THE PROPAGATION AND HUSBANDRY OF *ELAPHE FLAVIRUFA PARDALINA* (PETERS) INCLUDING NOTES ON NATURAL HISTORY

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INTRODUCTION

Elaphe flavirufa pardalina is one of four currently recognised subspecies of the Neotropical Ratsnake, *Elaphe flavirufa*. An additional subspecies, *Elaphe flavirufa polystichta*, was proposed in 1966, based on the close examination of a preserved specimen held in the British Museum (Smith, Williams 1966). This specimen was taken on Isla Ruatan, Islas de La Bahia, Honduras, around 1893. This subspecies *E.f. polystichta* shows only very minor differences from the mainland population of *E.f. pardalina*, having a slightly higher number of dorsal scale rows and also a higher posterior minimum. The two subspecies are identical in colour and pattern type.

I particularly mention *E.f. polystichta* as my own stock were captive bred from wild-caught adults from *Isla de Ruatan*. Wilson and Hahn (1973) heavily criticised the status of *E.f. polystichta*, suggesting that *E.f. polystichta* (Smith and Williams) should be relegated to the synonymy of *E.f. pardalina*.

The four currently accepted subspecies of *Elaphe flavirufa* (see Dowling 1952) also have their critics and it is clear that a great deal of work has yet to be done to stabilise the taxonomic status of this fascinating species.

The range for *E.f. pardalina* includes the Caribbean coastal regions of Guatemala, Honduras (incl. Islas de la Bahia) into Nicaragua (incl. Corn Island).

Reliable climatic statistics for the Caribbean coastal plain of Honduras have proved difficult to locate, although very useful information is given by Wilson and Meyer in their book *The Snakes of Honduras*. They state that in Honduras *Elaphe flavirufa* is only known from below 100 metres in the tropical moist forest and tropical dry forest formations. The climate of the tropical moist forest is given as having a high mean annual temperature (24°C) and high annual precipitation (2000-4000mm). The precipitation is spread throughout the year with no month receiving less than 50mm. The heaviest precipitation however appears to occur between the months of October and January.

The climate of the tropical dry forest is given as having a relatively high mean annual temperature (24°C) and receiving between 1000 and 2000mm of precipitation annually. During part of the year precipitation falls below 50mm per month and there are three to four months when precipitation is negligible.

Wilson and Meyer (1985) also include some excellent habitat photographs which give the keeper a very real insight into the natural habitat in which *E.f. pardalina* is found. *Elaphe flavirufa* may be at some risk from continued habitat destruction; Wilson and Meyer mention this as a very real threat to the rich and diverse amphibian and reptile population of Honduras. The Phillips Illustrated Atlas of the World (1984) gives some detailed information on habitat destruction in Honduras indicating that the aromatic pine forests of the East are being consumed by new paper mills on the hot rain soaked Caribbean coast. The lower alluvium filled valleys of the rivers draining into the Caribbean have also been reclaimed and the forest replaced by orderly banana plantations.

E.f. pardalina is a large (up to 1600mm), slenderly built colubrid with a relatively thin neck, distinct head, large eyes and a long tail. (See Plate 1 for a typically marked specimen).

Elaphe flavirufa is an aboreal and nocturnal snake and these behaviour patterns should be catered for when considering an appropriate vivarium design i.e. climbing and secure hide facilities.

Elaphe flavirufa is poorly represented in collections and its propagation is indeed a rare event. During 1990 I acquired four captive bred hatchlings of *E.f. pardalina* and in 1992 achieved what I believe to be the first U.K. captive breeding of this species. All four hatchlings were from wild caught parents and are unrelated, female 1 (F1) hatched in August 1989 and F2, male 1 (M1) and M2 hatched in August 1990.

Clearly the climate statistics that are available for Honduras give a pointer to certain parameters that must be met for the well being of this species in the vivaria. From my experience temperature and humidity are both extremely important in the adopted regime for the captive care of *E.f. pardalina.* It should be noted that as a tropical species it does not require a period of harsh winter cooling as with the more commonly kept temperate N. American *Elaphe* sp.

The temperature in the vivarium should be stablized at around 25°C through the year. Higher temperatures are tolerated in Summer but these should not be excessive. A very slight cooling period from November to February appears to be beneficial but at no time should the temperature be allowed to fall below 20°C for any length of time. Below 20°C digestion of food items ceases and regurgitation takes place. F1 experienced this problem during an unchecked heater tube failure, although recovery was complete when the recommended temperature was again maintained.

Too dry an environment causes severe problems with sloughing, but this is easily overcome by periodic misting of the vivarium and daily misting of the snake during ecdysis. I now have a large pile of sphagnum moss in each vivarium which is kept permanently damp. My preferred substrate has also been changed from corn cob chips to coir – a peat alternative made from crushed coconut husks. Before making these changes to my husbandry techniques M1 experienced two very bad sloughs in quick succession; no problems have been experienced since. F1 was housed immediately in a small drawer type vivarium, due to her size. F2, M1 and M2 were initially reared in plastic boxes on a rack system, heated by a 45w horticultural cable; they were moved into individual vivaria at 8 months of age.

