FIRST BAT MONITORING IN ALBANIA: BUNKERS OF TIRANA, PICTURE OF BAT CONSERVATION IN ALBANIA

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Abstract

During more than two years (2012-2014) the first monitoring on bats in Albania has been realised in the hilly area near Tirana. In bunkers and military tunnels, 5 species of bats have been identified: *Rhinolophus ferrumequinum, Rhinolophus euryale, Rhinolophus hipposideros, Myotis capaccinii* and *Miniopterus schreibersii*. This monitoring is underlining the short term impact of a rural area urbanisation on *R.ferrumequinum* and *R.hipposideros*, which were the two species with a population important enough to make any interpretation. Populations of these two species are not equally impacted by changes of the area due to their different ecology, but these two populations could both strongly decrease in a long term perspective.

Përmbledhje

Gjatë më shumë se dy vjet (2012-2014), monitorimi i parë i lakuriqëve të natës në Shqipëri u realizua në kodrat pranë Tiranës. Në bunkerët dhe tunelet e ndërtuara nga ushtria, 5 lloje lakuriqësh nate janë identifikuar: *Rhinolophus ferrumequinum, Rhinolophus euryale, Rhinolophus hipposideros, Myotis capaccinii* dhe *Miniopterus schreibersii*. Ky monitorim nënvizon ndikimin afatshkurtër të urbanizimit të një zone rurale mbi *R.ferrumequinum* dhe *R.hipposideros*, të cilët ishin dy llojet me madhësi popullate të mjaftueshme për të bërë intepretime. Popullatat e këtyre dy llojeve nuk janë njësoj të ndikuara nga ndryshimet në zonë për shkak të ekologjisë së tyre të ndryshme, por të dyja këto popullata mund të zvogëlohen ndjeshëm në një perspektivë afatgjatë.

Key words: Chiroptera; Albania; *Rhinolophus ferrumequinum*, *Rhinolophus hipposidero*, monitoring.

Introduction

Albania, in spite of being a small country of the south-west Balkans, is rich in bats: so far 32 species of bats has been identified. This richness is due to high diversity of habitats, high number of natural caves, and presence of former military buildings being actually used by bats' populations. During the last 40 years, the number of species identified in Albania jumped from 18 species (Hanak *et al*.,1961; Hurka, 1962; Hanak, 1964; Lamani, 1970) to 32 species (Bego & Griffiths, 1994; Chytil & Vlasin, 1994; Uhrin *et al*. 1996; Sachanowicz, 2006; Schieffler *et al*, 2013; Théou & Bego, 2013; Bego & Théou, 2014), due to surveys organised in different places in the country. However, until recently, no winter census and monitoring activity to assess population dynamics of bats in Albania have been conducted.

Following the discovery in November 2011 of a *Rhinolophus ferrumequinum* in a bunker near the artificial lake of Tirana, a monitoring of bats has been setup in the hills of Tirana. The aim of this study was to follow the population dynamics of bats using former military bunkers and tunnels of this area.

Material and methods

The monitoring was conducted in a network of 37 man-made bunkers and tunnels, which will be called here stations (Fig.1). The tunnels have been identified as stations with natural wall, while the bunkers were built with concrete wall. Each station has been visited 8 times between the 13/03/2012 to the 01/06/2014, bats encountered were identified, and the number of specimens per station was recorded.

