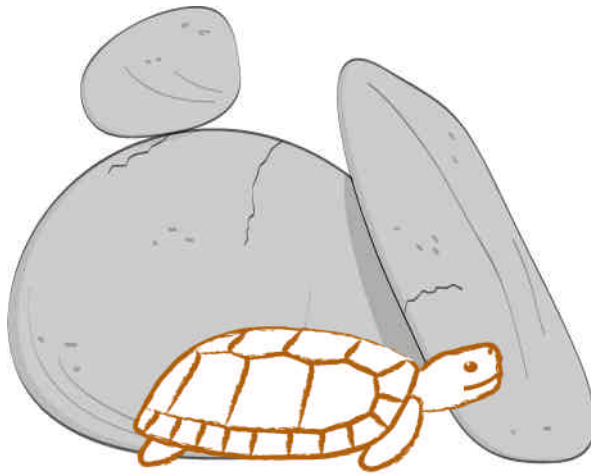


Homopus Research Foundation



Homopus Research Foundation

Annual Report 2009

*Victor Loehr
January 2010*

CONTENTS

1. INTRODUCTION AND ACHIEVEMENTS IN 2009.....	4
1.1. NEW LOGO.....	5
1.2. LONG-TERM STUDBOOK MANAGEMENT PLAN <i>HOMOPUS SIGNATUS SIGNATUS</i>	5
1.3. PROGRESS LONG-TERM FIELD STUDY <i>HOMOPUS FEMORALIS</i>	5
2. PLANS FOR 2010 AND THEREAFTER	6
3. STUDBOOK SUMMARIES	6
4. ACTUAL STUDBOOK OVERVIEWS.....	8
5. SPECIFIC INFORMATION FROM STUDBOOK PARTICIPANTS.....	20
6. NEW PUBLICATIONS	26
7. FINANCIAL REPORT	26
8. PERMIT OVERVIEW.....	27

Victor Loehr
loehr@homopus.org
<http://www.homopus.org>

1. INTRODUCTION AND ACHIEVEMENTS IN 2009

The Homopus Research Foundation aims to facilitate the long-term survival of *Homopus* in the wild, by gathering and distributing information about their biologies and by the formation of genetically healthy *ex situ* populations. In 2009, several activities contributed to this aim. The current report presents an overview of the achievements in 2009, as well as activities planned for 2010 and thereafter. Moreover, the actual studbook populations for *Homopus areolatus*, *Homopus femoralis* and *Homopus signatus signatus* are described, focussing on changes that occurred in 2009. All previous annual reports can be found on the website of the Homopus Research Foundation, <http://www.homopus.org>, section Publications.

Achievements in 2009 include the first publication of a husbandry protocol for *H. femoralis* (Chapter 6), and a preliminary analysis of effects of incubation temperature on *H. s. signatus* sex ratio (Chapter 5, locations A10 and HRF). In addition, the South African authorities resumed their involvement in the development of a long-term studbook population management plan for *H. s. signatus* (paragraph 1.2). Finally, paragraph 1.1 reports the development of a new logo for the Homopus Research Foundation, and paragraph 1.3 contains a progress report for the long-term field study on *H. femoralis*.

The 2008 annual report anticipated on several results for 2009. The following table summarises these results, confronted with results obtained in 2009. Results in the 2008 report anticipated for 2010 and later are listed in Chapter 2.

Result	Due
Studbook management plan <i>H. s. signatus</i> drawn up	31-12-2009
2009: Resumed communication with the South African authorities clarified the process through which authorities should be involved. However, this communication did not take place until October, leaving little time to finalise the required detailed plan (see paragraph 1.2). This activity was assigned a new due date 31-12-2010.	
Manuscripts submitted on:	
• Population density and dynamics of wild <i>H. s. signatus</i>	31-12-2009
• Consequences of aridification to the conservation of <i>H. s. signatus</i>	31-12-2009
• Captive husbandry of <i>H. femoralis</i>	31-12-2009
2009: All three manuscripts were submitted in 2009. The second and third papers were published in 2009. See Chapter 6.	

Further achievements that are worth listing:

- One general lecture about the work of the Homopus Research Foundation was held at the annual meeting of the European Studbook Foundation (ESF), Rotterdam Zoo, Netherlands. In addition, location A59 informed tortoise keepers and collection visitors about the work of the Homopus Research Foundation.
- The ESF was sent a back-up file of the studbook registration, including the key to the participant names and addresses. The board of the ESF has explicitly confirmed that the files will only serve as a back-up for the studbook and will not be made available to anyone.
- Amersfoort Zoo (Netherlands) requested *Homopus* spp. for the zoo collection. However, no animals were available.
- Several requests to obtain *Homopus* spp. were received from private tortoise keepers in Austria, Belgium, Germany, Italy, Netherlands and Sweden. One request for an unusually large number of tortoises for commercial farming purposes was forwarded to the South African authorities as such inquiries might stimulate poaching activity in the wild.
- Two individuals (South Africa and U.S.A.) sent photographs of *Homopus* for identification purposes. Both tortoises were *H. areolatus*.
- Invitations were received to submit papers for publication in various scientific or popular journals.
- A researcher on Las Palmas (Spain) asked for *H. signatus* to study genetics and mating selection, within the studbook. A moderately positive response remained without reply.
- At University of Applied Sciences Van Hall-Larenstein (Netherlands), a student preparing field

- studies on *Corucia zebrata* used the *Homopus* field research as an example.
- Photographic material was provided:
 - Terralog 1 (published by Chimaira, Frankfurt)
 - <http://www.waza.org> (World Association of Zoos and Aquariums)
 - <http://www.tortues.eu>
- The website of the Homopus Research Foundation was updated with minor changes (new publications, new logo, actual studbook overviews).

1.1. New logo

The logo of the Homopus Research Foundation remained unchanged from 2000 to 2009. It was relatively abstract and not easily interpreted. In order to improve the recognisability, a new logo (vector image in Adobe Illustrator) was developed in 2009. This new logo is easily associated with rock-living tortoises, and will be successful advertising the work of the Homopus Research Foundation.



1.2. Long-term studbook management plan *Homopus signatus signatus*

A draft studbook management plan for *H. s. signatus* was prepared and reviewed by all studbook participants in 2008. A summary of their comments is listed in the 2008 annual report. Because the plan includes imports of additional founders in the next decade, the draft was also sent to the South African authorities. In October 2009, the South African authorities responded that they would be prepared to review the draft management plan, but it should contain more details to allow them to assess if they should opt for a genetically valuable *ex situ* population with conservation potential (requiring circa 50 additional funders over 10 years time), or for a terrarium population with limited conservation value (requiring few additional founders). The authorities will consult stakeholders and make a well-informed decision.

Based on the South African response, the plan should answer at least the following questions:

- Why do we need an assurance population for a species that is listed (IUCN) Lower risk?
- Why is an assurance population developing outside the range country?
- How are South African stakeholders (authorities, zoos, private tortoise keepers, universities, reptile dealers) involved?
- How will we ensure proper long-term management of the captive population?
- What will be the impact of collecting 50 wild *H. s. signatus* on its conservation status?
- How will we ensure that individuals will be available for South African conservation actions?

It was not feasible to adjust the existing plan between October and December 2009. Therefore, all participants were informed about the South African response, and invited to help preparing the new plan. This will be prepared in 2010, and Paul van Sloun (Netherlands) has offered his assistance.

For the 2010 captive breeding season, the actual advice to studbook participants is continued: Participants are encouraged to discard eggs produced by F1 individuals, unless eggs will be used in experiments to shift the sex ratio towards females (e.g., incubating eggs in a strictly controlled environment at relatively high temperatures). Incubation results should be submitted for inclusion in the 2010 annual report.

1.3. Progress long-term field study *Homopus femoralis*

This study was permitted by CapeNature (South Africa). The permits require annual progress updates for CapeNature. Because this information may be informative for *Homopus* studbook participants, it will be included in the annual reports of the Homopus Research Foundation.

Based on the poor results of the December 2008 fieldwork (i.e., little tortoise activity due to late rains), fieldwork originally scheduled for September/October 2009 was postponed to February 2010. Rainfall data downloaded from the internet confirmed that September to December 2009 would not have been a suitable period for tortoise activity either. As a result from the 2008 fieldwork, a note reporting characteristics of natural *H. femoralis* nests was published in African Herp News.

2. PLANS FOR 2010 AND THEREAFTER

The table below lists results anticipated for 2010 and thereafter, with progress indicated:

Result	Due	Current status
Fieldwork conducted on <i>H. femoralis</i>	Feb-2010	In preparation, one volunteer recruited
Project proposal (schedule) and permits for long-term field study on <i>H. femoralis</i> updated	31-12-2010	Not yet started
Detailed studbook management plan <i>H. s. signatus</i> drawn up	31-12-2010	Draft has been prepared but requires more details before it can be assessed by the South African authorities.
Manuscripts submitted on:		
• Annual fluctuations of the temperature and relative humidity in the habitat of <i>H. femoralis</i>	31-12-2010	Data accumulation in progress
• Thermoregulation of wild <i>H. s. signatus</i>	31-12-2010	Data available
Studbook management plan <i>H. areolatus</i> drawn up	31-12-2011	Not yet started; due to the delayed <i>H. s. signatus</i> plan, this activity was postponed from 2010 to 2011.
Presentation held at symposium of the Herpetological Association of Africa	Jan-2011	Not yet started

3. STUDBOOK SUMMARIES

To keep the studbook registrations up to date, it is vital that all studbook participants keep the coordinator informed of any changes. In the studbooks on *H. femoralis* and *H. s. signatus*, each participant has accepted this obligation in a formal agreement between participant and coordinator. Regardless of the agreements, most participants are very motivated and inform the coordinator spontaneously when changes occur throughout the year. Others choose to wait until information is requested by the coordinator in the end of each year. However, some participants remain silent for an entire year or longer, despite repeated messages from the studbook coordinator. In order to keep track of where these communication flaws occur, the annual reports will include a list of unresponsive locations. This will make it easier for the reader to assess the validity of studbook information per location, and will facilitate the coordinator when approaching a silent participant. In 2009, no locations have been unresponsive.

