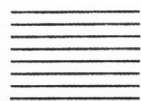


Distribution/Habitat

Except for Ireland, the larger Mediterranean islands, and southern Italy, southern Spain, and southern parts of the Balkan peninsula, *V. berus* extends over the whole of Europe from the Mediterranean Sea to as far north as 67° latitude. In the northern latitudes (above 50°) it is the only poisonous snake in Europe. The adder can tolerate the coldest environment of any of the viper species. In the northern parts of its range, it is found primarily at sea level. But as one progresses to central and southern Europe, it is found mainly at higher altitudes, reaching to at least 2,700 m in the Alps. In Italy it again moves to lower altitudes. The adder has very diversified habitats, especially in the northern parts of its range, where it is found in rocky or bushy hillsides, open fields, woods, shady areas, moors, and bogs. In the south, its habitat becomes more restricted, and it is usually found in mountainous areas or moist lowlands. It is also a good swimmer, and can be found in rivers and lakes. In general, the adder is found mainly in unpopulated areas next to or in open fields with bushes, not too many trees, and with an adequate small animal population. It is predominantly ground dwelling, but has been reported to climb into bushes.

Behavior

The adder hibernates in the winter, and presents a danger from about March through September. In Britain more than 60 percent of the bites occur from June to August; in warmer areas, such as Germany, bites occur from April through October. The period of hibernation may be shorter in warmer countries, and the adder may come out of hibernation even in the winter months for short periods during warm spells. It shows considerable tolerance for cold, and may be found even in the vicinity of snow. During the cooler months, the adder is active mainly during the day, while it is largely nocturnal during the warmer months. In cold weather, it spends a great deal of time basking in the sun, and retreats in the evening to cover within rocky crevices or animal burrows. In summer days, it is found beneath plant growth to shield it from the hot sun. Adders hibernate in colonies with a fixed hibernation area, and may be found in large numbers in certain areas as they are emerging from hibernation, or when they return to begin hibernation. *V. berus* is not a vicious or aggressive snake, but has a rather timid disposition. It has a tendency to freeze when danger is present. It may, however, easily be alarmed and will bite if frightened or stepped upon. The adder is reported to be unable to strike from the ground upwards more than 0.5 m; hence thick boots provide good protection against many bites. The young, which are born during August or September, may be venomous from birth, and may be more aggressive than adults.



Threat

Although *V. berus* is considered nonaggressive, a large number of bites are reported yearly. Most bites result from casual handling by persons unaware of its venomous nature, or to hikers who do not see what they are stepping on. The Swedish Public Health Service estimates that there are 1,300 bites per year in Sweden alone. In Finland, there were 163 cases reported in 1961. From just these reports, it is apparent that the adder can be a significant threat. The venom is not very toxic; the lethal dose for an average healthy adult has been estimated to be between 20 and 25 mg. The venom yield from an average snake is small, between 15 and 18 mg, and the amount of venom delivered per bite is highly variable. Most bites, therefore, are not sufficient to kill an average adult, and death is the exception rather than the rule. Fatalities, though, have been reported in the absence of any treatment. Mortality rates have been estimated by some to be as high as five to fifteen percent, but this is clearly too high. In Sweden, during the period 1915 through 1944, only 15 out of 4,736 hospitalized snakebite victims died. This amounts to a mortality rate of only 0.3 percent. The true mortality rate is probably just slightly higher than this figure.

Clinical Symptoms

The venom of the adder has been described as a coagulant with thrombinolytic and proteolytic action. Neurotoxin activity has also been found, particularly in *V. b. bosniensis*. Envenomation causes sharp pain or a severe burning sensation at the site of the bite, followed by a spreading swelling and inflammation of the lymph system. The victim usually develops nausea, headaches, vomiting, chest pains, and labored breathing. The absence of one or two of these symptoms does not rule out a serious case of envenomation. Generalized bleeding is rare, but the venom is hemolytic and hemorrhagic, and local edema will often be accompanied by hemorrhage. In this case, discoloration is evident, and blood blisters may develop within 48 hours. Severe envenomation may result in shock, followed by cardiovascular collapse.





