

## Online Table A. Types of Envenomation in North America

<i>Animal and type of envenomation</i>	<i>Hazard level*</i>	<i>Major venom properties</i>	
Pit vipers, hemorrhagic and coagulopathic (e.g., eastern diamondback rattlesnake [ <i>Crotalus adamanteus</i> ])	I	Potent hemorrhagins and proteases; procoagulants; indirect cytotoxins; anticoagulants; myotoxins	
Pit vipers, hemorrhagic and coagulopathic with paralytic features (e.g., Mojave rattlesnake [ <i>Crotalus scutulatus scutulatus</i> ], some timber rattlesnakes [ <i>Crotalus horridus</i> ], some southern Pacific rattlesnakes [ <i>Crotalus oreganus helleri</i> ])	I	Potent hemorrhagins and proteases; procoagulants; indirect cytotoxins; anticoagulants; myotoxins; presynaptic neurotoxins (Mojave toxin and isotoxins) in type A populations†	
Elapid snakes, postsynaptically neurotoxic (e.g., eastern coral snake [ <i>Micrurus fulvius</i> ])	I	Postsynaptic neurotoxins; myotoxins	
Scorpions, neurotoxic (e.g., Arizona bark scorpion [ <i>Centruroides sculpturatus</i> ])	I	Excitatory neurotoxins; sodium and potassium channel toxins	
Venomous lizards, hemorrhagic and coagulopathic, cardiovascular (extreme hypertension; e.g., Gila monster [ <i>Heloderma suspectum</i> ])	II or III	Kallikrein-like toxins; glucagon-like peptides; probable neurotoxins (clinical relevance unlikely); vasodilatory peptides	
Spiders, neurotoxic (e.g., black widow [ <i>Latrodectus mactans</i> ])	II	Presynaptic neurotoxin ( $\alpha$ -latrotoxin)	

Table A continues

**Online Table A. Types of Envenomation in North America** (continued)

<i>Animal and type of envenomation</i>	<i>Hazard level*</i>	<i>Major venom properties</i>	
Spiders, necrotic (e.g., brown recluse [ <i>Loxosceles reclusa</i> ], desert recluse [ <i>Loxosceles deserta</i> ])	III	Sphingomyelinase D; hemolysins; possibly, other necrotoxins	
Jellyfish, local (e.g., Portuguese man-of-war [ <i>Physalia physalis</i> ], sea nettle [ <i>Chrysaora quinquecirrha</i> ])	II or III	Few data available; membrane permeability-altering toxins; possibly, ion channel toxins	
Venomous fish, penetrative traumatic local (e.g., southern stingray [ <i>Dasyatis americana</i> ])	III	Few data available; edematogenic and proteolytic activities reported; possibly, vasoactive peptides (hypotensive, possibly cardiotoxic)	
Venomous fish, cytotoxic (e.g., tiger rockfish [ <i>Sebastes nigrocinctus</i> ])	III	Few data available; proteolytic activity reported; data suggest vasoactive peptides (hypotensive) and calcium-modulating effects on neuromuscular transmission	
Stinging bees, wasps, hornets, or ants	II or III	Melittin; phospholipase A <sub>2</sub> ; apamin (neurotoxin); biogenic amines; hemolysins; mast cell-degranulating peptide (proanaphylactic)	

\*—Hazard level is estimated by considering venom potency, average venom yield or estimated volume of venom available for ejection, documented involvement in and clinical course of human envenomation, and outcome information. The levels are I: serious and potentially fatal envenomation is possible; II: systemic, but fatal envenomation is possible (but rare), and severe morbidity is possible; III: usually local envenomation only.

†—Type A population refers to a geographically defined population of Mojave rattlesnakes that possess Mojave toxin. Some populations of other rattlesnakes possess similar toxins.<sup>A2</sup>

*Information from references:*

A1. Mebs D. *Venomous and Poisonous Animals: A Handbook for Biologists, Toxicologists and Toxinologists, Physicians and Pharmacists.* Boca Raton, Fla.: CRC Press; 2002.

