

Final Report 2015 EUROBATS Projects Initiative (EPI)

1. Project title/ Name of the Country

Plecotus sardus in Sardinia, Germany; Italy

2. Project Leader

Dr. Andreas Kiefer (AK)

AK is involved in bat conservation and bat research since 1989. He did field research (amongst others) in Germany, France, Luxembourg, Switzerland, Austria, Andorra, Italy (including Sardinia), Greece and Turkey. AK has knowledge of all relevant methods of bat research (e.g. radio-tracking, bio acoustic surveys and other field methods, genetics). AK has 20+ peer reviewed papers. From 2007-2013 he was the project leader of a large-scale conservation project of bats in the Eifel region, Germany. Since August 2013 AK is a member of the Dept. of Biogeography at Trier University (chair of Prof. Dr. Michael Veith). AK is interested in ecology and genetics of bats, especially the *Plecotus* species, and in bat conservation, here “Wind farms and bats” and protection of rare species such as *Plecotus sardus*.

Diploma thesis (1996): “Investigations to land use and interactions between populations of *Plecotus austriacus* in the Nahe region, Germany”

PhD thesis (2007): Phylogeny of Western Palearctic long-eared bats (Mammalia, Chiroptera, *Plecotus*) - a molecular perspective

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3. Project partners

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4. Author of the report

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5. Region of project implementation

Sardinia (Italy) and Rhineland-Palatinate (Germany)

6. Project period

From 2015 to 2017.

7. Report on implementation and development

Sardinia is the second biggest island of the Mediterranean Sea, therefore it is impossible to perform a survey on the entire island within one seasons with only a few people. Therefore, in 2015 we focused on the western part of the island, while in the 2014 we had focused on the eastern part (see attachment).

Ce.Pi.Sar. worked in Sardinia the whole year on public awareness, on surveys of roosts and potential roosts and on mist netting. Currently, they carry out surveys on the potential hibernacula of *P. sardus*. Ce.Pi.Sar. also assisted us during the field work.

Field work in Sardinia was carried out from the beginning of July until the end of September 2015. This summer we started our radio-tracking research. We caught and put transmitters on five

individuals of *P. sardus*, three of which we were able to track over a sufficient period (more than 3 nights). We were not able to track the other two specimens because they probably changed their roost far away and outside our range of activity. We did not try to track more specimens in 2015 because due to the species' potential sensitive to this kind of stress; therefore we tried to reach a balance between research and conservation.

For radio-tracking we performed five mist netting events and more than 25 field nights (Tab 1); in addition we spent five days of training in the field and more than ten days to research during the day to find back "disappeared" specimens. We spend every night at least 8 hours in field.

Table 1: Radio-tracking data of five specimens of *P. sardus*.

Bat	Sex	Age	Reproductive status	Date of night spent in field	Hours of real tracking
A	Female	Adult	Post-lactating	12/07/15	22:00 -1:32
				13/07/15	22:10-22:17
B	Female	Adult	Post-lactating	09/08/15	21:30-00:36
				10/08/15	21:00 -22:51
				11/08/15	22:07- 22:26
				12/08/15	21:32- 23:32
				13/08/15	21:37-22:22
				14/08/15	Not found
				15/08/15	Not found
				16/08/15	21:00-22:53
C	Female	Adult	Post-lactating	17/08/09	21:05-21:43
				18/08/15	20:00-00:45
D	Female	Adult	Post-lactating	24/08/15	22:00-23:40
				25/08/15	21:40-23:24
				26/08/15	21:20-22:23
				27/08/15	20:47-22:00
				28/08/15	20:07-22:33
				29/08/15	20:36-22:43
				30/08/15	20:15-21:24
				31/08/15	20:31-23:01
E	Female	Adult	Post-lactating	01/09/15	20:30-22:30
				07/09/15	22:00-1:32
				08/09/15	20:16- 23:20
				09/09/15	Not found
				10/09/15	20:21-05:32
				11/09/15	20:15-3:14
				12/09/15	20:18-3:09

We collected data on autoecology, about preference of hunting area and on time of flight activity of the specimens.

