THE AMETHYSTINE PYTHON (*MORELIA AMETHISTINA*). CAPTIVE KEEPING, REPRODUCTION AND GROWTH

By: Brian Barnett, 16 Suspension Street, Ardeer, Victoria, Australia, 3022.

Contents: Introduction -Materials and methods - Breeding - Egg laying - Incubation - Hatching - Rearing of young - Growth - Conclusion.

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INTRODUCTION

This snake is also commonly known as the Scrub python. Inhabiting the rainforest areas of north-east Queensland it is the most 'primitive' species within the Australian python radiation (that is, the one that looks most like the ancestral Asian forms). This very long (sometimes more than 8 metres) but slender snake is also found in New Guinea and may be closely related to some of the other New Guinea pythons (Shine, 1991).

It has a large elongate head, bearing enlarged plate-like head shields. Scales bear a milky iridescent sheen which has given rise to common and scientific names. Ground colour is pale yellowish brown to brown, marked with numerous irregular angular dark brown to black bands, blotches and streaks. Those on the anterior body may form elongate streaks, while those on lower flanks often coalesce into one or more broken stripes. All aspects of pattern become obscure on posterior body and tail. Dark streak extends from eye down to corner of mouth. Juveniles are less glossy than adults, with a weaker pattern. Lips and ventral surfaces are cream to white (Wilson & Knowles, 1988).

Egg number	Size (mm)	Weigth (g)
1	98,3 x 44,9	100,81
2	94,7 x 46,5	97,91
3	90,8 x 50,2	100,30
4	85,5 x 47,8	100,30
5	90,8 x 46,5	102,58

Table 1: monthly total length (TBL) measurements for five Amethystine pythons (*Morelia amethistina*) from birth to 27 months of age. Measurements in mm. Mean egg length oviposition 920 mm (855 - 983), n = 5. Mean egg diameter at oviposition 471 mm (449-502), n = 5. Mean egg weight at oviposition 100.38 g (97.91-102.58), n = 5.

The giant Scrub pythons of tropical Queensland are a good example of seasonal shift in habitat use which is probably driven mostly by the snake's thermal requirements. During winter they leave the thick rainforest to bask in open valleys and can sometimes be found in large numbers at that time. They have also been observed laying out on trees or floating vegetation at the edge of lakes attempting to satisfy their thermal requirements (Shine, 1991).

Egg number	Size (mm)	Weigth (g)
1	98,1 x 45,8	96,11
2	94,0 x 47,0	95,30
3	88,5 x 46,0	100,50
4	86,4 x 48,5	101,68
5	91,9 x 45,2	109,40

Table 2: monthly body weight (BW) and total food consumption (TF) for five Amethystine pythons (*Morelia amethistina*) from birth to 27 months of age. Measurements in g.

MATERIALS AND METHODS

Although I have bred the Amethystine python on several occasions this paper will concentrate on one only breeding because of extensive data collected and followed through in the raising of the young.

The male had been raised from a hatchling and having only been casually fed was approximately 2.45 m in length. It was seven years of age. It had been housed on its own in a conventional snake cage with thermostatically controlled year round heating. The method of heating was by a single Infra-red globe. Night and day light cycle was operated manually.

The female was a long term captive but had not been raised from a hatchling. It measured 2.33 m in length. It was housed similarly to the male with a thermostatically controlled Infra-red globe being the source of heat. Both thermostats were set at 30°C but temperatures directly beneath the globe would be noticeably higher when the globes were on. Prior to the introduction neither were given any temperature variance or cooling.

The cage that the female was being housed in was the one chosen for the introduction. It measured 1.22x0.61x0.76 m (lxwxh). Only furnishings apart from the gravel substrate were a large hollow log and water container.

BREEDING

The male was introduced to the female on the 5th June and the thermostat was lowered to 22°C from 30°C. This resulted in a minimum temperature of 22°C but this would rise to some degree during daylight hours when the room temperatures fluctuated slightly. There was still some doubt as to whether the female would be capable of carrying eggs at her

slim size but it was worth a try anyway. Those that have kept Amethystine pythons would know that one under 2.44 m is still a very slender snake and having seen 'Scrubby' eggs before could not imagine them being able to be carried by this particular female. It was only whilst preparing this paper and with discussion with Simon Kortlang that he brought to my notice that Rick Shine, in his recent book, had a chart which included minimum breeding sizes for several species, including the Amethystine. Shine's size was exactly the same size as my female, 2.33 m (Shine, 1991).