Homopus areolatus

Live specimens on 1 January 2009: 50 (excluding 6 specimens lost to follow-up)

Number of locations on 1 January 2009: 10 (5 countries, 1 zoo; excluding 1 location lost to follow-up)

New registrations: 0; 1 duplicate individual (64) was removed from the studbook registration

Births: 7, at 3 locations

Deaths: 1

Live specimens on 31 December 2009: 55 (excluding 6 specimens lost to follow-up)

Number of locations on 31 December 2009: 12 (5 countries, 1 zoo; excluding 1 location lost to follow-up)

Interpretation of changes:

The studbook population grew as a result of breeding successes at three locations combined with low mortality. Besides ongoing breeding success at location A46, location A16 resumed breeding, and A44 initiated breeding. Unfortunately, one captive-bred tortoise born in 2004 died.

Several transfers of captive-bred tortoises born at location A46 that had been completed before 2009 were entered in the studbook registration. In addition, location A56 forwarded two individuals to new location A66, without notifying the studbook coordinator. Now that captive-bred individuals from location A46 (all with the same sire) are spreading among several different keepers, it is vital to maintain a central registration. Without this registration, tortoises or their offspring might be introduced in the studbook as genetically unrelated individuals.

Although breeding of *H. areolatus* was restricted to few locations, results have improved compared to 2008. In addition to locations that produced offspring, locations A10 and A45 produced eggs. The

studbook population is growing, enabling additional locations to keep and breed *H. areolatus*. However, we do not yet control the development of the captive population, as breeding results tend to be coincidental at most locations, and causes of mortality are not well understood.

Homopus femoralis

Live specimens on 1 January 2009: 7

Number of locations on 1 January 2009: 3 (2 countries)

New registrations: 0

Births: 0

Deaths: 0

Live specimens on 31 December 2009: 7

Number of locations on 31 December 2009: 3 (2 countries)

Interpretation of changes:

Breeding results obtained in 2008 (location HRF) were not continued in 2009; female 4 did not produce any eggs. However, female 6 (location A08) produced an egg (indoors) that did not develop. Husbandry and breeding of *H. femoralis* requires considerable experimenting, as experience is scarce. Husbandry conditions will be altered to maximise breeding success in 2010.

Homopus signatus signatus

Live specimens on 1 January 2009: 62 (excluding 13 specimens lost to follow-up)

Number of locations on 1 January 2009: 24 (7 countries, 1 zoo; excluding 1 location lost to follow-up)

New registrations: 0

Births: 5, at 2 locations

Deaths: 6, at 4 locations

Live specimens on 31 December 2009: 61 (excluding 13 specimens lost to follow-up)

Number of locations on 31 December 2009: 22 (5 countries, 1 zoo; excluding 1 location lost to follow-up)

Interpretation of changes:

After years of population growth, the number of individuals decreased in 2009. Mortality was high compared to previous years. Unlike other hatchlings bred at location A07, tortoise 103 did not grow and died at age 6 months. At the same location, tortoise 108 died unexpectedly. Captive-bred tortoise number 6 was found several days after it had deceased. At location A50, two apparently healthy tortoises (both captive-bred) that were housed separately died within two days. This occurred shortly after introducing long-term captive tortoise number 1 (currently alive) to one of the enclosures. The fifth captive-bred tortoise that died in 2009 also appeared healthy and died unexpectedly. The relatively high 2009 mortality takes its toll on the genetic diversity of the captive population; the founders of most deceased tortoises are not currently alive, increasing the responsibility of keepers of siblings to take proper care of the survivors. Particularly the death of female number 5 is unfortunate, as it originated from a wild sire. Although all participants will take proper care of their tortoises, the survival of offspring numbers 53, 66 (both at location A33), 75 and 76 (both at location A54) is particularly important.

The results obtained in 2009 are disappointing compared to previous years, but do not change the long-term perspectives for the studbook. *Homopus s. signatus* remains a taxon that does well in captivity and can be bred successfully. In 2009, several F1 offspring were combined to form genetically unrelated couples that might be used for F2 breeding in the next years.

4. ACTUAL STUDBOOK OVERVIEWS

Homopus areolatus: Total studbook population. MULTX are groups of unregistered specimens at locations outside of the studbook. UNKX are specimens at locations outside of the studbook. lff means that a specimen is lost to follow-up.

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
=====								
A03								
1	F	????	WILD	WILD	KRAAIFONT HRF A03	~ Jul 1997 21 Nov 1997 14 Dec 1997 9 Nov 1998	_____ I HZ0525	Transfer Transfer Transfer Death
2	F	????	WILD	WILD	KRAAIFONT HRF A03	~ Jul 1997 21 Nov 1997 14 Dec 1997 13 Aug 1999	_____ II	Transfer Transfer Transfer Death
6	M	????	MULT1	MULT2	KRAAIFONT HRF A03	???? 21 Nov 1997 14 Apr 2001 ~12 Sep 2007	_____ VI HZ0738	Hatch Transfer Loan to Death
7	M	????	WILD	WILD	ROTTERDAM A03	???? ???? 5 Jul 1998	_____ HZ0457	Transfer Loan to Death
32	F	????	WILD	WILD	A29 A03	~ Jun 2000 15 Jun 2001 16 May 2002	_____ HZ0752	Transfer Transfer Death
33	F	????	WILD	WILD	LONDON RP A03	???? 23 Dec 2001 28 Jul 2003	_____ HZ0793	Transfer Transfer Death
45	M	14 Dec 1999	58	UNK5	A46 HRF A03	14 Dec 1999 4 Nov 2004 5 Nov 2004 25 Mar 2006	_____ V3 HZ0989	Hatch Transfer Loan to Death

Totals: 3.4.0 (7)

A10								
4	F	????	MULT1	MULT2	KRAAIFONT HRF A10	???? 21 Nov 1997 27 Oct 2004	_____ IV	Hatch Transfer Loan to
5	M	????	MULT1	MULT2	KRAAIFONT HRF A10	???? 21 Nov 1997 27 Oct 2004	_____ V	Hatch Transfer Loan to
62	F	~25 Nov 2007	5	4	A10 HRF	~25 Nov 2007 ~25 Nov 2007	_____ _____	Hatch Ownership

Totals: 1.2.0 (3)

A12								
8	F	????	WILD	WILD	KRAAIFONT A12	???? ~16 Sep 1999 19 Mar 2000	_____ A1	Transfer Transfer Death
9	F	????	WILD	WILD	A13 A12	???? ~16 Sep 1999 30 Apr 2000	_____ BLACKY	Transfer Transfer Death
13	M	????	WILD	WILD	KRAAIFONT A12	???? ~16 Sep 1999 15 Feb 2000	_____ A7	Transfer Transfer Death

15	F	????	WILD	WILD	A13 A12	???? ~16 Sep 1999 15 Feb 2000	_____ A4	Transfer Transfer Death
19	?	5 Feb 2000	MULT3	11	A12	5 Feb 2000 5 Feb 2000	_____	Hatch Death
20	?	16 Mar 2000	MULT3	11	A12	16 Mar 2000 16 Mar 2000	_____	Hatch Death
21	?	16 Mar 2000	MULT3	11	A12	16 Mar 2000 16 Mar 2000	_____	Hatch Death
Totals: 1.3.3 (7)								

A16

16	M	????	WILD	WILD	A16	30 Aug 1994	_____	Transfer
17	F	????	WILD	WILD	A16	30 Aug 1994	_____	Transfer
18	M	23 May 2000	16	17	A16	23 May 2000 30 Mar 2003	_____	Hatch Death
38	F	5 Apr 2003	16	17	A16	5 Apr 2003 28 Nov 2006	_____	Hatch Death
39	M	9 Apr 2003	16	17	A16	9 Apr 2003	_____	Hatch
48	M	23 Mar 2004	16	17	A16	23 Mar 2004	_____	Hatch
49	F	25 Mar 2004	16	17	A16	25 Mar 2004	_____	Hatch
50	F	8 Aug 2004	16	17	A16	8 Aug 2004	_____	Hatch
51	M	19 Aug 2004	16	17	A16	19 Aug 2004	_____	Hatch
52	F	25 Aug 2004	16	17	A16	25 Aug 2004	_____	Hatch
54	M	10 Jun 2005	16	17	A16	10 Jun 2005	_____	Hatch
55	M	27 Jun 2005	16	17	A16	27 Jun 2005	_____	Hatch
56	F	6 Oct 2005	16	17	A16	6 Oct 2005	_____	Hatch
57	F	3 Nov 2005	16	17	A16	3 Nov 2005	_____	Hatch
61	?	17 Dec 2006	16	17	A16	17 Dec 2006 ~ 9 May 2007	_____	Hatch Death
93	?	7 Jul 2009	16	17	A16	7 Jul 2009	_____	Hatch
94	?	7 Jul 2009	16	17	A16	7 Jul 2009	_____	Hatch
Totals: 7.7.3 (17)								

