

THE CORN SNAKE (*ELAPHE GUTTATA GUTTATA*) IN THE  
WILD AND IN THE TERRARIUM, PART I.

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### INTRODUCTION

The genus *Elaphe*, that is called "Rottesnoge" in Denmark, has a very wide distribution. It ranges across the American continent from the most-northern part of the U.S.A. to Costa Rica in the south, to middle and south Europe, Asia and the Malayan islands. Most *Elaphe*-species from America are not only very beautiful, but are also very suitable subjects to keep in a terrarium. This suitability can not be applied to most other representatives of this genus in the rest of the world, except for specimens that are bred in captivity. The Corn snake (*Elaphe guttata guttata*) from the southeast of the U.S.A. is one of the most beautiful *Elaphe*-species from America.

### DESCRIPTION

*Elaphe guttata guttata* is a medium-sized snake; the length of an adult (fullgrown) specimen usually varies between 76 and 122 cm. The longest specimen that has been found to date measured 182.9 cm, a lot more than the "normal" length. This is not so extraordinary, because it occurs with all

snake species.

The rather slender, but muscular body has a proportionally small but long and narrow head with a clear definition between the body and the neck. The tail is of an average length (at a total body length of 120 cm, about 19 cm of it is tail). The anal scale is divided; dorsals in 27 (seldom 29) rows, of which the upper five are slightly keeled in adult specimens; 8 supralabials, 11 or 12 sublabials; 215-240 ventrals; 61-79 subcaudals. The ventrals (belly scales) are slightly keeled on both sides. Together with the rather great mobility of the ventrals this keel makes it possible for *Elaphe guttata guttata* to have a good grip, even on unequal or vertical surfaces. This is fully used when these snakes climb in bushes and trees.

One gets a good impression of this quality when an *Elaphe guttata* "hangs" onto a vertical, smooth-barked log in the vivarium. If you try to take it

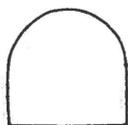
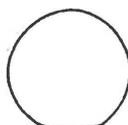


