THE EUROPEAN RATSNAKES OF THE GENUS *ELAPHE*

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INTRODUCTION

The genus *Elaphe* consists of around forty species and occurs within the confines of three continents, North (inc. Central) America, Europe and Asia. It contains some of the commonest snakes seen and kept in captivity, including Corn Snakes *(E. guttata)* and the *E. obsoleta* complex, both from N. America, and also some of the scarcest, for example I have not been fortunate to see such species as *E. davidi, E. cantoris* and several others, and I consider myself reasonably experienced in the world of *Elaphe*. In the U.K. it would seem that there is now a growing interest in the rarer species (rarer in the captive sense – many are plentiful in the wild), and it is not impossible to secure such animals as *E. radiata, E. taenuira, E. flavirufa* etc., where as this was not possible only a short time ago. The herpetologist with an interest in the Ratsnakes often includes other genera within their collections such as *Gonyasoma, Bogertophis* and *Senticolis* due to their past classification with *Elaphe*.

Some characteristics of *Elaphe* species are as follows:

Small to medium snakes from around 80 to around 250 cm.
Elongated head which is distinct from neck.
Moderately long tail, i.e. around 20 to 30% of total body length
Body usually cylindrical in shape with a flat belly.
Nine 'plates' on top of head.
Large and often square loreal scale present between the postnasal and preoculars.
Many have divided anal plate.
Hemipene structure has distinctive pattern of small spines and folds, ending in two distinct and equal lobes.
Egg laying.
Young are often different in appearance to the adults.

Many of the above characteristics are not exhibited in certain species, for example *E. rufodorsata* from eastern areas of Asia is actually a live bearer, taking this into account it is not surprising that several taxonomists are presently trying to reclassify many *Elaphe* species. The 'original' *Elaphe, Elaphe quatuorlineata,* was described in 1789 by Lacépède and is thus the 'type' of genus.

Ratsnakes occur in a wide range of habitats in the wild. I have seen and captured Ratsnakes both in Europe and N. America and have found them in all manner of areas; woods, marsh areas, scrubland, rocky screes, along coastlines, around human habitation, agricultural areas, streams and drainage ditches, almost anywhere can and often does provide a home. By past experience I can say that field trips prove most productive in the spring, many snakes only bask at this time of the year after emergence from hibernation. They take advantage of the sun's rays to warm themselves so they can be active to hunt for food after

their winter fast, and also to find a mate. At other times of the year many snakes become more secretive and hide during the heat of the day and become active only at dawn and dusk. I have found that tarmac covered roads are a good place to see specimens on summer evenings as they often attract many species of snake taking advantage of the sun warmed surface. Favourite hiding places include rubbish dumps, sheets of corrugated tin, rotting tree stumps and fallen logs and under large (and often very heavy!) rocks.

The genus *Elaphe* provides the herpetologist with some of the easiest snakes to keep in captivity, many, such as *E. guttata,* present little or no problems to induce breeding, and will live happily and reproduce under many different captive conditions. But, as we have established, this genus is very varied in its content, and thus some of its species do not prove to be as adaptable, many have yet to be bred in artificial conditions. I do not wish to become too involved in general captive husbandry, but I will include both a brief account in general terms, and also some greater details as applicable to the European species later. Many methods of housing these snakes have been employed; I personally use vivariums constructed of melamine covered chip board, with glass fronts and thermostatically heated with an underfloor heat cable, no artificial light is provided. I also have a number of plastic boxes of various sizes to suit from hatchlings up to adults, these are mounted upon shelves which are heated by heat cable, and again only natural light is provided via a large window in my reptile room. Other methods of providing heat can be by the use of heat mats, power plates and ceramic bulbs, but always use a suitable thermostat, many excellent electronic ones are available, the most accurate being the dimming and pulse proportional variety. I tend to use newspaper as a substrate, and only provide a water bowl, a hide box and a branch if the species to be housed is arboreal. Other substrates often used by herpetologists are wood shavings, wood chips and bark chips. Each snake is fed every five to ten days on appropriate size rodents, and a record is made of items consumed, along with copulation dates, egg-laying, sloughs, and anything of interest. Any eggs produced are placed in a tub of vermiculite mixed with equal quantities of water and incubated at 28°C in an incubator constructed of melamine and thermostatically heated with heat cable. I hope this has not been too brief, but I believe that this is not the place for too detailed general captive husbandry. I would refer the reader to many of the excellent general reptile books available (see bibliography) for greater details of methods similar to the above, and also several other variations.

