

Operation Wallacea

Sinai, Egypt 2011



Barbastella leucomelas, Sinai Barastelle (photo credit: Eleni Foui)

Bat report

By Eleni Foui

Introduction

Sinai peninsula is located between the Suez Canal and the Gulf of Aqaba. It is the eastern most part of Egypt and is bordering with Palestine and Israel by land and with Jordan and Saudi Arabia by sea. The main vegetation type of Sinai is a combination of Saharo-Arabian and Sudanian desert flora (Danin & Plitmann 1986). At the northern coast there are some elements of Mediterranean vegetation and at the southern mountains some areas of Irano-Turanian steppe flora (Danin & Plitmann 1986). In general, Sinai is dominated by three broad geological parts: sand dunes at the north, a limestone plateau at the central part and high altitude igneous rock mountains at the south (White, Dauphiné and Mohamed 2007).

There are 22 species of bats documented in Egypt. Generally, bats are not well studied in this area. The first compilation of all bat data of Egypt was done by Qumsiyeh in 1985. Before this publication only scattered records of single bats can be found in the literature starting in 1757 (for more details see Benda et. al 2008). Operation Wallacea's work on bats of Sinai started in 2005 with Christian Dietz who later produced the "Illustrated identification key to the bats of Egypt". Since 2005 Operation Wallacea's expeditions in the area have documented 15 species of bats at Sinai (and possibly two more from recordings) including rare and important species such as the Sinai Barbastelle (*Barbastella leucomelas*) which was rediscovered after its initial description in 1822-1826 (by Rüppell and Cretzschmar) and the lesser horseshoe bat (*Rhinolophus hipposideros*) which was initially found by Hoogstraal in 1953. Both these species have not been found in any other parts of Egypt. The Sinai Barbastelle is listed as vulnerable in IUCN's red list of threatened taxa and is a near-endemic with records from Sinai, Palestine, Israel and possibly Jordan (Basuony, Gilbert & Zalat 2010). This limited distribution makes Sinai Barbastelle the bat with the smallest known distribution of any Palearctic bat (Basuony, Gilbert & Zalat 2010). However, its main population is thought to be residing mainly at Sinai and thus Sinai is a very important area for the conservation of this species.

Objectives

The objectives of Operation Wallacea at Sinai in general and more specifically of the bat project are:

1. Inventory of the species present in each new area.
2. Monitoring the populations and species of previously sampled areas.

Methods

Mist-netting was carried out in order to assess the species present in each area and their distribution. Gardens with water were mainly chosen for sampling due to their suitability as water sources and feeding sites for bats. Three to six mist-nets were set before sunset and were opened when it was sufficiently dark (usually around 19:00 hours). The nets were usually left open for four to five hours, depending on the capture success and the bat activity. Nets were checked every 15 minutes. When a bat was caught it was removed carefully from the net and was kept in a cloth bag until processing. Information which was obtained from each bat included sex, age, weight and forearm length. Other measurements were also obtained when it was necessary for identification (e.g. ear length, length of third digit etc). Weight was taken using a spring balance and other measurements using calipers. The "Illustrated identification key to the bats of Egypt" by Christian Dietz (2005) was used for identification. Photos of each individual were also taken before releasing it.

Results

Four bats were caught during the first survey. Out of the nine sampling nights only two were successful with one and four bats respectively (Table 1). During the three sampling nights of the second survey 27 bats were caught. No bats were caught at St. Katherine or during the third survey. In total 31 bats were caught belonging to 5 species. A detailed description for each site is following.

Survey	Day	Site	Date	Number of individuals	Number of species
1	1	Wadi El-Akhdar	6/7/2011	0	0
1	2	Wadi El-Akhdar	7/7/2011	0	0
1	3	Ras El-Akhdar	8/7/2011	0	0
1	4	Wadi Tarfa	9/7/2011	0	0
1	5	Wadi Feiran	10/7/2011	1	1
1	6	Wadi Feiran	11/7/2011	0	0
1	7	Wadi Gharaba	12/7/2011	3	3
1	8	Wadi Sheikh Awad	13/7/2011	0	0
1	9	Wadi Tarfa	14/7/2011	0	0
St.Katherine	1	Wadi Arbaein	22/7/2011	0	0
St.Katherine	2	Monastery garden	23/7/2011	0	0
St.Katherine	3	Next to football field	24/7/2011	0	0
2	1	Wadi Nasb (camp)	26/7/2011	5	2
2	2	Wadi Nasb (pool)	27/7/2011	11	4
2	3	Wadi Nasb (village)	28/7/2011	11	2
3	1	Wadi Ramthy	3/8/2011	0	0
3	2	Wadi Sanad	4/8/2011	0	0

