

Vipera ammodytes, “Sand Viper” – origin of its name, and a sand habitat in Greece

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Photos by the author

Close-up view of *Vipera ammodytes* from Achaia Feneos.



INTRODUCTION

Greece has a rich viperid representation of five species (JÖGER & STÜMPEL, 2005). However, four of them have small and localised Greek distributions and are considered rare in Greece: *Vipera berus* in the northern mountains of the mainland, *Vipera graeca* in northern and central upland regions of the mainland, *Macrovipera schweizeri* in the Milos Archipelago (Western Cyclades), and *Montivipera xanthina* on the Eastern Aegean islands and in coastal Thrace.

The fifth species, *Vipera ammodytes*, is ubiquitous (BRINGSØE, 1986; HECKES et al., 2005; TRAPP, 2007) and basically forms a viperid landmark of Greece. Its popular name is either Sand Viper or Nose-horned Viper (ARNOLD, 2002; STÜMPEL-RIENKS, 1992). The latter name is understandable considering the characteristic shape of its snout, which is turned upward in a prominent projection. Sand Viper seems rather a peculiar name for *V. ammodytes* as it rarely occurs in truly sandy habitats, although KREINER's (2007) and SCHLÜTER's (2009) statements about its absence from such environments are also incorrect, as I will demonstrate in this article.

As a guidance to habitat preference and other natural historical aspects of *V. ammodytes*, my field observations on that species on the Peloponnese from April 2008 are provided. Of particular relevance is one truly sandy habitat in a coastal region with a rich population.

I will also explore the nomenclatural facets of *V. ammodytes* in a historical context as the record behind well-established scientific names often dates much further back in time than what the formal authorship of the binomial names reveal. The oldest recognised binomial names date of course from 1758, i.e. Linné's *Systema naturae* (10th edition) which was, regrettably, very superficial in terms of herpetology. This paper hopes to illustrate that works several hundred years older may provide much more detailed information, both on the origin of scientific names as well as on species' habits and habitats. A number of these very old books and/or manuscripts have been digitally scanned over recent years, formatted in pdf, and are thus available to a much wider audience than previously when only a select happy few had access to library vaults.

NOMENCLATURAL HISTORY OF VIPERA AMMODYTES

A. LINNÆUS (1758)

Two hundred and sixty-one years ago the foundations for the modern scheme of binomial nomenclature were laid by Swedish botanist, physician and zoologist Carl Linné (or Carl von Linné after his ennoblement, latinised as Carolus Linnæus or Carolus Linnaeus) in his work from 1758, *Systema Naturae*, having the full title *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Here the viper, at present known as *Vipera ammodytes*, was given the name *Coluber Ammodytes*. The original generic name *Coluber* is Latin and simply means “snake”, whereas *ammodytes* has Greek origins as *amos* means “sand”, and *dutes* means “burrower” or “diver”, in other words, the sand-diving snake. This meaning has already been explained in numerous publications, recently e.g. in LESCURE & LE GARFF (2006) and BODSON (2014).

Linné’s diagnosis of the species was very brief: *Nasus terminatus verruca erecta*, which translates as Snout ended in an erect wart. Its range was also described briefly, but incorrectly: *Habitat in Oriente*, i.e. the Orient or the Middle East. He mentions a male, indicating that the description was based upon this specimen, however no further details were provided. The *epitheton specificum* (species name) “*Ammodytes*” was spelled with an initial capital letter, unlike our current standards. For instance for the genus *Coluber*, which he uses for 82 species of very diverse snakes, representing the current families of Colubridae, Homalopsidae, Lamprophiidae, Elapidae, Viperidae and Pythonidae, 38 species epithets have an initial capital letter whereas 44 have an initial lower case letter. He used rules of grammar for that purpose so that e.g. nouns (like *Ammodytes*, *Molurus* and *Situla*) are with an initial capital letter and adjectives (like *agilis*, *annulatus* and *vittatus*) are spelled with an initial lower case letter.

