

Identification of Venomous and Non-venomous snakes

Buddhi Prakash Jain
Assistant Professor
Department of Zoology
Mahatma Gandhi Central University Motihari

Objectives of the lecture:

1. What is the difference between venomous and poisonous?
2. How to identify venomous and non venomous snakes?
3. Venomous snakes in India.

1. What is the difference between venomous and poisonous?

Both poisonous and venomous animals are toxic.

The venomous animals are those which can deliver or inject the toxin/venom directly into the body of another animals while poisonous animals are those which are toxic only if they are eaten or touched. It means the poisonous animal do not produce venom.

Example. A cobra snake is venomous because it produce venom and can inject this by biting while a lizard is poisonous which means it is toxic if another animals or humans eat it.

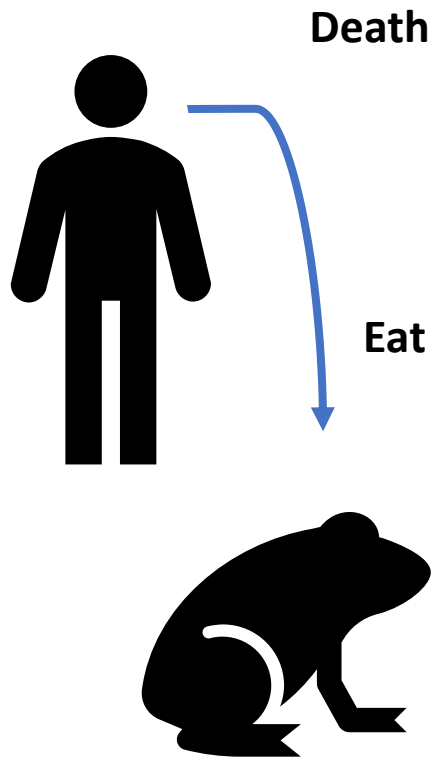
In case of snake, poisonous word is used in place of venomous which is not correct.

In another word we can understand as if a animal bites you and you die then the animal is venomous and if you bite the animal and you die then it is poisonous.

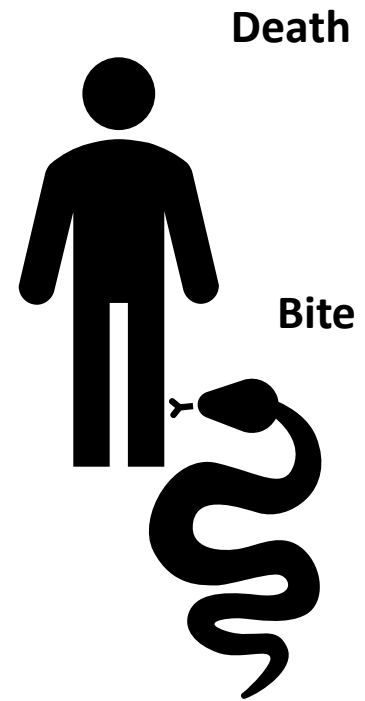
Toxins are the chemicals which are harmful to the body. Poison or venom are toxins which are differentiate on the basis of their delivery method. If the toxin is injected then it is called venom and if it eaten or absorb by skin then it is poison.

It means a venomous snake does not necessarily be poisonous.

* Garter snake (*Thamnophis*) is non venomous which means it is harmless in terms of its bite but poisonous as eating it is toxic (its body surface has toxins).



Poisonous



Venomous

2. How to identify venomous and non venomous snakes?

Around 3000 species of the snake are present across the globe. Only 20 percent (~600 species) is venomous and only 7 percent (~200 species) snakes are able to kill a human.

In Indian context more than 270 snake species are present out of which around 60 species are venomous.

India reported approximate 50000 death every year by snake bites.

Snakes are cold blooded animals which means they can not regulate the body temperature internally. Their body temperature changes according the environment.

Most of the snakes are covered by scales.

The venomous snake can be identified by careful observations of the following structures:

Step 1: Nature of the tail:

First observe the tail.