Figure 17. *V. berus*. (Photo: California Academy of Science, Steinhart Aquarium, by John H. Tashjian.)



Figure 18. *V. berus*. (Photo: Richard Schneider.)

Vipera Kaznakovi

Risk Category III, Minor Risk. Frequency of envenomation by this snake is low, and the venom may be moderately toxic to mildly toxic.

Names

Caucasus viper
Kaukasus-Otter (German)
Zmija zygzakowata (Polish)

Subspecies

The species *V. kaznakovi* is not subdivided.

Identification

A small and rather stout snake, *V. kaznakovi* has an average length of 0.45 to 0.5 m, and can reach a maximum length of 0.7 m. It is similar in size and appearance to *V. ursinii*, but is somewhat thicker. The head is short, broad, triangular, and is distinct from the neck. The snout is rounded and lacks a nose horn. The eyes have vertical pupils. A black line extends backwards from each eye to the corner to the mouth, and continues to the side of the neck. On top of the head there are two converging lines which form a V-mark with the vertex between the eyes. From the head to the tail down the middle of the back there is a series of rectangular dark blotches with dark edges which are often joined to form a zigzag line. On each flank there are two rows of dark spots which usually alternate with each other and often enlarge and spread out, becoming indistinct. Dorsal ground color is variable, and ranges from light yellow to brownish to dark red. Completely black specimens are sometimes found. Some specimens have another row of light spots on the lower flank.

Distribution/Habitat

In Europe, *V. kaznakovi* is found only in south European Russia. It inhabits the western part of the Caucasus Mountains from Georgian USSR north to the vicinity of the city of Krasnodar. It is found primarily in wooded hillsides and meadows at moderate elevations of up to 1,800 m.

Behavior

The behavior of *V. kaznakovi* is not well characterized, but is likely to be similar to *V. berus*. Thus, it probably is a nonaggressive snake that will avoid confrontation when it can. But, like all vipers, it will bite if persistently disturbed or hurt.

Threat

The venom is only moderately toxic, but it is more potent than that of *V. berus*. The venom yield is small due to its small size. Human and livestock fatalities have been recorded.

Clinical Symptoms

The venom is hemolytic, with factors that modify blood coagulation. Envenomation causes pain at the site of the bite, followed by swelling, discoloration, and internal bleeding. Severe envenomation can cause shock.



Figure 20. *V. kaznakovi* (male). Photo: San Antonio Zoo, by LeRoy Newburn.



Figure 21. *V. kaznakovi* (shortly after shedding). (Photo: San Antonio Zoo, by John H. Tashjian).

VIPERA KAZNAKOVI



Range of *Vipera Kaznakovi* in Europe.

• • • • •

Vipera Latasti

Risk Category IV, Little Risk. Frequency of envenomation by this snake is low, and the venom is only slightly toxic.

Names

Snub-nosed viper	Lataste's viper
Stulpnasen-Otten (German)	Vipere de Lataste (French)
Vibora comun (Spanish)	Pequena vibora (Spanish)

Subspecies

Only a single subspecies occurs in Europe: *V. l. latasti*.

Identification

This small, but robust, viper has an average length of 0.5 to 0.55 m, and can reach a maximum length of 0.75 m. Males are larger than the females. The head is broad, triangular, and distinct from the neck. The snout is short, and ends with a distinct nose horn formed from soft scales. The nose horn is not as tapered or quite as pronounced as that of *V. ammodytes*. The crown is covered by small keeled scales, except for a large scale over each eye, and sometimes a large frontal scale on the snout. The eyes have vertical pupils. There is a dark line extending backwards from each eye to the corner of the mouth, and there are small irregular markings on the top of the head. From the head to the tail down the middle of the back there is a row of large rhomboid spots with dark edges which often fuse to form a wavy zigzag stripe. A row of small, dark, diamond-like spots extend along each flank, and are usually opposite the indentations of the dorsal stripe. Coloration is fairly consistent, with the dorsal color a grey or brown. In females it is often reddish-brown. The belly is grey to yellowish, with small light or dark spots. The underside of the tail tip is usually yellow.

