# SNAKE

*From Myth to Science for Society and Ecology*


*:: Editors ::*

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**1.**

# MECHANICS OF SNAKES' SLITHERING

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Snakes are elongated, limbless, carnivorous reptiles of the suborder Serpentes. These creatures are ectoyhermic, amniote vertebrates whose body is covered with overlapping scales. Many species of snakes have skulls with several joints enabling them to swallow prey much larger than their heads with their highly mobile jaws. Snakes' kidneys appear one in front of the other instead of side by side, which helps them to accommodate their body in narrow.

Snakes are found on every continent except Antarctica, and on most smaller land masses; except some large islands, such as Ireland, Iceland, Greenland, the Hawaiian archipelago, and the islands of New Zealand, as well as many small islands of the Atlantic and central Pacific oceans. Sea snakes are widespread throughout the Indian and Pacific oceans. Snakes are thought to have evolved from either burrowing or aquatic lizards, during the Jurassic period.

Most species of snake are nonvenomous and those that have venom use it primarily to kill and subdue prey rather than for self-defense. Some possess venom that is potent enough to cause painful injury or death to humans. Nonvenomous snakes either swallow prey alive or kill by constriction.

The lack of limbs does not prevent the snakes from movement. Snakes have developed several different modes of locomotion to deal with particular environments. The locomotion of snake is known as slithering. Some common modes of locomotion are Lateral Undulation, Sidewinding, Concertina, Rectilinear and Slide-pushing.

The first locomotion mode of most limbless lizards is Simple Undulation. Simple undulation is characterized by waves of lateral bending being propagated along the body from head to tail.

**Lateral Undulation –**

It is the common serpentine locomotion of snakes. Lateral undulation i.e., side to side wriggling, is the type of locomotion usually associated with snakes. At any given time various areas of the snake's body are pushing simultaneously against a number of fixed points. As the snake moves forward new contact points are made. This is identical for movement across desert, through branches or swimming.

The fastest terrestrial snakes use this method of locomotion. In this type of locomotion, whenever a bend contacts a surface object, such as a rock or stick, it exerts force against it and deforms locally around it. Whenever a snake pushes against multiple objects simultaneously, the lateral force vectors cancel each other, leaving a resultant vector that propels the snake forward; postural adjustment around each object gives the snake even finer control over the direction of force exertion. Force exertion against each object is inversely proportional to the number of objects being pushed against simultaneously by the snake, but total force is roughly constant for a given speed and substrate.

In this type of movement of snakes, the large dorsal muscles are activated sequentially along the body. The muscles are active unilaterally in each bend, from the convex part of a bend forward to the straight or concave part of the bend. As the snake moves forward, each point along its body follows along the path established by the head and neck. Sliding friction is a critical component of lateral undulation. The local adjustment of curvature around each point of contact with an external object indicates a high degree of sensory-motor control.

**Concertina locomotion –**

This is common in burrowing snakes and can be seen when a snake crawls through a tube or climbing. While the back half of the body acts as an anchor the front half is pushed forward. The back half is then drawn forward.

This type of locomotion is common in arboreal and fossorial snakes and requires the most energy. This type of movement involves alternately pulling up the body into bends and then straightening out the body forward from the bends. The front part of the body then comes to rest on the surface and the back part of

the body is pulled up into bends again, and so forth. The bends may push laterally against the sides of a tunnel or vertically against the ground to keep the body from slipping. Thus, static friction is critical to concertina locomotion. In concertina locomotion, blocks of muscles are activated simultaneously, and unilaterally, in regions of bending and of static contact with the sides of a tunnel.

**Sidewinding –**

This is similar to concertina locomotion but the angle of movement is at 45 degrees to the direction that the snake is pointing. It is used by many snakes crawling on smooth or slippery surfaces, but is best known in the sidewinder rattlesnake (*Crotalus cerastes*) and a few desert vipers of Africa and Asia. Sidewinding is similar to lateral undulation in the pattern of bending, but differs in three critical ways: First, each point along the body is sequentially placed in static (rather than sliding) friction with the substrate. Second, segments of the body are lifted off the ground between the regions in static contact with the ground. Thus, the body sort of rolls along the ground from neck to tail, forming a characteristic track (that is proportional to body length) in sand; after being lifted off the ground and set down again a short distance away, the front part of the body begins a new track while the rear part of the body completes the old track. Third, because of the static contact and lifting of the body, the snake travels roughly diagonally relative to the tracks it forms on the ground. Muscle activity during sidewinding is similar to that in lateral undulation except that some muscles are also active bilaterally in the regions of trunk lifting.

**Rectilinear locomotion –**

In this type of movement the edges of the scales act as anchor points and the muscles then pull the body up to that point. This is often used by large snakes. The motion is similar to that of a caterpillar crawling and involves waves of bilaterally symmetrical muscle contractions. This type of locomotion is common in boas, pythons, and stocky vipers. This movement occurs in a straight line.

In rectilinear locomotion, the belly scales are alternately lifted slightly from the ground and pulled forward, and then pulled

downward and backward. But because the scales "stick" against the ground, the body is actually pulled forward over them. Once the body has moved far enough forward to stretch the scales, the cycle repeats. This cycle occurs simultaneously at several points along the body. Static friction is the dominant type of friction involved in rectilinear locomotion. Unlike lateral undulation and sidewinding, which involve unilateral muscle activity that alternates from one side of the body to the other, rectilinear locomotion involves bilateral activity of the muscles that connect the skin to the skeleton. One set of these muscles lifts the belly scales up and pulls them forward and another set of muscles pulls them downward and backward.

**Slide-pushing –**

This type of locomotion involves vigorous undulations of the body that slide widely over the surface. Slide-pushing is used when a snake on a smooth surface is startled and tries to escape quickly, but slips over the surface. In slide-pushing, irregular bends of the body and tail press vertically on the surface at different points; although the body slips on the surface, it pushes down with enough force to move the center of mass in a quasi-regular, often step-like, pattern. Thus the snake progresses irregularly by slipping along the ground. Sliding friction is most important in slide-pushing, although there may be occasional moments of static contact. The patterns of muscle activity during slide-pushing are unknown.

**References :**


- https://www.bbc.com/news/science-environment-35563941
- https://askdruniverse.wsu.edu/2017/12/18/how-do-snakes-slither/
- https://physicsworld.com/a/slithering-snakes-diffract-like-quantum-particles/
- https://thekidshouldseethis.com/post/38218729229
- https://en.wikipedia.org/wiki/Snake
- https://pubmed.ncbi.nlm.nih.gov/32271916/
- https://userweb.ucs.louisiana.edu/~brm2286/locomotn.htm
- https://www.britannica.com/animal/snake/Locomotion
- https://en.wikivet.net/Snake_Locomotion


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**2.**

# SNAKE DEATH: KNOWN BUT IGNORED CAUSES AND SOLUTIONS

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## Introduction

The snakes are most fearsome creatures for a common man, but these reptiles are one of the most shy and beautiful creatures. Actually snakes try to avoid human presence in their habitat. Human fear about snakes is due to incidence of snake bites as a cause of death the people see. Therefore a common scene in society, offices, farms and any such public places is always neary 100 % gathered mob prepare to kill this animal. In the list of cruelty for animals by human the snakes stands first in the list. Unfortunately when someone report to others about presence of snakes at a place especially in home or residential area the first reply of gathering is 'kill it'. Those who have not seen it also believe on person who reported it and ready to kill it and prepare well with a stick, stones, spears, iron arrows. This results in death of this poor, limbless, noiseless creature. This can be stopped. It is very true that, snakes never interested to apply their venom to bite or injure, paralyze and kill their prey. At several places to kill a snake is considered as a heroic act and the snake killer behave as a hero and showcase the poor animal'The Snake' by hanging on spear or on a stick. It has been mentioned in Hindu purana and in several religions ' JioJivassyaJivanam', live and let others to live. This mother earth is not made by cosmos universe only for human but nature has created several thousand species by spending sufficient time of millions of years by natural selection and rule of survival of fittest. The slogans such as 'snake is a friend of farmer' practically found not working, actually the slogan has changed to 'Human is first enemy of snakes'. This bruttle killing of snakes can be stopped by formulating new laws of wildlife protection, educating the masses, to students, farmers, teachers etc. It is found at several places in India that snake killing is a mob lynching type of activity, in this context the snake is alone against

several human enemies. In such cases the human who are ready to kill the snake don't know about exact reason of their involvement in bruttle killing act. The chapter deals with the discussion on why snakes are killed, what is their natural place in food chain and what a human being can do to save these creatures. Human has to understand clearly that, snakes are living on this earth since Jurasic Period and human evolved jus 1.60 lakh year ago. Snakes are senior than human in terms of evolution of life on the earth.

When we review the evolution of snakes that shows snakes were evolved in Jurasic period about 143 to 167 million years ago; since then 520 different genera and 3900 species evolved and distributed in various ecosystems of the world. Except Antarctica the snakes are found all over the world. When the data on snake species and their body size is reviewed it reveals that Barbadose Thread snake (*Tetracheilostomacarlae*) found in the Barbadose forests of West Indies, now categorized under the Critically Endangered (CR) category of IUCN has approximately average size of 10.0 cm. The longest, most fowerful for its grip on prey are reticulated Python which is 6.95 Meters in length. The next longest and largest in this category are well known Burmese Python and Green Anaconda.

The common big four known for their venom in the world are Spectacled Cobra (*Najanaja*), Common Krait (*Bungaruscaeruleus*), Russells' Viper (*Daboiarusselii*) and Saw scaled Viper (*Echiscarinatus*) (SenjiLaxme RR et al., 2019). The big four have been studied well in Indian subcontinent for their occurrence, biology and venom characterization, the venom effect on various systems in Mammals including human. According to the venom effect the snakes are classified as hemotoxic, neurotoxic and myotoxic. On major venomous species found in Indian subcontinent that found in the human inhabited area antidotes have been discovered and human lives are saved effectively from snake venomization but still several species are dominating on human race due to no answer human has on their antidote (SenjiLaxme RR et al., 2019). In recent finding by Senji et al. (2019) the common antidote used against big fou venomous speces is not effective against north Indian Krait species *Bungaruscaerulus*. Now the snake bite is considered world wide

as Neglected Tropical Disease. In India there are about 46,000 deaths and 140,000 disabilities annually for that big four species are involved moreover for other neglected venomous snake species the same antidote is not effective due to difference in the snake diet, the habitat difference and difference in biochemical composition of venom. Similar is the case of antidote for sea snake species bite. Snake venom itself is solution to find the answer in the form of synthesis of antidotes hence snake survival is important to get their venom, that is indirectly related to human survival.

Snakes have their own defense mechanism for having fangs, venom, sharp teeth in jaws and highly extensible jaws. Using these bio-weapons snakes easily grab and swallow the prey food as a whole. All snakes are carnivorous, predatory on variety of creatures in their surrounding habitat and one of the important predators in maintenance of ecological balance. Once the snakes get a large prey of their choice they can scurvies for few months without food. Snakes do not need to consume food daily. Several species hibernate during cold and majority species are active during night to avoid intense heat and light of the day. Snakes are one of the highly adaptive creatures to live in small and constricted area and also have less food demand. All creatures have instinct to survive by several means, snakes are one of them.It is essential to determine the possibilities of snake deaths that occour naturally as a part of food chain in nature and other reasons.

A) **Causes of snake death as a part of ecosystem and food chain**

1. Predation by Mammals like Herpestes:

The Herpestes species are one of the commonly occurring very agile Mammals. These are medium sized social Mammals. They feed on Scorpions, spiders and variety of medium to large snakes in deserts and semi-arid areas. Even they found killing common Indian spectacled Cobra, the spitting Cobra, Mozambique Cobra and common Krait species. Once the battle start in between these rivals then the death of Cobra is confirmed. The Herpestes are resistant to venom of snakes, no effect of snake bite on these Mammals. Herpestes attack mainly on head of snakes and they cut it from neck area. They feed on itor in many instance they leave the fragmented snake body on the battle ground. The exact reason

of this well known rivalry is not still clear but the Herpestes do not prefer invasion of snakes in their feeding territory.

2. Predation b Raptors:

The Raptors are group of birds mainly includes Hawks, Harriers, Kites, Eagles and Vultures. Of these the snake eating Eagle (Short toed snake eagle (*Circaetusgallicus*) the marsh Harriers are well known to swallow the snakes after predation. They feed on non-venomous and venomous both the snakes as their main diet or supplementary/secondary diet. This is natural food chain. Here the important issue is decrease in natural population of snakes hence the dependant birds are getting less food. his is disturbance in snake based food chain in Savana, grassland, scrubland and mountain ecosystems.

3. Death of Python due to feeding on Antlers:

The gigantic and one of the longest snakes are Reticulated Python (*Malayopython reticulates*) feed on variety of animals like monkeys, birds, squirrels, hare and deer species but if it select Male Chinkara (*Gazellabennetti*)at some occasions from a grassland then it for fetal for the Python. The whole body ofChinkara get digested but the long, pointed and straight antlers of this deer remain undigested. The antlers are usually regurgitate but if fail to do so due to penetration of these antlers in to vital organs or any visceral organs of the Python then cause internal bleeding and infections to cause the death of Python.

4. Cannibalism by own species or by other snakes:

The Cobra, Krait and King Cobra (*Najanaja*) are predatory on their own or other species as cannibalism. Mostly the young are cannibalized. The monitor lizard also one of the enemy to engulf or destroy snake eggs. Snakes always guard their eggs by coiling around it. But the young ones are free living hence there is equal chances of predation.

5. Death of New Born:

In oviparous and viviparous snakes the chances of death of newly emerged young snakes are mor because there is no parental care of new born in major snake species. As like other animals such a birds and Mammals the snakes do not provide any food to newly hatched young snakes therefore the young ones search their own food on their own efforts. Similarly no protection cover from

parents. The net result is death of about 70-80 % predation by Birds, Lizards and other snakes. This is natural food chain in various ecosystems where snakes found.

