus turcicus	
Tarentola mauritanica	
Algyroides fitzingeri	E
Archaeolacerta bedriagae	E
Podarcis sicula	
Podarcis tiliguerta	E
Chalcides chalcides	
Chalcides ocellatus	
Natrix natrix cetti	E
Natrix maura	
Hemorrhois hippocrepis	
Hierophis viridiflavus	
Zamenis longissimus/lineata?	

ministration that was financed starting in 2005. This project is mainly headed to the Sardinian protected areas.

As well known, distribution maps or lists, which give the time "snapshots" of an area, represent the starting point for monitoring activity which is necessary for a correct management of the territory.

The maps shown in the present paper represent an up date of those published in the *Atlante degli Anfibi e dei Rettili d'Italia / Atlas of Italian Amphibians and Reptiles* by Sindaco *et al.* (2006).

Material and Methods

Beside the ordinary surveying activity which is finalized to survey the whole island, 34 meshes (10 × 10 km U.T.M. grid) corresponding to 34 standardised sampling areas have been selected throughout the island. Up to now around 25 have been surveyed at least twice, in fall and spring (seasons of herpetofauna major activity). Surveying days are chosen at the best climatic situations in order to detect as much as possible animals. The above mentioned sampling meshes have been selected by the following criteria:

1. no former data available,
2. occurrence of different habitat types,
3. sites should represent the different Sardinian provinces,
4. possible presence of particular *taxa* (*e.g.* endemics) according to earlier information and habitat characteristics,
5. SCI: faunistic monitoring of SCIs (*Sites of Community Interest*, according to Natura 2000) data will be used also for the SCI monitoring program.

The sampling method is based on the Visual Encounter System. Standard information are recorded (*e.g.* record no., sp., date, Greenwich Mean Time (GMT), locality, altitude, habitat, coordinates, U.T.M. grid, Tair, Tsoil, Twater) and marked into the U.T.M. grid map. So far as possible all recorded individuals have been photographed.

The data gathered for the atlas are in any case qualitative and do not provide neither quantitative nor ecological information.

Results and Conclusions

For all the surveyed meshes most of the recorded species of Amphibians and Reptiles have been confirmed and new ones have been added. As follow we list only those species for which new records (meshes) have been gathered and relative comments with respect to data reported in the *Atlas of Italian Amphibians and Reptiles* (Sindaco *et al.*, 2006):

Euproctus platycephalus: additional localities for Eastern Sardinia, also recorded for the first time in the South-Western part of the island;

Speleomantes genei: some inland localities;

Speleomantes imperialis/S. sarrabusensis: additional inland and coastal localities;

Bufo viridis: a fairly good number of coastal and inland localities;

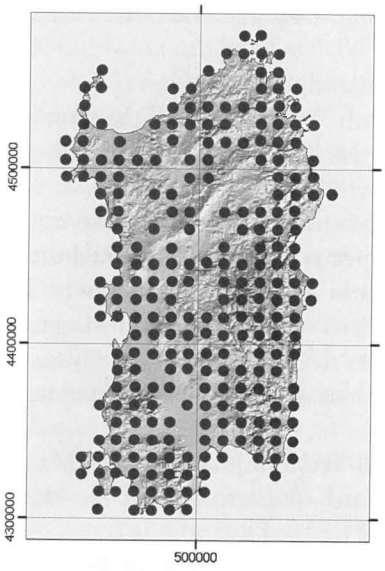

Figure 1. Updated distribution of the Sardinian herpetofauna.

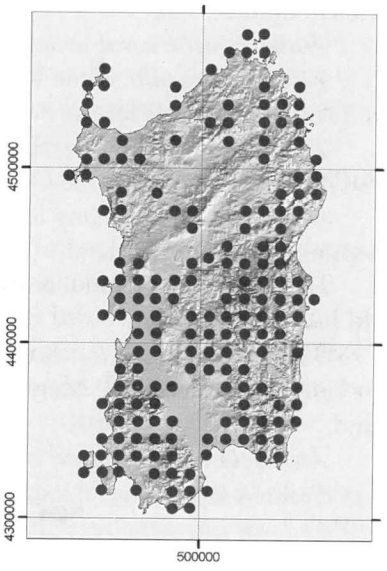

Figure 2. State of the art shows the know distribution of Amhibians.

