CAPTIVE GROWTH OF A CARPET PYTHON MORELIA SPILOTA

Simon Fearn
Victorian Herpetological Society, Australia.

■ INTRODUCTION

Captive growth rates of individual snakes are highly variable depending largely on rate of feeding. Such factors as suitability of caging, cage heating, the health of the snake (including stress) and simply the whim of individual keepers in regard to how often food items are offered and even what types of food items, their size and quantity all play an important role in eventual growth and development.

The author cannot locate any detailed, published data on captive growth rates of carpet pythons *Morelia spilota*. Very little data exists on captive growth for any other Australian Boidae. Barnett (1993) reports scrub pythons *Morelia amethystina* in his care attaining 2100mm in total length at 12 months of age, however the author believes (based on the results of this study) that under ideal conditions and fed *ad libitum* on suitably sized prey, some *Morelia amethystina* could attain total lengths approaching 3000mm at 12 months.

Detailed captive growth studies can provide valuable information such as sexual differences in growth rates, sexual differences in size at maturity, minimum size at sexual maturity and can indicate if observed local differences in average and maximal body sizes of a particular species occupying a large geographical area are environmentally determined, or adaptive and therefore genetic in origin. The Australian carpet pythons are a good example of the latter problem.

I will be referring to the carpet pythons of south-east Queensland as *Morelia spilota* throughout this article. Traditionally the carpet pythons of the Brisbane region have been assigned the subspecific status of *Morelia spilota variegata*. Barker & Barker (1994) based on taxonomic work by Wells & Wellington (1984, 1985) have confined the use of *variegata* for Northern Territory populations and assigned new variations to the carpet pythons of eastern Australia; namely *Morelia spilota cheynei* (jungle carpet python), *Morelia spilota mcdowelli* (coastal carpet python) and *Morelia spilota metcalfei* (inland carpet python).

Barker & Barker (1994) suggest the carpet pythons of the Brisbane region be referred to as *Morelia spilota mcdowelli*. I am unconvinced of the validity of these taxonomic revisions. A sensible and wisely cautious assessment of the taxonomy of this highly variable species is provided by Shea (1995).

It is generally accepted that *Morelia spilota* from southern Queensland consistently grow to greater lengths and weights than anywhere else in their range. Covacevich (1970) implies total lengths of 4027mm while Barker & Barker (1994) record that specimens between 2200 and 2700mm are regularly encountered. The author confirms the observations of Barker & Barker (1994) with Table 3 listing lengths and weights of wild randomly collected specimens examined by the author originating from wildlife rescue permits held by

several Brisbane herpetologists.

While such a small sample can provide few firm conclusions it would appear that males grow to greater lengths and weights than females and this would be expected in a population that displays male-male combat (Shine, 1991). The largest Brisbane *Morelia spilota* encountered by the author were males but this may represent a bias based on different activity patterns between the sexes. Male Brisbane *Morelia spilota* are particularly prone to human detection when they are sexually active in the spring. Slip & Shine (1988a) discovered that sexually active male New South Wales *Morelia spilota* (Diamond pythons) moved large distances in spring. Captive growth studies under controlled conditions of male and female hatchlings would indicate sexual differences in growth rates and age at maturity.

The author cannot locate any data on size at sexual maturity for Brisbane *Morelia spilota*. The smallest wild caught male that was involved in male-male combat had a body length of 1307mm snout-vent length (SVL) and a weight of 500 grams (Table 3). The captive raised subject of this work displayed a growth spurt, in both length and weight, at a similar body size between the fourth and fifth months (Figure 1) which may indicate the onset of sexual maturity. The smallest sexually active male New South Wales *Morelia spilota* (Diamond python) encountered by Slip & Shine (1988b) was 1490mm SVL.

The data presented in this work is rendered less useful as it involves only one snake with the identity of the male parent being uncertain. These data are presented as a guide to the maximal growth potential that can be expected from most *Morelia spilota* populations under captive conditions and that carpet pythons can reach sexual maturity under 12 months, of age and could be bred in their first spring.

