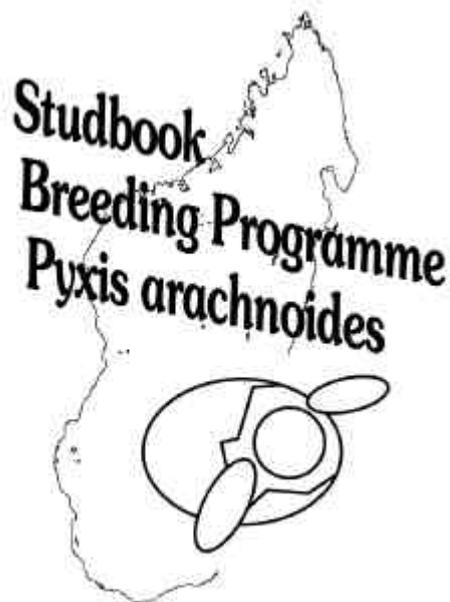


Studbook
Breeding Programme
Pyxis arachnoides



Annual Report
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APPENDIX HUSBANDRY CONDITIONS AND ADDITIONAL INFORMATION PER LOCATION

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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 Studbook Breeding Programme *Pyxis arachnoides* is one of few studbooks operating internationally. 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 2001

1.1. Introduction

This report is updating the annual report of the Studbook Breeding Programme *Pyxis arachnoides* published in 2000. The programme is aiming to form genetically healthy, reproducing captive populations and 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 co-ordinator) it has been decided that the studbook will operate exclusively in Europe, despite of occasional applies from keepers of *P. arachnoides* in the USA. Especially *P. a. arachnoides* appears to be present in Europe in sufficiently large numbers. It would be welcomed 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 already mentioned in the annual report last year, time constraints of the studbook co-ordinator (due to involvement in scientific fieldwork on *Homopus* within the Homopus Research Foundation) result in limited available time to manage the programme on *Pyxis arachnoides*. Activities will not extent beyond keeping the studbook registration up-to-date (also on the internet site), providing advise to participants and others when needed and preparing an annual overview (current report). However, structuring gathering of data, publishing, et cetera is also part of the aims of the Studbook Breeding Programme *Pyxis arachnoides*. It would be great if one or more participants would initiate activities here. The internet site is open to anyone who would like to use this medium to distribute data.

This report will summarise the activities of the Studbook Breeding Programme *Pyxis arachnoides* in 2001, plans for 2002, 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 next paragraphs an overview of the main activities in 2001 is presented.

1.2. Internet site

The internet site of the Studbook Breeding Programme *Pyxis arachnoides*, <http://home.kabelfoon.nl/~loehr/pyxis>) has not undergone any major changes. The actual composition of the studbook population has been updated on a regular basis and publications have been added. A link has been established between the information section and the information in the annual studbook reports. This will allow visitors to locate this up to date information, and at the same time it makes (time-consuming) updating of the information on the site less urgent.

One of the studbook participants has supplied interesting information regarding *Pyxis arachnoides* for inclusion at <http://www.schroete.de/arten/pyxis/index.shtml>. This information is in German.

1.3. Presentations and publications (see also chapter 6)

One publication on keeping of *P. a. arachnoides* was generated in a popular Dutch magazine *De Schildpad*. Furthermore a caresheet with minimum requirements for keeping and breeding *P. arachnoides* was produced. The latter document lists information gathered within the studbooks 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 written information published within the Studbook Breeding Programme *Pyxis arachnoides* can be found on the programme's internet site.

Mr. H. Vetter is thanked for sending several excellent full text publications on *Pyxis* for inclusion on the internet site.

1.4. *Contacts*

Many questions regarding *Pyxis arachnoides* have been sent to the studbook co-ordinator, especially about how to sex them and how to incubate the eggs. The latter question is asked rather frequently. All questions have been answered briefly, using information gathered within the programme. Unfortunately it is usually not possible to refer to publications. Publications (English and German) about successful incubation of *P. arachnoides* eggs are desperately needed! Some limited information is added in appendix 1.

TRAFFIC Europe has asked if a species related to *P. arachnoides*, *P. planicauda* is, or can be, kept and bred successfully in captivity. There are a few breeding results known from Jersey Zoo (UK). The main reason why this species is not kept and bred on at least the same scale as *P. arachnoides* appears to be that hardly any tortoises have been imported into Europe. My personal opinion is that there are no reasons to expect that this species is more difficult to keep and breed than *P. arachnoides*. It would certainly be worthwhile to test this in a structured breeding programme, preferably under supervision of the existing zoo studbook for this species.

2. PLANS FOR ACTIVITIES IN 2002

The number and type of activities conducted in 2002 will largely depend on initiatives of the studbook participants. Below are a number of activities that will be conducted or facilitated by the studbook co-ordinator and activities that have been reported to have been planned by participants.

2.1. *Internet site*

It will be attempted to post all papers that may be published within the Studbook Breeding Programme *Pyxis arachnoides* on the site in 2002. All authors within the studbook are kindly requested to assist, by sending such papers to the studbook co-ordinator. Also husbandry or other information can be send at all times for inclusion on the internet site.

2.2. *Publications and presentations*

One manuscript on husbandry and breeding of *Pyxis a. arachnoides* and *P. a. brygooi* is in preparation for publication in *Salamandra*.

A second paper on keeping and breeding *P. a. arachnoides* will be presented and published in the proceedings of the big turtle symposium in Vienna in January 2002. However, the author is not participating in the Studbook Breeding Programme *Pyxis arachnoides*.

3. CURRENT LIVING STUDBOOK POPULATION

The total number of registered live specimens *P. arachnoides* increased from 40 to 60. These specimens are housed at 12 locations (10 in 2000) in the Netherlands (5), Belgium (1) and Germany (6). All subspecies are represented in the studbook, but *P. a. oblonga* and *P. a. brygooi* are limited in numbers.

Location codes A01, A05, A07, A11, A15, A24 and LD-ZOO are virtual locations, outside of the Studbook Breeding Programme *Pyxis arachnoides*. These have been entered in order to allow registration of relationships between specimens bred at these locations. Also studbook numbers 0010-0012, 0044-0047 and 0063-0064 are virtual numbers, for parents at the virtual locations. Virtual specimen numbers may represent groups of specimens, but unfortunately all captive-bred specimens originating from the same location outside of the studbook should be considered related when there is doubt about parent-offspring relationships. Otherwise inbreeding may be introduced in the studbook population.

Specimens 0001-0003 were transferred from location A02 to location A22 in 2001. The keeper at location A02 needed more time for tortoise fieldwork and did not wish to decrease the amount of time spent per tortoise. This resulted in a logical reduction in number of tortoises kept. Specimens 0026-0029 were transferred from location A02 to location A08 for the same reason.