Egg number	Sizes body, tail total	Weight (g)	Sexe
1	598/117/715	49,51	man
2	599/120/719	50,40	man
3	603/115/718	48,19	vrouw
4	610/117/727	48,41	man
5	608/121/729	49,20	vrouw

Table 3: monthly food consumption and number of feeds per month for five Amethystine pythons (*Morelia amethistina*) from birth to 27 months of age. Food measured in g. Number of feeds in brackets.

No mating activity was noticed as most time both specimens were in the large hollow log. On the 9th July, five weeks after cooling was commenced, the temperature was raised from 22°C to 30°C at the thermostat. No night time cooler temperature was applied. The female spent long periods on top of the hollow log which would be the warmest 'basking' spot when the infra-red globe was on. During September it appeared that the snake was gravid but because of its size and relatively slim body the eggs did not appear like normal eggs in a gravid python. The snake was 'skin tight' and the eggs were drawn out more like sausages than the shape of the eggs. The male was removed from the female's cage prior to her shedding and returned to its own cage. The female shed her skin on 26th September which would turn out to be 34 days prior to laying. Neither of the snakes fed during the introduction period, the male resumed feeding once it was returned to its own cage. The female ate shortly after the eggs were deposited.

EGG LAYING

Prior to the snake laying its eggs she would lay coiled and 'belly up' in the normal pre-laying position. By this time the hollow log had been removed, replaced for a short time with a beer carton (for ease of observing her) and finally with a large plastic drum, bedded out with damp peatmoss, laid on its side and with half of the lid cut away as its entrance. Over several weeks the snake spent some time in this 'nest box' but generally was out basking under the infra-red globe. During the latter part of gestation I was concerned as the body was extremely taut.

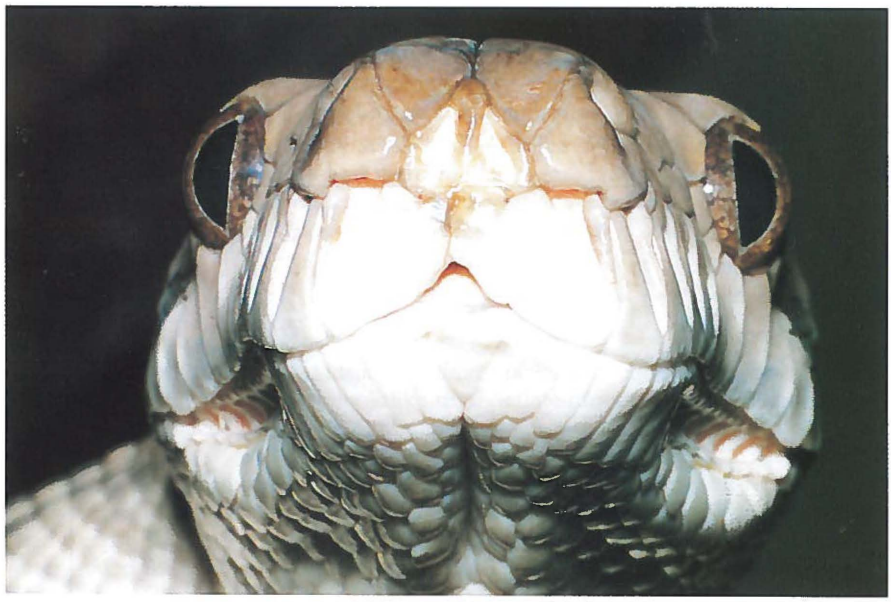


Foto 1: Morelia amethistina.
Foto: Brian Barnett.

On the 30th October she laid 5 fertile eggs. They were not laid in the 'nest box' but in the cavity between the drum and the cage wall. She had created a shallow depression in the gravel for this purpose. To see the female after she had laid, the eggs took on a normal shape once they left the body, it was almost unbelievable that she had actually carried them. The female, after laying, weighed 1.382 kg.

