

VARIATION, DISTRIBUTION AND BIOLOGY OF *ELAPHE TRIASPIS* (COPE, 1866)

PART 2

WITH REMARKS ABOUT CARE AND BREEDING OF THE SOUTHERN SUBSPECIES *ELAPHE TRIASPIS MUTABILIS* (COPE, 1885)

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Contents: The keeping and breeding of Elaphe triaspis mutabilis in the terrarium - Taxonomic remarks - Conclusion - Abbreviations, material and methods - Acknowledgements - References - Addenda.

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THE KEEPING AND BREEDING OF *ELAPHE TRIASPIS MUTABILIS* IN THE TERRARIUM

Only little is known about the captive care and breeding of *Elaphe triaspis*. These data relates mostly to the northern form of *Elaphe triaspis intermedia* (Cranston, 1989; De Vries 1983). Personally I do not know any publications about *Elaphe triaspis triaspis* and *Elaphe triaspis mutabilis*. Only some personal information of different snake keepers shows that the subspecies 'mutabilis' - which is mostly imported from Central America - must be seen as a problematic animal. Many snakes died after a short time, often because of intestine infections.

I had similar experience with this subspecies but I was able to establish that the cause of death of many *Elaphe triaspis mutabilis* was not always the result of a bad health condition or parasites, but that it is more often caused by the way of care-taking. Especially too much 'stress' is the most important factor in the development of diseases or aggravates it.

Such observations were also made by Cranston (1989) with *Elaphe triaspis intermedia*. *Elaphe triaspis* is a very shy snake that, at the least disturbance, violently strikes in all directions or tries to flee with jerky, fast movements. Even animals that rest in their hiding place show a quickened respiration, where a quick 'pumping' can be observed when there is a strong vibration near the terrarium.

In 1988 I received 6 specimens (length 60-100 cm) of *Elaphe triaspis mutabilis* from acquaintances from the U.S.A. and Europe (wildcaught animals from Honduras). Except for one specimen all other animals had the typical colour and markings of the Honduran *Elaphe triaspis mutabilis* (brownish orange, with more or less visible blotches), as described by Dowling (1960) and Wilson & Meyer (1985). One animal agreed with the first mentioned in markings, but had a greyish brown to olive grey colour. All specimens were only treated with a worm medicine (Citarin 2.5%, Bayer) because the examined faeces contained nematodes (round worms).

The animals were each housed separately in plastic terraria (45x30x35 cm, lxwxh). After a short time (two weeks-one month) two specimens of the brownish orange form died. The cause of death was in both cases gastritis, an inflammation of the stomach wall (University Hohenheim, Stuttgart). The other animals developed relatively well and accepted willingly dead and live laboratory mice for food. At first all specimens were extremely shy and bit violently at the least movement inside or outside the terrarium. This behaviour changed in such a way with two specimens that

they even became approachable. Up till now, the other snakes show no significant change.

After five months the three brownish orange specimens were placed together in a larger terrarium. In this terrarium (80x40x45 cm, lxwxh) the animals remained unchanged, shy and bity. Because of problems during feeding, such as fighting for the food, one female was housed separately again.

Three months later the female that had been removed from the group died suddenly without obvious symptoms (bad faeces etc). Again the cause of death was gastritis. The circumstances in all terraria were roughly the same, the only difference was that in the common terrarium the bottom was covered with peat and in the separate cage it was covered with paper. The temperatures during day time were 24-28°C and during night time 20-22°C. Regularly, especially before sloughing, tepid water was sprayed. Otherwise, there was only a little water bowl, which served as a moist spot and a drinking place. Mostly earthenware flower-pots turned upside down were used as hiding place. Lighting (fluorescent tubes, white colour) was turned on for 12 hours per day.

Although the snakes were sometimes seen during the day, their main period of activity was in the evening hours. The climbing branches in the terrarium were seldom used. There was no hibernation because of their tropical origin. Just small drops in temperature of 5°C were sometimes measured during the winter months.

The remaining animals are developing reasonably well up till now. However, working in the terrarium has to be done carefully so as not to make the animals too nervous.

Mating activities were observed in autumn. The male crawled with forward-jerking movements over the back of the female. A copulation did not take place.

In 1989 I got three young animals (about 40 cm long) from the brownish orange variety, which hatched from a clutch of an imported, pregnant female. The behaviour of the young animals was the same as that of the adult snakes, very nervous and bity.