We carried out a survey of the roosts of *P. sardus* at Lake Omodeo. Based on the radio-tracking survey we found a new roost inside a bridge, which for sure is a temporary roost. Thanks to the interviews to different shepherds we found also a second new roost which is potentially a mating and hibernating roost. It is an underground bunker which hosts several species of bats. The low temperature, the observation of specimens in torpidity, and the presence of few guano are clues that characterize this kind of roost. Ce.Pi.Sar has started a survey to assess the phenology of this roost.

We also carried out a presence/absence survey of *P. sardus* across the eastern part of Sardinia. Therefore, we interviewed several categories of persons (hunter, caver, shepherds, farmers, workers in archaeological sites and in public agencies) and did a survey of Nuraghi, Domus Dajane (prehistoric ruins that are present only in Sardinia), caves, dams, churches, monasteries and all kind of abandoned buildings, either private or public. Overall we checked more than 150 potential roosts in this area and interview more than 75 persons. Since it is not possible to trust the description of lay people on bat species we personally check all bat roost reported by them. We selected the most reliable information and checked all these “potential” bats roost. All colonies of *Plecotus* species in Sardinia that we know were found thanks to such interviews.

In the 2014, and before EPI, the field season was focused on collection of DNA samples and data of presence/abundance of all *Plecotus* species in Sardinia. Our preliminary results of the analyses of DNA show that there are at least two mitochondrial haplogroups of *P. sardus* on Sardinia. This may be a result of ongoing separation of two populations, or it is a result of historic separation. Further molecular analyses are needed, including nuclear data, to prove the occurrence of two separated populations.

As a spin-off of this project we observed two evolutionary lineages of *P. auritus* in 2015. One is the presumably endemic lineage of *P. auritus* (evolutionary significant unit, ESU; this lineage may well represent an up to know unrecognized subspecies!), the other one is the Western European lineage (Mucedda *et al.* 2002, Fichera, Veith and Kiefer *in Verbis*). Only one colony of the endemic lineage is known in Sardinia, and we didn't find any new roosts; no roost of the "western" lineage is known until now.

We finally updated and improved the distribution map of the three *Plecotus* species on Sardinia

8. Problems occurred during the project, species concerned

One of the few maternity roosts of *P. sardus* is inside of a school attic in Busachi town. The colony is threatened by the nesting of pigeons inside the attics where the colony is present. We are studying the best way how to get away the pigeon without disturbing the bats. Therefore, while we were doing the surveys, the school was closed because the building is not usable anymore.

About 11 years ago there was a restructure of the building that probably halved the size of this nursery colony (at that time it consisted of about 300 specimens). The building needs to be restructured again and the mayor of Busachi is willing to do this. However, it seems that there will be no restoration in short time. We already talked with the technical office in charge of this in Busachi town to explain how to carry on the restoration without harming the colony. The Ce.Pi.Sar. already sent a letter to all the authorities and agency in charge. Ce.Pi.Sar. has done a project that involved Ce.Pi.Sar., Busachi town and the Italian Ministry of Environment (MATTM) for some action to protect the colony of Busachi School. We hope that this previous agreement will be a base to avoid future damage to the colony.

This year we counted about 80 animals composed of mainly females and offspring in this roost. The roost is shared with *Rhinolophus hipposideros* which also uses it for a nursery colony. In the

abandoned Santa Chiara Village lives another nursery of *P. sardus*. S. Chiara Village belong to the previous Italian electricity company. The entire village is on sale. The building are abandoned and in continuous decay. It is threatened because buildings are falling apart and due to vandalism. In the future the building which hosts the colony will have problem of solidity. Moreover, the colony is disturbed by pigeons. We therefore are trying to find a way to buy the building and to restructure it; then it should be given to Sardinian authorities. Ce.Pi.Sar already wrote several letters to the all the authorities and agency in charge to avoid vandalism and disturbance inside the village. This year we counted about 60-80 animals. The colony is composed mainly of females and offspring and it shares the roost *Myotis emarginatus* and *Rhinolophus hipposideros*.