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Distribution/Habitat

In Europe, *V. latasti* exists throughout Portugal and Spain from the southern tip of the Iberian peninsula up almost to the Pyrenees Mountains. It is found in lowlands and hilly regions of moderate elevations reaching up to 1,200 m. It seeks mostly dry, rocky, or even sandy areas, and is usually not found near water or damp places. It is also found in open woodlands or thick forests, provided that they are not too moist. It is more common in the central and southern parts of the Iberian peninsula.

Behavior

Reports are sketchy, but the Snub-nosed viper is probably not very aggressive, and tends to avoid confrontation. It feeds on small invertebrates and small mammals, and usually does not attack larger animals. It is, however, easily disturbed, and will bite if annoyed. This viper is not very fast moving, and has a tendency to remain in one place, and to strike at anything that comes within its range. It is primarily diurnal, but can become nocturnal in the hot summer months.

Threat

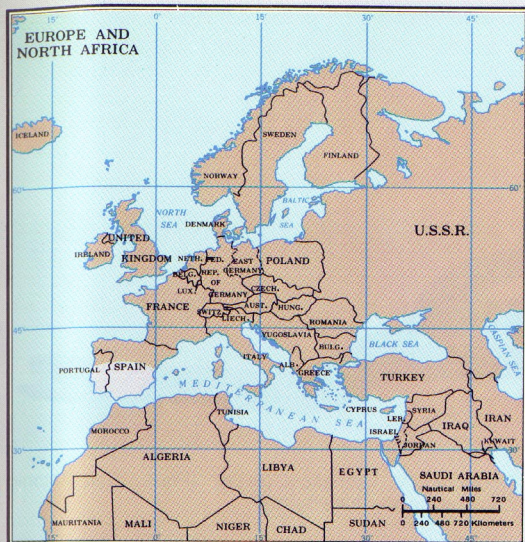
The venom of *V. latasti* is only moderately toxic, and the venom yield due to its size is small. The bite is not considered as very dangerous, and it rarely causes death in humans or large animals. Most bites occur to woodcutters moving through a section of woods. The snake usually does not give way, and bites occur when the woodcutters do not notice the snake.

Clinical Symptoms

The venom is hemolytic, with phospholipase A activity and some neurotoxin activity. It transforms blood lecithin to lysolecithin, which lyses red blood cells. This results in a decrease in the red cell count, and an increase in leucocytes. Envenomation causes sharp local pain followed by swelling and vomiting. Nausea and breathing problems can also develop. In severe envenomation, the swelling can spread, resulting in shock.



Figure 23. *V. I. latasti*. (Photo: Dallas Zoo, by David G. Barker).



Range of *Vipera Latasti* in Europe

VIPERA LATASTI

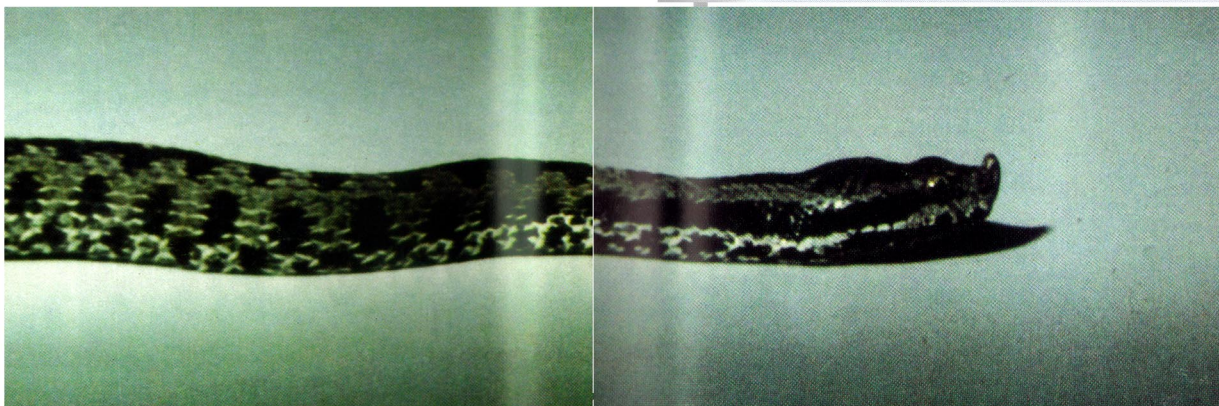


Figure 24. *V. I. latasti*. (Photo: San Antonio Zoo, by LeRoy Newburn).