**B) Snake death due to human interfere and invasion**

As explained above the causes of snake death as a part of food chain is naturally balanced, that maintains snake population in an ecosystem. But against this natural n=balance there are several death of snakes due to human intervention in ecosystem and anthropogenic activity impact in general.

1. Snakes are killed under the Vehicles:

The snakes are mostly land vertebrates living on ground, trees, in crevices and several places that suites to hide. But, during movement from one to next area if they cross the roads with frequent passage of four wheel vehicles especially cars, trucks, heavy cargo carriers etc. In molting stage the body movements become slow and lethargic hence they need more time to cross the roads. Once the vehicle tire pass on the body of snakes then the internal organs like liver, kidneys and visceral organs get crushed due to vehicle load. That cause internal bleeding and slow death. Whereas if head damaged then cause immediate death. It is ironical we found the dead snakes lied on roads are again crushed repeatedly due to passing several vehicles on its dead body. There is no sympathy by human to remove the dead animals including snakes from the roads to avoid dishonors to the dead snakes on roads that can be removed using simple use and throw hand gloves. It need hardly 02-03 minutes time share for the cremation of these poor animals.

2. Death of snakes in charmers boxes and in Captivity:

It is against the rules and laws of Biodiversity Protection Act (2002) and its various amendments in the last few years the snakes are considered strictly as wild animals hence could not be kept under human captivity. Except in specially permitted places like Zoological parks, Zoos and Research laboratories the snakes can be maintained and breed in captivity. Other than these scientifically monitored places the Charmers, hobbyist, poachers and smugglers never maintain the snakes for their natural needs like food, shelter. Charmers showcase the snakes by providing milk to snakes. But, the milk isnot a natural food of snakes, that

results in starvation of these creatures in captivity. Non-scientific captive rearing os snakes is one of the potential reason of snake death.

3. Snakes killed in Human residential areas:

Snakes are free living creatures. If home, office, store rooms, wearhouses and several other kind of residential areas in villages and towns if not maintained then the chances of snake invasion in to these areas is highly possible. Because snakes get easy place to hide and their natural food like house rats, hen chicks, frogs and poultry eggs. Inagriculture crop area frequently we found snake-human conflict. Especially in Soybean crop or Indian peanut crop due to thick foliage the snakes get shade and easy hide which they love. Similarly these crops are attractants of rodents like brown rat and squirrels, land birds, insects and other reptiles. In search of these easy available natural food animals snakes enter into crop fields before and even after harvesting. Accidently snakes get tumbled in human legs during farm management and crop protection activities like insecticide spray, irrigation and weed control activities. Here the problem is not from the snakes

But we blame human beings. It is because very rarely farmers use fully protected shoes during agriculture work. Irrigation to crop many times they involved at night time which is feeding time of snakes. This cause accidental snake bites to people in residential areas and to the farmers.Here also the snakes are blamed. With careful work operations the snake bites can be prevented. Here the point of accidental bite is ‘People ignore or fail to identify the presence of snakes. Once we see the snakes then not essential to kill it only but at almost all places they are killed.

2. Poaching for leather and venom:

The snakes are colorful creatures. The bands, rings, blotches, spots and uniform color patterns found on snake skin. Accordingly they are named as Banded krait, Reticulate Python, Green Anaconda, Green Pit Viper etc. Use of snake skin for ornaments, jeweler boxes, ladies purses, wallets etc is prohibited in India but in countries such as Indonesia, Malaysian, Philippines, Thailand, even in parts of China the snake leather is used. Snakes are killed in large number.To sale the snake venom as a narcotic drink with wine in black market the snakes are captured to collect their

venom. In this process of venom collection the fangs are damaged, internal bleeding occour and snke could not hunt their prey.

**C) How the Snake death can be prevented**

1. Identify and differentiate as venomous and non-venomous: In the misbelieves that all snakes are venomous they are killed by human , very rarely they are rescued. In the nature the number of venomous species are less as compared to maney species of non-venomous snake species.
2. Prevent snake attractants in the surrounding:Snakes survive only to complete their natural needs such as food , shelter and mate. In search of this only the snakes move and if these things are available at home, office, agriculture, wearhouse they reach there. Especially in search of rodents, frogs and other small domesticated Mammals and birds snakes entered in to human habitats and may cause accidental snake bites to human. This can be prevented to save human and snakes both just by attention, vigilance and good work sense.
3. Understanding snake behavior:As mentioned earlier all snakes are not venomous. Every species has its own behavior. Presence of Hood is behavior of Cobra whereas the Kraits are very silent and they move preferably along the wall sides but not in open plains. Hissing noise is also behavior of some venomous snakes. Therefore it is essential to educate masses to understand the snake life, their behavior and don't kill them.
4. Scientific handling and rescue of snakes: The snakes need to handled scientifically during rescue. There is special snake handling tong with front forceps and liver with handle so as to carefully grip the area near head and rest of the body. Use of plastic pipes, protective gloves and shoes, cloth bags, Plastic Boxes to carry for rescue are essential materials required. Otherwise by rough and unaided handling and capture for rescue may cause harm either to snakes or rescuers.This prevents snake death.
5. Organization of Public awareness program and students friendly activities, Training to Farmers: The students are the future of each country. The students should be well informed about snakes, diversity, snake bites and conservational issues. Education to farmers at mass level and use of laws may

effectively save the snakes.Everyone should understand about these creatures. The last but not the least the films sensor system should remove the events and shots in various serials, and documentaries showing, snakes have diamond in their head, snakes are revengeful . All such nonsense should not reach the masses and young generation. Any snake based film should be passed through the Biological Protection laws and concern Boards.

**References:**


- SenjiLaxme RR, Khochare S, de Souza HF, Ahuja B, Suranse V, Martin G, et al. (2019). Beyond the 'Big four' : Venom profiling of the medically important yet neglected Indian snakes reveals disturbing antivenom deficiencies. PLoSNegl Trop Dis 13 (12): e0007899. Doi: 10.1371/journal.pntd.0007899.
- Biological Diversity Act (2002).The legislative Department Govt. of India. PP 1-20.
- Romulus Whitakar, Ashok Captain, Feroz Ahmed (2004). Snakes of India: The Field Guide. Draco Books, Chennai.


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## SNAKE: SOME MISCONCEPTIONS

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When we think of snakes, the fear, the curiosity and the thought of killing it are still ingrained in the minds of people about snakes. A few days ago, in a village, some overzealous youths killed a python, while elsewhere, some youths killed a non-venomous snake of Dhaman species on the road. Most of these snakes are killed for no reason or out of fear and ignorance. Many other animals are attacking man but man only thinks of killing the snake as soon as he sees it. In rural areas, some areas are known to kill snakes only. They are very ruthless in killing snakes mercilessly. There is no mercy in killing a snake but there is real humanity in saving it. Such incidents still show the ignorance in the society about snakes. On the one hand, Nagpanchami was worshiped as a festival of snakes, and on the other hand, the idea of picking up a stone or a stick and killing it as soon as it appeared was brought to mind. It has to stop somewhere. Media like movies and TV serials have played a very bad role in spreading misconceptions about snakes. But conscious serpent practitioners, serpent friends, newspaper articles and books are helping to dispel this misconception. Dr. P.J. Devaras's 'Snacks of India', Romulus Whitaker's Maruti Chittampalli's 'Snakes in Our India', Nilim Kumar Khaire's 'Snakes', Bhalchandra Mayekar's 'Snakes: Understanding-Misunderstandings', and Rahul Shinde's 'Snakes in Maharashtra' etc. Are available for studious snake practitioners.

The snake is an important link in nature and is just as important as any other animal. Of the 2,500 species of snakes found in the world, 216 are found in India and 52 are venomous. Dr. J. P. Devaras notes it in his book *Snakes of India*. According to snake study by Nilim Kumar Khaire, there are 278 species of snakes in India.

The snake is basically a coward. He likes to run away if the enemy comes in front of him. He is a very lazy animal. If he stops going in search of prey, at other times he stays lying down. This

observation has been made by Nilim Kumar Khaire in the book *Snake*. He does not go to anyone by himself. He never bites unless he feels threatened. But the notion that every snake is poisonous is fundamentally wrong. Therefore, it is more important to know which snakes are poisonous and which are non-venomous in our area, and the snake friends are doing this work regularly. Wherever snakes are seen, the number of snakes killed is much lower than before. Even today, it is believed that man is bitten by a snake. But that is not the case. There are seven types of venomous snakes found in Maharashtra. These include Nag, Manyar, Ghonas (Parad) and Povla. Other non-venomous snakes include python, dhaman, kavadya, divad, Taskar, kukari, vala, dhulnagin, mandul, naneti, grass, etc. Therefore, when you see a snake, do not be afraid and do not kill them, call to snake-friend.

**Identification of Snakes**

Snake: Jahal venomous snake. Gray, yellowish, brown, gray or black. Wheat smooth scales like wheat. The head is big, the eyes are black and big. Fanya has a hood mark like the number ten in Marathi. Some snakes do not have this pattern. The length can average three to four feet or a maximum of seven feet three inches.

Between April and July, herpes lays 10 to 15 eggs. It takes up to 60 days for the eggs to hatch. Cobras look like cobras. They are toxic at birth. Snakes feed on small insects, frogs, lizards, rats and small snakes. Snakes are found everywhere in India. Habitat - Mainly granaries, dilapidated houses, bricks, stone piles and places where rats live. It is also found day and night. Usually avoids human contact. If it is bitten or chewed, it makes a frightening noise by making a hissing sound. The venom can be released only after biting your snake. Only African snakes throw venom through the air with their teeth. Like other snakes, the snake is more active in the rainy season. Snake venom is extremely poisonous and affects the human nerves, causing respiratory and cardiac arrest. Snake bites do not kill the patient quickly. Its toxins gradually affect the body. Therefore, the patient needs to be admitted to the hospital immediately. With proper treatment the patient can survive. Painkillers are made from snake venom.

**Ghonas:** This is also a highly venomous snake, characterized by three rows of round brown dots with white edges on its back. Head brown limbs scaly. Head triangular nostrils, large vertical eyes. Length up to 3 to 5 feet. Between May and July, the female gives birth to 6 to 60 chicks. Puppies also look like large pupae. They are toxic at birth. Many consider them to be dragon puppies and bite and bite them. It can be life threatening. Rats, lizards and other mammals of Ghonas (Parad).

Although it is dull by nature, if it is diverted, it makes a noise like a whistle of a cooker. There is a misconception about Ghonas or Parad snake that it swells and makes the human body swell. But when it bites, it releases poison and blood clots form on the body. Its attack speed can be up to eight feet per second, so the bite is sometimes unnoticed. It bites when a foot falls on it. At present, when weeding is going on in the field, they can bite with their hands. It can be used for soybean and cotton buds. So work carefully. Farmers should always wear high boots while working and spraying in the field. If it bites, you should go to the hospital immediately without wasting time. Its venom attacks the circulatory system. Immediate treatment can save the patient. Sometimes this dry bite does not release toxins so do not panic and go to the hospital for treatment.

Its venom mixes quickly with the blood, so the drugs used to stop the bleeding use gonadal venom.

**Manyar:** This is a very nocturnal nocturnal snake. There are two types of plain manyar and Wals Sindh manyar. They are faster and more aggressive at night than during the day. It is fifteen times more venomous than a snake. One male maneuver does not allow another male maneuver to enter its territory. For this he guards his territory with vigilance. Dark blue or dark brown gloss. Horizontal white paired stripes on the back. Pale stripes on the head and dark stripes on the tail. Lips and abdomen with white tail. 3 to 5.5 feet long. The female lays 8 to 12 eggs in March-May. Like herpes, the female protects her eggs. Its food is other snakes, small caterpillar chicks, rats, lizards, frogs, simple grass snakes and lizards. This is a snake that lives near human habitation. Sometimes he enters the house and enters the bed and if the person moves, he bites hard. Its venom attacks the nervous system. The

patient slowly begins to coma. Can be saved if treated immediately.

Non-venomous snakes are mainly found in Python, Dhaman, Kavadya, Patteri Kavadya, Divad, Tashkar, Kukari, Vala, Durkya Ghonas, Mandul, Dhulnagin, Naneti, Gavatya, Kaltondya. Cats and deer are semi-venomous snakes. This means that their venom affects their food. Not on man. People are scared to see a dragon because it is so big. The same is true of Dhaman, because it is very long, 7 to 11-7 "and because of its snake-like body, people are scared and run to kill it. A very agile daily snake. Dhaman lays 8 to 20 eggs in March-May. Romulus Vitekar writes in his book The Snake of India: Pigs emerge in July and July. Vatvaghale and Snake: A very helpful non-venomous snake for farmers but most misunderstood non-venomous snake is Dhaman.

Kavadya is a non-venomous, wall-climbing nocturnal snake. It looks like a sack that encloses with a drawstring. There are two types. A plain reddish brown with white horizontal stripes and another with striped scaly, yellowish white spots. Some people call Kavadya Kavadya Nag. The female lays 4 to 12 eggs in March-May. Snakes, lizards, insects feed on the walls of the house. There is a photo on the wall, a place to hang clothes and it bites while putting on and taking off clothes. The bite is a bit painful. So people who are bitten are very scared. Even so, owning one is still beyond the reach of the average person. Its bite is also painful. Divad is a blackish, mossy or grayish white scaly white, yellow spot on water. A snake biting near a drain in an urban area. When handled, it gives off a foul odor. It bites hard. Stays on the ground at night. Vala is a non-venomous snake that crawls under the floor of the house. When it rains, small snake cubs come out of the house. Ants, scorpions, insect eggs, larvae eating snakes. People are scared and kill this too. The rest of the smugglers, Kukri's teeth are sharp and sharp, hence the name Kukri.

Snakes do not eat dead prey. Each snake has a unique feature.

There are many misconceptions and misunderstandings about snakes. Dhaman chases in a circle, Dhaman drinks buffalo milk. One important thing here is that snakes are not vegetarians but completely carnivores. Parad, snake venom blows. There are many such misconceptions. Which are clearly wrong. Only during

the mating season, when the males roam in search of females, they are often seen one after the other. Also, when a snake is killed, it emits a specific odor through the anus and the smell of that odor can cause another snake to get there, leading to the misconception that the other snake in the pair came to take revenge. But as long as you do not harm the snake or feel it is dangerous, it does not harm you on its own.

