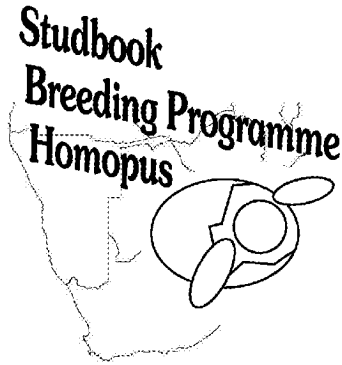
Studbook
Breeding Programme
Homopus



Annual Report

1998

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Since 1992 several Dutch herpetological societies have initiated a total of 60 studbook programmes. Strictly no commercial aspects are related to the studbooks. In 1997, all have been collected in an independent overall foundation; 'Stichting Overkoepelend Orgaan Stamboeken' (SOOS). The Studbook Breeding Programme *Homopus* is one of few studbooks operating world-wide.
The aims of the studbook programmes in general are:

- Collecting data on species and distributing these, especially among studbook participants
- Setting up (genetically) healthy captive populations

As wild populations of many reptiles and amphibians are under increasing pressure, it is important to collect data on the species. In some cases, gathered knowledge could be used for developing sound wildlife management if necessary. More important, efficient distribution of gathered knowledge among persons that keep the species in captivity, ultimately will allow the species to be bred in captivity in larger numbers. If captive breeding is carried out sound, the captive population could offer possibilities for future introduction projects.
When a reproducing captive population is present, this will decrease the number of wild specimens of the species taken from the wild for the live animal trade.

INTRODUCTION AND GENERAL ACTIVITIES IN 1998

This report is updating the one of the former Studbook *Homopus s. signatus*, that was prepared in 1997 and covered the period from 1995 to 1997. Since December 1997, the Studbook *Homopus s. signatus* has been included into the Studbook Breeding Programme *Homopus* and also a studbook on *Homopus areolatus* has been included with a small number of captive specimens. The Studbook Breeding Programme *Homopus* is aiming to gather and distribute as much information about species of the genus *Homopus* as possible. An information sheet containing the aims and methods of the studbook breeding programme has been prepared and may be obtained from the studbook coordinator. The programme's logo can be seen on the the cover of this report.

The year 1998 has been an extremely productive year with respect to activities of the studbook breeding programme. In the next paragraphs, an overview of all activities is presented.

Publications and presentations (see also LITERATURE)

In January 1998, a manuscript containing detailed information about husbandry, behaviour and captive breeding of *H. s. signatus* was submitted for publication in *Chelonian Conservation and Biology*. The reviewed manuscript was returned in October and the revised version will be published in the journal due out in December 1998 or July 1999.
Two additional manuscripts have been submitted and accepted for publication in *African Herp News*. The first one is dealing with dietary requirements of captive hatchling *Homopus s. signatus*, and the second one is dealing with the adjustment to northern hemisphere captive climatic conditions of southern hemisphere reptiles.
A final manuscript has been submitted for publication in *African Herp News* and contains information about the natural diet of *H. s. signatus* and *H. signatus cafer*.

At the symposium of the Herpetological Association of Africa at the University on Stellenbosch in September 1998, a poster about captive breeding of *H. s. signatus* was presented.

Internet site

In order to facilitate the exchange of information between participants and enthousiasts of the Studbook Breeding Programme *Homopus*, an internet site has been prepared and posted (http://www.homopus.org). Some of the studbook results as presented in this report are present online, together with information about *H. s. signatus*, *H. signatus cafer* and *H. 'bergeri'*.

Journeys

Both South Africa and Namibia were visited in 1998. South Africa was visited by the studbook coordinator in September and by two participants in October/November and November/December respectively. Namibia was visited by the coordinator and one of the participants, in September/October and October/November respectively.
Apart from presenting the poster at the symposium in Stellenbosch, an expedition was joined for collecting *H. signatus cafer* for Tygerberg Zoopark (Kraaifontein, South Africa). Participants of the zoopark were Tamara Harris-Smith (reptile curator) and Mr J. Spence (director). Furthermore, the habitat of *H. s. signatus* near Springbok was visited once more and it was found to be extremely dry this year. No tortoises were found. In Namibia, the habitat of *H. 'bergeri'* was visited near Aus. Only dead specimens were found.
Furthermore, a keeper and breeder of *H. 'bergeri'* was visited in Namibia. A lot of information was exchanged and future communications were planned.

Some of the information about the 1998 journeys has been posted on the programme's internet site.