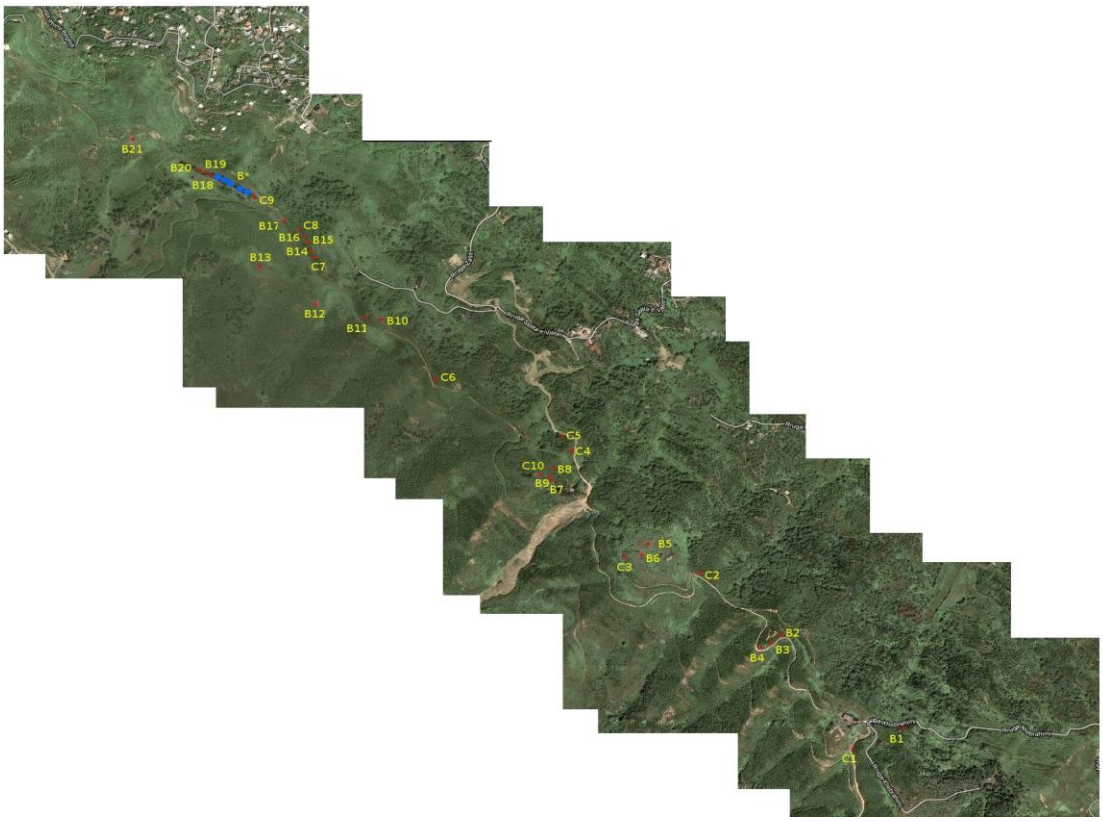

Figure 1. Location of the stations

The study area includes the hills surrounding the south of Tirana, between 41°18'32.5"N 19°47'09.7"E and 41°17'34.2"N 19°48'45.9"E. The north of

the area is composed by a highly urbanised environment (City of Tirana), whereas the south is composed by agricultural plots and young forests.

Results

A total of 5 species have been identified as using this network of stations during the year: *Rhinolophus ferrumequinum, Rhinolophus euryale, Rhinolophus hipposideros, Myotis capacinii* and *Miniopterus schreibersii*.

An important result of this study is that this area is used during all the year by bats, with maternity colony and stations used for hibernacula. Around 1/3 of the all network has been used by bats. A maximum of 13 stations used by bats has been recorded in May 2012, and the minimum has been recorded between December 2013 to June 2014, with 9 stations used (Fig.2).

Some stations have been hosting several species whereas others were hosting only one species.

