# *Homopus signatus signatus*

## (Namaqualand speckled padloper)

## Studbook Report

## 1995-1997

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Some years ago in The Netherlands several studbook (breeding) programs were started on different reptile and amphibian species. There were two main reasons to do so. Firstly these programs play an educational role as they facilitate the exchange of knowledge of the (esp. breeding) ecology of different species. This way, any data on reproduction of a species that have been gained can also be distributed efficiently to ensure a successful reproduction of the captive population as a whole. Secondly studbook programs offer the chance to form healthy *ex situ* populations as meant in the World Zoo Conservation Strategy[1]. *Ex situ* populations can be considered valuable to ensure survival of species in the wild in the future. All studbook programs currently running are supervised by an overall foundation ('Stichting Overkoepelend Orgaan Stamboeken') and strictly no commercial aspects are related to them.

[1] Captive Breeding Specialist Group IUCN / International Union of Directors of Zoological Gardens (1993). *World Zoo Conservation Strategy*.

# INTRODUCTION

Since the Namaqualand speckled padloper (*Homopus signatus signatus*) is a poorly known species, any investigations are welcome. Especially studbook projects offer a possibility for structurally investigating and publishing information on (captive) habits of the species. Although it is self-evident that not all captive observations will be applying to wild populations, several basic features can be learnt from specimens kept in captivity. Therefore, the initial goal that was emphasised in the studbook *H. s. signatus* was to gain as much information on the species as possible. In the mean time, captive conditions should be tried to maintain in such way that the species would breed as well. Breeding *H. s. signatus* in captivity furthermore would offer a way for other keepers of reptiles to keep *H. s. signatus* in captivity in the future.

After having gained considerable experience in keeping the ecologically related Eastern African pancake tortoise (*Malacochersus tornieri*) in captivity, location 2 seemed to offer reasonably well perspectives to start keeping a small population of *H. s. signatus* in captivity. In September 1995, four specimens were collected in and imported from Namaqualand, South Africa (see also IMPORTS, BIRTHS AND DEATHS). Before 1995, a previous visit to Namaqualand had taken place in November 1992. In order to extend the understanding of the habitat in which the species occurs in the wild, an additional visit has taken place in September 1997 and a future visit is planned in September/October 1998.

From the moment of importing, several problems had to be solved regarding the acquisition of an importing permit. At the moment of writing, most of the problems have been solved, although a barrier still exist with respect to transferring specimens to keepers in other countries (see also TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES). Only in 1997 the studbook was officially fully operational. Therefore, this first report is due out only now.

Since 1995, two reports have been published on captive (breeding) experiences with *H. s. signatus*, obtained from the group that was imported in 1995. The first was published in *De Schildpad* (Loehr and Van Dijk, 1996), which is an outlet of the Dutch Turtle/Tortoise Society. The second report has been published in *African Herp News* (Loehr, 1997), which is an outlet of the Herpetological Association of Africa. A third (more detailed) report is in preparation for offering to *Chelonian Conservation and Biology* (outlet of the Chelonian Research Foundation). Since 1995 also two lectures on keeping and breeding *H. s. signatus* have been presented; one in 1996 (June) at a meeting of members of the Dutch Turtle/Tortoise Society in Utrecht (The Netherlands) and one in 1997 (June) at a workshop in Basel (Switzerland).

## CURRENT LIVING STUDBOOK POPULATION

In the studbook *Homopus s. signatus*, all registered specimens still are located at one single location (location 2). Three wild-born animals are present and seven specimens that are born from these in captivity.
All specimens are kept in indoor enclosures permanently. The adult specimens are housed in a 120 x 80 x 60 cm (l x w x h) terrarium in which initially southern hemisphere climatic conditions were imitated. The terrarium is decorated with artificial stone slabs and boulders, imitating the natural environment. The hatchling tortoises are housed in smaller enclosures (30 x 30 x 30 cm to 80 x 50 x 40 cm (l x w x h)), that are decorated more simply with a hiding place and several small stones and bark. A maximum of three hatchlings are housed in a single terrarium. Also in the enclosures of the hatchlings, initially southern hemisphere conditions were prevailing. Within a period of about five years of time, the climatic conditions in all enclosures gradually are shifted to northern hemisphere. More detailed information on the enclosures and husbandry of the *H. s. signatus* can be found in Loehr and Van Dijk (1996) and Loehr (1997).