Survey 1

Site 1 – Wadi El-Akhdar

Wadi El-Akhdar (Green valley) was sampled for two consecutive nights. There were two wells and two water tanks in this garden and various trees, mainly palm trees. During the first night 3 nets (2.5 m, 9 m and 12 m long) were set close to the water tanks and well which were on one side of the wadi. During the second night two nets (9 m and 12 m long) were set on the same side and another one (12 m long) was set close to the well which was located on the other side of the wadi. No bats were caught during these two nights and only very few were seen flying around.



Figure 1: Well at Wadi El-Akhdar



Figure 2: Wadi El-Akhdar

Site 2 – Ras El-Akhdar

Ras El-Akhdar was sampled for one night. It is a very small garden with a small cultivated area and a few trees. There are two water tanks, one next to the garden and another one at the top of the hill. Three nets were set, one (12 m long) next to the water tank at the top of the hill, one (9 m long) next to the second water tank and the last (12 m long) close to the cultivated area. No bats were caught or seen at this site.



Figure 3: Garden at Ras El-Akhdar



Figure 4: Water tank at Ras El-Akhdar

Site 3 – Wadi Tarfa (at the beginning of the wadi)

This part of wadi Tarfa was sampled for one night. It is a garden with a cultivated area, trees and three water tanks. Three nets were set, two (6 m and 9 m long) were set close to two separate water tanks and one was set close to the trees and cultivation. No bats were caught but two were seen flying at sunset and some were heard (audible sounds) around 22:30 hours.



Figure 5: Garden at the beginning of Wadi Tarfa

Site 4 – Wadi Feiran (Breyga garden)

Wadi Feiran was sampled for two consecutive nights. Breyga garden is a densely vegetated garden with lime, pomegranate and palm trees (and possibly other trees as well) with two wells and a closed water tank. During the first night 3 nets were set. One (12 m long) was next to the water tank and was extending towards an area with trees. The second (9 m long) was placed next to one of the wells and the last one (12 m long) was set between trees. One bat was caught at the first net and several were seen flying around the area and close to the nets. The bat that was caught was a fruit bat identified as *Rousettus aegyptiacus*.

In the garden there was an area where people were staying with an open section with a strong light and a shaded section. Bats were flying around and often very close to the humans. Some individuals were seen flying in the shaded section resting for a few seconds and then flying out again.

During the second night 5 nets were set. The same 12 m long net was put close to the water tank and a 6 m long net was set perpendicular to that covering the other side of the tank. The same 9 m net was put close to the well but elevated about 50 cm from the ground. A 2.5 net was put diagonal to this net in order to close a small gap between the

9 m net and a tree. The last net (12 m long) was put between trees again. Furthermore, a net (6 m long) was put later at night at the area where bats were seen flying close to humans. The shaded area entrance was about 9 m long. A 6 m net was set there but the bats were detecting and avoiding it. The gaps at the two sides of the net were then closed but the bats were still managing to find a way out.



Figure 6: Garden at Wadi Feiran



Figure 7: *Rousettus aegyptiacus* individual caught at Wadi Feiran

Site 5 – Wadi Gharaba

Wadi Gharaba was sampled for one night. It was a remote area with a small valley where the garden was located. The garden had a big cultivated area and a few trees and bushes. It also had a water tank. Four nets were set, two (9 m and 6 m long) covering two sides of the tank and the other two (12 m and 6 m long) between the trees and the cultivations. Three bats were caught at the 12 m long net belonging to three different genera. They were identified as *Hypsugo ariel*, *Plecotus christii* and *Barbastella leucomelas*.