Dr. Prakash Amte has clarified this matter in his book Ranmitra while shedding light on the subject of snake bites and taking revenge. They say that there is no point in saying that the snake suffers and takes revenge. If the snake is hurt by you, it will react immediately. It is also a fact that if killed during a meeting, another snake will take revenge. If a snake is killed when a snake emits a specific odor during mating, then another snake can come there based on that odor. I had a similar experience in Sagar Nagar on Karegaon Road in Parbhani. On August 28, 2020, youngsters saw two large snakes playing. Called me, one ran away until I arrived and the other was beaten by some stupid kids for no reason. I was approaching. But by the time he left, he had been killed by a non-venomous snake. I was very angry, the killers had fled. When I went back home, I got a call. Another big snake came near that snake. I left immediately. So he ran away. But he started crouching around the snake like that ... I begged him not to kill the snake anymore and informed the frightened people present why the snakes come after each other and said that Dhamman is a non-venomous species of snake. And no snake bites and it is non-venomous. It doesn't hurt, but if you see any snakes anymore, don't kill them. Call Sarpamitra immediately. Thus many non-venomous snakes are killed by humans for no apparent reason. Then what harm will they do with grief.

There are four types of venomous snakes. This does not mean that venomous snakes should be killed. They are very useful for human beings. Their venom is useful in many ailments. They are used to treat asthma. The use of snake venom has been found to be effective in the treatment of cancer. This toxin is also used to treat heart disease. Snake venom is also used in homeopathic remedies. Ghonas and furse poisons are used in blood diseases. Horse poisoning is used in hemopholia. Dr. P.J. Devaras and Bhalchandra Mayekar note in their book.

The author of the book *Snaakes of India*, Dr. P.J. Devaras says that a person who has been bitten by a snake is not necessarily poisoned. A venomous snake that has been bitten does not always give a lethal dose of venom. In both cases the patient can survive without any treatment. The snake can then give a lethal dose of venom immediately after a bite. It has also been observed that a snake whose venomous teeth have been removed can bite a lethal dose of venom without it. We noticed this in the case of the King Cobra (whose teeth had been removed) who caught and sucked the rat snake before swallowing it.

Dr. Prakash Amte also says that if a venomous snake had eaten something before biting, the venom would have run out. So sometimes even a venomous snake bite does not bother a person much. In his book "Snake Understanding Misunderstanding", Bhalchandra Mayekar says that in some places, venom comes out when a snake attacks a prey or an enemy. We have seen many patients at the Government and Vibration Hospital in Parbhani who have been bitten by poisonous snakes but have no problem. Nilim Kumar Khaire writes in his book 'Snake' that sometimes the bite of a snake which does not inject venom is called dry bite.

The body of a snake contains only 70% water. As a result, snakes need less food and more water. Puppies are more susceptible to scabies due to their rapid growth. The snake does not eat for some time before it bites. The whites of the eyes are visible so they look blurred. Nilim Kumar Khaire says that during this period they become more angry.

The snake has no interest in biting humans because humans are not its prey. He bites by accident. Toxins are needed to kill and digest food. Non-venomous snake bites are extremely effective. So large foods are easily digested. They kill the prey by swallowing and then swallowing. Snakes do not eat prey killed by others. He does not even eat the dead. The snake is a lazy animal. But he hunts for himself. He sleeps soundly in cold climates. During this time, he meets his needs through the proteins stored in the body.

Mayekar writes that mugs, eagles, eagles, vultures, deer rabbits, herons, owls, rhinoceroses, wild cats and crocodiles hunt snakes. Some snakes like Nagraj and Manyar only eat snakes. The

dragon also traps and eats venomous snakes. Fish also attack and eat snakes like water snakes. Ghorpadis eat snake eggs. Chameleon lizards also eat snakes. Germs can also shorten the life of a snake. Gochid sticks to snakes and drinks their blood.

If you see a snake in the house or area, do not panic and watch it. Call Sarpamitra. Some citizens show circumstance. In the middle of the night, a woman from Mathura in Parbhani city, when she saw a poisonous Manyar snake in her house, without fear, carefully covered her basket and called for Sarpamitra. After seeing the dragon and snake lying in the well for a long time, the youths took the initiative to save him and called Sarpamitra and rescued him. The readiness shown by the young farmers to save a dying dragon trapped in a spider web at Wazur is noteworthy. While the cleaning was being carried out by the staff of the corporation, they managed to catch the snake with their vigilance and the citizens of the city also became fearless. The youths of Balsa village helped to catch the big snake in the hut. In Khanapur and Vanamkruvi also, due to the vigilance of the citizens, they succeeded in catching the venomous snake that had left in the middle of the night. The family was relieved by catching a snake in the commode. The grandmother woke up after seeing that it was getting late in the morning under the bed in the living room. She woke up her grandson, Sune and informed Sarpamitra. A snake lying in an unused bore was pulled out and given life. While working to save such snakes, we are doing this work selflessly without any payment.

Respecting snakes and catching them properly with the help of a stick without letting them get hurt as well as making people literate is the identity of a true serpent friend. Not only sound education but his alertness and dedication too are most required

Author Rahul Shinde in his book 'Maharashtratil Sap' says that snake lovers should release venomous snakes at night and non-venomous snakes during the day while releasing snakes caught in human settlements.

Snake friends have made a valuable contribution in saving snakes and making them literate.

It is also important to note that even during the Lockdown, the selfless service of the serpent friends continued to protect the citizens by intimidating and protecting them.

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**4.**

# SNAKE VENOM: MECHANISM OF ACTION ON THEIR PREY AND IN HUMAN

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## Introduction :

Snake venom is a highly modified saliva containing zootoxins that facilitate the immobilization and digestion of prey, and defense against threats. The study of venom and its composition falls under the field of toxinology and is an area of increasing interest. The glands that secrete the zootoxins are a modification of the parotid salivary glands found in other vertebrates, and are usually situated on each side of the head, below and behind the eye, and encapsulated in a muscular sheath. The glands have large alveoli in which the synthesized venom is stored before being conveyed by a duct to the base of channeled or tubular fangs through which it is ejected.

## What's in Snake Venom?

Snake venom is the fluid secretions from the modified **salivary glands** of venomous snakes. Snakes rely on venom to disable prey and aid in the digestive process.

The primary component of snake venom is protein. These toxic proteins are the cause of most of the harmful effects of snake venom. It also contains enzymes, which help to speed up chemical reactions that break chemical bonds between large molecules. These enzymes aid in the breakdown of carbohydrates, proteins, phospholipids, and nucleotides in prey. Toxic enzymes also function to lower blood pressure, destroy red blood cells, and inhibit muscle control.

An additional component of snake venom is polypeptide toxin. Polypeptides are chains of amino acids, consisting of 50 or fewer amino acids. Polypeptide toxins disrupt cell functions leading to cell death. Some toxic components of snake venom are

found in all poisonous snake species, while other components are found only in specific species.

Venoms contain more than 20 different compounds, mostly **proteins** and **polypeptides**.Venoms are complex mixtures of enzymes and proteins of various sizes, amines, lipids, nucleosides, and carbohydrates. Venoms also contain various metal ions that are presumed to act as cofactors and include sodium, calcium, potassium, magnesium, and zinc.There is a large degree of variability in venom composition at all taxonomic levels.

A complex mixture of proteins, enzymes, and various other substances with toxic and lethal properties serves to immobilize the prey animal, enzymes play an important role in the digestion of prey, and various other substances are responsible for important but non-lethal biological effects.

**Mechanism of Effect of Snake Venom on Pray and in Human Body**

Snake venom it is injected by unique fangs during a bite, and some species are also able to spit their venom. Venoms, in particular, have evolved a wide diversity of peptides and proteins that induce **harmful inflammatory and neurotoxic effects** including severe pain and paralysis, hemotoxic effects, such as hemorrhage and coagulopathy, and cytotoxic/myotoxic effects, such as inflammation and necrosis.

Venoms act on a variety of cells and tissues with pronounced physiological responses. Some of the actions of venom components include the digestion of cells and cell membranes, disruption of procoagulant and anticoagulant activities of blood, production of oxidizing agents, breakdown of collagen and the intercellular matrix between cells, and the disruption of nerve tissue.

Venom is thought to have several functions including defense, prey neutralization, and predigestion. It is delivered into the prey or attackers from the venom gland via ducts through specialized teeth or fangs. Some snakes species, such as the vipers, have large hollow front fangs which are very effective in delivering large amounts of venom while others possess poorly developed relatively ineffective grooved rear fangs. Not all venomous

snakebites result in **envenomation**. **25%** percent or more of snakebites are suspected to be '**dry**' bites.

Detection of snake toxins and toxin antibodies in body fluids remains very important for the identification of the biting species and the correct management of envenomation.

**Mechanism of Toxicity**

Snake venoms are complex mixtures of several different components or 'fractions' that can vary considerably within Crotalinae members. Depending on the content of the venom, multiple organ systems may be affected. Historically, Crotalinae venom was classified as neurotoxic, hemotoxic, cardiotoxic, or myotoxic, depending on the species of snake involved in the envenomation. This oversimplifies the complex nature of Crotalinae venom. Clinically, a patient may develop such multisystem disorders as platelet destruction, internal bleeding, hypotension, paresthesias, and rhabdomyolysis.Snake venom can induce myopathies of the esophageal musculature, leading to functional disturbances in swallowing and potentially to megaesophagus, which is discussed below under organ-specific lesions.

The onset of neurotoxic symptoms usually occurs within **4 h** but can be delayed up to **10 h** following a bite. The distribution of venom is variable and complex and possibly reaches different tissue sites unevenly.

**Snake Venom Delivery and Injection System**

Most venomous snakes inject venom into their prey with their fangs. Fangs are highly effective at delivering venom as they pierce tissue and allow venom to flow into the wound. Venom injection systems contain four main components: venom glands, muscles, ducts, and fangs.

**Venom Glands:** These specialized glands are found in the head and serve as production and storage sites for venom.

**Muscles:** Muscles in the head of the snake near venom glands help to squeeze venom from the glands.

**Ducts:** Ducts provide a pathway for the transport of venom from the glands to the fangs.

**Fangs:** These structures are modified teeth with canals that allow for venom injection.

**How Does Snake Venom Work?**

Snake venom is the poisonous, typically yellow fluid stored in the modified salivary glands of venomous snakes. There are hundreds of venomous snake species that rely on the venom they produce to debilitate and immobilize their prey. Venom is composed of a combination of proteins, enzymes, and other molecular substances. These toxics substances work to destroy cells, disrupt nerve impulses, or both. Snakes use their venom cautiously, injecting amounts sufficient to disable prey or to defend against predators. Snake venom works by breaking down cells and tissues, which can lead to paralysis, internal bleeding, and death for the snake bite victim. For venom to take effect, it must be injected into tissues or enter the bloodstream.

Snakes of the family **Viperidae** have an injection system that is very developed. Venom is continuously produced and stored in venom glands. Before vipers bite their prey, they erect their front fangs. After the bite, muscles around the glands force some of the venom through the ducts and into the closed fang canals. The amount of venom injected is regulated by the snake and depends on the size of the prey. Typically, vipers release their prey after the venom has been injected. The snake waits for the venom to take effect and immobilize the prey before it consumes the animal.

**Mechanics of Spitting**

Spitting cobras of the genera Naja and Hemachatus, when irritated or threatened, may eject streams or a spray of venom a distance of **4** to **8** ft. These snakes' fangs have been modified for the purposes of spitting; inside the fangs, the channel makes a 90° bend to the lower front of the fang. Spitters may spit repeatedly and still be able to deliver a fatal bite.Spitting is a defensive reaction only. The snakes tend to aim for the eyes of a perceived threat. A direct hit can cause temporary shock and blindness through severe inflammation of the cornea and conjunctiva. Although usually no serious symptoms result if the venom is washed away immediately with plenty of water, blindness can become permanent if left untreated. Brief contact with the skin is not immediately dangerous, but open wounds may be vectors for envenomation.

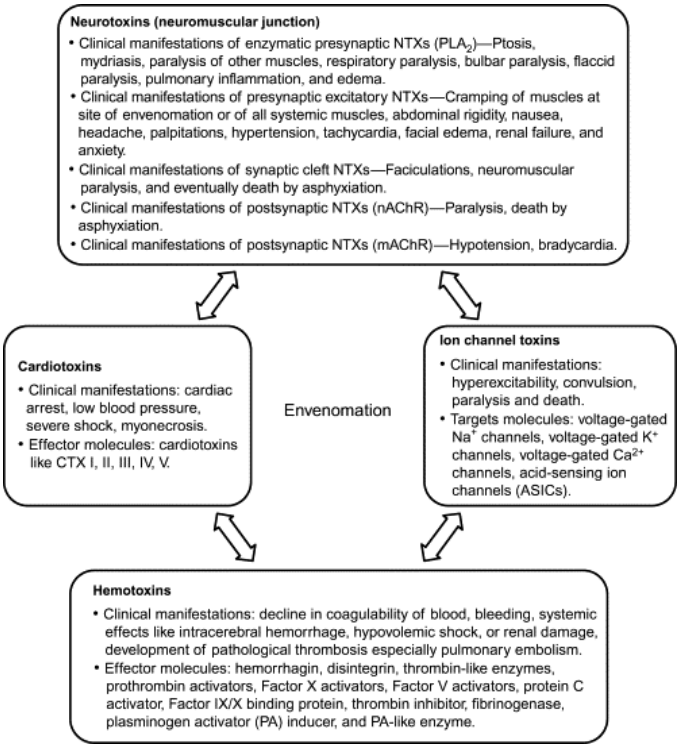


**Fig.**An overview of the major toxin groups, their associated clinical symptoms, and their target molecules.

## References


- *Adigun, Rotimi. "Necrosis, Cell (Liquefactive, Coagulative, Caseous, Fat, Fibrinoid, and Gangrenous)." StatPearls [Internet]., U.S. National Library of Medicine, 22 May 2017,*
- *www.ncbi.nlm.nih.gov/books/NBK430935/.*
- *Takacs, Zoltan. "Scientist Discovers Why Cobra Venom Can't Kill Other Cobras." National Geographic, National Geographic Society, 20 Feb. 2004, News.nationalgeographic.com/news/2004/02/0220_040220_TVcobra.html.*
- *Utkin, Yuri N. "Animal Venom Studies: Current Benefits and Future Developments." World Journal of Biological Chemistry 6.2 (2015): 28–33. doi:10.4331/wjbc.v6.i2.28.*
- *Vitt, Laurie J., and Janalee P. Caldwell. "Foraging Ecology and Diets." Herpetology, 2009, pp. 271–296., doi:10.1016/b978-0-12-374346-6.00010-9.*
- *Cunha-Oliveira, Teresa; Rego, Ana Cristina; Oliveira, Catarina R. (June 2008). "Cellular and molecular mechanisms involved in the neurotoxicity of opioid and psychostimulant drugs". Brain Research Reviews. 58 (1): 192–208.*
- Book: Snakes. Randy Powell, in Encyclopedia of Toxicology (Second Edition), 2005.
- https://en.wikipedia.org/wiki/Hemotoxin

**5.**

# SNAKES : RISKLESS, RISKY AND THE LETHAL

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## Introduction

When people talk about dangerous snakes like black mambas and cobras, at least one person in the conversation will ask whether the snake is poisonous or not. Due to social media and other sources, the term "poisonous snake" has been drilled into our collective consciousness. But this phrase is technically incorrect. Strictlyspeaking, most dangerous snakes are venomous.

