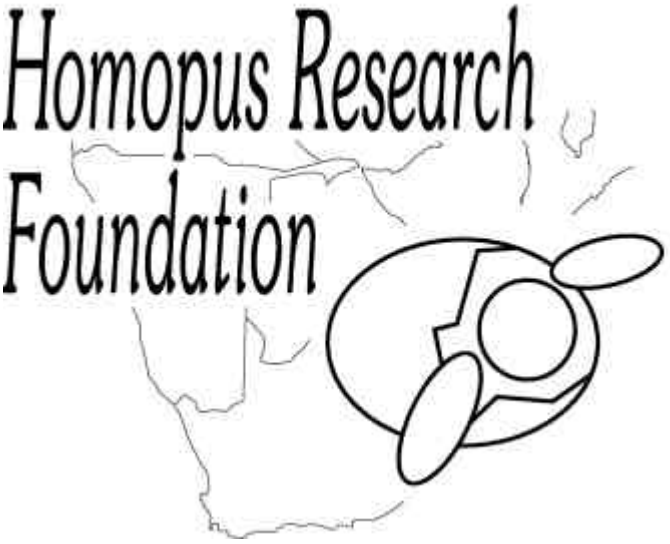
Homopus Research Foundation



Annual Report

2001

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The Homopus Research Foundation was founded in January 2001, aiming to gather and distribute information on *Homopus* in the benefit (directly or indirectly) of the species in the wild. This aim is realized by carrying out activities such as setting up captive studbook populations, studying captive populations and conducting research in the field. Unofficially, these efforts started as early as 1995 when the foundation's precursor, the Studbook Breeding Programme *Homopus* started.

The current report will focus in detail on the studbooks co-ordinated within the foundation. The aims of the studbooks are:

- To inform the herpetological community with data and publications generated from captive situations
- Procuring, maintaining, and reproducing genetically healthy captive individuals for future loans to recognised individuals and institutions

These conservation goals are particularly relevant today as wild populations of many reptiles and amphibians experience increasing survival pressures. Establishing working programs that emphasise captive husbandry in conjunction with fieldwork is crucial in developing sound wildlife management. A significant contribution that captive animals may perform is through the concept of re-introduction of their potential offspring. Although re-introduction of species is at a very early stage and occasionally controversial, there may come a time when the offspring of captive animals are the sole source for re-introducing species into previously suitable habitat where the natural population has become extinct. More importantly re-introduction has the potential of insuring genetic diversity to populations that have become unnaturally isolated due to human interference.

1. INTRODUCTION AND ACTIVITIES IN 2001

This report is updating the 2000 annual report of the Studbook Breeding Programme *Homopus*, published in December 2000. In January 2001 the Studbook Breeding Programme Homopus became an officially registered foundation, the Homopus Research Foundation. This foundation is aiming to form captive populations and to study these, to carry out research in the field and to gather and distribute as much information about species of the genus *Homopus* as possible.
This report will summarise the activities of the foundation in 2001, plans for 2002, and it will give an overview of the current composition and changes in the captive populations: *H. s. signatus*, *H. areolatus* and *H. femoralis* (new).
Additional information may be obtained from the internet site of the Homopus Research Foundation, http://www.homopus.org, or from the board of the foundation.

In the next paragraphs an overview of the main activities in 2001 is presented.

1.1. Publications and presentations Homopus Research Foundation (see also chapter 12)

The manuscript with detailed information about husbandry, behaviour and captive breeding of *H.* species (formerly known as *H. bergeri*), that was submitted for publication in *Chelonian Conservation and Biology* in September 1999 has been accepted for publication and was supposed to be published in 2001. However, so far the issue concerned appears not to have been printed.
One other paper (population characteristics, activity patterns and movement), resulting from the 2000 field research project on *H. s. signatus*, has been accepted for publication in *Journal of Herpetology* and will be printed in September 2002. A second manuscript (natural diet) has been submitted for publication in *African Journal of Herpetology*.
A note on male aggression in *H. s. signatus* is in press in the *Bulletin of the Chicago Herpetological Society* and a popular field report in the *Tortoise Trust Newsletter*.

Only life history notes (natural diet, autumn activity, maximum size and female mating activity; all in *African Herp News*) and a popular field report of the 2000 field study on *H. s. signatus* (*Tortoise Trust Newsletter*, Dutch translation in *Lacerta*) were published in 2001. Furthermore, leaflets with information about the Homopus Research Foundation were produced (abstracts sent out to many herpetological organisations for publication in their magazines and newsletters), as well as two Dutch information sheets with minimum requirements for successful keeping and breeding of *H. s. signatus* and *H. areolatus*. The latter two documents list information gathered within the studbooks on these species and may be used by (European) governments to judge if a keeper is housing the species properly. Legislation in many European countries is developing towards a situation in which keepers are only allowed to keep exotic animals in captivity if specific minimum requirements are met.

All published information is available from http://www.homopus.org, section Literature. Richard Boycott and Ortwin Bourquin published a new edition of the South(ern) African Tortoise Book in 2000 (see chapter 12), referring to most articles and notes on *Homopus* published within the Homopus Research Foundation until that moment.

A popular talk about the 2001 field research project on *H. s. signatus* has been presented at the Civil Engineering Division of the Ministry of Transport, Public Works and Water Management (Netherlands) and in Norrköping (Sweden). A similar talk on the 2000 field study was presented at a meeting of the Dutch Turtle and Tortoise Society (Netherlands) in spring. A delegate of the Homopus Research Foundation was furthermore asked to present information on *Homopus* in Switzerland in September, but unfortunately this was not possible due to fieldwork in this period. At the symposium of the Herpetological Association of Africa at Stellenbosch University (September), information on habitat use and activity of *H. s. signatus* was presented.

1.2. Internet site

The internet site has been updated rigorously to adjust it to the change from Studbook Breeding Programme *Homopus* to Homopus Research Foundation. Additionally, minor updates (new publications, changes in studbook composition, research activities, et cetera) have been performed throughout 2001.

The annual reports are posted on the internet site annually, providing information on husbandry in the appendices, in addition to the husbandry information on the site. Links have been placed in the husbandry sections of the site.
Since the current field projects on *H. signatus* are open to participation by others, some information about participation has been added on the internet site, as well as a request for enthusiasts to contact the Homopus Research Foundation.

Over 5700 page views have effected since June 1998 (approximately 1900 in 2001, 200 more than in 2000). South Africa has changed from the 10th to the 8th position in terms of number of visitors per country.

1.3. Journeys

South Africa was visited for six weeks in September and October 2001, within the scope of the field research project on *H. s. signatus* (see also paragraph 1.4). Three delegates of the Homopus Research Foundation participated in the fieldwork, as well as two external persons. One other *Homopus* studbook participant visited the research area for a few days during the field study.

1.4. Research

The field project on *H. s. signatus* that was conducted in 2000 was followed by a second study in September-October 2001. Generally the same aspects were investigated (in the same population), population dynamics, activity and reproduction, to increase information on temporal changes. Furthermore, the field experience from 2000 allowed to improve methods to obtain better results. Participants in 2001 were one Swedish (Janne Karlsson), three Germans (Fabian Schmidt, Sebastian Scholz and Ina Schettler) and a Dutch (Victor Loehr). One focus of the 2001 study was tortoise temperatures in relation to habitat temperatures. This aspect will be processed and published by Fabian Schmidt, whereas the other aspects will be processed by Victor Loehr. A native Springbok inhabitant continues to gather field data on aspects of the 2001 study until our next visit in September 2002. Details about the set-up of the studies can be found in the project proposals. These may be obtained from the Homopus Research Foundation, or can be downloaded from the internet site. Information about results can be found in paragraphs 1.1 and 2.1, and in chapter 12.
The 2001 field study would not have been possible without donations of money (Tortoise Trust (UK), Seneca Park Zoo (USA), Basel Zoo (Switzerland), Conservation International, and private turtle enthusiasts), and research materials (Röbke Agenturen (Netherlands) and Barbour-threads (Netherlands)). The offer to make radiographs of the tortoises was gratefully accepted from Springbok Hospital (South Africa). Permits were provided by Northern Cape Nature Conservation (South Africa) and South African Weather Services kindly provided weather data. Retha Hofmeyr, Brian Henen en Ernst Baard have continued their valuable input, greatly improving the research results.

Apart from the *H. s. signatus* field project and the continuing long term captive study on *H. s. signatus* (as described in the 1999 annual studbook report and as referred to in paragraph 2.1), the Homopus Research Foundation was involved in one other project:

- *Homopus s. signatus egg shells*
  Declan Nolan from Nijmegen University (Netherlands) is studying shells of tortoise eggs. Electron microscope scans from shells of captive hatched and non-hatched *H. s. signatus* eggs have been performed to study differences in calcium crystal shape and size.

1.5. Contacts

The Homopus Research Foundation has been contacted by various persons and organisations in 2001: Knoxville Zoological Gardens (request for *H. signatus* incubation information, as this institution so far has only bred male offspring, and request for information on *H. signatus* subspecies validity), Western Cape Nature Conservation (opinion regarding plans for large group of confiscated *Chersina angulata* in Bulgaria, and background information regarding apply for exporting permit *H. areolatus* and *C. angulata* to Europe), TRAFFIC Europe and WWF Germany (commercial price information on South African tortoises), webmaster http://www.testudomaniac.com (request for scans of southern African turtles), and various persons and institutions to request reprints of articles.
In addition, the Homopus Research Foundation has actively contacted others, for instance to locate captive *H. signatus* in the USA as a partner for the single male of unknown origin in the studbook. This

has yielded a second (captive-bred) male (all other specimens at this location had died previously). A captive-bred (related) couple would cost thousands of US dollars and therefore has not been acquired.

As a matter of special gifts for persons contributing to the Homopus Research Foundation, shopping bags and mousepads with the foundation's logo have been produced. At the same time, these gifts may act as an 'advertisements' for the foundation. For the latter reason also sun screens with the logo were produced for use in the rental car during field research on *Homopus*.

