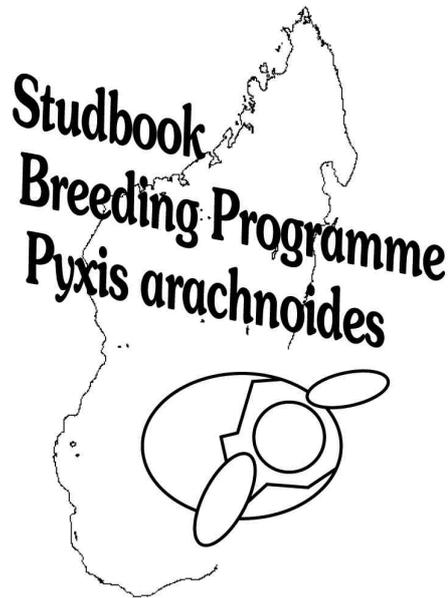


Studbook
Breeding Programme
Pyxis arachnoides



Annual Report
2003

Frank Van Loon
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Since 1992 several Dutch herpetological societies have initiated studbook programmes on reptile and amphibian species. In 1997, all programmes were condensed into an independent foundation currently known as European Studbook Foundation. Early in its development, the foundation formulated the very important criteria that no studbook participant would jeopardise their important herpetological contributions and goals with any commercial enterprise from their specimens, either currently or in the future. The aims of the studbook programmes in general are:

- To inform the herpetological community with data and publications generated from captive situations and field studies
- 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 2003

Introduction

This report is an update of the annual report of the Studbook Breeding Programme *Pyxis arachnoides* published in 2002. The programme aims to form genetically healthy, reproducing captive populations, to study these, and to gather and distribute as much information about *P. arachnoides* as possible. In order to keep the studbook manageable (in terms of number of tortoises and contacts between participants and coordinator), it has been decided that the studbook will operate exclusively in Europe, despite occasional applications from keepers of *P. arachnoides* in the USA. *Pyxis a. arachnoides* especially appears to be present in Europe in sufficiently large numbers. It would be a welcome development if someone in the USA would set up a studbook on *P. arachnoides*, similar to the Studbook Breeding Programme *Pyxis arachnoides*. Eventually, both studbooks could be linked. As was written in the previous annual report, the Studbook Breeding Programme *Pyxis arachnoides* now is managed by a new co-ordinator. This means more time will be available to manage the studbook, hopefully resulting in an everimproving studbook.

This report will summarise the activities of the Studbook Breeding Programme *Pyxis arachnoides* in 2003, plans for 2004, and it will give an overview of the current composition and changes in the captive population *P. arachnoides*. Additional information may be obtained from the internet site of the programme, <http://home.kabelfoon.nl/~loehr/pyxis>, or from the studbook co-ordinator.

In the following sections, an overview of the main activities in 2003 is presented.

Internet site

The internet site of the Studbook Breeding Programme *Pyxis arachnoides* has not undergone any major changes. The actual composition of the studbook population has been updated on a regular basis. The appendices in the annual studbook reports remain the major source of husbandry information.

It has been noted by the co-ordinator and some studbook participants that the commercials on the internet site were, on several days, if not weeks, were somewhat annoying and/or overwhelming. Steps will be taken to overcome this situation.

Presentations and publications

In 2003, a publication from a participant was published in a popular dutch turtle/tortoise magazine. Another manuscript on husbandry and breeding *P. a. arachnoides* is in press in the proceedings of the first European symposium on turtles and tortoises (Vienna, January 2002). This will probably appear in the first half of 2004.

Contacts

In 2003 several mails were sent and meetings were attended in order to find more keepers and/or breeders of one or all of the *Pyxis arachnoides* subspecies. One short PR-article was published in a popular Dutch magazine. This resulted in one new participant thusfar and a few possible candidates. It seems that a number of people are not interested in working via a studbook, don't see any advantages in a studbook or are frightened to participate. In the future more attempts will be made to persuade keepers/breeders throughout Europe to work with the studbook.

An attempt to make contact with Robertia Joseph will be made to ask for the results of his study.

2. PLANS FOR ACTIVITIES IN 2004

From the beginning of this year, the studbook breeding programme *Pyxis arachnoides* was transferred from Victor Loehr to Frank Van Loon. As this is my first experience with running a studbook, I still have to plan my time that I will be spending on the studbook.

A closer look by the co-ordinator will be taken to the successes made by the participants and to the distribution of the tortoises in captivity in order to minimize the risk of losing animals to electrical failure (power shutdown), fire, flood, disease, etc., and to maximize breeding results. For this reason the studbook co-ordinator replaced his couple of *Pyxis arachnoides arachnoides* to a location that has proven to breed with this subspecies. This was done with an agreement that the hatchlings will be divided fifty-fifty between the current location and me and that the original couple remains the property of, in this case, the studbook co-ordinator. It is important that the participants realize the importance of actually breeding these tortoises rather than keeping them or trying to breed them for too many years. Sometimes all they need is another location.

It has been pointed out by a participant, now that there are a few locations breeding *Pyxis arachnoides arachnoides*, it would be in the tortoises' and studbooks' best interest that the captive-born tortoises (from different wild parents) be coupled with each other in order to maintain the broadest genetic base from wild tortoises possible. To prevent, a more or less, inbreeding in the future, it is not wise to couple a wild caught tortoise with a captive-born one.

More attempts will be made to reach keepers/breeders. This will be done by contacting several tortoise and reptile magazines in Europe. An article will be published, in English, to try to boost the interest of the people and to reach a broader public.

A call to the participants will be made concerning the sex of their animals. Some tortoises have reached an age at which sex can be determined. To create unrelated couples between captive-born hatchlings it is always interesting to know whether you are dealing with a male or a female.

A call to participants who have more animals at their location than is registered in the studbook. More updates of the internet site during the year could be in order.

Internet site

In 2004, the internet site of the Studbook Breeding Programme *Pyxis arachnoides* will remain to be maintained by Victor Loehr. There are no direct plans for any major changes. However a new studbook programme will be released during 2004.

The occurrence of publicity has been found disturbing by the co-ordinator and a few participants on several visits to the site. Plans will be made to privatize a site. The costs will be paid by the co-ordinator.

Presentations and publications

An major English manuscript on husbandry and breeding of *P. a. arachnoides* is currently in press in the proceedings of the first European symposium on turtles and tortoises (Vienna, January 2002). However, this has not been written by a studbook participant.

A German publication on husbandry of *Pyxis arachnoides brygooi* is currently in press in *Radiata* (a Dutch magazine) and will be published in 2004.

Contacts

Contact with Joseph Robertia will be made to ask for the results of his study concerning captive breeding of *Pyxis a. arachnoides*.

3. CURRENT LIVING STUDBOOK POPULATION

The total number of registered live specimens *P. arachnoides* increased from 65 to 69. Three specimens died, and 4 were born. Three specimens were acquired from outside the studbook. The specimens are currently housed at 14 locations (13 in 2001) in the Netherlands (7), Belgium (1) and Germany (6). All subspecies are represented in the studbook, but *P. a. oblonga* and *P. a. brygooi* are very limited in numbers.