Table I: Current living studbook population *Pyxis arachnoides* per location as registered in the studbook. M is male, F is female, U is unknown, D is donation, L is loan, P is purchase 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	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
LOCATION A02 (0.0.2)									
0067	U	0026 0027	0029	15/03/01	A02 (B)	010315-IV-1	1	0.000	<i>arachnoides</i>
0068	U	0026 0027	0029	14/06/01	A02 (B)	010614-IV-2	1	0.000	<i>arachnoides</i>
LOCATION A03 (3.4.8)									
0030	M	WILD	WILD	14/01/91 04/01/95	RDZOO (D) A03 (L)	702004 HZ0305	1	0.000	<i>brygooi</i>
0031	F	WILD	WILD	14/01/91 04/01/95	RDZOO (D) A03 (L)	702005 HZ0306	1	0.000	<i>brygooi</i>
0032	U	0030	0031	10/10/94 25/04/98	RDZOO (B) A03 (L)	703152 HZ0539	2	0.000	<i>brygooi</i>
0071	M	WILD	WILD	? 23/12/01	LDZOO (D) A03 (D)	- HZ...	3	0.000	<i>arachnoides</i>
0072	F	WILD	WILD	? 23/12/01	LDZOO (D) A03 (D)	- HZ...	3	0.000	<i>arachnoides</i>
0073	U	WILD	WILD	? 23/12/01	LDZOO (D) A03 (D)	- HZ...	3	0.000	<i>arachnoides</i>
0049	F	WILD	WILD	20/06/98? 21/06/98	RDZOO (D) A03 (L)	? HZ0561	1	0.000	<i>brygooi</i>
0050	U	0030	0031	01/07/96	A03 (B)	HZ0428	4	0.000	<i>brygooi</i>
0051	U	0030	0031	27/10/96	A03 (B)	HZ0454	5	0.000	<i>brygooi</i>
0052	U	0030	0031	14/05/99	A03 (B)	HZ0624	6	0.000	<i>brygooi</i>
0053	U	0030	0031	07/06/99	A03 (B)	HZ0627	7	0.000	<i>brygooi</i>
0054	U	0030	0031	19/03/00	A03 (B)	HZ0683	8	0.000	<i>brygooi</i>
0055	U	0030	0031	12/05/00	A03 (B)	HZ0691	9	0.000	<i>brygooi</i>
0056	M	WILD	WILD	? 16/10/99	A11 (P) A03 (L)	- HZ0664	10	0.000	<i>brygooi</i>

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
0057	F	WILD	WILD	? 16/10/99	A11 (P) A03 (L)	- HZ0665	10	0.000	<i>brygooi</i>
LOCATION A04 (1.0.4)									
0004	M	WILD	WILD	17/05/99	A04 (P)	Uli	1	0.000	<i>arachnoides</i>
0006	U	WILD	WILD	19/09/98	A04 (P)	-	2	0.000	<i>brygooi</i>
0007	U	WILD	WILD	19/09/98	A04 (P)	-	2	0.000	<i>brygooi</i>
0008	U	WILD	WILD	19/09/98	A04 (P)	-	2	0.000	<i>brygooi</i>
0009	U	WILD	WILD	19/09/98	A04 (P)	-	2	0.000	<i>brygooi</i>
LOCATION A08 (3.2.0)									
0018	M	WILD	WILD	01/01/95	A08 (P)	-	1	0.000	<i>arachnoides</i>
0026	M	WILD	WILD	? 29/12/99 18/02/01	A11 (P) A02 (L) A08 (L)	- 991229-I -	2	0.000	<i>arachnoides</i>
0027	M	WILD	WILD	? 29/12/99 18/02/01	A11 (P) A02 (L) A08 (L)	- 991229-II -	2	0.000	<i>arachnoides</i>
0028	F	WILD	WILD	? 29/12/99 18/02/01	A11 (P) A02 (L) A08 (L)	- 991229-III -	2	0.000	<i>arachnoides</i>
0029	F	WILD	WILD	? 29/12/99 18/02/01	A11 (P) A02 (L) A08 (L)	- 991229-IV -	2	0.000	<i>arachnoides</i>
LOCATION A09 (2.1.0)									
0019	M	WILD	WILD	08/12/90	A09 (P)	'Damaged'	1	0.000	<i>arachnoides</i>
0020	M	WILD	WILD	08/12/90	A09 (P)	-	1	0.000	<i>arachnoides</i>
0021	F	WILD	WILD	08/12/90	A09 (P)	-	1	0.000	<i>arachnoides</i>
LOCATION A10 (2.1.0)									
0022	M	UNKN	UNKN	? 28/06/99	A05 (B) A10 (P)	- Paam1	1	0.000	<i>arachnoides</i>
0023	M	UNKN	UNKN	? 28/06/99	A05 (B) A10 (P)	- Paam2	1	0.000	<i>arachnoides</i>
0024	F	UNKN	UNKN	? 28/06/99	A05 (B) A10 (P)	- Paaf1	1	0.000	<i>arachnoides</i>
LOCATION A17 (0.0.3)									
0013	U	0012	0010	24/10/97 25/07/00	A06 (B) A17 (P)	- -	1	0.000	<i>oblonga</i>
0014	U	0012	0010	28/05/97 25/07/00	A06 (B) A17 (P)	- -	1	0.000	<i>oblonga</i>
0015	U	0012	0011	26/06/97 25/07/00	A06 (B) A17 (P)	- -	1	0.000	<i>oblonga</i>
LOCATION A18 (0.0.2)									
0016	U	0012	0010	27/04/99 25/07/00	A06 (B) A18 (P)	- -	1	0.000	<i>oblonga</i>
0017	U	0012	0010	20/07/99 25/07/00	A06 (B) A18 (P)	- -	1	0.000	<i>oblonga</i>