In the village also *Rhinolophus ferrumequinum* and *P. pipistrellus* are present too. This latter species uses a lot of temporary roosts inside the abandoned houses throughout the whole summer. The roost of the nursery colony of *P. sardus* in the house beside the old dam of Santa Chiara is falling apart, and just few animals live inside that probably belong to the main colony of Santa Chiara Village. This year we counted about 10-15 animals, females and offspring. Also *Rhinolophus hipposideros* uses this building for nursery. The building is also used temporarily by *M. emarginatus*.

Two nurseries of *P. sardus* are present in eastern Sardinia, and we intend to make surveys them in 2016. Both are composed of roughly 10-15 animals, females and offspring. The roost are in caves, one in a cliff cave and the other in a sea cave. Both caves are difficult to reach: one is inside a canyon in a cliff, the other is in a sea cliff and it is necessary to rent a boat to check it. The sea cave was checked only once; the cliff cave was checked twice, and the second time Ce.Pi.Sar. found no animals inside.

In this field season the main focus was on radio-tracking. We were able to collect data, but with a lot of difficulties. Nevertheless, our data are the first on foraging areas collected for this species. The roads in the study area are in very bad conditions, and during night there is no way to track a bat without 4WD car or walking. The landscape is very harsh and it is very hard to do triangulation, sometimes it is even impossible. The only way to collect data was staying in a point and recording the direction of the signal. Follow the bats by walking is impossible for a lot of aggressive shepherd dogs which are present in this area.

9. Contribution of the project to the objectives of the EUROBATS agreement

a) Numbers and names of related EUROBATS Resolutions

6.7: Conservation and Management of Critical Feeding Areas, Core Areas around Colonies and Commuting Routes

6.8: Monitoring of Daily and Seasonal Movements of Bats

6.10: Synergies between the Agreement and Other European Treaties for Nature Conservation

6.11: Wind Turbines and Bat Populations

6.16: Implementation of Conservation and Management Plan

4.3: Guidelines for the Protection and Management of Important Underground Habitats

4.5: Guidelines for the Use of Remedial Timber Treatment

b) Related points of action of the Conservation and Management Plan;

- Population Survey and Monitoring

- Roosts

- Habitats

7. International co-operation

10. Products (e.g. publications, workshops, seminars) and other outcomes of the project

In 2015 we had no scientific output of our project. CePiSar did a seminar in Busachi School for the students.

11. Detailed financial report

Task/Item	Cost	Epi funding obtained
Mileage of fieldwork	1762.25	2200
Telemetry receiver and antenna (1)	1319.71	1330.42
Transmitters (10)	1436.21	1428
Batteries*	24.97	40
Accommodation	460	
Sum	5003.14	4998.42

*Please, see the attachment 4 for detail

12. Summary (a short article with the most important outcomes to be put online on the EUROBATS website. The final report and the summary should contain acknowledgements to the donor countries that funded the project).

2015 was a successful year for knowledge of *Plecotus sardus*. During our project we discovered two new roost of this species; one of these potentially is the first hibernaculum of this species in the "Lago Omodeo Area".

We started radio-tracking and got the first data on foraging habitats of the species.

We continued our surveys of the most important roosts and our work in public awareness of the management of the species.

Our preliminary results on the analyses of DNA show that there are at least two mitochondrial haplogroups of *P. sardus* on Sardinia. This may be a result of ongoing separation of two populations, or it is a result of historic separation. Further molecular analyses are needed, including nuclear data, to prove the occurrence of two separated populations.

We are grateful to the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and the Ministère du Développement durable et des Infrastructures - Administration de la nature et des forêts, Luxembourg to granted our project.

13. We are grateful to

German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Ministère du Développement durable et des Infrastructures - Administration de la nature et des forêts, Luxembourg

14. Appendices

Attached 1: Survey area 2014 (Black circles show where we focused our surveys)

Attached 2: Survey area 2015 (Black circles show where we focused our surveys)

Attached 3: *Plecotus sardus* area (Dark green show the presence of *P.sardus*)

Attached 4: Details of cost

Attached 5: Receipts