All transfers in 2003 related to subspecies *P. a. arachnoides*. Specimens 79 and 84 were transferred from location A08 to location A10, Specimens 23 and 24 were transferred from location A10 to location A08.

Table I: Current living studbook population *Pyxis arachnoides* per location as registered in the studbook. The numbers far right are relative numbers per location, indicating which specimens are housed together. MULT1 is sire 26 or 27. UNKx specimens are founders outside of the studbook, used to register relationships between offspring in the studbook.

a) *Pyxis arachnoides arachnoides*

```

=====
Location: A08
=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
23 M ???? WILD WILD A05 ???? _____ Transfer
A10 28 Jun 1999 PAAM1 _____ Transfer
A08 29 Sep 2003 _____ Loan to 3
24 F ???? WILD WILD A05 ???? _____ Transfer
A10 28 Jun 1999 PAAF1 _____ Transfer
A08 29 Sep 2003 _____ Loan to 3
26 M ???? WILD WILD A11 ~ 1985 _____ Transfer
A02 29 Dec 1999 I _____ Loan to
A08 18 Feb 2001 _____ Loan to 1
27 M ???? WILD WILD A11 ~ 1985 _____ Transfer
A02 29 Dec 1999 II _____ Loan to
A08 18 Feb 2001 _____ Loan to 1
29 F ???? WILD WILD A11 ~ 1985 _____ Transfer
A02 29 Dec 1999 IV _____ Loan to
A08 18 Feb 2001 _____ Loan to 1
80 ? 26 Jul 2002 MULT1 29 A08 26 Jul 2002 _____ Hatch 2
88 ? 19 Jun 2003 MULT1 29 A08 19 Jun 2003 _____ Hatch 2
89 ? 18 Jul 2003 MULT1 29 A08 18 Jul 2003 _____ Hatch 2
90 ? 08 Aug 2003 MULT1 29 A08 08 Aug 2003 _____ Hatch 2
91 ? 31 Aug 2003 MULT1 29 A08 31 Aug 2003 _____ Hatch 2

```

Totals: 3.2.5 (11)

```

=====
Location: A10
=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
79 ? 06 May 2002 MULT1 29 A08 06 May 2002 _____ Hatch
A10 29 Sep 2003 _____ Transfer
84 ? 08 Jun 2002 MULT1 29 A08 08 Jun 2002 _____ Hatch

```

A10 29 Sep 2003 _____ Transfer

Totals: 0.0.2 (2)

Location: A11

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
14 Jun 2001  MULT1  29 A02  14 Jun 2001  IV-2  Hatch
17 Feb 2002  A11  17 Feb 2002  _____  Transfer  1
=====
    
```

Totals: 0.0.1 (1)

Location: A19

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
13 Aug 1999  UNK1  UNK2  A07  13 Aug 1999  _____  Hatch
1 Mar 2000  A19  1 Mar 2000  1  Transfer  1?
28 Aug 1999  UNK1  UNK2  A07  28 Aug 1999  _____  Hatch
1 Mar 2000  A19  1 Mar 2000  2  Transfer  1?
8 Aug 2000   UNK1  UNK2  A07  8 Aug 2000   _____  Hatch
1 Sep 2000  A19  1 Sep 2000  3  Transfer  1?
12 Aug 2000  UNK1  UNK2  A07  12 Aug 2000  _____  Hatch
1 Sep 2000  A19  1 Sep 2000  4  Transfer  1?
=====
    
```

Totals: 0.0.4 (4)

Location: A22

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
9 Sep 1996   UNK1  UNK2  A07  9 Sep 1996   _____  Hatch
22 Nov 1998  A02  22 Nov 1998  960909  Loan to
24 Feb 2001  A22  24 Feb 2001  _____  Loan to  1
16 Nov 1996  UNK1  UNK2  A07  16 Nov 1996  _____  Hatch
22 Nov 1998  A02  22 Nov 1998  961116  Loan to
24 Feb 2001  A22  24 Feb 2001  _____  Loan to  1
16 Sep 1997  UNK1  UNK2  A07  16 Sep 1997  _____  Hatch
22 Nov 1998  A02  22 Nov 1998  970916  Loan to
24 Feb 2001  A22  24 Feb 2001  _____  Loan to  1
~1980       WILD  WILD  A22  10 Sep 2002  _____  Transfer  2
=====
    
```

Totals: 3.1.0 (4)

Location: A23

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
30 Jul 2000  WILD  WILD  A23  30 Jul 2000  DONALD  Transfer  1
30 Jul 2000  WILD  WILD  A23  30 Jul 2000  DAISY   Transfer  1
30 Jul 2000  WILD  WILD  A23  30 Jul 2000  EUSEBI  Transfer  1
30 Jul 2000  WILD  WILD  A23  30 Jul 2000  PAULA   Transfer  2
1 Aug 1998   UNK1  UNK2  A07  1 Aug 1998   _____  Hatch
16 Sep 1999  A23  16 Sep 1999  TIC     Transfer  4
1 Aug 1998   UNK6  UNK7  A24  1 Aug 1998   _____  Hatch
1 Jul 1999   A23  1 Jul 1999   TRIC    Transfer  4
=====
    
```

66	?	1 Aug 1998	UNK6	UNK7	A24 A23	1 Aug 1998 1 Jul 1999	_____ TRAC	Hatch Transfer	4
69	M	????	WILD	WILD	A23	5 Jul 2001	PLUTO	Transfer	2
83	F	~ 1996	UNK10	UNK11	A38 A23	~ 1996 1 Aug 2002	_____ TAMARA	Hatch Transfer	4

Totals: 2.4.3 (9)

Location: A32

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event	
4	M	????	WILD	WILD	A04 A32	17 May 1999 25 May 2002	ULI ULI	Transfer Loan to	

Totals: 1.0.0 (1)

Location: A36

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event	
67	?	15 Mar 2001	MULT1	29	A02 A36	15 Mar 2001 24 Feb 2002	IV-1 _____	Hatch Transfer	1?
81	?	~ Jan 2000	UNK8	UNK9	A32 A36	~ Jan 2000 15 Aug 2002	_____ _____	Hatch Transfer	1
82	?	~ Jan 2000	UNK8	UNK9	A32 A36	~ Jan 2000 15 Aug 2002	_____ _____	Hatch Transfer	1

Totals: 0.0.3 (3)

Location: A39

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event	
86	?	28 Oct 2000	UNK1	UNK2	A07 A39	28 Oct 2000 16 Jul 2002	_____ _____	Hatch Transfer	1
87	?	29 Aug 2001	UNK1	UNK2	A07 A39	29 Aug 2001 16 Jul 2002	_____ _____	Hatch Transfer	1

Totals: 0.0.2 (2)