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	CAGE	FCOEF	SUB-SPECIES
LOCATION A19 (0.0.4)									
0040	U	0044	0045	13/08/99	A07 (B)	-		0.000	<i>arachnoides</i>
				01/03/00	A19 (P)	-	?		
0041	U	0044	0045	13/08/99	A07 (B)	-		0.000	<i>arachnoides</i>
				01/03/00	A19 (P)	-	?		
0042	U	0044	0045	13/08/99	A07 (B)	-		0.000	<i>arachnoides</i>
				01/09/00	A19 (P)	-	?		
0043	U	0044	0045	13/08/99	A07 (B)	-		0.000	<i>arachnoides</i>
				01/09/00	A19 (P)	-	?		
LOCATION A22 (0.0.3)									
0001	U	0044	0045	09/09/96	A07 (B)	-		0.000	<i>arachnoides</i>
				22/11/98	A02 (L)	960909			
				24/02/01	A22 (L)	-	1		
0002	U	0044	0045	16/11/96	A07 (B)	-		0.000	<i>arachnoides</i>
				22/11/98	A02 (L)	961116			
				24/02/01	A22 (L)	-	1		
0003	U	0044	0045	16/09/97	A07 (B)	-		0.000	<i>arachnoides</i>
				22/11/98	A02 (L)	970916			
				24/02/01	A22 (L)	-	1		
LOCATION A23 (3.3.3)									
0058	M	WILD	WILD	30/07/00	A23 (P)	Donald	1	0.000	<i>arachnoides</i>
0059	F	WILD	WILD	30/07/00	A23 (P)	Daisy	1	0.000	<i>arachnoides</i>
0060	F	WILD	WILD	30/07/00	A23 (P)	Eusebia	1	0.000	<i>arachnoides</i>
0061	F	WILD	WILD	30/07/00	A23 (P)	Paula	1	0.000	<i>arachnoides</i>
0062	U	0044	0045	01/08/98	A07 (B)	-		0.000	<i>arachnoides</i>
				16/09/99	A23 (P)	Tic	2		
0065	U	0063	0064	01/08/98	A24 (B)	-		0.000	<i>arachnoides</i>
				01/07/99	A23 (P)	Tric	2		
0066	U	0063	0064	01/08/98	A24 (B)	-		0.000	<i>arachnoides</i>
				01/07/99	A23 (P)	Trac	2		
0069	M	WILD	WILD	05/07/01	A23 (P)	Pluto	3	0.000	<i>arachnoides</i>
0070	M	WILD	WILD	14/07/01	A23 (P)	Oscar	4	0.000	<i>arachnoides</i>
LOCATION RDZOO (3.3.1)									
0034	M	0046	0047	?	A15 (B)	-		0.000	<i>arachnoides</i>
				07/06/97	RDZOO (P)	703791	2		
0035	M	0046	0047	?	A15 (B)	-		0.000	<i>arachnoides</i>
				07/06/97	RDZOO (P)	703792	3		
0036	F	0046	0047	?	A15 (B)	-		0.000	<i>arachnoides</i>
				07/06/97	RDZOO (P)	703793	2		
0037	F	0046	0047	?	A15 (B)	-		0.000	<i>arachnoides</i>
				07/06/97	RDZOO (P)	703794	2		
0038	M	WILD	WILD	12/07/87	A15 (D)	-		0.000	<i>arachnoides</i>
				09/07/97	RDZOO (P)	703825	4		
0048	U	0034	0036	21/10/99	RDZOO (B)	704297	6	0.000	<i>arachnoides</i>

Total population: (17.13.30)

All specimens together make the total living registered studbook population 17 males, 13 females and 30 unknown, housed at 12 locations. No females, but 5 solitary male *P. a. arachnoides* fit for breeding purposes are present, at locations A04 (0005), A08 (0018), A23 (0069 and 0070) and RDZOO (0035).

Table II: Current living studbook population *Pyxis arachnoides* as registered in the studbook.

LOCATION	MALES	FEMALES	UNKNOWN
LOCATION A02	0	0	2
LOCATION A03	3	4	8
LOCATION A04	1	0	4
LOCATION A08	3	2	0
LOCATION A09	2	1	0
LOCATION A10	2	1	0
LOCATION A17	0	0	3
LOCATION A18	0	0	2
LOCATION A19	0	0	4
LOCATION A22	0	0	3
LOCATION A23	3	3	3
LOCATION RDZOO	3	2	1
TOTAL	17	13	30

At locations A08, A09 and A10 groups containing multiple males are kept. This has the consequence that all offspring must be considered related to both males. At locations A03, A08, A23 and RDZOO multiple females are kept with one male, although there are surplus males available in the studbook population with which new blood lines could be formed. Now that the studbook population consists of a reasonable number of tortoises (especially for subspecies *P. a. arachnoides*) it would be good to consider what would be the best way to proceed. The following is suggested to the studbook participants involved:

- Location A08 has two females and two males in one enclosure. However, one of the females is probably unable to reproduce, so it does not make sense to combine this female with a specific male in a separate enclosure. The two males could be separated to produce hatchlings with known sire from female 0029 (this female is reproducing already). Together with males 0004, 0018, 0035, 0069 and 0070 this would result in six solitary males.
- Location A09 has two males and one female in one enclosure. One male could be separated, yielding a total of seven solitary males. Since no reproduction has taken place at location A09 in past years, it could also be considered to house the female at another location, or to transfer a single male to location A09 to combine it with the female (without the current two males of course).
- Location A10 has housed two males with one (egg laying) female. Separating one of the males would yield eight solitary males.
- Location A23 has three females housed with one male. From the studbook point of view, it would be best if all these females would be housed in separate enclosures with in each one male. Two additional males are already present at location A23. In case logistical problems would occur, location A23 could consider housing a couple at another studbook location. The studbook co-ordinator could assist to make an arrangement.
- Location RDZOO has two females combined with one male. One of the females could be combined with the solitary male at the same location.

It is obvious that the proposal above would involve rather serious changes for some keepers, especially in terms of number of enclosures. Nevertheless, I would urgently ask the keepers involved (locations A08, A09, A10, A23 and RDZOO) to consider the proposal and to respond to the studbook co-ordinator (**action: locations A08, A09, A10, A23 and RDZOO**). It should be possible to work out a situation that benefits both the studbook population and the keepers concerned. From the moment that couples would be separated, a period of 3 years should be taken into account during which offspring could be produced that is related to a previous mate, due to sperm storage.

In the case of *P. arachnoides brygooi* the situation is slightly different. Multiple females are kept together with one male at location A03, but there are no adult males available in the studbook population to pair one of the females with to form a new blood line. Because of the small number of *P. a. brygooi* in the population, it seems reasonable to keep the two females together with the single adult male at location A03, in order to maximise the number of hatchlings. However, it should be kept in mind that the females should be separated as soon as an unrelated male would become available. Potential males are available at location A04. The situation has to be re-evaluated in the next annual report.

Although the studbook co-ordinator has not been informed in 2001, sex of some of the specimens listed as 'unknown sex' may be known by now. Studbook participants are kindly requested to forward this information, if applicable (**action: all locations**).

4. IMPORTS, BIRTHS AND DEATHS

Imports of *P. arachnoides*, organised by the Studbook Breeding Programme *Pyxis arachnoides*, did not take place in 2001. As there seems to be a relatively large number of specimens already present in captivity, efforts to import additional specimens from Madagascar, or secondarily from other countries, are not planned.