INCUBATION

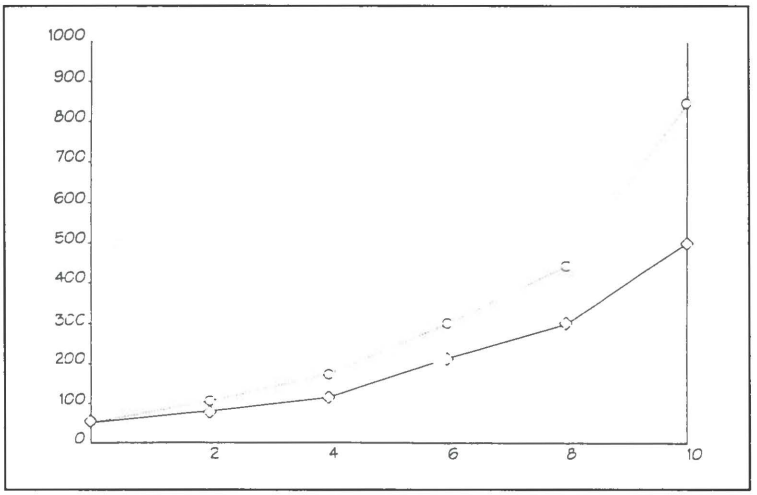
Upon the completion of laying, the five eggs (in an adherent clump) were removed from the female coils. As they had only been laid a matter of hours earlier, separation of the eggs from the clump was not difficult although to the inexperienced herp they would probably shudder watching the parchment-like material being gradually pulled apart from egg to egg leaving little rip-like fragments protruding from the otherwise smooth surface. The main reason why I separate the eggs, and don't leave them in a clump, is to be able to measure and weigh them.

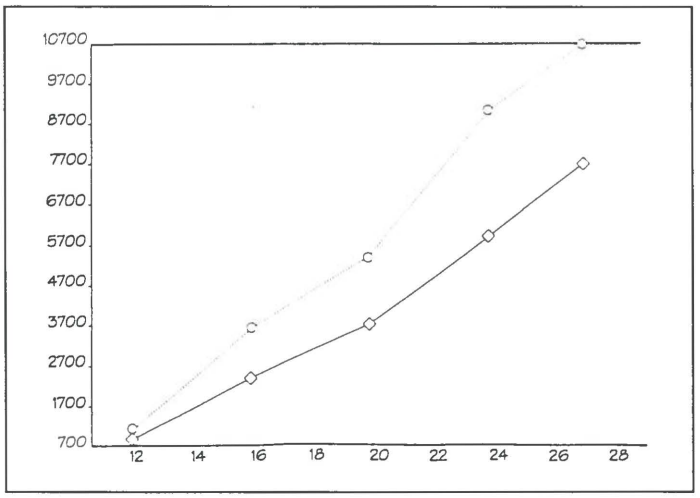
The incubator is the same one I have used, with slight modifications, for almost 20 years. Simplicity at its best although greater minds? have for years been improving on it with negative results.

The incubator is a wooden box which holds 12 plastic bread containers. 6 x 15 Watt globes are attached to the roof, spread evenly, 25 cm gap between the bottom of the globe and the top of the container. This applies a gentle, rather than rapid heating force. The herp room is naturally 'tropical' most of the time which does mean that the incubator does not have to work too hard to reach the desired temperature. The globes are controlled by a Landis & Gyr RAD.5 room thermostat and has a variance of about 2°C. The thermostat is set to the temperature in the containers, **not** in the incubator as the containers do retain

the heat for a longer time than that of the incubator. A probe is set in one of the containers attached to an external thermometer which gives easy visual reading at all times.

A container of 150 g of Vermiculite was prepared and 150 ml of water was added to it and mixed. The bottom of the egg almost touching the base of the container. The clear





Tabel 5a en b: Monthly total length (TBL) measurements for five Amethystine pythons (*Morelia amethistina*) from birth to 27 months of age. Largest python #1 (O----O), mean of all five (<>----<>)

plastic top of the container was placed on it and all were placed in the incubator. The incubator (or rather container) temperature ranged from 29°C to 31.5°C. The 'airtight' containers are not quite such and on tests conducted later on the average bread container, it was found that it lost approximately 8% of its moisture each week. The lid was removed for a few seconds once each week and the container rotated as moisture collects on the front or cooler part of the container, resulting with the egg at this position becoming overlarge whilst the one at the far end tends to shrink slightly.

HATCHING

As I was not certain of the expected incubation time, opinions varied so much, some concern was shown when the eggs began to look like semi-deflated footballs. A small amount of water 10-15 ml was placed under one egg, number 5. This would show up in the pre-hatch weights.

When the first head protruded through the shell the pre-hatch sizes and weights were taken. Two eggs had minimal weight loss (#1) 4.70 g and (#2) 2.61 g. The other three eggs had weight gain, two minimal (#3) 0.20 g and (#4) 1.38 g whilst (#5), which had the water added to it gained 6.28 g. All in all not much gain or loss either way and the size of the eggs only determined by the amount of water lost or added.