Fig. 1

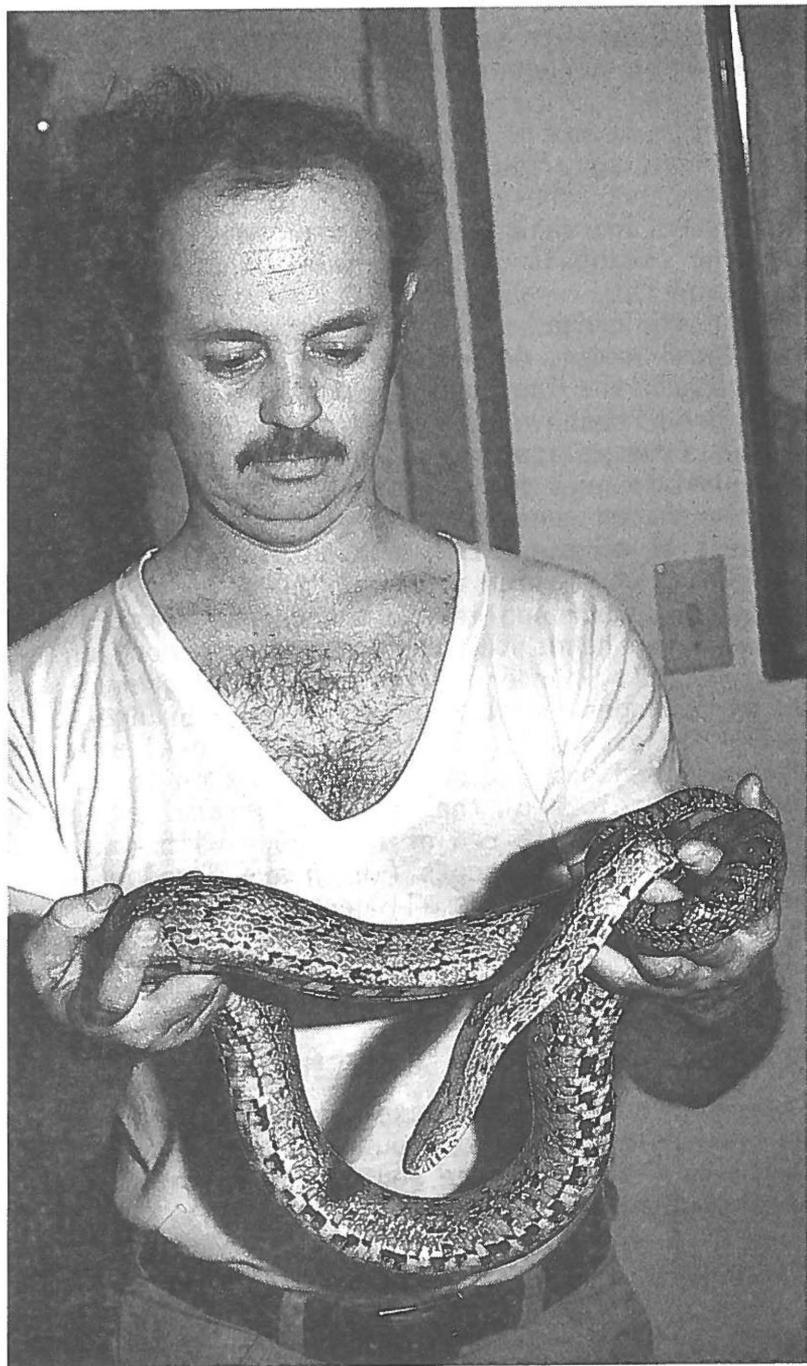


Cross-section of *Elaphe*. Cross-section of many other snake species.

off the branch, you can feel the strength of the grip supplied by the ventral scales.

A characteristic, not only for *Elaphe guttata guttata*, but also for the other *Elaphe*-species, is that the diameter of the body looks like an inverted U, while it is round in most other snakes (see fig. 1).

From the description of the build of *Elaphe guttata guttata* already mentioned, it is rather slender, but even with this character there are speci-



mens that deviate from the norm. During a visit to a terrarium keeper in northern Florida I saw an *Elaphe guttata* that was unusually robust (see picture). It was a female, caught by the owner some years ago. You would believe that the reason for this was purely fat deposition. But the owner protested and said that the snake was like this when he caught it. I had to admit that I could not feel any fat.

Within its range, *Elaphe guttata guttata* has several local names. Corn snake and Red rat snake are most used; the last one the most frequently and with good reason. The ground colour of the body varies from yellow-orange, orange-red, rust-coloured to grey with strongly red or brown-red, saddle-shaped spots at regular distances along the upper side of the back. On both sides there are similar, but smaller spots of the same colours. The same colour applies to the characteristic markings on the head. All these spots are, more or less clearly, bordered with black. The ground colour changes in many specimens from orange to yellow or even white in the lower lateral areas of the neck region; the white continues on the underside. The colour of the ventral surface varies from white to soft red or red-brown with many black, rectangular spots (which are more or less regularly spaced) in small groups. These spots often change into black stripes on the underside of the tail. *Elaphe guttata* is oviparous.

## DISTRIBUTION AND OTHER SUBSPECIES

The range of the Corn snake is rather large. This subspecies appears from southern New Jersey in the north to Florida in the south and Louisiana in the west (see fig. 2).

From most snake species with a large geographical range there are often geographical variants which

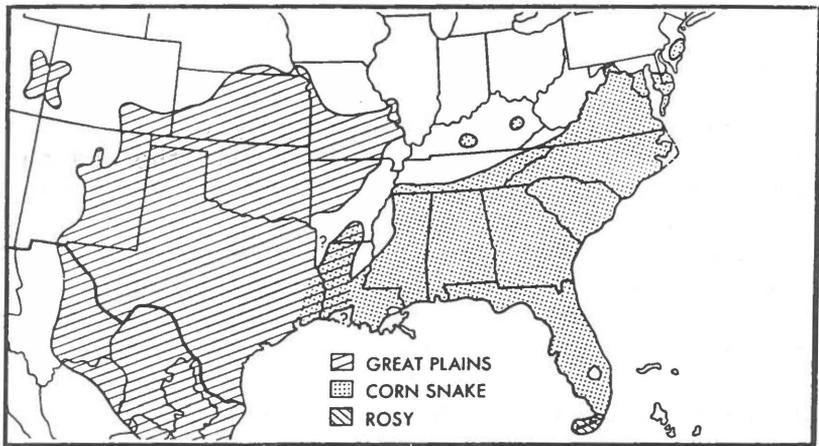


Fig. 2. Distribution of *Elaphe guttata* (from: Conant, 1975).

do not constitute subspecies. This is true of *Elaphe guttata guttata*, for example, there is a clear difference between the dominant ground colour of specimens from northern Florida and specimens from the southern part of Florida. The southern specimens are not as brightly coloured. The most beautiful and brightly coloured examples appear in South Carolina. Corn snakes from this area are also a bit longer and more robust.