There is one location that bred *P. arachnoides* in 2001 (location A02, subspecies *P. a. arachnoides*). Incubation succeeded after 357 and 252 days (2 hatchlings): 2 months at fluctuating temperatures between 32.0-26.5°C (both 12 hours per day), with a dehydrating substrate (initially water:vermiculite mass=3:1), then 2 months at room temperature (approximately 15-22°C, dry substrate) and the remaining time back in the incubator, after remoistening with water. At locations A08 and A10 eggs were produced. These are still being incubated (see appendix 1 for details).

Table III: Births of *Pyxis a. arachnoides* in 2001. U is unknown and B is birth.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH dd/mm/yy
0067	U	0026 0027	0029	15/03/01	A02 (B)	010315-IV-1	0.000	
0068	U	0026 0027	0029	14/06/01	A02 (B)	010614-IV-2	0.000	

Total number of births: (0.0.2)

Three specimens *P. a. arachnoides* died in 2001, at locations A04, RDZOO and LDZOO. All were wild-caught specimens. Cause of death of the specimen at location A04 was presumably kidney failure. Causes of death of the other two locations have not been reported.

Table IV: Deaths of *P. a. arachnoides* 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
0005	F	WILD	WILD	17/05/99	A04 (P)	30/06/01	?	Kidney failure
0033	M	WILD	WILD	14/01/91	RDZOO (D)			
				11/08/00	LD-ZOO (L)	?	?	?
0039	F	WILD	WILD	12/07/87	A14 (D)			
				09/07/97	RD-ZOO (D)	09/03/01	?	?

Total number of deaths: (1.2.0)

5. TOTAL STUDBOOK POPULATION AND FUTURE PERSPECTIVES

The current total registered studbook population consists of 64 specimens: 43 *P. a. arachnoides*, 5 *P. a. oblonga*, 14 *P. a. brygooi* and 2 of unclear subspecies. From these, 34 are wild-caught specimens and 30 are captive-bred. Captive-bred specimens of all three subspecies are present. All but four tortoises are currently alive, housed at 12 (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 required to combine the specimens in an optimal way to create as many blood lines as possible (see chapter 3). The other two subspecies are present in small numbers. Especially the situation regarding *P. a. oblonga* is critical, since all registered specimens are genetically related. Because it is clear that more specimens of all subspecies are present in Europe, it will be continued to convince keepers to register their specimens in the studbook. All studbook participants are requested to assist to interest keepers of *P. arachnoides* outside of the studbook, to register their specimens. Obviously, they will need to understand, and support, the general idea about studbooks.

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 2001 few breeding results have been reported. Fortunately, detailed information on successful breeding will soon be available (see paragraph 2.2). It is striking that some locations (both in and outside of the studbook) are extremely successful, whereas at other locations no breeding occurs during prolonged periods of time. It might be worthwhile either to experiment with different husbandry techniques when breeding does not occur at a specific location, or to house specimens at another location for a period of time to see if this makes a difference. A positive factor is that the mortality in the studbook population is low.

Table V: Total studbook population *Pyxis arachnoides*. M is male, F is female, U is unknown, D is donation, L is loan, P is purchase and B is birth. Studbook numbers 0010-0012, 0044-0047 and 0063-0064 are virtual specimens outside of the studbook, known parents of studbook specimens.

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH	SUB-SPECIES
0001	U	0044	0045	09/09/96 22/11/98 24/02/01	A07 (B) A02 (L) A22 (L)	- 960909 -	0.000		<i>arachnoides</i>
0002	U	0044	0045	16/11/96 22/11/98 24/02/01	A07 (B) A02 (L) A22 (L)	- 961116 -	0.000		<i>arachnoides</i>
0003	U	0044	0045	16/09/97 22/11/98 24/02/01	A07 (B) A02 (L) A22 (L)	- 970916 -	0.000		<i>arachnoides</i>
0004	M	WILD	WILD	17/05/99	A04 (P)	Uli	0.000		<i>arachnoides</i>
0005	F	WILD	WILD	17/05/99	A04 (P)	Esther	0.000	30/06/01	<i>arachnoides</i>
0006	U	WILD	WILD	19/09/98	A04 (P)	-	0.000		<i>brygooi</i>
0007	U	WILD	WILD	19/09/98	A04 (P)	-	0.000		<i>brygooi</i>
0008	U	WILD	WILD	19/09/98	A04 (P)	-	0.000		<i>brygooi</i>
0009	U	WILD	WILD	19/09/98	A04 (P)	-	0.000		<i>brygooi</i>
0013	U	0012	0010	24/10/97 25/07/00	A06 (B) A17 (P)	- -	0.000		<i>oblonga</i>
0014	U	0012	0010	28/05/97 25/07/00	A06 (B) A17 (P)	- -	0.000		<i>oblonga</i>
0015	U	0012	0011	26/06/97 25/07/00	A06 (B) A17 (P)	- -	0.000		<i>oblonga</i>