Coluber Ammodytes is not the only species with an incorrect geographical distribution. I would suggest that nearly half of them are wrong. I cannot say whether the explorers who collected animals abroad were to blame

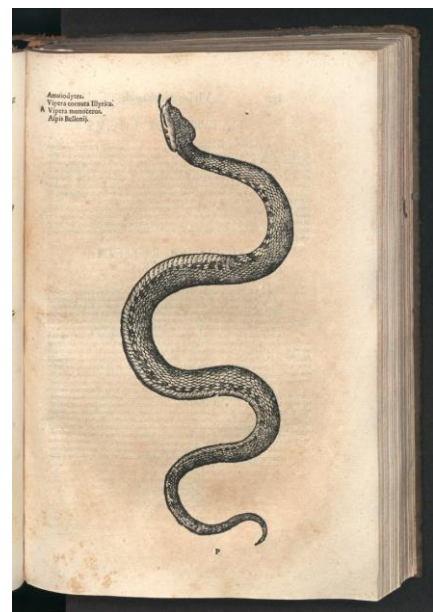
for being careless in providing correct geographical information for the specimens, or whether the researchers publishing new data should be blamed, or possibly both, or other persons handling the specimens. In general I find many of Linné’s descriptions of reptiles and amphibians superficial or even misleading, and I am more impressed by some earlier works that I will mention below.

Linné conducted most of his activities in Sweden and he did not travel much abroad, only to northern and central Europe (MALMESTRÖM & UGGLA, 1957). He visited Denmark, Germany, England, France and The Netherlands, but, to my knowledge, never reached southeastern Europe or the south-eastern Alps that are inhabited by *V. ammodytes*. So he did not have any experience with that species in the wild.

In spite of Linné’s status of being the father of modern taxonomy using binomial species names, Latin, latinised or scientific names were indeed well-known for numerous animals and plants hundreds of years before Linné wrote his important works. The alleged psammophilous habits of *V. ammodytes* date much further back in time.

B. ALDROVANDI (1639)

The scientific name of the Sand Viper was introduced much earlier than in Linné’s *Systema Naturae*. The Italian professor of natural history Ulisse Aldrovandi described this snake in his work *Serpentum, et Draconum Historiae Libri Duo Bartholomaeus Ambrosinus* which was published in 1639, 34 years after his death, and reissued in 1640. The version currently available on the internet is from 1640. The viper was called Ammodite, see also ADLER (2007). Aldrovandi had established a museum in Bologna with an impressive



Ulisse Aldrovandi: *Serpentum, et Draconum Historiae Libri Duo Bartholomaeus Ambrosinus*, page 169.

specimen collection. He made numerous drawings of the specimens; woodcuts of these were made for his books. Page 169 is comprised of a full-page drawing of *V. ammodytes* which clearly depicts its characteristic “nose-horn”, described as “*Vipera cornuta Illyrica*”, i.e. horned viper from Dalmatia (see figure). Judging from the shape of the “horn”, pointing obliquely forward, it fits well with the nominate subspecies which covers that range. His description is much more detailed and accurate than that of Linné. But occurrences in Italy and Libya are also mentioned, which is slightly confusing.

Aldrovandi’s account of this viper, described as sand coloured, was again not the first, and referred to an even older work, that of Gessner.

C. GESSNER (1589)

The oldest source in which I found a description of *Vipera ammodytes* is by the Swiss naturalist and bibliographer Conrad Gessner from the 16th century. His famed work on zoology, *Historia Animalium* in five volumes, was published between 1551 and 1587 (ADLER, 1989). Volume five, *Serpentium Natura*, appeared in 1587. I have not been able to access the original Latin version. However, a German translation entitled *Thierbuch* was published and is now available on the Internet. The snake volume *Schlangenbüch* appeared in 1589. That was long after Gessner’s death in 1565. The section on *V. ammodytes* was worded as follows:

“Von der Ammodyte/das ist Sand-schlang

Ammodytes. Centrias. Amindatus. Sand-schlang.

Von irem namen und woh sie züfinden.

Diß geschlecht der Schlangen bekompt sein nammen von der farb / die sich dem sand gantzlich vergleycht/oder auß der ursach/daß sie mertheils im sand wohnet und sich darinnen verbirgt. Sie wirt in Lybien/deßgleichen Italien/Windischland/unnd in der graffschafft Görtz gezeüget / sie ist elln lang / gefarbt wie sand / mit schwarzen püncten durchsprengt / über den rugken sind linien oder strich gezogen. Ir schwantz ist oberhalb zerspalten und hart / unnd kurtz darvon züreden / so ist sie der hecknatern gar änlich. Allein hatt sie

