Ecology of the Karoo dwarf tortoise, *Chersobius boulengeri*

Second Progress Report

Dwarf Tortoise Conservation

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Dwarf Tortoise Conservation (previously Homopus Research Foundation) is a non-commercial organisation entirely run by volunteers. The aim of the foundation is to gather and distribute information on dwarf tortoises, to facilitate their survival in the wild. This aim is achieved through scientific field studies, and through the development and study of captive studbook populations. Our results are published in scientific and popular outlets.

Introduction

In 2018, the precursor of Dwarf Tortoise Conservation, the Homopus Research Foundation, initiated a field study on the Karoo dwarf tortoise, *Chersobius* [previously *Homopus*] *boulengeri*. This study is funded by several donors. The current progress report provides an update about the study for donors and updates an earlier progress report dated 1 April 2018.

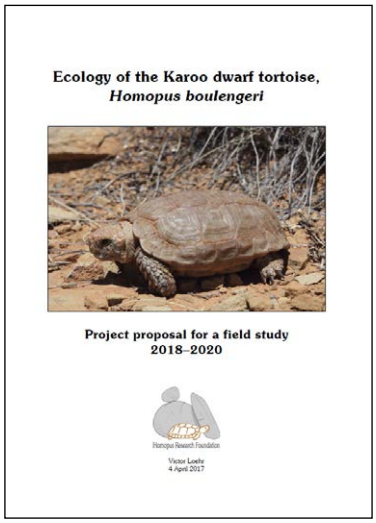
The following organisations and individuals have allocated funds, discounted prices, or in-kind contributions to the project:

- Turtle Conservation Fund and Conservation International
- Holohil Systems Ltd.
- British Chelonia Group
- Knoxville Zoo
- Dutch-Belgian Turtle and Tortoise Society
- Pedak
- Soek 'n Slapie

- Jan Barth
- Kurt Engl
- Silja Heller
- Brian Henen
- Lutz Jakob
- Mark Klerks
- Johann Klutz
- Martijn Kooijman
- Matthias Kupferschmid
- Koos and Coby Loehr
- Victor Loehr
- Frank van Loon
- Marcel and Lydia Reck
- Peter Sandmeier
- Uwe Seidel
- Paul van Sloun
- Lars en Petra Wolfs

Summary of study objective

A full description of the study is available in the project proposal. In summary, the study objective is to gather and publish ecological information that is relevant for the conservation of *C. boulengeri*:



- population structure and dynamics
- tortoise growth rates
- activity and movements
- home ranges
- diet
- reproduction

To meet this objective, three sampling periods have been proposed, in:

- February–March 2018 (6 weeks);
- October 2018–March 2019 (12 weeks);
- October–March 2020 (5 weeks).

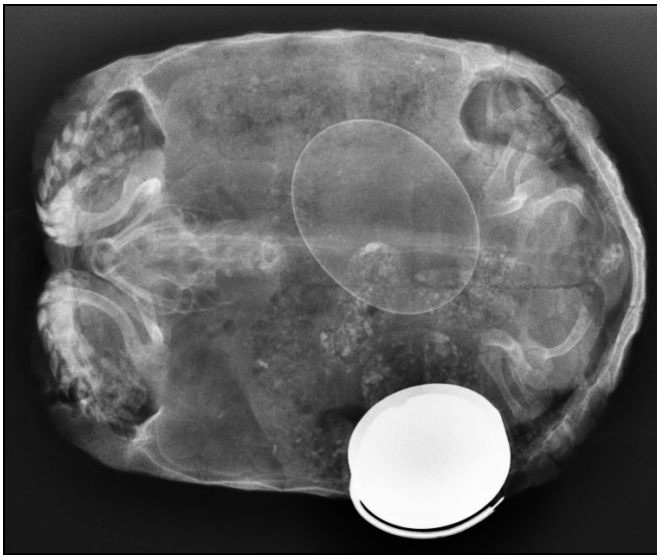
Progress from 1 April until 10 November 2018

Preparation

Based on the sampling results in February–March 2018, when no gravid females were encountered, a second 6-week sampling period was prepared for October–November 2018. Due to the relatively short period between the February–March and October–November, there was little time to obtain research materials (most notably telemetry equipment that had very long lead times), recruit volunteers, and arrange transport and accommodation. However, all preparations were completed timeously.