1.6. Imports

The attempt to import 2.2 unrelated wild-caught *H. s. signatus* into Germany to consolidate the genetic basis of the studbook population (potentially allowing another 15 years until additional specimens would become required; see strategy in 2000 annual report) has not worked out. The European Union has installed a ban on imports of all wild-caught *Homopus*, as these species are supposed to show a high mortality during transport and thereafter. When this regulation was proposed several years ago, the Studbook Breeding Programme *Homopus* already wrote a petition to the European Commission that such a regulation would be based on speculative information as far as *H. s. signatus* is concerned, since the studbook results show that a high survival certainly is a possibility. This letter was replied with a statement that the objective of the regulation was not to prevent small-scale imports for studbooks, as has indeed been incorporated in the existing regulation, that allows governments to grant permission for imports in some cases. In our case, the German government did not wish to use this possibility and did not grant a permit. As a result the tortoises were imported into the Netherlands.
The South African government has been most co-operative to grant permission to collect and export 2.2 *H. s. signatus* on certain conditions. These conditions have been translated into an agreement between the Homopus Research Foundation and all studbook participants. An example of this agreement is included in appendix 5. Additionally, a database has been set-up to include identification scans of all *Homopus* specimens in all studbooks within the Homopus Research Foundation. These will allow easy recognition of individual specimens in case they would be mixed up at some point. Now that the studbooks are growing, this is becoming increasingly important. Scans of most specimens are already present in the database.

One captive *H. areolatus* female was imported from South Africa into the Netherlands. This specimen had been found in the Pretoria area and was kept in a museum for some time. It was gratefully received as a donation from Wulf Haacke. Four additional captive *H. areolatus* were imported from Tygerberg Zoopark (South Africa) into Switzerland. These concerned all surplus specimens being brought in by visitors. The South African government has consulted the Homopus Research Foundation prior to issuance of exporting permits.

1.7. Finances

The Homopus Research Foundation is a non-profit, tax-exempt organisation. A financial report over the year 2001 can be found in appendix 4. All expenses were covered by external sources of income. Most notably, contributions were received from the field assistants in the *H. s. signatus* field research project and a major donation was received from Victor Loehr. The latter donation covered all overhead costs of the foundation and the international travel expenses of the person concerned for the field research.

Appendix 4 also contains an overview of private expenses of persons involved in the Homopus Research Foundation. These concern costs made for, but not through the foundation. To calculate the actual costs for the 2001 field research project, most of these costs have to be added to the foundation's expenses.

2. PLANS FOR ACTIVITIES IN 2002

The main focus of efforts within the Homopus Research Foundation will remain the ongoing field study of *H. signatus* in South Africa. Nevertheless, it will be attempted to pay attention to other activities related to *Homopus*.

2.1. Publications and presentations Homopus Research Foundation

The first manuscript resulting from the 2001 field study of *H. s. signatus* (reproduction, combination of data gathered in 2000 and 2001, co-authored by Retha Hofmeyr and Brian Henen from University of the Western Cape, South Africa) is currently in preparation for submission to *Herpetologica*. A manuscript on egg shell morphology of (captive) *H. s. signatus* is also in preparation and will eventually be submitted for publication in *African Zoology*. The 1999 report on captive breeding of *H. s. signatus* that was published in *Chelonian Conservation and Biology* will be updated with new information, to form a new paper that will be presented and published in the proceedings of the big turtle symposium to be held in Vienna in January 2002.
A presentation on habitat use and activity of *H. s. signatus* will also be presented at the Vienna symposium. Additionally, a popular presentation on tortoises of southern Africa, including *Homopus*, will be presented at the 'environment education centre' in Nieuwegein, Netherlands.

2.2. Internet site

The internet site of the Studbook Breeding Programme *Homopus* will continue to grow. All papers published within the Studbook Breeding Programme *Homopus* in 2002 will be posted on the site, and obviously changes in studbook composition will be updated frequently. Moreover, it will be attempted to post information about *Homopus* from outside of the programme, when available.
A few ideas exist to expand the internet site with new subjects:

- General information about other southern African tortoises, or at least a photo gallery
- Highlights of the fieldwork (photos)

It will depend on the available time whether these new sections can be realised in 2002.

2.3. Journeys

In order to conduct follow-up fieldwork on *H. signatus*, South Africa will be visited by a new group of research participants (including three studbook participants) in September and October 2002 (see paragraph 2.4).

2.4. Research

The fieldwork conducted in 2000 and 2001 will be followed by a two-year project on *H. signatus cafer* in 2002 and 2003. The same aspects will be studied, eventually allowing a comparison between the two subspecies, *H. s. signatus* and *H. s. cafer*. Several research participants for the 2002 study have already been recruited, but for both years there are still places open. The project proposal can be obtained from the Homopus Research Foundation or from its internet site.

As has already been mentioned in the previous annual report, Fabian Schmidt (Germany) has investigated whether it would be possible to conduct a research project on *H. s. signatus* for his Master's at Frankfurt University (Germany). This has turned out to be possible. He will start a laboratory project of approximately one year on temperature-dependent metabolism and thermoscanning in *H. s. signatus* and a second rock-dwelling tortoise, *Malacochersus tornieri*. *H. s. signatus* specimens (captive-bred) will be made available through the Homopus Research Foundation.

2.5. Imports

Recently, 2.1 *H. femoralis* were rescued by the Tortoise Trust and donated on loan to the Homopus Research Foundation. Depending on how these specimens will do, it will be considered to put efforts in acquisition of additional (preferably captive) specimens to form a larger studbook population.

Part 1:

Studbook *Homopus s. signatus*

3. CURRENT LIVING STUDBOOK POPULATION AND TRANSFERS

The number of locations where live *Homopus s. signatus* specimens were housed in 2001 grew from 4 to 7. These locations are in the Netherlands (2), Germany (2), USA (1), Sweden (1) and Belgium (1). The three new locations are in the Netherlands, Germany and Belgium, and were added in relation to the housing of newly imported specimens. Two new locations are housing captive-bred specimens (one for a Master's research project) to make room for a newly imported couple at locations that were originally keeping the captive-bred specimens.
The total number of live specimens in the studbook population grew from 24 to 33: Four specimens were imported and the remaining five specimens were born in the studbook population, at two locations. A sixth specimen was born, but one juvenile born in 2000 died. With the exception of one specimen (0017), all founder specimens originate from a single population in South Africa. In September 2001 the exact stretch of land was for sale and it is not known what effect this might have on the tortoise population.

Specimens 0007, 0012 and 0013 were transferred from location A07 to new location A18, for the Master's project and to make room for a newly imported couple at location A07. Specimens 0006 and 0010 were transferred from location A02 to new location A10 to make room for a newly imported couple. Specimens 0035 and 0036 were transferred from location A02 to A07. These are two newly imported specimens that had adjusted to captive conditions at location A02 and made room for rescued *H. femoralis*. Location A07 had originally been chosen for housing a newly imported couple *H. s. signatus* as the excellent facilities at this location make successful breeding likely. All transfers were in accordance with national and international legislation.

Table I: Current living studbook population *Homopus s. signatus* per location as registered in the studbook. M is male, F is female, U is unknown, D is donation, L is loan and B is birth. Cage numbers are relative numbers per location, indicating which specimens are housed together.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	CAGE	HOUSE NAME	FCOEF	SUB-SPECIES
LOCATION A02 (1.5.7)									
0001	M	WILD	WILD	30/09/95	A02 (D)	1	950930-I	0.000	*signatus*
0002	F	WILD	WILD	30/09/95	A02 (D)	1	950930-II	0.000	*signatus*
0003	F	WILD	WILD	30/09/95	A02 (D)	1	950930-III	0.000	*signatus*
0005	F	WILD	0003	27/02/96	A02 (B)	2	960227-III-1	0.000	*signatus*
0009	F	0001	0002	30/11/96	A02 (B)	2	971130-II-1	0.000	*signatus*
0015	F	0001	0002	20/09/99	A02 (B)	2	990920-II-6	0.000	*signatus*
0022	U	0001	0002	19/06/00	A02 (B)	3	000619-II-7	0.000	*signatus*
0025	U	0001	0003	12/09/00	A02 (B)	3	000912-III-8	0.000	*signatus*
0026	U	0001	0002	07/10/00	A02 (B)	3	001007-II-9	0.000	*signatus*
0029	U	0001	0003	15/07/01	A02 (B)	4	010715-III-9	0.000	*signatus*
0031	U	0001	0002	03/08/01	A02 (B)	4	010803-II-10	0.000	*signatus*
0033	U	0001	0003	19/08/01	A02 (B)	4	010819-III-10	0.000	*signatus*
0034	U	0001	0003	30/09/01	A02 (B)	4	010930-III-11	0.000	*signatus*
LOCATION A07 (1.1.0)									
0035	M	WILD	WILD	06/10/01	A02 (D)		011006-I	0.000	*signatus*
				16/12/01	A07 (L)	1	-		
0036	F	WILD	WILD	06/10/01	A02 (B)		011006-II	0.000	*signatus*
				16/12/01	A07 (L)	1	-		
LOCATION A10 (2.0.0)									
0006	M	0001	0003	08/11/96	A02 (B)		961108-III-2	0.000	*signatus*
				04/08/01	A10 (L)	1	-		