DESCRIPTIONS OF THE EUROPEAN *ELAPHE* SPECIES

***Elaphe scalaris* –Ladder snake (Schniz, 1822)**

I have decided to start with the only truly European *Elaphe, E. scalaris.* This species does not occur anywhere else other than Europe, while the other species ranges stretch into Asia. This is the most westerly occurring *Elaphe,* with a range confined to the Iberian Peninsula, along the Mediterranean coast of France almost to Italy, the Hyéres islands and the Balearic island of Minorca. Strangely I cannot find any records of this snake occurring in neighbouring Majorca. It inhabits sunny areas and is often active during even the hottest of summer days. Vineyards, open woods, scrubland, agricultural areas, rocky areas (inc. dry stone walls) and meadows are amongst the habitat *E. scalaris* prefers. Mainly found upon the ground, but occasionally climbs low bushes and trees. Wild specimens tend to be very aggressive when caught.

E. scalaris is not a large snake and tends to grow to around 120 cm with a large individual perhaps reaching approximately 150 cm. The adult colouration is quite variable but uniform, I have seen brown, rusty orange, dark green, light green, grey and many

variations of shade. There are two dark stripes running the length of the body. The juvenile colouration and pattern differs; they are often a pale yellow green colour, and the two stripes are joined by bars to form a ladder pattern, hence the name. The adult colouration can take three to four years to develop, even though by this time the animal will be an adult. The belly of both babies and adults is often an unmarked off-white colour, occasionally with black markings. The head has a dark line running from behind the eye to the mouth, spots and bars on the labials and often dark bars over the nostrils. The body scales are smooth, there are 27 or 29 mid-body scale rows, 200 to 220 ventral scales, 48 to 68 paired sub-caudals and a divided anal plate (on occasion, single). The identifying scalation details of the head are as follows; two preoculars (occasionally one), two postoculars, two temporals and seven supralabials, the most obvious identifying characteristic is the large and extended pointed rostral scale which extend between the two internasals.

This species is not commonly kept in captivity, due to perhaps its temperament, but more likely that it is infrequently imported into the U.K., and thus rarely offered for sale. Despite its aggressive tendencies it does settle into captivity well, and often becomes calmer. As with all reptiles it is best to only maintain animals that are captive bred as this not only removes pressure from the wild population, but also they are less likely to carry parasites and disease and thus have a better chance in captive conditions. Captive bred hatchlings are best kept in small lunch boxes racked on a heated shelf system. I provide a water bowl, a toilet roll tube for hiding and kitchen towel as a substrate, temperature within the hot part of the box is around 28°C, with the opportunity of a cooler area. They soon grow on a diet of rodents (usually they take defrosted food without hesitation), and once adult (often their third summer) they will breed. As an adult they need a vivarium of perhaps around 60 cm by 30 cm floor space, and as they do not climb very much I only provide them with a height of 30 cm. Other conditions are similar to those described for the hatchlings. Breeding is initiated by first providing a three month hibernation period at around 10° - 12° C, during this period disturbance is kept to a minimum, and fresh water is always available. Copulation takes place some 30 to 45 days after emergence from hibernation, and the eggs are laid 40 to 70 days after successful mating. Females tend to lay their eggs ten days after the pre-lay slough, clutches of around 4 to 7 are common, and around ten eggs is not unheard of. An incubation time of around 60 days at 28°C is usually exhibited. Hatchlings first food is usually defrosted pink mice.