Sampling

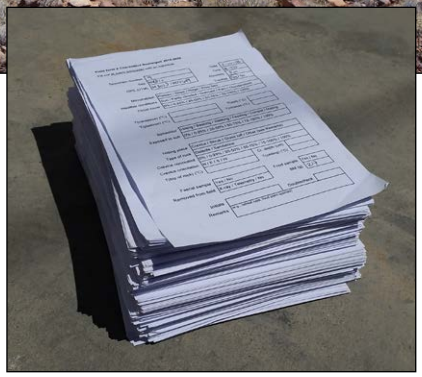
Focus during this sampling period was on reproduction, behaviour, thermoregulation and home ranges in spring. Nevertheless, several new and previously marked tortoises were found too. Spring started late, so that environmental conditions represented late August–September rather than October–November. On 2 October, 19 October and 7 November, respectively 15, 17 and 17 females were temporarily removed from the study site and radiographed. This time, females contained eggs.



Some females laid eggs, which was occasionally observed and filmed. Due to the high frequency of radiographing and large sample size, the data collected already suffice for a paper. It should be noted that the reproductive data were not collected easily, because it required hiking and driving gravel and paved roads for nearly 500 km, following a precise time schedule to return the females to the study site within 24 hours. All females were treated with extreme care and received water to replenish any fluids lost during handling and travelling.

Behaviour and thermoregulation were studied by intensive (i.e., 469 encounters in total, for 1,288 temperature recordings) radiotracking of 9 males and 16 females that had been opportunistically found and transmittered in February–March 2018. At the onset and throughout the October–November sampling period, all telemetered individuals were alive and well, although the signal from one male interrupted for several weeks possibly due to a damaged transmitter.

All tracking followed a randomised design to facilitate later statistical analysis. Radiotracking took 312 person-hours (excluding 4 hours per day to travel to and from the remote study site, totalling 96 hours). Considerable activity was recorded and it helped that the study site had a rainfall event just before the sampling started as well as widely ranging day temperatures. The behaviour and thermoregulation data will be processed and published in combination with data collected in summer.



A major disappointment in the October–November sampling period was the unexpected departure of a volunteer. The consequence was that all fieldwork during four weeks had to be done by a single person. Nevertheless, all anticipated data were collected. Two volunteers who assisted, as planned, during two weeks were Toby Keswick and Clara Lemyre.

The Karoo proved once again to be a harsh environment for research. Multiple tyre punctures required a long hike and hitch-hiking to get home. Moreover, one of the telemetry receivers fell when a rock on a steep slope tumbled, along with the person operating the receiver. Fortunately, this person was not injured and the receiver could still be used. In general, the rocky and hot environment takes a huge toll on the research equipment and few items are likely to last longer than 3–4 sampling periods.

Dissemination of results

The majority of the results will be processed and published in peer-reviewed journals as combined results for the 2018–2020 period. However, one life-history note was published in 2018:

Loehr, V.J.T. 2018. *Chersobius boulengeri* (Duerden, 1906), Karoo Padloper, Reproduction. African Herp News 68: 37–39.

In addition, two movie clips of feeding and egg-laying Karoo dwarf tortoises were published online. Two previous volunteers (Olda Mudra and Paul van Sloun) presented progress of the study in presentations at meetings at Charles University (Prague, Czech Republic) on 3 November and at the Dutch Turtle and Tortoise Society (Maarn, Netherlands) on 24 November. This progress report will also be distributed and posted on the website of the Dwarf Tortoise Conservation.

Continuation of the study

The study will continue as drafted in the project proposal. However, the proposed 12-week period in October 2018–March 2019 has been split in two separate periods, one in October–November 2018 and one in February–March 2019. This will allow us to:

- increase insight in the reproductive biology of *C. boulengeri* throughout the activity season;
- record behaviour and thermoregulation in spring;
- base the population modelling on consistent mark-recapture periods in February–March.

Furthermore, a second spring sampling period may be added in October 2019, which would exclusively look at reproduction. This would reveal reproductive variation among years with possibly different environmental conditions.