Apart from *Elaphe guttata guttata*, there are two more subspecies. One of these is *Elaphe guttata emoryi*, whose distribution area is even larger. This subspecies inhabits Texas and all its bordering states, including the north of Mexico. The most northern border of this subspecies is the most southern part of Nebraska. In Louisiana it appears together with *Elaphe guttata guttata*. The local name of *Elaphe guttata emoryi* is "Great plains rat snake". It has the same markings as the Corn snake: the ground colour is light grey, grey or grey-brown with dark grey or brown spots.

Although slightly shorter (61-91 cm; record 153 cm), it is a more robustly built snake.

The other subspecies is *Elaphe guttata rosacea*.

This subspecies only appears on the most southern part of Florida, namely a row of islands (The Keys) which form the southernmost point of Florida. It does not differ much from the Corn snake. The difference is, that the black edges around the spots of the back and the sides are reduced or completely absent. This is also true of the ventral surface. The local name for *Elaphe guttata rosacea* is "Rosy rat snake". All specimens living on The Keys are given this name, but this is not accurate, because the distribution area of *Elaphe guttata guttata* also reaches as far south as The Keys, which means that there must be many cross-breedings between the two subspecies. If you wish to find a "real *rosacea*", you have to go to one of the most southernly islands of The Keys. Personally I do not believe in this subspecies, partly because there is no difference in the scalation and partly because the difference in colour is very small and of little consequence.

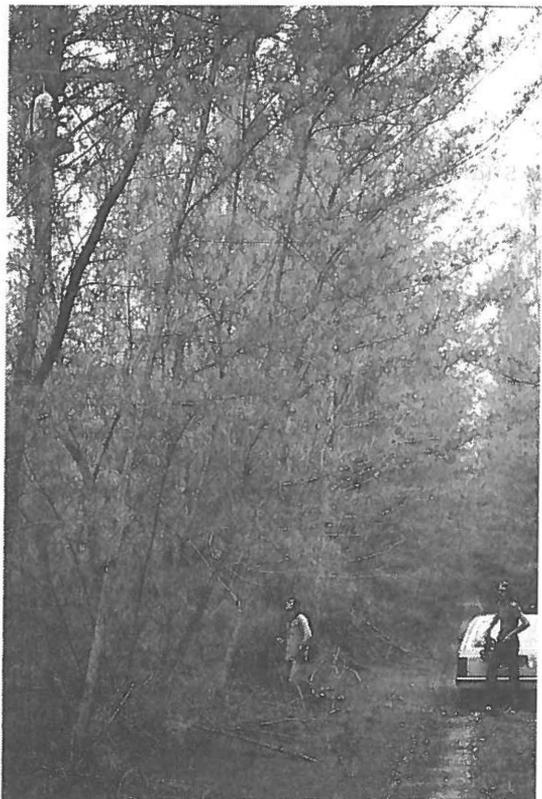
## HABITAT

The Corn snake does well in the neighbourhood of people, in contrast with many other snake species. However, urbanisation, changing land from virgin pasture to agricultural land, plantations, roads and cities has reduced the number of snakes considerably. The Corn snake has adapted itself remarkably well to the changed circumstances, and has even profited by them. The areas that are used for the growing of corn, together with the associated storehouses, unavoidably increase the rodent population, which means ample food for the snakes. Many farmers look upon the Corn snake as a useful ally.

This good adaptability shows that the Corn snake does not show exacting habitat requirements; they do well in different habitats. A few examples of places where these snakes are found, are: afforested, sloping or hilly ground; moor with some coniferous trees; conifer wood; oak-dominated scrub; rocky hill sides; inclines; open or semi-arid plains; prairies; corn fields and other agricultural grounds; fruit plantations; verges; heaps of stones; by and in buildings such as barns, hotel-cellars and churches.