One of the young animals died after one month (cause of death unknown). Another specimen was given to a fellow terrarium keeper, where it also died after a short time. Also in this case, no specific symptoms were observed (cause of death also unknown).

The third animal, which was housed in the same terrarium, had at first some problems with its digestion. After the snake was placed in a separate terrarium the problems disappeared. This animal is now (January 1991) grown to 75 cm.

The greyish-brown specimen (a female of about 100 cm long) behaved in a calmer way than the brownish orange animals. But it takes on a defensive posture immediately when you approach the terrarium. This specimen eats adult mice very well, which are even accepted from tweezers.

In the same year I got two wildcaught animals (males) of *Elaphe triaspis mutabilis* (according to the information of the Honduran dealer they came from Guatemala, in the vicinity of the border of El Salvador and Honduras). These animals belonged to the greyish brown variety. Both animals developed very well, but they were as shy and nervous as the specimens described before. After some time (December 1989) I placed one of these males (about 80 cm in length) together with the greyish brown female. About one hour after they were placed together I was able to observe them while they were copulating. The copulation lasted three hours. Since then, the couple has been kept together.

On 5 March 1990 a second copulation could be observed, which lasted two hours. During the following four weeks several attempts to copulate were recorded and sperm was found on the bottom. Because at one time the female visibly suffered from the 'obtrusive' male, she was placed in a separate terrarium again. Early May it was clearly visible that the back part of the female's body began to increase in girth, which suggested a pregnancy. Towards the end of May the female became noticeably nervous and was digging with her nose in the ground. On account of this symptom I put a box filled with moist peat in the terrarium in which five oblong eggs were laid on 6 June 1990.

The clutch was incubated in vermiculite at 27-28°C. After two months' incubation I observed little slits in the eggs. One of the eggs was even more slit, so you could see the thin egg membrane. However, egg fluid did not come out. In this case, a too dry substrate could not be the reason, as this was checked at least two times a week and it was always moist enough. Besides, the eggs were completely covered with vermiculite.

On 29-30 August 1990 (84-85 days) all five juveniles hatched without problems. The hatchlings were reasonably large (35 cm on average) and differed clearly in colour and pattern from the adult animals. After their first slough all accepted pink mice for food. The young *Elaphe triaspis mutabilis* were already as aggressive as the adult snakes. One of the hatchlings demonstrated this while it was still half in the egg. While checking the clutch this young tried to bite immediately. The young animals grew up without any problems.

In September I was amazed to observe again an increase of the female's girth. At first I noticed this without the idea of a further pregnancy, because the snake had been eating very well after she laid her eggs, and she was housed without a male since April. Because the snake became increasingly more restless and was digging in the substrate again, I put a box filled with moist peat in the terrarium, which was duly visited after some time.

On 9 October 1990 the snake produced a second clutch, this time four eggs. The clutch was incubated under the same circumstances, except for the fact that the substrate was now semi-moist peat. During this incubation no changes could be seen on the surface of the eggs. After an incubation period of 26 days the young snakes hatched on 24 December 1990. The hatchlings were just as strong as those from the first clutch.

In this case of a double clutch, 'sperm-storage' seems obvious. Another possibility to take into consideration could be that the first copulation in December 1989 led to the fertilization of the first clutch of June 1990 (a period of about seven months). The copulation in March 1990 could then have led to the fertilization of the second clutch of October 1990 (a period of eight months). Because the animals were not constantly monitored, other copulations may have taken place in the meantime. Considering the known pregnancy-period of 40-120 days of *Elaphe*-species, seven to eight months in this case would be very unlikely. Meanwhile the phenomenon of delayed fertilization is known of many colubrids. By this is meant the property of sperm to be preserved in the female's reproductive system for a longer period (up to several months or even years). Some examples of this reproduction particularity with the genus *Elaphe* are already known, such as for example *Elaphe dione*, *Elaphe guttata* or *Elaphe helena*.

TAXONOMIC REMARKS

Elaphe triaspis was placed in a new genus (*Senclicolis*) by Dowling & Fries (1987). In how far this new genus name will continue is not yet clear. However, my opinion is, as long as it is not clear how all representatives of the genus *Elaphe* - in the old and new world - are related to one another, the species that are singled out, such as *Elaphe triaspis*, *Elaphe rosaliae*, *Elaphe subocularis* and *Elaphe oxycephala* will keep their genus name (*Elaphe*) for the present time.

The present taxonomic 'chaos' may later even develop into a small disaster when certain points are overlooked in this selective new classification, which probably might give different results later.

