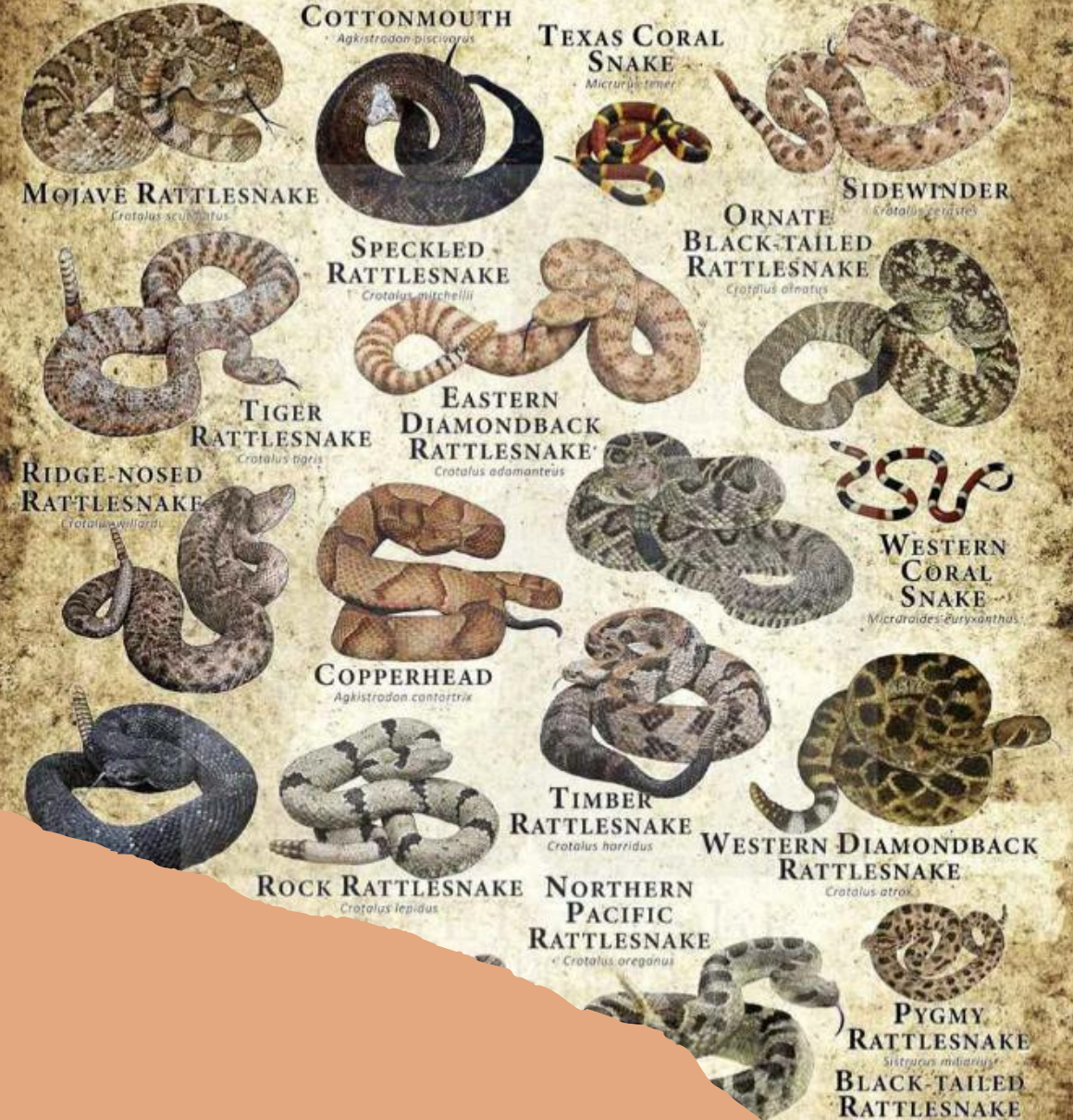


Venomous Snakes of the United States

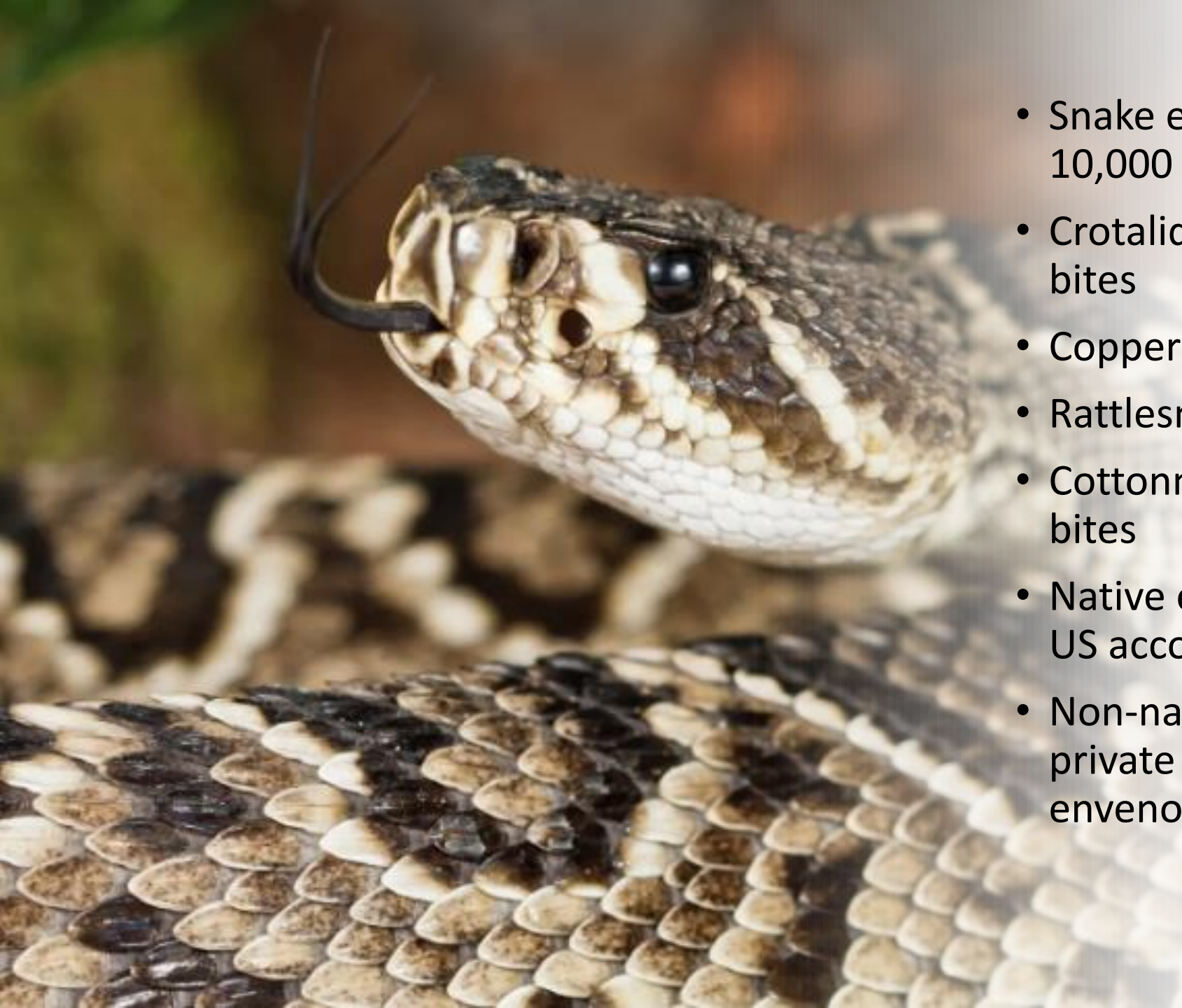


Snakes of the United States

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- Snake envenomations in the US: 5000-10,000 annually
- Crotalids are responsible for >97% of bites
- Copperheads cause 45-50% of bites
- Rattlesnakes: 30-40% of bites
- Cottonmouths account: 10-15% of bites
- Native elapids (coral snakes) from the US account for fewer than 3% of bites
- Non-native snake species in zoos and private collections comprise 1% of envenomations.

Background



- <8% of snakebite victims experience severe systemic toxicity or limb-threatening effects
- Death is exceptionally uncommon:
 - U.S. snakebite review (2001-2004) estimated 9900 envenomations with a mortality rate of 0.05%
- Untreated lethality rate for copperheads <1%
- Untreated lethality rate for Mohave rattlesnake (*C. scutulatus*) estimated to be 30-40%

Prevalence of fatal snakebites in the United States 1989–2018

Wyatt MS^{a,b,*}, Jason Folt, MD^c, Kimberly Wyatt, MS^d, Nicklaus P. Brande

^a Wyatt et al.