■ CAPTIVE GROWTH

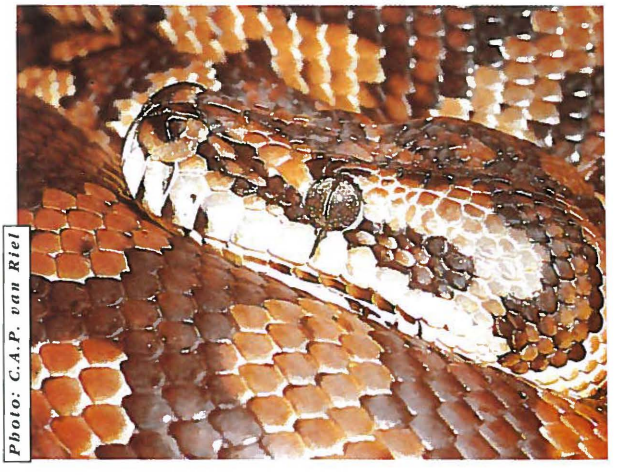
A hatchling male *Morelia spilota* was obtained by the author several days after emerging on 19.1.95. This snake was one of a clutch of 21 eggs laid by a 2440mm, 5kg Brisbane *Morelia spilota*. The female parent was briefly housed with several male Brisbane *Morelia spilota* and a single male centralian carpet python *Morelia spilota bredli*.

The hatchling snake grew from 480mm SVL (total length 580mm) and a weight of 30.4 grams to 1810mm SVL (total length 2130mm) and a weight of 3.1 kg at 12 months of age (Figure 1, Table 1).

Body and tail length measurements were obtained by forcing the snake to relax through momentary tiring. For the first seven months measurements were made with the snake held by the author behind the head and in the vicinity of the vent with the other hand and stretched with gentle pressure along a tape measure. In the latter five months the same procedure was employed but involved two people and the snakes increasing bulk was supported on a long bench. This is the only method that allows for accurate and consistent measurement and is described by Fitch (1987).

Weights were obtained initially on electronic scales but

Morelia spilota variegata



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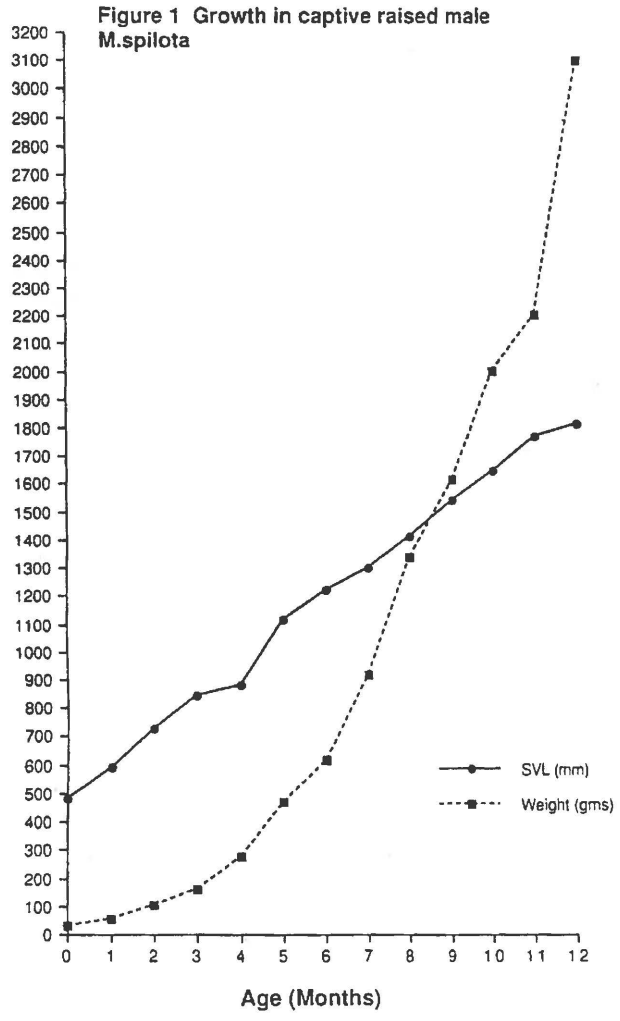

Figure 1: Growth of captive raised male Morelia spilota

these were abandoned when the scales 2kg limit was breached. Subsequent weights were made on spring balance scales with a 15kg limit.

All weights were obtained after a large stool was produced from the previous feed. Comparison of dates in Tables 1 and 2 will show that weighing/measuring and feeding often occur on the same day. In all cases feeding took place after weighing. The author was attempting to reduce the amount of lost feeding days to a minimum.

■ FEEDING

This snake was fed *ad libitum* (as often as it would eat) and exclusively dead laboratory rats.

The snake hatched on 19.1.95 but the author made no attempt at feeding until the first slough on the 29.1.95. The snake was initially offered a 6gm pinky rat held in forceps while it was coiled on small branches set up in its enclosure. The snake struck savagely at the rat and partially coiled around it but it was released and rejected after a few seconds. At this stage, having been disturbed, the snake was in a defensive posture aimed at the author. Holding the rat in forceps again, the author tapped the head of the rat on the posterior dorsal surface of the snake initiating a determined strike and more vigorous coiling around the body of the rat. The rat was successfully ingested on this second attempt.