Foto 2: Morelia amethistina.
Foto: Brian Barnett.

All snakes emerged from the eggs within 24 hours of the egg splitting or being split. The first emerged from the egg on the 23rd January and the last on 25th January, 85-87 days after being laid. Eggs 1-4 split naturally and impatience saw me split (#5). The neonates are generally non-aggressive prior to their first feed and are not distinctly marked like the adults and have a uniform copper colouration.

REARING OF YOUNG

Each of the young was placed in a 30.5 cm aquarium. The substrate was washed =8 aquarium gravel, a small drinking bowl and small hide container were the only furnishings. A wooden lid with a plastic 4" x 2" vent enclosed the tank. All sides, apart from the front, were painted so as to give some sense of security. Heating was by natural room heating, i.e. loss of and build up of heat from other cages. Temperature ranged from 27°C to 32°C. They were offered their first feed immediately after their first shedding (12-13 days).

#1. refused food it was offered on the 1st, 2nd, 4th, 8th day after shedding. Food offered was small mice up to 7 g and 'pinky' rats. On the 13th day after shedding (26 days after birth) this snake ate two small mice 5-7 g. It became a regular feeder from this point.

#2. refused food it was offered on the 1st, 2nd, and 4th day after shedding, but accepted a feed of three mice on the 8th day after shedding (21 days after birth). It was somewhat of a reluctant feeder over the next month, accepting some feeds but refusing most, but after this period settled down in its feeding habits. Food accepted was mice.

#3. refused food it was offered on the 1st, 2nd, 4th, 8th, 13th, 18th and 21st days after shedding. Food offered was in the form of small mice only. On the 22nd day it was 'force-fed' one small mouse. Once again it refused food offered on the 25th, 28th, 29th, 35th day after shedding and on the 36th day was 'force-fed' three small mice just under 10 g in total weight. From this period on it ate voluntarily but was a little inconsistent over the next few months.

#4. was a 'pain in the butt'. It refused food offered, both in the form of small mice and pinky rats, over a considerable period and was 'force-fed' many times before accepting its first voluntary feed of a pinky rat 80 days after first sloughing or 93 days after birth. From this point it settled down as a regular feeder and eventually accepted rats or mice.

#5. ate voluntarily from the first day after shedding.

These early feeds would eventually regulate the differences between sizes over the forthcoming years as the early 'good feeders' had a jump start and the way food was being offered in 'take as much as you like', it was almost impossible for the stragglers to catch up.

As the snakes grew they were transferred to larger individual cages. After the aquariums, they were housed in thermostatically controlled cages with 'blue 40 Watt globes' being the source of heating.

No major problems were associated with the rearing of the young apart from the many 'near misses' from the ever enthusiastic jaws of the pythons. Only one, the largest, was a quiet and non-aggressive snake and could be handled freely in a non-restraint manner not normally given to 'Scrubbies' over 4 m.

With more experience with subsequent litters, problems with reluctant feeders have been eliminated by offering small finches if mice or rats are rejected. The young snakes can be weaned off the birds over to mice or rats with a limited effort of'trick feeding'.

Age/Mths		#1	#2	#3	#4	#5
Birth	BW	49.5	50.4	48.2	48.4	49.2
2	BW	107.2	78.7	61.9	49.0	120.3
	TF	137.29	78.79	37.9	13.0	171.4
4	BW	180.6	126.2	112.3	83.2	185.8
	TF	358.98	227.14	188.38	130.36	346.20
6	BW	307.3	204.9	190.1	160.6	245.2
	TF	653.49	449.69	377.89	441.85	542.88
8	BW	455.6	289.9	231.1	304.8	311.2
	TF	1072.60	677.52	534.86	788.89	711.12
10	BW	841.1	535.8	333.0	452.1	432.4
	TF	2062.71	1190.34	815.60	1226.51	1017.28
12	BW	1121.5	755.0	452.9	720.0	685.2
	TF	2823.59	1771.73	1100.37	1880.12	1679.30
16	BW	3561.5	1991.1	1283.7	2370.0	2241.2
	TF	9227.5	4874.2	3145.5	5892.6	5967.3
20	BW	5586.0	2587.0	2558.0	3901.0	4077.0
	TF	14829.0	6425.3	6345.0	9773.3	10401.4
24	BW	8896.0	4456.0	4106.0	5801.0	6419.0
	TF	23801.4	11710.5	11234.1	16085.2	17585.5
27	BW	10773.0	5760.0	6326.0	7557.0	8335.0
	TF	28820.3	15328.0	16798.5	20303.0	22785.0