Figure 8: Garden at Wadi Gharaba



Figure 9: Garden at Wadi Gharaba



Figure 10: *Hypsugo ariel* individual caught at Wadi Gharaba



Figure 11: *Plecotus christii* individual caught at Wadi Gharaba



Figure 12: *Barbastella leucomelas* individual caught at Wadi Gharaba

Site 6 – Wadi Sheikh Awad

There were three gardens close together at wadi Sheikh Awad. They had a few trees and cultivated areas, some abandoned buildings and a water tank. Three nets were put in this area. Two (9 m and 12 m long) were set in the bigger garden between trees, one (2.5 m long) was set next to the water tank (second garden) and the last (6 m long) was set in the third garden between a tree and the cultivated area. One or two bats were seen right after sunset but no bats were caught in the nets.



Figure 13: Garden at Wadi Sheikh Awad

Site 7 – Wadi Tarfa (at the end of the wadi)

This part of wadi Tarfa (different from site 3) was sampled for one night. It is a garden with trees, cultivated areas and two water tanks. Three nets were set at this site. Two of them (9 m and 6 m long) were set along the edges of each water tank and the last (12 m long) was set between trees. No bats were caught and only one or two were seen flying around sunset.



Figure 14: Garden at the end of Wadi Tarfa (photo credit: Amanda Kennedy)

St. Katherine

Site 1 – Wadi Arbaein (beginning)

This garden is located at St. Katherine's town at the beginning of wadi Arbaein. It is a garden with lots of fruit trees and one water tank. Three nets were set at this site, one (9 m long) next to the water tank and two more (12 m long) between the trees. No bats were caught or seen flying in this area.



Figure 15: Garden at St. Katherine town at the beginning of Wadi Arbaein

Site 2 – Monastery garden

This garden owned by St. Katherine's monastery is a very big garden with many fruiting trees. There is one water tank in this site but the water level was very low. Three nets were placed between the trees (2 x 12 m and 9 m long). No bats were caught in the nets and only a few were seen flying between 20:00 and 21:45 hours.



Figure 16: Monastery garden at St. Katherine's town

Site 3 – Garden on main road next to football field

This garden is located next to the main road of St. Katherine's town, close to Fox camp and next to the football field. It has fruiting trees, a cultivated area and one well. Two nets were placed between the trees (12 m long) and one next to the well (9 m long). No

bats were caught in the nets. At least three to four bats were flying around the football field's flood lights and a few were also seen around the street lights. A couple were seen flying at the garden but too high.

Survey 2

Site 1 – Wadi Nasb (camp site)

The first night of the second survey sampling took place close to the camping site. Two nets (12 m and 6 m long) were placed between palm trees at a garden opposite the camping site. One net (9 m long) was placed between trees next to a water tank in a garden next to the camping site. One fruit bat (*Rousettus aegyptiacus*) was caught at the 12 m long net and five *Hypsugo ariel* at the net close to the water tank. Few bats were also seen flying.



Figure 17: Garden opposite the camping site at wadi Nasb



Figure 18: Garden with water tank next to the camping site at wadi Nasb



Figure 19: *Hypsugo ariel* individual caught close to a water tank next to the camping site at wadi Nasb (photo credit: V. Deepak)



Figure 20: *Rousettus aegyptiacus* individual caught in a garden opposite the camping site at wadi Nasb (photo credit: V. Deepak)

Site 2 – Wadi Nasb (animal pool)

During the second night sampling was carried out at 3 water pools (Fig. 21) which are mainly used by animals. An area with palm trees was also close. One net (9 m long) was placed above the water pool and two nets (12 m and 6 m long) were placed between palm trees. Eleven bats belonging to four different species were caught in the net above the pool. Seven *Hupsygo ariel*, two *Rousettus aegyptiacus*, one *Eptesicus bottae* and one *Plecotus christii* were caught in total (Fig. 22 – 25). In general lots of bats were seen flying close to the pools.



Figure 21: Pools used mainly by animals at wadi Nasb



Figure 22: *Rousettus aegyptiacus* individual caught at the pool at wadi Nasb



Figure 23: *Eptesicus bottae* individual caught at the pool at wadi Nasb



Figure 24: *Hypsugo ariel* individual caught at the pool at wadi Nasb



Figure 25: *Plecotus christii* individual caught at the pool at wadi Nasb

Site 3 – Wadi Nasb (Nasb village)

During the third night sampling took place close to Nasb village. One net (9 m long) was placed above a pool (Fig. 26) and two more (12 m long) were put at a garden (Fig. 27). The garden had a few trees and a cultivated area. Nine bats (*Hypsugo ariel*) were caught above the pool and two (*Barbastella leucomelas*) were caught in the garden (Fig. 28 & 29). Many bats were seen flying.