First it would be important to know in what way the two continentally divided groups are related to one another. This will certainly lead to a clear distinction. Only when this problem has been solved, a division within these two large groups (Old and New World) will seem meaningful. However, this is a very difficult theme which needs more detailed information. Because of this reason, I would like to refer to a book where this problematic theme will be discussed



Foto 9: *Elaphe triaspis mutabilis*, 2 jaar oud vrouwtje van de oranje variant, 2 years old female, orange form, Honduras; foto K.-D. Schultz.



Foto 10: *Elaphe triaspis mutabilis*, ± 120 cm lang, volwassen dier van de oranje variant, ± 120 cm long, adult animal of the orange form Honduras; foto K.-D. Schultz.

comprehensively ("A Monograph of the Colubrid Snakes of the Genus *Elaphe* Fitzinger 1833" by Schulz, Entzeroth & Scheidt, in preparation).

CONCLUSION

The neotropical species *Elaphe triaspis* is divided into three subspecies, which are mainly distinguished by their colour and markings. The separate subspecies are varied among each other. A more precise definition that takes all characteristics into account (colour, number of saddle spots, intensity of markings and structure of head markings) may well be practical when the still poorly known populations in Guatemala and El Salvador are left out. The possibility of an intergraded area in Guatemala can be explained, because specimens from this country sometimes show characteristics of all three subspecies. The species occurs in dry as well as in humid subtropic to tropic habitats, which are partly situated in high altitudes. *Elaphe triaspis* is mainly a nocturnal colubrid with preference for small rodents as food.

It turned out to be difficult to keep *Elaphe triaspis* in a terrarium. Especially excessive stress-situations have to be avoided as much as possible. Long transportation and changing terraria several times has to be avoided. A spacious terrarium with many hiding places is recommended to give the animals the necessary possibility for reclusion and protection. It can lead to feeding problems and further stress situations when two or three animals are kept together in one terrarium. It is also recommended to keep each snake separately in a terrarium, divided by a partition. This partition can be fitted with an opening that can be locked. Through this opening the different sexes can be brought together from time to time.

The breeding result of the subspecies *mutabilis* was first published in this article and appeared to be reasonably simple in retrospect. Remarkable was a double clutch within five months without male contact in that period - about two months before the first clutch till after the second clutch. Sperm storage is very likely in this case. Rearing the young on pink mice poses no real problems. And it is absolutely necessary to provide a stress-free environment for the young and house them in separate terraria while the grow up.

ABBREVIATIONS, MATERIAL AND METHODS:

My own research refers mainly to markings and colour of preserved and also live specimens (a total of 16 live specimens - 10 *Elaphe triaspis mutabilis*, 2 *Elaphe triaspis triaspis*, 4 *Elaphe triaspis intermedia*), and also photographs of live animals of all subspecies.

Data from references or quotations were compared and combined with my own results.

- BM (British Museum of Natural History, London)
- SMF (Senckenberg Museum, Frankfurt am Main)
- MNHN (Museum National d'Histoire Naturelle, Paris)
- PKS (Personal Collection Schulz)

Elaphe triaspis triaspis

Mexico, Yucatán (MNHN 6613) coll. Boucard.

Belize, Belize (MNHN 6611) coll. Sumichrast.

Mexico, Yucatán (BM 80.7.13.16).

Elaphe triaspis intermedia

Mexico, Tehuntepec, Tapaba pies Santa Efigenia (MHNH 1889-147) coll. Dugés.

Mexico (MNHN 6610) coll. Méhédin.

Mexico (SMF 34575, type) coll. Pagenslecker.

Elaphe triaspis mutabilis

Guatemala, Panzas (MNHN 1888-125) coll. Bocourt.

El Salvador, Fincu Astellero Cumbre (SMF 43104) coll. Mertens.

Honduras (PKS et-10, et-11) coll. animal dealer in Honduras

Guatemala (PKS et-12, et-13) coll. animal dealer in Honduras.

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Foto 11: *Elaphe triaspis mutabilis*, volwassen mannetje van de oranje variant met sterk gereduceerde tekening, adult male of the orange form with strongly reduced pattern, Honduras; foto K.-D. Schultz.