From that point on this python has never refused a meal, striking with great determination and on one occasion grabbing the head of a 40 gram rat and twisting it with such force that it was torn off.

While still a juvenile this python would often indicate willingness to feed by coiling on cage branches with the head hanging down towards the cage floor. At a larger body size willingness to feed was indicated by producing a large stool and exploring the cage, particularly at night.

Size of rats offered was increased commensurate with increasing body size (Table 2) with the author making a judgement of the size of the rat that could be comfortably ingested.

All furred rats were partially skun, having the skin and fur removed ventrally from the chest and abdomen as far as the groin. In addition the tails of rats 200g or more in weight were cut off. This procedure appears to considerably enhance the rate of digestion, particularly where very large prey items are concerned and has been used by the author for a range of snake species, particularly elaphids. The author has observed first hand the deaths of several snakes in Brisbane collections from putrefaction of large ingested rodents during periods of hot weather. Death Adders *Acanthophis* spp. (Elapidae) appear to be particularly prone.

Muttonbird oil was injected into the third feed rodent (0.10 ml) and doses were increased commensurate with increasing body size up to 2ml/kg. Muttonbird oil, its qualities and doses are described by Munday (1994).

***Table 1**: Growth and frequency of sloughing in captive raised male Morelia spilota. (SVL = Snout-Vent-Length)*

Date	SVL	Tail Length	Total length	Weight	Sloughs
290195	480	100	580	30,4	290195
280295	590	120	710	54	030395
310395	730	145	875	106	250395
280495	843	160	1003	158	200495
300595	880	200	1080	280	150595
280695	1115	221	1335	466	150695
280795	1220	231	1451	616	240795
280895	1300	260	1560	916	280895
290995	1410	261	1671	1338	211095
281095	1540	265	1805	1614	261195
261195	1649	280	1929	2000	050196
261295	1770	300	2070	2200	
260196	1810	320	2130	3100	

Table 2: Rate of feeding and weight of food consumed (grams) for captive raised male Morelia spilota.

Date	Rats per feed	Total per feed (g)	Date	Rats per feed	Total per feed (g)
290195	1x6	6	250795	1x90	90
010295	1x6	6	280795	1x196	196
030295	1x8	8	030895	1x268	268
060295	1x8	8	100895	1x238	238
110295	1x8	8	150895	1x238	238
170295	1x10	10	290895	1x80	80
210295	1x25	25	020995	1x54, 1x88	140
040395	1x30	30	050995	1x266	266
100395	1x30	30	130995	1x50,1x86	136
150395	1x44	44	170995	1x44,1x74	118
260395	1x45	45	220995	1x276	276
010495	1x42	42	300995	1x44,1x76	120
080495	1x44	44	051095	1x42, 1x54 1x76	172
200495	1x76	76	091095	1x270	270
280495	1x70	70	221095	1x258	258
020595	1x70	70	281095	1x258	258
160595	1x88	88	031195	1x42, 2x76,	194
230595	1x42	42	081195	1x348	348
260595	1x42	42	151195	2x60, 1x66	186
300595	1x100	100	281195	1x348	348
030695	1x82	82	081295	1x414	414
150695	1x88	88	161295	1x380	380
200695	1x94	94	231295	1x350	350
240695	1x92	92	070196	1x342	342
280695	1x82	82	120196	1x390	390
020795	1x92	92	170196	1x360	360
070795	1x88	88	210196	1x362	362
110795	1x94	94			
				Total	8304

In addition, calcium ascorbate (Vitamin C) powder was dusted onto all feed rodents. At 12 months of age this snake had consumed 8.3 kg of rats (Table 2).

■ CAGING

This snake was initially housed in a small glass terrarium 615mm x 310mm x 300mm. The cage lid was a sheet of peg board at which one end a light fitting and a red 25 watt globe were attached. Directly under the

globe was placed a smooth river rock 110mm x 110mm x 30mm weighing 780 gm. This remained continuously warm under the globe and provided an effective hot spot at one end of the cage. The globe was left on continuously unless room temperature reached 30°C on hot days in January and February. Cage substrate was paper, a water bowl was present at all times and a small eucalypt branch was included to cater for the arboreal habits of this species. Immediately after feeding, the snake would coil on top of or directly beside the basking rock and stay there for as much as three days continuously (particularly during the winter months) until the digestive process was well advanced at which time it would once again coil on the eucalypt branch at varying distances from the heat source.