A2. Weinstein SA, Minton SA, Wilde CE. *The distribution among ophidian venoms of a toxin isolated from the venom of the Mojave rattlesnake (Crotalus scutulatus scutulatus).* *Toxicon.* 1985;23(5):825-844.

A3. Campbell JA, Lamar WW. *The Venomous Reptiles of the Western Hemisphere.* Ithaca, NY: Comstock Pub. Associates; 2004.

A4. White J, Cardoso JL, Fan HW. *Clinical toxicology of spider bites.* In: Meier J, White J. *Handbook of Clinical Toxicology of Animal Venoms and Poisons.* Boca Raton, Fla.: CRC Press; 1995:259-330.

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## Online Table B. Selected Exotic Venomous Animals in Private Collections in the United States

Taxa	Hazard level*	Major venom properties	Comments
<b>Venomous snakes: Family Viperidae, hemorrhagic and coagulopathic envenomation</b>			
Gaboon viper ( <i>Bitis gabonica</i> )	I	Hemorrhagins (zinc metalloendopeptidases); fibrinolytic, procoagulant, antiplatelet, myotoxic, and cardiotoxic properties; nonparalytic neurotoxicity anecdotally reported	Prodigious size; fangs up to or exceeding 6 cm in length; large amounts of highly toxic venom; fairly common in private venomous snake collections
			
Indian saw-scaled viper ( <i>Echis ocellatus</i> )	I	Hemorrhagins (zinc metalloendopeptidases); fibrinolytic, procoagulant, necrotoxic, and nephrotoxic properties	Particularly toxic to humans; several species maintained in captivity
			
Eyelash viper ( <i>Bothriechis schlegelii</i> )	II or III	Procoagulants probably present	Most often causes local envenomation; occasional fatalities have been reported; several phases (yellow, green, etc.) common in private collections
			
<b>Venomous snakes: Family Elapidae, postsynaptic neurotoxicity or necrotic envenomation</b>			
Indian cobra ( <i>Naja naja</i> )	I	Postsynaptic neurotoxins or potent necrotoxins (venom properties vary among geographic populations)	Monocellate ("monocled") cobra ( <i>Naja kaouthia</i> ) common in private collections; albino phase has been bred extensively
			

Table B continues

\*—Hazard level is estimated by considering venom potency, average venom yield or estimated volume of venom available for ejection, documented involvement in and clinical course of human envenomation, and outcome information, where available. The levels are I: serious and potentially fatal envenomation is possible; II: systemic, but fatal envenomation is possible (but rare), and severe morbidity is possible; III: usually local envenomation only; IV: rarely causes serious envenomation.

**Online Table B. Selected Exotic Venomous Animals in Private Collections in the United States** (continued)

Taxa	Hazard level*	Major venom properties	Comments
<b>Venomous snakes: Family Colubridae†, hemorrhagic and coagulopathic envenomation</b>			
Boomslang ( <i>Dispholidus typus</i> )	I	Hemorrhagins and procoagulants	Uncommon in private collections; antivenom available only from the South African Vaccine Producers
			
<b>Scorpions: Family Buthidae, excitatory neurotoxic envenomation</b>			
Yellow scorpion ( <i>Leiurus quinquestriatus</i> )	I	Neuroexcitatory and cardiotoxic properties (cardiotoxins probably present)	Probably most toxic scorpion species; fairly common in exotic animal trade
			
<i>Androctonus</i> species	I	Neuroexcitatory and cardiotoxic properties (cardiotoxins probably present)	Genus of highly toxic scorpions with several species commonly available in exotic animal trade
			
<b>Bony fish: Family Plotosidae, local envenomation</b>			
Coral catfish ( <i>Plotosus lineatus</i> )	III	Few data on specific venom components; edematogenic, nociceptive, and hemolytic properties reported; venoms produce cardiorespiratory depression and hypotension under laboratory conditions	Systemic envenomations have been reported; occasionally kept in home marine aquariums
			
<b>Bony fish: Family Scorpaenidae, cytotoxic envenomation</b>			
Lionfish ( <i>Pterois volitans</i> )	III	Few data on specific venom components; proteolytic and hemorrhagic properties; venoms result in cardiorespiratory depression and hypotension under laboratory conditions	Capable of inflicting a potentially complicated local wound if carelessly handled; popular in aquarium trade (illegal in several states)
			

Table B continues

†—The reference to the family Colubridae is used for convenience. This group is an artificial assemblage that consists of many unrelated species; most of these are nonvenomous. However, some are venomous, and others have oral secretions with variable toxicity and of unknown medical importance.

