Ecological and Behavioural Study of mammalian Desert Carnivores in the Moroccan Sahara

RESEARCH ON THE SAND CAT
(Felis margarita margarita)

Results of the December 2016 expedition

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To the attention of our sponsors
Context

This research study on the sand cat (*Felis margarita*) is on-going in the frame of a partnership agreement for the conservation of desert carnivores signed on 9 January 2015 between Jardin Zoologique National de Rabat (JZN), Parc des Félinis at Lumigny-Nesles-Ormeaux, France (PDF) and the French association SOS Félinis & Co.

After two successful expeditions in 2013 and 2015 in the region of Dakhla-Oued Ed-Dahab, the research team – Grégory Breton (curator at Parc des Félinis, France), Alexander Sliwa (curator at Cologne Zoo, Germany), Saâd Azizi (veterinarian at Jardin Zoologique National, Morocco) and two local drivers and guides, misters Elhaj Alifal and Brahime Boupoya – went to the study site again from 6 to 15 December 2016, near to the road N3 and the track Bougoufa between the towns of Dakhla and Aouserd, to carry on the work where the first four sand cats where captured and followed in 2015 (Breton, Sliwa, Azizi and Essalhi, 2016).

This new expedition was again authorized by the Haut Commissariat aux Eaux et Forêts et à la Lutte contre la Désertification (HCEFLCD, research permit n°16/2016 from June 16, 2016) and the Agence Nationale de Réglementations des Télécommunications (ANRT, autorisation n°91RIRT2016 from December 2, 2016) and this report aims to present the main results.

Budget and sponsors

The budget of our December 2016 expedition is close to **6,600€** with half allocated to new telemetry equipment that allowed the team to follow the animals. A detailed budget is available upon request. It is important to specify that both Grégory Breton and Alexander Sliwa have until today prepared and performed this work in their holidays, without wages, nor any financial compensation.

This 2016 expedition would not have been possible **without the financial support of the following institutions and organizations:**

- the International Society for Endangered Cats (ISEC, Canada),
- the Association SOS Félinis & Co. (France),
- The animal keeper class of 2015/2016 from the HELHa school (Belgium),
- Big Cat Rescue (USA),
- Cincinnati Zoo (USA),
- and Mme Hamelin, a French writer who published a book on small cats in 2016.
Results of our 2016 expedition

First of all, our team was not able to locate again the 4 sand cats we collared during the expedition of December 2015. Whereas we know a good part of the home range of two specimens (M2, F2), we were not able to find the VHF signal of the two males, despite intensive search. We knew the task was really difficult because the duration between both expeditions was about a year without tracking in the field and the animals could have shifted their territories, could be dead or they could have been near us without us being able to detect them as the two small radio-collars allocated to the females F1 and F2 were expired before our trip. But we keep hopes in finding one or several of these specimens, alive or at least the collars during the next expeditions. It is important to specify the collars we use do not hamper the cats in their hunting, eating and mating activities. That type of collar is the product of numerous years of research and is optimized to follow other similarly sized felid species like the black-footed cat (*Felis nigripes*), which is also studied by Dr. Sliwa in South Africa for 24 years now.

However, this new expedition was successful in the search for other sand cats, because we found **10 new specimens** (see the table below) and were able to capture **8 of them** (one female and seven males). After capturing three juveniles born in the beginning of the year (M3, M5, M6), we have decided to only fit the first one with a VHF collar (M3) and to release the two others without collars, however identifiable in future though an implanted microchip. The team subsequently tracked and followed the 6 radio-collared cats daily by recording their daytime resting locations and part of their nightly moves. In total, the team drove and walked 1523 km with 1130 km at night.

**Summary table listing all sand cats observed during this trip**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Identifiers in publications</th>
<th>Allocated names</th>
<th>Observation date</th>
<th>Contact hour</th>
<th>Captured</th>
<th>Collared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>F3 Météorite</td>
<td>09/12/16</td>
<td>19:15</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>M3 Chab</td>
<td>09/12/16</td>
<td>23:05</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>M4 Atlas</td>
<td>10/12/16</td>
<td>01:00</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>M5 -</td>
<td>10/12/16</td>
<td>23:35</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>M6 -</td>
<td>11/12/16</td>
<td>00:45</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>6</td>
<td>?</td>
<td>-</td>
<td>11/12/16</td>
<td>? (&gt; 01:30)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>7</td>
<td>?</td>
<td>-</td>
<td>12/12/16</td>
<td>00:30</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>M7 Sarie</td>
<td>12/12/16</td>
<td>01:40</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>M8 Badre</td>
<td>13/12/16</td>
<td>01:50</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>M9 Lucifer</td>
<td>13/12/16</td>
<td>22:05</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