Location: ROTTERDAM

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event	
18	M	????	WILD	WILD	A08 ROTTERDAM	~ Jan 1995 4 Sep 2002	_____ 704790	Transfer Loan to	1
20	M	????	WILD	WILD	WASS BR C ROTTERDAM	8 Dec 1990 17 Apr 2002	_____ 704725	Transfer Transfer	2
21	F	????	WILD	WILD	WASS BR C ROTTERDAM	8 Dec 1990 17 Apr 2002	_____ 704726	Transfer Transfer	2
34	M	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703791	Transfer	3
35	M	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703792	Transfer	4
36	F	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703793	Transfer	3?
37	F	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703794	Transfer	5?
38	M	????	WILD	WILD	VLISSINGE	12 Jul 1987	_____	Transfer	

					ROTTERDAM	9 Jul 1997	703825	Transfer	5
48	?	21 Oct 1999	34	36	ROTTERDAM	21 Oct 1999	704297	Hatch	6
71	F	????	WILD	WILD	LONDON RP ROTTERDAM	???? 23 Dec 2001	704781	Transfer Transfer	1
72	F	????	WILD	WILD	LONDON RP ROTTERDAM	???? 23 Dec 2001	704582	Transfer Transfer	4
73	?	????	WILD	WILD	LONDON RP ROTTERDAM	???? 23 Dec 2001	704583	Transfer Transfer	7

Totals: 5.5.2 (12)

Location: WASS BR C

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
19	M	????	WILD	WILD	WASS BR C	8 Dec 1990	DAMAGE	Transfer 1

Totals: 1.0.0 (1)

In response to the activities of ROTTERDAM to concentrate *P. a. arachnoides* there, communication has taken place between the studbook coordinator and the participants concerned. In the view of the studbook coordinator, it would have been better to form breeding pairs by transferring female tortoises from ROTTERDAM to locations with solitary males, or few specimens. The high concentration of specimens at ROTTERDAM makes the population vulnerable for disaster, and breeding at ROTTERDAM has not been very successful in past years (presumably due to problems in providing the correct climatic conditions). However, it also has to be kept in mind that many specimens did not arrive at location ROTTERDAM until 2002, with limited opportunities for breeding prior to that year. The advice of the studbook coordinator has not been accepted by ROTTERDAM. One reason for this were EAZA conditions, disabling ROTTERDAM to transfer specimens to private individuals. This is a situation that should be solved in the future, as it may frustrate further collaboration between zoos and private individuals in the studbook.

ROTTERDAM recombined its breeding pairs but the fact remains that breeding group 34 and 36 consists of related specimens and may lead to inbreeding.

Solitary males fit for breeding are present at locations A08 (specimen 26 or 27), WASS BR C (19) and location A22 (specimen 1,3 or 85) . Male 4 at location A32 is probably housed in a breeding pair, since additional specimens *P. a. arachnoides* are present at this location. These have not yet been registered in the studbook, and therefore location A32 has been requested to register these specimens too.

A solitary female (59, 60 or 83) is present at location A23. It would be advisable to transfer one female to a location with fewer specimens and with a solitary male, to form an additional (potential) bloodline (this suggestion has been turned down by the owner) or a captive bred specimen (62, 65 or 66) could be exchanged with a solitary WILD male (for example at location A08, WASS BR C or ROTTERDAM) and, at his turn, this male could be paired with a WILD female housed at this location (specimen 59 or 60). To a certain extent, the same situation applies for location A23 as for location ROTTERDAM.

Location A22 keeps all his captive bred *Pyxis arachnoides arachnoides* in the same enclosure, this is not recommended. As the tortoises reach sexual maturity, they will start to breed, in this case inbreeding could be the result. It is advised that males 1 and 3 are put in another enclosure (for example with male 85). Remember that once the tortoises have been seen mating, the female could store sperm for 3 years. Another possibility is the exchange of a male (1 or 3) from location A22 with a male (65? or 66?) from location A23.

Location A08 has 5 captive bred juveniles, all of the same adults. It is advised that, once the juveniles become older, they should be paired with (recent) offspring of Location A07 (location A39, A19) or other captive bred animals of the same subspecies.

b) *Pyxis arachnoides brygooi*

Location: A03

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
30 M ???? WILD WILD ROTTERDAM 14 Jan 1991 702004 Transfer
A03 4 Jan 1995 HZ0305 Loan to 1
31 F ???? WILD WILD ROTTERDAM 14 Jan 1991 702005 Transfer
A03 4 Jan 1995 HZ0306 Loan to 1
32 ? 10 Oct 1994 30 31 ROTTERDAM 10 Oct 1994 703152 Hatch
A03 25 Apr 1998 HZ0539 Loan to 2
49 F ???? WILD WILD ROTTERDAM ???? _____ Transfer
A03 21 Jun 1998 HZ0561 Loan to 1
50 ? 1 Jul 1996 30 31 A03 1 Jul 1996 HZ0428 Hatch 3
51 ? 27 Oct 1996 30 31 A03 27 Oct 1996 HZ0454 Hatch 4
52 ? 14 May 1999 30 31 A03 14 May 1999 HZ0624 Hatch 5
53 ? 7 Jun 1999 30 31 A03 7 Jun 1999 HZ0627 Hatch 6
54 ? 19 Mar 2000 30 31 A03 19 Mar 2000 HZ0683 Hatch 7
55 ? 12 May 2000 30 31 A03 12 May 2000 HZ0691 Hatch 8
92 ? 03 May 2003 30 31 A03 03 May 2003 HZ0899 Hatch
=====

```

Totals: 1.2.8 (11)

Location: A10

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
74 F? ???? UNK1 UNK2 A10 10 Oct 2001 PABU01 Transfer 1
75 F? ???? UNK1 UNK2 A10 10 Oct 2001 PABU02 Transfer 1
76 F? ???? UNK1 UNK2 A10 10 Oct 2001 PABU03 Transfer 1
=====

```

Totals: 0.3?.0 (3)

Location: A11

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
56 M ???? WILD WILD A11 ~1985 _____ Transfer
A03 16 Oct 1999 HZ0664 Loan to
A11 08 Nov 2003 _____ Transfer
=====

```

Totals: 1.0.0 (1)

A large proportion of the *P. a. brygooi* population in the studbook is housed at location A03. As has already been outlined for *P. a. arachnoides*, this makes the population vulnerable for disaster, and spreading the specimens over several locations should be considered. Location A03 has argued that long-term growth data is gathered from the captive-bred specimens at this location and this should be included in any considerations to transfer specimens. The current combination of adult founder specimens appears to be reasonable, given the lack of solitary specimens. However, it is of the utmost importance that locations A03 and A10 provide the gender of their juvenile specimens as soon as this is known, to allow exchange of specimens and formation of additional breeding pairs.

c) *Pyxis arachnoides oblonga*

Location: A17

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
13 ? 24 Oct 1997 UNK1 UNK2 A06 24 Oct 1997 _____ Hatch
A17 25 Jul 2000 _____ Transfer 1?
14 ? 28 May 1997 UNK1 UNK2 A06 28 May 1997 _____ Hatch
A17 25 Jul 2000 _____ Transfer 1?
15 ? 26 Jun 1997 UNK1 UNK3 A06 26 Jun 1997 _____ Hatch
A17 25 Jul 2000 _____ Transfer 1?
=====

```

Totals: 0.0.3 (3)

Location: A18

```

=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
16 ? 27 Apr 1999 UNK1 UNK2 A06 27 Apr 1999 _____ Hatch
A18 25 Jul 2000 _____ Transfer 1
17 ? 20 Jul 1999 UNK1 UNK2 A06 20 Jul 1999 _____ Hatch
A18 25 Jul 2000 _____ Transfer 1
=====

```

Totals: 0.0.2 (2)

No changes have occurred in the *P. a. oblonga* population since last year. Overall, the situation is very worrisome, with only related juvenile specimens in the studbook (see also chapter 5). It is of importance to acquire additional founder specimens in the studbook. As the present specimens all are juveniles, there does not appear to be a high pressure to inbreed these specimens once they are adults; there will be time to acquire unrelated stock.