A26

27	M	????	WILD	WILD	KRAAIFONT A26	???? 9 Jul 2001	_____	Transfer ltf Transfer
28	F	????	WILD	WILD	KRAAIFONT A26	???? 9 Jul 2001	_____	Transfer ltf Transfer
Totals: 1.1.0 (2)								

A27

29	M	????	WILD	WILD	KRAAIFONT A27	???? 9 Jul 2001 9 Nov 2001	_____	Transfer Transfer Death
30	F	????	WILD	WILD	KRAAIFONT A27	???? 9 Jul 2001 11 Nov 2001	_____	Transfer Transfer Death
Totals: 1.1.0 (2)								

A37

22	M	????	WILD	WILD	A20	????	_____	Transfer
					A21	17 Oct 2000	_____	Transfer
					A37	15 Sep 2002	1	Transfer
23	F	????	WILD	WILD	A20	????	_____	Transfer
					A21	17 Oct 2000	_____	Transfer
					A37	15 Sep 2002	2	Transfer
24	F	~ 1993	UNK1	UNK2	A20	~ 1993	_____	Hatch
					A21	17 Oct 2000	_____	Transfer
					A37	15 Sep 2002	3	Transfer
46	?	30 Sep 2004	22	24	A37	30 Sep 2004	_____	Hatch

Totals: 1.2.1 (4)

A42

35	M	9 Jul 2002	16	17	A16	9 Jul 2002	_____	Hatch
					A42	~30 Sep 2005	_____	Loan to

Totals: 1.0.0 (1)

A43

10	M	????	WILD	WILD	A13	????	_____	Transfer
					A12	~16 Sep 1999	ERNST	Transfer
					A43	~ May 2004	_____	ltf Loan to
11	F	????	WILD	WILD	KRAAIFONT	????	_____	Transfer
					A12	~16 Sep 1999	A5	Transfer
					A43	~ May 2004	_____	ltf Loan to
12	F	????	WILD	WILD	KRAAIFONT	????	_____	Transfer
					A12	~16 Sep 1999	A6	Transfer
					A43	~ May 2004	_____	ltf Loan to
14	F	????	WILD	WILD	KRAAIFONT	????	_____	Transfer
					A12	16 Sep 1999	BABY	Transfer
					A43	~ May 2004	_____	ltf Loan to

Totals: 1.3.0 (4)

A44

37	F	7 Aug 2003	5	4	HRF	7 Aug 2003	IV-3	Hatch
					A10	21 Aug 2004	_____	Loan to
					HRF	27 Oct 2004	IV-3	Transfer
					A44	31 Oct 2004	ESMERA	Loan to
47	M	~ Jun 1993	UNK3	UNK4	A47	~ Jun 1993	_____	Hatch
					A48	~ 2000	_____	Transfer
					A44	21 Nov 2004	HUGO	Transfer

Totals: 1.1.0 (2)

A45

25	F	15 Sep 2001	5	4	HRF	15 Sep 2001	IV-1	Hatch
					A10	24 May 2003	_____	Loan to
					A16	4 Dec 2004	_____	Loan to
					A45	27 Feb 2005	_____	Loan to
34	M	30 Jun 2002	16	17	A16	30 Jun 2002	_____	Hatch
					A45	27 Feb 2005	_____	Loan to
53	M	12 Jun 2005	34	25	A45	12 Jun 2005	_____	Hatch

Totals: 2.1.0 (3)

A46

58	M	????	WILD	WILD	A46	9 Sep 1997	03	Transfer
59	F	????	WILD	WILD	A46	9 Sep 1997	01	Transfer
60	F	????	WILD	WILD	A46	25 Mar 1999	02	Transfer

84	?	~ 7 Feb 2008	58	MULT4	A46	~ 7 Feb 2008	_____	Hatch
85	?	~ 7 Feb 2008	58	MULT4	A46	~ 7 Feb 2008	_____	Hatch
86	?	~ 7 Feb 2008	58	MULT4	A46	~ 7 Feb 2008	_____	Hatch
87	?	~25 Feb 2008	58	MULT4	A46	~25 Feb 2008	_____	Hatch
88	?	5 Feb 2009	58	MULT4	A46	5 Feb 2009	_____	Hatch
89	?	6 Feb 2009	58	MULT4	A46	6 Feb 2009	_____	Hatch
91	?	12 Feb 2009	58	MULT4	A46	12 Feb 2009	_____	Hatch
92	?	~ 7 Mar 2009	58	MULT4	A46	~ 7 Mar 2009	_____	Hatch
Totals: 1.2.8 (11)								

A48								
90	?	3 Feb 2009	47	37	A44	3 Feb 2009	_____	Hatch
					A48	3 Feb 2009	_____	Ownership
						10 Feb 2009	_____	Transfer
Totals: 0.0.1 (1)								

A54								
79	?	~15 Mar 2007	58	MULT4	A46	~15 Mar 2007	_____	Hatch
					A54	~15 Jun 2008	_____	Transfer
80	?	~15 Mar 2007	58	MULT4	A46	~15 Mar 2007	_____	Hatch
					A54	~15 Jun 2008	_____	Transfer
						15 Oct 2008	_____	Death
81	?	~15 Mar 2007	58	MULT4	A46	~15 Mar 2007	_____	Hatch
					A54	~15 Jun 2008	_____	Transfer
82	?	~15 Mar 2007	58	MULT4	A46	~15 Mar 2007	_____	Hatch
					A54	~15 Jun 2008	_____	Transfer
83	?	~15 Mar 2007	58	MULT4	A46	~15 Mar 2007	_____	Hatch
					A54	~15 Jun 2008	_____	Transfer
						15 Oct 2008	_____	Death
Totals: 0.0.5 (5)								

A56								
67	F	8 Apr 2004	58	MULT4	A46	8 Apr 2004	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer
69	M	~22 Apr 2004	58	MULT4	A46	~22 Apr 2004	_____	Hatch
					A56	~21 May 2006	_____	Transfer
70	F	14 Mar 2004	58	MULT4	A46	14 Mar 2004	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer
						8 May 2009	_____	Death
71	F	~ 6 Mar 2004	58	MULT4	A46	~ 6 Mar 2004	_____	Hatch
					A56	~21 May 2006	_____	Transfer
72	M	14 Mar 2004	58	MULT4	A46	14 Mar 2004	_____	Hatch
					A56	~21 May 2006	_____	Transfer
73	M	14 Mar 2004	58	MULT4	A46	14 Mar 2004	_____	Hatch
					A56	~21 May 2006	_____	Transfer
74	M	~11 Feb 2004	58	MULT4	A46	~11 Feb 2004	_____	Hatch
					A56	~21 May 2006	_____	Transfer
75	M	6 Jan 2004	58	59	A46	6 Jan 2004	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer
76	F	11 Jan 2004	58	59	A46	11 Jan 2004	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer

78	F	23 Mar 2005	58	MULT4	A46	23 Mar 2005	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer

Totals: 5.4.1 (10)

A66

68	M	8 Apr 2004	58	MULT4	A46	8 Apr 2004	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer
					A66	18 Sep 2009	_____	Transfer

77	F	14 Feb 2005	58	MULT4	A46	14 Feb 2005	_____	Hatch
					A56	~15 Jun 2008	_____	Transfer
					A66	18 Sep 2009	_____	Transfer

Totals: 1.1.0 (2)

HRF

3	?	????	MULT1	MULT2	KRAAIFONT HRF	???? 21 Nov 1997 29 Oct 1999	_____	Hatch Transfer Death
26	?	15 Oct 2001	5	4	HRF	15 Oct 2001 26 Apr 2002	IV-2	Hatch Death
31	?	11 Nov 2001	5	4	HRF	11 Nov 2001 11 Nov 2001	_____	Hatch Death
36	?	12 Oct 2002	5	4	HRF	12 Oct 2002 12 Oct 2002	_____	Hatch Death

Totals: 0.0.4 (4)

WUPPERTAL

40	M	????	WILD	WILD	WUPPERTAL	28 Mar 1991	91586A	Transfer
41	M	????	WILD	WILD	WUPPERTAL	28 Mar 1991	91586B	Transfer
42	F	22 Feb 1999	58	MULT4	A46 HRF WUPPERTAL	22 Feb 1999 4 Nov 2004 9 Nov 2004 14 Apr 2005	_____ NOMARK 91586C	Hatch Transfer Loan to Death
43	F	21 Dec 1999	58	MULT4	A46 HRF WUPPERTAL	21 Dec 1999 4 Nov 2004 9 Nov 2004 26 Mar 2005	_____ CR1 91586D	Hatch Transfer Loan to Death
44	F	20 Dec 2001	58	MULT4	A46 HRF WUPPERTAL	20 Dec 2001 4 Nov 2004 9 Nov 2004 4 Nov 2005	_____ CL2 91586E	Hatch Transfer Loan to Death

Totals: 2.3.0 (5)

=====

TOTALS: 29.36.25 (90)

Homopus femoralis: Total studbook population.