***Elaphe situla* – Leopard snake (Linnaeus, 1758)**

This species is certainly the prettiest of the European *Elaphe*, and this combined with its interesting and nervous habits (i.e. a challenge to maintain in captivity and to find in the wild) makes it one of the most desirable *Elaphe* for the herpetologist. It is not a widespread animal, confined to mainly the eastern parts of Europe, it is found most westerly in Malta and Sicily, through southern Italy, from the former Yugoslavia, through Greece (inc. many Greek islands) to Albania, into Turkey and southern Bulgaria and thus into Asia Minor and the Caucasus. *E. situla* is a lowland species rarely found above 500 metres and often around the coastline. Habitats include rock piles, field edges, dry stone walls, rocky screes and occasionally around marshes, but by far the commonest around human habitation, the Greeks know this snake by the name 'House snake'. They are often found actually in houses, under them, in cellars, barns, gardens and rubbish dumps, where they are undoubtedly attracted by rodents. Most tend not to climb, and are generally more active by dusk, disliking intense heat, they often retreat into hiding to escape the heat and are rarely seen during the hotter months of the year.

Plate 1. Sub-adult male *Elaphe situla* (Maltese form).

Plate 2. Head of *Elaphe situla*.

E. situla is not a large snake growing to no more than around 100 cm, usually less. The adult and juvenile pattern remain the same throughout life, but there are two distinct forms, one blotched (formerly described as *E. s. leopardina*) and one striped (formerly *E. s. situla*). Both forms occur within the same range, and do 'inter-breed', producing both striped and blotched hatchlings. Blotched animals have brown to red blotches (often 'dumbbell' in shape) on a grey, yellow grey or green grey background. Striped animals have the same background colours, but instead of the blotches, two red/brown stripes run the length of the body. The underside of both is often off white towards the forepart of the body, leading to either black markings or totally black towards the rear. Some individuals have a totally black belly. The head is marked similarly in both forms, with a distinctive band which stretches from each eye and resembles a 'Lone Ranger' type mask, (sometimes only two black spots are present), there are two lines extending away from the rear of the eye, some black bars on the labials (often one under the eye) and a distinctive 'V' or 'Y' shaped red mark along the neck onto the top of the head to between the eyes. There are 27 (rarely 25) mid-body scale rows, 220 to 260 ventrals, 68 to 90 paired sub-caudals and a divided anal plate. The distinguishing head scalation is that there is one preocular, two postoculars, two temporals and eight supralabials.

This species has gained a reputation of being a poor captive, but I feel it is not too difficult a snake to maintain, but by no means easy. It is better that only captive bred specimens of this species are maintained as wild caught individuals often become stressed within captive conditions (due to their nervous disposition), and thus the parasitic burden within them often proves too much and they succumb quite quickly. Wild caught animals can be acclimatised to captive conditions if they have a full faecal sample analysed and precautionary drugs administered, to clear the specimens of any parasites within them. Even so, they often do not appreciate this kind of handling, and even if they do survive their first year, it often takes them this length of time before they resume feeding by themselves. I have heard of one case of wild caught animals surviving their ordeal, but it took two years of careful acclimatisation before they were settled enough to breed. Captive bred animals are much easier and they seldom provide great problems. The main thing to keep in mind is that this species does not like it too warm, I find that 25°C at the hottest part of the cage is sufficient, and also to provide plenty of hiding places. I personally have found that they do well in the box system similar to that mentioned for the hatchlings earlier, but with boxes of proportionate size (Tupperware cake boxes are ideal for adults), but some other keepers prefer more 'open' vivaria such as glass fish tanks as they have observed their animals basking in the early morning sun. I provide my animals with three months of hibernation during the winter months at around 10° - 12°C, copulation is around 30 to 45 days after emergence. Around three to five long sausage shaped eggs are laid some 60 to 70 days after copulation, the female usually sloughs twelve days before. They are incubated in wet vermiculite for approximately sixty days at 28°C, the hatchlings first food is small pink mice, usually taking defrosted with no hesitation.

***Elaphe longissima* – Aesculapean Snake (Laurenti, 1768)**

This is one snake with quite a history behind it. Its name stems from the Greeks identifying the snake with their god of medicine, Aesculapius. The Romans picked up on this and also regarded the species as sacred. It is said that the widespread range of *E. longissima* is due to the Romans taking them along on their crusades. Yet another theory has little to do with the Romans; it could have been changing weather patterns that forced them out of Northern Europe, only surviving in the warmer areas of the present day range. I am not one to speculate but I rather fancy the former theory! It could be possible that they are both valid. *E. longissima* is found widespread throughout central and southern Europe, from central France through southern Switzerland, Austria, Czech Republic, to Ukraine and southward to extreme north east Spain, Sicily and southern Greece. Isolated colonies exist in Germany and north west Spain. The range spreads into Turkey and North Iran. Habitats