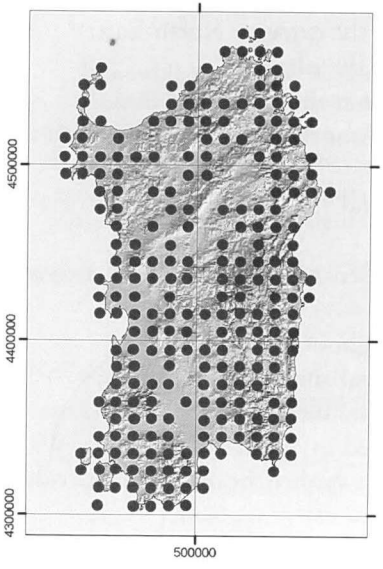

Figure 3. State of the art shows the know distribution of Reptiles.

Discoglossus sardus: several localities throughout the island and coastal area of Trinità d'Agultu;

Hyla sarda: many localities throughout the island;

Pelophylax kl. *esculentus*: two sites in the South-Western part of the island;

Emys orbicularis: several localities mainly in the North-Eastern, Central and South-Estern parts of the island, coastal zones included.

Trachemys scripta: has been observed in both anthropized and natural/semi-natural habitats. Even if the distribution of the species is scattered the Red-eared Terrapin has been recorded throughout the island in anthropized sites of the provinces of Olbia, Sassari, Oristano and Cagliari, as well as in the following natural habitats: Lago di Baratz, in some streams close to Cannigione, Cala Gonone, Sorso and Castelsardo, in the Tirso and Flumendosa rivers, and in the Stagno di Molentargius.

Testudo graeca: some localities in the Central-Western portion of the island;

Testudo hermanni: some localities in the North-Western part of the island and scattered records for the South-Western one;

Testudo marginata: several localities in the North-Eastern part of the island and scattered records for the Central-Western one.

Euleptes europaea: many localities in the inland of the Central-Eastern and Southern parts of the island;

Hemidactylus turcicus: many localities in the inland of the Central and Southern parts of the island;

Tarentola mauritanica: many localities throughout the island;

Algyroides fitzingeri: many coastal and inland localities throughout the island;

Archaeolacerta bedriagae: one new record of the extreme North-East;

Podarcis sicula: several localities throughout the island;

Podarcis tiliguerta: several localities throughout the island;

Chalcides chalcides: several localities throughout the island but mainly in the Central portion;

Chalcides ocellatus: several coastal and inland localities throughout the island;

Hemorrhois hippocrepis: one record for the Central-Western coastal area and several In the South;

Hierophis viridiflavus: many localities throughout the island;

Natrix maura: a fairly good number of coastal and inland localities;

Zamenis longissimus/*Z. lineatus*: considered doubtful for the island (Razzetti & Zanghellini, 2006), has been recently observed in Western and South-Western Sardinia but it was not possible to determine whether the observed individual belonged to the *Z. longissimus* or to *Z. lineatus*.

Taking into account the diverse biological, ecological and distributional

habits of the different species, which do not allow homogenous surveying results, the following can be in general considered relatively easy to be surveyed: *Euproctus platycephalus, Speleomantes, Discoglossus sardus, Hyla sarda, Bufo viridis, Emys orbicularis, Testudo graeca, Testudo hermanni, Testudo marginata, Hemidactylus turcicus, Euleptes europaea, Tarentola mauritanica, Chalcides chalcides, Chalcides ocellatus, Algyroides fitzingeri, Archaeolacerta bedriagae, Podarcis sicula, Podarcis tiliguerta, Hierophis viridiflavus and Natrix maura.*

Natrix natrix cetti seems to be distributed almost exclusively in the South-West and in Eastern sector of the island and seems to inhabit only mountainous habitats. It can be considered as relatively rare.

The distribution of *Hemorrhois hippocrepis* seems to be localised and the species has been mostly recorded in the South and in the South-Western part of the island. The species can be still considered uncommon.

The presence of the Aesculapian Snake in Sardinia, is now supported by only one recent observation. The species can therefore be considered very rare for the island and be still referred to acclimatized allochthonous animals (Razzetti & Zanghellini, 2006).

Pelophylax kl. *esculentus* which has been recently introduced in the island, seem to spread relatively slowly.

Trachemys scripta, is an alien species which has been recently introduced in the islands. Consequences of the introduction require special monitoring.

Despite the nearly impossibility to get all the inventory completed and considering the distribution of animals itself a dynamic process, the importance of having updated distributional maps represent anyway the basic tool for the management of a territory and relative conservation initiatives.

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