According to biologists, the term *venomous* is applied to organisms that bite or sting to inject their toxins, whereas the term *poisonous* applies to organisms that unload toxins when you eat them. This means that very few snakes are truly poisonous. The vast majority of snake toxins are transferred by bite. One exception is the garter snake (*Thamnophis*), which is small and harmless in terms of its bite but is toxic to eat because its body absorbs and stores the toxins of its prey (newts and salamanders).

Along with snakes, dangerous spiders and some lizards are also generally venomous. In addition, other animals (such as jellyfish, bees, ants, and wasps) are venomous even though they do not contain fangs. The platypus (*Ornithorhynchusanatinus*) is probably the best-known venomous mammal. Male platypuses have a fanglike spur on the inner side of each ankle that is connected to a venom gland located over the thighs.

Poisonous animals include most amphibians (that is, frogs, toads, salamanders, etc.), which carry around some amount of toxins on their skin and within their other tissues. These chemicals are strong enough that they can be deadly to humans. Several plants, such as deadly nightshade (*Atropa belladonna*) and castor beans (*Ricinuscommunis*), are poisonous and thus should not be consumed. One of the most familiar toxic plants is poison ivy (*Toxicodendronradicans*); nearly all parts of the plant contain urushiol, a substance that can produce a severe itchy and painful inflammation of the skin known as contact dermatitis.

Snakes bring both good and bad to the world. But mostly, these reptiles have been placed in the role of evil because the most scariest creature for humans is the venomous snakes. Rat snake is a peaceful friend of society that wants little more than to eat a rat. Forgive them, Mother Nature, for they know not what they do. Reticulated python (*Python reticulatus*), probably the longest snake in the world (if not the heaviest), the reticulated python of Southeast Asia is also an occasional man-eater and a popular pet. Recently, a 25 feet, weighing 350 pounds was named the largest snake in captivity. Green anaconda (*Eunectesmurinus*) is the biggest of the boas and perhaps the bulkiest of all snakes. This snake gives live birth to 20-inch babies and can reportedly grow up to 28 feet and 280 pounds. It is relatively sluggish and does not, with any regularity, attack humans. Yet people hate the creatures.

Ashe's spitting cobra (*Najaashei*) is also known as the spitting cobra. This spitting cobra doesn't just spit; it spits venom. And since the venom is harmless to intact skin, the mean evolutionary tactic behind this nasty habit seems to be, precisely, to hit the victim in the eye, which can cause permanent blindness. Ashe's spitting cobra is the largest of the dozen or so spitting cobra species, which live in Africa and Asia. *N. ashei*, reaches nine feet in length, has been seen eating five-foot-long puff adders (another deadly venomous snake) and, like all the spitting cobras, can also inject venom by biting.

The king cobra (*Ophiophagushannah*) can grow to twice the length of the Ashe's spitting cobra and in one bite may administer a quantity of venom which is enough to kill an elephant. The species acts aggressively when cornered or when guarding a nest, in which the females lay their eggs, but does not commonly attack humans.

Throughout the New World tropics, roughly 2,000 people die every year from the bite of the pit viper (*Bothrops* atrox). Its close cousin, *B. asper*, goes by the same common names and is comparably devastating and said to be so aggressive. In Africa, the black mamba *(Dendroaspispolylepis*), the fastest snake in the world and the second longest venomous snake, growing to 14 feet. It may strike a single victim repeatedly like a psycho with a butcher knife. Its venom is so potent it can kill a horse and a person in just 30 minutes; and, in bite victims who go untreated, the

mortality rate is 100 percent. Black Mamba delivers the 'kiss of death'.

Beaked sea snake (*Enhydrinaschistosa*), tops the list of the world's most venomous snakes. This snake is rated as the world's sixth most venomous snake. It is considered the most dangerous sea snake. Its fangs may measure just four millimeters, and surfers and divers wearing wetsuits may be protected. Yet nine of every ten people killed by sea snakes are killed by the beaked sea snake, which is said to be easily provoked and very aggressive. It inhabits shallow, murky waters in Australia and much of the Indian Ocean, often among mangrove roots. Wading fishermen are frequent victims.

In 2011, the *BBC* reported that snakes bite as many as 5.5 million people every year, killing at least 100,000. In India alone, the article stated, a million people may suffer snakebites every year. The Indian cobra, Russell's viper, saw-scaled viper and common krait are the main perpetrators in India, while the king cobra tends often to be wrongly blamed. In sub-Saharan Africa, carpet vipers, black mambas, puff adders and boomslangs are snakes to be feared. In Australia, the snake blacklist is long and frightening, while in Europe vipers are the main culprit, and in North America, rattlesnakes. What to do if bitten by a snake? Antivenin is said to be the only reliable treatment, unfortunately. The wound of a snakebite victim should be firmly wrapped in a bandage before the person is carried on a makeshift stretcher to the nearest doctor. "If you can, also take the snake," as identifying the needed antivenin can otherwise be difficult. Cover the wound with loose and sterile bandage. Remove any jewelry from the area that was bitten. Remove shoes if the leg or foot was bitten. Note the Snake's Appearance and be ready to describe the snake to emergency staff.

And things not to do after receiving a snakebite? Cutting the flesh near the wound, applying ice, trying to suck the venom out of the bite and having a beer or caffeinated drinks or any other medications.

**References –**


- https://www.britannica.com/story/whats-the-difference-between-venomous-and-poisonous
- https://www.smithsonianmag.com/travel/snakes-the-good-the-bad-and-the-deadly-58395991/

- https://www.webmd.com/first-aid/snakebite-treatment
- https://learn.eartheasy.com/articles/these-3-snakes-are-your-gardens-best-friends/
- https://www.vice.com/en/article/bv88k5/snakes-form-friendships-according-to-scientists
- https://www.khou.com/article/news/local/animals/snakes-friend-or-foe/285-434100799


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**6.**

# ECOLOGICAL ROLE OF SNAKE IN ECONOMIC ACTIVITY

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## Introduction

Ecology is the study of relationships between living organisms including humans and their physical environment ecology considers organisms at the individual, population, community, ecosystem and the biosphere, the branch also studying the food chain in a wetland areas.

Snakes are important elements in their notice environment and regulating the population of their prey. these are exclusively carnivores, mean's that they are predators,the usefulness of snakes ranges from their ecological importance to the economicimportance of snakes in both pest and health care industries, snakes play on important role in maintaining balance in the ecosystem the snakes become prey for birds, mammals and even other snakes the snakes, can keep pests, such as rats and mice in check and some species that are harmless to people prey on poisonous snakes, reducing prey on poisonous snakes, reducing the chance of a deadly encounter snakes can be useful in controlling rat population. The snakes, form a key link in the food chain and act as predators the help maintain a healthy ecosystem and environment. They also controlling small mammal populations. Most snakes prey on rodents, which cause a variety of issues. Rodents cause property damage, Spread infection of diseases and destroy agricultural Products. Human with ophidiophobia is a kind of phobia where you have an extreme fear of snakes. Snakes are absent in Irland but mostly found in Brazil and extinct in Antaratika. Snakes are found in forests, swamps, grasslands, deserts & in both fresh and salty water.

## Beneficial Activities

The snakes are of great advantage to mankind. They are responsible for rodent destruction, rats,mice voles are very prolific

breeders andare the greatest enemies of man. They destroy stored food material, sewages, godown, crops etc. The loss caused by rodents is incalculable the snakes are very effective in control at rats as they can enter in to the burrows of the rodents very easily. No other single natural agency is so effective for control of rats as the snakes.

A recent study in Malaysia has pointed out that, in rat population of 100, the snakes are responsible for destroying about 80, each year.

Snakes are alsoeat, several harmful insect i.e. Termites, this help in insect control effective. And as a food, they are appreciate of food in same parts of Asia and Africa. In Japan, sea-snakes are eaten in large Numbers, after cutting off their heads.

Skins of snakes are also used for ornamental purposes. Several year back, there was a craze tor reptilian skin. In western countries also snake skin were used for shoes, purses, hand-bags and other fashion - requirements.

Snakes are also used in medicines, not only the snakes were used as delicacy but they were also regarded by chines to keep away the cold of winter. In united stats of America, the rattle - snake is eaten as an appetizer.

Venom of snakes are also used in pharmacology,different viscera of snakes are said to have different properties. It is said that blood of snakes, if applied on lips, gives them the natural red color. Gall-bladder of snakes possess, strength giving properties. Snake oils are used by athletes of tuberculosis and also used in pregnancy.

In north America, a powder, made from dried skin of rattle snakes, causes abortion, In Europe. The skin of snakes were tied around the abdomen during later stag of pregnancy, so as to ease delivery. There is a great impact of snake on human mind also, they are regarded as symbol of courage, wisdom and longevity.

**Harmful Activities**

The effects if snakes on mankind are difficult to assess. The number of deaths due to snake bit is very high all over the world. But in India, the maximum deaths occur and the death rate is high in all tropical countries,including India, Ceylon, Burma, Australia,

and Brazil. Besides, there is a heavy loss of mankind due to snake bite. After the discovery of antivenin, the death rate has considerable and decreased. Poultry-birds are destroyed in large numbers by poisonous and non-poisonous snakes. The loss in poultry is particularly very great. In fish production also the snakes are a mounting menace. All so at insects, birds, lizards, frogs and toads.

**Conclusion**

The hindu people believe that, snake gods are associated with wealth and healthy life and they will act as great securities, when the people meet difficulties in their life. It is also believed that, snake gods are having separate world and Shri Nagrajan and Shri Nagarani are ruling that world.

**!! Save Snake, Save Earth !!**

**Reference**


- Text Book of Zoology, Sedgwick A.A., Central book depo,Allahabad.
- Chordate Zoology, E. L. Jordan & P.S. Verma,S.Chand Publication.
- Text Book of Zoology, Parker T. J., Mac Millan Co, London.
- Chordate Morphology, Malcom jollie, East-West press Ltd.,New Delhi.
- Introduction to Chordates, Majupuria, S.Nagin &Co.
- A TB of Zoology, R.D. Vidyarthi, Vol.Xl, Agrasia publishers, Agra.


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**7.**

# STUDY OF DIFFERENT SNAKES IN BEED DISTRICT

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## Abstract

In Beed District generally Cobra,Dhaman and Ajgar snakes are found in our District.Very poisonous snake cobra found in our region.

## Introduction

Cobra,dhaman and ajgar found in our region.Man is feared to snakes.Snakes are found in our surrounding atmosphers.Poisonous and non-poisonous snakes are found in our India.These snakes lives in holes,under stones ,in wall of mud houses.Generally in our region Cobra is very poisonous snake.Dhaman is found in our region.Dhaman is found in rivers and wells.Ajgar is found in our Beed district.

## Material And Methods

For this study of different snakes Author gives visits to different villages.Information is collected from snakecatchers or Garudi. Author survey different places of Beed district.

## Discussion

Scientific name of cobra is *Najanaja.* This species is found in our India.Cobra is found in holes.Cobra is Carnivorous feed on frogs,rats,lizards & small animals. In our Beed district cobra is also called Nag.It is generally 2-3 meters long. Colour of cobra is generally whitish (gehuw).In hibernation cobra has golden colour.UshapedBinocellate form having septacle like mark.Cobra feeds on frogs ,rats ,lizards and small animals.Cobra has head ,neck, trunk and tail region.Head of cobra contalns mouth,eyes and nostrils. Cobra expand its neck region to form hood which contains binocellate mark on dorsal surface.In our region of villages we says figure of ten.Whitish band present around the mark.Eyes has narrow pupil.Its body is covered by smooth oblique scales.Poison fangs having 1-3 small teeths.Its nostril s are large and vertically elliptical.Cobra is very deadly poisonous

snakes. When cobra bites Human or other animals they occurs death.When any sound or any animal came,he rise their hood and hood sways backside and ready to striking and he produces hissing sound or we call as foose.On Nagpanchami festival day our Beed district womens says to coba is our brother and worshipped.

Dhaman is found in ouebeed district.Its scientific name is Ptyas.Its family is Colubridae.Dhaman feed on frogs,toads,mammals,small snakes and lizards.These are climbs on trees.Dhaman attacks forcibly like whip so we called rope snake.Body of dhaman is elongated.Dirty yellow colouredd haman is found in our region.Body of dhaman is about 3-4 meter long covered with 16-17 rows of keeled scales.Body dhaman is divided into head,neck,trunk and tail.Head and neck distinctly marked.Head of Dhaman contains slit like mouth,eyes and nostrils and a bifid tongue.Dhaman is non-poisonous.