Von der Sand-schlang

Die nun der pair ersach vnd merckte, daß sie auff in zü wolt / da lufft er den fisch fangen vnd lobte daz. In allem fischen aber so ojk die schlang fischzehen schick weit zu mach, jedoch verzele sie ferner. Der pair ach, tek der warnung nit, sonder geht er vnlug darnach, kan fact zühelen widerumb dahn, sibe da sprang die schlang gegen in auff, schick hab an sein lingen arm / vmb schick die den dancfichen mit dem ganz leyb, den schwanz aufgewonnen, welchen sie herab hangen ließ / vnd den kopff strackte sie empor, so steiff vnd hart, daß man die einmal der krümmen oder bücken hernach leydtlich am arm sehen mocht. Sie biß abte den pannen nit, daz er vngertt sie bey dem kopff mit der andern hand / vñ sie vom arm / vñ schickte sie hinweg. Das fleisch faulte am arm vñ schickte sich vom bein. Jedoch ward es heuff geschmit ten vnd die wunden fleißig zühelert. Man befahl dem bawen darnenber, folte als leje ein ader, auß dem selben arm schlagen lassen / vñ so offte beschad flößt die vñ schwarz blüt darauf. Dife hab ich von dem pannen silbß gehört, vnd die an- maal am arm siber gesehen.

Wen dieser pair erzalte mit dazmal, daß vñ die Blatt schlangen mit gelben vñ goldfarben binden vñ den kopff als waan sie gefönt waren / gesehen wu- den, welche sich in die Blatt nach den fischen begiben. Inso daz aber jagt sie der nen fischen nach, die vñ der die sein schickten vñ sich darnenber enthalten vñ ver- bergen, als da sind gepopen vñ der gleichen, vñ damit inen feiner entzihen mß ge- so vñ schickten sie die sein ringsweyß mit iren leyb.

In Landen gegen mit macht gelegen / findt man schlangen die (wie Claus Mas- gius vermeldet) gekrümpf oder bogen weyß zehen schick, weyß schickten vñ den leuten nachstellen mit iren zühelerten. Jedoch so außsien sie so laut in dircen laub, daß man sich leydtlich vor irem auffzug vergammen / vñ in iren wunden entzihen mag.

In Dingen wirt ein art schlangen gefunden zweyer spalten lang / ohne schwanz (daber heißt man sie gekrümpff), von leyb überall gtych die / die silb schickten gleych werten psey auff die laut zü.

Von der Ammodyte, das ist Sand-schlang.

Ammodytes.
Centrias.
Amindatus.
Sand-schlang.

Den iren namen vñ woh sie züfinden.

Diß geschlecht der schlangen bekompt sein nammen von der farb / die sich dem sand gantzlich vergleycht, oder auß der ursach, daß sie mertheils im sand wohnet vñ sich darinnen verbirgt.

Sie wirt in Lybien/deßgleichen Italien/Windischland/vñ in der graffschafft Görtz gezeüget / sie ist elln lang / gefarbt wie sand / mit schwarzen püncten durchsprengt / über den rugken sind linien oder strich gezogen. Ir schwanz ist oberhalb zerspalten vñ hart vñ kurz darvon züreden / so ist sie der hecknatern gar änlich. Allein hatt sie ein grossen kopff / breitere kinbacken, vñ an dem oberen erzigt sich zü außert ein gewech, gleych wie ein spitzige wartzen / daber wirt sie von theriac heymen Aspide del corno, daß ist ein gehörnte aspis schlang, genennet, vñ zwar nit ohn ursach / dieweyl sie gleych der aspidi, den menschen geschlingen tödtet vñ umbbringet.

Don

GESSNER’s (1589) text from *Historia Animalium*, volume five, *Serpentium Natura*.

ein grossern kopff breitere kinbacken / unnd an dem oberen erzigt sich zu ausserst ein gewechs / gleych wie ein spitzige wartzen / daher wirt sie von theriac kremeren Aspide del corno, daß ist ein gehörnte aspis schlang/genennt/ unnd zwar nit ohn ursach / dieweyl sie/ gleych der aspidi, den menschen geschlingen tödtet unnd umbbringet.”

Transcribed into current German:

“Von der Ammodyte/das ist die Sand-schlange

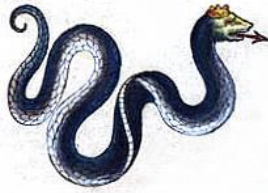
Ammodytes. Centrias. Amindatus. Sand-schlange.