4. IMPORTS, BIRTHS AND DEATHS

Imports of *P. arachnoides*, organised by the Studbook Breeding Programme *Pyxis arachnoides*, did not take place in 2003. Plans to import small numbers of *P. a. brygooi* and *P. a. oblonga* might be supported by the programme, as it appears increasingly unlikely that a sufficiently large number of tortoises for a viable captive population is present.

Two subspecies were bred in 2003, *Pyxis arachnoides arachnoides* (4 at location A08, for details see appendix1) and *Pyxis arachnoides brygooi* (1 at location A03).

Table II: Births of *P. arachnoides* in 2003.

a) *Pyxis arachnoides arachnoides*. MULT1 is sire 27 or 28

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
88	?	19 Jun 2003	MULT1	29	A08	19 Jun 2003	_____	Hatch
89	?	18 Jul 2003	MULT1	29	A08	18 Jul 2003	_____	Hatch
90	?	8 Aug 2003	MULT1	29	A08	8 Aug 2003	_____	Hatch
91	?	31 Aug 2003	MULT1	29	A08	31 Aug 2003	_____	Hatch

Totals: 0.0.4 (4)

b) *Pyxis arachnoides brygooi*

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
92	?	03 May 2003	30	31	A03	03 May 2003	HZ0899	Hatch

Totals: 0.0.1 (1)

A total of 2 *P. arachnoides* died in 2003, at 2 locations. One *P. a. arachnoides* died at location A10. This specimen was a male, it died from unknown causes (see appendix 1).

Two *P. a. brygooi* died in 2002 at location A10 from unknown causes and one died in 2003 at location A03 from unknown causes.

Table III: Deaths of *P. arachnoides* in 2003.

a) *Pyxis arachnoides arachnoides*

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
22	M	????	WILD	WILD	A05	?????	_____	Transfer
					A10	28 Jun 1999	PAAM1	Transfer 2

Totals: 1.0.0 (1)

b) *Pyxis arachnoides brygooi*

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
57	F	????	WILD	WILD	A11	~1985	_____	Transfer
					A03	16 Oct 1999	HZ0665	Death

5. TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current total registered studbook population consists of 83 specimens: 56 *P. a. arachnoides*, 5 *P. a. oblonga*, and 22 *P. a. brygooi* (2 of which are morphologically deviant). From these, 39 are wild-caught specimens and 44 are captive-bred. Captive-bred specimens of all three subspecies are present. All but 13 tortoises are currently alive, housed at 14 (participating) locations.

The population is strongly biased towards subspecies *P. a. arachnoides*. The number of specimens of this subspecies is sufficiently large to offer a positive perspective for the studbook, but it is necessary to combine the specimens in an optimal way to create as many bloodlines as possible, to increase breeding success, and to minimise risks of disaster in the relatively small population (see chapter 3). Also, ongoing discussion with EAZA is required to outline problems that this studbook experiences with regard to transfers of animals between zoos and private individuals.

The other two subspecies are present in much smaller numbers. Especially the situation regarding *P. a. oblonga* is critical. Inclusion of American keepers of this subspecies in the studbook, or importing a small number of (preferably captive) *P. a. brygooi* or *P. a. oblonga* should be considered.

Although many registered specimens in the studbook are captive-bred, it has to be kept in mind that many of these breeding results have been accomplished years ago, and often the reproducing adult specimens are housed at other locations, and have not been registered in the studbook population. In 2003, yet again few breeding results have been reported. Therefore, the main focus from this studbook should still be the distribution of information on husbandry and breeding of *P. arachnoides*. Appendix 1 of this report provides a small contribution to this objective.

Table IV: Total studbook population *Pyxis arachnoides*. MULT1 is sire 26 or 27. UNKx specimens are founders outside of the studbook, used to register relationships between offspring in the studbook.

=====

a) *Pyxis arachnoides arachnoides*

=====

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
1	M	9 Sep 1996	UNK1	UNK2	A07	9 Sep 1996		Hatch
					A02	22 Nov 1998	960909	Loan to
					A22	24 Feb 2001		Loan to
2	F	16 Nov 1996	UNK1	UNK2	A07	16 Nov 1996		Hatch
					A02	22 Nov 1998	961116	Loan to
					A22	24 Feb 2001		Loan to
3	M	16 Sep 1997	UNK1	UNK2	A07	16 Sep 1997		Hatch
					A02	22 Nov 1998	970916	Loan to
					A22	24 Feb 2001		Loan to
4	M	????	WILD	WILD	A04	17 May 1999	ULI	Transfer
					A32	25 May 2002	ULI	Loan to
5	F	????	WILD	WILD	A04	17 May 1999 30 Jun 2001	ESTHER	Transfer Death
18	M	????	WILD	WILD	A08 ROTTERDAM	~ Jan 1995 4 Sep 2002		Transfer Loan to
19	M	????	WILD	WILD	WASS BR C	8 Dec 1990	DAMAGE	Transfer
20	M	????	WILD	WILD	WASS BR C	8 Dec 1990		Transfer
					ROTTERDAM	17 Apr 2002	704725	Transfer
21	F	????	WILD	WILD	WASS BR C	8 Dec 1990		Transfer
					ROTTERDAM	17 Apr 2002	704726	Transfer

