

BREEDING AND GROWTH OF THE PLUMED BASILISK (*BASILISCUS PLUMIFRONS*) AT THE ROYAL MELBOURNE ZOO

CHRIS B. BANKS

Keeper-in-Charge (Reptiles), Royal Melbourne Zoo, P.O. Box 74, Parkville, Victoria 3052, Australia

INTRODUCTION

The Plumed or Green crested basilisk (*Basiliscus plumifrons*) is an attractive iguanid species inhabiting tropical, wet, evergreen forests of Costa Rica, Central America (Heyer, 1967).

The first specimens to be exhibited at Melbourne were received from Brookfield Zoo, Chicago in November, 1976. Unfortunately the female did not survive the journey and we were left with a solitary male until February, 1980 when two females arrived from Rotterdam Zoo.

ACCOMMODATION

Soon after arrival the male was transferred to a large exhibit, measuring 2x2x1.8m high, which also housed a small group of Star tortoises (*Geochelone elegans*). As with all our reptile enclosures, the interior walls and floor are of simulated rock, with numerous resting ledges. The heated floor maintains a temperature of 24-31°C, higher in summer than in winter due to the influence of outside weather conditions. It is also covered with a thick layer of coarse sand and contains a centrally-located plant pocket which presently holds two *Ficus lyrata*. A palm, *Kuntea* sp., is situated to the rear of the exhibit. These plants, together with an open network of branches in the upper areas, provide adequate cover and perching sites for the lizards.

To one side of the enclosure is a 0.5m² shallow pond which is used extensively by tortoises and lizards alike. Clear perspex sheets in the roof above the wire-topped exhibits result in natural lighting and seasonal photoperiod changes. The enclosure is also lit by a 40W "True-lite" fluorescent tube which is switched on from 0810-1650 hours daily.

The females were introduced to this exhibit soon after their arrival in 1980 and settled in well with the resident male.

ADULT DIET

For the most part, the adults in this report were fed small mice, locusts (*Locusta migratoria*) and Northern field crickets (*Teleogryllus oceanicus*), the latter two usually being dusted with a mixture of bone flour and "Petvite" prior to feeding. On occasions the male will also take pieces of tomato and fruit from the tortoise's food tray. This is a similar feeding regime to that noted by Bloxam (1980) for this species at the Jersey Wildlife Preservation Trust, but contrasts with the more fruit/vegetable oriented diet offered at the Brookfield Zoo (Pawley, 1972).

BREEDING

The two females were placed on display with the male 10 days after their arrival in late February 1980, and commenced feeding the next day. They were designated female 2 and female 3. Female 2 laid two eggs whilst in transit and No. 3 laid four infertile eggs eight days after arrival. The latter female was also observed digging in the enclosure floor on 22nd and 28th March but no eggs were laid. The male was seen attempting to mate female 3 from 9-16 April and 10 eggs were laid on 19th May but again all were infertile (see Table 1).

Female 2 was removed from the exhibit on 1st May due to her dominance by female 3 and on no further occasion were the two females placed together. Female 3 laid a further 13 eggs on 15th September and 7 on 27th November during a brief period of display. Female 2 laid 4 eggs on 30th October. None of these 24 eggs were fertile.

In 1981, female 3 was seen digging in mid-January but it was not until 22nd July that she oviposited. During the week prior to laying the female appeared to present herself to the male — she positioned herself about 0.5m from the male, lowered her forebody to the sand and raised her pelvic region and tail. This behaviour has not been observed at any other time.

A total of 14 eggs was laid 150mm below the surface and next to a large branch. The tortoises had been removed from the exhibit to prevent them disturbing the lizard and laying took place from 1300-1400 ours. The eggs were immediately removed for artificial incubation. After being weighed and measured they were placed in a container of moist Vermiculite which was positioned in an incubator set at 28°C. Five infertile eggs were discarded after 15 days and a further two after 28 days. The remaining seven eggs were carefully measured after 35 days and were found to have increased in size (see Table 1). All seven eggs split on 26th September with a healthy lizard emerging from each the next day after an incubation period of 67 days. At hatching they averaged 43mm S.V. (41-44), 135mm total length (126-143) and 2.06g (2.01-2.12).