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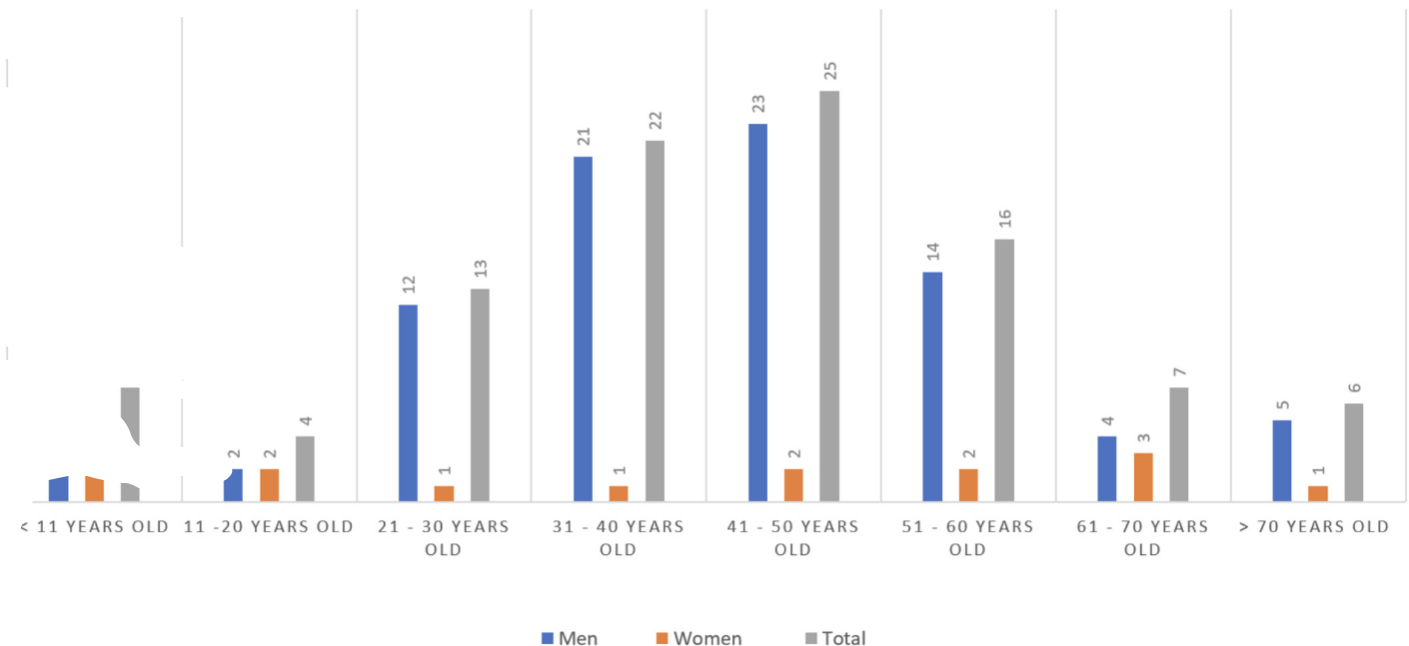
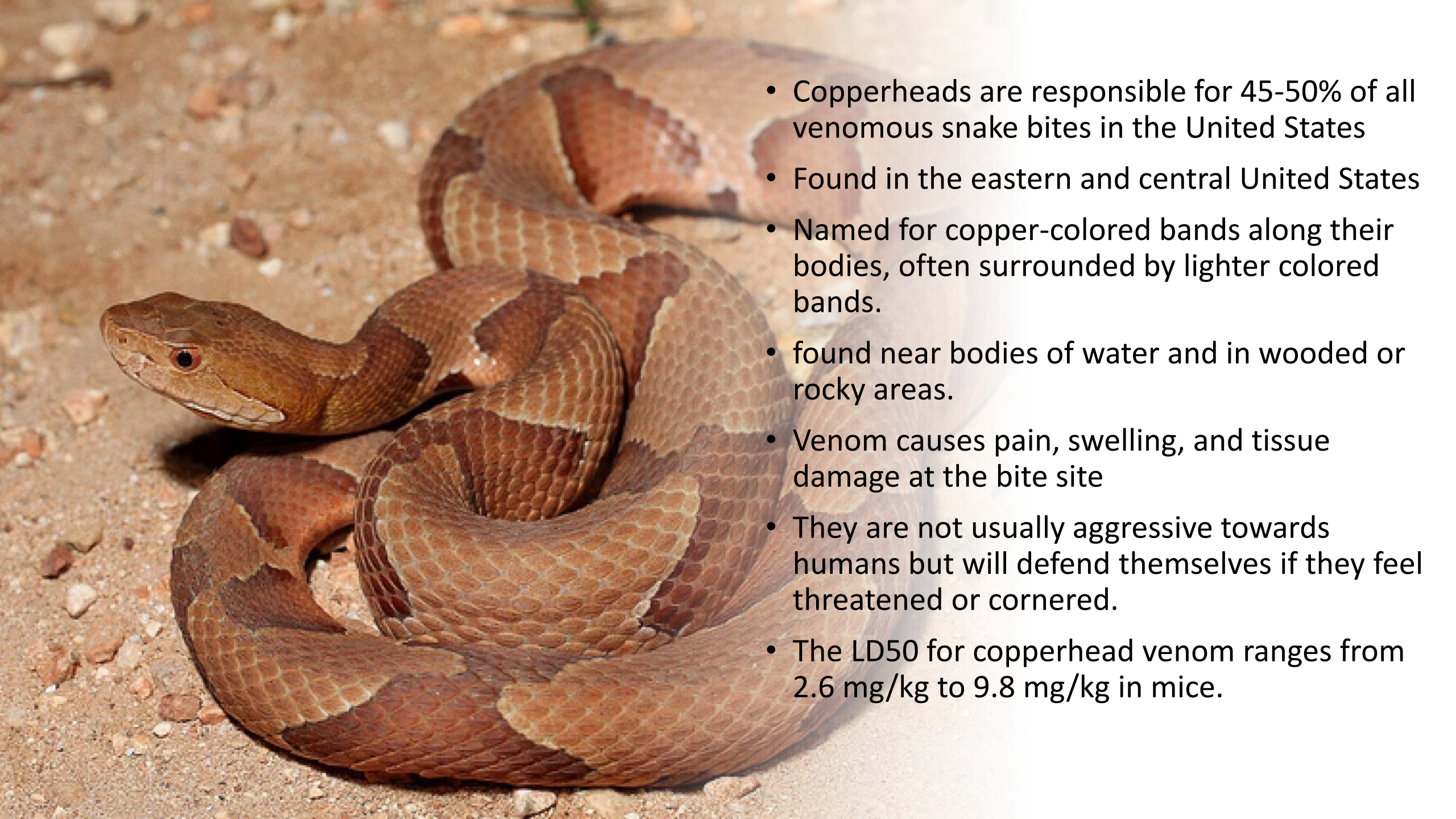