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH	SUB-SPECIES
0016	U	0012	0010	27/04/99 25/07/00	A06 (B) A18 (P)	- -	0.000		<i>oblonga</i>
0017	U	0012	0010	20/07/99 25/07/00	A06 (B) A18 (P)	- -	0.000		<i>oblonga</i>
0018	M	WILD	WILD	01/01/95	A08 (P)	-	0.000		<i>arachnoides</i>
0019	M	WILD	WILD	08/12/90	A09 (P)	'Damaged'	0.000		<i>arachnoides</i>
0020	M	WILD	WILD	08/12/90	A09 (P)	-	0.000		<i>arachnoides</i>
0021	F	WILD	WILD	08/12/90	A09 (P)	-	0.000		<i>arachnoides</i>
0022	M	UNKN	UNKN	?	A05 (B)	-	0.000		<i>arachnoides</i>
				28/06/99	A10 (P)	Paam1			
0023	M	UNKN	UNKN	?	A05 (B)	-	0.000		<i>arachnoides</i>
				28/06/99	A10 (P)	Paam2			
0024	F	UNKN	UNKN	?	A05 (B)	-	0.000		<i>arachnoides</i>
				28/06/99	A10 (P)	Paaf1		20/02/00	
0025	U	0022 0023	0024	02/09/99	A05 (B)	-	0.000		<i>arachnoides</i>
				18/09/99	A10 (P)	Paau1			
0026	M	WILD	WILD	?	A11 (P)	-	0.000		<i>arachnoides</i>
				29/12/99	A02 (L)	991229-I			
				18/02/01	A08 (L)	-			
0027	M	WILD	WILD	?	A11 (P)	-	0.000		<i>arachnoides</i>
				29/12/99	A02 (L)	991229-II			
				18/02/01	A08 (L)	-			
0028	F	WILD	WILD	?	A11 (P)	-	0.000		<i>arachnoides</i>
				29/12/99	A02 (L)	991229-III			
				18/02/01	A08 (L)	-			
0029	F	WILD	WILD	?	A11 (P)	-	0.000		<i>arachnoides</i>
				29/12/99	A02 (L)	991229-IV			
				18/02/01	A08 (L)	-			
0030	M	WILD	WILD	14/01/91 04/01/95	RDZOO (D) A03 (L)	702004 HZ0305	0.000		<i>brygooi</i>
0031	F	WILD	WILD	14/01/91 04/01/95	RDZOO (D) A03 (L)	702005 HZ0306	0.000		<i>brygooi</i>
0032	U	0030	0031	10/10/94 25/04/98	RDZOO (B) A03 (L)	703152 HZ0539	0.000		<i>brygooi</i>
0033	M	WILD	WILD	14/01/91 11/08/00	RDZOO (D) LDZOO (L)	702003 -	0.000		<i>arachnoides</i>
								??/??/01	
0034	M	0046	0047	?	A15 (B)	-	0.000		<i>arachnoides</i>
				07/06/97	RDZOO (P)	703791			
0035	M	0046	0047	?	A15 (B)	-	0.000		<i>arachnoides</i>
				07/06/97	RDZOO (P)	703792			
0036	F	0046	0047	?	A15 (B)	-	0.000		<i>arachnoides</i>
				07/06/97	RDZOO (P)	703793			
0037	F	0046	0047	?	A15 (B)	-	0.000		<i>arachnoides</i>
				07/06/97	RDZOO (P)	703794			
0038	M	WILD	WILD	12/07/87 09/07/97	A15 (D) RDZOO (P)	- 703825	0.000		<i>arachnoides</i>
0039	F	WILD	WILD	12/07/89 09/07/97	A15 (D) RDZOO (P)	- 703826	0.000		<i>arachnoides</i>
								09/03/01	
0040	U	0044	0045	13/08/99 01/03/00	A07 (B) A19 (P)	- -	0.000		<i>arachnoides</i>
0041	U	0044	0045	13/08/99 01/03/00	A07 (B) A19 (P)	- -	0.000		<i>arachnoides</i>
0042	U	0044	0045	13/08/99 01/09/00	A07 (B) A19 (P)	- -	0.000		<i>arachnoides</i>
0043	U	0044	0045	13/08/99 01/09/00	A07 (B) A19 (P)	- -	0.000		<i>arachnoides</i>

STUD ID	SEX	SIRE ID	DAM ID	DATE OF ARRIVAL dd/mm/yy	LOCATION	HOUSE NAME	FCOEF	DATE OF DEATH	SUB-SPECIES
0048	U	0034	0036	21/10/99	RDZOO (B)	704297	0.000		<i>arachnoides</i>
0049	F	WILD	WILD	20/06/98?	RDZOO	?	0.000		<i>brygooi</i>
				21/06/98	A03 (L)	HZ0561			
0050	U	0030	0031	01/07/96	A03 (B)	HZ0428	0.000		<i>brygooi</i>
0051	U	0030	0031	27/10/96	A03 (B)	HZ0454	0.000		<i>brygooi</i>
0052	U	0030	0031	14/05/99	A03 (B)	HZ0624	0.000		<i>brygooi</i>
0053	U	0030	0031	07/06/99	A03 (B)	HZ0627	0.000		<i>brygooi</i>
0054	U	0030	0031	19/03/00	A03 (B)	HZ0683	0.000		<i>brygooi</i>
0055	U	0030	0031	12/05/00	A03 (B)	HZ0691	0.000		<i>brygooi</i>
0056	M	WILD	WILD	?	A11 (P)	-	0.000		unknown
				16/10/99	A03 (L)	HZ0664			
0057	F	WILD	WILD	?	A11 (P)	-	0.000		unknown
				16/10/99	A03 (L)	HZ0665			
0058	M	WILD	WILD	30/07/00	A23 (P)	Donald	0.000		<i>arachnoides</i>
0059	F	WILD	WILD	30/07/00	A23 (P)	Daisy	0.000		<i>arachnoides</i>
0060	F	WILD	WILD	30/07/00	A23 (P)	Eusebia	0.000		<i>arachnoides</i>
0061	F	WILD	WILD	30/07/00	A23 (P)	Paula	0.000		<i>arachnoides</i>
0062	U	0044	0045	01/08/98	A07 (B)	-	0.000		<i>arachnoides</i>
					A23 (P)	Tic			
0065	U	0063	0064	01/08/98?	A24 (B)	-	0.000		<i>arachnoides</i>
				01/07/99	A23 (P)	Tric			
0066	U	0063	0064	01/08/98?	A24 (B)	-	0.000		<i>arachnoides</i>
				01/07/99	A23 (P)	Trac			
0067	U	0026	0029	15/03/01	A02 (B)	010315-IV-1	0.000		<i>arachnoides</i>
		0027							
0068	U	0026	0029	14/06/01	A02 (B)	010614-IV-2	0.000		<i>arachnoides</i>
		0027							
0069	M	WILD	WILD	05/07/01	A23 (P)	Pluto	0.000		<i>arachnoides</i>
0070	M	WILD	WILD	14/07/01	A23 (P)	Oscar	0.000		<i>arachnoides</i>
0071	M	WILD	WILD	?	LDZOO (D)	-	0.000		<i>arachnoides</i>
				23/12/01	A03 (D)	?			
0072	F	WILD	WILD	?	LDZOO (D)	-	0.000		<i>arachnoides</i>
				23/12/01	A03 (D)	?			
0073	U	WILD	WILD	?	LDZOO (D)	-	0.000		<i>arachnoides</i>
				23/12/01	A03 (D)	?			

Total population: (18.15.31)

6. LITERATURE ABOUT *PYXIS*

Below a list is printed of literature on *Pyxis*. Anyone who is aware of references, please send these to the studbook co-ordinator, for inclusion in the 2002 annual studbook report, and the internet site.