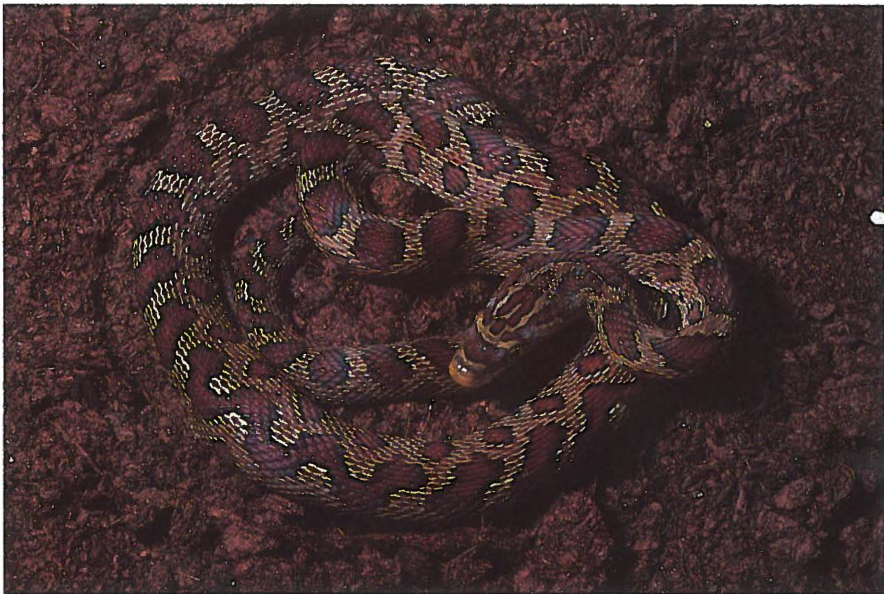


Foto 12: *Elaphe triaspis mutabilis*, jong mannetje van de oranje variant, young male of the orange form, Honduras; foto K.-D. Schultz.



Foto 13: Een jonge *Elaphe triaspis mutabilis* kruipt uit het ei, leaving the egg; foto K.-D. Schultz.

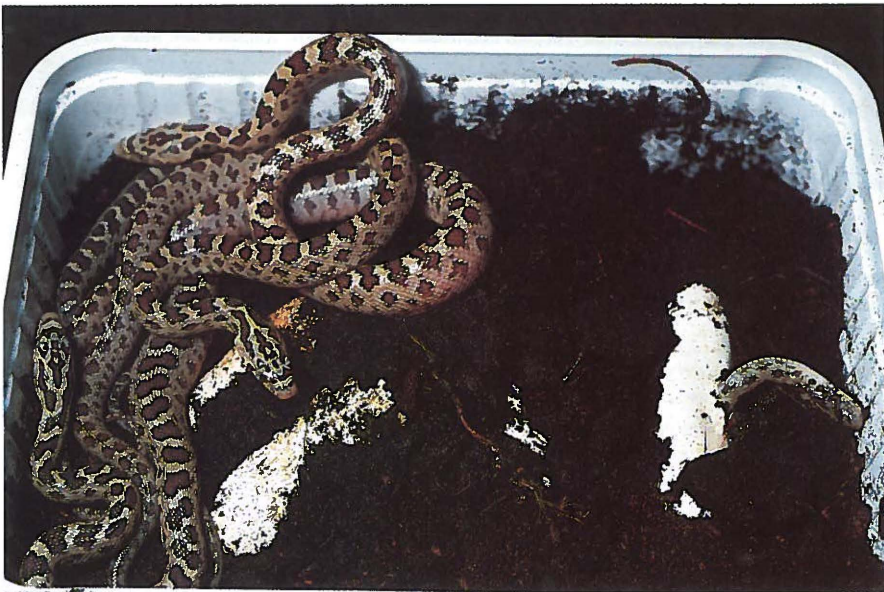


Foto 14: *Elaphe triaspis mutabilis*, zojuist verveld, tweede legsel, grijsbruine variant, just sloughed, second clutch, greybrown form; foto K.-D. Schultz.

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Foto 15: *Elaphe triaspis mutabilis*, 3 weken oud, grijsbruine vorm, 3 weeks old, greybrown form; foto K.-D. Schultz.