As during our previous expeditions, we have observed a high number of fennecs (*Vulpes zerda*, n=34) and Rüppell’s foxes (*Vulpes rueppelli*, n=19) and also African wolves/golden jackals (*Canis anthus*, n=3), Saharan striped polecats (*Ictonyx lybica*, n=3) and African wildcats (*Felis silvestris lybica*, n=1).
Photos

The team took many pictures of these 8 captured sand cats and during the course of the expedition. We also have beautiful camera-trap sequences of various carnivores, including the sand cat. All these pictures are available upon request. Here are some of them illustrating the work done on the sand cats (copyright: G. Breton).

After its capture, each sand cat (F3 here) is fitted with a VHF collar while under anaesthesia. The procedure is monitored by Dr Azizi and physical measurements are taken.

Each sand cat (M9 here) is covered with a warm cloth to avoid that it loses body heat during the anaesthesia and the wake-up phase, after the injection of the reversal drug.

The team is patiently waiting for the full recovery and waking-up of each sand cat (M8 here), letting it go when it wants. Each cat is then followed at distance during 20-30 min. to make sure it is moving safely.

During daylight, the team is using the signal emitted by the VHF collars to find each cat again (M9 here), something only possible with this technology (a cat is hidden in the left picture but is fully invisible).
Program’s development

The work done by the team is unique for several reasons:
- First, the sand cat is not a species widely studied in the world despite its wide distribution area (Sliwa et al. 2016). According to Brodie (2009), the species was the subject of only 3 peer-reviewed articles between 1986 and 2007. This is really low compared to the other felid species and other carnivores of similar sizes.
- This study is the first one ever done in Morocco to specifically study this species considered not frequent and classified as vulnerable in the country (Cuzin, 1996). Alongside the work done on gazelles and waldrapp ibis, this program confirms and internationally promotes Morocco’s commitment to study and protect its fauna.
- The results gathered by our team in two expeditions already surpass the results obtained by other researchers in the United Arab Emirates collected using camera-traps (Ahmed et al., 2016) and in Israel, where telemetry results were not transparently analysed and published and therefore only published anecdotally (Abbadi, 1993).

For all these reasons, we would like to carry on our work and follow the cats to discover more about their ecology and behaviour. We are planning a new expedition in February 2017, before our research permits from the HCEFLCD and the ANRT expire, to find the cats collared in 2016, but also in 2015 and to proceed tracking them. This will gather more data on their home ranges, territories and behaviours.

Once our research permits are renewed, we would also like to go back before the summer, in April or May 2017, and then during autumn, between October and December 2017. However we would need substantial additional financial support to do so.

Impact

Besides the scientific articles already published (Sliwa et al., 2013; Breton et al., 2016) and the ones to come, this work has multiple benefits for all involved parties, the team but also the Jardin Zoologique National de Rabat and Morocco Kingdom.

The team is hoping to present its work and promote this collaboration and the involvement of Rabat Zoo and the HCEFLCD during international conferences and meetings like the EAZA Felid TAG in March 2017, the Sahelo-Saharan Interest Group meeting in May 2017, the EAZA Annual Conference in September 2017 and other important events yet undetermined (e.g. EAZA Conservation forum, other conferences in the USA, in the UAE, ...).

This study is also a very good example for our current and past zoo sponsors to advertise their involvement in effective in-situ research and conservation actions. So far, 4 zoological institutions supported this work: Lyon Zoo (France), Eskilstuna Zoo (Sweden), Edinburgh Zoo (Scotland) in 2015 and Cincinnati Zoo (USA) in 2016.
When possible, the team will design educational materials in Arabic, French and English to promote the study and later on, it is envisaged to create a website or a Facebook page to communicate and engage a wider audience.

Finally, our work is now interesting some print medias and TV broadcasters and producers including the BBC who would like to accompany us to film the sand cat in its natural environment and our work. Before moving forward in that direction, we however need to strengthen our partnership and recognition with the Moroccan authorities to have a research permit covering a longer period before requested any filming permits.

Acknowledgements

We again thank all our sponsors without whom we could not have started and we would not be able to carry on this study.
We also express our sincere thanks to Monsieur le Haut-Commissaire du HCEFLCD, Dr. Lhafi, to the Technical Director and Head Veterinarian of JZN, Dr. Essalhi, and to the head of the office “Assignation des fréquences” at ANRT, Monsieur Latrache, for their interest in our work, their trust and support during the past year.

Bibliography