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	CAGE	HOUSE NAME	FCOEF	SUB-SPECIES
0010	M	0001	0002	22/10/97	A02 (B)		971022-II-3	0.000	*signatus*
				04/08/01	A10 (L)	2	-		
LOCATION A12 (3.2.4)									
0017	M	WILD	WILD	?	UNKNOWN		-	0.000	unknown[1]
				08/09/99	A12 (D)	1	-		
0018	M	WILD	WILD	16/09/99 (?)	A12 (D)	2	Viejo	0.000	*signatus*
0019	M	WILD	WILD	16/09/99 (?)	A12 (D)	3	Stumpy	0.000	*signatus*
0020	F	WILD	WILD	16/09/99 (?)	A12 (D)	3	Midge	0.000	*signatus*
0021	F	WILD	WILD	16/09/99 (?)	A12 (D)	2	Bertha	0.000	*signatus*
0027	U	0018 0019	0020 0021	15/10/00	A12 (B)	4	Sashi	0.000	*signatus*
0028	U	0018 0019	0020 0021	15/11/00	A12 (B)	4	Peanut	0.000	*signatus*
0030	U	0018 0019	0020	26/07/01	A12 (B)	5	-	0.000	*signatus*
0032	U	0018 0019	0020	10/08/01	A12 (B)	5	-	0.000	*signatus*
LOCATION A16 (2.0.0)									
0011	M	0001	0003	10/11/97	A02 (B)		971110-III-4	0.000	*signatus*
				22/11/98	A06 (L)		-		
				05/07/00	A07 (L)		-		
				16/09/00	A16 (L)	1	-		
0014	M	0001	0003	22/10/98	A02 (B)		981022-III-5	0.000	*signatus*
				22/11/98	A07 (L)		-		
				16/09/00	A16 (L)	2	-		
LOCATION A18 (2.1.0)									
0007	F	0001	0003	24/12/96	A02 (B)		961224-III-3	0.000	*signatus*
				22/11/98	A06 (L)		-		
				05/07/00	A07 (L)		-		
				14/12/01	A18 (L)	1	-		
0012	M	0001	0002	21/11/97	A02 (B)		971121-II-4	0.000	*signatus*
				22/11/98	A07 (L)		-		
				14/12/01	A18 (L)	1+2	-		
0013	M	0001	0002	26/09/98	A02 (B)		980926-II-5	0.000	*signatus*
				22/11/98	A07 (L)		-		
				14/12/01	A18 (L)	1+2	-		
LOCATION A25 (1.1.0)									
0037	M	WILD	WILD	06/10/01	A25 (L)	1	-	0.000	*signatus*
0038	F	WILD	WILD	06/10/01	A25 (L)	1	-	0.000	*signatus*

Total population: (12.10.11)

All specimens together make the total living studbook population 12 males, 10 females and 11 unknown, housed at 7 locations. Three single females (0007, 0009 and 0015) and 6 single males (0006, 0010, 0012, 0013, 0011 and 0014) fit for breeding purposes are present, at locations A02 (0009 and 0015), A10 (0006 and 0010), A18 (0012 and 0013, and 0007) and A16 (0011 and 0014). These all originate from the same 1.2 founder population and thus are genetically related (same sire). Female 0005 is not related to

[1] Originating from unknown wild location

all F1 specimens, but this female has a shell deformation and presumably is not able to survive egg production. Female 0007 and alternating males 0012 and 0013 (both offspring from the same founders) are nevertheless housed together at location A18. This is done in order to trigger egg production where the eggs will be used for non-destructive research purposes at Frankfurt University. The following conditions apply to the current keeper: (1) In case inbred hatchlings are produced, these have to be kept at his location or at another location where no other *H. signatus* are present (responsibility remains with the current keeper); these inbred specimens will not be used for breeding purposes. (2) The adult female must be separated from the related males after the research period early 2003 and the female must remain with the current keeper for three years without mates, to prevent production of hatchlings with unknown sire; this period can be used to determine if sperm storage occurs in this species. (3) Any hatchlings produced during this period must be treated as described in (1). It is unlikely that unrelated males would become available in the next three years, as these should be produced by the two couples imported in 2001.

An additional single male (0017) fit for breeding is available at location A12. This male is originating from an unknown wild location and therefore will only be paired with females that are from unknown original location, or with surplus females (see also chapter 5).

Wild-caught specimens 0018, 0019, 0020 and 0021 were originally housed as a 2.2 group at location A12. They were separated to form different blood lines in 2001. For the next three years, all hatchlings will be considered related to both males (due to possible sperm storage), until it will be possible to prove otherwise by DNA analysis.

Table II: Current living studbook population *Homopus s. signatus* as registered in the studbook.

LOCATION	MALES	FEMALES	UNKNOWN
A02	1	5	7
A07	1	1	0
A10	2	0	0
A12	3	2	4
A16	2	0	0
A18	2	1	0
A25	1	1	0
TOTAL	12	10	11

4. IMPORTS, BIRTHS AND DEATHS

The relevant authorities granted permits to collect and export/import 2.2 South African *H. s. signatus* into the Netherlands in 2001 (see also paragraph 1.6). These specimens were required to consolidate the studbook population and potentially allow the population to grow for another 15 years before additional blood lines would be required. The specimens (0035-0038) were collected and exported in October from the same population, from which the captive population already present results (0001-0004 collected in 1995 and 0018-0021 collected in 1999). It is considered of importance not to mix specimens from different geographic localities (genetic pollution).

Table III: Imports of *Homopus s. signatus* in 2001. M is male, F is Female and D is donation.

STUD ID	SEX	DATE OF CAPTURE dd/mm/yy	FIRST CAPTIVE LOCATION	DATE OF ARRIVAL dd/mm/yy	ORIGIN
YEAR 2001					
0035	M	03/10/01	A02 (D)	06/10/01	Springbok, Namaqualand (South Africa)
0036	F	03/10/01	A02 (D)	06/10/01	Springbok, Namaqualand (South Africa)
0037	M	03/10/01	A25 (D)	06/10/01	Springbok, Namaqualand (South Africa)
0038	F	03/10/01	A25 (D)	06/10/01	Springbok, Namaqualand (South Africa)

Total number of imports: (2.2.0)

The studbook population *H. s. signatus* produced eggs and hatchlings at two locations in 2001. At location A02, female 0003 produced three eggs and female 0002 produced four eggs, a new highest egg number produced by these two females in one season. This may have been caused by persistent low temperature in early summer, extending the spring season. None of the egg shells appeared low in calcium. The first and third egg of female 0002 were found in the enclosure after absence of the keeper (oviposition date unknown). The first egg presumably was turned when transferring it to the incubator. When it started to smell bad it was opened, to find an embryo that had died early in development. The third egg did not show any signs of development when opened when it started to smell. The shell of the last egg of female 0002 cracked during incubation, without showing signs of development. The incubation substrate in 2001 was kept lower than in 2000 (weight ratio vermiculite:water=1:2 instead of 1:3), when dead dehydrated hatchlings were found in eggs with cracked shells. It is not clear why the fourth egg of female 0002 cracked in 2001. The shell will be examined by means of electron microscopy.

The initial breeding results at location A12 in 2000 have continued in 2001. The incubation conditions were changed to a temperature cycle of 25.0 and 32.2°C (both 12 hrs) (previous situation described in 2000 annual report and additional information in appendix 1 of the current report). One female produced an egg with an apparently not fully developed shell. This has happened previously at location A02 (see previous annual reports) and was explained in terms of stress experienced by the female. However, in the case of the female at location A12 the cause is not clear, as this female apparently has not suffered from increased stress levels and is a ‘dominant’ specimen in its enclosure.
The egg that was laid by female 0020 on 3 March was pipped on 25 July at 7:00 hrs, exposing a bit of remaining yolk sac. The hatchling remained in the egg until 26 July 19.00 hrs and emerged completely on its own. The yolk sac was totally absorbed. She drank well after cleaning off the vermiculite. Weight was 8 g.

Both females that were imported in 2001 have produced one egg. The specimen that was housed at location A02 buried the egg, whereas the female at location A25 simply dropped it on the surface in a crevice. Both eggs are currently in the incubator.

Information about incubation methods and periods can be found on the internet site of the Homopus Research Foundation. Additional husbandry information is present in the appendices.

Table IV: Births of *Homopus s. signatus* in 2001. U is unknown.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH dd/mm/yy
0029	U	0001	0003	15/07/01	A02 (B)	010715-III-9	0.000	
0030	U	0018 0019	0020	26/07/01	A12 (B)	-	0.000	
0031	U	0001	0002	03/08/01	A02 (B)	010803-II-10	0.000	
0032	U	0018 0019	0020	10/08/01	A12 (B)	-	0.000	
0033	U	0001	0003	19/08/01	A02 (B)	010819-III-10	0.000	
0034	U	0001	0003	30/09/01	A02 (B)	010930-III-11	0.000	

Total number of births: (0.0.6)

One specimen died in 2001, at location A02. This concerned a tortoise born in 2000. The entire group of specimens (four tortoises) born at location A02 in 2000 started to show signs of what appeared to be dehydration. Symptoms were similar to those described by Loehr in *African Herp News* in 1999 (see chapter 12). From then on, all hatchlings and young juveniles are being soaked three times weekly. This has improved the condition of the remaining specimens born in 2000 and these have commenced to grow again.

Table V: Deaths of *Homopus s. signatus* in 2001. U is unknown and B is birth.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	DATE OF DEATH dd/mm/yy	AGE AT DEATH yy/mm	PRIMARY CAUSE
0023	U	0001	0002	19/07/00	A02 (B)	29/06/01	345 d	Dehydration?

Total number of deaths: (0.0.1)

5. TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current total studbook population of the studbook *H. s. signatus* consists of 38 specimens. From these, 13 are wild-caught specimens (12 collected and imported by the Homopus Research Foundation) and 25 are captive-bred. Thirty-three tortoises are currently alive, housed at 7 locations.

The importing of 2.2 unrelated specimens from South Africa in 2001 fits within the strategy for the studbook *H. s. signatus* drawn up in the 2000 annual report. This strategy potentially results in growth of the captive population without having to inbreed or import additional unrelated tortoises for the next 15 years. Different blood lines are present in the USA (2) and Europe (3). So far, one couple that was imported in 2001 has adjusted to captive conditions, feeding well and showing what is considered normal oviposition. The second couple appears healthy, but has not yet been observed feeding.

In order to provide an extra insurance that potential conflicts regarding breeding strategies will be solved in the interest of the studbook population, the imported specimens remain the property of the Homopus Research Foundation. This has been agreed in the document shown in appendix 5. In this construction, it is the board of the Homopus Research Foundation which is authorised to make final decisions. The board is supervised by the European Studbook Foundation, to reassure that decisions are based on sound studbook management. The foundation has installed a (scientific) genetics advisory board in order to determine the best strategies regarding future species genetics. Obviously, conflicts within the studbook will be avoided by acting as a team, sharing the same general view on studbooks and studbook management.