=====

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
--------	-----	------------	------	-----	----------	------	----------	-------

=====

A08

1	M	????	WILD	WILD	A28 HRF A08	~ Jan 2001 23 Dec 2001 17 Apr 2002	_____ I	Transfer Loan to Loan to
6	F	????	WILD	WILD	BEAUF W HRF A08	16 Mar 2006 19 Mar 2006 2 Apr 2006	NONE _____ _____	Capture Transfer Loan to

Totals: 1.1.0 (2)

A10									
2	M	????	WILD	WILD	A28	~ Jan 2001	_____	Transfer	
					A08	23 Dec 2001	_____	Loan to	
					A10	30 Jul 2006	_____	Loan to	
5	F	????	WILD	WILD	BEAUF W	16 Mar 2006	NONE	Capture	
					HRF	19 Mar 2006	_____	Transfer	
					A10	30 Jul 2006	_____	Loan to	
Totals: 1.1.0 (2)									

HRF									
3	M	????	WILD	WILD	A28	~ Jan 2001	_____	Transfer	
					HRF	23 Dec 2001	III	Loan to	
4	F	????	WILD	WILD	BEAUF W	16 Mar 2006	NONE	Capture	
					HRF	19 Mar 2006	_____	Transfer	
7	M	7 Jun 2008	3	4	HRF	7 Jun 2008	_____	Hatch	
Totals: 2.1.0 (3)									

TOTALS: 4.3.0 (7)									

Homopus signatus signatus: Total studbook population. MULT1 are specimens 18 and 19, MULT2 specimens 20 and 21. UNK1 and UNK2 are unknown specimens outside of the studbook. ltf means that a specimen is lost to follow-up. Specimen number 95 is inbred and not available for further breeding.

=====

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event	
--------	-----	------------	------	-----	----------	------	----------	-------	--

=====

A07									
35	M	????	WILD	WILD	SPRINGBOK	4 Oct 2001	NONE	Capture	
					HRF	6 Oct 2001	_____	Transfer	
					A07	16 Dec 2001	_____	Loan to	
36	F	????	WILD	WILD	SPRINGBOK	3 Oct 2001	NONE	Capture	
					HRF	6 Oct 2001	_____	Transfer	
					A07	16 Dec 2001	_____	Loan to	
97	F	15 Sep 2007	35	36	A07	15 Sep 2007	_____	Hatch	
					HRF	15 Sep 2007	_____	Ownership	
102	M	28 Jun 2008	35	36	A07	28 Jun 2008	_____	Hatch	
					HRF	28 Jun 2008	_____	Ownership	
103	M	10 Aug 2008	35	36	A07	10 Aug 2008	_____	Hatch	
					HRF	10 Aug 2008	_____	Ownership	
					A07	27 Feb 2009	_____	Death	
106	?	20 May 2009	35	36	A07	20 May 2009	_____	Hatch	
					HRF	20 May 2009	_____	Ownership	
107	?	21 Jul 2009	35	36	A07	21 Jul 2009	_____	Hatch	
					HRF	21 Jul 2009	_____	Ownership	
108	?	~27 Sep 2009	35	36	A07	~27 Sep 2009	_____	Hatch	
					HRF	~27 Sep 2009	_____	Ownership	
					A07	~15 Dec 2009	_____	Death	
Totals: 3.2.3 (8)									

A08									
42	F	20 Aug 2002	1	2	HRF	20 Aug 2002	II-11	Hatch	
					A08	19 Apr 2003	_____	Loan to	
73	M	2 Aug 2005	37	38	HRF	2 Aug 2005	HSS73	Hatch	
					A08	18 Apr 2009	_____	Loan to	

95	M	18 Sep 2007	41	42	A08	18 Sep 2007	_____	Hatch
					HRF	18 Sep 2007	_____	Ownership
101	?	10 Nov 2008	41	42	A08	10 Nov 2008	_____	Hatch
					HRF	10 Nov 2008	_____	Ownership
					A08	~24 Nov 2008	_____	Death

Totals: 2.1.1 (4)

A10

6	M	8 Nov 1996	1	3	HRF	8 Nov 1996	III-2	Hatch
					A10	4 Aug 2001	_____	Loan to
					A31	7 May 2002	_____	Loan to
					A10	8 Dec 2002	_____	Loan to
						5 Sep 2009	_____	Death
7	F	24 Dec 1996	1	3	HRF	24 Dec 1996	III-3	Hatch
					A06	22 Nov 1998	_____	Loan to
					A07	5 Jul 2000	_____	Loan to
					A18	14 Dec 2001	_____	Loan to
					A31	6 May 2002	_____	Loan to
					A10	8 Dec 2002	_____	Loan to
44	M	31 Oct 2002	35	36	A07	31 Oct 2002	_____	Hatch
					HRF	31 Oct 2002	_____	Ownership
					A10	24 Jul 2004	_____	Loan to
77	F	13 Jul 2006	44	7	A10	13 Jul 2006	_____	Hatch
					HRF	13 Jul 2006	_____	Ownership
80	?	10 Sep 2006	44	7	A10	10 Sep 2006	_____	Hatch
					HRF	10 Sep 2006	_____	Ownership
					A10	1 Mar 2007	_____	Death
81	?	3 Sep 2006	44	7	A10	3 Sep 2006	_____	Hatch
					HRF	3 Sep 2006	_____	Ownership
					A10	8 Apr 2008	_____	Death
93	M	30 Jul 2007	44	7	A10	30 Jul 2007	_____	Hatch
					HRF	30 Jul 2007	_____	Ownership
94	M	27 Aug 2007	44	7	A10	27 Aug 2007	_____	Hatch
					HRF	27 Aug 2007	_____	Ownership

Totals: 4.2.2 (8)

A12

45	?	~ Jun 2002	MULT1	20	A12	~ Jun 2002	_____	Hatch
						~ Jun 2002	_____	Death
46	?	~ Jun 2002	MULT1	20	A12	~ Jun 2002	_____	Hatch
						~ Jun 2002	_____	Death
48	?	~ Jul 2002	MULT1	20	A12	~ Jul 2002	_____	Hatch
						~ Jul 2002	_____	Death
49	?	~ Jul 2002	MULT1	20	A12	~ Jul 2002	_____	Hatch
						~ Jul 2002	_____	Death

Totals: 0.0.4 (4)

A16

11	M	10 Nov 1997	1	3	HRF	10 Nov 1997	III-4	Hatch
					A06	22 Nov 1998	_____	Loan to
					A07	5 Jul 2000	_____	Loan to
					A16	16 Sep 2000	_____	Loan to
14	M	22 Oct 1998	1	3	HRF	22 Oct 1998	III-5	Hatch
					A07	22 Nov 1998	_____	Loan to
					A16	16 Sep 2000	_____	Loan to

Totals: 2.0.0 (2)

A18								
15	F	20 Sep 1999	1	2	HRF	20 Sep 1999	II-6	Hatch
					A31	6 May 2002	_____	Loan to
					A18	8 Dec 2002	_____	Loan to
69	M	9 May 2005	37	38	HRF	9 May 2005	HSS69	Hatch
					A33	28 May 2006	NURI	Loan to
					A18	3 Sep 2007	_____	Loan to
Totals: 1.1.0 (2)								

A25								
3	F	????	WILD	WILD	SPRINGBOK	26 Sep 1995	NONE	Capture
					HRF	30 Sep 1995	III	Transfer
					A25	12 Jun 2004	_____	Loan to
						22 Aug 2008		Death
Totals: 0.1.0 (1)								

A31								
22	M	19 Jun 2000	1	2	HRF	19 Jun 2000	II-7	Hatch
					A31	6 May 2002	_____	Loan to
						14 Sep 2002		Death
29	?	15 Jul 2001	1	3	HRF	15 Jul 2001	III-9	Hatch
					A31	6 May 2002	_____	Loan to
						14 Aug 2002		Death
Totals: 1.0.1 (2)								

A33								
53	F	20 Jul 2003	13	5	HRF	20 Jul 2003	030720	Hatch
					A51	16 Sep 2006	_____	Loan to
					A33	30 Dec 2007	_____	Loan to
63	M	6 Jul 2004	35	36	A07	6 Jul 2004	_____	Hatch
					HRF	6 Jul 2004	_____	Ownership
					A51	14 Aug 2006	_____	Loan to
					A33	30 Dec 2007	_____	Loan to
66	F	6 Aug 2004	13	5	HRF	6 Aug 2004	040806	Hatch
					A51	2 Jun 2006	_____	Loan to
					A33	30 Dec 2007	_____	Loan to
Totals: 1.2.0 (3)								

A35								
31	M	3 Aug 2001	1	2	HRF	3 Aug 2001	II-10	Hatch
					A31	6 May 2002	_____	Loan to
					A35	30 Nov 2002	_____	Loan to
						~ Jul 2006		Death
34	M	30 Sep 2001	1	3	HRF	30 Sep 2001	III-11	Hatch
					A31	6 May 2002	_____	Loan to
					A35	30 Nov 2002	_____	Loan to
						~ 1 Apr 2007		Death
Totals: 2.0.0 (2)								