=====

22	M	????	WILD	WILD	A05 A10	???? 28 Jun 1999 26 Sep 2003	_____ PAAM1 PAAM1	Transfer Transfer Death
23	M	????	WILD	WILD	A05 A10	???? 28 Jun 1999	_____ PAAM2	Transfer Transfer
24	F	????	WILD	WILD	A05 A10	???? 28 Jun 1999	_____ PAAF1	Transfer Transfer
25	?	2 Sep 1999	UNK3	24	A05 A10	2 Sep 1999 18 Sep 1999 20 Feb 2000	_____ PAAU1	Hatch Transfer Death
26	M	????	WILD	WILD	A11 A02 A08	~ 1985 29 Dec 1999 18 Feb 2001	_____ I _____	Transfer Loan to Loan to
27	M	????	WILD	WILD	A11 A02 A08	~ 1985 29 Dec 1999 18 Feb 2001	_____ II _____	Transfer Loan to Loan to
28	F	????	WILD	WILD	A11 A02 A08	~ 1985 29 Dec 1999 31 Dec 2000 9 Mar 2002	_____ III _____	Transfer Loan to Loan to Death
29	F	????	WILD	WILD	A11 A02 A08	~ 1985 29 Dec 1999 18 Feb 2001	_____ IV _____	Transfer Loan to Loan to
33	M	????	WILD	WILD	ROTTERDAM LONDON RP	14 Jan 1991 11 Aug 2000 ~ Jul 2001	702003 _____	Transfer Loan to Death
34	M	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703791	Transfer
35	M	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703792	Transfer
36	F	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703793	Transfer
37	F	????	WILD	WILD	ROTTERDAM	7 Jun 1997	703794	Transfer
38	M	????	WILD	WILD	VLISSINGE ROTTERDAM	12 Jul 1987 9 Jul 1997	_____ 703825	Transfer Transfer
39	F	????	WILD	WILD	VLISSINGE ROTTERDAM	12 Jul 1987 9 Jul 1997 9 Mar 2001	_____ 703826	Transfer Transfer Death
40	?	13 Aug 1999	UNK1	UNK2	A07 A19	13 Aug 1999 1 Mar 2000	_____ 1	Hatch Transfer
41	?	28 Aug 1999	UNK1	UNK2	A07 A19	28 Aug 1999 1 Mar 2000	_____ 2	Hatch Transfer
42	?	8 Aug 2000	UNK1	UNK2	A07 A19	8 Aug 2000 1 Sep 2000	_____ 3	Hatch Transfer
43	?	12 Aug 2000	UNK1	UNK2	A07 A19	12 Aug 2000 1 Sep 2000	_____ 4	Hatch Transfer
48	?	21 Oct 1999	34	36	ROTTERDAM	21 Oct 1999	704297	Hatch
58	M	????	WILD	WILD	A23	30 Jul 2000	DONALD	Transfer
59	F	????	WILD	WILD	A23	30 Jul 2000	DAISY	Transfer
60	F	????	WILD	WILD	A23	30 Jul 2000	EUSEBI	Transfer
61	F	????	WILD	WILD	A23	30 Jul 2000	PAULA	Transfer
62	?	1 Aug 1998	UNK1	UNK2	A07	1 Aug 1998	_____	Hatch

					A23	16 Sep 1999	TIC	Transfer
65	?	1 Aug 1998	UNK6	UNK7	A24	1 Aug 1998	_____	Hatch
					A23	1 Jul 1999	TRIC	Transfer
66	?	1 Aug 1998	UNK6	UNK7	A24	1 Aug 1998	_____	Hatch
					A23	1 Jul 1999	TRAC	Transfer
67	?	15 Mar 2001	MULT1	29	A02	15 Mar 2001	IV-1	Hatch
					A36	24 Feb 2002	_____	Transfer
68	?	14 Jun 2001	MULT1	29	A02	14 Jun 2001	IV-2	Hatch
					A11	17 Feb 2002	_____	Transfer
69	M	????	WILD	WILD	A23	5 Jul 2001	PLUTO	Transfer
70	M	????	WILD	WILD	A23	14 Jul 2001	OSCAR	Transfer
						1 Apr 2002		Death
71	F	????	WILD	WILD	LONDON RP	????	_____	Transfer
					ROTTERDAM	23 Dec 2001	704781	Transfer
72	F	????	WILD	WILD	LONDON RP	????	_____	Transfer
					ROTTERDAM	23 Dec 2001	704582	Transfer
73	?	????	WILD	WILD	LONDON RP	????	_____	Transfer
					ROTTERDAM	23 Dec 2001	704583	Transfer
79	?	6 May 2002	MULT1	29	A08	6 May 2002	_____	Hatch
80	?	26 Jul 2002	MULT1	29	A08	26 Jul 2002	_____	Hatch
81	?	~ Jan 2000	UNK8	UNK9	A32	~ Jan 2000	_____	Hatch
					A36	15 Aug 2002	_____	Transfer
82	?	~ Jan 2000	UNK8	UNK9	A32	~ Jan 2000	_____	Hatch
					A36	15 Aug 2002	_____	Transfer
83	F	~ 1996	UNK10	UNK11	A38	~ 1996	_____	Hatch
					A23	1 Aug 2002	TAMARA	Transfer
84	?	8 Jun 2002	MULT1	29	A08	8 Jun 2002	_____	Hatch
85	M	~1980	WILD	WILD	A22	10 Sep 2002	_____	Transfer
86	?	28 Oct 2000	UNK1	UNK2	A39	16 Jul 2002	_____	Transfer
87	?	29 Aug 2001	UNK1	UNK2	A39	16 Jul 2002	_____	Transfer
88	?	19 Jun 2003	MULT1	29	A08	19 Jun 2003	_____	Hatch
89	?	18 Jul 2003	MULT1	29	A08	18 Jul 2003	_____	Hatch
90	?	8 Aug 2003	MULT1	29	A08	8 Aug 2003	_____	Hatch
91	?	31 Aug 2003	MULT1	29	A08	31 Aug 2003	_____	Hatch

Totals: 18.15.23 (56)

b) *Pyxis arachnoides brygooi*

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
6	?	????	WILD	WILD	A04	19 Sep 1998	_____	Transfer
						~15 Aug 2002		Death
7	?	????	WILD	WILD	A04	19 Sep 1998	_____	Transfer
8	?	????	WILD	WILD	A04	19 Sep 1998	_____	Transfer
						~15 Aug 2002		Death

9	?	????	WILD	WILD	A04	19 Sep 1998 ~15 Aug 2002	_____	Transfer Death
30	M	????	WILD	WILD	ROTTERDAM A03	14 Jan 1991 4 Jan 1995	702004 HZ0305	Transfer Loan to
31	F	????	WILD	WILD	ROTTERDAM A03	14 Jan 1991 4 Jan 1995	702005 HZ0306	Transfer Loan to
32	?	10 Oct 1994	30	31	ROTTERDAM A03	10 Oct 1994 25 Apr 1998	703152 HZ0539	Hatch Loan to
49	F	????	WILD	WILD	ROTTERDAM A03	???? 21 Jun 1998	_____	Transfer Loan to
50	?	1 Jul 1996	30	31	A03	1 Jul 1996	HZ0428	Hatch
51	?	27 Oct 1996	30	31	A03	27 Oct 1996	HZ0454	Hatch
52	?	14 May 1999	30	31	A03	14 May 1999	HZ0624	Hatch
53	?	7 Jun 1999	30	31	A03	7 Jun 1999	HZ0627	Hatch
54	?	19 Mar 2000	30	31	A03	19 Mar 2000	HZ0683	Hatch
55	?	12 May 2000	30	31	A03	12 May 2000	HZ0691	Hatch
56	M	????	WILD	WILD	A11 A03 A11	~ 1985 16 Oct 1999 08 Nov 2003	_____	Transfer Loan to Transfer
57	F	????	WILD	WILD	A11 A03	~ 1985 16 Oct 1999	_____	Transfer Loan to
74	?	????	UNK1	UNK2	A10	10 Oct 2001	PABU01	Transfer
75	?	????	UNK1	UNK2	A10	10 Oct 2001	PABU02	Transfer
76	?	????	UNK1	UNK2	A10	10 Oct 2001	PABU03	Transfer
77	?	????	UNK1	UNK2	A10	10 Oct 2001 15 Feb 2002	PABU04 PABU04	Transfer Death
78	?	????	UNK1	UNK2	A10	10 Oct 2001 01 Dec 2002	PABU05 PABU05	Transfer Death
92	?	????	30	31	A03	03 May 2003	HZ0899	Hatch

