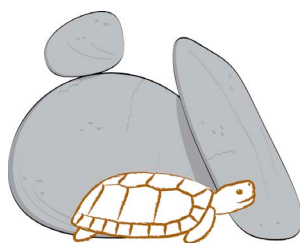


Ecology of the Karoo dwarf tortoise, *Chersobius boulengeri*



Fifth Progress Report



Dwarf Tortoise Conservation

Victor Loehr
23 March 2020

Contents

Introduction	2
Summary of study objective.....	2
Progress from 18 October 2019 until 23 March 2020.....	3
PREPARATION	3
SAMPLING.....	3
ADDITIONAL SURVEYS	4
DISSEMINATION OF RESULTS	5
Continuation of the study	5

Dwarf Tortoise Conservation
Kwikstaartpad 1
3403ZH IJsselstein
Netherlands

<http://www.dwarftortoises.org>

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 [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 18 October 2019.

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

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Turtle Conservation Fund and Conservation International • Knoxville Zoo • Holohil Systems Ltd. • British Chelonia Group • Turtle Survival Alliance EU • Dutch-Belgian Turtle and Tortoise Society • Soek 'n Slapie • Pedak | <ul style="list-style-type: none"> • Jan Barth • Kurt Engl • Sheryl Gibbons • Silja Heller • Brian Henen • Courtney Hundermark • Lutz Jakob • Mark Klerks • Johann Klutz • Martijn Kooijman | <ul style="list-style-type: none"> • Libor Kopecny • 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 main [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

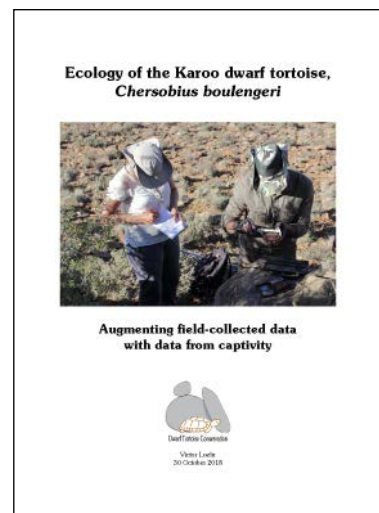
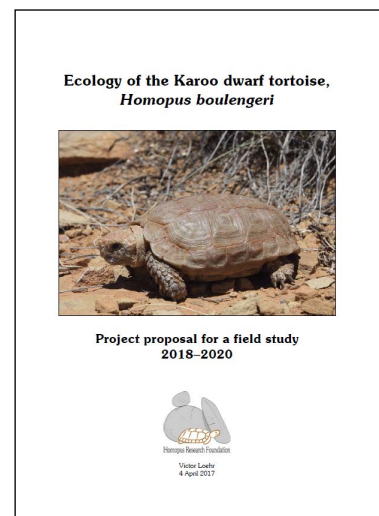
To meet this objective, three sampling periods have been proposed, in:

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

In response to the sampling results, the sampling took place during the following periods:

- February–March 2018 (6 weeks)
- October–November 2018 (6 weeks)
- February–March 2019 (6 weeks)
- October 2019 (1 week)
- February–March 2020 (6 weeks)

When it became clear that the original study approach would not be able to generate sufficient data on reproduction and tortoise growth rates, a supplemental project proposal was drawn up. This second project proposal seeks to augment field-collected data with data from captivity, which will be reported in the annual reports of Dwarf Tortoise Conservation. The captive study started in March 2019.



Progress from 18 October 2019 until 23 March 2020

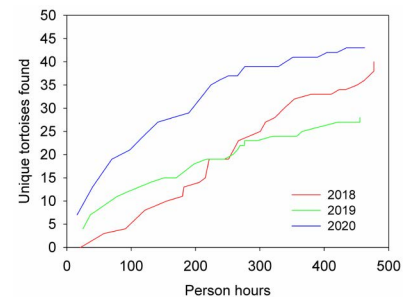
Preparation

Most preparations for the February–March 2020 sampling period (e.g., permits, arrangements for genetic study of diet) had already been completed towards the October 2019 fieldwork. Consequently, time was available to recruit and prepare a student who would focus on dietary work. Van Hall Larenstein University of the Applied Sciences (Netherlands), previously involved in a behavioural study on speckled dwarf tortoises (*Chersobius signatus*), delegated a student (Nicole Barten) for an internship.

Sampling

This sampling period was affected by the COVID-19 outbreak, because one Chinese volunteer who would participate for 6 weeks was unable to obtain a visa and had to cancel its participation. In addition, one other volunteer who would attend for 6 weeks was granted a visa for only 4 weeks. Nevertheless, the sampling was very successful.

In 463 person-hours, five persons (Sheryl Gibbons, Courtney Hundermark, Andreas Iosifakis, Toby Keswick, Victor Loehr) were able to locate a record number of 43 unique tortoises, among which were many recaptures from 2018 and 2019. The total number of unique tortoises located during the 2018–2020 study was 98. In February–March 2020, an additional 53 opportunistic encounters with tortoises were recorded for individuals that had already been captured in the same sampling period, emphasising our sampling success. Nine dead tortoises were also found, three of which were marked.