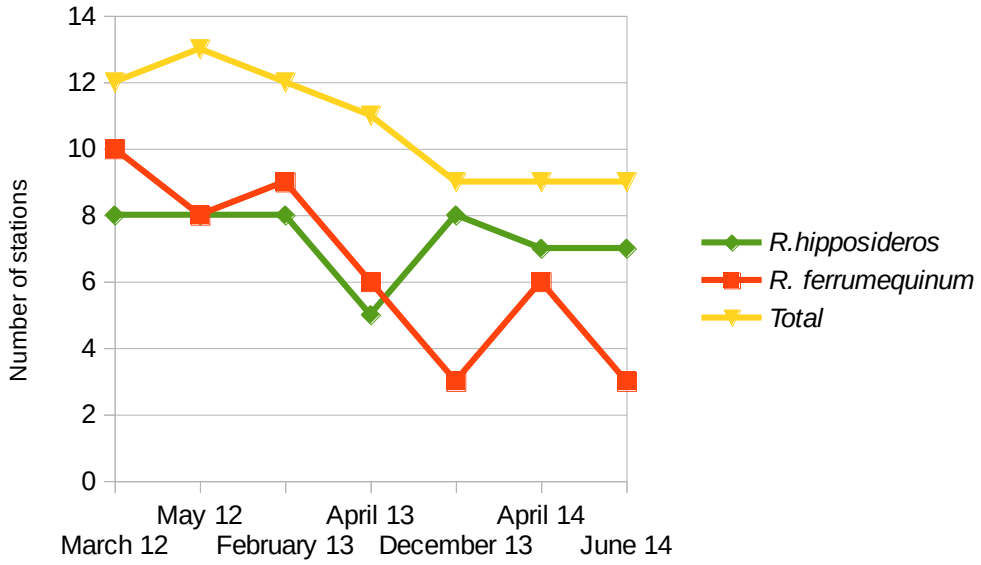

Figure 2. Number of stations used by *R. ferrumequinum* and *R. hipposideros*

An overall decrease of the number of stations used can be observed during the frame of the monitoring. With a 70 % decrease of stations used, *Rhinolophus ferrumequinum* seems to be more impacted than *Rhinolophus hipposideros* (12.5 % decrease).

Using the first ever data collected in Albania during winter period, the use of the stations by the two main species encountered in the area has been studied as well. The results show that *R.ferrumequinum* is forming aggregation up to 23 specimens, and is concentrating in few stations, with 69 % of the

population in one station, and 84 % in two stations. On the contrary, specimens of *R.hipposideros* are always alone and seem to spread during the winter, in order to use a maximum of different sites, with 69 % of the winter population in 4 stations, 83% in 6 stations (Fig.3).

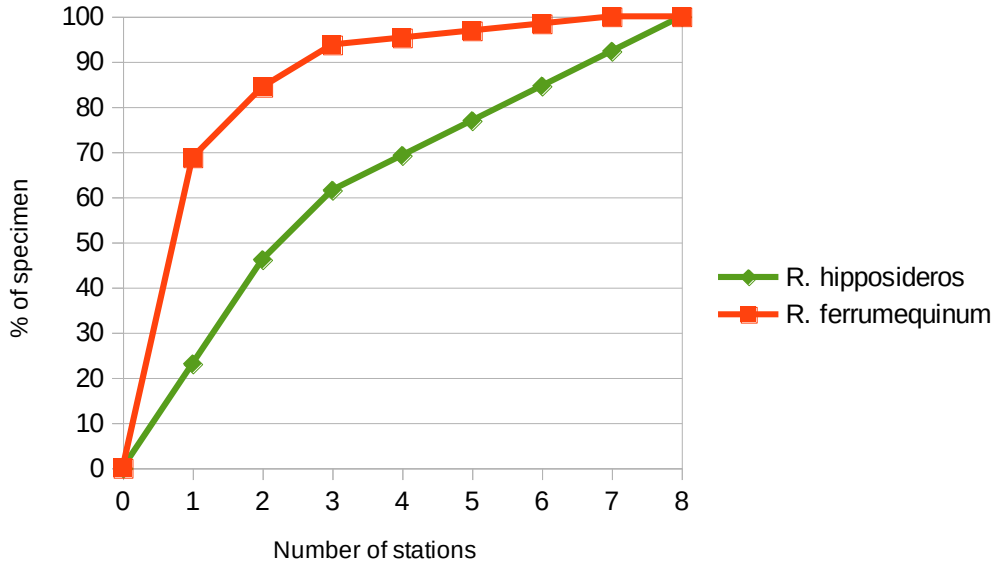

Figure 3. Use of stations during winter time by *R.ferrumequinum* and *R.hipposideros*

During this first monitoring effort, important variations of the bat populations using the network have been observed (Fig.4). These variations can be noticed during the same year, and/or between years.

Due to the few specimens observed, the variation of population of the others species (*Myotis capaccinii*, *Miniopterus schreibersii* and *Rhinolophus euryale)* is not showing any particular interest, whereas the populations of *R.ferrumequinum* and *R.hipposideros* seem to follow a different way.

The important increase of the *R.ferrumequinum* population in April 2014 is strongly linked with the population of one station, which hosted 92.4 % (134 specimens) of the total population for this species.

