

A PROBLEMATIC TERRARIUM ANIMAL?



Remarks on Chrysopelea ornata ornatissima

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Chrysopelea is spread over almost the entire tropical part of Southeast Asia.

■ INTRODUCTION

Due to their striking colouration the flying snakes of the genus *Chrysopelea* have always been popular terrarium animals though considered very difficult to keep, and the conversion to a mouse diet rather difficult to accomplish. Having observed the subspecies *Chrysopelea ornata ornatissima* in the wild and having kept them in captivity for the last 8 years I can, at least for this subspecies, say that they are, contrary to general opinion, very easy animals to maintain. This article is intended to clear up some of the misunderstandings and inaccuracies that can be found in the literature and to provide more information on the keeping and breeding of these animals.

■ GENERAL INFORMATION AND DISTRIBUTION

According to the work of De Rooij, Smith and Mertens, the genus *Chrysopelea* consists of six species with three subspecies. These are

Chrysopelea ornata ornata • *Chrysopelea ornata ornatissima* • *Chrysopelea pelias* • *Chrysopelea paradisi paradisi* • *Chrysopelea paradisi celebensis* • *Chrysopelea paradisi variabilis* • *Chrysopelea chrysochlora* • *Chrysopelea taprobanica* • *Chrysopelea rhodopleurum viridis*.

Of these species only *Chrysopelea ornata ornatissima* has so far been imported on a regular basis. The genus

■ COLOURATION, PATTERN AND SIZE

Within the subspecies *Chrysopelea ornata ornatissima* Smith (1943) distinguishes two colour morphs that appear in different geographic regions:

1:

Dorsal colouration, green-yellow or soft-green, every scale has a central black line or circle which is more or less solid black. At regular intervals the scales are completely black, forming cross stripes. On the ridge of the back a row of red or orange spots may be present and formed like three-petaled flowers. The ventral scales are green, the head is black with yellow cross banding and spots. Subcaudal scales are outlined in black or form a black mesial stripe. In all the specimens from Ceylon that I saw, flower-like spots were present at every second cross band. In specimens from the south of India these spots were not so obvious or even absent.

Distribution: Sri Lanka and the western Ghats south of the Goa cleft (Fide Wall).

2:

Like the previous form but without the spots on the ridge of the back. In forms from Burma and Siam the black cross bands are less distinct and may even be absent. The mesial stripes on each scale can then look like longitudinal lines. In forms from French Indo-China the black cross bands may be very weak, similar to

forms from the south of India.

Distribution: Throughout Indo-China with extensions to the north-west into the triangle in Burma and the Darjeeling region. From Patna, Buxa and Bihar down to the Orissa region to the north-east towards Tongkin and the south of China (Hong Kong). Occurring south to a latitude of 60°N.

Body size: - 1040 mm, tail length 300 mm
 - 1100 mm, tail length 275 mm

Specimens with a total length of 1400 mm are common.

Interestingly Trutnau describes *Chrysopela paradisi* for the island Phuket on which I found only *Chrysopelea ornata ornatissima*. Obviously here both species occur in the same biotope. According to Tweedie the most northern distribution of *Chrysopelea paradisi* is Penang in Malaysia. Cox however also positions it in Thailand. Personally I have not found *Chrysopelea paradisi* on Phuket.

■ OBSERVATIONS IN THE WILD

Observations in the wild are restricted to the area of the province of Suratthani including the island Koh Samui in the South of Thailand. In this region *Chrysopelea ornata ornatissima* is very common, as in most other parts of its distribution. This is surely due to its remarkable ability to adapt to different biotopes. It is found both in jungle and cities. It is active from the early morning, shortly after sunrise, until the afternoon. This snake can often be found near or even inside houses, hunting its prey. Interestingly, I observed how *Chrysopelea ornata ornatissima* allowed people to approach quite close before fleeing. On one occasion, a *Chrysopelea* stalking a Tokel (*Gecko gecko*), could be approached undisturbed for up to one metre. However, once disturbed, these snakes can move incredibly fast.

On occasions where I have witnessed these snakes in full flight, I have been able to observe the much described 'flying' of this genus. Even though *Chrysopelea ornata ornatissima* is not capable of such extended flights as *Chrysopelea paradisi*, it is also nevertheless impressive. I have often observed how *Chrysopelea ornata ornatissima*, while trying to escape, glided to the ground from a height of six or seven metres. Their posture during flight was identical to the typical S-shape described in the literature for *Chrysopelea paradisi*. From this height the snakes can travel a distance of five to six metres from their launch point. Attempts described by Golder (1985) of this species, in a controlled environment, unsuccessfully reaching a target distance from a height of approximately 2 metres, was probably due to the insufficient height of the launch point. Golder describes the snakes as adopting an outstretched body position. From my observations in the wild, snakes launching themselves from this height also adopt the outstretched body position. Outside their period of most activity, the animals are predominantly found underneath roof tiles, thatched roofs, wood piles and boards. These hiding places are mainly found at heights of approximately 1.5 metres but the occasional snake is found close to the ground. I noted too that the animals prefer hiding places in which they have body contact from both below and above. When setting up a terrarium for these animals this is certainly something to consider and an appropriate hide-box should be supplied. Due to their diurnal lifestyle it was possible to observe these animals hunting. During this activity the animals often come to the ground. Once a prey has been spotted the animal slowly moves towards it. Interestingly, lizards (*Calotes*) that sit absolutely still are recognised as prey from a distance of one to two metres. As soon as the snake has approached its victim to a distance of 30 centimetres it suddenly moves and strikes. Smaller prey items are eaten alive while larger ones are constricted. Venom is injected into its prey by chewing motions. The venom however does not appear to be very potent. On a number of occa-