Totals: 2.3.17 (22)

c) *Pyxis arachnoides oblonga*

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
13	?	24 Oct 1997	UNK1	UNK2	A06 A17	24 Oct 1997 25 Jul 2000	_____	Hatch Transfer
14	?	28 May 1997	UNK1	UNK2	A06 A17	28 May 1997 25 Jul 2000	_____	Hatch Transfer
15	?	26 Jun 1997	UNK1	UNK3	A06 A17	26 Jun 1997 25 Jul 2000	_____	Hatch Transfer
16	?	27 Apr 1999	UNK1	UNK2	A06 A18	27 Apr 1999 25 Jul 2000	_____	Hatch Transfer
17	?	20 Jul 1999	UNK1	UNK2	A06 A18	20 Jul 1999 25 Jul 2000	_____	Hatch Transfer

Totals: 0.0.5 (5)

Appendix 1

Husbandry conditions and additional information per location

The information below is an update on the information presented in appendix 1 of the previous annual report.

Location A08

This article appeared in "Trionyx", 1(2), 38-43

Breeding the Malagasy spider tortoise

1. Introduction

The Malagasy spider tortoise (*Pyxis arachnoides*) is a small and beautiful tortoise. The species is threatened (red data list IUCN 2002). The threats for this species mainly consist of habitat destruction (the original habitat is destroyed to make place for agricultural land to feed the fast growing population) and collectioning for the reptile trade. To my knowledge mainly for the pet trade. For example; in 2000 an export permit (CITES) was issued for 1000 specimens. It is obvious that this means an irresponsible exploitation for a species that is vulnerable and has only a limited breeding potential.

The rising christianity in Madagascar is also a threatening factor for the animals. The indigenous muslim population are not allowed to eat tortoises. Tortoises are according to Islamic laws unclean animals. Christianity, to which more and more people convert due to an unremitting diligence of the mission, has no such regulations.

A next threat appears to be the collecting of animals for the liver, which is highly priced in Asia for its favourable properties. It is obvious that a lot of animals weighing 300 gramms are needed for 1 kilo of liver.

2. Distribution / subspecies

Pyxis arachnoides inhabits the coastal regions of southwestern Madagascar (see map). At the moment, three subspecies are recognized:

Pyxis arachnoides arachnoides, the nominat form, recognizable on its frontal hinge that can be fully closed and its completely yellow plastron (dark squares on the map).

Pyxis arachnoides oblonga, this subspecies also has a fully functional hinge but the plastron has some black dots on it (triangles on the map)

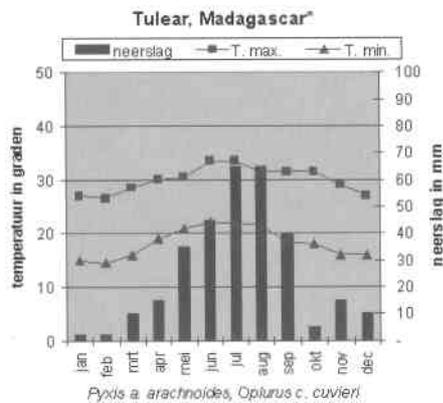
Pyxis arachnoides brygooi, the smallest subspecies and the only without a fully functional hinge. The hinge allows some motion, but not a full closing of the shield (cikels on the map).



3. Climate

Chart 1 shows the climatic conditions in Tulear. Tulear lies within the home range of *Pyxis arachnoides arachnoides*. The climate is characterised as hot and dry with clear differences between the seasons and a temperate difference between day and night (approximately 8°C). The main difference between is the division between a very dry and a slightly less dry time. Accompanied table reflects my way of keeping. The temperature- /rainfallcycle in this table has shifted 6 months to

the real temperature- rainfall cycle as it occurs in Madagascar. Due to the fact that I have inadequate possibilities to create southern hemispherical winter conditions in our summer. I choose to offer the winter conditions during our winter. The climatic chart is adjusted to this and therefore has shifted 6 months (January on the chart is in reality July).



4. Status

Based on the presence of the plastral hinge on the front of the carapace and some other differences such as the shape of some of the vertebra (Pritchard and ETI), *Pyxis* is a separate gender. Recent genetic research has made it clear that all the endemic tortoises of Madagascar (*Geochelone Yniphora*, *Geochelone radiata*, *Pyxis arachnoides* and *Pyxis planicauda*) are derived of a single group (Van der Kuyl e.a., 2002) and therefore are relative closely related. It seems apparent to classify them in one or more gender exclusive to Madagascar or to classify them in the gene *Geochelone*. Due to the huge differences between the large species (current *Geochelone*) and the smaller species (*Pyxis*) a reinstatement of the gender *Asterochelys* (current *Geochelone*) would seem an option. In this case, *Pyxis* could still be used in the future. This discussion is gladly left to the herpetologists. It is my opinion that the unique hinge from these Testudines together with the other unique characteristics of these animals, gives these tortoises the status of species. The larger Malagasy tortoises are then classified in *Asterochelys*, and the smaller ones in *Pyxis*. For more information about this topic, I refer to the earlier mentioned article.

5. Description of *Pyxis arachnoides*

The spider tortoise is a small tortoise (with a maximum of 13cm for the males and on average 15 cm for the females) (Pritchard, 1979). The carapace is mostly dark coloured with a limited number of rays on the shields. Striking is that the rays seldom run straight down. Rarely, rays run from the vertebra to the marginals. The dark colour fades with aging and the drawing becomes a little bit paler. A broad white band forms on the border between the vertebra and marginals. The marginals don't show any rays. Due to the lack of rays between the vertebra and the marginals, the general picture is that of a spiders' web, hence its name.



6. Behaviour

The most striking in the behaviour of *Pyxis a. arachnoides* is the lack of typical behaviour. I would not recommend this species to people who love to see things move in a terrarium, despite the appealing markings and size.

