REPRODUCTION OF *BITIS GABONICA RHINOCEROS* (SCHLEGEL, 1855) IN CAPTIVITY.

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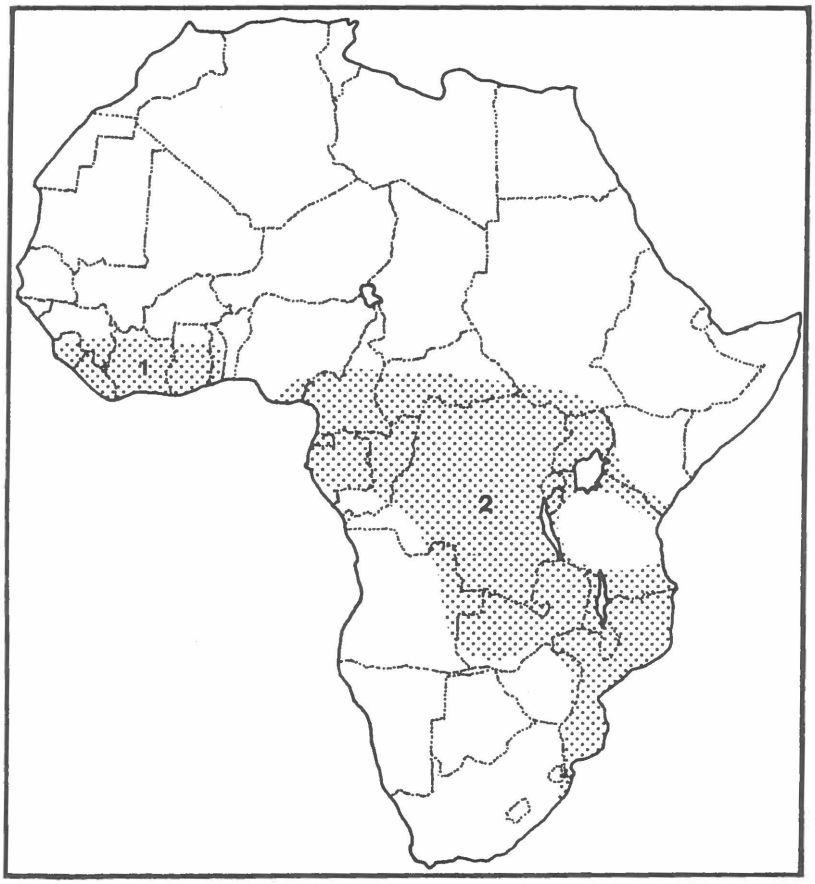
INTRODUCTION

The genus *Bitis* includes very large as well as very small African vipers. According to Welch (1982) and Broadley (1983) this genus includes the following species:

Bitis arietans arietans (Merrem, 1820)
- - *somalica* Parker, 1949
- *atropos atropos* (Linnaeus, 1758)
- - *unicolor* FitzSimons, 1959
- *caudalis* (Smith, 1849)
- *cornuta cornuta* (Daudin, 1803)
- - *inornata* (Smith, 1849)
- *gabonica gabonica* (Dum., Bibr. & Dum., 1854)
- - *rhinoceros* (Schlegel, 1855)
- *heraldica* (Bocage, 1889)
- *nasicornis* (Shaw, 1802)
- *parviocula* Böhme, 1977
- *peringueyi* (Boulenger, 1888)
- *schneideri* (Boettger, 1886)
- *worthingtoni* Parker, 1932
- *xeropaga* Haacke, 1975

Bitis gabonica is without doubt one of the best known of the genus owing to its beautiful geometrical pattern and remarkable dimensions: adult specimens can attain a length of 180-200 cm (Cans-



Map 1. Distribution of
1. *Bitis gabonica rhinoceros*
2. *Bitis gabonica gabonica*

dale (1973) reports 205,7 cm) and a body weight up to 15 kg. This snake has immense poison fangs of about 4 cm and large venom glands. For these reasons it is considered very dangerous, though very few bites are known.
Bitis gabonica gabonica is found in southern Sudan, Uganda, Tanzania, Zaire, Gabon, Angola,