Investigation area and site where *Chrysopelea ornata ornatissima* was found, approximately 20 km's south-west of the city of Suratthani in the South of Thailand.

sions I was bitten on my hand while catching these animals and never suffered any ill effects. Tweedie too, in his book "The snakes of Malaysia", mentions that the bites he received from *Chrysopelea paradisi* had no toxic effect. In contrast to this Zäpernick and Denzer describe symptoms after a bite from *Chrysopelea ornata*. In contrast to my experiences Thai people consider *Chrysopelea ornata* extremely venomous. Regularly after I had been bitten the bite was checked with a worried expression and people were surprised that even after a couple of hours I was still in good health. I cannot, however, rule out the possibility that a bite from an adult female which is larger than an adult male, may exhibit symptoms of envenomisation.

Apart from believing this snake's venom to be deadly, local people believe that *Chrysopelea ornata ornatissima* crawls into the opened mouth of a Tokeh and eats parasites from its neck and stomach and even, according to some, eats part of its liver. During all this the Tokeh sits perfectly still with its mouth wide open. Surely these stories are not true. Apart from the fact that it would be impossible to reach the liver without injury it is very unlikely that *Chrysopelea* would feed on endoparasites that could seriously compromise its own health. However, as I was able to observe, there is some factual basis to these stories. A female *Chrysopelea ornata ornatissima*, which was approximately one metre long, approached an adult male Tokeh - far too big to qualify as food. While constantly flicking its tongue, the snake approached the Tokeh head on. Quacking loud-

ly the Tokeh slowly retreated. The snake continued its approach till within 5 centimetres of the Tokeh. The Tokeh did indeed hold its mouth wide open, as had been described by the locals. This opening of the mouth however is a well know defensive posture of Tokehs. I unfortunately approached the animals too closely and both *Chrysopelea* and Tokeh fled. Hopefully I will again have the opportunity to observe this behaviour and be able to shed more light on the facts behind these strange observations of the locals.

In nature *Chrysopelea ornata ornatissima* seems to feed mainly on lizards, especially on *Galotes versicolor* and *Hemidactylus frenatus*, but also eats frogs. According to Smith Tokehs belong to the food spectrum of *Chrysopelea ornata ornatissima*. I observed conflict situations between snake and Tokeh lasting up to two and three hours in which the geckos were not always the first to retreat.

From my observations of *Chrysopelea ornata ornatissima*, the primary mating season lasts from January to April i.e. the driest season with the lowest temperatures - "low" being daytime temperatures around 30°C. During the night however they drop to around 20°C and in the morning often a ground fog develops. Several times I was lucky enough to observe animals in their attempts to mates. Interestingly, several males often tried to mate with one female. The males crawl in a manner typical of vipers with erratic jerking movements over the backs of the females. When several males are present they try to push each other aside. All this looks quite hectic to the observer, not to mention the females frantic attempts to escape. All mating attempts I observed took place during the period from morning to afternoon. During these attempts the animals were always on the ground.

Several gravid females that I caught in Thailand, deposited their eggs between the middle of June and the middle of July. The number of eggs varied between ten and thirteen. The eggs that were laid in Thailand were buried at appropriate spots and left alone.

Photo by J. Bulian

Adult female *Chrysopelea ornata ornatissima*.

■ OBSERVATIONS IN THE TERRARIUM

Of the animals I had caught, I brought back six to Germany for further study. They were two males and four females. The animals were housed in two separate terrariums according to their sex. These measured 100 x 70 x 60 cm (L x W x H) for the males and 80 x 70 x 80 cm ((L x W x H) for the females. The tanks were lit with two fluorescent tubes for 12 hours a day. There was no additional heating. During the winter months temperatures dropped to about 25°C and in the summer, rose to 30°C. Night time temperatures fell to 18°C in the winter and from 23 to 25°C in the summer. To accommodate their arboreal lifestyle the cages were fitted with ample climbing facilities. As the snakes are pretty light they hardly damage plants so dense foliage was also supplied. Initially wood shavings were used for substrate. Later on bark chips were added. Unfortunately mayflies were introduced with the bark chips and spread through the entire room. Extermination was only possible using large amounts of dichlorvos.