Table 1. Ovipositional data for *B. plumifrons* at the Royal Melbourne Zoo

Clutch laid (No. eggs)	No. eggs fertile	Mean egg weight at laying (g)	Mean egg length at laying (mm)	Mean egg width at laying (mm)
22 Feb, 1980 (4)	0	Not	recorded	
19 May, 1980 (10)	0	Not	recorded	
15 Sept, 1980 (3)	0	1.8	22.3	11.6
20 Oct, 1980 (4)	0	Not	recorded	
27 Nov, 1980 (7)	0	Eggs	dehydrated when found	
22 July, 1981 (4)	7	2.3	22(25*)	14 (19.5*)

* size after 35 days

GROWTH OF YOUNG

Hatchling *B. plumifrons* have been adequately described by Pawley (1972) and Bloxam (1980) and suffice to say that these individuals showed no appreciable differences. They were placed in an all glass aquarium measuring 1.0 x 0.4 x 0.5m high. The floor was covered with a layer of coarse sand, and leaves were provided for cover. A pot plant, *Stromanthe sanguinea*, and small branches running the length of the tank were included for resting and climbing. A 200W heat lamp was suspended over the wire top, producing a maximum temperature of 32-36°C on the uppermost leaves and branches. The lizards spent most of their time in these areas. As the tank was situated on a heated table, floor temperature did not drop below 24°C. A 40W fluorescent "True-lite" was also placed above the tank enabling the lizards to bask within 200mm of the tube. As with the display enclosure this was switched on from 0810-1650 hours daily.

The lizards were sprayed each morning with a fine mist spray and always drank readily from droplets on the vegetation. A shallow bowl of water was also present at all times. Feeding commenced the day after hatching with small meal-worms being accepted without hesitation. Growth was very slow over the first month and two deaths occurred after 21 and 28 days respectively. Overheating was thought to be the cause and consequently the maximum temperature was reduced to 33°C. This may have been only part of the problem as further deaths occurred 54 and 69 days after hatching. In order to make servicing of the tank less traumatic for the lizards and to enable the tank to be carried to a sunny, off-limit area outside the Reptile House each day, the lizards were transferred to a small tank (600 x 300 x 300mm high) in late November. In early December, as feeding still consisted solely of small crickets and mealworms dusted with boneflour and Petvite, it was decided to attempt careful force-feeding of small pieces of fruit and hard-boiled egg. Although this was carried out on four occasions over a two-week period, it did not appear to reduce the lizards' reluctance to accept such food and the practice was discontinued.

After overcoming the initial difficulties, the two remaining lizards grew steadily and by the end of the sixth month, the larger individual began to develop the large crests which are characteristic of the male *B. plumifrons*. A further seven months elapsed before the smaller lizard exhibited similar development. Although the lizards still accept live crickets with relish since the 14th month they have taken increasing amounts of chopped fruit, pieces of hard-boiled egg and moistened Puppy Chow.