**Table I:** Current living studbook population *Homopus s. signatus* 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 (1.2.7) | | | | | | | | |
| 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 | U | WILD | 0003 | 27/02/96 | LOCATION 2 (B) | 960227-III-1 | 0.000 | *signatus* |
| 0006 | U | 0001 | 0003 | 08/11/96 | LOCATION 2 (B) | 961108-III-2 | 0.000 | *signatus* |
| 0007 | U | 0001 | 0003 | 24/12/96 | LOCATION 2 (B) | 961224-III-3 | 0.000 | *signatus* |
| 0009 | U | 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* |
| 0011 | U | 0001 | 0003 | 10/11/97 | LOCATION 2 (B) | 971110-III-4 | 0.000 | *signatus* |
| 0012 | U | 0001 | 0002 | 21/11/97 | LOCATION 2 (B) | 971121-II-4 | 0.000 | *signatus* |
| Total population: (1.2.7) | | | | | | | | |

All specimens together make the total living studbook population one male, two females and seven unknown, located at a single location. 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 | 1 | 2 | 7 |
| TOTAL | 1 | 2 | 7 |

## IMPORTS, BIRTHS AND DEATHS

All specimens present within the studbook population originate from a single import in 1995. In September 1995, four adult *Homopus s. signatus* were imported from Namaqualand, South Africa. These were all collected very close to Springbok. Studbook numbers 0002, 0003 and 0004 were located on one koppie. Number 0001 was found several hundred meters further on a hill slope. Both in September 1995 and in September 1997, males of *H. s. signatus* appeared to occur in a relatively low density if compared to adult females and hatchlings. The period of time between collecting and releasing of the tortoises in the already operational enclose in The Netherlands was only five days.

**Table III:** Imports of *Homopus s. signatus*. M is male, F is Female. All are donations.

| STUD ID | SEX | DATE OF CAPTURE dd/mm/yy | FIRST CAPTIVE LOCATION | DATE OF ARRIVAL dd/mm/yy | ORIGIN |
|---|---|---|---|---|---|
| YEAR 1995 | | | | | |
| 0001 | M | 25/09/95 | LOCATION 2 | 30/09/95 | Springbok, Namaqualand (South Africa) |
| 0002 | F | 24/09/95 | LOCATION 2 | 30/09/95 | Springbok, Namaqualand (South Africa) |
| 0003 | F | 24/09/95 | LOCATION 2 | 30/09/95 | Springbok, Namaqualand (South Africa) |
| 0004 | M | 26/09/95 | LOCATION 2 | 30/09/95 | Springbok, Namaqualand (South Africa) |

Total number of imports: (2.2.0)

Since 1996, *H. s. signatus* has been bred in captivity at location 2. Initially, shortly after importing two single eggs were laid by female 0002 and 0003. Both presumably resulted from fertilisation in nature, as until then hardly any mating behaviour had been observed. Both eggs were incubated at constant temperatures between 28-32°C in a mixture of vermiculite and water (1:3 weight based ratio). Relative humidity fluctuated between 30-60%. The substrate was remoistened after 100 days of incubation. The first egg hatched on 27 February 1996; the second egg showed no signs of embryonic development.

Mating activity was observed throughout the year, but increased in (artificial) spring. Single eggs that presumably resulted from captive mating were laid on 22 July and 3 September (0003) and 12 August, 19 September and 27 October (0002). These were incubated at a daily temperature rhythm (12 h 26°C; 12 h 32°C) in vermiculite as described above. As a result of the daily temperature cycle the relative humidity fluctuated between 45-75%. The eggs of the first female hatched on 8 November and 24 December 1996. The eggs of the second female hatched on 30 November 1996 and 26 January 1997. The last egg of the second female showed no signs of embryonic development.

In 1997, eggs were laid at 15 July (0003) and 28 June, 2 August, 1 September and 26 September (0002). These were incubated in the same way as in 1996. The first three of these hatched respectively at 10 November, 22 October and 21 November 1997. The egg that was produced at 1 September showed no signs of development and the egg laid at 26 September still is being incubated.

Striking is the large number of eggs laid in one season (up to four eggs!) and the short time interval between separate clutches (minimum of 25 days).