Fig. 1. Snakebite fatalities by age and sex.



Copperhead (*Agkistrodon contortrix*)



- Copperheads are responsible for 45-50% of all venomous snake bites in the United States
- Found in the eastern and central United States
- Named for copper-colored bands along their bodies, often surrounded by lighter colored bands.
- found near bodies of water and in wooded or rocky areas.
- Venom causes pain, swelling, and tissue damage at the bite site
- They are not usually aggressive towards humans but will defend themselves if they feel threatened or cornered.
- The LD50 for copperhead venom ranges from 2.6 mg/kg to 9.8 mg/kg in mice.

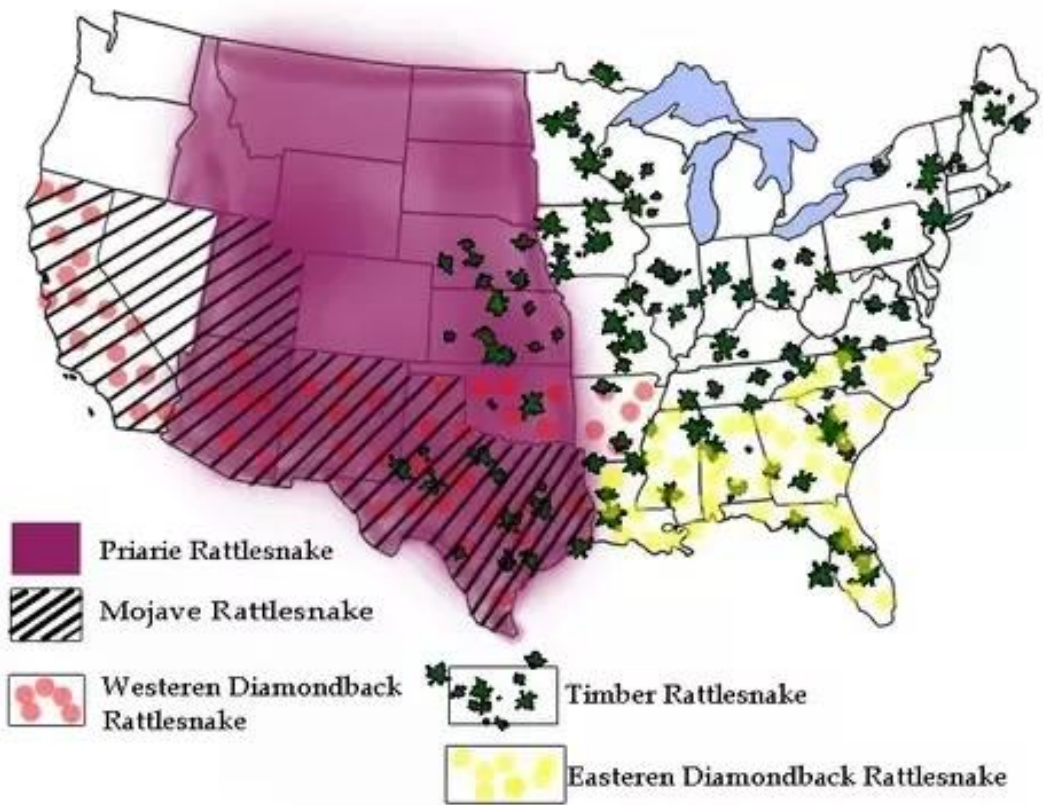


Copperhead Venom

- Phospholipase A2: An enzyme that can break down cell membranes
- Metalloproteinases: Enzymes that break down connective tissue, leading to bleeding and tissue damage