In our Beed district large and huge snake is found Ajgar.Scientific name of Ajgar is Phyton.Family of ajgar is Boidae.Ajgar is about 10 meter long and has 110-115 kg weight.Ajgar is found on the grounds,n trees and jungles.This found in our villages fo Beed districts.Agjar feed on other animals like birds,goats,sheeps,deers,cows,dogs and horses.Ajgar is very huge and massive voluminous.Colour of ajgar is brown with dark rhomboid edged spots.Head and neck is distinct.Head covered with symmetrical shields or small scales and free eyes with vertical pupil.Lancet shaped brown mark present over head.Ajgar has teeths.Ajgar is very lethargic. During feeding or on seeing prey ,it becomes very active and coils arounds prey.Ajgar kills the prey by pressing within the coils of its massive muscular body and gradually shoves the prey.*P.molorus* is one of largest living Serpent.

**Acknowledgement**

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**References:**

**S.S.Lal :** Vertebrate Zoology ( practical) .Rastogi Publication

**R. L.Kotpal :** Modern Textbook of ZoologyVertebrates.- Rastogi publication,Meerut-New Delhi.

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**8.**

## SUPERSTITIONS, SAPERAS AND SNAKE CHARMING

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### Superstitions

Snakes are probably the most misunderstood, hated and universally disliked animals in the world since times immemorial, most of fears about snakes are based on sheer ignorance and baseless superstitions such as fallacy regarding 'Ichhadhari snake' who can transform into humans and vice versa at will, as often picturized by cinema. It is also wrongly believed that image of the person killing a snake is imprinted on the retina of dead snake, so that the living partner of that snake, can easily recognize the murderer and take revenge. It is also said that by performing certain rituals, the snake who had previously bitten a person, can be forced to appear physically and suck its own venom from the body of the victim who will recover at once. Some believe in a mysterious hoop snake or whip snake who keeps the end of its tail into mouth to become a ring or wheel that can roll after a person and stab in the back. It can chase a person even on a stair. Another snake is reputed to milk cattle. Some snakes are supposed to hypnotize birds. It is needless to emphasize that none of these superstitions is based on facts. Therefore, saperas took advantage of all these baseless superstitions to fear people for his livelihood.

### Saperas

Now a days, it's not easy to find a snake charmer, even on Nag Panchami, the yearly religious festival in honour of the king cobra, which celebratedin August or in Shrawan per year.Saperas knows king cobra, is the Lord Shiva's cobra, therefore they worship snakes. The blue-skinned Hindu god is usually portrayed wearing a king cobra around his neck.Saperas use to move from village to village carrying snakes in bamboo baskets. Whenever saperas stopped in a village, a crowd would gather around. Charmer then take out snakes from baskets by flipping the lid off the basket, and the cobra popped up like a jack-in-the-box, scanning around with its hood fully extended and fixes its gaze on the tip of saperas

gourd flute. The cobra's black scales glistened as it swayed, following the movement of the flute's tip. The snake looked to be about 4 feet long, coiled in the basket, with a small, almost jewel-like head and glittering black eyes above the outstretched hood. For a couple of minutes, the man and the snake seemed connected in a very ancient, intricate dance — but the snake can't hear a thing.Snakes don't have ears; most people don't know that, But snake charmers use the pipe, so what the snake sees is simply something which is menacing, above him, which is swaying, so the snake's attention is focused just on the swaying object and moves along with that, it appears to people that the snake is actually dancing to the tune of his pipe.To prevent the snake from biting, snake charmers sometimes break off the animal's fangs or sew its mouth shut. As a result, the snake can't eat and slowly starves to death, so the snake has merely been tamed, and won't bite. Even after the show, people would stay on, to see further something in tinboxas eager.

**Snake charming**

The earliest evidence for snake charming comes from ancient Egyptian sources. One of the earliest records of snake charming appears in the Bible in Psalm 58:3–5: "The wicked turn aside from birth; liars go astray as soon as they are born. Their venom is like that of a snake, like a deaf serpent that does not hear, that does not respond to the magicians, or to a skilled snake-charmer." Charmers there mainly acted as magicians and healers. As literate and high-status men, part of their studies involved learning the various types of snake, the gods to whom they were sacred, and how to treat those who were bitten by the reptiles. Entertainment was also part of their repertoire, and they knew how to handle the animals and charm them for their patrons.Snake charming as it exists today probably originated in India. Hinduism has long held serpents to be sacred; the animals are believed to be related to the Nagas, and many gods are pictured under the protection of the cobra.

The earliest snake charmers were likely traditional healers by trade. As part of their training, they learned to treat snake bites. Many also learned how to handle snakes, and people called on them to remove snakes from their homes. Baba Gulabgir (or Gulabgarnath) became their guru since his legend

states that he taught people to revere the reptiles and not fear them. The practice eventually spread to nearby regions, ultimately reaching North Africa and Southeast Asia.The early 20th century proved something of a golden age for snake charmers. Governments promoted the practice to draw tourism, and snake charmers were often sent overseas to perform at cultural festivals and for private patrons. In addition, the charmers provided a valuable source of snake venom for creating antivenins.The practice is no longer legal following changes to the Wildlife Protection Act. The law was originally passed in 1972, and aimed at preventing the export of snakeskins, introducing a seven-year prison term for owning or selling snakes.Beginning in the late 1990s, however, the law was also applied to the snake charmers. As a result, the charmers were forced to move their performances to less-travelled areas such as small villages or face legal actions.

In 2003, hundreds of them gathered at the temple of CharkhiDadri in Haryana to bring international attention to their plight. In December of the following year, a group of snake charmers stormed the legislature of the Indian state of Odisha with their demands while brandishing their animals. The Indian government and various animal-rights groups have now acknowledged the problem. One suggested solution is to train the performers to be snake handlers, capturing and removing venomous snakes from city and suburban gardens. In return, they could sell their traditional medicines as souvenirs. Another proposal would try to focus attention on the snake charmers' music and treat them like other street musicians.

Snake charmers typically walk the streets holding their serpents in baskets or pots hanging from a bamboo pole slung over the shoulder. Charmers cover these containers with cloths between performances. Dress in India, Pakistan and neighbouring countries is generally the same: long hair, a white turban, earrings, and necklaces of shells or beads. Once the performer finds a satisfactory location to set up, he sets his pots and baskets about him (often with the help of a team of assistants who may be his apprentices) and sits cross-legged on the ground in front of a closed pot or basket. He removes the lid, then begins playing a flute-like instrument made from a gourd, known as

a been or pungi. As if drawn by the tune, a snake eventually emerges from the container; if a cobra, it may even extend its hood.In the Western world snake charming is very different. Western-style snake charmers use pythons and boa constrictors for their performances as they are not venomous. Western-style snake charmers do not use a musical instrument; instead they perform dance routines involving the snakes.

Traditionally, snake charmers use snakes that they have captured themselves in the wild. This task is not too difficult, as most South Asian and North African snakes tend to be slow movers.The exact species of serpents used varies by region. In India, the Indian cobra is preferred, though some charmers may also use Russell's vipers. Indian and Burmese pythons, and even mangrove snakes are also encountered, though they are not as popular. In North Africa, the Egyptian cobra, puff adder, carpet viper and horned desert viper are commonly featured in performances. In The UK, US and Europe pythons and boa constrictors are used to comply with Animal Handling and Animal Welfare Regulations.

At home, snake charmers keep their animals in containers such as baskets, boxes, pots, or sacks.For safety, some North African snake charmers stitch closed the mouth of their performing snakes, leaving just enough opening for the animal to be able to move its tongue in and out. Members of the audience in that region believe that the snake's ability to deliver venomous bites comes from its tongue, rather than fangs. Snakes subjected to this practice soon die of starvation or mouth infection, and must be replaced by freshly caught specimens. Similar methods are used in India, where snakes are defanged and have their poison sacks incapacitated. They are then also kept in boxes or bags for 30–45 days and dehydrated so that their muscles cramp (making them sluggish) and so that they will drink the milk offered by devotees at festivals (the milk is indigestible to the snake).

Methods of dealing with the fangs include expert surgical removal of both the fangs and replacement fangs, which has been done by some Native American and African snake charmers. Barring extraordinary measures, pulled fangs are replaced within days. Fangs may also be plugged with wax or other material.In West Africa, charmers have been observed to treat the snake's

body and mouth with herbs that paralyze the jaw muscles and cause inflammation of the venom glands.Members of the Pakkoku clan of Burma tattoo themselves with ink mixed with cobra venom on their upper body in a weekly inoculation which may protect them from the snake, though there is no scientific evidence of that.

Snake charming is typically an inherited profession. Most would-be charmers thus begin learning the practice at a young age from their fathers. Members of the Sapera or Sapuakela castes, snake charmers have little other choice of profession. In fact, entire settlements of snake charmers and their families exist in some parts of India and neighbouring countries. In Bangladesh, snake charmers are typically members of the nomadic ethnic group Bede. They tend to live by rivers and use them to boat to different towns on market days and during festivals.North African charmers usually set up in open-air markets and *souks* for their performances. In coastal resort towns and near major tourist destinations one can see snake charmers catering to the tourist market, but in most of the region they perform for the local audiences; an important part of their income comes from selling pamphlets containing various magic spells (in particular, of course, against snake bites).

In previous eras, snake charming was often the charmer's only source of income. This is less true today, as many charmers also scavenge, scrounge, sell items such as amulets and jewellery, or perform at private parties to make ends meet. Snake charmers are often regarded as traditional healers and magicians, as well, especially in rural areas. These charmers concoct and sell all manner of potions and unguents that purportedly do anything from curing the common cold to raising the dead. Villagers and city dwellers alike often call on them to rid of snakes in houses.

**Pungi / Been / Murli:** The pungi also known as the been or the murli, is a wind instrument, originating from the Indian subcontinent. The instrument consists of a reservoir into which air is blown and then channelled into two reed pipes. It is played with no pauses, as the player employs circular breathing. In street performances, the pungi is used for snake charming.The pungi is an Indian folk music instrumen that is mostly played by cobra charmers in Sindh, Pakistan, and Rajasthan, IndiaThe instrument

is made from a dry hollowed gourd with two bamboo attachments. It is also a double-reed instrument. The pungi is played by Jogi in the Thar desert. It was theorized that it was made not just for snake charming, but to make people enter a half-conscious state as part of a religious practice.It is in particular played by snake charmers, mostly in the Terai and Nepal, to arouse snakes to dance.The instrument has a high, thin tone and continuous low humming.

It has been an important instrument in Indian folk culture and is known by various names in different parts of India. In northern India, it is known as the been, tumbi, and bansi; in the south, it is known as the magudi, mahudi, pungi, and pambaattikuzhal.The pungi is constructed from a solid coconut cover, to which pieces of bamboo are joined, and has two components: a hollow vessel constructed from a gourd, and two pipes, each with a free-beating single reed (jivala) similar to the reeds of a mijwiz, with eight to nine finger holes.The player blows air through the top tube-like portion of the instrument. One pipe makes drone-like sounds. And the other produces the melody. The pipe that produces the melody has seven holes and a range of one octave. The drone pipe only has one hole. Traditionally, both sounds are played simultaneously using circular breathing to create a hypnotic effect.The pungi is usually played solo, as it is difficult to play it with other instruments.

The instrument was often used to entertain the public with snake charming. However, this practice was eventually banned throughout the country in 1991, under the Wildlife Protection Act, 1972.Snakecharming is the practice of appearing to hypnotize a snake (often a cobra) by playing and waving around an instrument called a pungi. A typical performance may also include handling the snakes or performing other seemingly dangerous acts, as well as other street performance staples, like juggling and sleight of hand. The practice was historically the profession of some tribesmen in India but this is no longer the case.Snake-charmer performances still happen in other Asian nations such as Pakistan. Bangladesh, Sri Lanka and south-east Asian nations like Thailand and Malaysia are also home to performers, as are the North African countries of Egypt, Morocco and Tunisia.Ancient Egypt was home to one form of snake

charming, though the practice as it exists today likely arose in India.It eventually spread throughout Southeast Asia, the Middle East, and North Africa.

Despite a sort of golden age in the 20th century, snake charming is today dying out. This is due to a variety of factors, chief among them is the enforcement of the Wildlife Protection Act, 1972 in India banning ownership of snakes. In retaliation, snake charmers have organized in recent years, protesting the loss of their only means of livelihood, and the government has made some overtures to them. Snake charming is almost extinct in India.

Many snake charmers live a wandering existence, visiting towns and villages on market days and during festivals. During a performance, snake charmers may take a number of precautions. The charmer typically sits out of biting range and the snake is sluggish and reluctant to attack anyway. More drastic means of protection include removing the reptile's fangs or venom glands, or even sewing the snake's mouth shut. The most popular species are those native to the snake charmer's home region, typically various kinds of cobras, though vipers and other types are also used.

Although snakes are able to sense sound, they lack the outer ear that would enable them to hear the music. They follow the pungi that the "snake charmer" holds with his hands. The snake considers the person and pungi a threat and responds to it as if it were a predator.Snake charmers used to be a fixture at Indian markets and festivals, beguiling crowds with their ability to control some of the world's most venomous reptiles.But one of India's iconic folk arts is fading away — and animal-rights activists say it can't happen soon enough. They say it's an art based on cruelty.

**Transfixture**

A 1972 Indian law forbids anyone to keep a snake, but it hasn't been enforced much in the case of snake charmers until recently. The Indian government has tried to accommodate snake charmers and their existing snake, while trying to keep them from capturing more snakes.Now a day’s number of NGO group are trying to rehabilitate snake charmers by turning them into snake rescuers. Instead of performing at festivals, the snake charmers can be called in to remove venomous snakes from city and suburban

gardens and return them to the wild.So today instead of catching the snake, exploiting it, killing it, they actually help us protect snakes. It's not just the law that's working against the snake charmers as performers; it's India's evolving culture as well.Still, if it were possible to save something from the art of snake charming, it might be the music of the charmer's flute, a seductive little song that snakes can never hear. Awareness as above among peoples, saperas and society believing that snakes are an important part of our life as destroyer of rat and saver of crop, playing important role in food chain and ecosystem.