Vipera Ursinii

Risk Category IV, Little Risk. Frequency of envenomation by this snake is low, and the venom is only slightly toxic.

Names

Meadow viper	Orsini's viper
Field adder	Wiesenotter (German)
Vipere d'Orsini (French)	Vipera-de-Stepa (Romanian)
Ostromunucesta usojnica (Bulgarian)	

Subspecies

Five subspecies occur in Europe.

- V. u. ursinii*: Italian meadow viper
- V. u. macrops*: Karst viper
- V. u. rakosiensis*: Danubian meadow viper
- V. u. renardi*: Steppe viper
- V. u. wettsteini*: French meadow viper

Identification

V. ursinii is a small, moderately thick-bodied viper, with an average length of 0.4 to 0.5 m, and a maximum length of 0.65 m. This makes it the smallest viper in Europe. Females are larger than males. The head is oval, narrower than that of other vipers, but still distinct from the neck. The snout is rounded and just slightly upturned. The crown is covered by five large scales. The eyes are small with vertical pupils. The tail is short, and comprises about one tenth of the snake's total length. There is a dark line extending from each eye backwards to the corner of the mouth. On top of the head there are two or four lines which converge just behind the eyes. From the head to the tail down the center of the back there is a dark wavy zigzag line with black edges that is sometimes discontinuous, forming a series of blotches. There are two alternating rows of dark spots on each flank, with the spots of the upper row usually opposite the indentations of the dorsal stripe. The flanks are darker than the back. The coloration of the meadow viper is not as variable as the other viper species; it is also distinctive in its rough appearance. The dorsal color of this snake can be grey, yellowish, greenish, or light brown. The belly is usually light grey or dark grey, sometimes with small dark spots. The underside of the tail tip is dark grey, sometimes with yellow markings. Completely black specimens have been found in parts of its range, especially in Yugoslavia. Young specimens have a more striking color pattern than the adults.

Distribution/Habitat

This snake can be found in Yugoslavia, Albania, Hungary, Bulgaria, Romania, southeastern France, central Italy, southern Austria, and southern Russia, including the Caucasus Mountains. Over much of its range, this snake is found in dry plains and flatlands with few trees or bushes; it is more common when these conditions occur at somewhat higher elevations. It is also found in thin woods, hillsides, and mountainous regions. In the Caucasus Mountains it reaches elevations of over 2,700 m. In Austria, Hungary, and Romania, it moves to lower elevations, and is found in moist low-lying grasslands, and even in marshes. It is found in large numbers in the plains around Lake Neusiedler, southeast of Vienna. In this area it is continually threatened by civilization; in Austria it is under government protection. In general, it seeks open areas near dry clay or loamy soil. It hides in rodent dens and small animal burrows, and often uses them as places for hibernation.

Behavior

V. ursinii hibernates during the winter months and emerges from approximately March through October. Its hibernation behavior is probably similar to that of *V. berus* in that it likely hibernates in colonies and emerges in large numbers in the spring. Having emerged, however, each snake leaves the colony for its own hunting area. The young are born in July, August, or early September; at birth they are very small, measuring 1.4 cm in length. The meadow viper mates in April through June, and can be found in groups during this time. It is mainly diurnal, but during the hot summer months it can become nocturnal. It is more active than other vipers in Europe, and can move rapidly. It is not aggressive, and is considered to have a gentle disposition. It feeds on beetles, grasshoppers, lizards, and small rodents. It usually does not bother larger animals, and it avoids human confrontation. It seldom bites humans, even when bothered. However, like any venomous snake, it will bite if continuously disturbed, stepped on, or handled in a rough manner.