Barker & Barker (1994) report that a significant number of keepers have difficulties initiating a feeding response in hatchling *Morelia spilota*. I believe that providing a cage large enough for the inclusion of above substrate coiling perches is essential for these snakes, even in the hatchling stage. Except after ingestion of a large meal the snake in this study spent much of its time off the cage substrate on cage perches. As recorded earlier willingness to feed was indicated in the juvenile stage by coiling on branches with the head angled down, mirroring wild ambush predation (Slip &

***Table 3a**: Lengths and weights of field caught sample of Brisbane Morelia spilota (SVL = Snout-Vent-Length; * indicates incomplete tail).*

No.	SVL (mm)	Tail length (mm)	Total length (mm)	Weight (g)
1	1460	215	1675	1000
2	1320	235	1555	1200
3	1520	265	1785	950
4	1350	183	1533	800
5	2160	265*	2425	4000
6	1310	221	1531	900
7	2590	395	2985	6900
8	2650	337	2987	7200
9	1307	230	1537	500
10	1750	215	1965	1350
11	1690	302	1992	1500
12	1790	300	2090	2000
13	1590	270	1860	1050
14	1485	273	1758	1200
15	1580	245	1825	900
16	1310	190	1500	600
17	950	150	1100	245
18	1030	165	1195	225
19	1780	270	2050	1400
20	1700	230	1930	930
Mean	1616,1	247,8	1864	1742,5
SD	429,08	57,06	479,08	1929,08
Range	950-2650	150-395	1100-2987	225-7200

Shine, 1988c). Brisbane *Morelia spilota* appear to spend most of their time above ground in trees and shrubs and the wall cavities and roofs of human dwellings (Barker & Barker, 1994; Fearn, pers. obs.).

On the 28/6195 the snake was moved to a larger glass aquarium, 1220mm x 460mm x 460mm. Again the cage lid was peg-board and a Phillips IR100R-PAR 100 watt infrared lamp was installed at one end of the lid and run off a Honeywell room thermostat attached to the opposite end of the lid. The thermostat was set for 26°C at the cool end of the cage. Cage substrate was paper, a water bowl was present at all times and a rock, 260mm x 200mm x 100mm and weighing 8kg was placed directly under the heat lamp and acted as a heat reservoir, storing and radiating warmth for a considerable period after the lamp was extinguished by the thermostat. After feeding, the snake would spend up to 48 hours continuously coiled beside the rock, shuttling its body at varying intervals exposing different parts of its flanks to the side of the rock. Temperatures beside the rock where the snake spent much of its time after feeding varied from 29 - 36°C depending if the heat lamp was on or off.

It is deeply entrenched among many Brisbane snake keepers that glass cages present a significant health risk to captive pythons due to rapid loss of cage heat

***Table 3b**: Lengths and weights of field caught sample of Brisbane Morelia spilota (females; * indicates incomplete tail).*

No.	SVL (mm)	Tail length (mm)	Total length (mm)	Weight (g)
1	963	180	1143	200
2	2430	360*	2790	3100
3	1330	230	1560	700
4	1770	210	1980	2000
5	600	200	800	122
6	2135	220*	2355	3100
7	1670	240*	1910	1400
8	1770	280	2050	1500
9	1990	305	2295	1600
10	2360	333	2693	3400
11	1790	290	2080	1100
12	1360	230	1590	750
13	1630	255	1885	1100
14	1590	250	1840	900
15	1720	295	2015	1500
16	1380	205	1585	700
17	1630	260	1890	1000
18	1325	230	1555	750
19	790	150	940	110
Mean	1591	248,5	1792,4	1317,4
SD	466,5	51,2	620,4	952
Range	600-2430	150-360	800-2790	110-3400

through glass. As long as adequate heating and temperature control are provided (this applies to any caging) such beliefs are false.

■ CONCLUSION

Captive growth rates of pythons can be spectacular and provide valuable information. It is hoped that this work may encourage more python keepers/breeders to keep detailed records of captive growth, particularly in respect to rearing sibling hatchlings of different sexes and rearing hatchlings from different localities in the species range.

It involves little effort to weigh food items and present captive snakes with similar sized meals at the same time to display possible sexual differences in growth. Monthly weighing and measuring places little stress on captive snakes as long as it is carried out efficiently with a minimum of handling. Detailed behavioural and growth rate data gathered from captive snakes can be particularly useful when combined with field data on wild specimens of the same population and species.

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