Around May/June the animals awake out of aestivation. To my limited experience, first the males and one or two weeks later the females. Due to the limited number of animals in my care it is possible that

this is merely a characteristic of my animals instead of being something general. The animals start to feed again and incidentally mate. Whereas with many species the males are mating or fighting, with *Pyxis* this is a calm event. I have never observed the ramming behaviour among *Pyxis* males or among males and females. The only interaction between both males in the terrarium are an occasional pseudo mating. On this is reached so peacefully that, to me, it seems more like a mistake than an attempt to establish hierarchy. Stress is never observed. The lack of aggression can also point at a lack of important things in the care of the tortoises. For example, I don't supply UVA. On several lizard species it has been pointed out that UV radiation plays a role in recognizing the sexes. At a suboptimal care the animals will put few energy in establishing ranks or protecting the right to mate, or they simply don't recognize the other sex.

A suboptimal care might also lead to a lack of the typical rank establishing behaviour. For example, at the time of writing, I take care of two male *Homopus femoralis*. At the first keeper, where probably has taken place a suboptimal care for the tortoises derived from the visible malformations, three males could be put together without any problems. At this time it is impossible to put them together without the appearance of stress and stress related diseases. Consequently it might be keeping my *Pyxis* at suboptimal conditions because they don't show enough activity to establish ranking order but perhaps it is just a characteristic of this species.

At my place, the first egg is laid approximately six weeks after the end of aestivation. At Victor Loehr's place one time an egg was laid immediately after the resting period. After the first, eggs are laid at monthly interval. Each time one egg per clutch. An exception to this was at the end of last season. Later more about this event.

7. Care / terrarium

I take care of a group of three animals (two males and a female) in a terrarium of 110 x 80 x 60 cm (LxWxH). The terrarium is lit by a 23 Watt fluorescent lamp. Heating is provided by means of a 60 Watt spotlight. The terrarium is placed in a reptile room where the temperature is centrally controlled. An egg-laying tray is provided, it is placed half under the spotlight and it is embedded in the soil.

Decoration is provided by means of a thick branch which the animals use to hide (under or behind). This branch also screens a part of the nesting site, but so that the animals can get under it. Further decoration is provided by means of some homemade bushes (leaved bamboo (*Pseudosasa japonica*)) put in a piece of clay and a number of large dried leaves (plane trees). The advantage is that there are no toxic parts. The substrate is sand. The enclosure is finished with a large water-dish (large enough to fit an adult) and a feeding dish.

As earlier said, I keep my animals according to the Northern hemisphere, which means I shifted the climate by six months. The length of the day differs between 14 hours for the longest day and 10 hours for the shortest day (according to 30° latitude). This doesn't transpond entirely with the natural situation. Tulear lies on 23° degrees latitude, but, for my convenience, I choose for two schemes (30° latitude and the equator) for my reptile room. The fluorescent lamps is always turned on and off 30 minutes before the spots which mainly provide heat. Between May and November the terrarium is sprayed three times weekly. Outside this period there is no spraying. Despite the fact that the animals don't eat or drink during the resting period, water and food are always accessible.

During the active period the animals are fed and water is supplied every other day. During the winter months this frequency is reduced to two times weekly.

No UV-lamps are used.

8. Feeding

The food that herbivores get at my place is made up of a basis that is completed with several components (according to the season). The basis is formed by greens such as dandelion, plantain (during the growing season) and is once a week completed with apple and/or carrot. If there is nothing available in the garden, the wild greens are replaced by endive. In spring and pre-summer this food is completed with flowers (especially dandelions but also hibiscus), germinated seeds (taugé) and heucobs. As the summer goes by, the percentage of heucobs increases and the percentage of germinated seeds and flowers decreases. After July no more germinated seeds are given, flowers only on occasion.

All of the food is sprinkled with 1% (weight ratio) of a vitamin/mineral supplement. At this moment I use a 1 to 1 (weight ratio) mixture of Calcicure 40+ (Witte Molen) and calciumlactate.

Drinkingwater is always supplemented with a vitamin solution (Vitasol multi 1 ml/l) and a D3-preparation (made by the pharmacist, 50000 IU of D3/ml., water-soluble, 0.15 ml (=3 drops) per liter).

9. Resting period

The animals have, as described in paragraph 6, a resting period during our winter months. Looking at the climate in the area of origine, one could expect that not so much cold periods but dry periods with a typical scarcity of food are bridged.

During the resting period, the animals hide under bushes or leaves in the terrarium and subsequently stop moving, despite temperatures climbing regularly to 30°C. The animals are completely in rest. This means that no activity is observed during this period. The young animals dig in. This possibility is not available to the adults (only in the nesting site) and this behaviour is not observed. They usually rest behind the log or under leaves but sometimes in plain sight.

10. Diseases

Due to the dryness of the enclosure it is easy to keep the infection pressure to a minimum. A lot of micro-organisms will perish under these circumstances. Furthermore it is important to remove the faeces daily and to carefully clean the water bowl. Under these circumstances I haven't had a single problem with diseases. Last year one of the females, kept here in breeding loan, died. This was a very old animal (faded colour and opened scute edges) with an egg laying problem. In the past, one egg had to be removed via the cloaca and a second egg was still in the animal. This egg could not be reached via the cloaca and it was decided, between the vet and the owner of the animal, that we should let the animal go into the resting period, hoping that in spring the egg would be in reach due to all the pushing of the animal. Because the animal died during the winter, this solution was unsuccessful.

11. Breeding

If everything goes fine, mating should occur. I only witnessed a few matings. The males seem most active from June to August. Females normally lay one egg at a time, however occasionally a clutch of two eggs can be laid.

The results of the eggs laid are described in a table in this article. A few things have to be pointed out. First of all, I didn't see the female laying the eggs. Thus making it possible that I found the eggs later. Because I thoroughly searched the laying site a couple of times, this possibility is rather small. Also because the owner of the animals pointed out that he also found, on several occasions, clutches of two eggs. Remarkable is that with the clutches of two eggs, the period of one month between two eggs, doubles. I think that around the time the female normally would lay the first (and only) egg, couldn't find a proper nesting site. The dry period had already begun in the enclosure. After three eggs I thought to have become at the end of the laying cycle. I noticed the female was a little bit restless and I remoistened the laying site, resulting in a clutch of two eggs. It is my opinion that the animals apparently are capable of holding the egg for a while until the conditions are acceptable and this way are able to lay two eggs. This is in conjunction with the results of the owner of the animals, where the animals also didn't have a proper laying site all the time.

The eggs are incubated using a scheme of Victor Loehr, slightly changed by me.

Original scheme of Victor Loehr

Two months at 26 – 32°C (12/12 h) in an open dish on vermiculite:water (weight ratio of 1:3). Then out of the incubator and two months on the floor of the terrarium room (15 – 25°C, depending on season and day or night). After again two months, remoisten the substrate with two thirds of the original amount of water and put it in the incubator.