Dieses Geschlecht der Schlangen bekommt seinen Namen durch die Farbe / die dem des Sandes völlig gleicht/oder dadurch/dass sie größtenteils im Sand lebt und sich darin verbirgt. Sie wird für Libyen/desgleichen Italien/Windischland/und die Grafschaft Görz bezeugt / sie ist eine Elle lang / gefärbt wie Sand / schwarz gepunktet / über den Rücken sind Linien oder Striche gezogen. Ihr Schwanz ist oberhalb gespalten und hart / und kurz geschildert / so ist sie der Hecknatter sehr ähnlich. Sie hat allerdings einen

Schlungenbüch

Das ist ein gründliche vnd vollkommne

Beschreibung aller Schlangen/ so im Meer/ süßen Wasser
vnd auff Erden ir wohnung haben/ Sampt der selbigen conterfaltung: Erst-
lich durch den Hochgedeyhten weyberümpften Herrn D. Conrad Gessner
zusamen getragen vnd beschriben/ vnd hernacher durch den Wolgedeyhten
Herrn Jacobum Caronum genchret vnd in dise ordnung
gebracht: An verso aber mit sondrem
Klepp veretüschet.



Mit Römischer Keßertlicher Käuffst. Stad vnd Reichs-
schen Jaren nit nach zürucken.

Gedruckt zu Zürich in der Froschschow/
M. D. LXXXIX.

Woodcut drawing of *Vipera ammodytes*, i.e. the Ammodite, from Aldrovandi (1639) *Serpentum, et Draconum Historiae Libri Duo* Bartholomaeus Ambrosinus.

größeren Kopf / breitere Kiefer / und an dem oberen [Kiefer] befindet sich außen ein Gewächs / ähnlich einer spitzen Warze / daher wird sie von Theriakkrämer Aspide del corno, das ist eine gehörnte Aspisschlange/ genannt/ und zwar nicht ohne Grund / deswegen sie/ gleich der Aspidi, den Menschen durch ihren Umschlingen tötet und umbringt."

Translated into English:

"About the Ammodyte/that is the Sand Snake

Ammodytes. Centrias. Amindatus. Sand Snake.

This snake genus has been given its name because of the colour / which totally resembles that of the sand/or because / it generally lives in sand and hides itself there. It has been recorded from Libya/also from Italy/Windischland/and the county of Görz / it is one cubit long / coloured like sand / overlaid with black stippling / there are lines across the back. Its tail is divided on the upper side and hard / and characterised as short / thus very

similar to the hedge snake. It has however a larger head / wider jaws / and there is a projection on the upper [jaw] / similar to a pointed wart / hence it is called Aspide del corno by snake-oil pedlars, that is a horned Asp Snake/ it is named/ and not without reason / therefore like the Aspidi, it kills by winding around humans."

Windischland is Slavonia, a historical region in eastern Croatia. The county of Görz is located in the south of Austria. Both regions are biogeographically logical. On the other hand, a misunderstanding must have caused the inclusion of Libya in its distribution.

The word Hecknatter ("hecknatern") is an old German expression meaning "hedge snake", which has been used for several snake species found in or near hedges (SCHMIDTLER, pers. comm.). In this case I find it likely that Gessner had a viperid species in mind, possibly even the current-day Hecknatter, *Vipera berus*. The words "theriac kremeren" took a longer time to decipher, both literally (the internet scan is of medium quality), and textually. Only when realising that theriac (or theriak) can mean a panacea, and kremeren most likely is the plural of Kramer (Krämer, or Hausierer, in current German, pedlars in British English) (IN DEN BOSCH, pers. comm.), it became clear that Gessner referred to hawkers selling wonder medicines, in this particular case most probably a form of snake oil or other snake derivative.

Aspide del corno is as relevant today as "Vipera dal corno" in Italian, as it was over four centuries ago (see e.g. STUMPEL-RIENKS, 1992).

It is unclear why it is mentioned that *V. ammodytes* "kills by winding around humans". Further down in Gessner's text details of its bite are provided, for instance that a victim will die within three hours after having been bitten. It may have been taken for granted that a lethal bite is also involved. Still, this seems a curious discrepancy. Checking Gessner's text on the Asp Viper, to which *Vipera ammodytes* is compared ("gleich der aspidi"), I did not find that action described for the asp snakes (however many forms are discussed), only venom was repeatedly mentioned. Thus, the action of killing is shrouded in uncertainty. It is possible that snakes, and especially deadly venomous species, were



Vipera ammodytes, nominate subspecies. It is characteristic that its nasal horn has an obliquely forward projection. Additionally the rostral is generally wider than high whereas it is approximately equally wide and high in *V. a. meridionalis*. This individual of *V. a. ammodytes* is a juvenile (SVL 25.0 cm, total length 28.6 cm) which was found near Paklenica in Croatia in October 2009.

attributed super-natural forces and could kill not only by direct venom injection through the fangs.