Table 6: monthly bodyweights for five Amethystine pythons (*Morelia amethistina*) from birth to 27 months of age. Largest python #1 (O----O), mean of all five (<>---<>)

GROWTH

The following tables and graphs represent data collected over a 27 month period. Due to ill-health at the time, the project was completed at this stage but I feel at this point most of the required material had been obtained. Growth was extremely rapid and naturally, the more rapid growth was attributed to the more food consumed. At twelve months of age, one of the snakes were just over 2.1 m in length. At 2 years of age the largest was almost 3.7 m in length and at the completion of the official growth rates at 27 months the largest was in excess of 3.88 m. The occasional measurement was taken after this period and at three years of age the largest was in excess of 4.4 m. At 4 years of age the largest measured 4.77 m in length.

Foto 3: Morelia amethistina.
Foto: Brian Barnett.

Foto 4: Morelia amethistina, hatchling.
Foto: Brian Barnett.

Month	#1	#2	#3	#4	#5
1	49.6 (3)	29.8 (2)	5.1 (1)	4.8 (1)	69.2 (6)
2	87.7 (6)	49.0 (3)	32.9 (3)	8.2 (1)	102.2 (5)
3	112.5 (4)	81.6 (4)	87.9 (5)	20.1 (2)	103.0 (3)
4	109.2 (4)	66.8 (3)	52.5 (3)	97.2 (5)	71.7 (2)
5	121.7 (3)	187.7 (5)	144.7 (5)	174.2 (5)	148.8 (3)
6	172.8 (3)	76.8 (2)	58.1 (3)	205.0 (4)	95.4 (2)
7	317.2 (4)	117.7 (3)	95.9 (2)	99.0 (2)	120.7 (2)
8	101.9 (2)	74.2 (2)	47.8 (1)	180.3 (3)	nil (0)
9	481.8 (5)	195.8 (4)	196.4 (4)	153.0 (3)	47.2 (1)
10	508.3 (4)	317.0 (4)	84.3 (2)	284.6 (3)	259.0 (3)
11	441.3 (3)	325.3 (3)	200.7 (3)	324.0 (3)	381.6 (3)
12	532.8 (3)	415.5 (3)	214.7 (2)	523.8 (4)	514.4 (3)
13	1211.2 (3)	660.4 (3)	274.1 (2)	632.3 (3)	639.4 (2)
14	1435.8 (3)	584.0 (2)	549.8 (2)	1105.3 (3)	646.9 (2)
15	2453.4 (4)	1451.2 (4)	478.2 (2)	848.5 (2)	1781.0 (4)
16	1090.3 (2)	247.5 (1)	612.4 (2)	1232.2 (3)	986.8 (2)
17	1179.3 (2)	248.8 (1)	794.8 (3)	1294.4 (3)	1085.7 (2)
18	2467.5 (4)	434.0 (1)	1132.8 (3)	1540.2 (3)	1725.0 (3)
19	1330.8 (2)	420.6 (2)	403.8 (1)	438.5 (1)	549.3 (1)
20	623.9 (1)	447.7 (2)	868.1 (2)	607.6 (1)	1074.1 (2)
21	2199.4 (3)	1230.2 (3)	2168.5 (4)	1332.0 (2)	2824.5 (4)
22	2866.8 (4)	1738.3 (3)	1440.0 (2)	2941.6 (4)	1451.1 (2)
23	1471.8 (2)	979.3 (2)	639.0 (1)	nil (0)	682.3 (1)
24	2434.4 (3)	1337.4 (2)	641.6 (1)	2038.3 (3)	2226.2 (3)
25	795.0 (1)	1230.7 (2)	1285.9 (2)	691.2 (1)	1412.8 (2)
26	2671.5 (3)	1468.1 (3)	2829.9 (4)	2758.5 (3)	2388.2 (3)
27	1552.4 (2)	918.7 (2)	1448.4 (2)	767.9 (1)	1399.1 (2)

Tabel 7: Monthly food consumptionand number of feeds per month for five amethystine pythons from birth to 27 months age. Food measured in gms. Number of feeds in brackets.

CONCLUSION

Our largest python has a reputation of having an aggressive nature and to some degree this is true. Nevertheless, the occasional 'quiet scrubbie' is encountered. It is not over-difficult to maintain in captivity, although questionable husbandry techniques have given this impression in some collections. With a little caution, even the most aggressive specimen can be handled safely provided common sense and care is taken. There is probably more change of the snake being damaged in a rough encounter than the handler. A hungry 'scrubbie', of a quiet nature can inflict the same result as the 'normal' aggressive specimen.