I will try to describe two habitats that I have seen in Florida that were wild and undisturbed. Friends there, in the north as well as in the south, took me to local areas where the greatest and densest snake populations were to be found. Something that both habitats have in common is the immediate neighbourhood of water in streams, but with an absolutely dry bottom on the higher parts of the banks. It does not matter if the streams are natural or man-made canals.

At one habitat the bank is covered with a thick carpet of fir-needles. The resulting bottom vegetation is rather thin. The Corn snake spends most of its time quite hidden, either under rotting tree trunks, under pieces of rock, in subterranean galleries or holes dug by rodents, or they are found high in the fir-trees, often higher than ten meters. Up there they lay in open air, nicely coiled up in the branches, but always in the vicinity of a hiding place, like a hole in the tree trunk or a piece of bark that is loose. Whether they are found outside or hidden depends on the weather and the temperature, because they do not like high temperatures. On the photo you can see my travel companion climbing a fir-tree to catch a Corn snake and on the next photo you see the snake laying on the branch watching the assailant's progress. If you are not careful enough, the snake

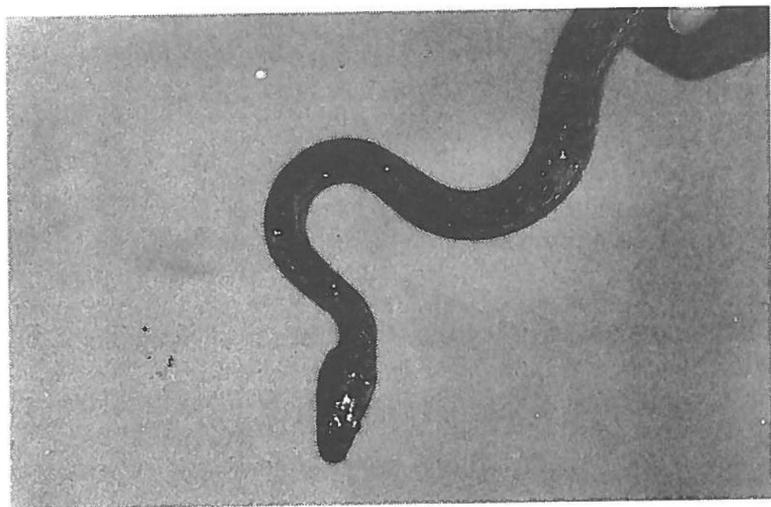
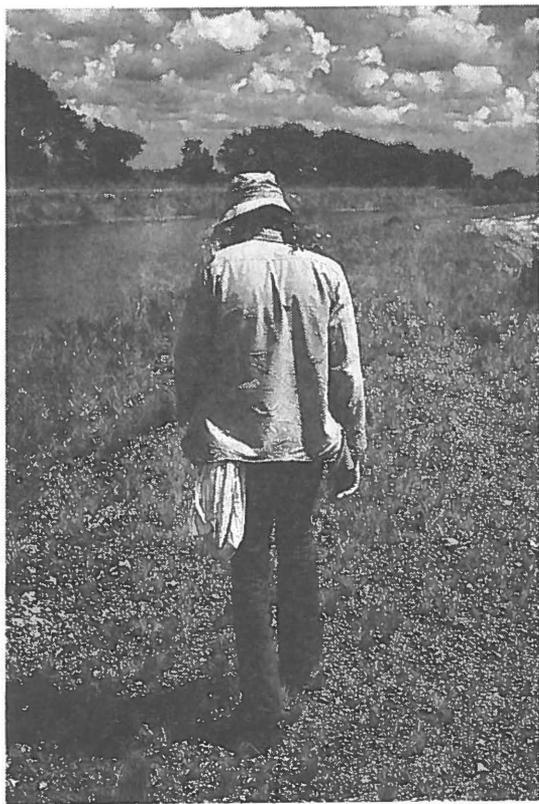


gets scared and will flee to its hiding-place or to very thin branches. If necessary it will drop from the tree. If this happens, the snake has disappeared before you can climb down.