- Tail is flat, laterally compressed – Sea snake – Venomous.
- Tail is short and blunt – Sand Boa – Non venomous
- Tail is round and cylindrical – Venomous/Non venomous

Step 2: Nature of the ventral scales:

If the tail is cylindrical snake can be venomous or non venomous, observe the ventral scales:

- Small scales on the ventral side (belly region) – Non venomous- Garter snake.
- Ventral scales are large but do not cover the belly region completely, small scales at the end of broad ventral scales- Non venomous – Python.
- Ventral scales are broad and cover the entire width of the belly region – Venomous/ Non venomous.

Step 3: Nature of the head scales:

If the tail is cylindrical and ventral shield is broad covers the entire belly part, the snake can be venomous or non venomous, observe the head scales:

- Small head scales - Venomous- Viper.
(If loreal pit (thermoreceptor) is present in front of eye then it is pit viper).
- Large shield in the head – Venomous/ Non venomous

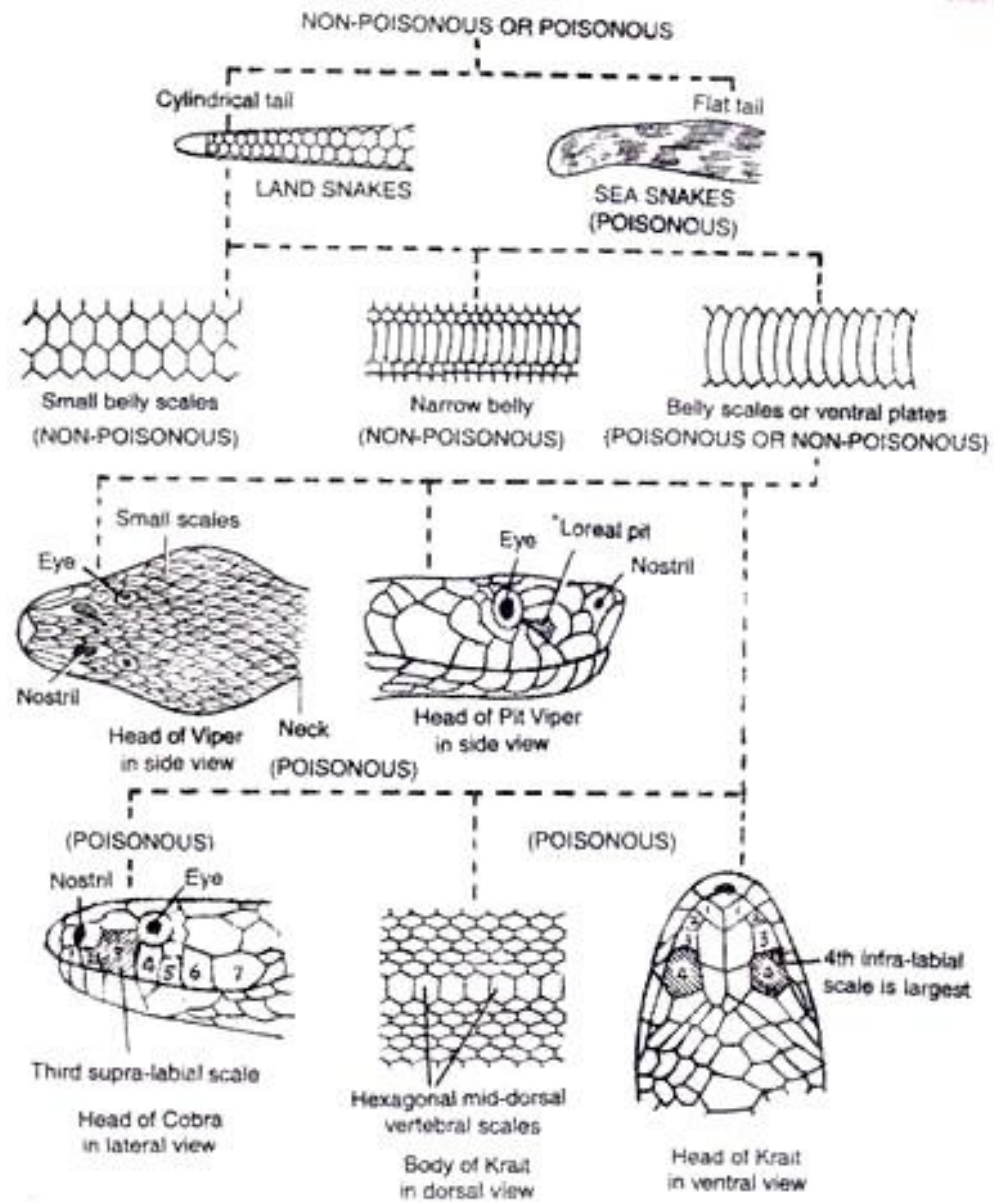
Step 4: Nature of the jaw scales and vertebral scales:

If the tail is cylindrical, ventral shield is large, head is covered with large shield, snake can be venomous or non venomous, observe the jaw and vertebral scales:

If the vertebral scales are not large, third supra labial shield (upper jaw) is large and touch the nostril and eye – Venomous- Cobra or coral snake.

Vertebral scales (mid dorsal on back) are large and hexagonal, four infra labial scales with 4th one is the largest – Venomous - Krait.

Character	Venomous snake	Non venomous snake
Teeth	In upper jaw two fangs are present which are modified teeth	All the teeth in the upper jaw are uniform and no fangs present
Snake bite mark	1 or 2 puncture on the skin by fangs	Many punctures made by maxillary teeth
Colour	Bright colour	Not bright (some non poisonous snake as python, sand boa etc. are brightly coloured)
Head	Triangular and broad	Short and elongated
Tail	Flat or cylindrical	Cylindrical or blunt
Ventral scales	Large and along the entire width of	Small or large but not cover the belly region completely
Head scales	Small or large	Large shield
Dorsal scales	Smaller (hexagonal in krait)	Large, not in hexagonal shape



3. Venomous snake in India

In India around 60 venomous species are present, out of which four are the deadliest refereed as Big four:

1. Russell's viper (*Daboia russelii*)
2. Common krait (*Bungarus caeruleus*)
3. Indian Cobra (*Naja naja*)
4. Saw-scaled viper (*Echis carinatus*)

1. Russell's viper (*Daboia russelii*)

Pitless viper.

Cause maximum number of death in India.

Found in almost all parts of India.

Body is short (up to 1.5 meter).

Body is light brown colour. Dark black or brown rings are present all along the body.

Triangular head.

Venom is hemotoxic.



Umich.edu



2. Common krait (*Bungarus caeruleus*)

It is bluish-black or black in colour. Several cross bands of white or light coloured present along the body.

Head is narrow.

Body is elongated and cylindrical.

Hexagonal enlarged dorsal shield is present.

3rd and 4th supra labial in upper jaw large and touch the eye.

Venom is neurotoxic.



Brainkart.com



3. Indian Cobra (*Naja naja*)

Body brown to black in colour. Length 2 meter.

Commonly called as Nag. Diurnal.

It can dilates the neck and can be identified by dark mark on the dorsal side of head.

Fangs are small.

Third supra labial shield touch the nostril and eye.

Venom is neurotoxic.



4. Saw-scaled viper (*Echis carinatus*)

After Russel viper , it is the most common viper in India. Smallest among big four (0.3 to 0.5 meter)

Colour is light to dark and sandy brown to grey. It shows camouflages in the background.

They have zigzag darker pattern all over the body. Large eye and wide head than neck.

It coils its body in the shape of "8". Scales are rough and it produce sound of a saw cutting wood by rubbing its scale.

Venom is hemotoxic..



References:

<https://www.nationalgeographic.com/animals/reptiles/group/snakes/>

<https://www.ncbi.nlm.nih.gov/pubmed/28799310>

<http://www.biologydiscussion.com/zoology/reptiles/difference-between-poisonous-snakes-and-non-poisonous-snakes-reptiles/41078>

<http://www.walkthroughindia.com/wildlife/the-6-most-venomous-snakes-in-india/>

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1678-91992006000100002

A modern Text book of Zoology Vertebrates by R.L Kotpal.

Sulabh, Sourabh & Shivahre, Pushp. (2018). COMMON POISONOUS SNAKES OF INDIA -A REVIEW. World Journal of Pharmaceutical Research. 431-442.
10.20959/wjpr20181-10495.

THANK YOU