Threat

V. ursinii is the least dangerous venomous snake in Europe. It is docile and rarely bites, usually only when trodden upon or mistaken for a nonpoisonous snake, and thus handled in a manner so as to hurt it. Its venom is the least toxic of the vipers in Europe, and because of its small size, it has a small venom yield. There are no recorded cases of human fatalities.

Clinical Symptoms

The venom is hemolytic, with phospholipase A, proteolytic activity, and little or no kinin-forming activity. Envenomation will cause local pain and swelling of the immediate area. This is followed by dizziness and sickness, but recovery is usually relatively fast, without serious after effects.

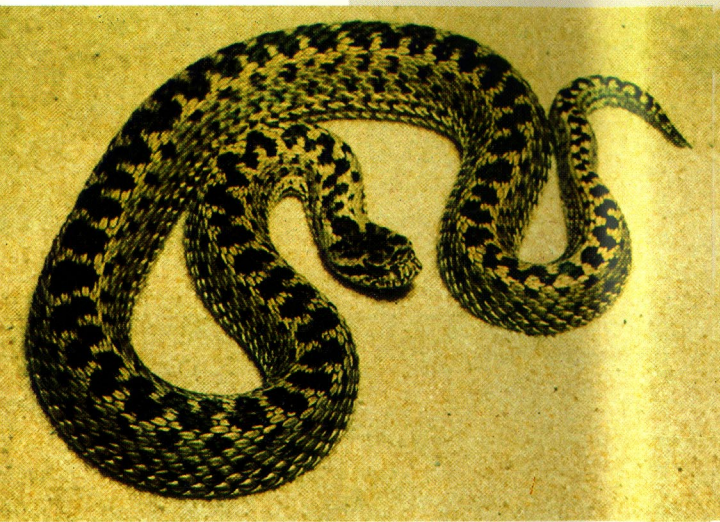
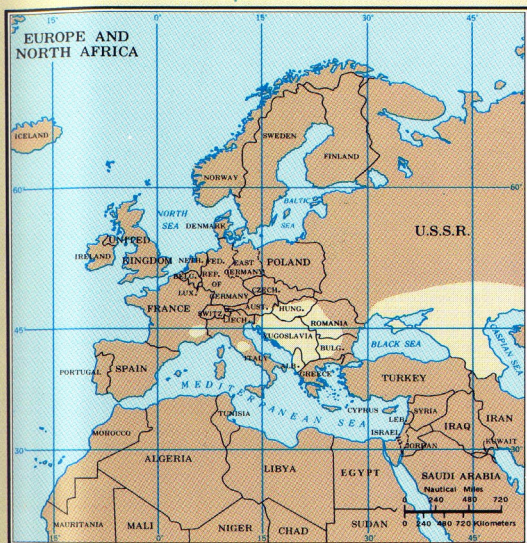


Figure 26. *V. u. renardi*. (Photo: Bronx Zoo, by John H. Tashjian.)

VIPERA
URSINII





Range of *Vipera Ursinii* in Europe



Figure 27. *V. u. wettsteini*. (Photo: Erich Sochurek.)

Agkistrodon Halys

Risk Category IV, Little Risk. Frequency of envenomation by this snake is low, and the venom is only slightly toxic.

Names

Pallas's viper	Asiatic pit viper
Halys' pit viper	Halys-Grubenotter (German)
Vipere halys (French)	Halyskaarme (French)
Mokasyn hali (Polish)	Halysorm (Swedish)



Subspecies

Only one subspecies of this snake is found in Europe: *A. h. caraganus*.