## References


1) https://www.npr.org/2011/08/08/139086119/in-india-snake-charmers-are-losing-their-sway
2) Chandra, Sharmila (12 November 2013). "India's snake-charmers sway on the edge of extinction A traditional art form faces extinction". *India Today*. Retrieved 16 April 2020
3) *Amtul Jamil (21–27 December 2012), "Snakes* and *charmers", The Friday Times, XXIV (45)*. Umerkot is one of the centers of the craft in Pakistan.
4) Powell, Michael; Forbeck, Matt (18 December 2012). *The Most Forbidden Knowledge: 151 Things NO ONE Should Know How to Do*. Adams Media. ISBN 978-1440560934.
5) *"India snake charmers have identity crisis". Los Angeles Times. 21 February 2012*. Retrieved *1 February* 2020.
6) *"In India, Snake Charmers Are Losing Their Sway". NPR.org*. Retrieved *1 February* 2020.
7) Patterson, Alice. "Everything You Need To Know About Snake Charming". *Oddle Entertainment Agency*. Retrieved 1 February 2020.
8) https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/s/Snake_charming.htm


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# SNAKE SPECIES DIVERSITY AND THEIR DISTRIBUTION IN KODIYALMALE RESERVE FOREST, BANTWAL, DAKSHINA KANNADA, KARNATAKA, INDIA

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## 1. Introduction:

Snakes are probably derived from the lizard ancestry in Mesozoic period. They have long narrow bodies devoid from limbs. Since ancient time the snakes are one of the successful vertebrates on the earth. Most of the snakes are found in the arid zone of the world [14]. They play very important role in various food chains in the ecosystems. They occupy various habitats that include Costal, Forests, Rocky Area, Grass, Urban Area, Pond/Marshes, Scrubland, Farms and Village Environs. The snake's food habitat consists of fishes, amphibians, reptiles, birds, mammals. This shows various selection of food in these creatures. They are natural predators for harmful rodents and insects in agriculture fields. But in our country India due to lack of awareness among people in rural area many snakes have been killed by the people. Snakes run on extreme points of their ribs which are moved forwards, carrying with them the ventral shields to which they are attached. Their tongue is long, narrow and forked, and retractile into a basal sheath. It is well provided with sense organs and is exceedingly protractile. It is used as a tactile organ. Majority of the snakes are non-venomous. The venom apparatus in the mouth of venomous snakes include pair of fangs is an effective structure useful for them to kill their prey. Due to human conflict with these snakes in the various habitat without protection measures the snake bite happens. Due to lack of knowledge about these snake species as venomous or non-venomous they are killed. All over the world due to fear or dislike about the snakes resulting into killing whenever and wherever they are seen [10].

Snakes are one of the most successful living vertebrates [12]. These are from clade Squamata (Lizards, Snakes & Amphibians) consists of 9193 species of that 3378 are snake species in the world [9]. The Indian Cobra, Russell's Viper, Saw Scaled Viper and Common Krait called as Big four Venomous snakes found in India. Due to human interference like habitat destruction, road kills, scarcity of prey animals are the major threats for the survival of snakes [10,11]. Therefore, monitoring on diversity and distribution of snakes has to be conducted in various ecosystems.

## 2. Study Area

Present study was aimed to determine the diversity, distribution and varied morphs of the snake (Fig 1) species in Kodiyalmale Reserve Forest, Bantwal, Dakshina Kannada which is spread over 380.36 hecters. The study on snake elements in the fallowing 3 areas covering various habitats. (Fig.1), namely (1)Vogga ($12^0$92'N, $75^0$99'E): it lies in transition place of reserve forest along with agriculture fields and urban area. (2) Kavalapadur ($12^0$90'N, $75^0$11'E):it lies in core zone of reserve forest along with thick vegetation and agriculture fields. (3) Shri Karenjeshwara Temple ($12^0$91'N, $75^0$13'E):it lies in core zone of reserve forest along with rocky habitat with temple area.

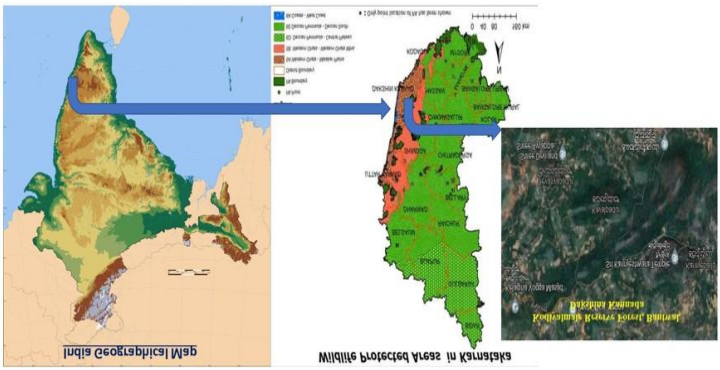


**Fig 1. Map Showing Kodiyalmale Reserve Forest, Bantwal, Dakshina Kannada, Karnataka, India**

## 3. Methods

To determine diversity and distribution of snake species in various habitats in Kodiyalmale Reserve Forest, Bantwal, Dakshina

Kannada, Karnataka, India. The data was collected from various habitats from volunteers, road kill reports and encounter during field observation. For making observations and recording the data, various equipment's including digital camera, binoculars 7x10, torch lights, GPS, vernier caliper,etc. were used in the field. Identification of various taxa was carried out by using available literature – Reptiles (Smith 1935; Tikader & Sharma 1992; Daniel 2002; Whitaker & Captain 2008)[1]. Further to fortify, consulted experts and compared the type species of museum in Mangalore University, Mangalore. The species included in this paper is to the best of my knowledge and any species that have been out is only due to the reason that it was not encountered during the present study.

## 4. Results and Discussion

There are many studies on the snake diversity in Karnataka and near by states like Kerala, Tamil Nadu [10,11], from Goa [ 9], from Western Ghats region of various states [ 8,9,10]. The study was especially conducted in Kodiyalmale Reserve Forest, Bantwal for the first time and reported occurrence of 33 number of snake species were recorded, of those six species were highly venomous, four species were semi venomous and twenty-three species were non venomous.

**Table 1 – Checklist of Venomous, Semi-Venomous & Non-Venomous Snakes in Kodiyalmale Reserve Forest, Bantwal, Dakshina Kannada, Karnataka, India.**

| ***Family*** | ***Species Name*** | ***Common Name*** | ***Red List*** | ***IWPA*** | ***Toxicity*** | ***Activity*** |
|---|---|---|---|---|---|---|
| 1. Typhlopidae | *01.amphotyphlops braminus (Daudin,1803)* | Brahminy Worm Snake | NE | Sch IV | Non - Venomous | Diurnal |
| | *02.Grypotyphlops acutus (Dumeril & Bibron, 1844)* | Beaked Worm Snake | LC | Sch IV | Non - Venomous | Diurnal |
| 2. Uropeltidae | *03. Uropeltis ellioti (Gray, 1858)* | Elliot's Shieldtail | LC | Sch IV | Non - Venomous | Both |
| 3. Pythonidae | *04. Python molurus (Linnaeus, 1758)* | Indian Rock Python | NE | Sch I Part II | Non - Venomous | Both |
| 4. Boidae | *05. Gongylophis conicus (Schneider, 1801)* | Common Sand Boa | NE | Sch IV | Non - Venomous | Both |
| | *06. Eryx johnii (Russell, 1801)* | Red Sand Boa | LC | Sch IV | Non - Venomous | Both |
| | *07. Eryx whitakeri Das, 1991* | Whitaker's Boa | NE | Sch IV | Non - Venomous | Both |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5.Colubridae | *08. Amphiesma beddomei (Gunther, 1864)* | Beddome's Keelback | LC | Sch IV | Non - Venomous | Both |
| | *09. Amphiesma stolatum (Linnaeus, 1758)* | Buff-Striped Keelback | NE | Sch IV | Non - Venomous | Diurnal |
| | *10. Xenochrophis piscator* | Checkered Keelback | NE | Sch IV | Non - Venomous | Both |
| | *11. Macropisthodon plumbicolor* | Green Keelback | NE | Sch IV | Non - Venomous | Both |
| | *12. Ahaetulla nasuta (Lacepede, 1789* | Common Vine Snake | NE | Sch IV | Semi-Venomous | Both |
| | 13. Ahaetulla pulverulenta (Dumeril & Bibron, 1854) | Brown Vine Snake | LC | Sch IV | Semi-Venomous | Both |
| | 14. Argyrogena fasciolata (Shaw, 1802) | Banded Racer | NE | Sch IV | Non - Venomous | Diurnal |
| | *15. Boiga beddomei (Wall, 1909)* | Beddome's Cat Snake | DD | Sch IV | Semi-Venomous | Night |
| | *16. Boiga trigonata (Schneider, 1802)* | Common Indian Cat Snake | NE | Sch IV | Semi-Venomous | Night |
| | *17. Coelognathus helena (Daudin, 1803)* | Common Indian Trinket Snake | NE | Sch IV | Non - Venomous | Diurnal |
| | 18. Dendrelaphis tristis (Daudin, 1803) | Common Bronzeback Tree Snake | NE | Sch IV | Non - Venomous | Diurnal |
| | *19. Lycodon aulicus (Linnaeus, 1758)* | Common Wolf Snake | LC | Sch IV | Non - Venomous | Night |
| | *20. Lycodon striatus (Shaw, 1802)* | Barred Wolf Snake | NE | Sch IV | Non - Venomous | Night |
| | *21. Lycodon travancoricus (Beddome, 1870)* | Travancore Wolf Snake | NE | Sch IV | Non - Venomous | Night |
| | *22. Oligodon arnensis (Shaw, 1802)* | Common Kukri Snake | NE | Sch IV | Non - Venomous | Both |
| | *23. Oligodon taeniolatus (Jerdon, 1853)* | Variegated Kukri Snake | NE | Sch IV | Non - Venomous | Both |
| | *24. Chrysopelea ornata(Boie,1826)* | Ornamental Flying Snake | NE | Sch IV | Semi-Venomous | Both |
| | 25. Ptyas mucosa (Linnaeus, 1758) | Indian Rat Snake | NE | Sch IV | Non - Venomous | Diurnal |
| | 26. Sibynophis subpunctatus (Duméril, Bibron & Duméril, 1854) | Duméril's Black headed Snake | NE | Sch IV | Non - Venomous | Night |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Elaphidae | *27. Bungarus caeruleus (Schneider, 1801)* | Common Indian Krait | NE | Sch IV | Highly Venomous | Night |
| | *28. Calliophis melanurus (Shaw, 1802)* | Slender Coral Snake | NE | Sch IV | Highly-Venomous | Night |
| | *29. Calliophis nigrescens (Gunther, 1862)* | Striped Coral Snake | NE | Sch IV | Highly-Venomous | Night |
| | *30. Naja naja (Linnaeus, 1758)* | Spectacled Cobra | NE | Sch II Part II | Highly-Venomous | Diurnal |
| 7. Viperidae | *31. Daboia russelii (Shaw & Nodder, 1797)* | Russell's Viper | NE | Sch II Part II | Highly-Venomous | Diurnal |
| | *32. Echis carinatus (Schneider, 1801)* | Indian Saw-scaled Viper | VU | Sch IV | Highly-Venomous | Night |

## Photographs taken during the field work

Fig 1. Spectacled Cobra (*Naja naja*)

Fig 2 Common Krait (*Bungarus s. sindanus*)

Fig 3 Saw Scaled Viper (*Echis carinatus*)

Fig 4 Russell's Viper (*Dabola russelii*)

Fig 5 Slender Coral Snake (*Calliophis melanurus*)

Fig 5 Red Sand Boa (*Eryx johnii*)

Fig 7. Green Vine (Ahaetulla nasuta)

Fig 7. Trinket Snake (Coelognathus helena)

Fig 8. Ornamental Flying Snake (Chrysopelea ornata)

Fig 7. Common Indian Cat Snake (Boiga trigonata)

Fig 8 . Common WolfSnake (Lycodon aulicus)

Fig 9. Elliot's Shieldtail (Uropeltis ellioti )

## 5. References

1. Daniel JC. The Book of Indian Reptiles. Bombay Natural History Society, Bombay. 2002, 227.
2. Devrus PJ. Snakes of India, National Book Trust (NBT), New Delhi, 1970.
3. Gharpurey KG. Snakes of India and Pakistan, 4th edition, The Popular Book Depot, Lamington Road, Bombay, 1954.
4. Khaire NA. Guide to Snakes of Maharashtra, Goa and Karnataka. Indian Herpetological society. 'USANT', Maharashtra, India, 2006.
5. Khaire Neelamkumar. Indian Snakes, Indian Herpetological Society, Pune, 1996. 8. Mukesh Ingle. Herpetofauna of Naglok region Jashpur District, Chattisgarh. Rec. Zool. SU2V. India: III (Part4). 2011, 79-96.
6. Pincheira-Donso D, Bauer AM, Meiris S, Uetz P. Global taxonomic diversity of living Reptiles. PLOS ONE. 2013; 8 (3): e5974.doi: 10.1371/journal.Pone.0059741.
7. Sathish Kumar VM. The conservation of Indian Reptiles: An approach with molecular aspects. REPTILE RAP. 2012; 14:2-8.
8. Todd RL, Steven P, Rowland G, Paul Greig-Smith, Gerald M, Greg B et al. Herpetological observations from field expeditions to North Karnataka and Southwest Maharashtra, India. Herpetological Bulletin. 2010; 112:17-37.
9. Uetz P. How many Reptile species?. Herpetological Review. 2000; 31:13-15.
10. Uetz P. The Reptile data base. Available: http://www.reptile-database.org.Accessed July 2018. 11. Whitakar R, Captain A. Snakes of India. The Field Guide. 2nd Edi. Draco Books. 2008, XIV+385. 15. Whitaker Romulus. Common India Snakes, A fielde.