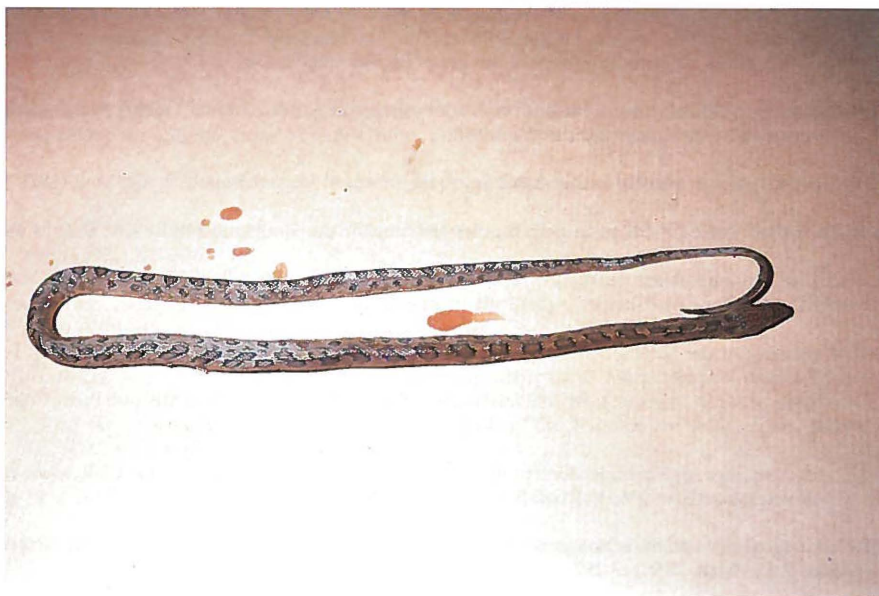


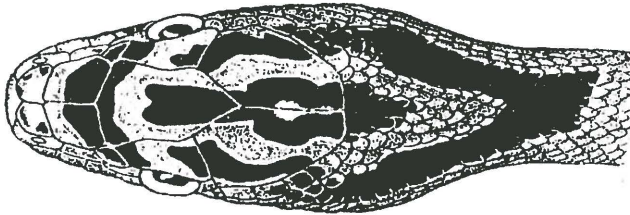
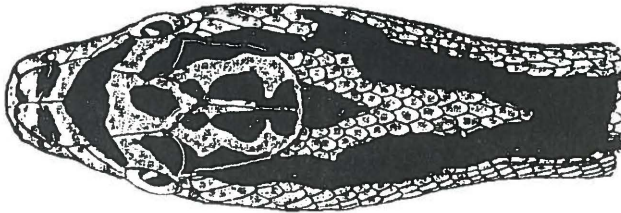
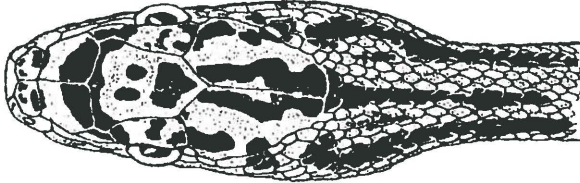
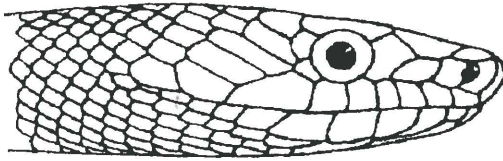
Foto 16: *Elaphe triaspis mutabilis*, halfwas , semiadult, SMF 43014 Cumbre, El Salvador; foto K.-D. Schultz.

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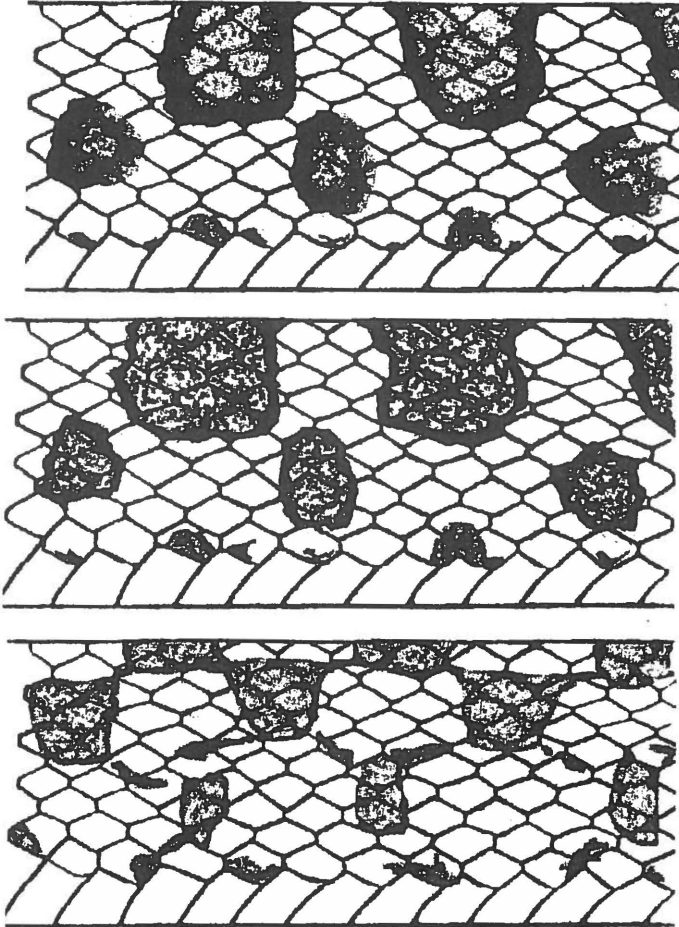
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APPENDIX A