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Appendix 1

Husbandry conditions and additional information per location

Location A02

Adults

Until they were transferred in February, four (2.2) adult specimens *P. a. arachnoides* were housed indoors in a 120 x 80 x 60 cm (l x w x h) chipboard enclosure, integrated in a scaffolding of enclosures. Front pane was transparent glass, all other sides were painted with sky blue paint. The enclosure was illuminated using a 18 W tube light (no UV emission). Heating occurred by means of a 80 W spot light and a heating wire in concrete in the bottom of the enclosure, all switched via dimmers. The transformer of the tube light was also integrated in the bottom of the enclosure, providing a site that was warm on all days. Climatic conditions were as described for *H. s. signatus* at <http://www.homopus.org>, with the exception that summer rains were imitated by intensive spraying, every other day. In winter, the enclosure was sprayed lightly once weekly.

Soil consisted of a 4 cm layer of fine gravel (ϕ 5 mm) and sand. An egg laying site was provided by means of a plastic container (approximately 15 cm) filled with the same soil material, in the bottom of the enclosure. The enclosure was furthermore decorated with wood, bark, artificial plants and dry plane-tree leaves to provide hiding places. The leaves were being eaten.

Tortoises were fed four times weekly, on green leaves (collected outside in summer, in winter endive and chicory). Twice per week cucumber and carrot was added, once per week also tomato or orange and apple was provided. In all cases a calcium/vitamin (Gistocal) supplement was added. A water bowl was available permanently, with water supplemented with 23 μ g vitamin D₃ per litre.

The tortoises were generally inactive. They appeared to feed in the morning or afternoon, and after that they retreated again. Activity was higher on days when the tortoises were not being fed. Mating activity was rare, but occurred in June-July, when the males seemed slightly more active, traversing the enclosure. Eggs were produced after at most one week of digging test nest holes, and was induced by moistening the egg laying site with hot water. Sites that are protected by overhanging wood were favoured.

In winter the tortoises were less active, and sometimes remained hidden for several days or weeks. They continued to feed irregularly.

Egg incubation

Incubation succeeded after 357 and 252 days (two hatchlings): 2 months at fluctuating temperatures between 32-26.5°C (both 12 hrs per day), with a dehydrating substrate (initially water:vermiculite=3:1 mass ratio), then 2 months at room temperature (approximately 15-22°C, dry substrate), and the remaining time back in the incubator, after remoistening with water.

Juveniles

Previously four juvenile specimens *P. a. arachnoides*, and currently two recently born *P. a. arachnoides* are housed indoors in a 75 x 60 x 40 cm (l x w x h) glass enclosure, integrated in a scaffolding of enclosures. The front is open (the room is heated), all other sides are closed and painted with sky blue paint. The enclosure is illuminated using a 18 W tube light (no UV emission). Heating occurs by means of two 40 W spot lights and heating mats under the enclosure, all switched via dimmers. Climatic conditions are as described for *H. s. signatus* at <http://www.homopus.org>, with the exception that summer rains are imitated by intensive spraying, every other day. In winter, the enclosure is sprayed lightly once weekly. A deeper soil depth provides some humidity at the bottom at all times.

Soil consists of a 4 cm layer of fine gravel (ϕ 1-2 mm) and sand. The enclosure is furthermore decorated with a piece of bark and dry plane-tree leaves to provide hidings places. The leaves are being eaten.

Tortoises are fed four times weekly, on green leaves (collected outside in summer, in winter endive and chicory). Three times weekly so called soaked heucobs' are added; pellets consisting of a variety of dried plant material. In all cases a calcium/vitamin (Gistocal) supplement is added. A water bowl is available permanently, with water supplemented with 23 μ g vitamin D₃ per litre. The hatchlings are soaked (10 minutes) three times weekly in summer and once weekly in winter during their first year.

The tortoises typically become active immediately after the lights have switched on, searching for food. They are fed in the morning, before the lights switch on. After feeding they retreat (they remain active for a longer period of time, on days when they are not being fed). Both at that time, and during the night, they sometimes dig into the soil for a few centimetres, under the bark or dry leaves. In the evening, about 3 hours before the lights switch off, they become active again, and feed.

In winter the tortoises are less active, and sometimes remain hidden for several days or weeks. They continue to feed irregularly.



Location A03

A detailed publication is in preparation for publication in *Salamandra*.

Location A04

All following information is true for both subspecies kept at this location, if not mentioned otherwise.

Housing

The specimens are kept in a greenhouse, situated indoors in the living room. In the greenhouse, there are open glass enclosures for *Pyxis*. In an enclosure measuring 145 x 55 cm one male and one female *P. a. arachnoides* are housed. The group of *P. a. brygooi* (four juvenile specimens) occupy a triangle shaped enclosure of 160 x 100 cm. They used to share the enclosure with two captive-bred juvenile *Kinixys belliana*, but these have been transferred to another enclosure. The decoration of the enclosure consists of live plants, roots, ceramic dishes and a drinking bowl.

The enclosures are heated by several halogen lamps, heating the entire greenhouse. Furthermore, each of the enclosures has a 150 W halogen spot as basking site. An additional heating source (depending on season, see below) is a heated water container of 80 l, heated up to 32°C. A fan mixes the air in the greenhouse (6 hours per day, with intervals).

Climate

Between June and August the specimens are located in a greenhouse in the garden, to allow a 'winter period' of low activity. They are placed in a resting box, that they cannot exit. They start resting immediately. In the end of August/beginning of September, the tortoises are woken up by placing them in the garden during a sufficiently warm rain shower. After that, they are transferred to the indoor greenhouse. At this time, temperatures are relatively low, 28-30°C during the day, and >20°C during the night (nocturnal temperature drop is difficult to realise indoors). Relative humidity is kept low.

In the end of October till April, the water container in the greenhouse is filled and heated. An additional 300 W halogen lamp is switched on. As a result, the temperature and relative humidity rise (32-40°C (day); 24-28°C (night) and 100%, respectively).

In May preparations for the winter rest are made, by emptying the water container, and by maintaining temperatures and relative humidity as in September/October.

Artificial light in the house always is switched on for 11 hours per day. Sunlight is able to penetrate into the indoor greenhouse, via a window located south.

Feeding

The tortoises are fed daily in the morning, exclusively on green leaves. If possible, they are fed on wild herbs and grasses (all species found on a local pasture land), in winter they receive Lattuga salad and endive, added with plenty of soaked straw pellets. They never are fed on meat or fruits, and they do not receive artificial vitamins.

Location A08

Housing

At the moment I keep one single male (*P. a. arachnoides*, 0018) and a group of four (same subspecies, 2.2 specimens) in two separate terrariums of 110 x 80 x 60 cm. The single animal is kept together with a pair *Oplurus cuvieri*, which originate from the same area. The breeding group is kept together with a single male *Phelsuma madagascariensis grandis* to control the number of crickets in this terrarium. The terrariums are placed in a special reptile room. One 24 W tube light and one 60 W lamp illuminate and heat the terrarium. Both terrariums have sand on the bottom and in both terrariums there is a special site for nesting with a depth of about 12 cm. The sand in this part of the terrarium is kept moist during the 'wet' period.