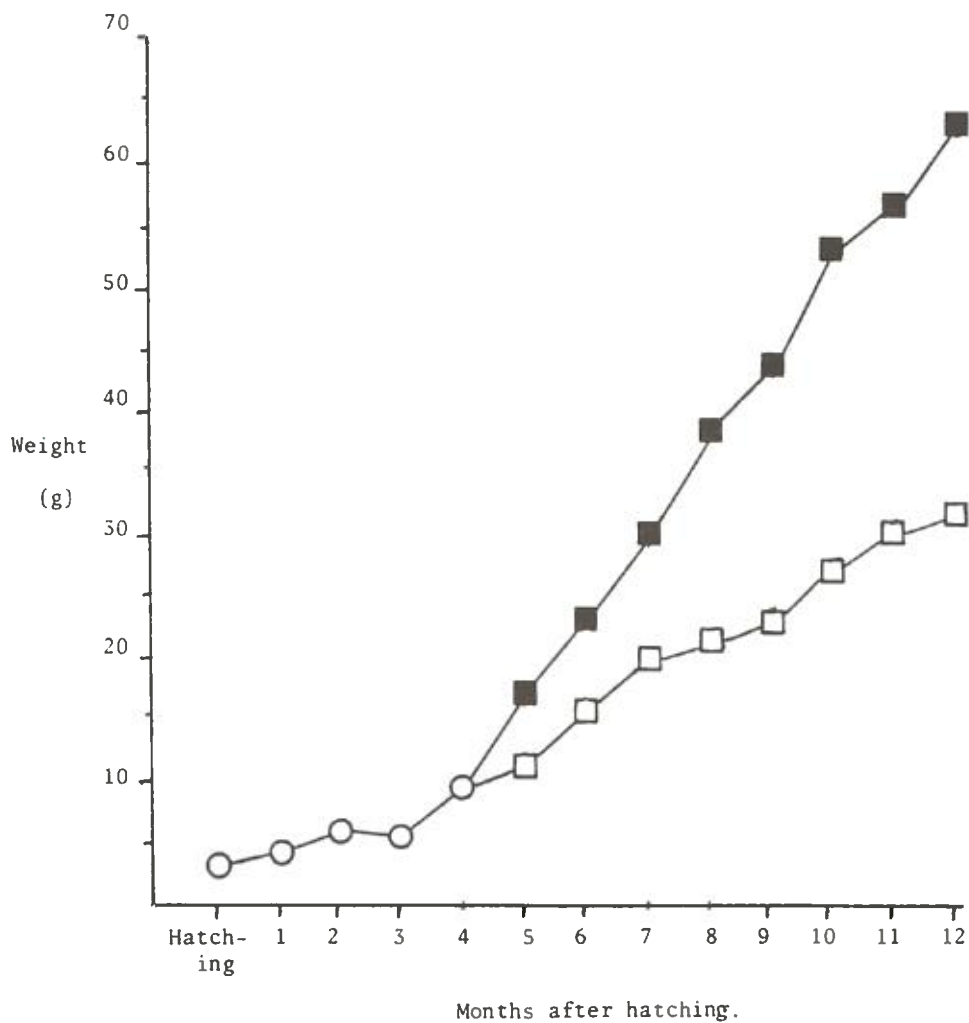


Figure 1. Weight increase in grams from hatching to 12 months of age for *B. plumifrons* at the Royal Melbourne Zoo. ○ - mean; ■ - male 1; □ - male 2.