Research

The Studbook Breeding Programme *Homopus* has been asked to cooperate in a study on microsatellite DNA in (South African) tortoises of the University of Cape Town (Jessica Cunningham). In order to find out how microsatellite DNA has evolved over evolutionary time, DNA samples are needed from specimens with known parent - offspring relationships. It is planned to collect blood samples of all *H. s. signatus* within the studbook and to send these to South Africa for analysis.

Contacts

From the database of the International Species Information System (ISIS), it appears that *H. signatus* is present in three zoos in the USA; Knoxville Zoological Gardens, Wildlife Conservation Society (Bronx) and St. Louis Zoological Park. Some of these organisations even have bred the species in captivity. An attempt has been made to contact the organisations in order to ask whether they would be interested to participate in the Studbook Breeding Programme *Homopus* and to exchange hatchlings to prevent inbreeding in future generations. Unfortunately, none of the organistions has replied to the apply.

PLANS FOR ACTIVITIES IN 1999

Most activities in 1998 featured *H. signatus* and *H. 'bergeri'*. Also in 1999 these species will be emphasized. However, efforts will be put in the studbook *H. areolatus* as well, aiming at interesting persons that keep this species (legally obtained) to participate in the Studbook Breeding Programme *Homopus*.

Presentations

In January 1999, a lecture about captive management and observations in the wild of *H. s. signatus*, *H. signatus cafer* and *H. 'bergeri'* will be presented at a symposium of the Austrian *Schildkrötenfreunde Österreich*.

Internet site

The internet site will gradually increase in size. The person that is keeping and breeding *H. 'bergeri'* in Namibia has agreed to write a manuscript about his experiences. Presumably a summary of it can be posted on the internet site.
All papers published within the studbook breeding programme will be posted on the site as well.

Journeys

South Africa and Namiba will be visited again in 1999, with two main goals. Firstly, the habitat of *H. 'bergeri'* will be studied more intensively, possibly including a search in an area from which the species has not been described yet but that looks suitable. Secondly, preparations will be made regarding the intended research project on *H. signatus* in 2000 (see also *Research*).

Research

Existing plans to realise a research project on wild *H. signatus* in August/September 2000 will be processed in detail in 1999, resulting in a research proposal for obtaining necessary permits and funds. Aspects that could be studied are (among others) reproduction, natural diet and population dynamic characteristics. Nicolas Bayoff -who has carried out a previous study on *H. s. signatus* in 1991/1992- will participate in the project and Mrs Hofmeyr from the University of the Western Cape has been proposed to combine efforts with existing plans of the university for an ecophysiological study. Two field assistents will participate; Tom Licitra from the USA and Tamara Harris-Smith from Tygerberg Zoopark (Kraaifontein, South Africa).

Contacts

Efforts to contact Knoxville Zoological Gardens, Wildlife Conservation Society (Bronx) and St. Louis Zoological Park will be continued, as exchange of captive-bred *H. s. signatus* in order to prevent inbreeding in the studbook population in the future is considered of utmost importance.
Regarding contacts with zoological institutions, it is considered desirable for the Studbook Breeding Programme *Homopus* to participate in ISIS. In 1999, it will be tried to raise sufficient funding to pay the annual membership fee of US$ 375,-.

Part 1:

HOMOPUS S. SIGNATUS

CURRENT LIVING STUDBOOK POPULATION AND TRANSFERS

Currently, in the studbook *Homopus s. signatus* specimens are housed at three locations; location 2, location 3 and location 4. The internet site of the Studbook Breeding Programme *Homopus* has proven a helpful tool to reach additional keepers of *H. signatus* overseas. However, applicants are allowed to participate in the programme only after confirming that their specimens have been obtained legally. This is a barrier for increasing the number of locations and specimens within the captive population, but for the time being it is not considered desirable to include illegal specimens. On location 2 three adult specimens are kept and offspring of these specimens has been transferred to the two other locations in November 1998. Four of the captive-bred juveniles stayed on location 2.
Since 1995, the environmental conditions in the enclosures of all specimens have been adjusted to northern hemisphere. Detailed information about captive management of *H. s. signatus* on location 2 is presented in Loehr (in press). Information about husbandry at the two other locations is not available yet, but will be presented in the annual report of 1999.