Scheme Gerrit Hofstra

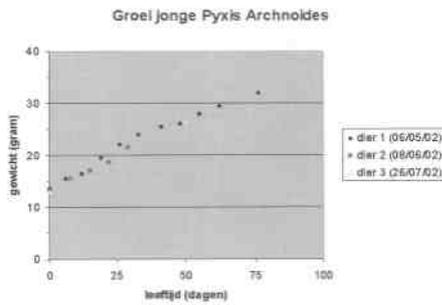
Two months at 27 – 32.5°C (12/12 h) in an open dish on vermiculite:water (weight ratio of 1:2) after this two months at 20 – 26°C (12/12 h). Subsequently in a closed dish on vermiculite:water (weight ratio 1:1) in the incubator.

12. Rearing the young

Rearing the young animals is not so difficult. The young weigh at birth approximately 13 grams, are slightly bigger than young *Testudo hermanni*. They also start growing rapidly. Unfortunately they take a resting period, as do the adults, during which they hardly eat and grow. The juveniles are kept together in a small terrarium (40x40 cm). This way of keeping apparently doesn't have negative effects on the young. There hardly is any interaction with each other. The growth lines of the animals are almost the same. Remarkable is that the young animals also take a resting period, although I keep them a little moister than the adults



Graphic on growth



Breeding results

Location	Oviposition	clutch size	hatch date	incubationperiod (days)
Ammer	????	1-2	-----	-----
Loehr		1		
Hofstra	29-08-2001	1	06-05-2002	250
Hofstra	26-09-2001	1	08-06-2002	255
Hofstra	01-11-2001	1	26-07-2002	267
Hofstra	22-07-2002	1	in the incubator	
Hofstra	21-08-2002	1	in the incubator	
Hofstra	28-09-2002	1	in the incubator	
Hofstra	19-11-2002	1	in the incubator	

13. Final word

Thanks to Max Ammer, who has given me this animals on a breeding loan and Victor Loehr for his negotiations for the loan and for his valuable advices on the care of the animals.

14. Literature

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Pritchard, P.C.H. (1979).

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www.redlist.org

Van der Kuyl A.C., Ph Ballasina D.L., Dekker J.T., Maas J., Willemsen R.E. , Goudsmit J.

Phylogenetic relationships among the species of the genus Testudo (Testudines: Testudinidae) inferred from mitochondrial 12S rRNA gene sequences. Department of Human Retrovirology, Academic Medical Center, University of Amsterdam, Melbergdreef 15, 1105 AZ Amsterdam, The Netherlands, Mol. Phylogenet. Evol. 2002 Feb; 22(2): 174-183

Location A10

At my place a few things changed during the year to decrease the number of eggs laid. A second laying hill was made under the spotlight to create a warmer place to lay eggs with a number of temperature gradients. This site was kept dry. A temperature controller was taken into use so that during the hot days we had this summer, the temperature would automatically stay lower than 35°C in the tortoiseroom. This controller dims the spotlight, not the tube lights.

At the end of the year, my adult couple of *Pyxis arachnoides arachnoides* was replaced at location A08. Since I never had any breeding results, only (infertile) eggs and since the number of eggs found (both total and annually) were significantly fewer in numbers than what should be attainable (a clutch size of 4 eggs, laid at monthly interval, should be considered attainable) it is my opinion that enough valuable years have been spent trying to breed this species with this couple. I only found 5 eggs (7 if you also count the eggs found during cleaning the enclosure). So it seems that two eggs were laid the last few years, possibly three eggs were laid the past two years. This year (2003), no eggs were produced while in mean time at location A08 already three eggs were laid. It was therefore decided to attempt further breeding with this couple at location A08.

On 29 September 2003 the adults were transferred (on breeding loan, using a 50/50 rule to divide any offspring between the two locations) to Location A08 and 2 juveniles were transferred from Location A08 to A10 (also on loan, to be coupled with captive offspring from another bloodline).

A few days later, the female laid a single egg at location A08. This egg was laid in plain sight and was not buried (which normally is the case). The egg was also cracked and a few pieces were missing. This could be the result of the stress related to the transfer because the female made no attempts to dig at my place since a month. On 24 December 2003 another egg was found, again not buried. This could still be related to the new environment because she normally buries her eggs. This egg was placed in the incubator at Location A08 (and still is to this date, 18-01-2004).

If the production of (viable) eggs should increase during the next few years (or possibly next year) it is obvious that something or some factor (or multiple factors) is missing at my place or is at suboptimal level.

On 26 September 2003 my other adult male died. It lived solitary since 04-03-2002 in an enclosure adjacent to the adult couple. His appetite was fairly good but nevertheless it seemed to me that it never was as good as when he was living in group. During September I left for South Africa to participate in the Homopus project (Viktor Loehr) and I received a few phone calls from the person who took care of the tortoises during my absence which stated that he reduced his food intake even further. As I got back he was dehydrated. I soaked him every day in a warm bath but it was too late. His weight at the time of death was 278 grams which was fine (normal between 270 and 320 grams). Cause was unknown.

Location A22

Specimens: 3.1 specimens are kept at this location. 2.1 tortoises have not reached sexual maturity yet and are housed separately from the adult male.

Housing: The semi-adult *Pyxis a. arachnoides* (2.1) were transferred to a new glass enclosure measuring 120x70x60 cm (LxWxH) in summer of 2002. It is situated above another tank of the same size, so the tortoises are located at approximately 1.5 m above the ground which seems to make them feel more comfortable during handling. 3 sides of the tank are covered with cork. The enclosure is situated near a window at the eastern side of the house and thus is exposed to natural sunlight. Further illumination takes place by means of a 30W tube light, a 70W HQI lamp and a 40W spot without UV-output in summer. In winter (from October to March) the HQI lamp and the spot are switched off completely. Photoperiod ranges from 10 to 14 h. during the year.

The substrate consists of two different types of sand of orange/reddish colour. Moreover some stones, dried grasses, a cork bark and twigs serve as cage furniture. In order to imitate the natural habitat, some succulents (*Euphorbia*, *Alluaudia*, *Pachypodium*) were planted in the tank. The tortoises ate a small amount of all plants which did not harm them obviously.

A waterdish is available at all times in summer and removed during aestivation. The terrarium was sprayed over with warm water every day which caused the tortoises to become active and search for water. This could also be observed when the plants were watered.

The adult male is kept separately in a glass tank measuring 100x70 cm. The ground consists of sand and a few grasses, stones and roots to make the cage furniture complete. The enclosure is illuminated by a 40W spot light and a 50W HQL lamp.

Feeding: The tortoises were fed with several green leaves at least every other day during their active period. The food was usually mixed with Agrobs haycobs. Fruits or vegetables were never offered to the Pyxis. After a longer period without supplementation of additional vitamins, I started to add a certain amount of Korvimin ZVT+ Reptil to the food this year. Starting in early autumn, the tortoises are fed less often and with more haycobs until feeding has stopped completely for aestivation. Water is offered very rarely during aestivation (approximately every one or two months).

Behaviour: After the tortoises had been transferred to the new enclosure, they became far more active than in the year before. They could be observed foraging for food from morning until late in the afternoon. Presumably the natural sunlight and the new position of the enclosure in a corner of the room which is more quiet provoked this change in behaviour. Sexual activities could not be observed yet.