include dry, sunny woods, dense vegetation, agricultural areas and it is often found residing in deserted ruined buildings. In the north of the range they are often only found on south facing slopes, and are sometimes found in mountainous areas up to nearly 2,000 metres in the Tirol. They can climb well, and although sometimes found active within the hottest part of the day, favour cooler conditions. This species consists of one nominate, *E. l. longissima,* and one subspecies, *E. l. romana* (Suckow 1798). The latter is confined to southern Italy and Sicily. *E. l. persica* (Werner 1913) is now often given species status, i.e. *E. persica,* and occurs in northern Iran.

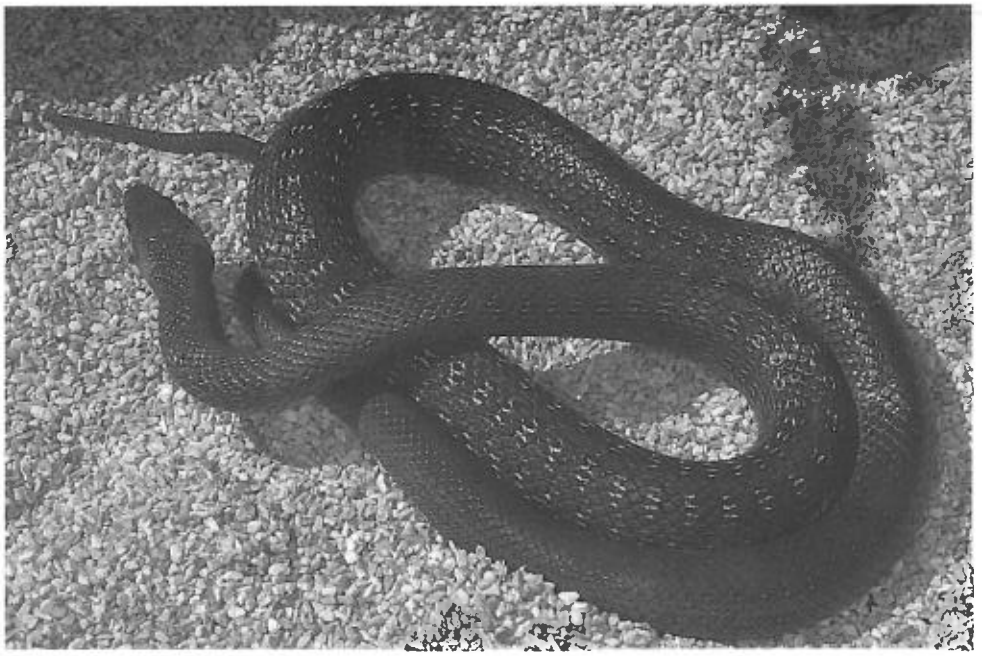

Plate 3. Sub-adult male *Elaphe longissima*

A medium sized snake of around 150 cm, occasionally up to 200 cm. The general adult colour is a green to grey buff, often olive, and the scale tips are sometime etched in white. The head is often marked with a dark line from the rear of the eye, and the labials are usually yellow, sometimes a yellow collar is also present. When juvenile they tend to be uniformly green to dark green, nearly always with white tipping to the scales. The yellow head markings and collar are much more prominent, the collar also often outlined with a black area. The underside varies from uniform white or yellow to totally black, or only black markings – especially towards the rear of the body. *E. l. romana* has the same general colour and markings, but in addition tends to have light or sometimes darker stripes running the length of the body. The body scalation details are the same for both ssp., in that there are 23 (occasionally 21) mid-body scale rows, 205 to 248 ventrals, 60 to 91 paired subcaudals and a divided anal plate. The head has one preocular, two postoculars, two temporals, eight (sometime nine) supralabials and nine infralabials.

Although not kept in captivity very widely, they make ideal captives and are relatively easy to maintain. I supply a glass fronted melamine vivarium, heated and furnished in the manner described earlier. Suitable vivarium dimensions for an adult are around 80 cm by 45 cm with a height of around 45 to 60 cm to enable them to climb. Hatchlings are best maintained in lunch box style vivaria upon heated shelves. Temperature in the warmest part of the cage should not exceed 28°C. Feeding presents few problems, all of the individuals I have maintained have proved to be avid feeders on appropriate sized rodents. Hibernation is carried out within the winter for around three months at 10°C to 12°C.