The Corn snake shares this habitat with two other snake species. One of them, *Drymarchon corais couperi*, sometimes eats Corn snakes. It lives on or below the ground, especially underground in rodent galleries. The other snake that lives here is *Elaphe obsoleta*, a species closely related to *Elaphe guttata*. It is a little larger and often found in trees, but usually not higher than two or three meters above ground. It is represented here by two subspecies. Especially in the south of Florida *Elaphe obsoleta rossalleni* appears with the Corn snake and in the other parts of Florida it is *Elaphe obsoleta quadrivittata*. These two *Elaphe obsoleta* subspecies and the *Drymarchon corais* subspecies are not as numerous as the Corn snake in this habitat.

The other habitat of *Elaphe guttata guttata* which I studied differs greatly from the one described above. There are no trees in the direct neighbourhood of the stream, but the ground vegetation is again very thin. The soil conditions are, seen through human eyes, not so pleasant for snakes (as you can see on the photo). The canal is man-made. The Corn snakes here prefer to live as close to the water as possible, as long as the bank is totally dry.

The banks of the canal consist of volcanic, rough "stones", varying in size between two and ten centimetres. They form an aerated structure with many interspaces. In this labyrinth of interspaces the Corn snake lives deep in the canal bank. It is likely that when the snakes crawl between the volcanic stones, there will be many little and large collapses. As you can see on the picture, the Corn snakes that live here show clearly the



signs of this. To put it mildly, they look terrible, because the head and body are covered with scars. These wounds, which are seldom serious, are only superficial and disappear after one or two sloughings when they are taken away from these surroundings.

In this habitat the temperature also influences whether the snakes are hidden or not. Especially during the morning you can see them laying outside their burrows with two-thirds of their body exposed in order to warm themselves. On good days we could see six to eight specimens when we walked along such a canal for 1 km. In contradiction to the Corn snakes from the woodland habitat I described where the snakes felt safe in the high fir-trees, we had the impression that the snakes in this habitat did not feel safe between the volcanic rocks, when we approached them. As soon as we got closer than four or five metres, the snakes quickly retracted into the canal bank and kept hidden for some time. In this habitat you can see some other snake species too, namely *Sistrurus miliarius barbouri* and *Coluber constrictor priapus*.

It seems that the Corn snake does not make high demands on its habitat, as long as there is enough food. Because both described habitats included water, you would think that the Corn snakes might spend some time in the water. It appears that this does not happen often. However, when a prey enters the water, the Corn snake will follow it, without hesitation.

#### CLIMATE AND ACTIVITY

In a great part of the range of the Corn snake the air-humidity is often higher than normal for the U.S.A. In the greatest part of the range there is an annual rainfall of 1000 -1500 mm, whereas in

some parts of Florida the yearly rainfall amounts to 2000 mm. During the summer the average temperature varies from 22°C in the northern part of the distribution area and about 27°C in the southern part. During the winter-months the temperature amounts to about 4.5°C in the north and about 21°C in the south, thus a very clear difference in temperature-ratio within the distribution area. You would think that one and the same snake species finds it difficult to find the right living conditions at such different average temperatures. But as the Corn snake is no lover of too high temperatures, it succeeds perfectly in this. In the north, during the summer, it often lays outside in the sun to warm itself sufficiently, whereas in the south it often stays underground so as not to get too warm. It will be clear that in the south the Corn snake only seldom hibernates, whereas the further north you travel, the longer hibernation lasts; some times as much as six months is spent in hibernation. Its active period is similarly varied across its range. When it is hungry and goes hunting, it does this late in the afternoon in the north. The further you get southwards, the later it starts hunting. In Florida it starts hunting only after it gets dark (apart from a short period during the winter), and it develops its greatest activity period between 21.00 hours and 24.00 hours. You clearly notice this when you drive about in Florida during the evening and the night. It is not unusual to see eight or ten Cornsnakes crossing the road and about half as many *Elaphe obsoleta* subspecies, when you drive about in the right places during these three or four hours. It is a pity that half of these, and sometimes more, are D.O.R. (Dead On Road). This happens most frequently while the snakes are crossing the roads and not because they are warming up on the road (although the latter is true of

Rattlesnakes). When we were in Florida, we of course also saw other snake species that were run over, but the greatest part were the above-described species. It should also be mentioned that the snakes were seen on roads with comparatively little traffic. During the day you hardly see snakes on these roads, except those species that are active during the day, like *Coluber constrictor* and *Opheodrys aestivus*, but even this is rare.