MORPHOLOGICAL DETAILS OF *VIPERA AMMODYTES*

As pointed out above, two popular names exist for this species: Sand Viper and Nose-horned Viper. Sandy habitats are excep-

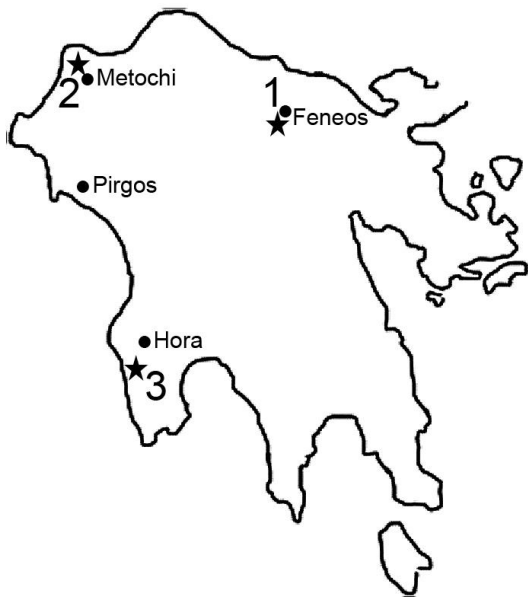
tional for the species (see below), so Sand Viper is a fairly unsuitable name. Nose-horned Viper is a better choice. Within the genus *Vipera* it possesses by far the most distinct and prominent, but soft, 'nose-horn' with a length of up to 7 mm. It is covered by numerous small apical scales, normally ranging from 9 to 22, arranged in 3 (rarely 2 or 4) transverse rows. The upper tip of the rostral may reach the basal part of the horn. The direction of the nasal horn of *V. ammodytes* exhibits geographical variation.

In *V. a. meridionalis*, which occurs in Greece and Turkish Thrace, it is vertically erect whereas it has a distinct obliquely forward projection in the nominate subspecies distributed from the southeastern Alp area, through a major part of the Balkan peninsula but excluding Greece, Turkish Thrace, Bulgaria and southern Romania. I consider the Central Asian and Middle East taxon *transcaucasiana* a subspecies of *V. ammodytes* in accordance with URSENBACHER et al. (2007), even though some authors treat it as a distinct species. *Vipera latastei* and *Vipera monticola*, two West Mediterranean species, also have snout projections; however, their 'horn' is considerably smaller, up to 2 mm. It has the shape of a lobe. The scalation of the horn is also different in the two species groups. *V. latastei* and *V. monticola* have a very long rostral that covers most of the anterior part of the horn, which has merely 3-7 apicals.

In a third European viper, *Vipera aspis*, fairly widespread in southwestern and southern-central Europe, the tip of the snout is slightly but distinctly upturned, but its nature is far from horn-like as in *V. ammodytes*.

FIELD TRIP TO THE PELOPONNESE, APRIL 2008

When I observed vipers in Greece, I was reminded that one of the common names for *Vipera ammodytes*, Sand Viper, had been challenged before in the literature (e.g. KREINER, 2007). One goal of this paper is to communicate observations on an atypical sandy habitat in the north-western Peloponnese in April 2008. Data on a typical hilly and rocky habitat for *V. ammodytes* on the northern Peloponnese from the same trip is also included, as is brief information on a road record in the western Peloponnese.



Map of the Peloponnese showing the three localities where *Vipera ammodytes* was found during the 2008 trip. Numbers refer to the same localities as the text: 1 = vicinity of Achaia Feneos (Kalivia) in the Feneos basin, 2 = Strofilia forest, 3 = between Hora and Giailova.

The facts are presented in chronological order and then used to seek a connection between the ancient descriptions and current field observations.

Habitat 1. Feneos basin, northern Peloponnese – 19-20 April 2008

The Feneos basin is a fertile area with diverse and rich herpetofaunas, mainly reptiles (MAYER et al., 1990; MAYER & BEYERLEIN, 1999).

I have visited the area of macchie around Achaia Feneos (Kalivia) on several occasions and have observed a wide variety of reptile species. Today the area is highly dominated by intensive agriculture of the true basin or valley where I recorded only a few reptiles and amphibians. Hence my efforts concentrated on the hilly and rocky slopes close to the town of Achaia Feneos (until recently officially named Kalivia), at an altitude of 770 m. At approx. 10 o'clock on April 20, I noticed one female *V. ammodytes* that was well hidden on the ground inside a dense scrub of macchie. As I was passing by, I just managed to get a glimpse of the viper's head through the green leaves as the snake had found a small spot for basking, but only the anterior part of the snake was in the sun. The snake was very calm and remained motionless as we photographed its front part. Even as I carefully moved overlying branches with leaves to get better photos at a closer



The *Vipera ammodytes* from Achaia Feneos exactly as it was found, partly hidden inside dense scrub of macchie. Only the head and anterior part of the body were visible and directly exposed to sun.

distance, it did not stir at all. Subsequently we moved the viper a few metres to an open place for better shots, where it remained calm.