A36								
12	M	21 Nov 1997	1	2	HRF	21 Nov 1997	II-4	Hatch
					A07	22 Nov 1998	_____	Loan to
					A18	14 Dec 2001	_____	Loan to
					A31	6 May 2002	_____	Loan to
					A36	8 Dec 2002	_____	Loan to
						20 Oct 2003		Death
Totals: 1.0.0 (1)								

A37

33	M	19 Aug 2001	1	3	HRF A31 A37	19 Aug 2001 6 May 2002 11 Dec 2002 26 Dec 2003	III-10 _____ _____ _____	Hatch Loan to Loan to Death
60	F	????	WILD	WILD	A37	~15 Mar 2003	_____	Transfer
61	M	7 Oct 2003	WILD	60	A37	7 Oct 2003	_____	Hatch
62	F	5 Jun 2004	WILD	60	A37	5 Jun 2004	_____	Hatch
67	M	5 Aug 2004	WILD	60	A37	5 Aug 2004	_____	Hatch
82	M	26 Dec 2005	25	60	A37 HRF	26 Dec 2005 26 Dec 2005	_____ _____	Hatch Ownership
83	?	~15 Jan 2006	25	60	A37	~15 Jan 2006 ~15 Jan 2006	_____ _____	Hatch Death
84	?	~15 Feb 2006	25	60	A37	~15 Feb 2006 ~15 May 2006	_____ _____	Hatch Death
85	?	~15 Mar 2006	25	60	A37	~15 Mar 2006 ~20 Mar 2006	_____ _____	Hatch Death
86	M	~20 Apr 2006	25	60	A37	~20 Apr 2006	_____	Hatch
87	M	~15 Oct 2005	25	60	A37	~15 Oct 2005	_____	Hatch
88	M	~15 Nov 2005	25	60	A37 HRF	~15 Nov 2005 ~15 Nov 2005	_____ _____	Hatch Ownership
89	M	18 Jan 2007	25	60	A37	18 Jan 2007	_____	Hatch
92	M	10 Aug 2007	25	60	A37 HRF	10 Aug 2007 10 Aug 2007	_____ _____	Hatch Ownership
98	M	29 Dec 2007	25	60	A37	29 Dec 2007	_____	Hatch
Totals: 10.2.3 (15)								

A39

40	M	2 Jul 2002	1	3	HRF A39	2 Jul 2002 12 Apr 2003	III-13 _____	Hatch Loan to
Totals: 1.0.0 (1)								

A40

43	F	29 Sep 2002	1	2	A40	6 Jun 2003	_____	Loan to
91	M	3 Aug 2007	37	38	HRF A40	3 Aug 2007 14 Nov 2009	_____ _____	Hatch Loan to
Totals: 1.1.0 (2)								

A42

54	F	5 Sep 2003	1	3	HRF A42	5 Sep 2003 7 Nov 2003	III-17 THEODO	Hatch Loan to
55	?	3 Sep 2003	1	2	HRF A42	3 Sep 2003 7 Nov 2003 13 Mar 2004	II-14 _____ _____	Hatch Loan to Death
Totals: 0.1.1 (2)								

A43

17	M	????	WILD	WILD	A12 A43	8 Sep 1999 ~ May 2004	_____ _____	Transfer ltf Loan to
18	M	????	WILD	WILD	SPRINGBOK A12 A43	~16 Sep 1999 ~16 Sep 1999 ~ May 2004	NONE VIEJO _____ _____	Capture Transfer ltf Loan to

19	M	????	WILD	WILD	SPRINGBOK A12 A43	~16 Sep 1999 ~16 Sep 1999 ~ May 2004	NONE STUMPY _____	Capture Transfer ltf Loan to
20	F	????	WILD	WILD	SPRINGBOK A12 A43	~16 Sep 1999 ~16 Sep 1999 ~ May 2004	NONE MIDGE _____	Capture Transfer ltf Loan to
21	F	????	WILD	WILD	SPRINGBOK A12 A43	~16 Sep 1999 ~16 Sep 1999 ~ May 2004	NONE BERTHA _____	Capture Transfer ltf Loan to
27	?	17 Oct 2000	MULT1	MULT2	A12 A43	17 Oct 2000 ~ May 2004	SASHI _____	Hatch ltf Loan to
28	?	15 Nov 2000	MULT1	MULT2	A12 A43	15 Nov 2000 ~ May 2004	PEANUT _____	Hatch ltf Loan to
30	?	26 Jul 2001	MULT1	20	A12 A43	26 Jul 2001 ~ May 2004	_____ _____	Hatch ltf Loan to
32	?	10 Aug 2001	MULT1	20	A12 A43	10 Aug 2001 ~ May 2004	_____ _____	Hatch ltf Loan to
47	M	????	UNK1	UNK2	A12 A43	~ Jan 2002 ~ May 2004	ERNST _____	Transfer ltf Loan to
56	?	22 Aug 2003	MULT1	20	A12 A43	22 Aug 2003 ~ May 2004	_____ _____	Hatch ltf Loan to
57	?	17 Sep 2003	MULT1	20	A12 A43	17 Sep 2003 ~ May 2004	_____ _____	Hatch ltf Loan to
58	?	20 Sep 2003	MULT1	20	A12 A43	20 Sep 2003 ~ May 2004	_____ _____	Hatch ltf Loan to
Totals: 4.2.7 (13)								

A50

1	M	????	WILD	WILD	SPRINGBOK HRF A25 A50	27 Sep 1995 30 Sep 1995 12 Jun 2004 8 Mar 2009	NONE I _____ _____	Capture Transfer Loan to Loan to
5	F	27 Feb 1996	WILD	3	HRF A50	27 Feb 1996 16 Sep 2006 24 Mar 2009	III-1 _____ _____	Hatch Loan to Death
13	M	26 Sep 1998	1	2	HRF A07 A18 A31 HRF A50	26 Sep 1998 22 Nov 1998 14 Dec 2001 6 May 2002 8 Dec 2002 16 Sep 2006	II-5 _____ _____ _____ II-5 _____	Hatch Loan to Loan to Loan to Transfer Loan to
64	M	29 Jul 2004	1	3	HRF A50	29 Jul 2004 17 Apr 2005 25 Mar 2009	III-19 _____ _____	Hatch Loan to Death
Totals: 3.1.0 (4)								

A52

70	M	24 Jun 2005	1	3	A25 HRF A52	24 Jun 2005 24 Jun 2005 5 Jan 2007 11 Jun 2007	DOPPPIE _____ _____ _____	Hatch Ownership Loan to Death
Totals: 1.0.0 (1)								

A54

75	M	9 May 2006	13	5	HRF A54	9 May 2006 24 Mar 2007	_____ _____	Hatch Loan to
----	---	------------	----	---	------------	---------------------------	----------------	------------------

76	F	20 Jun 2006	13	5	HRF A54	20 Jun 2006 24 Mar 2007	V-4 _____	Hatch Loan to
Totals: 1.1.0 (2)								

A55								
74	M	31 Jul 2005	1	3	A25 HRF A55	31 Jul 2005 31 Jul 2005 24 Mar 2007	_____ _____ _____	Hatch Ownership Loan to
96	F	30 Jul 2007	35	36	A07 HRF A61 A64 A55	30 Jul 2007 30 Jul 2007 13 Apr 2008 10 May 2009 12 Sep 2009	_____ _____ _____ _____ _____	Hatch Ownership Loan to Loan to Loan to
Totals: 1.1.0 (2)								

A57								
10	M	22 Oct 1997	1	2	HRF A10 A31 A33 A57	22 Oct 1997 4 Aug 2001 7 May 2002 8 Nov 2002 6 Apr 2008	II-3 _____ _____ UHURU _____	Hatch Loan to Loan to Loan to Loan to
79	F	9 Aug 2006	37	38	HRF A57	9 Aug 2006 5 Nov 2009	_____ _____	Hatch Loan to
Totals: 1.1.0 (2)								

A58								
71	M	25 Jun 2005	44	7	A10 HRF A58	25 Jun 2005 25 Jun 2005 6 May 2008	_____ _____ _____	Hatch Ownership Loan to
Totals: 1.0.0 (1)								

A59								
51	M	1 Jul 2003	1	2	HRF A41 A59	1 Jul 2003 2 Nov 2003 13 Sep 2008	II-13 _____ _____	Hatch Loan to Loan to
Totals: 1.0.0 (1)								

A60								
41	M	25 Jul 2002	1	3	HRF A08 A60	25 Jul 2002 19 Apr 2003 12 Oct 2009	III-14 _____ _____	Hatch Loan to Loan to
68	M	14 Aug 2004	35	36	A07 HRF A61 A60	14 Aug 2004 15 Aug 2004 8 Oct 2006 18 Sep 2008	_____ _____ _____ _____	Hatch Ownership Loan to Loan to
Totals: 2.0.0 (2)								

A62								
25	M	12 Sep 2000	1	3	HRF A31 A37 A62	12 Sep 2000 6 May 2002 11 Dec 2002 ~ 9 Oct 2008 2 Jan 2009	III-8 _____ _____ _____ _____	Hatch Loan to Loan to Loan to Death
Totals: 1.0.0 (1)								