Online Table B. Selected Exotic Venomous Animals in Private Collections in the United States (continued)

Taxa	Hazard level*	Major venom properties	Comments
<b>Bony fish: Family Siganidae, local envenomation</b>			
Rabbitfish (e.g., foxface, <i>Siganus vulpinus</i> , other species)	III	No data on specific venom components, likely hemorrhagic and nociceptive	May inflict a painful wound if carelessly handled; several species commonly kept in home marine aquariums
			
<b>Cartilaginous fish: Family Potamotrygonidae, penetrative traumatic envenomation</b>			
Spotted freshwater stingray ( <i>Potamotrygon leopoldi</i> )	III	Few data on specific venom components; edematogenic, nociceptive, and proteolytic properties	Capable of inflicting a potentially complicated local wound if carelessly handled; popular in aquarium trade (illegal in several states)
			
<b>Sea anemones: Phylum Cnidaria, various families; local envenomation</b>			
Sea anemones and stinging corals (numerous genera and species)	III or IV	Few data on specific venom components; cytolytins reported	Stings may cause mild transient local pain; variety of fragile species offered in aquarium trade; also applies to a number of cultured corals available to the reef aquarium hobbyist
			
<b>Centipedes: Family Scolopendridae (and others), local envenomation</b>			
Tropical centipedes (primarily genus <i>Scolopendra</i> )	III or IV	Few data on specific venom components; hemorrhagic, proteolytic, cytolytic, edematogenic, and nociceptive properties reported	May inflict a painful but minor wound if carelessly handled; variety of species occasionally offered in exotic animal trade
			

Table B continues

Online Table B. Selected Exotic Venomous Animals in Private Collections in the United States (continued)

Taxa	Hazard level*	Major venom properties	Comments
<b>Spiders: Family Theraphosidae, local envenomation</b>			
Mexican red-kneed tarantula ( <i>Brachypelma smithii</i> ), numerous other species	III or IV	Few data on specific venom components; ion (potassium) channel toxins have been characterized	Most tarantulas are inoffensive and reluctant to bite; urticating hairs, common on these spiders, may cause local dermatitis or more severe atopic response (including ophthalmia); other species (e.g., Goliath bird-eating spiders [ <i>Theraphosa blondi</i> ]) are more aggressive and may inflict a painful but minor bite
			

## Information from references:

- B1. Mebs D. Venomous and Poisonous Animals: A Handbook for Biologists, Toxicologists and Toxinologists, Physicians and Pharmacists. Boca Raton, Fla.: CRC Press; 2002.
- B2. Campbell JA, Lamar WW. The Venomous Reptiles of the Western Hemisphere. Ithaca, NY: Comstock Pub. Associates; 2004.
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- B4. Tibballs J. Australian venomous jellyfish, envenomation syndromes, toxins and therapy. *Toxicon*. 2006;48(7):830-859.
- B5. Sutherland SK, Tibballs J. Australian Animal Toxins. The Creatures, Their Toxins and Care of the Poisoned Patient. New York, NY: Oxford University Press; 2001.
- B6. Seifert SA, Oakes JA, Boyer LV. Toxic Exposure Surveillance System (TESS)-based characterization of U.S. non-native venomous snake exposures, 1995-2004. *Clin Toxicol (Phila)*. 2007;45(5):571-578.
- B7. Trestrail JH III, al-Mahasneh QM. Lionfish sting experiences of an inland poison center: a retrospective study of 23 cases. *Vet Hum Toxicol*. 1989;31(2):173-175.

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