- Bradykinin-potentiating peptides: Molecules that can increase the activity of bradykinin which causes pain, swelling, and blood vessel dilation
- C-type lectins: Proteins that can affect blood clotting and immune function
- Serine proteinases: Enzymes that break down proteins leading to tissue damage

US Rattlesnakes



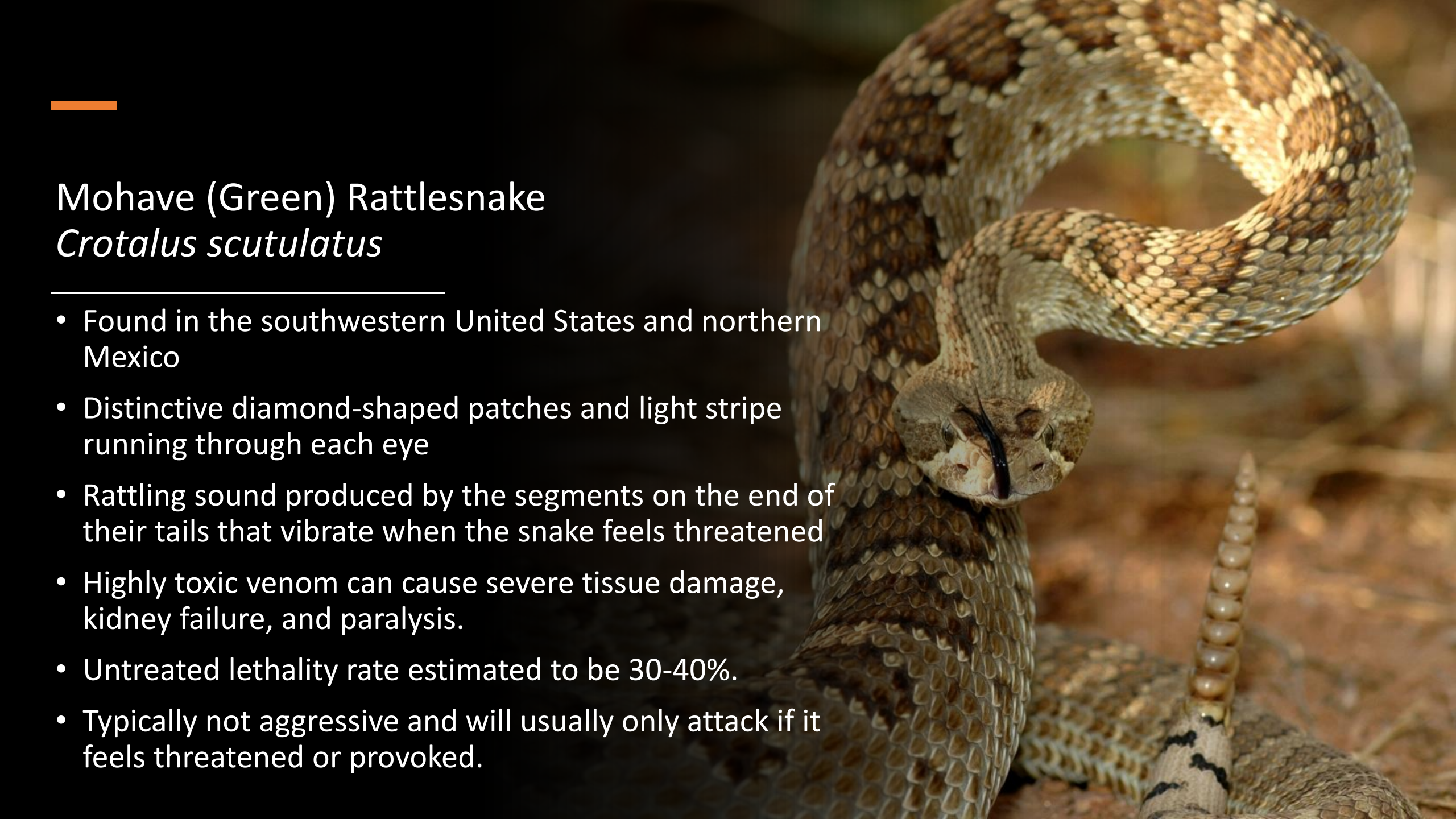


RATTLESNAKES OF NORTH AMERICA





Mohave (Green) Rattlesnake
Crotalus scutulatus

A close-up photograph of a Mohave (Green) Rattlesnake. The snake's head is in the foreground, facing left, with its mouth slightly open. Its body is coiled in the background, showing a pattern of diamond-shaped patches and a light stripe running through each eye. The scales are a mix of brown and tan colors. The background is a blurred natural setting with dry leaves and twigs.