## THE HUNTING BEHAVIOUR

The Corn snake is an excellent hunter, something that is necessary, because this species has a very healthy appetite. When searching for food it is calm and self-possessed, investigating the ground carefully for scent tracks that can lead to prey. When such a track has been found and the real hunting-phase starts, then there are two courses which may be followed. One is that the snake remains composed and stalks the prey slowly till it can grasp it, which is done quickly and precisely. The other way is that the snake follows the track with rather fast, shaky movements that end in an "explosion" when he makes eye-contact with the prey. In this "explosion" the prey is caught with lightning speed, usually by the head and then strangled. When such an attempt is unsuccessful and the prey tries to get away, the snake will follow it as quickly as possible. As said above, the Corn snake constricts its prey and is able to exert great pressure with its coils; the prey is killed very rapidly. After one to one and a half minutes, when the heartbeat and every other movement has stopped, the snake's grasp becomes a bit looser and the head of the prey is searched for and the prey swallowed. Corn snakes are able, in proportion to their head, to eat rather large prey: larger than, for example, a Kingsnake (*Lampropel-*

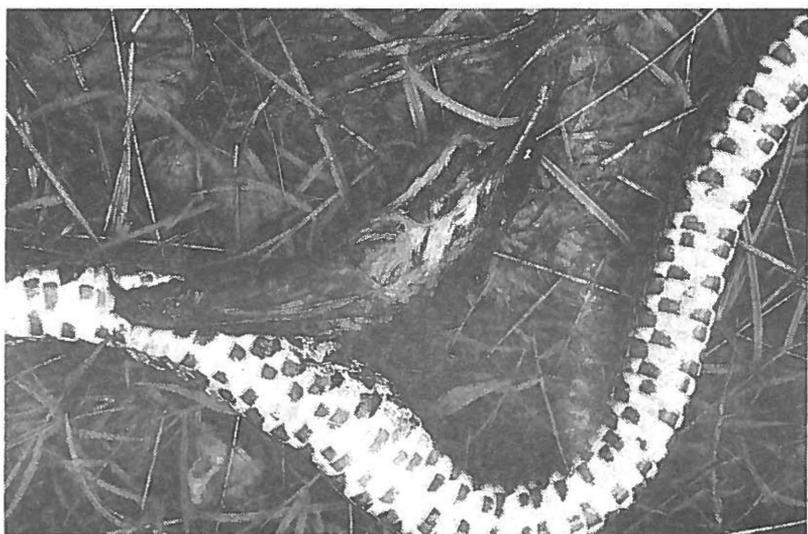
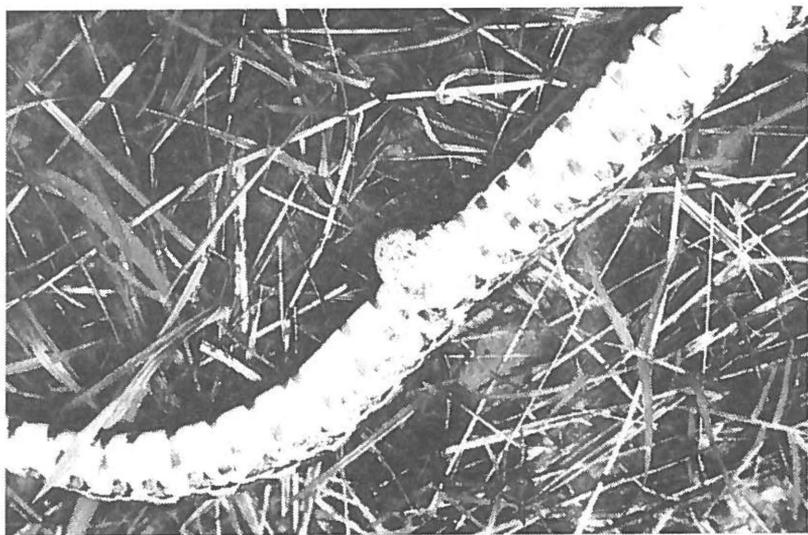
tis) with an equal head size. Their choice of food is varied, but mainly consists of all kinds of rodents, and especially their young, of the right size. Now and then they also eat small birds, bats, lizards and frogs (especially tree-frogs). The young Corn snakes particularly are keen on lizards and frogs.