A63								
78	M	10 Jun 2006	44	7	A10 HRF A63	10 Jun 2006 10 Jun 2006 7 Mar 2009	_____ _____ _____	Hatch Ownership Loan to
Totals: 1.0.0 (1)								

A64

59	M	10 Jun 2004	1	3	HRF	10 Jun 2004	III-18	Hatch
					A61	17 Apr 2005	_____	Loan to
					A64	10 May 2009	_____	Loan to

Totals: 1.0.0 (1)

A65

72	M	24 Jul 2005	MULT3	MULT4	HRF	24 Jul 2005	?-1	Hatch
					A65	17 Oct 2009	_____	Loan to

Totals: 1.0.0 (1)

HRF

2	F	????	WILD	WILD	SPRINGBOK HRF	26 Sep 1995 30 Sep 1995 14 May 2004	NONE II	Capture Transfer Death
4	M	????	WILD	WILD	SPRINGBOK HRF	28 Sep 1995 30 Sep 1995 24 Dec 1995	NONE IV	Capture Transfer Death
8	?	26 Jan 1997	1	2	HRF	2 Feb 1997		Death
9	F	30 Nov 1996	1	2	HRF	30 Nov 1996	II-1	Hatch
16	?	4 Oct 1999	1	3	HRF	4 Oct 1999 4 Oct 1999	III-6	Hatch Death
23	?	19 Jul 2000	1	2	HRF	19 Jul 2000 29 Jun 2001	II-8	Hatch Death
24	?	2 Aug 2000	1	3	HRF	2 Aug 2000 2 Aug 2000	III-7	Hatch Death
37	M	????	WILD	WILD	SPRINGBOK HRF A25 HRF	3 Oct 2001 6 Oct 2001 6 Oct 2001 12 Jun 2004	NONE _____ _____ 0612-I	Capture Transfer Loan to Transfer
38	F	????	WILD	WILD	SPRINGBOK HRF A25 HRF	3 Oct 2001 6 Oct 2001 6 Oct 2001 12 Jun 2004	NONE _____ _____ 612-II	Capture Transfer Loan to Transfer
39	?	11 Jun 2002	1	3	HRF	11 Jun 2002 20 Jun 2002	III-12	Hatch Death
90	?	29 May 2007	37	38	HRF	29 May 2007 8 Jul 2007	_____ _____	Hatch Death
99	M	21 May 2008	37	38	HRF	21 May 2008	_____	Hatch
100	M	24 Jun 2008	37	38	HRF	24 Jun 2008	_____	Hatch
104	?	4 Jun 2009	37	38	HRF	4 Jun 2009	_____	Hatch
105	?	27 Jul 2009	37	9	HRF	27 Jul 2009	_____	Hatch

Totals: 4.3.8 (15)

PRAHA

50	M	17 Jun 2003	1	3	HRF PRAHA	17 Jun 2003 20 Dec 2003	III-15 _____	Hatch Loan to
52	F	9 Jul 2003	1	3	HRF PRAHA	9 Jul 2003 20 Dec 2003	III-16 _____	Hatch Loan to
65	M	31 Jul 2004	35	36	A07 HRF PRAHA	31 Jul 2004 31 Jul 2004 31 Aug 2006	_____ _____ _____	Hatch Ownership Loan to

Totals: 2.1.0 (3)

WUPPERTAL								
26	F	7 Oct 2000	1	2	HRF	7 Oct 2000	II-9	Hatch
					A31	6 May 2002	_____	Loan to
					WUPPERTAL	18 Dec 2002	_____	Loan to
						2 Jun 2008	_____	Death
Totals: 0.1.0 (1)								
=====								
TOTALS: 54.24.30 (108)								

5. SPECIFIC INFORMATION FROM STUDBOOK PARTICIPANTS

Location A08

During summer, *H. femoralis* was housed outdoors in a naturally decorated enclosure covered with glass. The tortoises appeared to do well.

Location A10

In order to alter the sex ratio for offspring *H. s. signatus*, I changed the set point of the incubator's temperature controller and I installed a new heat cable (increased wattage to provide sufficient heat to reach the set temperature). The set point was increased from 32.5°C to 33.5°C to increase the female/male ratio of the offspring. This resulted in a temperature of 33.5-34.0°C in the incubator (overall) with peaks up to 35°C for a very short time for some days when the set point of the temperature controller changed from night time (29°C) to daytime (33.5°C). In addition, the diurnal cycle was altered. Previously, day and night time were both 12 hours. In the new situation, day time was 18 hours and night time was 8 hours.

The new incubation method resulted in two dead (fully developed, with a very small yolk sack) *H. s. signatus* offspring when manually opening the eggs. The same problem occurred with *H. areolatus* incubated in the same incubator.

Location A16

The following photographs show *H. areolatus* number 17 producing a clutch of two eggs (10 g each), and one of the eggs hatching (hatchling weight 6 g).



Location A33

The male *H. s. signatus* has started courtship behaviour, i.e., it has initiated following the largest female. In March, I found an egg in a retreat (not buried), but it is uncertain when it was produced, as the females did not show increased activity. The egg was incubated in the same substrate that is in the enclosure, at 31°C. It did not develop and may not have been fertile.

Location A37

While location HRF may keep up to three male *H. s. signatus* in one enclosure for several years after hatching, males at location A37 start biting one another within one year. Causes and patterns of agonistic behaviour between male *H. s. signatus* remain poorly understood.

Location A42

Homopus s. signatus female number 35, born on 2 July 2002, had the following measurements on 29 November: Length 96 mm; width 74 mm; height 35 mm; body mass 164 g

Location A44

The female *H. areolatus* laid five eggs after oxytocin injection on 16 November 2008. The tortoise was treated because it no longer fed or moved. It normally weighs circa 280 g, but after laying the eggs it weighed circa 240 g and needed more than half a year to recover. The eggs were probably laid too early; two broke during oviposition. One offspring *H. areolatus* was born on 3 February 2009 after an incubation period of just 79 days at 30.5°C. All eggs were incubated in a *Jäger Kunstglucke*. They were placed on top of 2-3 mm Vermiculite. The Vermiculite was made as moist as possible without it clumping. In addition, a bowl of water was added to the *Jäger Kunstglucke* so that the relative humidity varied between 80-90%. Water was added to the Vermiculite once a week; the eggs were placed in the incubator and the Vermiculite was mixed with water. After this, the eggs were placed on top of the Vermiculite again. In the middle of the incubation period, the Vermiculite was replaced by new Vermiculite. Due to moving in February and November 2009, the offspring was transferred to a new location 7 days after hatching.

On 13 December 2009, the female laid a clutch of four eggs without any complications. After one week (20 December) the female already regained its normal 2009 weight (circa 290 g) and appeared healthy. After nine days, blood vessels could be seen in all four eggs by candling, so they are fertile.

In 2009, several attempts were made to keep the male and female *H. areolatus* together. This was unsuccessful. After two days of mating, the female tried to escape from the male. Subsequently, the male became very aggressive towards the female and bit her tail and forelimbs to bleeding. Both tortoises were placed together every 4-6 weeks for just two days. Mating attempts could be seen most of the time.

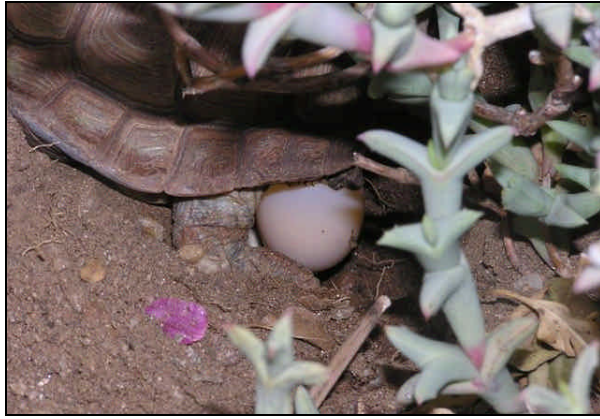
Location A46

Some interesting observations were made on the adult group of *H. areolatus*. Both females remain active during the whole year. Only during very cold spells they hide in their shelters. During summer, they are inactive during longer dry and/or hot periods, but they become active to produce eggs immediately when we sprinkle or mist the enclosure. The male has a different activity pattern. It shelters for 3-4 months (in 2009 from mid April until 10 August). We normally imitate winter rains during that time to stimulate mating behaviour. During dry and hot weather, the male stays in its shelter like the females, and is only active during thunderstorms or after sprinkling the enclosure for longer than half an hour.



Hatchlings are kept in a much more humid environment and are sprayed and soaked at least once a week (even in cold mornings). During summer they receive the same treatment twice a week, but get “misted” during hot weather conditions daily or at least every second day. Without misting, tortoises burry themselves in the humid soil, or shelter under wood or rocks.

The following photographs show *H. areolatus* during oviposition and four offspring born in 2008.



Location A66

A detailed report was prepared by location A66 in German. To facilitate German and English readers, the following is in both languages.

September 2009

Am 18. September 2009 durften wir von Location A56 diese wunderbaren Tiere übernehmen. An Hand der Gewichte kann man feststellen, dass der Stress doch etwas gross ist. Sie erkundeten die neue Umgebung sehr genau, fressen noch nicht viel. Das Männchen „rast“ viel umher und klettert, wir nennen ihn liebevoll Panzer-Ratte. Es macht uns sehr Freude, dass wir diese interessanten Tiere halten und beobachten dürfen.