During the months of May to November, the terrariums were sprayed heavily with water every two to three days. During the months December to March, which is also the dry season in Thailand, no water was sprayed. Under these conditions the animals were kept without any difficulties. From the outset, they were

persuaded to eat mice and the larger females even took adult mice. With a regular supply of food females have a tendency to excessive weight gain. In my experience it is sufficient to feed the females one adult mouse every two weeks. The problem of obesity has so far not occurred in the males as they are more moderate eaters. Sloughing of adult animals occurs every four to five months. After a short period of adaptation it is possible to perform minor tasks in the terrarium without the animals trying to escape or to bite.

■ BREEDING ATTEMPTS

Based on my observations in nature the females were introduced to the males in January 1994. Both males had sloughed just prior to this. No attempt to mate was observed but from May to July 1994 a total of three clutches were deposited of which one was fertilised and two were unfertilised. The fertilised eggs were incubated in a plastic box filled with moist peat in an incubator. As for viper eggs, the temperature was set to 29°C. Unfortunately, after two weeks the eggs collapsed and moulded. With the fourth clutch in August 1994, (which contained four fertilised and five unfertilised eggs), I tried to incubate eggs on several types of substrate including no substrate - two eggs were incubated on chicken wire over water in a plastic box. For the other two eggs vermiculite and white peat was used. The incubation temperature was again 29°C. Much to my annoyance, however, all eggs moulded again after two to three weeks.

To be better prepared for the next years eggs, I contacted other people who keep or have kept *Chrysopelea* but the news was quite disappointing. With almost everyone the eggs were lost. Only on one occasion did the eggs hatch. In all other cases the eggs moulded after two to three weeks. The one successful incubation took place in the Zoo of Dresden that owns specimens of *Chrysopelea ornata ornatissima* that I had

brought from Thailand. These animals live in a densely vegetated terrarium. Both the laying of the eggs and their incubation took place unnoticed within the terrarium. Which offered no solution to the problem. During my next visit to Thailand in January and February of 1995, I tried to find out where *Chrysopelea ornata* deposits her eggs. From the talks I had with the local people I found out that the eggs were generally not deposited in the soil, but mainly in moist and relatively cool places under stones or wooden boards or in crevices. This answer may not necessarily be the right one as the eggs that are laid in the soil are surely seldom found. However, this is at least an indication for a change in the method of breeding.

The cause of the high number of unfertilised eggs I suspect to be the relatively low temperatures under which the animals were kept during the mating season, especially since no breeding attempts were observed. Because of this all six animals were transferred to a terrarium measuring 100 x 80 x 70 cm (L x B x H), after the males had been kept in a small terrarium at 25°C for three months. Lighting was by two fluorescent tubes of 18 W, heating by a heating cable. The 'decorations' consisted of branches, artificial plants and several up turned flower pots as hide boxes. Wood shavings was used as a substrate. The water bowl had a capacity of half a litre. Due to the added heating cable, temperatures in the terrarium rose from 30 to 33°C during the day and fell to 24°C at night. With this rise in temperature all snakes became significantly more active. A disadvantage of the higher temperature lies in their feeding behaviour. They tend to often bite and even try to constrict each other in the frenzy and my quick intervention has saved the occasional snake. Now I regularly observe the snakes during feeding until all the mice have been eaten. One can only, through adopting this practice, be sure you still have the same number of snakes in your cage after feeding.

Although in 1995 copulation was again not observed, all four females clearly showed signs of being gravid by the end of April. The first eggs were laid on April 28.

Unfortunately these eggs that were deposited randomly in the terrarium were unfertilised. In total eleven eggs were found. Things looked more positive for the second female though. From May the 20th she frequently visited the egg laying box that had been supplied. This was a plastic box filled with peat that was partially covered with slate. The snake stayed in the box sometimes for the whole day. The eggs were laid on May the 27th and during the course of the afternoon a total of eleven eggs were deposited. Of these, four were unfertilised. The other eggs were put in a plastic box filled with peat. Some eggs were buried in the peat, while others were partially covered or placed on the surface. The eggs that had been completely or partially covered with peat went bad after two weeks and moulded. The other eggs retained their colour. The plastic box was incubated in an empty terrarium with temperatures varying from 23 to 27°C. A second clutch of eggs was laid on May the 31st. Of these ten eggs, five were unfertilised and the remaining eggs were incubated as described above. Unfortunately with this clutch also the eggs that had been incubated on days and began to mould. Two eggs that were opened for inspection contained embryos that were in an early stage of development (total length 10 cm).

Again in 1996 several clutches of eggs were laid.

Young Chrysopelea ornata ornatissima showing the cross banding typical of juveniles.



Photo by J. Bultman

Unfortunately all of these were unfertilised. For this reason this article cannot be concluded with positive results. However, I hope that other people who keep *Chrysopelea* may benefit from my experiences and that in time success may be achieved in breeding this species.

■ ACKNOWLEDGEMENTS

I thank Mr Bernd Eichmann, Lünen and Markus Juschka, Düsseldorf, for their advice on taking care of *Chrysopelea ornata* and my attempts to incubate the eggs. Mrs. Gabi Aabaslama from Neuss I thank for the translation of the relevant literature.

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Translation from German by René van der Vlugt
English corrections by Graeme Blem