**Table IV:** Births of *Homopus s. signatus* between 1995 and 1997. 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 1996 | | | | | | | | |
| 0005 | U | WILD | 0003 | 27/02/96 | LOCATION 2 | 960227-III-1 | 0.000 | |
| 0006 | U | 0001 | 0003 | 08/11/96 | LOCATION 2 | 961108-III-2 | 0.000 | |
| 0009 | U | 0001 | 0002 | 30/11/96 | LOCATION 2 | 971130-II-1 | 0.000 | |
| 0007 | U | 0001 | 0003 | 24/12/96 | LOCATION 2 | 961224-III-3 | 0.000 | |
| YEAR 1997 | | | | | | | | |
| 0008 | U | 0001 | 0002 | 26/01/97 | LOCATION 2 | 970126-II-2 | 0.000 | 02/02/97 |
| 0010 | U | 0001 | 0002 | 22/10/97 | LOCATION 2 | 971022-II-3 | 0.000 | |
| 0011 | U | 0001 | 0003 | 10/11/97 | LOCATION 2 | 971110-III-4 | 0.000 | |
| 0012 | U | 0001 | 0002 | 21/11/97 | LOCATION 2 | 971121-II-4 | 0.000 | |

Total number of births: (0.0.8)

Shortly after having imported the adult *H. s. signatus* from South Africa, one of the males turned out not to be able to adapt to captive conditions. The behaviour was dominated by walking aimlessly and continuously through the enclosure, rather than to find a suitable hiding place for most of the time as did the remaining tortoises. Without having started feeding voluntarily, the specimen died at 24 December 1995. It has been donated to Mr M. Hoogmoed from the Natural History Museum in Leiden (Netherlands), where it is registered as number RMNH 27497.
Besides the adult male, one of the hatchlings died shortly after hatching. The egg of the hatchling concerned was opened artificially when the incubator had broke down and surrounding temperatures were very low. It was decided to do so, because the egg should have hatched several weeks prior, compared with the average incubation period of the eggs that had already hatched. It was expected that the hatchling would be able to survive, if the egg would appear to be fertile. Unfortunately the yolk sac that was attached to the hatchling was still quite large. Although it was absorbed slowly during the following days, presumably an infection of the yolk sac one week later caused the death of the hatchling.

**Table V:** Deaths of *Homopus s. signatus* between 1995 and 1997. M is male, U is unknown, D is donation 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 |
|---|---|---|---|---|---|---|---|---|
| YEAR 1995 | | | | | | | | |
| 0004 | M | WILD | WILD | 30/09/95 | LOCATION 2 (D) | 24/12/95 | >85 d | Exhaustion after transfer to captivity |
| YEAR 1997 | | | | | | | | |
| 0008 | U | 0001 | 0002 | 26/01/97 | LOCATION 2 (B) | 02/02/97 | 7 d | Infection of yolk sac/exhaustion |

Total number of deaths: (1.0.1)

## TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

Summarising, the current studbook population of the studbook *Homopus s. signatus* consists of twelve studbook numbers. From these, four are wild-borne specimens and eight are captive-borne. Ten tortoises are currently alive, housed at one location.
In the near future, it is desirable to split the population over two or more locations. In that way, more space can be offered per tortoise and furthermore the risk of having the entire population killed by an outbreak of disease will decrease. It has become clear that although *H. s. signatus* can be kept and bred in captivity in northern Europe, this is not easily done. Therefore, it is important to find a location where all requirements for keeping and breeding the species can be met. Until now, only one location seems suitable. However, the fact that this location is outside of the Netherlands disables us to transfer the tortoises; an exporting permit will not be provided by the Dutch authorities as an official importing permit for the adults still has not been provided. I am convinced that eventually a way to transfer the tortoises will be found. However, this will take some more time.
If it will be possible to breed a second generation from captive bred studbook numbers 0005 and one of the hatchlings that are borne from female 0002, no inbreeding will occur as these have two different pairs of parents. All further combinations of hatchlings will result in a certain percentage of inbreeding. As a starting point of the studbook is to prevent all inbreeding as much as possible, several unrelated specimens will be beneficial for the health of the captive population in the future. If it turns out to be possible to keep and breed *H. s. signatus* at a second location, it will be considered how additional specimens can be obtained.

**Table VI:** 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 | U | WILD | 0003 | 27/02/96 | LOCATION 2 (B) | 960227-III-1 | 0.000 | |
| 0006 | U | 0001 | 0003 | 08/11/96 | LOCATION 2 (B) | 961108-III-2 | 0.000 | |
| 0007 | U | 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 | U | 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 | |

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