Mohave (Green) Rattlesnake

Crotalus scutulatus

- Found in the southwestern United States and northern Mexico
- Distinctive diamond-shaped patches and light stripe running through each eye
- Rattling sound produced by the segments on the end of their tails that vibrate when the snake feels threatened
- Highly toxic venom can cause severe tissue damage, kidney failure, and paralysis.
- Untreated lethality rate estimated to be 30-40%.
- Typically not aggressive and will usually only attack if it feels threatened or provoked.

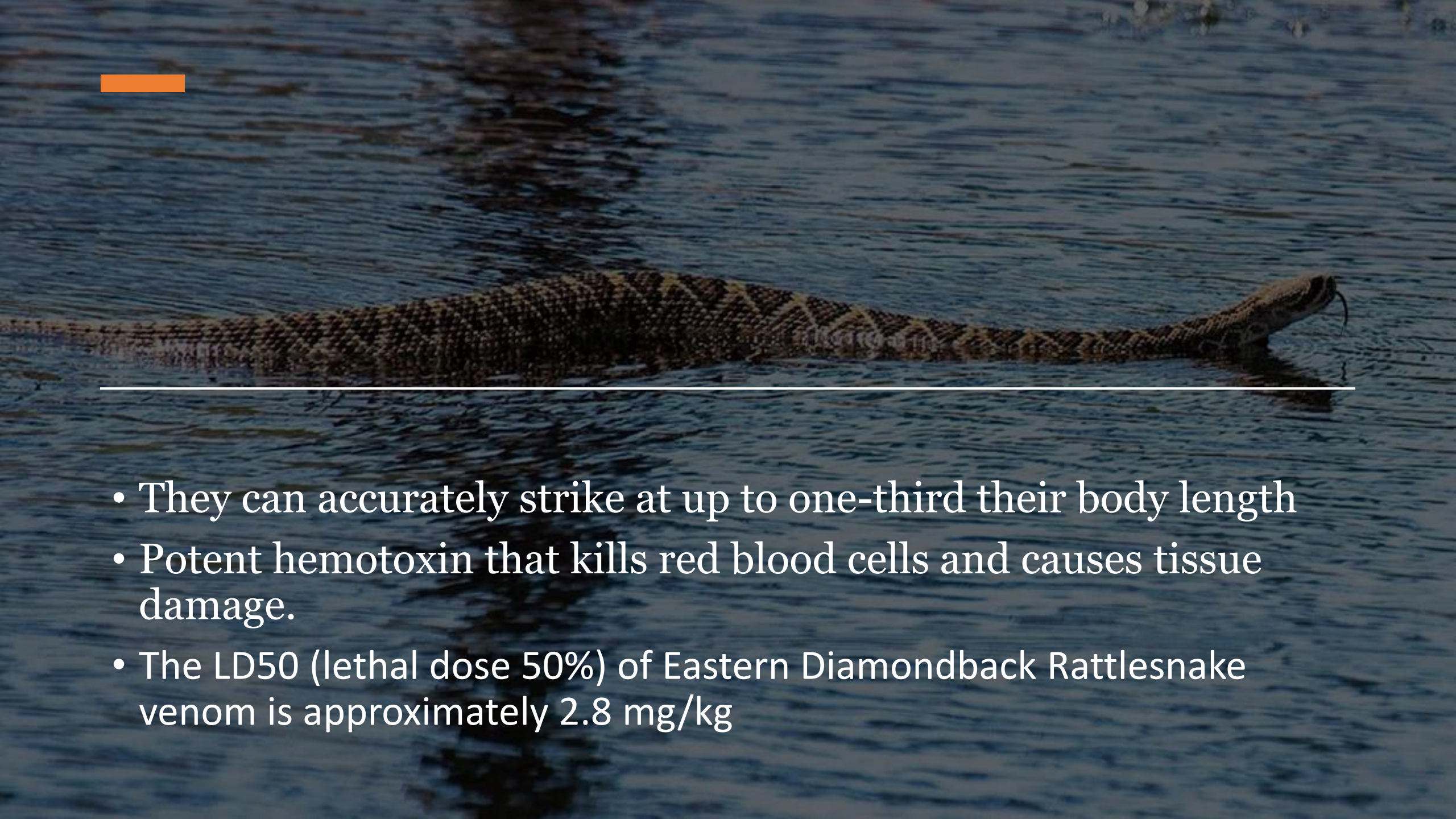


Eastern Diamondback Rattle Snake
Crotalus adamanteus

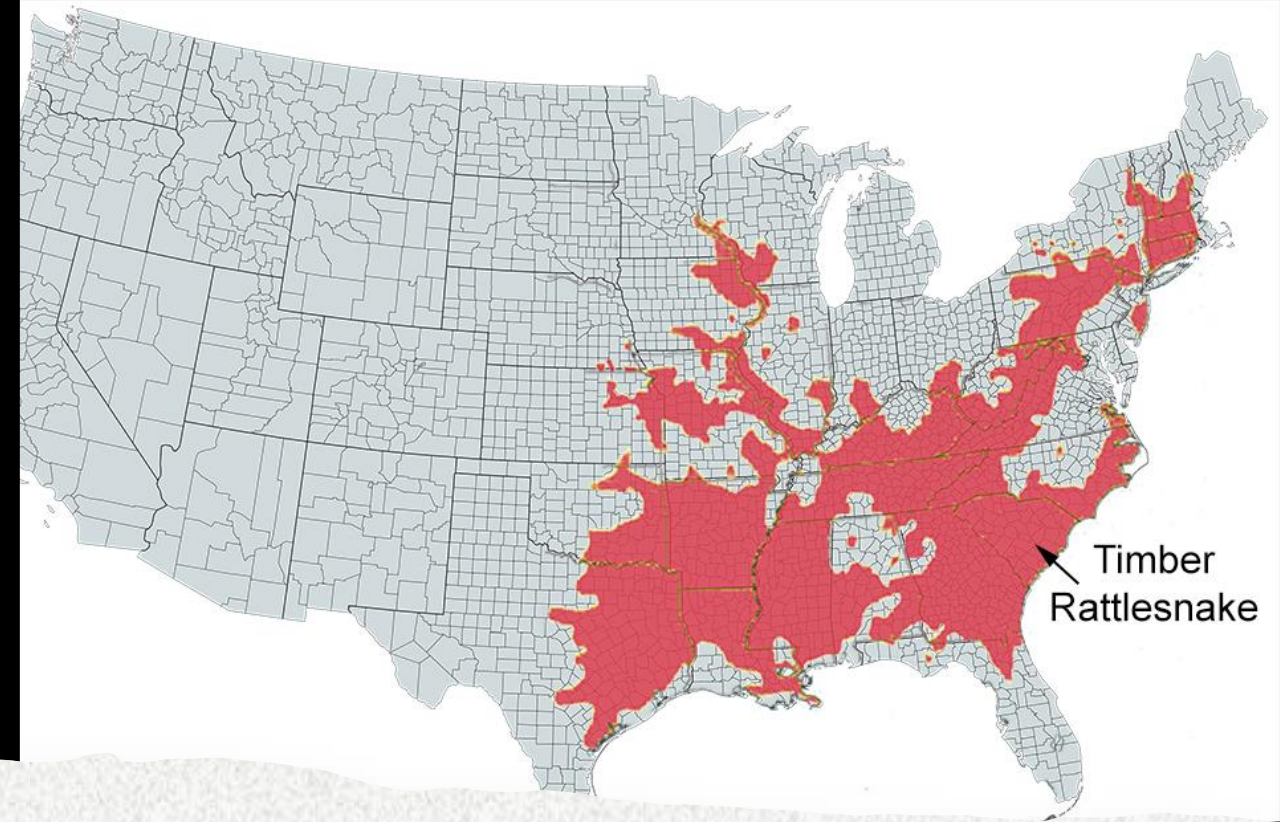
Eastern Diamondback Rattle Snake *Crotalus adamanteus*

- Largest venomous snake in North America
- Some reach 8 feet in length and weigh up to 10 pounds.
- Live in the dry, pine flatwoods, sandy woodlands, and coastal scrub habitats
- North Carolina to Florida and west to Louisiana
- Yellow-bordered, light-centered black diamonds
- Averse to human contact and only attack in defense





-
- They can accurately strike at up to one-third their body length
 - Potent hemotoxin that kills red blood cells and causes tissue damage.
 - The LD50 (lethal dose 50%) of Eastern Diamondback Rattlesnake venom is approximately 2.8 mg/kg



Timber Rattlesnake
Crotalus horridus

Timber Rattlesnake

- threatened species in many states due to habitat loss and persecution by humans.
 - primarily feed on small mammals, such as mice and chipmunks.
 - non-aggressive and will try to avoid confrontation if possible
 - LD50 for timber rattlesnake venom ranges from 1.9 mg/kg to 10 mg/kg
-