Figure 26: Pool opposite Nasb village



Figure 27: Garden next to Nasb village



Figure 28: *Hypsugo ariel* individual caught above the pool at Nasb village



Figure 29: *Barbastella leucomelas* individual caught in a garden next to Nasb village

Survey 1

Site 1 – Wadi Ramthy

Wadi Ramthy was sampled during the first night of the third survey. The chosen location had a water tank, a well and very few trees and bushes (Fig. 30). There was a garden in close proximity but had very short trees and therefore no nets were put there. Three nets were set up, one (12 m long) was set close to the vegetation, one (9 m long) was set next to the water tank and the last (12 m long) was set close to the well. No bats were seen or caught at this location.



Figure 30: Water tank and well at wadi Ramthy

Site 2 – Wadi Sanad

A garden at wadi Sanad was sampled during the second night of the third survey. The garden had a few trees and some cultivated parts but also had a big water pool and a well (Fig. 31 & 32). One net (9 m long) was set across the water pool and one (12 m long) was set close to a vegetated area. No bats were caught in the nets and not bats were seen flying in the area.



Figure 31: Garden at wadi Sanad



Figure 32: Water pool in the garden at wadi Sanad

Discussion

There are 22 species of bats recorded in Egypt (Dietz 2005) and about 15 species at Sinai (Operation Wallacea expeditions). During the 17 sampling nights of this expedition 31 bats were caught belonging to 5 species. The majority of the bats (27) were caught at three adjacent sites during the second survey (Wadi Nasb). Only two other nights were successful with one and three bats respectively. In some of the sites bats were seen flying but higher than the nets. This makes very prominent the necessity of a bat detector in order to record the species that are not caught usually in the nets (for details see recommendations).

Mist-netting in deserts is very difficult and suitable sites must be targeted. We tried to mist-net in places where there was vegetation and water bodies present. These sites might be visited by bats more often for feeding and drinking purposes. The sites during the first survey were located at very wide valleys. On the other hand, wadi Nasb was a low elevation area with steep hill sides and narrow valleys with gardens and water pools. It was surrounded by big dry valleys. This habitat seemed ideal for the bats that visited the water pools and the gardens. Another very important component for the presence of bats in an area could be suitable roosting sites. During this expedition no roosting sites were found. However, the steep hill sides of the second survey were rocky and possibly had suitable crevices and cave like formations for bats.

Recommendations

Bat detector

A very useful piece of equipment for the future bat work at Sinai would be a bat detector. Transects can be carried out by volunteers or even Bedouin guides with a bat detector and recorder. The recordings can be processed later by the bat scientist. The species present in an area can be identified using specific bat software (e.g. BatSound Pro) and the echolocation call library which already exists for the bats of the area. If an interesting call is found in the recordings then mist-netting can be carried out in the area in order to try and catch the species that emitted the call. This method is very helpful for monitoring and comparing bat activity between sites. It is user friendly once the people have been trained and it also minimises the stress to the bats by avoiding direct handling when it is not necessary. Because mist-netting in the desert is often difficult using this method could help to focus mist-netting effort into sites with higher bat activity and/or species of interest.

The recommended bat detector is Pettersson D240x by Pettersson Elektronik (current price: 1170 euros - <http://www.batsound.com/?p=35>). The recommended recorder is Edirol Roland R-09HR (current price: 340 British pounds - http://www.alanaecology.com/wildlife/Roland_R-09HR_Digital_Recorder.html) with an SD card.

New nets

During the 2011 expedition two new nets were purchased (9 m and 12 m long). The previous nets are not in a very good state and most of them have many holes. All bats caught were captured in the new nets even though older nets were used as well. This could be an indication that nets with many holes could be more easily detected or avoided by bats. However, it is worth mentioning that the new nets were probably used at the more optimum areas. It would be better though if one or two more nets of different sizes are purchased and also a repair kit in order to repair new holes that are made. If the older nets are discarded they should be properly destroyed in order to avoid any animals getting caught by accident.

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