They are fairly common in captivity and occasionally bred by a small number of herpetologists. Their status in the wild seems secure and their only immediate threat appears to be habitat destruction.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
#1	x	x	x	x	x		x		x	x	x	x	x	
		32	27	32	50	39		55		38	29	44	35	
#2	x	x	x	x		x		x		x	x	x	x	
		37	43	34	50		53		56		38	33	41	
#3	x	x		x			x		x		x	x		x
		52		49		94		59		44		48	40	
#4	x			x	x	x	x		x	x	x	x	x	
		95			43	23	43	48		42	35	27	31	
#5	x	x	x		x		x				x	x	x	
		36	41		42	78			108			34	37	

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
#1		x	x	x		x	x		x	x			x		x
	36		36	50		38		51		41		45		65			59	
#2		x	x			x		x	x	x		x		x		
	38		41		62		47		47	35		52		70				
#3		x			x	x	x	x		x		x		x			x	
	80			38		37	41	37		47		70		49		55		
#4		x			x	x		x	x			x		x			x	
	52			47		47		49		44		49		78		35		
#5		x		x		x	x		x	x		x		x		x		
	43			38	47	64	23		41		43	36		49		45		

Tabel 8a en b: Sloughing data for five amethystina pythons from birth to 27-28 months of age. X indicates the month of sloughing. Number in the tables are the days between sloughing.

ACKNOWLEDGMENT

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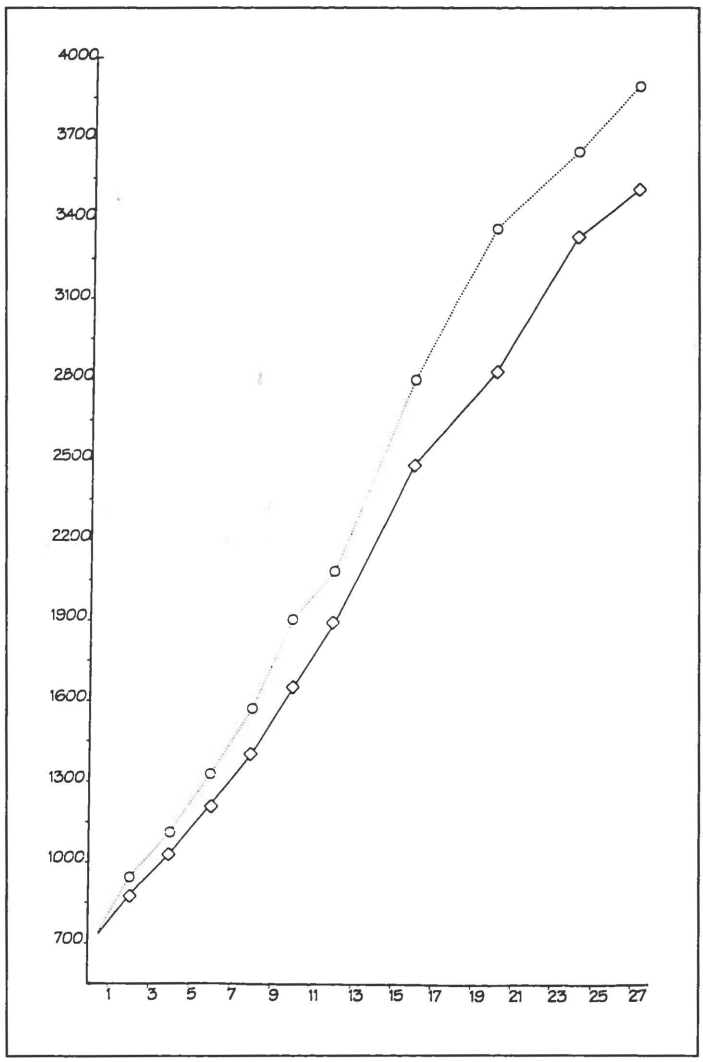
REFERENCES

Shine, R., 1991. Australian snakes - A Natural History, Reeds Books P/L.

Wilson, S.K. & D.G. Knowles, 1988. Australia's Reptiles, Collins Publishers.



Tabel 9: Monthly total length (TBL) measurements for five amethystine pythons from birth to 27 months of age; largest python #1 = O.....O, mean of all five = <>-------<>. Length in mm.