In the terrarium some logs of wood are placed together with some death leaves to construct some hiding places. About half of the nesting place is shaded.

Climate

I use the photoperiod of 30° latitude for the northern hemisphere. This means 8 hrs daylight during winter and 14 during summer. In the period from May to September (both included) the terrarium is sprayed with water three times a week to simulate a wet period. Normally the terrarium dries within 3-4 hrs after spraying.

Behaviour

The most obvious behaviour is the 'hibernating' during hot and cold periods. An animal does not loose more than 3% of its bodyweight during this 'hibernation'. Normally the animals rarely move and will not feed during the period from November to May (partly information from previous location A02). The males typically are awake some two weeks before the females. Mating occurs mostly in July and August. Even for slow and placid turtles this species is very quiet. Nevertheless I still think they are beautiful and very interesting.

Eggs are buried at almost exactly the same site each time (the hottest shaded place at a dept of about 8 cm).

Feeding

Standard feeding consists of greens (dandelion leaves and flowers, English plantain (*Plantago lanceolata*), 'heucobs' and incidentally grated carrot and apple (about once a week). All food is dusted with a 50/50 mixture of Calcicare 40+ (Witte Molen) and calcium lactate to about 0,5-1% of the weight of the food. All drinking water is supplemented with 1000 IU vitamin D₃ and 1.5 g of calcium lactate per l.

During the winter period the animals do not eat, but if necessary will get endive and Brussels sprouts. During the spring months several forms of sprouted seeds are added to the diet. Feeding occurs every other day, however, the animals will not eat for several weeks to months during resting periods.

Reproduction

Female 0029 has produced three clutches of one egg on the following dates: 29-08-2001, 26-09-2001 and 01-11-2001. The eggs are placed in a commercial Jaeger incubator and are incubated conform the advice of location A02 (see this appendix). So far all eggs look alright (none has exploded yet).

Remarks

The female that had an egg removed in 2000 (0028; see annual report 2000) turned out to have another egg on a radiograph performed in December 2000 (this egg was already faintly visible on a radiograph that was made prior to the removal of the first egg). Therefore this animal was kept awake and moist during the last winter period (2000-2001), hoping that she would produce her egg normally. Since this did not happen, the animal has been rechecked by a vet but on both occasions the egg was too far in the body for relatively safe manual removal through the cloaca. On a new radiograph in November 2001 the (still single) egg appeared to have collapsed somewhat and together with the vet it was decided to house the animal under normal conditions (including resting period), hoping that she would produce the egg after winter (2002). Apart from the egg, the animal appeared to be in good health (no inflammations around the egg; the eggs seemed still loose in the oviduct).

Location A09

Enclosure

Measures 116 x 52 cm. Two hiding places are present, by means of clay flower pots. Additionally, a wood stump, water bowl, two artificial plants are present. The soil consists of 'reptbark' and sand.

Climate

The enclosure is heated by means of a 120 W spot light (temperature during the day 30°C, during the night 18-20°C).

Feeding

Cut endive (approximately 60%) and alternating tomato, apple, mushrooms, taugé, grated carrot, et cetera. A calcium/vitamin supplement (Gistocal) is added.

Behaviour

Mating is observed in July and August. Recently, no eggs have been produced. Mass recordings have not taken place since the animals have become adults.

Location A10

This text is updating Van Loon, 2001 (see chapter 6). This article has also been included in the 2000 annual report of the Studbook Breeding Programme *Pyxis arachnoides*.

Enclosure

Housing has not changed in 2001, although some changes have been made regarding illumination and heating. Until 2000 the tortoises were illuminated at a constant cycle of 12 hrs light per day. This has been changed to a seasonal cycle. Between mid September and end November the photoperiod is decreased in weekly 15 minutes steps from 13 hrs (07.00-20.00 hrs) to 11 hrs (08.00-19.00 hrs). This reduced photoperiod is maintained for three months (December-March). After this, photoperiod is reversed between March and May, to remain constant at 13 hrs during summer.

In September 2000 a new type of lamp was installed, being 100 W halogen. This results in a more intensive illumination at approximately the same heating. The new type was chosen after it had appeared to induce mating activity in other tortoises.

Feeding

Since 2001 vitamins are provided throughout the year, instead of only in winter. Hopefully this will have a positive effect on egg production.

Incubation

The egg that was produced on 31/08/00 (egg number two) was removed from the incubator on 26/01/01. It had a small crack in the lower half of the shell and part of the yolk had flown into the substrate. This egg was partially dehydrated and fungus grew on the shell. It is not clear when and why the shell had cracked. No abnormalities were noted when an identification number was written on the shell after which it was placed in the incubator.

A new egg (number three) was found on the substrate on 22/10/01. Presumably it had been produced 1-3 days earlier, since the female was found at her usual egg laying site during this period. This egg still is in the incubator. Day temperature (09.00-21.00 hrs) is 32.5°C and night temperature is 26.5°C. The substrate still is vermiculite:water=1:3 (mass ratio). Relative humidity in the incubator has been increased from 80 to 95-100% by adding an extra water bowl. The intention is to lower this after 5 months, to imitate a dry season. When the approximate hatching date is approaching, the relative humidity will be increased again, as will the substrate humidity.

Finally

In case no additional clutches will be produced in this egg laying season, the sexes will be separated in the end of the year. One male will be housed with the female during several periods with interruptions. This is also a more desirable situation from the studbook point of view.

In case there are readers who have experience (positive or negative) with the proposed incubation technique, please get in touch via the studbook co-ordinator. Also in case someone has females available, please register them in the studbook and/or contact the studbook co-ordinator.

Location A17

Enclosure

A group of 3.1.3 *P. a. oblonga* inhabits a closed enclosure of 205 x 50 cm. The enclosure has ventilation spaces at the sides. Soil consists of bark humus and loamy sand in a ratio of about 1:1, with some sandy sites. The depth of the soil layer is 4-12 cm. Further decoration of the enclosure consists of three wood stumps and a *Beaucarnia* sp. The wood provides retreats, that are being used by the specimens. They also retreat under hanging leaves of the *Beaucarnia*.

The terrarium is heated by means of the transformers of the tube lights in the enclosures under the one from *Pyxis*, as well as two 80 W spot lights and two 58 W tube lights with reflectors. The tube lights are switched on at 9.00 hours, and at 10.00 hours the spots are switched on. At 20.00 hours the spot lights are switched off, and after 21.00 hours the enclosure is dark. Photoperiod is gradually changed from 14 hours to 9-10 hours, in summer and winter respectively.