Gefüttert wurde vor allem Blüten und Knospen von verschiedenen Naturpflanzen, wie Hibiskus, Disteln, Löwenzahn, Wiesenpipeau und Zuchetti. An Kaktusfeige zeigten sie kein Interesse.

Sie sonnten sich abwechselungsweise unter der Bright-Sun (150 m/w) und der Vitalux (bis 350 m/w) über die Mittagszeit. Als Grundlast dient bei uns immer die FL-T 5/865 54 Watt Daylight.

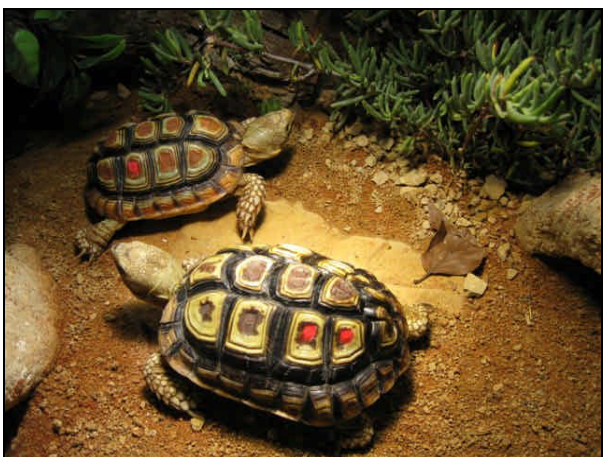
Als Uebergang vom schwachen zum starken Licht, dient eine 50 Watt Spottlampe aus 2 Meter Entfernung. Als Nachtlampe (Mondschein) dient eine Strassenlampe (ca. 30 Meter), die durch unsere Eingangstüre leuchtet.

On 18 September 2009 we were able to receive these wonderful animals from location A56. Body mass measurements show that the animals experience considerable stress from the transfer. They explored their new environment but ate little. The male is particularly active and climbs the terrarium decoration, like a rat with a shell. We are glad that we are able to keep and observe these interesting animals.

We feed the tortoises mostly with flowers and flower buds gathered outdoors, such as *Hibiscus*, thistles, dandelion, *Wiesenpipeau* and zucchini. They showed no interest in *Opuntia* fruits.

The animals basked alternating under Bright-Sun (150 m/w), and under Vitalux (up to 350 m/w) lamps in the afternoon. We use fluorescent T5/865 54 Watt as illumination.

In order to obtain a transition from low to high light, we use a 50 Watt spot light at 2 meter distance. An outdoor street lamp at 30 meter distance provides some „moonlight“ in the night.



Der gute Vernebler (natürlich von Location A56) läuft fünf Mal täglich. Morgens und abends je 30 Minuten, sonst 15 Minuten. Zwei Mal pro Woche werden die Pflanzen von Hand nachgegossen.

Eine genaue Tabelle wird noch erstellt, wenn alle Lampen und der Vernebler definitiv eingestellt sind.

The misting system (similar to location A56) runs five times per day, 30 minutes in the morning and evening, and otherwise 15 minutes. Two times weekly the plants in the enclosure are watered manually.

We plan on preparing a detailed table with the switching times for the lamps and misting system.

Oktober/October 2009

Am 7. Oktober gegen Abend hat das Weibchen am Rand der Höhle rechts neben 2 Bright-Sun Lampen 1 Ei gelegt, Gewicht 7 Gramm, Grösse Ei 31,0 x 20,0 mm

In the evening of 7 October, the female produced an egg (31.0 x 20.0 mm, 7 g) at the entrance of a hiding place, close to two Bright-Sun lamps.



Nach der Eiablage hat das Weibchen getrunken. Bei der Inkubationstemperatur achte ich, dass das Ei 12 Std./Tag Minimum 32 Grad hat. Nachts fällt die Temperatur auf 28,5 bis 29 Grad. Diagramm ist am Entstehen.

Die Tiere befinden sich viel unter den UV Lampen. Ich messe die Temperaturen regelmässig, am Boden bis zu 60 Grad, auf dem Panzer bis zu 40 Grad. In der Nacht fallen die Temperaturen (Raum) im Moment von 16,5 bis 17,5 Grad, da sich in diesem Raum keine Heizung befindet. Links und rechts vorn beim Terrarium habe ich noch 2 Frontscheiben von 40 cm angebracht, damit der Wärmepuffer besser

After oviposition, the female drank. We incubate the egg at 32°C (12 hours each day) and 28.5-29.0°C (12 hours each day). We are preparing a diagram.

The animals often bask under the UV lamps. We measure the temperatures frequently: soil temperatures reach up to 60°C, shell temperature reaches 40°C. Night temperatures in the room where the terrarium is placed drop to 16.5-17.5°C, because this room is not heated. To maintain sufficiently high temperatures in the enclosure, we have installed two 40 cm front panes at the left and right sides of the enclosure. This also improves the effect of misting.

bleibt. Dadurch ist die Verneblung auch besser gewährleistet.

Ich habe anfangs Monat eine zweite Bright-Sun installiert, somit habe ich das viel breitere Spektrum und der Boden wird grossflächiger und besser aufgeheizt, da der Raum auch tagsüber nicht viel wärmer ist.

Gefüttert werden sie viel mit verschiedenen Blüten, die man noch im Garten findet und die sie sehr gerne haben. Auch erhalten sie regelmässig Grünfutter.

Beide Tiere sind immer noch sehr aktiv, das Männchen bedrängt nach wie vor das Weibchen in keiner Weise.

November 2009

Wir haben die Tiere wie jeden Monat gewogen. In der Nacht schlafen sie oft nebeneinander am Eingang der Höhle, sieht richtig niedlich aus. Da ich keine Blüten mehr finde im Garten, füttere ich regelmässig Karotten. Am Anfang waren sie nicht interessiert, aber unterdessen gehört dies zu einem Bestandteil ihrer Nahrung. Sie fressen auch gerne Bachflohkrebse, verteile im Terrarium etwa 5 Stück damit sie diese suchen müssen und etwas Beschäftigung haben. Selbstverständlich befindet sich immer einige Sepiaschalenstücke im Terrarium, die sie regelmässig anknabbern. Auch Grünfutter wie Spitzwegerich u.s.w.



Nun sind 8 Wochen seit der Eiablage verstrichen, nun sieht man deutlich beim Ei, dass sich die Flüssigkeit senkt. Nach meiner Erfahrung von anderen tropischen Tieren, zum Beispiel Panterschildkröten, heisst das, dass das Ei nicht befruchtet ist, leider. Man sieht auch keine Äderchen beim Durchleuchten. Bebrütungstemperaturen und Luftfeuchtigkeit gemäss beiliegender Tabelle.

In the beginning of October, a second Bright-Sun was installed to provide better illumination and better heating of the soil surface. This was necessary because the diurnal room temperatures were quite low.

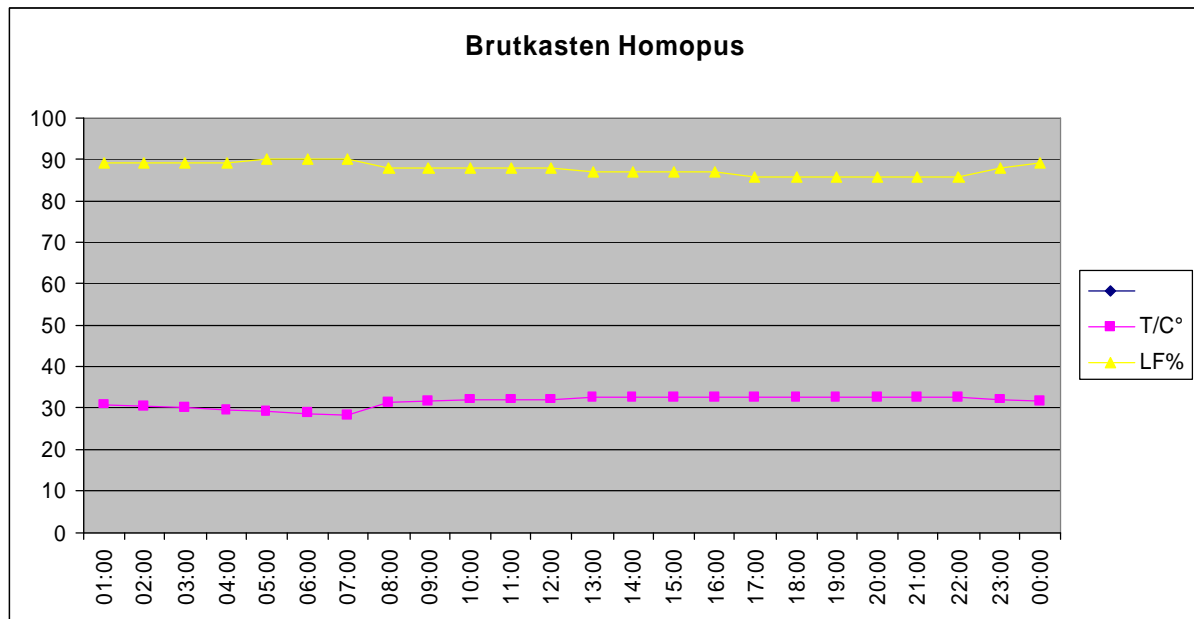
The tortoises are fed on various flowers from the garden, which they like a lot. In addition they receive green vegetable matter.