Table VI: Total studbook population *Homopus s. signatus*. M is male, F is female, U is unknown, D is donation, L is loan, B is birth and P is purchase.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH
0001	M	WILD	WILD	30/09/95	A02 (D)	950930-I	0.000	
0002	F	WILD	WILD	30/09/95	A02 (D)	950930-II	0.000	
0003	F	WILD	WILD	30/09/95	A02 (D)	950930-III	0.000	
0004	M	WILD	WILD	30/09/95	A02 (D)	950930-IV	0.000	24/12/95
				02/09/96	NNM (D)	RMNH27497		
0005	F	WILD	0003	27/02/96	A02 (B)	960227-III-1	0.000	
0006	M	0001	0003	08/11/96	A02 (B)	961108-III-2	0.000	
				04/08/01	A10 (L)	-		
0007	F	0001	0003	24/12/96	A02 (B)	961224-III-3	0.000	
				22/11/98	A06 (L)	-		
				05/07/00	A07 (L)	-		
				14/12/01	A18 (L)	-		
0008	U	0001	0002	26/01/97	A02 (B)	970126-II-2	0.000	02/02/97
				24/03/99	NNM (D)	RMNH28042		
0009	F	0001	0002	30/11/96	A02 (B)	971130-II-1	0.000	
0010	M	0001	0002	22/10/97	A02 (B)	971022-II-3	0.000	
				04/08/01	A10 (L)	-		
0011	M	0001	0003	10/11/97	A02 (B)	971110-III-4	0.000	
				22/11/98	A06 (L)	-		
				05/07/00	A07 (L)	-		
				16/09/00	A16 (L)	-		
0012	M	0001	0002	21/11/97	A02 (B)	971121-II-4	0.000	
				22/11/98	A07 (L)	-		
				14/12/01	A18 (L)	-		
0013	M	0001	0002	26/09/98	A02 (B)	980926-II-5	0.000	
				22/11/98	A07 (L)	-		
				14/12/01	A18 (L)	-		

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH
0014	M	0001	0003	22/10/98	A02 (B)	981022-III-5	0.000	
				22/11/98	A07 (L)	-		
				16/09/00	A16 (L)	-		
0015	F	0001	0002	20/09/99	A02 (B)	990920-II-6	0.000	
0016	U	0001	0003	04/10/99	A02 (B)	991004-III-6	0.000	04/10/99
				16/10/99	NU (D)	-		
0017	M	WILD	WILD	?	UNKOWN	-	0.000	
				08/09/99	A12 (D)	-		
0018	M	WILD	WILD	16/09/99 (?)	A12 (D)	Viejo	0.000	
0019	M	WILD	WILD	16/09/99 (?)	A12 (D)	Stumpy	0.000	
0020	F	WILD	0003	16/09/99 (?)	A12 (D)	Midge	0.000	
0021	F	WILD	WILD	16/09/99 (?)	A12 (D)	Bertha	0.000	
0022	U	0001	0002	19/06/00	A02 (B)	000619-II-7	0.000	
0023	U	0001	0002	19/07/00	A02 (B)	000719-II-8	0.000	29/06/01
0024	U	0001	0003	02/08/00	A02 (B)	000802-III-7	0.000	02/08/00
				14/10/00	NU (D)	-		
0025	U	0001	0003	12/09/00	A02 (B)	000912-III-8	0.000	
0026	U	0001	0002	07/10/00	A02 (B)	001007-II-9	0.000	
0027	U	0018	0020	15/10/00	A12 (B)	Sashi	0.000	
		0019	0021					
0028	U	0018	0020	15/11/00	A12 (B)	Peanut	0.000	
		0019	0021					
0029	U	0001	0003	15/07/01	A02 (B)	010715-III-9	0.000	
0030	U	0018	0020	26/07/01	A12 (B)	-	0.000	
		0019						
0031	U	0001	0002	03/08/01	A02 (B)	010803-II-10	0.000	
0032	U	0018	0020	10/08/01	A12 (B)	-	0.000	
		0019						
0033	U	0001	0003	19/08/01	A02 (B)	010819-III-10	0.000	
0034	U	0001	0003	30/09/01	A02 (B)	010930-III-11	0.000	
0035	M	WILD	WILD	06/10/01	A02 (D)	011006-I	0.000	
				16/12/01	A07 (L)	-		
0036	F	WILD	WILD	06/10/01	A02 (D)	011006-II	0.000	
				16/12/01	A07 (D)	-		
0037	M	WILD	WILD	06/10/01	A25 (D)	-	0.000	
0038	F	WILD	WILD	06/10/01	A25 (D)	-	0.000	

Total studbook population: (13.10.15)

NNM = Natural History Museum, Leiden (Netherlands)
NU = Nijmegen University, Nijmegen (Netherlands)

Part 2:

Studbook *Homopus areolatus*

6. CURRENT LIVING STUDBOOK POPULATION AND TRANSFERS

Live *Homopus areolatus* are located at 6 studbook locations, an increase of 3 since last year: Netherlands (2), USA (1), Sweden (1), Switzerland (1) and Germany (1). Locations A13, A20, A29, KRAAIFTN-ZOO and LONDON-ZOO have transferred specimens, but do not have their collections registered in the studbook registration (most of them do not house *H. areolatus* at the present time).
The total number of live specimens increased from 10 to 19 in 2001. Four new specimens were imported (two died subsequently), 5 were newly registered European captive animals and 3 were born (1 dead in shell).

Husbandry conditions and additional information is available in appendix 2.

One male (0006; previously misidentified as female) was transferred from location A02 to A03 to form a new breeding group at this location. Specimens 0032 and 0033 were transferred from locations outside of the studbook to A03 for the same reason (specimen 0033 is still in quarantine). Specimens 0022, 0023, 0024 and 0027, 0028 were transferred from locations outside of the studbook to locations A21 and A26 (both new locations).

Table I: Current living studbook population *Homopus areolatus* as registered in the studbook. F is female, M is male, U is unknown, B is birth and D is donation. Cage numbers are relative numbers per location, indicating what specimens are housed together.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
LOCATION A02 (1.1.2)									
0004	F	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-		0.000	-
				21/11/97	A02 (D)	971121-IV	1		
0005	M	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-		0.000	-
				21/11/97	A02 (D)	971121-V	1		
0025	U	0005	0004	15/09/01	A02 (B)	010915-IV-1	2	0.000	-
0026	U	0005	0004	15/10/01	A02 (B)	011015-IV-2	2	0.000	-
LOCATION A03 (1.2.0)									
0006	M	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-		0.000	-
				21/11/97	A02 (D)	971121-VI			
				14/04/01	A03 (D)	HZ0738	1		
0032	F	WILD	WILD	?	A29 (D)	-		0.000	-
				15/06/01	A03 (D)	HZ0752	1		
0033	F	WILD	WILD	?	LONDON-ZOO (D)	-		0.000	
				23/12/01	A03 (D)	HZ0793	2		
LOCATION A12 (1.2.1)									
0010	M	WILD	WILD	?	A13 (D)	-		0.000	-
				16/09/99 (?)	A12 (D)	Ernst (A3)	1		
0011	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-		0.000	-
				16/09/99 (?)	A12 (D)	A5	1		
0012	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-		0.000	-
				16/09/99 (?)	A12 (D)	A6	1		
0014	U	WILD	WILD	?	KRAAIFTN-ZOO (D)	-		0.000	-
				16/09/99 (?)	A12 (D)	Baby	3		

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
LOCATION A16 (1.1.1)									
0016	M	WILD	WILD	30/08/94	A16 (P)	-	1	0.000	-
0017	F	WILD	WILD	30/08/94	A16 (P)	-	1	0.000	-
0018	U	0016	0017	23/05/00	A16 (B)	-	2	0.000	-
LOCATION A21 (1.2.0)									
0022	M	WILD	WILD	?	A20 (P)	-		0.000	-
				17/10/01	A21 (P)	-	1		
0023	F	WILD	WILD	?	A20 (P)	-		0.000	-
				17/10/01	A21 (P)	-	1		
0024	F	UNKN	UNKN	?	A20a (P)	-		0.000	-
				17/10/01	A21 (P)	-	1		
LOCATION A26 (1.1.0)									
0027	M	WILD	WILD	?	KRAAIFTN-ZOO (D)	-		0.000	-
				09/07/01	A26 (P)	-	1		
0028	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-		0.000	-
				09/07/01	A26 (P)	-	1		

Total population: (6.9.4)

All specimens together make the total living studbook population 19 specimens. There are no solitary specimens fit for breeding available. Adult specimens are housed in multiple female breeding groups at many locations, but since there are no additional males available this appears the most optimal way to optimise breeding results in the years to come. However, when males would become available, it would be of importance to separate females to form additional blood lines.

Table II: Current living studbook population *Homopus areolatus* as registered in the studbook.

LOCATION	MALES	FEMALES	UNKNOWN
A02	1	1	2
A03	1	2	0
A12	1	2	1
A16	1	1	1
A21	1	2	0
A26	1	1	0
TOTAL	6	9	4

7. IMPORTS, BIRTHS AND DEATHS

The relevant authorities granted permits to export/import 0.1 captive South African *H. areolatus* into the Netherlands and 2.2 into Switzerland in 2001 (see also paragraph 1.6). All five animals were surplus specimens. They are being used to consolidate the studbook population. Unfortunately two specimens (0030 and 0031) died shortly after importing.

Table III: Imports of *Homopus areolatus* in 2001. M is male, F is Female, P is purchase and D is donation.