This individual was the only *V. ammodytes* found at the Achaia Feneos locality during my four spring visits, i.e. in April 1995, April 2001, April 2005, and April 2008. At these occasions the following species were recorded:

Bufo viridis, *Testudo hermanni*, *Testudo marginata*, *Mediodactylus kotschy*, *Anguis cephalonica*, *Pseudopus apodus*, *Algyroides moreoticus*, *Lacerta trilineata*, *Podarcis peloponnesiacus*, *Ablepharus kitaibelii*, *Ophiomorus punctatissimus*, *Xerotyphlops vermicularis*, *Hierophis gemonensis*, *Platycephalus najadum*, *Telescopus fallax*, *Zamenis situla*, *Malpolon insignitus*, *Natrix natrix*, and *Vipera ammodytes*.

I consider all these species syntopic with *V. ammodytes* and not just sympatric. *P. apodus*, *X. vermicularis*, *H. gemonensis*, and *T. fallax* were not recorded in the mapping survey of the entire Feneos basin carried out by MAYER et al. (1990). However, they were expected, considering their wide-spread distribution on the Peloponnese (BRINGSØE, 1986; TRAPP, 2007).

Habitat 2. Strofilia forest, north-western Peloponnese – 21-22 April 2008

The Strofilia forest is part of a unique natural habitat in the sandy coastal zone of the north-western Peloponnese, which is strictly protected at an international level. It is a very important forest of *Pinus pinea* (Umbrella Pine), along with lagoon and dune habitats. The altitude is close to sea level, at most reaching 20 m above sea level. I visited the Strofilia forest and the adjacent Kalogria lagoon four times, i.e. April 1985, April 1994, April 1995, and April 2008, and observed a rich herpetofauna (BRINGSØE, 1986, 2004; JØRGENSEN, 1995). Already in 1994 we noticed that *V. ammodytes* is not strictly connected to dry

habitats as one individual was found in a moist to swampy microhabitat merely some two metres from one of the numerous ponds (JØRGENSEN, 1995). However, this moist area was close to the drier sandy soil of the forest. To my knowledge *V. ammodytes* from a swampy habitat (in southwestern Greece) was only reported once before (BIELLA, 1983).

On 21 April 2008 we observed four *V. ammodytes* in the relatively open forest (see figure). Most of the forest floor was shaded, but there were some open spots suitable for basking. It is normal that there are abundant shrubs with spiny branches, and many big rocks found in *V. ammodytes* habitats.

But that is certainly not the case in the Strofilia forest. There is indeed quite dense undergrowth of shrubs in the forest, but it is not spiny and there are basically no rocks. I presume that this habitat offers less favourable hiding places than normal *V. ammodytes* habitats, but still the species is common here. Possibly the conditions are suboptimal for its predators.

During our four visits to the Strofilia forest (including the adjacent Kalogria lagoon and coastal dunes) the following species of amphibians and reptiles have been recorded:

Lissotriton graecus (sympatric), *Pelophylax epeiroticus* (sympatric), *Pelophylax kurtmuelleri* (sympatric), *Bufo viridis*, (syntopic), *Hyla arborea* (sympatric), *Emys orbicularis* (sympatric), *Mauremys rivulata* (sympatric), *Testudo hermanni* (syntopic), *Testudo*



The Strofilia forest on the northwestern Peloponnese, habitat of *Vipera ammodytes*.



A vividly coloured adult *Vipera ammodytes* in the Strofilia forest.

marginata (sympatric), *Lacerta trilineata* (syntopic), *Podarcis ionicus* (syntopic), *Ablepharus kitaibelii* (syntopic), *Elaphe quatuorlineata* (syntopic), *Natrix natrix* (sympatric), *Natrix tessellata* (sympatric), and *Vipera ammodytes*.

I have indicated for each of the 15 species whether I consider them to be syntopic with *V. ammodytes* or merely sympatric. Those that are sympatric may not often occur in close proximity to vipers as they generally have different habitat requirements.