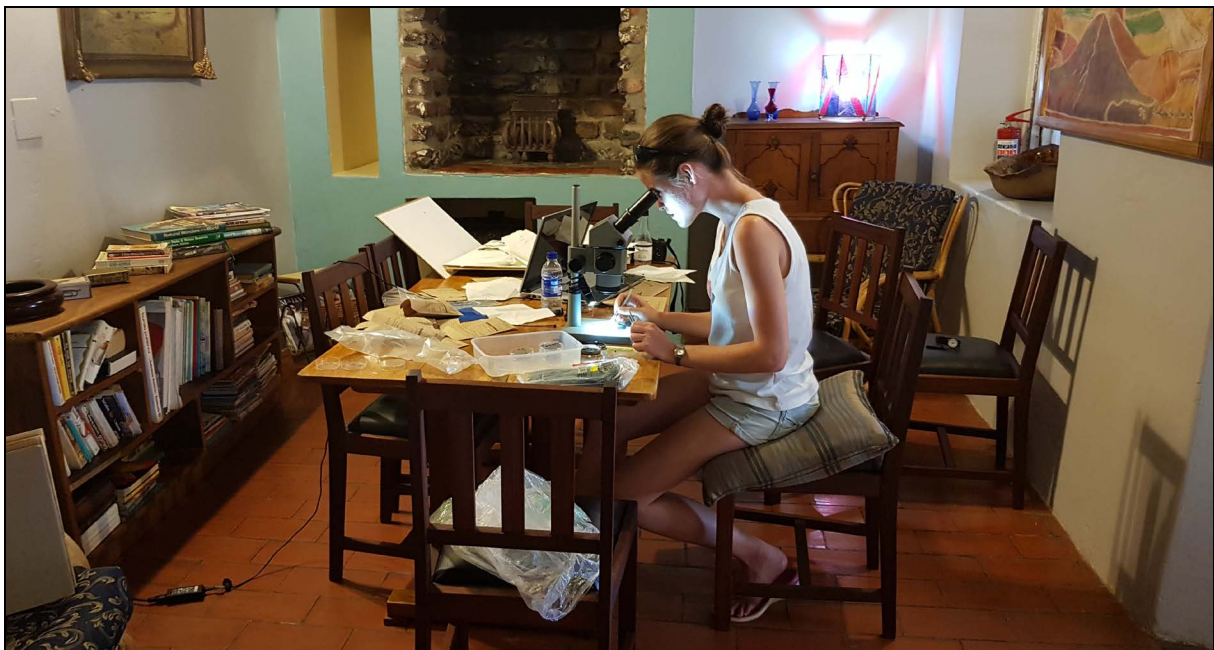
Favourable rainfall conditions, in contrast to the October 2018–December 2019 drought, provided excellent opportunities for investigations of the tortoise diet. We discovered almost 30 plant species that had not been encountered at the study site previously, most of which were flowering. Some new species could be identified in the field, many required involvement of an expert (Sue Dean), and several were collected as herbarium specimens for identification at Kirstenbosch Botanical Garden. Genetic samples were collected of all plant species for which sequences are not publicly available.



To reveal the diet of the tortoises, the student focused on morphological analysis of faecal samples collected in 2018–2019 and on focal observation of (nine) live tortoises, which were seen eating a relatively small number of plant species. In addition, faecal samples were collected, dried and exported for later genetic analysis. Because the existing 10 permanent vegetation plots provided insufficient quantitative information about the availability of food plants for tortoises, an additional 30 plots were randomly selected and analysed. A drone enabled us to gather detailed recordings of microhabitats and elevations, which will be used in analyses of diet and home ranges.



All transmitters from 14 surviving female tortoises were removed. Although the theoretical life expectancy of the transmitter batteries had already expired, all transmitters continued to operate until they were removed. Removal of transmitters (and epoxy) occurred without damaging the tortoises.



Additional surveys

Two areas outside the study site were briefly surveyed for Karoo dwarf tortoises. One farm, approximately 100 km from the study site, produced a single female, whereas a farm bordering the study site appeared to contain neither live nor dead tortoises. It appeared that none of the farms had a population of Karoo dwarf tortoises, emphasising the importance of the study site for the conservation of the species.

Dissemination of results

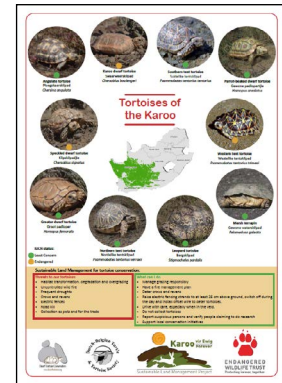
The majority of the results will be processed and published in peer-reviewed journals as combined results for the 2018–2020 period. However, two life-history notes were already published:

Loehr, V.J.T. 2017. *Homopus boulengeri*, Duerden 1906, Karoo Padloper. Reproduction. African Herp News 65: 18–19.

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

Furthermore, a research paper on behaviour and thermoregulation in summer has been completed and submitted for publication. Movie clips on [feeding](#), [egg-laying](#), [male aggression](#), [female aggression](#), [drinking](#), [thermoregulation](#) and [general behaviour](#) of Karoo dwarf tortoises, and on [cloud formation](#), have been published online. This progress report will also be distributed and posted on the website of the Dwarf Tortoise Conservation.

In 2019, the Dutch Turtle and Tortoise Society donated funds to produce a poster on Karoo tortoises, to raise awareness among farmers and other Karoo residents. The poster provides concrete do's and don'ts, and was produced in a collaborative effort of Dwarf Tortoise Conservation and the Endangered Wildlife Trust. It will be implemented in existing outreach by the Endangered Wildlife Trust.



Continuation of the study

Sampling for the study has been completed. The study has generated 1,140 encounters accounting for 98 unique tortoises. The large number of encounters, along with wet and drought conditions during the study, will enable analysis and publication of all anticipated study topics. If the COVID-19 crisis will permit, plant identifications and genetic analyses will be completed in 2020. Data processing, writing and publishing will continue in 2020–2023.