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**10.**

# SOME FACTS ABOUT SNAKES

**Niture S. D.**
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Reptiles are first true terrestrial vertebrates evolved from amphibians and later on from reptiles birds and mammals were evolved. Snakes belongs to class reptilian commonly known as Serpentes, which is often shortened to the serpent in mythical stories, comes from the Latin word "serpō," means "creep" or "crawl. Snakes belongs to Kingdom :Animalia, Phylum:Chordata, Class Reptilia,Order:Squamata. Though they are a **reptile**, like a lizard is, they have no eyelids or ear holes.Snakes are Found in Africa, Asia, Central America, Eurasia, Europe, North America, Oceania, Sout America.Out of over 3,800 different types, only 600 have venomous fangs. Only 200 of these snakes have enough potency to harm a human.Snakes are found in most places on earth, except Antarctica, Iceland, Ireland, Greenland and New Zealand.

**1.Comman Types of Snakes** :The following common types of snakes found around the world:

**A. Pythons** – Pythons are a family of snakes consisting of 42 total recognized species. These reptiles can be found mostly in Asia, Australia, and **Africa**. Most species in this family are "ambush predators" meaning they remain motionless and strike as prey passes by.

**B.Elapids** – Most elapids are commonly referred to as "cobras." These snakes are characterized by the erect, venomous fangs at the front of their mouths, and species can be terrestrial or aquatic. Elapids are endemic to tropical and subtropical regions throughout the world.

**C.Rattlesnakes** – **Rattlesnakes** are found on the American continents and are characterized by the rattle at the end of their tails which they use to scare off predators. Although rattlesnakes rarely attack humans unless provoked, rattlesnake bites are the leading cause for snakebite injuries in North America. Rattlesnakes have a large rattle at the end of their tail, which emits a loud noise. The rattlesnake's rattle is a series of hard segments

made of keratin. A new segment is added each time a snake sheds. When shaken, the segments vibrate against each other, producing a familiar buzz.

**D.Garters** – Garter snakes are generally harmless snakes found throughout North and Central America. These snakes were long believed to be non-venomous,.

**2.Snake Habitat:**Snakes are quite versatile, and many types work in the climates of the world. Though the only continent without snakes is Antarctica, there are a few countries like Ireland, New Zealand and Iceland. Alaska has no native species.The typical habitat is just as broad as where they can live. In water-based and land-based environments alike, these reptiles can also be found in tropical areas. Water snake commonly live near and in water, most snakes live on land. Based on the species, snakes can live in deserts, grasslands, and the rainforest

**3.Short and Long snakes**: Snakes are limbless reptiles, their head and their tail, which takes up the entire length of their body. Some snakes are as short as 4.1 inches (like the Barbados thread snake), though the longest snake in the world (which is the reticulated python) is over 20 feet long.

**4.Thermoregulation:** Snakes, like other reptiles, are cold-blooded. This means that their body temperature changes according to their environment, unlike warm-blooded animals, like us. Our temperature remains constant regardless of the weather outside. To survive, snakes living in colder climates hibernate in winter and come out in summer when they can use the suns heat to keep warm. These reptiles seek out the right environment to keep their body warm since their cold-blooded body is unable to regulate its temperature. Most often, snakes use natural sunlight to keep their body warm, but they will hide to cool off as well

**5.Skin Shedding**: Unlike most animals, a snake's skin doesn't grow along with them. Therefore, to grow, they shed their skin and produce more. A process that also helps to keep them healthy. It is really very impressive. The number of times they shed varies with species, though they will usually shed a couple of times a year. Faster growing species and young snakes shed more than others. Some ofthem change their eye color when the shedding occurs, becoming paler than their typical color.

**6.Body Adaptations:**

**a.Skull:** A snake's skull is flexible, individual bones are able to move away from each other. Elastic ligaments connect the bones to each other. The joint between the upper and lower jaw enables the snake to open their jaws as widely as possible. The two halves of the lower jaw are also connected by ligaments, which enable the pieces to move independently of one another. Such adaptations are necessary for feeding on prey that is larger than their head

**b.Teeth:** The teeth of snakes vary by the species. Snakes do not chew their food, despite the presence of teeth. Instead, they swallow it whole.Some species have several needle-sharp teeth, while others have fangs. The snakes with fangs naturally store their venom in the sacs that are behind the eyes. The venom is poisonous, but only about 600 species have it. Snake's teeth are not used to chew their food. The prey, whether killed or still alive, is always swallowed whole. Therefore, the skull must be able to withstand an incredible amount of stress considering snakes are able to take in prey that is 2 to 4 times the width of their head

**c.Sense Organs:**A snake has no external ears and earholes, but its ears are internal. Lacking external ear openings, hearing in snakes is geared for sensing vibrations. Their eyesight is basically poor, sensitive only to movement. Snakes usually find prey with their advanced sense of smell. Snakes have a specialized organ called the Jacobson's Organ, which consists of two pits lined with a sensory tissue. When snakes flick their tongue, tiny particles of scent are transported to the pits of Jacobson's Organ, which then tells the snake all about its prey

**d.BodyColour:**The snakes body covered by scales, though they have skin like humans underneath them. The color is often a sign of how dangerous the snake is, but the pattern will help differentiate the threats from harmless animals. Often, snakes are found in every color of the rainbow, including red, green, yellow, blue, and black. A high abundance of color means that it is more dangerous, though venomous snakes usually have a triangular head

**e.Pits:** Pit vipers have facial pits found below and between the eye and nostril on both sides of the head. The pit is highly sensitive to infrared radiation (heat) and serves as a direction finder in locating warm-blooded prey or predators

**7.Body size and hunting**: The body of the animal is also indicative of the way that the snake hunts. Animals with a long and thin body will hunt down their prey by hunting through bushes, while short yet thick snakes will sit and wait for their prey
**8.Capturing prey:**Snakes use a range of senses to find prey. Their sense of smell is particularly important, they smell using their forked tongues. As they flick them in and out of their mouth, they collect chemical particles from the air and then transfer them to a special organ on the roof of their mouths, known as the Jacobson's organ, which determines the scent. Snakes can also detect heat from prey animals and sense vibrations.Most snakes like to sit and wait for prey to come along. Only a few species actively hunt for their dinner. Once they find their prey, some inject venom while others use constriction to squeeze their prey to death. A constrictor loops its body around prey and exerts pressure on its victim from two or more points as the prey exhales. The constricted animal is prevented from inhaling; death comes from suffocation. Many of the largest snakes, such as the anaconda (Eunectesmurinus), are constrictors. Anacondas can reach lengths of more than 7.6 m (25 ft.) and consume birds and small mammals including deer and tropical pigs called peccaries. One large specimen was found to have a 1.8 m (6 ft.) caiman (a type of crocodilian) in its stomach
**9.Swallow Large animals**: Because snakes have a slow metabolism, they don't have to eat as often as other animals, but when they do eat, they eat big. They can open their jaws far wider than we can, and eat prey much bigger than themselves. They can't bite their food though, so swallow it whole and use inward-facing teeth to hold prey in place while slowly edging it further and further into their mouth. They can do this because their lower jaw bone, or mandible, is not fused together like ours but loosely connected by ligaments. They can move the two sides separately, so always maintain a firm grip on their prey.Once they have swallowed their prey, it can take days to weeks to fully digest it.
**10.Snake Diet**:These reptiles have a carnivorous diet, meaning that their diet entirely consists of other animals. They can choose warm-blooded or cold-blooded animals, seeking out amphibians, insects,earthworms,slugs, fish, rodents, rabbits and birds. Though every snake consume their prey whole, the way that they render them helpless varies. Boas and pythons will bite

their prey to hold onto them, wrapping their body around and squeezing the life from the prey. If the animal has fangs, it will deliver venom to its prey. The venom comes from a sac that is hidden behind the eyes.

**11.Snake Predaters and threats:** One of the biggest predators of these reptiles is humans. Humans will use them for meat, clothing, and many other purposes, though the animal is largely not considered to be endangered.The population of these reptiles can be negatively impacted by deforestation, hunting, and climate change..

**12.Snake Enemies**: These reptiles may be rather impressive hunters, but animals like large birds and coyotes have made these reptiles into a regular part of their diet. They are also hunted by mongooses, wild boars, foxes, raccoons, and others that can pick them up and consume them.

**13.Defence:** Each species has its own way to defend itself against threats. Camouflage plays a major role in their defense, hiding for additional coverage. Venomous species bite as a last resort, but they primarily will try to flee instead.

**14.Reproduction**:The reproduction process of these reptiles is primarily a process of internal fertilization. Most species intertwine their bodies with that of their partner, and the male releases the sperm from one of the two organs it has. The female doesn't necessarily become pregnant with her young right away; some females can store the male's sperm for 2-5 years before fertilization.

The species will determine the type of birth that the female has. Rattlesnakes and garter snakes will give birth to their babies as live young, which makes them ovoviviparous. However, species like the ball python and the corn snake will lay eggs, which makes them oviparous. In fact, approximately 70% of all these reptiles are oviparous, rather than ovoviviparous.

The number of eggs or live young will vary greatly. For snakes that give birth to live young, about 10-30 are born in each litter, though the diamondback water snake can have up to 40 babies in a litter. The live-bearing females often find a sheltered spot where they give birth to the babies. For the species that lay eggs, the clutch size varies significantly. While the ball python may only lay a single egg, some clutches are up to 100 eggs annually.

**15.Life span:**The species of the animal will determine their lifespan. While smaller species (like the garter snake) live for less than ten years, the various types of boas can leave for about 25 to 50 years. As of September 2020, the longest living snake is a ball python who is currently 62 years old and lives in **St. Louis Zoo** of Missouri.

**16.Smell do snake hate:** There are a couple of smells that snakes hate. Some of them include smells of clove, garlic, onion, smoke, lime, and cinnamon

**17.Snake Venom**:Snake venom is a highly modified salivacontainingzootoxinsthat facilitate the immobilization and digestion of prey, as well as the defense against threats. It is injected by unique fangs during a bite, and some species are also able to spit their venom.Broadly four types of snake venom found discussed below.

**a.HaemotoxicVenom:** This type of snake venom destroys red blood cells causes hemolysis, disrupts blood clotting, and also attacks other types of cells and tissues causing profound tissue damage and often, organ failure. These types of bites are very painful. Effects may not begin for hours after a bite. Permanent tissue damage almost always results. A person bitten by a snake with hemotoxic venom may bleed from orifices like nose, eyes, and also gums and the brain. e.g**Pit Viper**

**b.MyotoxicVenom**:Affects muscle tissue primarily. This venom affects the ability of the muscles to contract – leaving the prey flaccid and easy to eat. If a human is bitten it results in pain the legs, hips, and shoulders with paralysis the main danger at first. Damage to kidneys follows. About 25% of bite victims have severe muscle and/or kidney damage from this venom. **e.g Sea Kraits**

**c.Neurotoxic Venom:** Affects the nerves and nervous system. There may be little pain or swelling when bitten by a snake has a progressive paralyzation of the muscles of the body, followed by death from respiratory failure as your diaphragm fails to work anymore. Initially, an envenomated bite causes ptosis, droopy eyelids, seeing double, and a sleepy, dazed-like paralysis. There is sometimes excess salivation and vomiting. e.g Cobra

**d.Cytotoxic Venom:** Attacks and kills living cells of all sorts. In humans, bites from snakes with cytotoxic venom produce severe

local and organ-related symptoms, bleeding, swelling and pain. e.g King Cobra

**Conclusion:**

It is true that some species of snake are venomous and capable of killing humans, the majority are harmless. Furthermore, snakes are unlikely to intentionally attack humans. Snakes have powerful digestive enzymes that can break down tough materials like feathers, hair, and bone. Some species inject saliva containing venomous enzymes into their prey. The saliva is injected through teeth called fangs. The venom causes tissue damage and begins the digestive process. Sometimes this venom can be quite dangerous in species like cobras, rattlesnakes, kraits, vipers, and sea snakes. Be sensible, show respect and give spacetosnakes. It's their home too, and they deserve to live without being poked, prodded and picked up by us

**Refrences**

a-z-animals.com/animals/sn
https://www.nationalgeographic.com/animals/reptiles/facts/snakes-1
https://onekindplanet.org/animal/snake/
https://seaworld.org/animals/facts/reptiles/snakes/
https://en.wikipedia.org/wiki/Snake_venom

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**11.**

# SOME REMEDIES ON SNAKE BITE AND MYTHS AND FACTS ABOUT SNAKES

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## Introduction

Snakes are elongated, limbless, carnivorous reptiles of the suborder Serpentes**.** They do not have ears as most of us think of an ear. They do have a sensory ear bone, called the columella, which detects vibrations.Snakes use their tongues to detect smells to find food or stay away from enemies. Their eyes do not move inside their head, and they do not have common eyelids.Some types of snakes have a special pit located near their eyes that allows them to detect small changes in temperature. This allows them to be aware of the heat given off by the bodies of rodents or other animals they might want to eat.

Snakes are remarkable animals for the strength of emotion they arouse in people. A recent survey from a television programme showed that more than a quarter of children disliked snakes more than any other animal, and the proportion of adults is probably nearly as high. In Britain, though, there is little danger of snake-bite and most of the reasons given by people for disliking snakes are highly irrational, for example, that they are slimy or dirty when of course they are neither. This dislike of snakes seems to be something that learnt from other people and not acquired from contact with snakes themselves. In various parts of the world men make a living by cashing in on man's awe of snakes. The snake charmer relies on the fact that people are prepared to pay to watch him handle animals that they fear and would not approach themselves.