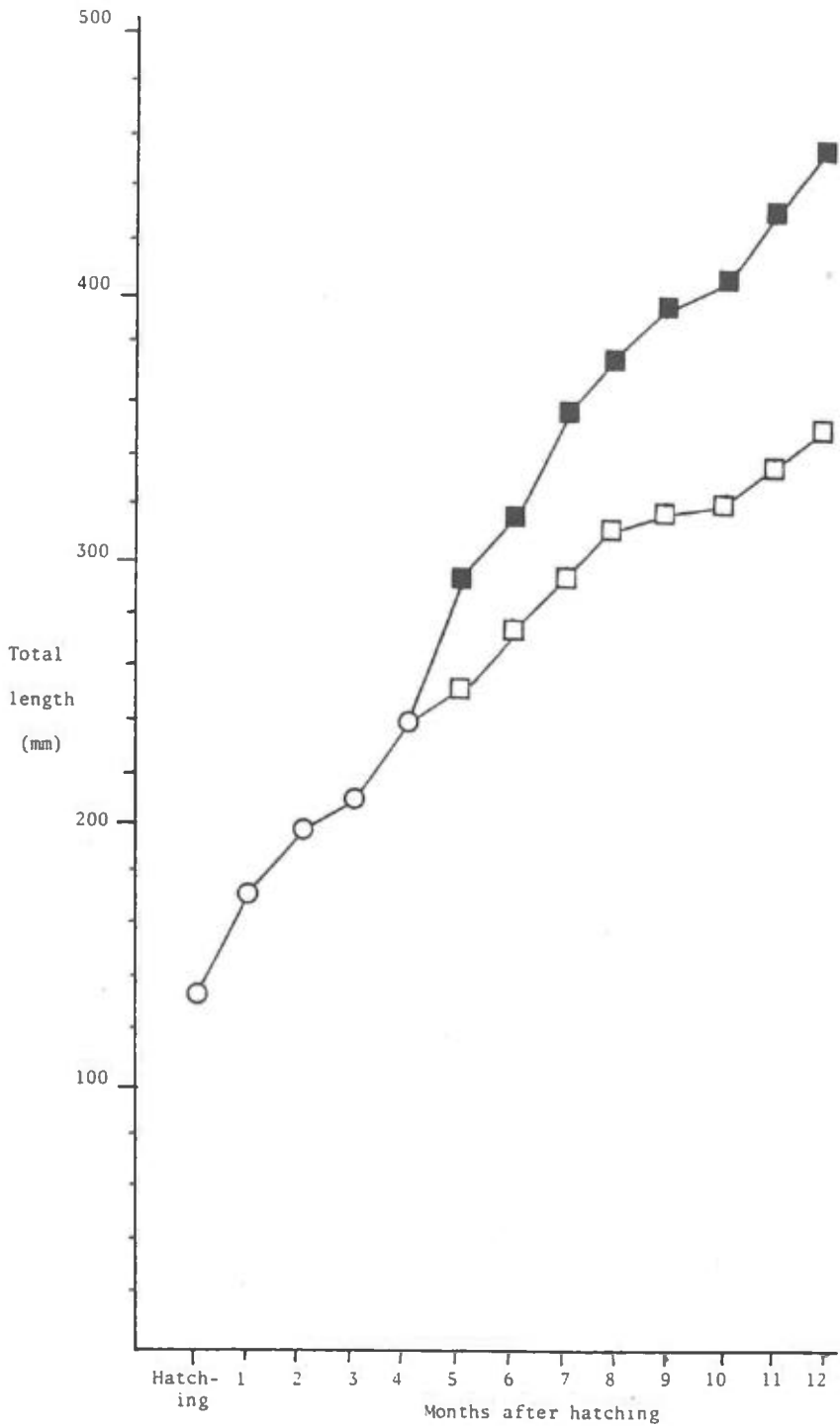


Figure 2. Increase in total length in millimetres from hatching to 12 months of age for *B. plumifrons* at the Royal Melbourne Zoo. ○ - mean; ■ - male 1; □ - male 2.

DISCUSSION

The two previously published accounts of captive breeding of *B. plumifrons* (Bloxam, 1980; Pawley, 1972) differ in the breeding seasons shown by the respective animals. Those at Jersey (Bloxham, 1980) oviposited from November-July while those at Brookfield (Pawley, 1972) oviposited from May-September, with corresponding differences in times of hatching. Both are northern hemisphere collections, but in both instances the period from which data was drawn did not extend into the second breeding season and it may well be that long term studies will reveal a more specific breeding regime. Indeed the ovipositional data in this report show elements of both previous accounts and are only from one season, as both females died in late 1981.

However, egg dimensions at laying and after 35 days incubation (Table 1) were similar to those previously recorded under similar incubation conditions. Incubation length also showed a similar correlation. Unlike the previously reported breedings, no humidity problems were experienced during incubation as the eggs were maintained at 90-93%.

As can be seen from Figures 1 and 2, the individual which first showed itself to be a male (male 1) grew at a faster rate than its sibling, from the point at which individual recordings commenced. This is despite no shortage of available food, space, or cover. It is also of interest to note the differing growth rates between these individuals and the Jersey animals; after about 200 days the latter weighed almost 40g while the Melbourne specimens averaged 24g (18-30g). The weight at hatching was very similar for both groups; from 2-3g. Mean snout-vent length as a percentage of total length varied very slightly over the first 12 months — from 30.2% at 1 month to 26.1% at 12 months. That for the remaining adult male is very similar: 26.9%.

At the time of writing, both lizards are still very shy and it will be some time before they are introduced to the exhibit still occupied by the adult male after six years. As these are the only *B. plumifrons* in Australia at the present time, every consideration must be taken to ensure further successful reproduction.

Products mentioned in the text

True-lite (Vita-lite)

Duro-test International, 17-10 Willow Street, Fair Lawn, New Jersey 07410, U.S.A.

Petvite

I.G.Y. Manufacturing Pty. Ltd., 20 O'Briens Road, Hurstville, N.S.W. 2220, Australia.

Puppy Chow

Robert Harper & Co. Ltd., 5 Dunlop Road, Mulgrave, Vic., Australia.

ACKNOWLEDGEMENTS

I am grateful for Roy Dunn's review of this paper, drafts of which were typed by Meg Braden.

REFERENCES

- Bloxam, Q.M.C. (1980). Breeding and maintenance of the Plumed basilisk *Basiliscus plumifrons* at the Jersey Wildlife Preservation Trust. *Dodo. Journal of the Jersey Wildlife Preservation Trust* 17: 88-96.
- Heyer, W.R. (1967). A herpeto-faunal study of an ecological transect through the Cordillera de Tilaran, Costa Rica. *Copeia* 1967 2: 259-71.
- Pawley, R. (1972). Notes on reproduction and behaviour of the Green crested basilisk (*Basiliscus plumifrons*) at Brookfield Zoo, Chicago. *International Zoo Yearbook* 12: 141-44.