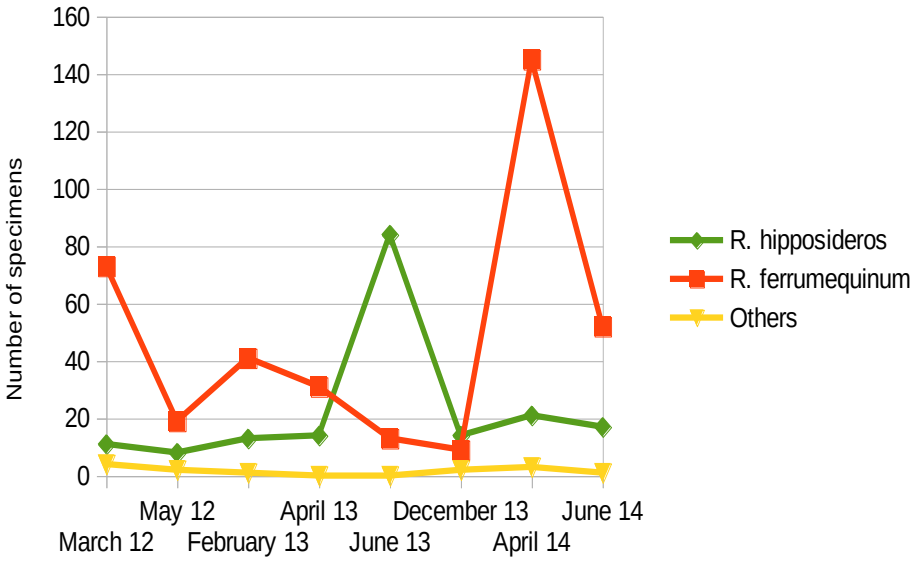

Figure 4. Bat population during the monitoring

Finally, it is important to underline here that during the timeframe of the monitoring, the area has been strongly impact by urbanisation and illegal destruction of bunkers, especially at the end of the year 2013. In total, 17 stations have been totally or partially destroyed. Most of these stations were bunkers, whereas only one tunnel has been destroyed.

Discussion

As explained previously, the area has been strongly impacted during the monitoring period**.** But this disturbance has not equally impacted the species identified in the area.

Rhinolophus ferrumequinum seems to be the most impacted species, as it is mainly using bunkers that were the main target of the illegal destructions. The decrease of the number of stations used (Fig.2) shows a rarefaction of available roosts for this species, and consequently the concentration of almost all individuals (92.4 %) in one station. The latest data show that the overall population seems to have not been impacted by illegal destructions, and the highest number of specimens in April 2014 may confirm this finding. The important increase of the number of specimens in one station may also confirm the strong decrease of available sites inside the network and its proximity. The habitat is still offering enough opportunities to be used by the specimens, but due to the lack of available roosts, most of the specimens of the study area may have been constrained to use the same roost. The fact that this species is known not to perform long distance migrations (Dietz *et al.*, 2007) could explain this kind of movement of the specimens inside the network of stations/sites. This situation may increase the threat on this

species in the study area, because any disturbance on the roosting site could impact the entire population.

The same situation was also observed during winter, where the same station was used by 70 % of the population of the network.

We assume that, as no maternity colonies have been identified in the area, the specimens that can be observed between May and July 2014 are males (Dietz *et al*., 2009), which could explain the decrease of the population between April and June 2014, with females reaching maternity colonies. But this affirmation needs miss-netting to be confirmed.

Contrarily, *R.hipposideros* got a relative stabilisation of the population. This can be explained by two factors: firstly, this species is mainly using tunnels, which are not impacted by destruction and disturbances, and, secondly, specimens are using higher number of stations than *R.ferrumequinum*, which makes the impact of a possible disturbance at the population level to be low.

However, the change of the area is also impacting this species, especially during the reproduction period. Thus, in spring 2013 two maternity colonies have been identified. Unfortunately, the two bunkers used by these colonies have been partially destroyed, or even transformed as human habitation. The availability of roosting sites for maternity colony is also a key point for this species, as well as the availability of night roosts (Knight & Jones, 2009).

Assuming that specimens using tunnels during the year are mainly males (Crucitti, 1998), females of this species are more impacted by the modifications of the area, which could strongly influence the use of this area by this species in the future **(**Knight & Jones, 2009**).**

In long term, the urbanisation of the area could also modify the composition of the bat population. Important *Pipistrellus sp.* population has been identified near the lake of Tirana (Çera, 2014), which is only 1km away from the study area. The further urbanisation could increase the ecological niche of *Pipistrellus spp.* in the area, especially due to the artificial light use by these species for hunting, which could increase the food competition among the different species of bats (Arlettaz, 2000).

Conclusion

This monitoring is showing that bat species and genera are not impacted equally in a short term period by the urbanisation, due to their ecology.

The number of specimen using the area seems to have not been directly impacted for the moment, thanks to the relative good habitats around the actual roosts. But, if the urbanisation will further increase in the near future, the bats population of the area will soon drastically decrease, due to direct mortally, non-availability of roosts, food competition and increased pressure to move.

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