Identification

Pallas's viper is different from the other venomous snakes in Europe in that it belongs to the family *Crotalidae*, the "pit vipers," and not the family *Viperidae*. The family *Crotalidae*, or crotalids, are characterized by a large pit on each side of the snout located between the eye and the nostril, but closer to the mouth. These pits are heat receptors used to detect warm-bodied prey. The average length of the snake is 0.55 to 0.7 m, and the maximum is 0.9 m. The body is robust, though not as stout as that of the *Vipera*. The head is narrow, flattened on top and distinct from the neck. There are nine large shields on top of the head. The eyes are small with vertical pupils. There are several markings on the head, including a bar between the eyes, a short stripe from each eye to the corner of the mouth, and a dark spot above the snout. The snout is usually rounded, but can be slightly upturned at the tip. The tail is short and comprises about one eighth of the total length. Down the middle of the back there is a series of dark grey crossbands with dark edges which cross the back and almost reach the middle of the flanks. The crossbands may alternate with dark spots on each flank, and both crossbands and spots may fuse to form an irregular network. Its dorsal color is grey, yellowish, or brownish. *A. h. caraganus* is usually lighter than the other subspecies, and has more crossbands. Variations can occur, and orange, reddish, or black specimens can be found. The belly is grey to dark grey with dark spots. The tip of the tail is yellowish, dark brown, or black.

Distribution/Habitat

Mainly an Asiatic snake, *A. h. caraganus* extends into Europe only in a small section of southeastern European Russia where the Volga River enters the Caspian Sea. It occupies very diversified habitats from desert shrub to short grass or wooded steppes, coniferous forests, or mountainous areas up to elevations of 4,000 m. In Europe, it occupies mainly desert shrub, short grass steppes, dry river valleys, and thin woods. It seeks dry areas with many rocks and boulders.

Behavior

Pallas's viper hibernates from November to March. The males emerge from hibernation about one week before the females. Mating takes place any time from April to July, and this snake may be found in groups during this time. The young are born from about late July to October. It is mainly a nocturnal snake, and during the warmer months it emerges only after sunset. Reports vary as to its aggressiveness. Some indicate that it is similar to the *Vipera* in that it will usually not strike unless it is continuously disturbed or hurt; other reports claim that it will bite with only minor provocation. Usually the pit vipers will use their heat receptors to sense anything warm that comes within a certain range. It is this, and not their eyesight, that guides their strike. This gives them an additional advantage in the dark or when hunting small animals in burrows.

Threat

The toxicity of this snake's venom varies over its range. In general, it is not very toxic. The LD₅₀ is 16.0 $\mu\text{g/g}$ by subcutaneous injection. It is not a large snake, and does not have a large venom yield. Usually, it is a danger only to small animals. The bite is painful, but the victim recovers without any ill effects; normally recovery is within a few weeks. Deaths to cows, horses, and humans have been recorded, however, and caution should be used with this snake.

Clinical Symptoms

This snake's venom is mainly hemotoxic with proteolytic activity, and factors that modify blood coagulation. Two hemorrhagic factors have been reported. There is also a neurotoxin present, and the initial symptom after a bite is a slight paralysis. Envenomation causes a sharp pain at the site of the bite, and is followed by edema, necrosis, and generalized tissue breakdown. An increase in both heart rate and blood pressure is observed. These symptoms subside after a few days in a mild case, but will persist in severe envenomation. Death, when it occurs, is usually caused by respiratory failure.





Figure 29. *A. h. carraganus*. (Photo: Houston Zoo, by John H. Tashjian.)



Range of *Agkistrodon Halys* in Europe

AGKISTRODON HAIYS

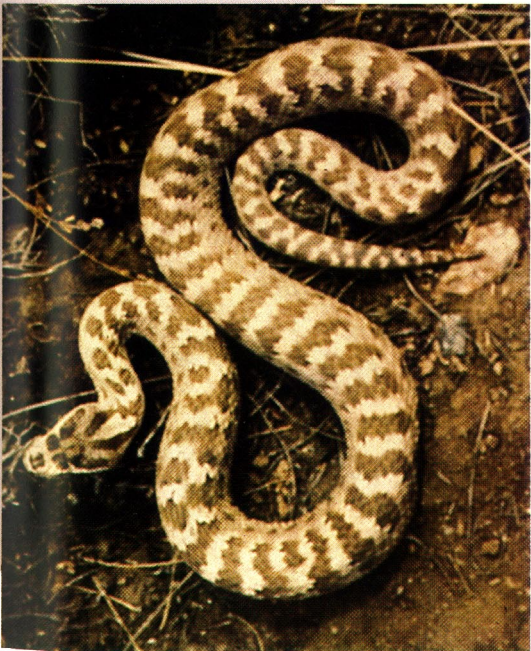


Figure 30. *A. h. carragnus*. (Photo: Erich Sochurek.)