Climate

Day temperatures in summer rise up to 36°C, and in winter up to 28°C. During the night the temperatures are 22 and 19°C.

In summer the enclosure is sprayed daily, in winter only twice weekly. Especially the decoration of the enclosure and the three closed sides of the terrarium are sprayed. The soil is moistened every other day in summer, and once weekly in winter. As a result, relative humidity changes between 85 and 30%.

Feeding

The animals are fed daily on a basis of romain salad, several wild herbs, and twice weekly fruits (no banana or *Citrus*-fruits). The food is supplemented with calcium, and once weekly additionally with Korvimin ZVT. In the enclosure there are several cuttlebones, that are being eaten by the tortoises.

Behaviour

During the day the tortoises are usually hidden and half buried in the soil. This changes when food is provided or when the terrarium is sprayed. However, the animals do not seem to like being sprayed directly, and in that case they run for shelter.

A water bowl that is refilled daily is used by the animals for drinking and defecating. They seem to drink relatively large amounts of water, if compared to other tortoise species. Additionally, they seem to eat more, relatively to their small size. The seven specimens in the enclosure eat half a head of lettuce per day.

Reproduction

The adult female in the enclosure produced three clutches on 06-04-01 (one egg), 07-06-01 (two eggs) and 18-08-01 (one egg). All were produced early in the evening and oviposition took 0.5-1 hr. Nests were approximately 8 cm deep and the clutch with two eggs had the eggs positioned on top of each other, so that the upper egg was only a few centimetres under the soil surface.

The eggs were incubated in humid vermiculite at a temperature of 30°C and a relative humidity of approximately 80%. One egg of the 06-04-01 clutch was disposed when fungus started to grow on it. The others are still in the incubator.

Eggs are not being candled to minimise risks during incubation.

Location A18

Housing

The enclosure measures 100 x 40 cm, and is decorated with 3-7 cm deep sand, five pieces of bark for shelter, two stones, three plants (2 Agavaceae, 1 Crassulaceae) and one dish for water. The enclosure is inhabited by two young *P. a. oblonga*, hatched in 1999. It is heated and illuminated by means of soil heating (25 x 35 cm), two Osram Concentra spot lights of 60 W, and two tube lights of 18 W.

Climate

Although I decreased the length of the light period, the frequency of spraying and food supplement, the tortoises still remained quite active during November and December. I sprayed every four days and the light period was constantly at 11 hrs. Only at the beginning of January they stayed under the bark longer and reduced feeding. Since the beginning of January I further decreased the light period to 10 hrs and switched off both Concentra spots as well as the soil heating. Since mid January spraying was completely reduced and the temperature range was from 16-23°C. Under these conditions the tortoises were kept till mid April. Since one animal appeared to be very weak, the wet and warm period was not introduced gradually, but both Concentra Spots were switched on immediately, as well as the soil heating. The soil was moistened again six times weekly. Additionally, both animals were soaked every day with Multi-Mulsin or Basica supplement. Only the light period was adjusted gradually to 13.5 hrs. As both animals lost weight during this dry period and one animal was in a real critical condition, the future dry periods will be reduced from three months to about six weeks in January/February.

Feeding

Feeding was reduced to every second day in November. Only dried leaves were provided. From the beginning of January, food was given only once a week and stopped mid January till mid April, according to the climatic conditions.

Growth

Date	Specimen 0016		Specimen 0017	
	Dimensions (mm) (l x w x h)	Mass (g)	Dimension (mm) (l x w x h)	Mass (g)
31/10/00	68.2 x 50.4 x 33.2	58	49.0 x 40.4 x 26.6	24
18/04/01		44		18
10/11/01	82.1 x 57.8 x 35.2	96	53.3 x 42.5 x 28.6	36

Location A22

Specimens

The three specimens that are kept at this location hatched in 1996 (0001 and 0002) and in 1997 (0003). They were bred at location A07 and were kept at location A02 until February of 2001.

Housing

The *Pyxis* are housed in a glass enclosure that measures 120 x 60 x 30 cm. The soil consists of different kinds of sand and fine gravel. As decoration, there are some stones, grasses and *Tillandsia*. There are several hiding places like hay, bark and a stone cave. The *Pyxis* prefer to sleep in some hay under branches.

The enclosure is illuminated by a 30 W tube light (Arcadia Repti Light 900mm) and 2 spot lights without UV output. They also produce enough heat for the tortoises.

Climate

The photoperiod ranges from 10 hrs in January to 14 hrs in July. The temperature is mostly near 27°C. In summer, the temperature rose till 32°C at noon and dropped till 20°C at night. The relative humidity ranges from 40-50%. After the enclosure was misted, the humidity was 70% and remained high for about 2 hrs.



Feeding

Food was offered daily in summer. Several greens were given to the tortoises in the early afternoon. The specimens preferred *Taraxacum* and flowers. Fruit or vegetables were offered rarely. Vitakalk is always added to the food to provide vitamin D₃.

Behaviour

When the tortoises arrived at their new location in February, they were very inactive. They did not move spontaneously. By April, the specimens were taken out of their hiding places and were soaked. After that, they were placed in front of the feeding dish and they started feeding. After a few minutes they returned to the hiding place and slept until they were fed again. But they were still very inactive. By the end of the summer, all three tortoises became active spontaneously and a normal behaviour was shown. They became active in the morning and were fed. Sometimes they were active a second time during afternoon. They like to soak and drink from the water bowl daily.

Growth

Registered growth was as following:

Date	Specimen	Mass (g)	Carapace length (cm)
14/03/01	Paa0001	146	8.69
14/03/01	Paa0002	125	7.9
14/03/01	Paa0003	140	8.45
03/04/01	Paa0001	150.5	8.69
03/04/01	Paa0002	126	7.9
03/04/01	Paa0003	147	8.45
07/05/01	Paa0001	150.5	8.7
07/05/01	Paa0002	130	7.95
07/05/01	Paa0003	147	8.45
01/06/01	Paa0001	150.5	8.9
01/06/01	Paa0002	132.5	8.1
01/06/01	Paa0003	147	8.45
14/07/01	Paa0001	154	8.9
14/07/01	Paa0002	138	8.4
14/07/01	Paa0003	147	8.7
12/09/01	Paa0001	155	8.9
12/09/01	Paa0002	140	8.5
12/09/01	Paa0003	144	8.7
20/10/01	Paa0001	155	9.0
20/10/01	Paa0002	142	8.6
20/10/01	Paa0003	149	8.8
18/11/01	Paa0001	161	9.0
18/11/01	Paa0002	142	8.6
18/11/01	Paa0003	149	8.8