STUD ID	SEX	DATE OF CAPTURE dd/mm/yy	FIRST CAPTIVE LOCATION	DATE OF ARRIVAL dd/mm/yy	ORIGIN
YEAR 2001					
0027	M	?	KRAAIFTN-ZOO (D) A26 (P)	? 09/07/01	South Africa
0028	F	?	KRAAIFTN-ZOO (D) A26 (P)	? 09/07/01	South Africa
0029	M	?	KRAAIFTN-ZOO (D) A27 (P)	? 09/07/01	South Africa
0030	F	?	KRAAIFTN-ZOO (D) A27 (P)	? 09/07/01	South Africa
0032	F	?	A29 (D) A03 (D)	? 15/06/01	South Africa

Total number of imports: (2.3.0)

The breeding results obtained at location A16 in 2000 were not continued in 2001. The female produced two clutches of two eggs (in January and November), but the first clutch did not result in hatchlings. This may be due to disturbance related to transfers of animals and terrariums while working in the house. The second clutch is still in the incubator.
An interesting observation was made regarding mass changes during egg laying. The female mass was 184 g 3-4 hrs prior to oviposition. One hour after oviposition (2 eggs, 7 and 8 g) the mass was 178 g. The explanation for this limited mass decrease could be rehydration by drinking immediately after egg laying.

At location A12, no eggs or hatchlings were reported in 2001.

The newly imported female at location A03 produced a clutch of three eggs immediately after importing. These eggs did not show any development. Husbandry conditions prior to importing are not known for this specimen.

The couple at location A02, obtained as captive-bred juvenile specimens in 1997, produced the first clutches in 2001. One clutch (2 eggs) was produced 21 June and one on 22 July (3 eggs). All eggs were incubated in (mass ratio) water:vermiculite=1:2 (buried completely), at temperatures fluctuating between 31.5-26.5°C (both 12 hrs per day). Substrate was not rehydrated during incubation. One egg in the first clutch hatched on 15 September and one in the second clutch on 15 October. The second clutch furthermore contained one fully developed but dead embryo. This egg had a crack in the shell and the yolk sac may have been infected. However, this is speculation. The crack may have been caused by a slow dehydration of the incubation substrate. The room in which the incubator is located has a changed heating with higher temperatures. This results in a higher ambient humidity in the incubator and thus a slower dehydration of the substrate. The incubator has been adjusted to a lower ambient humidity for the next season.

The specimens at location A21 showed mating activity, but did not produce any eggs.

Further details about egg incubation and periods can be found in appendix 2.

Table IV: Births of *Homopus areolatus* in 2001. U is unknown.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH dd/mm/yy
0025	U	0005	0004	15/09/01	A02 (B)	-	0.000	
0026	U	0005	0004	15/10/01	A02 (B)	-	0.000	
0031	U	0005	0004	11/11/01	A02 (B)	-	0.000	11/11/01

Total number of births: (0.0.3)

Two of the *H. areolatus* imported from a captive location in South Africa in 2001 died in the same year. Since the specimens appeared to have adjusted to captive conditions, fed well and showed mating activity, it is assumed that they died from a violent bacterial infection. They were kept at a location with many other tortoises (obviously separated from the *H. areolatus*) and both died within just 2 days. Apparently they had no resistance against attracted bacteria.
Apart from the deaths of the two adult tortoises, one hatchling was found dead in the egg shell.

Table V: Deaths of *Homopus areolatus* in 2000. U is unknown, F is female, M is male, B is birth and D is donation.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	DATE OF DEATH dd/mm/yy	AGE AT DEATH yy/mm	PRIMARY CAUSE
0029	M	WILD	WILD	? 09/07/01	KRAAIFTN-Z (D) A27 (P)	09/11/01	?	Bacterial infection?
0030	F	WILD	WILD	? 09/07/01	KRAAIFTN-Z (D) A27 (P)	11/11/01	?	Bacterial infection?
0031	U	0005	0004	11/11/01	A02 (B)	11/11/01	0	Dead in shell, infection yolk sac?

Total number of deaths: (1.1.1)

8. TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current studbook population of the studbook *H. areolatus* consists of 33 specimens. From these, 19 are wild-caught (11 handed to Tygerberg Zoopark by visitors, 1 caught in the Pretoria area in South Africa, 1 had been in captivity in the Netherlands for about 15 years, and 6 originate from unknown locations) and 11 are captive-bred. Nineteen tortoises are alive, housed at 6 locations.

It is obvious that the studbook population *H. areolatus* is still not safe. Mortality has been high over the past years and reproduction is low. However, the current composition of the studbook population potentially allows formation of several different blood lines. For various reasons, breeding results are not optimal yet. Since the species has been reported to reproduce fairly easily in captivity, there is hope that breeding success will increase in the studbook in the near future. At this moment, additional specimens are not required for the studbook to function.

Table VI: Total studbook population *Homopus areolatus*. M is male, F is female, U is unknown, D is donation, B is birth, L is loan and P is purchase.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH
0001	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				14/12/97	LOCATION 5 (D)	HZ0525		09/11/98
0002	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				14/12/97	LOCATION 5 (D)	-		13/08/99
0003	U	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-	0.000	
				21/11/97	A02 (D)	971121-III		29/10/99
				15/12/99	UU (D)	-		
0004	F	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-	0.000	
				21/11/97	A02 (D)	971121-IV		
0005	M	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-	0.000	
				21/11/97	A02 (D)	971121-V		
0006	F	UNKN	UNKN	?	KRAAIFTN-ZOO (B)	-	0.000	
				21/11/97	A02 (D)	971121-VI		
				14/04/01	A03 (D)	HZ0738		
0007	M	WILD	WILD	?	ROTTERD-ZOO (?)	-	0.000	
				?	LOCATION 5 (L)	HZ0457		05/07/98
0008	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				16/09/99 (?)	A12 (D)	A1		19/03/00 (?)
0009	F	WILD	WILD	?	A13 (D)	-	0.000	
				16/09/99 (?)	A12 (D)	Blacky (A2)		30/04/00 (?)
0010	M	WILD	WILD	?	A13 (D)	-	0.000	
				16/09/99 (?)	A12 (D)	Ernst (A3)		
0011	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				16/09/99 (?)	A12 (D)	A5		
0012	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				16/09/99 (?)	A12 (D)	A6		
0013	M	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				16/09/99 (?)	A12 (D)	A7		15/02/00 (?)
0014	U	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				16/09/99 (?)	A12 (D)	Baby		
0015	F	WILD	WILD	?	A13 (D)	-	0.000	
				16/09/99 (?)	A12 (D)	A4		15/02/00 (?)
0016	M	WILD	WILD	30/08/94	A16 (P)	-	0.000	
0017	F	WILD	WILD	30/08/94	A16 (P)	-	0.000	
0018	U	0016	0017	23/05/00	A16 (B)	-	0.000	
0019	U	0013	0011	05/02/00	A12 (B)	-	0.000	05/02/00
0020	U	0013	0011	16/03/00	A12 (B)	-	0.000	16/03/00

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH
0021	U	0013	0011	16/03/00	A12 (B)	-	0.000	16/03/00
0022	M	WILD	WILD	?	A20 (P)	-	0.000	
				17/10/01	A21 (P)	-		
0023	F	WILD	WILD	?	A21 (P)	-	0.000	
				17/10/01	A21 (P)	-		
0024	F	UNKN	UNKN	?	A20a (P)	-	0.000	
				17/10/01	A21 (P)	-		
0025	U	0005	0004	15/09/01	A02 (B)	010915-IV-1	0.000	
0026	U	0005	0004	15/10/01	A02 (B)	011015-IV-2	0.000	
0027	M	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				09/07/01	A26 (P)	-		
0028	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				09/07/01	A26 (P)	-		
0029	M	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				09/07/01	A27 (P)	-		09/11/01
0030	F	WILD	WILD	?	KRAAIFTN-ZOO (D)	-	0.000	
				09/07/01	A27 (P)	-		11/11/01
0031	U	0005	0004	11/11/01	A02 (B)	011111-IV-3	0.000	11/11/01
0032	F	WILD	WILD	?	A29 (D)	-	0.000	
				15/06/01	A03 (D)	HZ0752		
0033	F	WILD	WILD	?	LONDON-ZOO (D)	-	0.000	
				23/12/01	A03 (D)	HZ0793		

Total studbook population: (8.16.9)

UU = Utrecht University, Utrecht (Netherlands)

Part 3:

Studbook *Homopus femoralis*

9. CURRENT LIVING STUDBOOK POPULATION AND TRANSFERS

Live *Homopus femoralis* are located at 2 studbook locations in the Netherlands. The total number of live specimens is 3. All were obtained from the British Tortoise Trust, that had rescued the specimens from a private keeper in the UK.

Table I: Current living studbook population *Homopus femoralis* as registered in the studbook. F is female, M is male, D is donation and L is loan. Cage numbers are relative numbers per location, indicating what specimens are housed together.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
LOCATION A02 (1.1.0)									
0001	M	WILD	WILD	?	A28 (D)	-		0.000	-
				23/12/01	A02 (L)	011223-I	1		
0003	F	WILD	WILD	?	A28 (D)	-		0.000	-
				23/12/01	A02 (L)	011223-II	1		
LOCATION A03 (1.0.0)									
0002	M	WILD	WILD	?	A28 (D)	-		0.000	-
				23/12/01	A08 (L)	-	1		
Total population: (2.1.0)									

All specimens together make the total living studbook population 3 specimens. One male fit for breeding purposes is housed solitarily at location A08.

Table II: Current living studbook population *Homopus femoralis* as registered in the studbook.

LOCATION	MALES	FEMALES	UNKNOWN
A02	1	1	0
A08	1	0	0
TOTAL	2	1	0

10. IMPORTS, BIRTHS AND DEATHS

Since the studbook for this species has started only recently, with just 3 specimens, there have been no imports, births or deaths. However, mating attempts have been observed at location A02.

11. TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current studbook population of the studbook *H. femoralis* consists of 3 specimens, all wild-caught (rescued long term captive animals). All three are still alive, housed at 2 locations.

It will be attempted to keep and breed this species successfully, before planning any future activities. However, the single male at location A08 will be borne in mind in case a female tortoise would become available at a captive location (for instance a South African zoo). If keeping and breeding will be successful, plans might be made to develop the studbook further to allow more extensive gathering of data on this poorly known species.