ANTIVENOMS

TABLES

Table I. Antivenoms Available for Use Against European Venomous Snakes

Table II. Sources of Antivenom

Table III. Addresses for Sources of Antivenom

Table I. Antivenoms Available for Use Against European Venomous Snakes

	V. ammodytes	V. aspis	V. berus	V. kaznakovi	V. latasti	V. lebetina	V. ursinii	V. xanthina	A. halys
Antivenin (Crotalidae) Polyvalent (Wyeth Laboratory)									●
Isper V (Institut Pasteur)		●	●						
Isper Europe (Institut Pasteur)	●	●	●						
Near and Middle East (Institut Pasteur)	●					(1)			
Europe (Behringwerke AG)	●	○	●			○		○	
North Africa (Behringwerke AG)						●			
Near and Middle East (Behringwerke AG)	●					●		○	
Antiviperin (Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo")	●	●	●	○	○		●	○	○
Venise (Institute for Sera and Vaccines)	●		●						
Antiviperinum (Institute of Immunology)	●	○	○						
(No name given) (Institute of Epidemiology and Microbiology)	●	●	●						
Monovalent V. lebetina (Research Institute of Vaccine and Serum)						●			
Polyvalent Vipera and Naja (Research Institute of Vaccine and Serum)						●			

Continued on Reverse

Table I. Antivenoms Available for Use Against European Venomous Snakes (Continued)

	V. ammodytes	V. aspis	V. berus	V. kaznakovi	V. latasti	V. lebetina	V. ursinii	V. xanthina	A. halys
Antiviperin (Institut Pasteur D'Algerie)						●			
(No Name given) (Institut D'Etat des Serums et Vaccins Razi)						●			
(No Name given) (Institut D'Etat des Serums et Vaccins Razi)					●				
(No Name given) (Institut D'Etat des Serums et Vaccins Razi)									●
Polyvalent (Institut D'Etat des Serums et Vaccins Razi)		○			○	●		●	●
Habu antivenine (The Chemo-Sero-Therapeutic Research Institute)									○
Mamushi antivenine (The Takeda Pharmaceutical Co.)									●
Mamushi antivenin (Research Institute for Microbial Diseases)									●
Mamushi antivenine (Kitasato Institute)									●
Mamushi antivenine (Chiba Perfectural Serum Institute)									●
Mamushi, Monovalent (Shanghai Vaccine and Serum Institut)									●

● Effective protection afforded.

○ Slight to moderate protection afforded.

(1) Effective against *v. lebetina obtusa* only.

Table II. Sources of Antivenom

<i>Vipera ammodytes</i>	Institut Pasteur	"Isper Europe" "Near and Middle East"
	Behringwerke AG	"Europe" "Near and Middle East"
	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin"
	Institute for Sera and Vaccines	"Venise"
	Institute of Immunology	"Antiviperinum"
	Institute of Epidemiology and Microbiology	Anti-Vipera ammodytes (1)
<i>Vipera aspis</i>	Institut Pasteur	"Isper V" "Isper Europe"
	Behringwerke AG	"Europe" (2)
	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin"
	Institute of Immunology	"Antiviperinum" (2)
	Institute of Epidemiology and Microbiology	Anti-Vipera aspis (1)
	Institut D'Etat des Serums et Vaccins Razi	"Polyvalent" (2)
<i>Vipera berus</i>	Institut Pasteur	"Isper V" "Isper Europe"
	Behringwerke AG	"Europe"
	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin"
	Institute for Sera and Vaccines	"Venise"
	Institute of Immunology	"Antiviperinum" (2)
	Institute of Epidemiology and Microbiology	Anti-Vipera berus (1)