Copulation is usually observed some 30 to 40 days after this period, with the eggs being produced around 45 to 70 days later. The female completes a pre-lay slough 12 days before laying her eggs. An average clutch of eggs varies from five to twelve, and take 50 to 63 days to incubate at 28°C in the usual conditions. These observations are taken from my own experience and other herpetologists records and only concern *E. l. longissima*, I have not been able to find any captive husbandry records for *E. l. romana*, but it is not unreasonable to assume that they do not differ from the nominate immensely.

***Elaphe quatuorlineata* – Four-Lined Snake (Lacépède, 1789)**

This is the bulkiest of all the European *Elaphe*, reaching some 200 cm, and has been known to grow to around 250 cm. There are three distinct 'forms' that have been given subspecies status, *E. q. quatuorlineata*, the nominate, *E. q. sauromates* (Pallas, 1814) and *E. q. muenteri* (Bedriaga, 1881). A further two forms have been described, *E. q. prematura* (Werner, 1935), a form occurring within the Greek Isles and now synonymous with *E. q. muenteri*, and also *E. q. rechingeri* (Werner, 1932), (also sometimes listed as *E. longissima rechingeri*), a form that only exists on the Greek island of Amorgos, and over which there have been many discussions concerning its taxonic status. This is not an appropriate paper in which to discuss this problem, and indeed I'm not sure that I am qualified to speak on the matter so I will refrain from doing so! Each of the three generally accepted forms mentioned above differ in many ways, so apart from a few general points I feel they deserve individual attention.

Taken as a species on the whole, its range exists from Sicily, central and southern Italy, then from Croatia, southwards through Albania, Greece, including most Greek islands and through to Asia Minor including Ukraine and Kazakhstan. It is often found in warm, sunny, sometimes humid areas, open woods, meadows, rocky over-grown hill sides, ruins, dry stone walls, and sometimes even marshy areas and around drainage ditches. It occurs up to around 1200 m, especially in the south of its range. The appearance of each subspecies is distinct, see later descriptions. The head pattern is much the same in all and tends to be little marked apart from a streak from the rear of the eye, colour is uniform apart from the labials, which in adults are often lighter. The underside is often an off white or yellow colour, sometimes unmarked, some have an indistinct series of darker markings. The juvenile appearance is also similar in all, the ground colour of the body being grey to grey brown, with black or black brown blotches along the back, often with a further series of spots along the flanks. The head is heavily marked with black parietals and supraoculars, and a 'Lone Ranger' mask between the eyes. Depending on the subspecies this pattern slowly fades to leave an adult pattern of four stripes. Each blotch slowly fades, apart from each outer edge along the flanks, which become darker, and slowly join each other to form the stripes. This may take up to three or four years to fully develop. Scalation details are the same for all, the head has two preoculars, three (sometimes two) postoculars, two temporals and eight (occasionally nine) supralabials, the body has 25 mid-body scale rows (rarely 23 or 27), 195 to 234 ventrals, 56 to 90 paired sub-caudals and a divided anal plate. The body scales are faintly keeled.

E. q. quatuorlineata

Occurs throughout Italian and Sicilian range, many parts of Greece, Albania, former Yugoslavia, commonly known as the Western Four-Lined Snake. Adults are typically yellow brown to grey brown with four dark stripes along the body. Some stripeless animals have been known. Captive requirements are reasonably easy to cater for, vivaria similar to the preceeding species will suffice, but keep in mind that *E. q. quatuorlineata* grow to a large size and will need an appropriately larger vivarium. Temperatures at a maximum of around 28°C are favoured. Diet consist mainly of rodents, but some have been known to eat eggs. From personal experience some hatchlings prove to be problematic and will only feed after a period of hibernation. A three month period of hibernation at 10 - 12°C is required to breed from healthy adults, after which copulation takes place, some 36 to 60 days after emergence. Approximately 30 to 56 days pass before up to 16 eggs are laid. The female sloughs between 11 and 16 days before laying. Incubation ranges from 60 to 62 days at 28°C.