Table III: Total studbook population *Homopus femoralis*. M is male, F is female, D is donation and L is loan.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH
0001	M	WILD	WILD	?	A28 (D)	-	0.000	
				23/12/01	A02 (L)	011223-I		
0002	M	WILD	WILD	?	A28 (D)	-	0.000	
				23/12/01	A08 (L)	-		
0003	F	WILD	WILD	?	A28 (D)	-	0.000	
				23/12/01	A02 (L)	011223-II		

Total studbook population: (2.1.0)

12. LITERATURE ABOUT *HOMOPUS*

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Annual report 1995-1997
Annual report 1998
Annual report 1999
Annual report 2000
General information sheet Homopus Research Foundation
Studbook information sheet Homopus Research Foundation
Caresheet *Homopus areolatus* in Dutch
Caresheet *Homopus s. signatus* in Dutch

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Population dynamics, behaviour and natural diet of the Namaqualand speckled padloper (*Homopus s. signatus*) - 2000

Population dynamics, behaviour and reproduction of the Namaqualand speckled padloper (*Homopus s. signatus*): Enhancing our knowledge - 2001

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Appendix 1

Husbandry conditions and additional information per location *Homopus s. signatus*

The information below is the same as presented in the previous annual report, with additional information/replacements in case there were changes in the current year.

Location A02

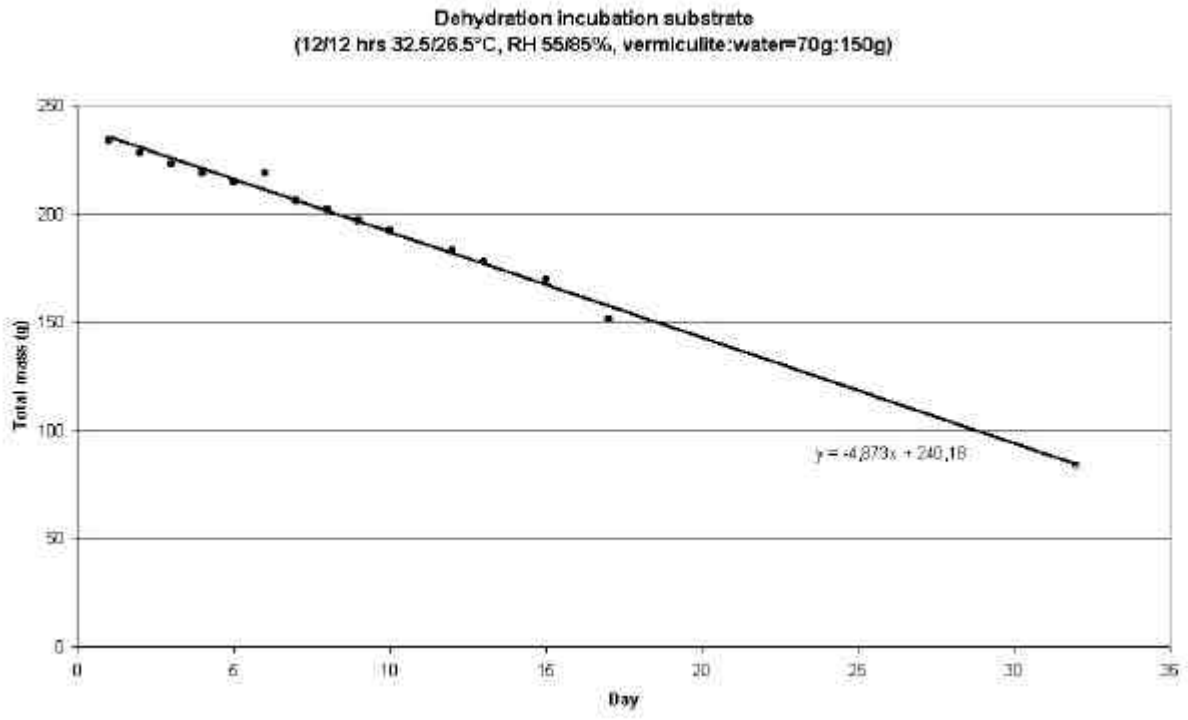
Husbandry conditions have been described in detail and have been published in several articles by Victor Loehr (see chapter 12). It is attempted to change the conditions as little as possible. However, in 2001 some major changes have occurred:

In July, the previous enclosure of the adult breeding group of *H. s. signatus* has been changed for an open enclosure, measuring approximately 185/135 x 150 cm (total size is 185/120 x 300 cm, with one half separated for an adult couple *H. areolatus*). This enclosure is situated directly at a large south/south-east facing window, allowing it to be illuminated by natural (sun)light. It contains a deep soil layer (10 cm fine gravel) throughout the enclosure, except in rock crevices to facilitate tracking of nests. Real rocks have been used as decoration and to form hiding places, together with wood, live plants originally occurring in Namaqualand, et cetera (see photograph).

The enclosure is heated by three 150 W halogen lamps at 55 cm above the soil surface. They also provide some illumination when the sky is clouded. The room in which the enclosure is located is furthermore heated by other open enclosures and by natural sunlight. Central heating may be used for extra heating in spring, when required. All lights are switched via an astrotimer time control unit, adjusting photoperiod automatically to 34° latitude (northern hemisphere). The window that borders the enclosure opens automatically at night when temperatures are above 5°C and in summer an air-conditioning unit is used for additional cooling capacity (maximum night temperature 20°C). A PC-

datalogger records the highest and lowest temperature in the enclosure every 2 minutes (installed recently; results will be presented in the 2002 annual report). The enclosure is sprayed once weekly in summer, increasing to four times weekly in winter and spring.
Apparently the adult tortoises have gradually adapted to the much more favourable climatic conditions in captivity. They are more active throughout the year, if compared to the period just after importing, and mating takes place in all months (peaking in early spring). Oviposition starts earlier than previously and ends later, but is still confined to the spring season.
The hatchling and juvenile enclosures are as described previously, but juveniles and hatchlings are soaked three times weekly for 10 minutes to prevent dehydration. The newly imported adult couple (specimens 0035 and 0036) was kept similar as the originally imported wild-caught specimens at this location, until 0035 and 0036 were transferred to location A07 in December. They were provoked to start feeding by offering wet green *Taraxacum* and endive leaves after spraying the enclosure. The tortoises started to drink from these leaves, but soon started to feed on them. Flowers were refused. The behaviour of these specimens was rather restless during the first 1-2 weeks, but became more relaxed thereafter.
Adults are fed four times weekly, hatchlings six times weekly, until they reach an age of two years. The diet has been reduced to endive and chicory (*Taraxacum*, *Plantago*, *Trifolium* and *Vicia* between April and November) added with 'heucobs' (mixture of large number of dried plant species compressed in pellets, soaked before feeding) and a calcium/vitamin supplement (Gistocal). A water bowl (23ìg vitamin D_3 per litre) is available in all enclosures at all times.

The incubator (see chapter 12) has been changed as well. A second electronic thermostat protects the eggs against overheating (maximum 33°C) in case the main thermostat would fail. Furthermore, the time control unit that was used to apply a diurnal temperature cycle of 12/12 hrs has been replaced for an astrotimer. This results in varying diurnal heating periods during the year, with longer days in early eggs than in late ones. The figure below shows the rate of drying out in a typical container with substrate in the incubator.



Location A07
The following applies to the keeping of specimens 0007, 0012 and 0013. These specimens were transferred in December, and specimens 0035 and 0036 were acquired instead. Female 0007 was kept separated from (related) males 0012 and 0013 from January, to prevent mating activity. The males were exchanged between terrariums 1 and 2 weekly.

Enclosures
The enclosure of female specimen 0007 and alternating males number 0012 and 0013 measures 120 x 60 cm (divided in two compartments), and has a soil consisting of sand. Further decoration consists of a pile of stones. The enclosure is illuminated by means of one 36 W tube light, and two 50 W halogen spots. These keep the temperature at 30°C, and under the spots >45°C. Using an Astrotimer, photoperiod in autumn is automatically reduced to 9 hours, and in summer it gradually increases to 13 hours.

When one of the males is not housed in the enclosure described above, it is housed in a separate enclosure measuring 60 x 27 cm, with a soil layer consisting of sand. In this enclosure there is also a pile of stones available. The enclosure is illuminated and heated using a 50 W halogen spot, providing the same temperatures as in the first enclosure. Photoperiod is also controlled in the same way. Males are exchanged every week.

Feeding
The tortoises are fed daily on fresh green leaves collected outside (*Taraxacum*, *Trifolium*, grasses, et cetera), endive, romaine lettuce, cut fruits (apple, pear, melon, berries) and legumes (cucumber, zucchini, paprika). A calcium/vitamin supplement (Vitakalk, Vitakraft) is always added.

Water
Plain water is provided once weekly in a water bowl. In summer a dry season is simulated, with water being provided only once every 2 weeks. During this period they are also fed less frequently, with food items containing less water.

Climate

May-July:	Introduction to dry season, with reduction of food and water
July-October:	High temperatures and dry conditions
November-May:	Gradually decreasing (till approximately 30°C) temperatures. Spraying of the enclosure. Water and food available.

Date	0012		0013		0007	
	Mass (g)	SCL (mm)	Mass (g)	SCL (mm)	Mass (g)	SCL (mm)
15/01/00	66	76	62	75		
15/02/00	65	77	63	75		
15/03/00	66	77	65	75		
15/04/00	66	78	67	75		
15/05/00	77	80	67	75		
15/06/00	78	82	66	75		
15/07/00	79	82	66	75		
15/08/00	80	78	66	75		

Date	0012		0013		0007	
	Mass (g)	SCL (mm)	Mass (g)	SCL (mm)	Mass (g)	SCL (mm)
15/09/00	82	82	68	76		
18/10/00	70	82	68	78	133	90.1
15/01/01	66	76	62	75	130	90.1
15/03/01	72	77	63	75	138	91
15/06/01	78	77	65	75	142	91
10/09/01	75	78	63	75	135	91
18/11/01	87	82	67	79	148	91

Location A10

Specimens 0006 and 0010 have been transferred to location A10 only recently and therefore it is not yet possible to write in detail about husbandry.