Zambia, eastern Zimbabwe, Mozambique and South Africa (Zululand) (FitzSimons, 1962).
Bitis gabonica rhinoceros lives in Guinea, Guinee-Bissau, Liberia, Sierra Leone, Ivory Coast, Ghana and Togo.
The habitat of this species is tropical rain forest, and it is often found in jungle clearings or open areas near villages and riverbanks up to an altitude of 2300 m. Its habit of lying motionless is really amazing and is practised by day as well as night. Only during the mating season can high activity be seen in males. Due to the colours of the body and its perfect immobility this species is practically invisible, buried in the humus of the forest with only the large triangular head lying on the ground. This behaviour is retained in the terrarium. A characteristic of these snakes are the rapid tail movements when a prey approaches. Some desert snakes behave in a similar way.
Its preferred prey is: small mammals, birds, probably also small monkeys and Cansdale (1973) lists brush-tailed porcupines and royal antelopes.
There is almost no difference in colour and pattern between *Bitis gabonica rhinoceros* and *Bitis gabonica gabonica* with the exception of a small black triangle under each eye in *Bitis gabonica gabonica*. *Bitis gabonica rhinoceros* has two large protuberances on the point of the nose; in *Bitis gabonica gabonica* these 'horns' are smaller. Compared with the females, the males are smaller, but have a longer tail with generally three to four light-coloured markings (females usually one to two).

BITIS GABONICA RHINOCEROS IN THE TERRARIUM

I obtained the female in February 1982 and the male in May 1983, when both were about two months

old. The female is kept in a terrarium measuring 200x150x80 cm (lxwxh) and the male in one of 150x 150x80 cm (lxwxh). Both terraria are provided with very good ventilation. The bottoms of the wooden boxes are painted with waterproof paint and covered with a thick layer of wood chips. In nature these snakes live in forests where the humidity is constant and close to 100%. I never tried to obtain a humidity that high and the snakes do not seem to suffer. I believe that a very high humidity may cause problems so I just spray the snakes regularly when they are ready to slough.
With a room temperature of 20°C in winter I can reach a temperature of 26°C at the coolest spot in the terrarium by means of a bulb. Even on the coldest nights the temperature never drops below 15°C. In summer the lights are automatically turned off by a thermostate as soon as the room temperature rises to 35°C. At night a temperature of 20°C is advisable. The lights of the terraria are regulated by an outside photo-electrical cell, so the *Bitis gebonica rhinoceros* are fully adapted to the rhythm of daylight and darkness in the Netherlands.
Both animals eat dead rats every 15 days. Since this species is more active during the night, I prefer to offer food in the evening. By means of a very long pair of tweezers I put the dead rat near the head of the snake. Usually they bite the prey as they would with living animals and immediately raise the head and front one third of the body. The rat is held in the mouth for some minutes which is a good moment to administer any medication.
The female has now reached a length of 180 cm and a weight of 6.5 kg; the male is 130 cm and weighs 3.5 kg.

Fig. 1. *Bitis gabonica rhinoceros*. Foto: V. Pezzano.

Fig. 2. *Bitis gabonica rhinoceros*. Foto: V. Pezzano.

COPULATION

The male stopped eating in December 1984 and was very active during the day; the female went on with her normal peaceful and sleepy life. We now come to the middle of February 1985. The male has refused food for about 92 days but has been drinking regularly and he does not seem to have lost weight. During the last month I fed the female more frequently (about one dead rat with multivitamins every seven days) as I expected that, during pregnancy, she would refuse all food.
On the 16th of February the male was put in the females terrarium. After five minutes he seemed to notice that he was in "nice" company and constantly checking the surroundings with his tongue, he finally rushed to her. All the time she remained motionless. After a short ritual, consisting of tremblings and body against body massages, all accomplished with great care by the male, they copulated for about 20 minutes. After the act the male lied down to rest under the lamp. The female, however, after having lost a lot of sperma, turned around for some time before quietening down.
During that day I saw more copulations, all lasting longer than the first.
In the evening I put the male back into his own terrarium, where he went on creeping about.
On the 20th I again put him in the female's terrarium and took the opportunity to make video films.
On the 28th the female was clearly annoyed by the presence of the male and with quick movements she escaped from his insistent attentions. She did not want him any more.
The male continued to refuse food until 25 April and in this period he was very active during daytime. I force fed him twice with mice and multivitamins. In May, after 167 days of fast, he accepted two rats and resumed his normal behaviour.
The female continued to eat regularly for two