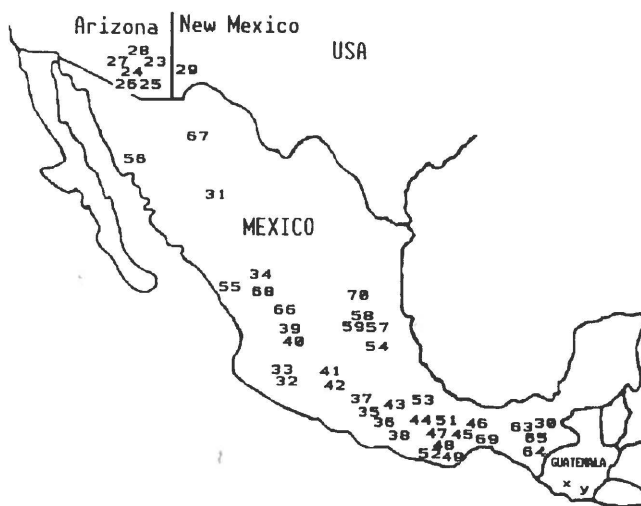
Head marks of *Elaphe triaspis* (fide Günther 1887) and head marks of juveniles: *Elaphe triaspis intermedia*, *Elaphe triaspis mutabilis* and *Elaphe triaspis triaspis*.



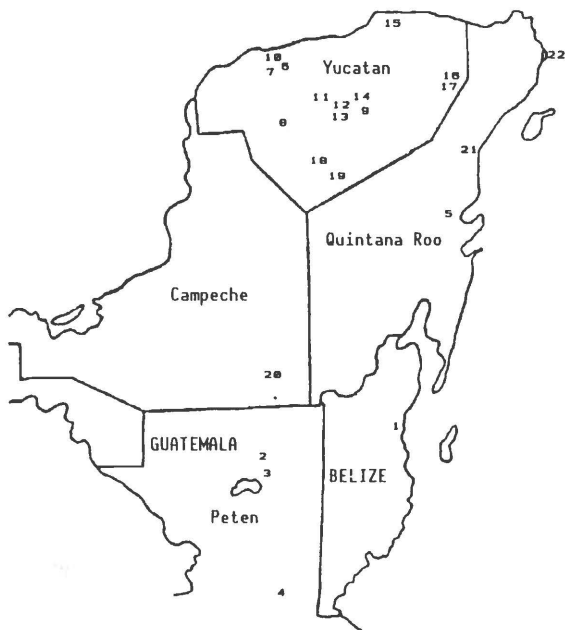
Dorsolateral marks at mid-body of juveniles of *Elaphe triaspis triaspis*, *Elaphe triaspis mutabilis* and *Elaphe triaspis intermedia*.



APPENDIX B



Distribution of *Elaphe triaspis intermedia*



Distribution of *Elaphe triaspis triaspis*



Distribution of *Elaphe triaspis mutabilis*

ADDENDA

Since this article was written, four further clutches were laid by the female of *Elaphe triaspis mutabilis*. In Februari 1991 the female was placed together with the male for one week. Copulations were observed several times. The female was kept separate after this period. On 22 May 1991, 5 eggs were laid. The juvenile snakes hatched on 12-13 August. On 8 September 1991 a clutch of three eggs was produced again. Unfortunately the snakes did not hatch. I opened the eggs and found three fully developed snakes. The reason of death cannot be explained.

During February 1992 the female was kept together with the male again. This time for two weeks. After this period the sexes were separated again. On 18 May 1992 a clutch of 5 eggs was laid. The juvenile snakes hatched on 11-14 August. On 10 September 1992 a second clutch of four eggs was produced which is still in the incubator.

These new breeding data explain definitively a sperm-storage of *Elaphe triaspis mutabilis*. Interesting is the fact, that all data (time of egg-laying and hatching) show similarities within the three years of breeding. There was a regular interval and nearly the same months of egg-laying.