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 and B is birth.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	SUB-SPECIES
LOCATION 2 (2.4.1)								
0001	M	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-I	0.000	*signatus*
0002	F	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-II	0.000	*signatus*
0003	F	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-III	0.000	*signatus*
0005	F	WILD	0003	27/02/96	LOCATION 2 (B)	960227-III-1	0.000	*signatus*
0006	M	0001	0003	08/11/96	LOCATION 2 (B)	961108-III-2	0.000	*signatus*
0009	F	0001	0002	30/11/96	LOCATION 2 (B)	971130-II-1	0.000	*signatus*
0010	U	0001	0002	22/10/97	LOCATION 2 (B)	971022-II-3	0.000	*signatus*
LOCATION 3 (0.1.1)								
0007	F	0001	0003	24/12/96	LOCATION 2 (B)	961224-III-3	0.000	*signatus*
0011	U	0001	0003	10/11/97	LOCATION 2 (B)	971110-III-4	0.000	*signatus*
LOCATION 4 (0.0.3)								
0012	U	0001	0002	21/11/97	LOCATION 2 (B)	971121-II-4	0.000	*signatus*
0013	U	0001	0002	26/09/98	LOCATION 2 (B)	980926-II-5	0.000	*signatus*
0014	U	0001	0003	22/10/98	LOCATION 2 (B)	981022-III-5	0.000	*signatus*
Total population: (2.5.5)								

All specimens together make the total living studbook population 2 males, 5 females and 5 unknown, housed at three locations. Single adult animals fit for breeding purposes are not present.

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

LOCATION	MALES	FEMALES	UNKNOWN
LOCATION 2	2	4	1
LOCATION 3	0	1	1
LOCATION 4	0	0	3
TOTAL	2	5	5

IMPORTS, BIRTHS AND DEATHS

Imports of wild *H. s. signatus* were not necessary in 1998. However, on the long run it is important to make the basis of the current studbook population -three wild-caught adult specimens- broader, in order to prevent inbreeding in the future. An enthousiast in the USA is preparing an apply for collecting, exporting and importing few specimens from the Springbok region (Northern Cape Province), within the scope of the Studbook Breeding Programme *Homopus*. As the total studbook population is originating from specimens from this region, it is considered desirable to add only specimens from the same geographic locality.

In 1998, two hatchling *H. s. signatus* were born on location 2. As a total of 4 eggs had been produced by the two adult females, this means that hatching rate was only 50%. In two previous years 5 eggs per year were laid, with respectively 4 and 3 eggs hatching. As a tendency is present towards decreasing productivity of the adult tortoises in the studbook population, probable causes will be investigated in case 1999 yields a further decrease.
Details about oviposition, incubation technique and hatchling care can be found in Loehr (in press).

Table III: Births of *Homopus s. signatus* in 1998. 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
YEAR 1998								
0013	U	0001	0002	26/09/98	LOCATION 2	980926-II-5	0.000	
0014	U	0001	0003	22/10/98	LOCATION 2	981022-III-5	0.000	

Total number of births: (0.0.2)

In 1998 no specimens of *H. s. signatus* have died.

TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

Summarising, the current studbook population of the studbook *H. s. signatus* consists of 14 specimens. From these, four are wild-caught specimens and eight are captive-bred. Twelve tortoises are currently alive, housed at three locations.
The recent distribution of specimens over several locations offers the ability to provide more room per tortoise and it furthermore decreases the risk of having the entire population killed by an outbreak of disease.
Two points of concern are present: Unrelated specimens have to be located and added to the studbook population as future partners for the (related) captive-bred specimens in the studbook and the decrease of productivity of the adult specimens should be monitored.

Table IV: Total studbook population *Homopus s. signatus*. M is male, F is female, U is unknown, D is donation and B is birth.

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	LOCATION 2 (D)	950930-I	0.000	
0002	F	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-II	0.000	
0003	F	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-III	0.000	
0004	M	WILD	WILD	30/09/95	LOCATION 2 (D)	950930-IV	0.000	24/12/95
0005	F	WILD	0003	27/02/96	LOCATION 2 (B)	960227-III-1	0.000	
0006	M	0001	0003	08/11/96	LOCATION 2 (B)	961108-III-2	0.000	
0007	F	0001	0003	24/12/96	LOCATION 2 (B)	961224-III-3	0.000	
0008	U	0001	0002	26/01/97	LOCATION 2 (B)	970126-II-2	0.000	02/02/97
0009	F	0001	0002	30/11/96	LOCATION 2 (B)	971130-II-1	0.000	
0010	U	0001	0002	22/10/97	LOCATION 2 (B)	971022-II-3	0.000	
0011	U	0001	0003	10/11/97	LOCATION 2 (B)	971110-III-4	0.000	
0012	U	0001	0002	21/11/97	LOCATION 2 (B)	971121-II-4	0.000	
0013	U	0001	0002	26/09/98	LOCATION 2 (B)	980926-II-5	0.000	
0014	U	0001	0003	22/10/98	LOCATION 2 (B)	981022-III-5	0.000	