Western Diamondback Rattlesnake
Crotalus atrox

Western Diamond Back Rattle Snake *Crotalus atrox*

- Found in the southwestern US and northern Mexico.
- Diamond-shaped markings along its back, which are brown or gray in color and outlined in white
- Western diamondbacks are pit vipers with heat-sensing pits on their face used to detect prey like rodents and rabbits.
- venom can cause severe pain, swelling, and tissue damage, as well as systemic effects like nausea, vomiting, and difficulty breathing
- LD50: 2.45 mg/kg to 3.3 mg/kg



A photograph of a Cottonmouth Water moccasin snake (Agkistrodon piscivorus) coiled on a dark asphalt surface. The snake's mouth is wide open, revealing a bright white interior and a pinkish-red tongue. The snake's scales are a mix of dark brown and lighter tan colors. The background shows a cracked asphalt surface and a small patch of green vegetation in the bottom left corner.

Cottonmouth
Water moccasin
Agkistrodon piscivorus



- Cottonmouths also known as water moccasins
- Found in the southeastern US
- Named for their white mouths that they show when threatened
- Cottonmouths are semi-aquatic, and usually found near water
- Nocturnal and feed on fish, frogs, and small mammals
- Cottonmouth venom causes pain, swelling, tissue damage, nausea, vomiting, and difficulty breathing.
- LD50 of cottonmouth venom ranges from 2.6 mg/kg to 5.1 mg/kg





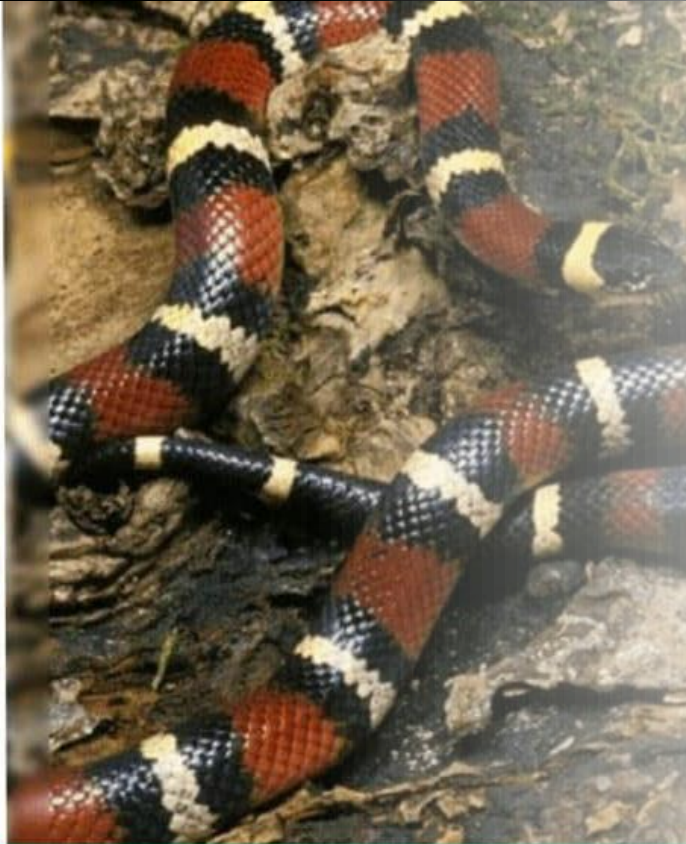
Coral Snake
Micrurus fulvius

- Coral snakes are venomous snakes found in North and South America, with different species in different regions
- They have red, yellow, and black banding patterns along their bodies, which can be difficult to distinguish from nonvenomous mimics.
- Coral snakes are reclusive and generally not aggressive towards humans, but will bite if threatened or handled.
- Their venom is highly toxic and can cause paralysis of the respiratory system, leading to death if not treated promptly.
- The LD50 of coral snake venom ranges from 0.18 mg/kg to 0.4 mg/kg in mice, according to some studies.
- In the United States, the eastern coral snake is the only native species, found primarily in the southeastern states.





Coral Snake



Milk Snake

"Red touch yellow, kill a fellow. Red touch black, friend of Jack."

- This means that if a snake has red and yellow banding, it is likely a venomous coral snake and should be avoided
- However, if a snake has red and black banding, it is likely a harmless species, such as a milk snake or scarlet king snake

A brown snake with its mouth open, coiled on a rock in a natural setting. The snake's head is raised, and its mouth is wide open, showing its tongue and teeth. The background consists of green foliage and trees, suggesting a forest or woodland environment. The lighting is natural, highlighting the texture of the snake's scales and the surrounding vegetation.

The End