months but then became irritable and unwilling to accept food. I also offered live prey which she sometimes killed but did not eat. Then she showed great interest for a dead rat but did not touch it. The consumption of water was normal, maybe more than normal. I always added multi-vitamins to the water.
In the evenings I noticed that she was lying in a ring-shaped manner but during day-time she took her normal "S"-position under the bulb. This unusual behaviour went on until three months after the copulation.
Unfortunately there is no information available from other herpetologists and as far as I know this is the first case of copulation and birth of *Bitis gabonica rhinoceros* in a terrarium. Based on previous experience with *Bitis arietans* that I had when working with the herpetological group Atrox, I expected a pregnancy period of about six months. According to Akester (1979), however, the pregnancy period of *Bitis gabonica gabonica* amounts to one year.

THE YOUNG ONES

On 10 July the female became very irritable. She appeared to have gained some weight. On 4 August she sloughed and produced faeces. All day long she rubbed the cloaca against the chips of wood as if she wanted to clean herself, but I could not see anything.
On 6 August at 15.00 pm I discovered three young and a lot of unfertilized "eggs". As the female, which I now call Mama, was probably still wanting to give birth, I took the video camera and had the opportunity to film the birth of a young male. The contractions came every three minutes and in between she produced either three "eggs" or one snake and two "eggs". On 7 August at 19.00 pm she

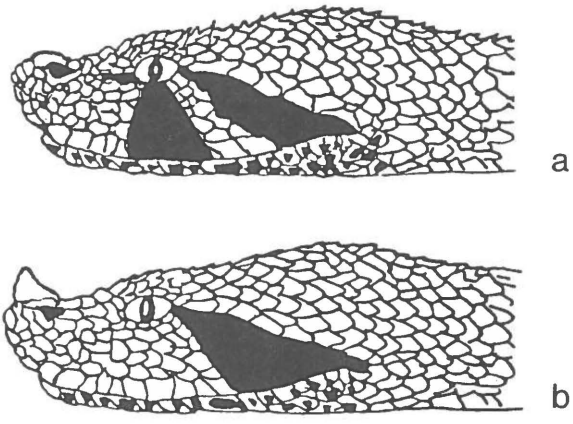


Fig. 1. Head of a. *Bitis gabonica gabonica*
b. *Bitis gabonica rhinoceros*

produced the last "eggs" and finally I had a total of 6 young and 37 unfertilized "eggs". Unfortunately four specimens were not complete and therefore eliminated.
One male and one female appeared to be in very good condition and they sloughed a few minutes after birth. To help them they were put in a little container with just a little water at a temperature of 37°C and thus the sloughing went perfectly.
The young male was 31 cm long, weighed 45 g and was very irritable. The female measured 33 cm with a weight of 48 g and was very quiet. Each young snake was placed in a separate terrarium with a temperature of 26°C and a humidity of the air of 70%. The little ones disappeared immediately under the wood chips at the bottom of the terraria. Every night they could be seen moving around and drinking. One week after birth I offered each of them a half-grown living mouse and both accepted it.

Today, on 5 September, after having consumed three mice each, the weight of the male is 60 g and that of the female 75 g. They grow very fast. Mama, the big work done, remained immobile for four days under the light-bulb and a few days later she accepted two dead rats.

DISCUSSION

There were many unfertilized "eggs" which may be related to the young age of the female and to the fact that it was her first pregnancy. I have made similar observations on specimens of *Vipera russellii*, *Vipera ammodytes*, *Vipera aspis*, *Cerastes cerastes*, *Bitis arietans* and *Bitis caudalis*, but it never occurred with *Echis carinatus pyramidum* or with *Trimeresurus sp.* and *Crotalus sp.*

CONCLUSION

In the author's opinion the reproduction in terrarium of the beautiful african Gaboon vipers is not too difficult. Of course it is necessary to have specimens in a very good condition and one should try to keep them like that. The temperature and the day light do not seem to stimulate copulation. Temperature may affect the duration of pregnancy, which for this female was 171 days. Practically the same pregnancy period is mentioned for *Bitis arietans*.
I hope that the above information will be helpful to those planning to breed this colourful species. Although the animal is highly venomous it has a very quiet non-aggressive character. If we could breed more *Bitis gabonica*, we could perhaps decrease the import of specimens taken from nature.

ACKNOWLEDGMENTS

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