Part 2:

HOMOPUS AREOLATUS

CURRENT LIVING STUDBOOK POPULATION AND TRANSFERS

Homopus areolatus in the studbook are located at two locations; location 2 and location 5. Four captive born juveniles (bred in Tygerberg Zoopark (Kraaifontein, South Africa)) are present at the first location and a single wild-caught adult female on location 5 (originally handed to Tygerberg Zoopark by visitors).
At both locations the tortoises are kept in indoor enclosures permanently. The juvenile specimens are housed as a couple and two singles in enclosures measuring 75 x 50 x 40 cm (l x w x h), in which northern hemisphere climatic conditions prevail. The terrariums are decorated with wood and stones, imitating the natural environment. No UV-radiation is supplied. One of the juveniles is housed isolated from the others, as it is severely diseased (see also IMPORTS, BIRTHS AND DEATHS).
At location 5, the adult specimen is housed in an enclosure in which southern hemisphere climatic conditions prevail. Also in this terrarium the natural habitat is imitated.

Table I: Current living studbook population *Homopus areolatus* as registered in the studbook. F is female, U is unknown and D is donation.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	SUB-SPECIES
LOCATION 2 (0.0.4)								
0003	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-III	0.000	-
0004	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-IV	0.000	-
0005	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-V	0.000	-
0006	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-VI	0.000	-
LOCATION 5 (0.1.0)								
0002	F	WILD	WILD	21/11/97	LOCATION 2 (D)	?	0.000	-
Total population: (0.1.4)								

All specimens together make the total living studbook population one single adult female (fit for breeding purposes) and four specimens of unknown sex, housed at two locations.

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

LOCATION	MALES	FEMALES	UNKNOWN
LOCATION 2	0	0	4
LOCATION 5	0	1	0
TOTAL	0	1	4

IMPORTS, BIRTHS AND DEATHS

In 1998 no wild *H. areolatus* were imported. In order to reinstate a breeding group in the future, an apply for transferring a partner for the single adult female on location 5 has been directed to Tygerberg Zoopark. CITES-permits have not been applied for yet.

Due to the death of two adult specimens in the breeding group on location 5, no breeding results were obtained in 1998. The adult male died in July, probably caused by pneunomia (post-mortem report available). This specimen had been in captivity for about 15 years. The cause of death of the female is not known yet, as the post-mortem report still is in preparation.
One of the juveniles on location 2 appeared to be diseased (fluid retention, weak limbs, extreme skin sloughing) and was taken to the Birds and Exotic Animal Specialist Group of the Veterinary Department of the Utrecht University in The Netherlands. X-raying revealed that approximately 1/3 of the internal volume was taken by air, at the site where the lungs should be present. The cause of this phenomenon is unknown, as is the cure. Although the specimen is showing a normal behaviour and feeds well, it is uncertain whether it will survive.

Table III: Deaths of *Homopus areolatus* in 1998. 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	DATE OF DEATH dd/mm/yy	AGE AT DEATH yy/mm	PRIMARY CAUSE
YEAR 1998								
0001	F	WILD	WILD	14/12/97	LOCATION 5 (D)	09/11/98	?	?
0007	M	WILD	WILD	?	LOCATION 5 (L)	05/07/98	?	Pneunomia

Total number of deaths: (1.1.0)

TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current studbook population of the studbook *H. areolatus* consists of seven specimens. From these, three are wild-caught (two handed to Tygerberg Zoopark by visitors and one in captivity in The Netherlands for about 15 years) and four are captive-bred. Five tortoises are alive, housed at two locations.
As the total studbook population of *H. areolatus* is limited, it is desirable to add specimens in order to provide chances for the survival of the studbook on the long run. Specimens could be added by participation of additional keepers of the species or by importing specimens. Although the first alternative is preferable, especially for providing a partner for the solitary female importing could be inevatible

Table IV: Total studbook population *Homopus areolatus*. M is male, F is female, U is unknown, 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	F	WILD	WILD	14/12/97	LOCATION 5 (D)	HZ0525	0.000	09/11/98
0002	F	WILD	WILD	14/12/97	LOCATION 5 (D)	?	0.000	
0003	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-II	0.000	
0004	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-III	0.000	
0005	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-IV	0.000	
0006	U	UNKN	UNKN	21/11/97	LOCATION 2 (D)	971121-V	0.000	
0007	M	WILD	WILD	?	LOCATION 5 (L)	HZ0457	0.000	05/07/98

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