Plate 4. *Elaphe quatuorlineata muenteri*, adults

Plate 5. Hatchling *Elaphe quatorlineata quatuorlineata*

E. q. muenteri

The basic appearance of both adult and juvenile are the same as the preceeding description, the main difference being the size, *E. q. muenteri* rarely exceeds 150 cm. The adult pattern is developed at a much earlier age, for example at around 18 months, an *E. q. muenteri* will be, say around 60 cm, an *E. q. quatuorlineata* will also be around the same size, but the former will almost have fully developed the adult pattern, perhaps some 12 to 18 months before the latter. Found only on some islands within the Cyclades including Milos, Santorini, Mykanos and Amorgos. Rarely found in captive collections, but it is kept in the same manner as the nominate, with perhaps a smaller cage being more suitable. Provided with a hibernation of two to three months at 12°C - 15°C, copulation is usually observed around 60 to 100 days after this period. Eggs are laid 30 to 50 days later and they hatch within 45 - 56 days at 28°C.

E. q. sauromates

As a juvenile resembles the preceding descriptions, but this pattern is retained into adult life, and does not develop stripes. Some even lose the blotches, and become almost patternless. The ground colour as an adult is generally yellow to yellow brown, with dark brown markings and blotches (if present). As a hatchling the only obvious difference between *E. q. sauromates* and *E. q. quatuorlineata /muenteri* is that many of the former have a red spot within the region of the parietals and frontal scales, the latter two always lack this feature. This subspecies is known commonly as the Eastern Four-Lined Snake and is thus found primarily in he most eastern parts of Europe, from north east Greece through to Asia as far as the Aral sea, north to Bulgaria and Romania, and south to North Iran. Again not commonly seen in captivity, but does make an ideal captive subject. If subjected to a hibernation period of three to four months at 10°C copulation often takes place 16 to 40 days after, and 6 to 16 eggs are laid around 35 to 60 days later. Incubated in wet vermiculite at 28°C the eggs will take up to 60 days to hatch.

THE EURO/ASIAN *ELAPHE* SPECIES

It would be incorrect to finish without mentioning the two species often listed in the literature on European herpetofauna, even though strictly speaking they do not occur in Europe. *Elaphe dione*, the Steppes / Diones ratsnake (rarely referred to as the Eastern Leopard Snake), is a widespread animal occurring in areas within Turkey, throughout Asia into China. It is found in a variety of locations, from lowland to mountainous regions and often around human habitation. Individuals are often brown of varying shades in colour with a series of darker speckles and small blotches. I have in my own collection some very attractive yellow individuals with reddish blown blotches. The head is similar in appearance to *E. situla* but the pattern (if present) is less distinct, with the markings often being of almost the same colour as the base colour. Brief scalation details are as follows, 25 (sometimes 23 or 25) mid-body scale rows, 171 to 214 ventrals, 51 to 78 paired subcaudals, the anal plate is usually divided, usually two preoculars, sometimes one, two or three postoculars and eight supralabials. Grows to around 100 cm in length. This snake is reasonably easy to keep in captivity, and reproduces frequently, hibernation of no less than three months and no higher than around 10°C is needed, and mating is often reported after hibernation. I have heard that good results can be obtained by allowing copulation to take place before hibernation (personal communication), this I have yet to authenticate. Eggs are usually laid around 53 days after copulation and hatch after only 25 to 35 days at 28°C.

Plate 6. Adult male *Elaphe dione* (photo, M. Curruthers)

Elaphe hohenackeri, Transcaucasian or Hohenackers Ratsnake grows to around 90 cm and occurs throughout Turkey into Asia as far as Iran. There is one subspecies, *E. h. taurica* which occurs in southern Turkey. It is a grey to tan coloured snake, with two rows of spots, and again resembles *E. situla* in many ways. Scalation is as follows, 23 (sometimes 25) mid-body scale rows, 195 to 226 ventrals, 57 to 74 paired subcaudals, one large preocular, two postoculars and eight supralabials. Habitat includes mountain forests, rocky screes and gardens. Little is known about this little snake, either in the wild or its captive husbandry. Hibernation is thought to be required, and it is known that three to seven eggs are laid in July in the wild and that probably a short incubation period is exhibited.

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