Enclosure

Both males are housed separately in enclosures measuring 120 x 60 x 60 cm. Several retreats have been constructed in each enclosure, using different materials (rock, wood). Soil consists of 5 cm of Rhine sand with a layer of small gravel (Humagran feeding granulate) on top of it. The enclosures are illuminated by means of a 100 W halogen spot each. The photoperiod is gradually decreased to 11 hrs in winter. Spraying intensity increases to three times weekly in winter.

Feeding

The tortoises are fed three times weekly, supplemented with a calcium/vitamin preparate (Gistocal). They receive drinking water five times weekly.

Location A12

The tortoises are being kept in a wooden enclosure 183 x 61 x 61 cm. Overhead lighting is provided via two 122 cm Vitalite Power twists. Lights are changed annually to provide a seasonal light cycle. I am using a coarse sand substrate similar in texture to that found in their natural environment, but different in color (brown/grey not reddish). Five shelters/hides are located throughout the habitat. They are constructed by stacking flat rocks. All are used at one point or another, often communally.

Heat is provided via basking lights only. There is a primary 25 W red basking light that goes on 1 hour prior to over head lighting, and goes off one hour prior to the end of the photoperiod. A second basking light in the tank kicks on for 3 hours per day at mid day (this is changed annually to provide seasonal variation). The temperature at this end of the tank during those hours reaches above 37°C. This is being done to simulate mid day high temperatures experienced in their natural environment. The tortoises have been observed basking at this time. Using this method, the tortoises are provided with a night time gradient of 24-25°C degrees at night, and 31-39°C during the day.

Water is left in the tank at all times and is changed (at least) daily. They have been observed drinking from it. My animals are fed every other day. Their diet consists of fresh and dried greens (dandelion, kale, romaine, et cetera with chopped timothy hay for the dry portion) and some type of vegetable. All meals are supplemented with Miner-all brand calcium. This calcium has no vitamins in it, so Nekton Rep Color vitamins are provided once a week (sprinkled over food stuffs). They show a fondness for green beans, seedless cucumber, grated carrot, yellow and green squash, bean sprouts and the occasional piece of

fruit (strawberry or grated apple) I have also fed them rose, dandelion and Rose of Sharon blossoms on occasion.
I have a long term captive male *H. signatus* that I am housing individually in a glass aquarium under the same conditions. I am hoping to find a female of unknown origin that this individual could be paired to.
I have de-parasitized all specimens at this point. All are doing well.

As far as incubation goes, I use vermiculite and filtered water at a 1:3 ratio. The egg is placed only slightly into the substrate. I begin monitoring the egg (candling) after about 30 days to track humidity levels. I check the egg about once a week which also provides me an opportunity to allow fresh air into the incubator. I end up adding about 3cc of water around the egg once a week during the last four to six weeks of incubation, *but*, only because the incubator I use dries out quickly. I imagine much about incubation technique is determined by equipment. I am using a Hovibator styrofoam incubator.
Hatchlings are placed in an aquarium after the yolk sac has disappeared upon hatching. The aquarium has a paper towel substrate, overhead florescent lighting and a 60 W incandescent heat lamp in one corner. The first week a damp rolled up paper towel is kept in to provide a high humidity retreat. Fresh water is provided at all times. Each hatchling is physically placed in the water dish at least twice a week to assure proper hydration, but they seem to have no problems finding or drinking from standing water.
Their daily diet consists primarily of dandelion greens supplemented with calcium and vitamin D_3. Either grated carrot, tomato, grated apple, broccoli, sliced green beans or chopped peaches are offered twice a week.
The hatchlings from 2000 are doing very well at this point. Shashi is weighing in at 26 g and Peanut at 22 g. I am noticing a very slight hint of pyramiding.

Location A16
There are two males of *Homopus s. signatus* at our location and the caretakers are Janne and Sonja who do equal part of the work with the tortoises.
Tortoises are kept in two separate terrariums with a floor area of 100 x 50 cm and with an open top in a display system containing twelve enclosures like these. Heating and light is obtained from a 40 W spotlight approximately 33 cm above the soil surface in each enclosure and 36 W tube lights that are each used for several of the cages. Tube light type is 5.0 UVB (Zoo-Med). The tube lights are about 33 cm from the soil surface as well. The terrariums are made of plastic and are easy to pull out to do proper cleaning. Everything in the enclosures is disinfected about two times a year when all soil is changed. No heating mats are used but the spotlights and tube lights heat the enclosures in each upper row. The room has a window facing south, so natural sunlight and photoperiod variation is provided. Moreover, tube lights have been constructed on the ceiling of the room to provide extra light. These are switched via a timer.
The soil in the enclosures consists of fine, but almost dust free sand with a depth of about 2-3 cm, with one part 4-5 cm that is kept slightly moist. There are hiding places consisting of cork bark and we put in some dried grass that are used both as hiding places and food. Hiding places cover the tortoises completely when they hide and they are used each night, except when it is very warm in summer. During those nights they select open areas to rest.
Fresh water is present at most times. Feeding frequency during April-November is about 3-4 times per week (green leaves collected outside, mainly dandelion, clover and some grasses). Food is supplemented with calcium, vitamin D_3 and some multivitamins. We do not give this with every feeding, but calcium every other week and vitamins about once or twice a week. In winter (December-March) we feed once or twice per week and use mostly dried grass that we collect and dry during summer. This is supplemented with some carrot, apple, tomato and ruccola that we buy. Tortoises experience a northern hemisphere climatic cycle:

December-March:	6-8 hrs light
April-May:	8-10 hrs light
June-September:	12 hrs light
October-November:	8-10 hrs light

In spring and autumn the cage is kept a little more humid and we try to spray at least once a day. Usually in the morning or evening, but after having experienced Namaqualand spring we will increase the humidity slightly in the next year. Relative humidity in our house is low, usually around 35-40%. Once in a while we soak the tortoises and they normally drink and deposit faeces then.

Temperatures (°C) in the terrariums are approximately as following (not under spotlight):

December-March:	Day 22; Night 17-18
April-June:	Day 25; Night 22
July-August:	Day 26-28; Night 24
September-October:	Day 25; Night 22
November:	Day 22; Night 18-20

Some measured weights (g; measured incidentally):

Date	0011	0014
03-11-00	54	59
05-01-01	57	63
04-02-01	62	76?
05-03-01	62	69
07-04-01	61	69
07-08-01	62	70
07-12-01	62	69

Location A25

Housing
Size enclosure: 150 x 80 cm

Decoration
Flagstones, mopani wood stumps, rocks. Substrate is fine gravel.

Inhabitants
1.1 *Homopus s. signatus*, imported from South Africa on 6 October 2001.

Heating
1 x 80 W spot light (Phillips)
1 x 150 W halogen lamp
1 x 36 W daylight tube light (Philips TLD 36W)
At night no additional heat source is provided

Illumination
Since these specimens have recently been imported they are exposed to 14 hrs of light per day (South African summer season). In the morning (8:00 hrs) the spot and the halogen bulb are switched on. One hour later the tube light is switched on. In the evening (21:00 hrs) the tube light is switched off and one hour later the bulbs.

Climate - photoperiod and temperature
Currently 14 hrs. A scheme has been drawn up to adjust the specimens to the northern hemisphere climatic cycle. To achieve an adjustment to the northern hemisphere the scheme below will be used. Temperature 25-32°C at daytime, 18-20°C at night.

Climate - humidity
Air humidity is low but three times a week (Tuesday, Thursday and Sunday) the enclosure is sprayed. The amount of water used for spraying will be adjusted to the season.

Month	Jan '02	Feb '02	Mar '02	Apr '02	May '02	Jun '02	Jul '02	Aug '02	Sept '02	Oct '01	Nov '01	Dec '01
Temp (°C)	29	25	25	29	29	32	32	32	29	32	32	29
Photoperiod (hrs)	12	9	9	12	12	14	14	14	14	14	12	12
Spraying intensity	+/-	+	+	+	+/-	+/-	+/-	-	-	-	+/-	+/-

Feeding (frequency, composition, supplements)
No feeding observations so far. But there are some signals that the animals do feed. The animals gain weight and leaves of *Taraxacum* disappeared.
Drinking water is provided with the aid of a pipette. Two weeks after this method had been attempted for the first time, the female drunk 15-20 ml water. The female pushed her nostrils to a rock to drink.
Water is offered daily, but the animals drink 1-2 times a week. A water bowl is also present at all times.

Behaviour
First two weeks the tortoises showed stressful behaviour. During this period the animals where separated. A plank divided the enclosure in two equal parts.

In an attempt to reduce stress (characterised by restlessly digging against the plank and running against the glass front pane) I removed the plank. This resulted in a switch of most used hiding places for both specimens. The female, which was positioned right, found a place on the left side. The male, placed left, uses the right side more frequently now. After a month the animals make a less stressed appearance.

Growth
Not sufficient data available because of short time span in captivity. Weight of female is 162 g and male 80 g. Weight at arrival was 171 and 86 g. Weight loss of the female is mainly due to egg laying (see below). Male weight has dropped slightly but has been stable for weeks now.

Reproduction
One egg produced on 6 November, weighing 12 g. Egg was dropped in a crevice. Incubation is currently in progress. Egg appears to be fertile.

Appendix 2

Husbandry conditions and additional information per location *Homopus areolatus*

The information below is the same as presented in the previous annual report, with additional information/replacements in case there were changes in the current year.

Location A02
The previously described enclosure of the adult breeding couple has been changed for a new enclosure similar to that described for *H. s. signatus* at the same location (see appendix 1 and photograph below). This compartment of the enclosure is sprayed with a higher intensity to provide slightly more humid conditions. Furthermore, decoration and hiding places consist mainly of wood instead of rocks.
Feeding and further husbandry methods are similar to those for *H. s. signatus*.