Habitat 3. Between Hora and Gialova, SW Peloponnese – 22 April 2008

The last locality from our trip was inspected very superficially, but it illustrates yet another typical way of finding this viper. The observation took place on a main road in a suburban and agricultural area. We saw one viper (adult male) on the asphalt road as we were driving in the afternoon. We were 7 km south of Hora and 7 km north of Gialova. We moved the individual further into an olive grove, a few hundred metres away from houses and

habitation where we photographed it (see figure). Afterwards we carried the snake a bit further away from the houses and released it. We made no attempts to find further reptiles. It is typical for *V. ammodytes* to be found on roads, though there may be substantial traffic of motor vehicles and the species also occurs close to villages and other human activities. In many cases vipers (and other snakes) are found dead on the roads, either run over by cars (probably often killed deliberately), or killed by humans by other means. See also BRINGSØE (1986, 1995). Even though these latter observations date more than one third and one fourth of a century back in time, it is my impression that the attitude to snakes among Greek people has not changed significantly.

DISCUSSION

The origin of scientific names is often worth investigating, especially when it seems illogical or based on misunderstandings or wrong information. That is indeed the case for *Vipera ammodytes* as its sand-dwelling behaviour is the exception for this snake species.



Vipera ammodytes found on a road on the western Peloponnese, photographed in a typical defensive posture.

The official author of the binomial name, LINNÆUS (1758), was not of much help in elucidating this riddle as its alleged psammophilous habits date much further back in time. ALDROVANDI's (1639) description of the Ammodite as *Vipera cornuta Illyrica* may possibly explain the mistake of including Libya, in North Africa, in its distribution. Had Aldrovandi confused it with *Cerastes cerastes*, which also possesses upward horn-like projections and which is common in Libya? The horns of *C. cerastes* are fundamentally very different from that of *V. ammodytes*, but there are major superficial similarities between them, which, in my opinion, make confusion possible or even likely.

The erroneous inclusion of Libya in the distribution of *V. ammodytes* probably stems from GESSNER (1589). Since the origin of this snake's common name was associated with a coloration resembling sand and an alleged habit of digging in sand, *V. ammodytes* may also have been confused with another member of the genus *Cerastes*, namely the sand-dwelling (but "hornless") *Cerastes vipera*, which lives in Libya.

GESSNER (1589) already identified the genus *Cerastes* under a group of venomous snakes from North Africa and the Middle East in an eight-page chapter "Von der Aspis Schlangen" ("On the Asp Snakes"), mainly dealing with their venom and deadliness. Additionally *Naja haie* was apparently included in that group as well (perhaps a venom-spitting species as indicated in the text). LINNÆUS (1758) made separate entries for *Cerastes vipera* (named *Coluber Vipera*, Habitat in Ægypto) and *Cerastes cerastes* (named *Coluber Cerastes*, Habitat in Oriente). Moreover, he treated *Vipera aspis* as well (named *Coluber Aspis*, Habitat in Gallia). On that basis I am not in a position to explain why *Vipera ammodytes* was described as being sand-dwelling and occurring in North Africa.

It is hard to say precisely why such errors occur in old natural history works. The fact that the authors rarely had the opportunity to study exotic animals in the wild would inevitably have been an important source of error as information had to be passed

on from several people starting with local collectors in remote regions. Fieldwork was probably uncommon among those authors describing animals from museum collections. Specifically, mistakes and misunderstandings made by GESSNER (1589) might have been echoed uncritically by ALDROVANDI (1639), and consequently ALDROVANDI's (1639) errors were likely carried over by LINNÆUS (1758).

In conclusion, linking natural history observations of today to the above-mentioned historical accounts is a natural process despite a nearly half a millennium time gap. Moreover, pre-Linnaean works may be very relevant for many well-established taxa, as these will often provide detailed original information (cf. ADLER (1989, 2007)). But, as illustrated in this paper, we need to evaluate such information critically and sceptically. The *Systema naturae* is shallow in many ways, albeit pioneering in its introduction of binomial nomenclature. As indicated by its title, it is basically just a system of nature that has, nevertheless, proved a tremendously important tool for current standards in nomenclature and systematics. However, I would say, at least in terms of herpetology, this system is by far the most important element of the work, as unfortunately the descriptive parts are quite incomplete compared to earlier works. Several earlier works are now becoming available online, and it is very worthwhile to make use of these previously almost inaccessible works. We may expect more to come on the Internet in the future.