Both animals are still active, without the male bothering the female.

We have weighed the animals monthly. In the night, both individuals sleep together peacefully at the entrance of one of the retreats. Since it is no longer possible to find flowers in the garden, we feed carrots from time to time. Initially they were not interested, but now it forms part of their diet. They will also eat freshwater amphipods, which we hide in the enclosure (circa 5 specimens at a time) so that the tortoises need to search for them. Obviously, the terrarium also contains several cuttlebone pieces that the tortoises eat. They receive green matter such as *Plantago lanceolata*.



Eight weeks after oviposition, egg fluids have settled at the bottom of the egg. According to my experience with tropical tortoises such as *Stigmochelys pardalis*, this might unfortunately indicate that the egg is not fertile. The egg does not appear to contain blood veins either. Incubation temperatures and relative humidity are shown below.



Es ist deutlich ersichtlich und auch logisch vom physikalischen Standpunkt her, dass die Luftfeuchtigkeit bei der Nachtabsenkung höher und am Tag niedriger ist.

It is clearly visible, and makes sense physically, that the relative humidity increases when night temperatures decrease, and decreases when day temperatures increase.

Dezember/December 2009

Und wieder ist ein Monat vergangen, an dem wir lustiges von diesen Tieren beobachten konnten. Da wir vor 4 Wochen ca. 10 Spitzwegeriche eingepflanzt haben, fressen sie regelmässig von diesen. Was sie auch sehr gerne fressen ist der italienische, gezüchtete Löwenzahn. Im Moment finden wir keine Blüten, (diese fehlen im Winter bei uns in der Natur), füttern wir regelmässig Gedörnte. Da die Temperaturen nachts bis auf minus 15° gesunken sind und die Raumtemperatur nur 15° plus war, habe ich das Terrarium vorne mit Plexiglas abgedeckt, damit ich tagsüber im ganzen Terrarium ausserhalb der Strahler 20-22° Grundlast habe. Die Tiere wurden dadurch viel aktiver, vor allem das Männchen. Unter dem Strahler hatten sie genug wärme ca. 40° am Boden 50°, aber nur örtlich, das sie auch immer ausnutzen.

Another month has passed during which we enjoyed observing the animals. The tortoises regularly feed from the ten *P. lanceolata* that we have planted four weeks ago. They also enjoy cultivated Italian dandelion. At this moment flowers are not available (at our place there are no flowers outside in winter), so we regularly feed dried flowers. Since outdoor night temperatures have decreased to -15°C, and room temperatures to 15°C, we have covered the open front of the enclosure with Plexiglas. As a result, the temperatures of the entire soil surface (except near spot lights) reach 20-22°C. This has increased tortoise activity levels, particularly the male activity level. Under the spot lights, temperatures of circa 40°C are available, with the soil surface reaching 50°C. Tortoises always use these local sites of high temperatures.

Location HRF

From 1996 to 2008, this location produced 36 offspring *H. s. signatus* of known sex. Incubation temperatures were analysed to detect relationships with sex ratio.

Incubation temperatures (°C)	# eggs	# males	# females	% males
Constant 28-32 (24 hrs)	1	0	1	0
Diurnal 31.0 (12 hrs) / 24.0 (12 hrs)	3	3	0	100
Diurnal 31.5 (12 hrs) / 26.5 (12 hrs)	3	3	0	100
Diurnal 32.0 (12 hrs) / 26.0 (12 hrs)	13	9	4	69
Diurnal 32.0 (12-14 hrs) / 26.0 (10-12 hrs)	2	0	2	0
Diurnal 32.0 (12-14 hrs) / 26.5 (10-12 hrs)	14	6	8	43

Although incubation methods had some additional variables (incubator type, incubation substrate, substrate humidity), the findings suggest that male-biased sex ratios may be prevented by applying day temperatures above 32.0°C for circa 13 hours, combined with night temperatures above 26.0-26.5°C for circa 11 hours. It is recommended that breeders of *H. s. signatus* use these results to formulate their incubation techniques. It should also be ensured that temperatures are measured with calibrated or multiple thermometers, at different sites in the incubator, throughout the incubation period.

Homopus s. signatus number 38 produced an egg that broke during oviposition on 2 March. The egg shell appeared normal, but half of the shell was withdrawn in the oviduct. Specialist veterinary care could not solve the problem, i.e., the egg shell could not be removed by means of forceps (female sedated) or through injection of calcium and oxytocin. Radiography revealed that the female had a second calcified egg in one of the oviducts. The female was treated with enrofloxacin. Treatment with oxytocin was repeated on 18 April, when the female produced the (encapsulated) egg shell remains (photo). The treatment with enrofloxacin was also repeated. The female did not produce the second egg in 2009.



6. NEW PUBLICATIONS

The following overview summarises all manuscripts and articles that were submitted, accepted, or published in 2009.

Subject	Submitted	Accepted	Published	Journal
Husbandry and breeding account <i>Homopus</i> spp.	2003/2008			Mertensiella (English), resubmitted for inclusion in a book edited by Prof. W. Sachsse in 2008
First captive breeding of the greater padloper, <i>Homopus femoralis</i>	2008	2008	2009	Turtle and Tortoise Newsletter (English)
Annual variation in reproduction of wild <i>H. s. signatus</i>	2008			Copeia (English)
Consequences of aridification to the conservation of <i>H. s. signatus</i>	2009	2009	2009	African Journal of Herpetology (English)
The greater padloper (<i>Homopus femoralis</i>) in captivity: an assessment of husbandry feasibility	2009	2009	2009	Radiata (German and English)
<i>Homopus femoralis</i> , Greater Padloper, Natural nests	2009	2009	2009	African Herp News (English)
"Groot padloper" (<i>Homopus femoralis</i>) in het terrarium	2009			Trionyx (Dutch)
Population density and dynamics of wild <i>H. s. signatus</i>	2009			Chelonian Conservation and Biology (English)

7. FINANCIAL REPORT

The available funds accumulated in 2009, as a result of several donations and low expenses (e.g., no *Homopus* fieldwork occurred in 2009). A small amount was used for preparing the 2010 fieldwork on *Homopus femoralis*. Acquisition of radio transmitters for the telemetry study from 2011 to 2012 will

deplete virtually all available funding in 2010. Two European herpetological societies have informed the Homopus Research Foundation that they would welcome funding applications, and these opportunities will be explored further.

Financial report Homopus Research Foundation 2009

Revenues		Expenses	
Net amount	Item	Amount	Item
€		€	
<i>Project H. femoralis 2006-2011</i>		<i>Project H. femoralis 2006-2011</i>	
2,420	Remaining funds 2008	100	Various equipment (batteries)
188	Donations private individuals	1,000	Reservation recharging radiotransmitters
2	Interest bank account	1,510	Reservation purchase additional radiotransmitters
		p.m.	Reservation other project expenses
2,610	Subtotal	2,610	Subtotal
<i>Other</i>		<i>Other</i>	
69	Donation V. Loehr to cover non-project expenses	26	Chamber of Commerce 2009
		42	Annual costs bank account
69	Subtotal	69	Subtotal
2,679	Total	2,679	Total

8. PERMIT OVERVIEW

The activities reported in this document would not have been possible without the following permits issued by the South African and Namibian authorities:

Exporting of H. areolatus

- Exporting permit 49683 (Ministry of Environment and Tourism, Namibia)
- CITES exporting permit 8830 (Ministry of Environment and Tourism, Namibia)
- CITES exporting permit 3558 (Ministry of Environment and Tourism, South Africa)
- Health certificate 13\1\4\2\ 09/2- 1676/04 (Ministry of Agriculture, Water and Rural Development, Namibia)
- Various additional permits issued to individual studbook participants (Namibia)

Collecting and exporting of H. femoralis

- Collecting permit AAA004-00010-0035 (CapeNature, South Africa)
- CITES exporting permit 58679 (Department of Environmental Affairs and Tourism, South Africa)
- Health declaration dated 17-03-06 (Department of Agriculture, South Africa)

Collecting and exporting of H. s. signatus

- Collecting permit 331/95 (Western Cape Nature Conservation Board, South Africa)
- Collecting permit 28/2001 (Northern Cape Nature Conservation, South Africa)
- CITES exporting permits 16579 and 281/95C (Department of Environmental Affairs and Tourism, South Africa)
- Permit to move animals/animal products 2001/10/3/A (Department of Agriculture, South Africa)

Field study on H. boulengeri

- Research permits 755/05, 43/2005 and 35/2005 (Northern Cape Nature Conservation, South Africa)

Field study on H. femoralis

- Research permits AAA004-00185-0035 and AAA004-00020-0028 (CapeNature, South Africa).

Field studies on H. s. signatus and H. s. cafer

- Research permits 137/99, 84/99, 019/2001, 010/2001, 46/2003, 26/2003, 8/2003, 168/2003, 43/2003, 158/2003, 633/2003, 25/2003, 158/2004 and 633/2004 (Northern Cape Nature Conservation, South Africa)
- Research permits 428/2002 and 41/2002 (Western Cape Nature Conservation Board, South Africa)