The tortoises typically spend mornings basking under the spot lights, after which they become very active and start searching for food. They are fed in the morning, before the lights switch on. After feeding they tend to retreat. Both at that time, and during the night, they sometimes dig into the soil for a few centimetres, under a log or plant. They rest at open sites more frequently than *H. s. signatus*.
The hatchling enclosure consists of a 50 x 30 cm open aquarium with a 3 cm humid soil layer of peat/sand (ratio 2:1). Dead leaves and several pieces of cork provide shelter. The enclosure is heated and illuminated with a 25 W spot light, positioned 20 cm above the soil surface. The enclosure is placed in the same heated room as the enclosure of the adults. It is sprayed intensively every other day, and the hatchlings are soaked three to four times weekly. Growth proceeds smoothly under these conditions. The hatchlings are mainly inactive and stay in the vicinity of the spot light. Approximately half of the enclosure is never used.
See appendix 1 for details about the incubator used for *H. areolatus* eggs.

Location A12
The adult group at this location is housed in an 152 x 61 x 30 cm (l x w x h) enclosure. Temperature is maintained at 38.3°C during the day, and 23.9°C during the night. Relative humidity fluctuates between 19-37%.
A single juvenile specimens is kept separately, in an enclosure measuring 76 x 30 x 30 cm (l x w x h), at the same temperatures and relative humidity.

Location A16
There are three *H. areolatus* at our location, one adult couple and one juvenile that born in 2000. Keepers are Janne and Sonja who do equal parts of the work with the tortoises.
The adult tortoises are kept in a terrarium with a floor area of 100 x 60 cm, with a height of 50 cm. It is a standard terrarium with sliding glass doors and top ventilation with some ventilation situated in the lower front. It is constructed from glass and aluminium. Heating and light is obtained from a 40 W spotlight about 32 cm above the soil surface, one half of a 36 W tube light situated above the glass top, and a small heating mat under a part of the cage. Before 1 October the spotlight was a normal one, but it was changed for a Neo Lux 40 W (EuroZoo) that is supposed to provide some amount of UV-A and UV-B. Earlier (2000) we were using 18 W UVB tube lights, but we stopped this in 2001. Because of disappointing breeding results we decided to try UVB incandescent lights. This is probably not a solution for improving the breeding results and when it will not be successful we will change back to previous husbandry methods. Soil in the terrarium consists of fine sand with a depth of 4-5 cm and an egg laying site of sand that is about 6-7 cm deep. The egg laying area is situated at the heating mat, providing a temperature of about 26-35°C depending of depth and exact site, and of course time of the year (no heating during winter).
During their activity period from March to December, they stay in open areas during about 30% of the nights so one will find them in the open quite often. In this period, they are active during the day and often mating behaviour can be observed (several times a week). The male follows the female and is often in front of her 'looking in her eyes' and almost stretching his front limbs forward completely. Courtship is quiet and gentle, not as aggressive as in my other tortoises. After following her and 'looking in her eyes' for a while he can usually mount her without disagreement. Then there is the usual tortoise vocalisation.
Water is provided at all times and food is offered about 3-4 times a week during April-November and about once or twice a week in the rest of the year. Food consists mostly of dandelions, clover and some grass, collected outside. This is supplemented with calcium, vitamin D_3 and some multivitamins. We do not give this with every feeding but calcium every other week and vitamins about once or twice a week. In winter we feed about once or twice a week and use mostly dry grass that we collect and dry during summer. This is supplemented with some carrot, apple, tomato and ruccola, that we buy. We keep the photoperiod like it is on the northern hemisphere:

January-March:	6-8 hrs light
April-May:	8-10 hrs light
June-September:	12 hrs light
October-December:	8-10 hrs light

In spring and autumn the enclosure is kept a little more humid and we try to spray with water at least once a day, usually in the morning or evening. Having experienced South African spring, we will increase the humidity more in the next year. Relative humidity in our house is low, usually around 35-40%. Once in a while we soak the tortoises and they normally drink and deposit faeces then.
Approximate temperatures (°C) in the terrarium during the year are as following:

January-March:	Day 22; Night 18-19
April-June:	Day 25; Night 22-23
July-August:	Day 26-28; Night 25-26
September-October	Day 25; Night 22
November:	Day 22; Night 20

The juvenile is kept in a small terrarium of 50 x 50 cm in the same room and is treated the same as the adults, although it is soaked every 3-4 days. During the first half year of its life it was soaked daily. However, it grew to rapidly, resulting in lumpy shell growth. Diet is the same as that of the adults. This

may be too much for normal growth too. Last, we think that the initial humidity in the enclosure (around relative humidity of 40%) could have been too low.

The following weights (g) have been noted:

Date	Male	Female	Juvenile
22-01-00	116	174	
22-01-00		152 (produced two eggs of each 8 g)	
22-02-00	104	161	
10-03-00	103	172	
30-03-00	110	187 (after drinking)	
08-04-00	111	177	
20-04-00	107	177	
17-06-00			6
21-06-00	115	180	
08-07-00	118	186	6
03-11-00	111	184	19
30-12-00	124	183	23
05-01-01	121	179	20
07-01-01		185 (produced two eggs of 6 and 7g earlier in week)	
04-02-01	117	190	25
05-03-01	115	189	34
07-04-01	112	192	37
03-06-01			46
07-08-01	116	190	56
06-11-01		184 (produced two eggs of 7 and 8 g 3-4 hrs later)	
06-11-01		178 (produced two eggs of 7 and 8 g 1 hr before)	
	125	196	58

During November 2000 - March 2001 we did some work on our house and had to move animals and terrariums from room to room. This has caused a lot of disturbance during the spring season and had *H. areolatus* eggs late in the year. At the moment of writing the female is quite heavy and we will keep the tortoises at summer temperatures during December awaiting a possible second clutch.

The incubation method for the hatched egg was 26/32°C for 12/12 hrs in vermiculite that was moistened 1:3 with water (weight based ratio). The egg was only slightly buried.

Location A21

The male is housed in a terrarium 100 x 50 x 50 cm. The lighting is composed of 2 x 20 W halogen spots and a 18 W 'true light' tube. The females share a terrarium 150 x 50 x 35 cm but they are kept seperated by a board. This terrarium has 3 x 20 W halogen spots and a 30 W 'true light' tube.
The temperature is at daytime 25 to 28°C. At night the temperature drops to 20°C. The true light tubes are on for 8 hrs, the halogen spots are on for 12 hrs.
The tortoises have access to fresh water all the time and the enclosures are sprayed early in the morning every day. Every two weeks the tortoises are soaked for 30 minutes. At this time they defecate.
I am going to turn the temperature down to 10 to 15°Celsius for 6-8 weeks, as I did last year. During this time the specimens will receive no food.
The enclosure soil is composed of fine pine bark (2-8 mm). The tortoises are fed with wild greens, flowers and (in winter) different salads, especially romana lettuce and dried flowers.

Appendix 3

Husbandry conditions and additional information per location *Homopus femoralis*

Since the *H. femoralis* present within the Homopus Research Foundation have only been acquired weeks ago, currently no husbandry details have been included. These will be added in the 2002 annual report.

Appendix 4

Financial report Homopus Research Foundation

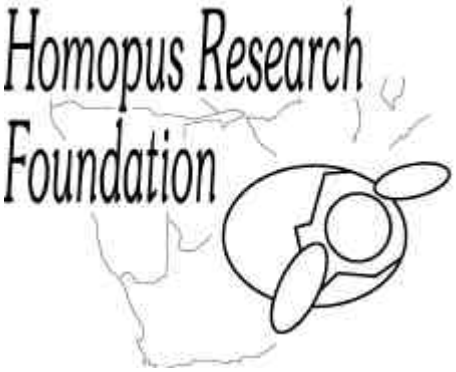
Appendix is not available in this internet version of the report. Please contact the Homopus Research Foundation.

Appendix 5

Example agreement HRF and studbook participants

Agreement studbook participant

Version 2, 2 November 2001



Introduction

The studbooks under auspices of the Homopus Research Foundation have entirely or partially (depending on the species) been set up with tortoises obtained from southern African organisations or collected in the wild, permitted by the local governments. The provided exporting permits contain a number of conditions and in the case of permits issued by Northern Cape Nature Conservation (South Africa) an agreement between the latter organisation and the Homopus Research Foundation has been drawn up. In all cases, the main conditions are that specimens and their offspring may not be used for commercial purposes, should remain registered in the studbook and the permit issuing organisation should be informed on developments with regard to the specimens. Since the very beginning the *Homopus* studbooks have been set up as strictly non-commercial activities and annually studbook reports are being drawn up to inform others.

The studbooks are growing, to become increasingly difficult to manage with many locations in different countries. At the same time, the Homopus Research Foundation wishes to meet all permit conditions and agreements. This makes it important to translate these into an internal agreement. If the foundations fails to meet the conditions and agreements, this might result in denial of any future permits. All studbook participants are supposed to take their responsibility not to carry out any activities that might harm the Homopus Research Foundation.

The following summarises the most important do's and don'ts. Adding your name, signature and date indicates that you agree with the conditions to participate in the studbooks supervised by the Homopus Research Foundation.

Agreement

I agree with the following:

All specimens:

- Tortoises in the studbook may not be used for any commercial purposes
- All genetically related offspring should be registered in the studbook
- Changes in the studbook data (births, deaths, transfers) should be send to the board of the foundation immediately
- Some brief information on husbandry and breeding should be send to the board annually on request

Specimens property of the Homopus Research Foundation (currently all *Homopus s. signatus*, except the US population):

- Tortoises and all genetically related offspring remain property of the foundation, the board will act as a formal owner
- Keepers must register all other specimens of the same species (if they keep those) if they also keep studbook animals
- Directions from the board of the foundation regarding (re)combinations of specimens, transfers and whether or not to breed with specific specimens, must be followed
  Note: In all cases it will be attempted to reach a decision in good harmony by discussing the issue
- In case a participant wishes to stop keeping tortoises, the foundation should be given a reasonable period of time to find alternative locations for the tortoises

- Deviations from these conditions are only possible with explicit consent of the board of the Homopus Research Foundation

Name:

Signature:

Date:

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