In their review of available habitat data for *V. ammodytes*, HECKES et al. (2005) provided several examples of occurrences on sandy substrate: a forest with sandy substrate near Istanbul, as well as sandy beaches on Mykonos and Ios (the Cyclades). Our initial observation of *V. ammodytes* in a swampy area of the Strofilia forest in 1995 should not be over-interpreted, as it was in close proximity to the 'ordinary' forest on dry substrate; the snake might have been hunting hydrophilous prey. An earlier observation of *V. ammodytes* near Lake Stifalia (BRINGSØE, 1986) gave me the same impression. According to TRAPP (2007) very moist habitats are avoided by this snake. The first two habitats (Feneos basin and Strofilia forest) are very different and both of them

are characterised by high numbers of reptiles and amphibians occurring in several different microhabitats though the above-mentioned species lists are probably fragmentary. These observations, linked with detailed published descriptions (HECKES et al. 2005; TRAPP 2007), illustrate that *V. ammodytes* is a generalist in terms of habitat selection. On that basis it is considered natural that this species may also go to extremes so that sandy environments can be inhabited occasionally.

SUMMARY

The scientific name *Vipera ammodytes* would indicate that this viper is typically sand-dwelling but the reality is that this habitat is unusual for the species. Though it was formally described by LINNÆUS (1758), earlier works portrayed the species in much more detail and explained the curious name. In this context the works of ALDROVANDI (1639) and GESSNER (1589) are discussed. However, they erroneously included Libya in its distribution. That mistaken information might have been caused by confusion with the genus *Cerastes*, which can possess upward horn-like projections although not on the snout (*C. cerastes*), and may live in sandy habitats (*C. vipera*). However, members of *Cerastes* had already been described in separate entries, so the background for the misinformation cannot be fully explained. Even though GESSNER's (1589) *Historia Animalium* was published nearly half a millennium ago, it is still relevant to link his observations with current field studies.

From a trip to the Peloponnese in April 2008, observations on *V. ammodytes* were made at three localities. The first (Achaia Feneos, northern Peloponnese) being a typical macchie habitat whereas the second (Strofilia, northwestern Peloponnese) was formed by a sandy forest habitat. In the third case one individual was found on a main road on the southwestern Peloponnese. In terms of habitat selection, *V. ammodytes* is a true habitat generalist occurring in a wide range of habitats, also exceptionally in fully sandy habitats.

SAMENVATTING

De wetenschappelijke naam *Vipera ammodytes* zou kunnen doen vermoeden dat deze adder zandige gebieden bewoont. maar dat is echt uitzonderlijk voor de soort. De slang werd formeel beschreven door LINNÆUS (1758), maar oudere werken (ALDROVANDI, 1639; GESSNER, 1589) karakteriseerden haar al gedetailleerder en verklaarden de opmerkelijke naam afdoende. Niettemin, deze auteurs meenden dat de slang ook in Libië in Noord-Afrika voorkwam. Dit kan zijn ten gevolge van verwarring met het genus *Cerastes* waarvan vertegenwoordigers ook hoorntjes op de kop (maar niet op de snuitpunt) kunnen hebben (*C. cerastes*), en die in een zandige leefomgeving voor kunnen komen (*C. vipera*). Echter, vertegenwoordigers van het genus *Cerastes* werden door de genoemde auteurs al onder aparte trefwoorden behandeld, zodat de verwarring toch niet geheel verklaard kan worden. Het is opmerkelijk dat GESSNER'S (1589) *Historia Animalium*, weliswaar haast vijf eeuwen geleden gepubliceerd, nog steeds zinnig in verband gebracht kan worden met huidige veldstudies.

Tijdens een uitstapje naar de Peloponnesos in April 2008, namen we *V. ammodytes* waar op drie verschillende plekken. De eerste

(Achaia Feneos, in het noorden van de Peloponnesos) was een typisch macchia habitat, terwijl het tweede (Strofilia, noordwestelijke Peloponnesos) een zandig bosgebied was. Het derde geval betrof een individu gevonden op een hoofdweg in het zuidwestelijk deel van de Peloponnesos. *Vipera ammodytes* is feitelijk een echte habitatgeneralist die in vele typen terrein kan leven, bij uitzondering zelfs in volledig zandige gebieden.

ACKNOWLEDGEMENTS

My Danish friends Jan Lehmann (Bagsværd), Otto Høj Madsen (Næstved), Sune Obsen (Stenløse), and Arne Olsen (Roskilde) were excellent travel companions during my herpetological trip to the Peloponnese in April 2008. Kraig Adler (Cornell University, Ithaca, New York), Herman in den Bosch (Leiden University), Uwe Fritz (Museum für Tierkunde, Senckenberg Naturhistorische Sammlungen Dresden), Samuel C. Furrer (Zoo Zürich), Fabian Schmidt (Zoo Leipzig), and Josef F. Schmidtler (Munich) provided very useful historical information. Carsten Kirkeby (Køge) kindly prepared the map of the Peloponnese.

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