Table II. Sources of Antivenom (Continued)

<i>Vipera kaznakovi</i>	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin" (2)
<i>Vipera latasti</i>	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin" (2)
	Institut D'Etat des Serums et Vaccins Razi	Anti-Vipera latasti (1) "Polyvalent" (2)
<i>Vipera lebetina</i>	Institut Pasteur Behringwerke AG	"Near and Middle East" (3) "Europe" (2) "North Africa" "Near and Middle East"
	Research Institute of Vaccine and Serum	"Monovalent Vipera lebetina" "Polyvalent Vipera and Naja"
	Institut Pasteur D'Algerie	"Antiviperin"
	Institut D'Etat des Serums et Vaccins Razi	Anti-Vipera lebetina (1) "Polyvalent" (2)
<i>Vipera ursinii</i>	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin" (2)
<i>Vipera xanthina</i>	Behringwerke AG	"Europe" (2) "Near and Middle East" (2)
	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin" (2)
	institut D'Etat des Serums et Vaccins Razi	"Polyvalent"

Table II. Sources of Antivenom (Continued)

<i>Agkistrodon halys</i>	Wyeth Laboratories	"Antivenin (Crotalidae) Polyvalent"
	Istituto Sieroterapico e Vaccinogeno Toscano "Sclavo"	"Antiviperin" (2)
	Institut D'Etat des Serums et Vaccins Razi	Anti- <i>Agkistrodon halys</i> (1) "Polyvalent"
	The Chemo-Sero-Therapeutic Research Institute	"Habu antivenine" (2)
	The Takeda Pharmaceutical Company	"Mamushi antivenine"
	Research Institute for Microbial Diseases	"Mamushi antivenine"
	Kitasato Institute	"Mamushi antivenine"
	Chiba Prefectural Serum Institute	"Mamushi antivenine"
	Shanghai Vaccine and Serum Institut	"Mamushi, Monovalent"

(1) No specific name supplied by manufacturer.

(2) Slight-to-moderate protection afforded by this antivenom.

(3) Proven effective against subspecies *V. Lebetina obtusa* only.

Table III. Addresses for Sources of Antivenom

WYETH LABORATORIES
Box 8299
Philadelphia, PA
USA

INSTITUT PASTEUR
Annexe de Garches
92 (Hauts-de-Seine)
Paris, France

BEHRINGWERKE AG
D 3550 Marburg/Lahn
Federal Republic of Germany

ISTITUTO SIEROTERAPICO e VACCINOGENO TOSCANO "SCLAVO"
Via Fiorentina 1, Siena
Italy

INSTITUTE for SERA and VACCINES
W. Pieck Str.
Prague, Czechoslovakia

INSTITUTE of IMMUNOLOGY
Rockefellerova 2
Zagreb, Yugoslavia

INSTITUTE of EPIDEMIOLOGY and MICROBIOLOGY
Sofia, Bulgaria

RESEARCH INSTITUTE of VACCINE and SERUM
Ministry of Public Health
Ul. Kafanova 93
Tashkent, USSR

INSTITUT PASTEUR d'ALGERIE
rue Docteur Laveran
Algiers, Algeria

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INSTITUT d'ETAT des SERUMS et VACCINS RAZI
P.O. Box 656
Tehran, Iran

THE CHEMO-SERO-THERAPEUTIC RESEARCH INSTITUTE
Kumamoto 860, Kyushu
Japan

THE TAKEDA PHARMACEUTICAL COMPANY
Osaka, Japan

RESEARCH INSTITUTE for MICROBIAL DISEASES
Osaka University
Suite 565
Japan

KITASATO INSTITUTE
Minato-ku
Tokyo, Japan

CHIBA PREFECTURAL SERUM INSTITUTE
Inchikawa
Japan

SHANGHAI VACCINE and SERUM INSTITUTE
1262 Yang An Road (W)
Shanghai, China

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