During the early summer of 1978, late in the evening, I had an unique experience that shows that *Elaphe guttata* eats bird's eggs too. When I drove on a highway in the northeast of Texas, a snake was run over by the car in front of me. Although you are not allowed to stop on a highway, I could not resist the temptation and drove backwards to examine the snake. It appeared to be an *Elaphe guttata emoryi* whose abdomen was run over, exactly over the anus. It was alive and the damage did not look really serious. Its very fat stomach showed that the snake had eaten that evening. I put it in a sack and drove away. The next afternoon, somewhere in Louisiana I looked at it again and saw that it had died. I was interested in what the snake had eaten, so I cut it open carefully. I found a bird's egg and a bird.

It is known that Bullsnares (*Pituophis*) and *Elaphe obsoleta* subspecies eat bird's eggs when they can get them, but I have never heard before of this being done by Corn snakes. Furthermore I have never seen it mentioned in literature.

## BREEDING

*Elaphe guttata* breeds very successfully. Normally the female lays eggs once per year or two times per year in the southern part of its range. The copulation takes place in spring and the pregnancy lasts 35-60 days. The eggs are laid in May, June and July (2nd clutch). The number of eggs varies between nine and twentyfive. Young and very small



females often lay only three to five eggs, but this number increases in the following years. When the female gets older, the number of eggs reduces again. The form and size of the eggs depends on the way the female is built and how large she is. The eggs tend, to a certain extent, to have a bigger girth when the female is large. A very thin female will often lay long and thin, almost cylindrical eggs, while a robustly built female lays eggs that are a bit more round, for example like bird's eggs. The egg length can, when they are laid, vary from about 30-61 mm and have a diameter of about 18-32 mm. They normally weigh between 5-12 g, but the largest eggs can weigh more than 20 g. Generally speaking the eggs of *Elaphe guttata guttata* are smaller than the eggs of *Elaphe guttata emoryi*. The young of *Elaphe guttata guttata* vary in length from 20-35 cm, while there are young of *Elaphe guttata emoryi* recorded that measured 39.7 cm. Apart from being longer, young of *Elaphe guttata emoryi* are often more robustly built in proportion to their length than the young of *Elaphe guttata guttata*.

## ENEMIES

As mentioned before, the Corn snake is one of the snakes that has adapted itself very well to the change from natural to cultivated landscapes. For this reason the Corn snake is not under threat of extinction. Yet man is his greatest enemy, especially because of the enormous numbers of *Elaphe guttata* that are run over every night. *Elaphe guttata* and its young are also a natural part of the food-chain and are eaten by a great number of animals, like birds of prey and small beasts of prey such as the otter.

## AGE

The greatest recorded age a Corn snake has reached is 21 years and 9 months (Perkins, 1954). Such a great age is not unusual for *Elaphe guttata* as may be evident from the following facts:

- 21 years and 4 months (Perkins, 1951),
- 19 years and 4 months (Conant & Hudson, 1949),
- 18 years and 4 months (Perkins, 1948).

This information about age is all from specimens kept in captivity; there is not enough research done about the possible age of these snakes in the wild to make any statement about longevity in the wild.

## DEFENCE BEHAVIOUR

When you come across *Elaphe guttata* in the wild and you want to catch it, it first will try to flee. When this does not work, some specimens will defend themselves bravely. When the intruder is near enough, the snake will strike forward and bite. It is not unusual for the snake to hiss at the moment of striking. Other means of defence is vibrating the tail against the ground. The sound this makes is similar to that made by rattlesnakes. It is not known whether the Corn snake tries to imitate a rattlesnake or whether it just wants to make as much noise as possible to scare the intruder.

Not all *Elaphe guttata* offer resistance with such violence as biting. Most struggling specimens calm quickly and become tame when they are kept in a terrarium. Their fantastic adaptability, their toughness, their size, beauty and their calm and reliable character makes *Elaphe guttata* an excellent snake to keep in a terrarium.

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Translation: Astrid Gomes / Fons Sleijpen.