The vivaria lighting is set at 12 hours on and 12 hours off for the whole year. Expensive UV tubes are not necessary (i.e. True-lite) as, is already mentioned, *Elaphe flavirufa* is nocturnal.

Feeding is unproblematic as all my specimens have a strong feeding response, accepting on a regular basis pre-killed laboratory mice of an appropriate size. Occasionally food items are refused, in particular during the slight cooling period and during the mating season (males only).

In the vivaria each drawer unit is lined with newspaper and in the main compartment climbing branches are provided; fresh drinking water is available at all times.

Behaviour in the vivaria has proved to be very predictable: each snake appears at around 22:00 to climb in the branches and hunt for food. They appear very much to enjoy their arboreal activities and I feel it is very inappropriate to house them in plastic boxes much beyond the hatchling stage. (i.e. up to 8 months). Although not stated in any available literature I feel it is highly probable that in the wild small birds will also be taken.

E. flavirufa is a highly nervous snake and does not react well to being handled, thus they are rarely removed from their vivaria. If handled they are prone to very rapid movements and it is not unusual for a lightning strike to take place.

At the beginning of 1992 I decided that all four snakes had developed sufficiently to consider an attempt at breeding this species.

On the 6/4/92, M1 was introduced into the vivarium of F1 and M2 to F2; at this time F1 was of age 30 months and F2, M1 and M2 of age 18 months. At 22:30 on the same day F2 and M2 were observed clearly coupled high up in the branches of their vivarium. On 8/4/92 F1 and M1 were similarly observed coupled at 22.45 and separated at 23.35. Over the next few days semen stains were found regularly in both vivaria, including the drawer

Plate 1. Female *Elaphe flavirufa pardalina*, clearly gravid.

Plate 2. *Elaphe favirufa pardalina* during oviposition.

Table 1. REPRODUCTIVE DATA FOR *ELAPHE FLAVIRUFA PARDALINA*

PAIRINGS	F1/M1	F2/M2
Mating Dates	8/4/92	6. 8. 11/4/92
Pre-Oviposition Slough	28/5/92	25 26/5/92
Date of Oviposition	4/6/92	4/6/92
Gestation Period	57 Days	54-59
Clutch Size	5	4
Incubation Temp. °C	26-30	26-30
Incubation Period	69-70 Days	69
Date of Hatch	12 13/8/92	12/8/92
Fertility	40%	50%

BOTH FEMALES LAID BETWEEN 08.00 AND 16.00

Table 2. EGG AND HATCHLING DATA

FEMALE 1							FEMALE 2						
Egg	L (cm)	W (cm)	Weight (g)	Hatch Date	1st Slough	1st Feed	Egg	L (cm	W (cm)	Weight (g)	Hatch Date	1st Slough	1st Feed
1	6.2	2.7	25.75 = X	12/8	21/8	21/8	1	6.6	3.1	25.38 = X	12/8	21/8	3/9
2	6.85	2.6		*			2	6-7	2-75		12/8	22/8	22/8
3	6	2.3		INF			3	6	2.25		INF		
4	5.9	2.2		INF			4	6.8	2.3		INF		
5	6.8	2.6		13/8	22/8	1/9							

* This Egg went full term but did not hatch naturally. It was opened after 10 further days incubation and was found to contain a live deformed neonate.

units. Both pairs of snakes were returned to individual vivaria on 16/4/92 and within a further two weeks both females were observed to be clearly gravid. (See Plate 1.). Both females fed normally up to the end of April when they began to refuse food items. F2 experienced a very poor pre-oviposition slough (despite misting), and on 26/5/92 I decided to assist her, very much concerned about added stress before egg laying. Fortunately no problems were experienced and both females laid in boxes of damp sphagnum moss. The eggs were surprisingly large when compared to other *Elaphe* sp. I have bred; for detailed reproductive data and egg/hatchling data see Tables 1 and 2. The incubation medium was damp vermiculite (1:1 by weight with water) and the incubation temperature fluctuated between 26°C and 30°C with an average of approximately 28°C. The eggs were inspected on a weekly basis and no extra water was added during incubation. The eggs that proved to be infertile were discarded when appropriate, otherwise incubation was uneventful, although the eggs from F1 became discoloured as incubation progressed. Hatching took place between the 12th and 13th August and the hatchlings were large as expected from such sizeable eggs. They were replicas of their parents, although more brightly coloured. Only the hatchling from egg 5 was measured and weighed to avoid stress. It weighed 22.5g and had a length of 35.2cm.

After their first slough two hatchlings, one from each clutch, fed regularly on week-old pink mice. The other two however were slower and showed a marked preference for pre-thawed pink mice with the nose area cut with a scalpel.

The sex ratio proved to be 3:1, determined by probing.

Elaphe flavirufa is indeed a very beautiful ratsnake worthy of inclusion in any collection, although it should only be considered by the more experienced hobbyist who can provide the necessary conditions to ensure it's well-being. It's reproductive biology is relatively straightforward and it makes a fascinating vivarium subject.

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