Sometimes the snakes exhibited by a charmer are harmless species but often they are potentially poisonous. Some of the less reputable charmers work with specimens that have had their fangs removed or even the front of the jaws terribly mutilated, but many charmers work with intact snakes and need quite a bit of skill to

carry out their work. Some snake charmers may build up a little resistance to venom by allowing themselves many small doses but with all of these charmers this century, snakes there still remains the possibility of a bite ending in death. In spite of the dislike of snakes found in modern times have in various times and places been welcomed or even venerated as gods. In Africa, India, South America and Europe, snakes have been worshipped. Some of the ancient Greek gods were originally snake deities. Man tends to look with awe at anything unusual and the snakes with their unblinking gaze, locomotion without legs and ability in some cases to kill with a single bite, are sufficiently odd and unlike man to inspire respect. Furthermore snakes shed their skins and this has given rise to the belief that they can be born again'. For this reason snakes have become symbols of health and life and in many snake cults have become associated with fertility.

**As a food**

Snakes are fairly simple to skin, although this should be done as soon as possible after death. It is only necessary to slit to snake down the middle of the belly and pull off the skin. Snake skin does not retain its bright colours after death but the beautiful patterning to be seen on many species remains. Snakes are also extensively used as food. In the western world where there is no general shortage of meat we tend to under-use our natural animal resources and flown on unusual meats. In less developed parts of the world people have neither acquired, nor can afford, our peculiar prejudices and do not so easily pass over a chance of easily killed meat. The large constricting snakes are the most frequent source of food, Anacondas and Boa Constrictors in South America, and large pythons in Africa, Asia and Australia, but in the far east such fare as Hamadryads, Kraits and cobras are eaten and enjoyed.

Certain snakes are considered special delicacies when they are in good fat condition in the autumn. On the larger snakes there is plenty of meat and also much fat, and it is possible to make a very good meal for them. In America alone, among the developed countries, is there much systematic use of snakes as food and there is only a limited small-scale demand for rattlesnake meat. Apparently good food, rattler steaks were eaten by early settlers

but nowadays are sometimes served as novelties at cocktail parties and similar gatherings.

**Snake bite and its treatment**

The Greek god of healing and medicine, Aesculapius, had a snake twined round a staff as his symbol and today this same symbol is still in use as the symbol of pharmacies and the medical profession. The Caduceus, symbol of the messenger god Mercury, was two snakes entwined round a staff, and was a sign of peace. Nowadays in reputable medicine snakes have little use, but some venoms have been tested for use as drugs although mostly they are too variable and impure to be much. Russell's Viper venom has been used as a blood coagulant to stop severe bleeding. It is estimated that every year over the whole thirty thousand people die of snake bite. This sounds a large number but is only a tiny fraction of the world population, and for that matter only a small percentage of the number of people bitten by poisonous snakes every year.

The cobra family are probably the most dangerous to humans but the venom of the viper family has more unpleasant symptoms. All venoms are a mixture of many substances but in the venom of cobras and seasnakes neuro toxins predominate. These are nerve poisons and may cause a feeling of weakness and a paralysis they may extend to the muscles used in breathing and those of heart causing death mainly by suffocation. There is little pain and consciousness is usually retained to the end.

In cobra venom there are also substances that break down red corpuscles in the blood and work to stop the blood coagulating. In viper venom haemotoxins predominate. These are substances that attack blood corpuscles and break down the cells of the blood vessel linings and substances that causes the blood to clot internally. The symptoms are painful, involving burning sensations at the bite, swelling that may double the size of a limb, and discoloration of the tissues where they are attacked by venom to blues, reds or even black and green. The main danger comes from internal bleeding or from weakening of heart which usually develops a fast but feeble pulse. Recovery from cobra bite is normally complete but viper bite can, because of the tissue damage it causes, leave long-lasting or even permanent effects.

Probably in most cases the worst effect of a snake bite is a state of shock and fear in the recipient, and it has been known for people to die, apparently from shock, after a bite from a harmless snake.

Many remedies for snake bite have been advocated over the last few hundred years. In most cases the remedy has been worse than the bite, for example amputation of the bitten limb or administration of large amounts of alcohol, liable to cause a fast pulse or even alcohol poisoning. Even apparently sensible precautions like sucking the bite or administering potassium permanganate, which neutralizes venom in a test tube, are actually of little value as a venom is so rapidly absorbed from the bite into the bloodstream that only a very little remains at the site to be tackled. In cases of snake bite the offending reptile should be killed and kept for damnification being handled only by the tail. Medical aid should be summoned immediately and in the meantime the patient should be kept in a state of complete rest with a bitten limb handing down and kept still to minimize blood flow. It is sometimes helpful to put a ligature round a limb above the bite but this should only be tight enough to impede blood flow in the veins and not the arteries and in any case the ligature should be released every few minutes. The object of all the first aid for bites of this kind is to slow down the spread of poison, if possible, until a doctor arrives with an antidote. Nowadays antidotes to the venom of many of the world's poisonous snakes are available. These are produced by inoculating an experimental animal, nearly always a horse, with small doses of venom. Gradually the animal builds up a resistance in its blood to the venom and eventually it can withstand, with no ill effects, an injection of venom that would be lethal to an untreated animal, as its blood can attack the venom and render it harmless. Blood serum transferred from immunized horses can be injected into bitten humans and again will go about the business of neutralizing venom. This antivenom serum is known as antivenin.

Antivenin is usually very effective against snake bite if used quickly enough. Its main disadvantage is that a small proportion of people are allergic to horse serum and in these people antivenin may have worse effects than the bite. The only person to die following a snake bite in Britain since the Second World War died from the effects of serum, not the bite. If care is taken with its

administration antivenin should normally provide a complete cure. In several places in the world there are now institutes devoted to the production of antivenin and to further research into venoms. One of the main troubles is that every snake has its own characteristic venom and differences between venoms are so great that it is impossible to produce a single antivenin to act against all kinds of bite. For a single area of the world, though, it is usually possible to provide a polyvalent antivenin which can be used against say, most of the vipers liable to be encountered. To make antivenin it is necessary to have large supplies of venom and therefore regular supplies of poisonous snakes.

To a certain extent demand is satisfied by offering rewards for live poisonous snakes but most institutes researching into venom also maintain their own snake 'farms'. Large numbers of snakes are kept in escape proof compounds in which are small domed houses where they tend to congregate in the dark. When snakes are required for venom and domes are lifted and the snakes inside are taken to have their venom extracted by the processbut skilled, operation is carried out by seizing the snake correctly behind the head and then opening its mouth or inducing it to bite through a membrane into a small cup. While the fangs are in the cup the head of the snake is pressed gently to force venom from the glands down the fangs. The snake is then taken away and allowed plenty of time to manufacture new venom before being used again.

Most of the research into venom is concerned with the numerous species of snake which are found in the tropics, but antivenin is also made for use against the snakes found in Europe. The antivenin in use in this country in manufactured from Adder venom is Paris and in Italy the Sand Viper is an important source of venom for antivenin production. Although snakes may sometimes have a nuisance value to humans if they are poisonous or if they kill poultry, they also have a useful side. Perhaps their chief economic importance is in the destruction of rodents. Rat snakes are welcomed by North American farmers for this reason and pythons are no less welcome in some parts of Asia where they may be deliberately placed in grain stores to discourage rats. From time immemorial, too, the skins of snakes have been used as leather. Several compounds from snake venoms are being researched as potential treatments or preventatives for pain,

cancers, arthritis, stroke, heart disease, hemophilia, and hypertension, and to control bleeding (e.g. during surgery).

**Some Myth and Facts about Snake:**

| Myth | Facts |
|---|---|
| Snakes must be coiled up to strike. | A snake only coils as a defense mechanism and to see more clearly. They do not have to be coiled when they strike. They strike quickly and can reach a victim at a distance nearly equal to the length of the snake's body. |
| Snakes are mean. | A snake lives in a world where they must defend themselves. They are not out to get people. They are just defending themselves because a human is so much larger than they are. |
| Rattlesnakes always rattle before they strike. | A rattlesnake rattles to warn if they are afraid they have been seen, but studies show that if they are camouflaged, they might not rattle. |
| Only poisonous snakes bite. | Any snake can bite, and although the bite of a non-poisonous snake has no venom, it can cause infection. |
| The number of rattles on a rattlesnake tells the age in years. | A rattlesnake can shed its skin several times per year, so although this does create a new rattle with each shedding, it is not representative of a year's time period. Older rattlesnakes can also lose rattles in battle or while hunting food. |
| Snakes make good pets. | Snakes are a very popular house pet for many families. The truth is however, reptiles carry salmonella. Salmonella is a kind of bacteria that can cause serious illness in |

| | |
|---|---|
| | people. Snakes and other reptiles can spread salmonella to people even if they come from pet stores. |
| Snakes drink Milk. | Snakes drink water and do not drink milk, neither can they digest it properly. They are reptiles and have no association with milk, only mammals who have mammary glands can produce milk and thus a liking for milk in non-mammals is unlikely. |
| Snakes carry a diamond in their forehead. | It is impossible for a Snake to carry anything in its head. The mythological status attached with a Snake in India is probably responsible for this myth. |
| Snakes remember you if you hurt them. | Snakes are not vengeful animals and do not have the necessary intelligence to remember people or places for getting revenge. Hindi Movies (Bollywood) have a lot to do with the creation of this myth. |

**References**

Khanna D.R and Yadav P.R. (2004): *Biology of Reptiles* Discovery Publishing House, New Delhi. Pp- 395.

https://sciencetrek.org/sciencetrek/topics/snakes/facts.cfm

https://wildlifesos.org/chronological-news/snake-facts-myths/

https://en.wikipedia.org/wiki/Snake

Vyas VK, Brahmbhatt K, Bhatt H, Parmar U (2013). "Therapeutic potential of snake venom in cancer therapy: current perspectives". *Asian Pacific Journalof Tropical Biomedicine*. 3 (2): 156–62. doi:10.1016/S2221-1691(13)60042-8

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**12.**

# ECOLOGICAL ROLE OF SNAKE : AN OVERVIEW

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## Abstract

Biodiversity plays an important role in maintaining the ecological balance in the ecosystem. All different species form a complex food web and help to maintain a balance between population.. All over the world, snakes are animals which is fearedand hated by people. Unfortunately, the fact is that most of the enmity that surround snakes are guided by ignorance or misunderstanding.Just like other animals snakes form a important key link in the food chain as they act as predators as well asprey Without snakes, the number of prey species would beincrease to unnatural levels and disturb the balance of the ecosystem. Similarly, if a number of snakes are killed, the predators that eat snakes will struggle to find food. Snakes are thus an important component of the natural environment and help to maintain a healthy ecosystem and environment.This paper is an attempt to take an review on important role of snake in the environment and to remember that just like other wildlife,snakes are also on this planet for a reason only.

## Key words

Snake, ecology,balance,food chain,importance.

## Introduction

**Snake**belonging to suborder Serpentes also called **serpent** these reptiles distinguished by their limbless condition and long elongated body and tail. Classified with lizards in the order Squamata, snakes represent a lizard that, over process of evolution, has undergone structural reduction, simplification, loss as well as specialization. All snakes lack external limbs, but not all legless reptiles are snakes.Near about all snakes are covered with scales and as reptiles, they are cold blooded and regulate their body temperature externally. The scales serve

variousfunctions as they trap moisture in dry climates and reduce body friction as the snake moves.

Snakes inspire attraction and feelings in a way that no other type of animal can.These long, legless reptiles play an important role in the natural environment and food webs.Aseffective hunters and predators, snakes use their highly-developed senses of sight, taste, hearing and touch to locate, identify and track their prey. Some snakes use a lethal dose of venom, a modified saliva, to paralyse and kill their prey while others use their powerful muscular bodies to hold their prey to death.

Snakes are highly motile creatures, able to move over sand and rocks; burrow in the soil; squeeze through cracks and crevasses in rocks; climb near vertical rock walls and the thinnest tree branches; and even swim at great speed- all without limbs .Snakes are misunderstood and primarily out of negligence about their true nature and position in the natural world. All snakes are predators, but venomous snakes have given an inaccurate view to the whole group, as most people cannot tell the dangerous from the harmless howeveronly a small percentage are venomous, and of those only about half are capable of inflicting a lethal bite.

Near about in every culture since prehistoric times including various present-day cultures the snake has worshipped. Serpent worship is one of the earliest forms of veneration, with some carvings dating to 10,000 BCE.

**Discussion**

Snakes were inthe popularitybasis, among all other animals are most hated animal. Following are thereason that indicate how snakes are important and worthy for environment

- **Snakes helps to maintain balance in the food web.**
  Snakes play an important role in maintaining balance in the ecosystem. In most systems, snakes can be both predator and prey. When a large prey population attracts and sustains a large snake population, those snakes become prey for birds, mammals and even other snakes.
- **Snakes act asnatural form of pest control.**
  As predators, snakes keep prey populations in balance. For example, rodents reproduce exponentially in the absence of

predators, as long as there is plenty of food. This is particularly true in environments dominated by humans.

- **Snakes mustdeserve our respect and appreciation.**
  Snakes, while feared around the world, are also revered and celebrated in many cultures. In some societies snakes are often viewed as good fortune and in others, the snake created the world. Being predators, the benefits of snakes are now being recognized as providing humans with an ecological service. As a society, we do not have to love snakes, but we can at least respect their right to exist without harm and appreciate their vital role in maintaining Earth's biodiversity.
- **Economic Importance of Snakes**
  There are some important economic factors that snakes provide to the population. Snakes provide entertainment in zoos and as pets. The pet industry is worth over 72 billion dollars worldwide with snakes a key part of that industry.
  Another aspect of the healthcare affected by snakes is the anti-venom industry. Anti-venom is a huge part of the healthcare/pharmaceutical industry and is used as the primary treatment for people and pets who receive a venomous snake bite.Despite the disgrace snakes often get, they are more central to ecology than mostrealize. New research reveals that snakes might even play a key role in dispersing plant seeds.

**Conclusion**

As snakes is not be the most popular animal on the planet, around the world, It is not surprising that snakes are often treated in a negative light. Most commonly they are feared and hated due to the historic disgrace against their misconceived nature. These negative approach towards snake species can lead to various harmful actions and has even resulted in planned oppression and killings. Such actions and harm has unfortunately comesfrom two sources as ignorance and misunderstanding but in reality **snakes help to maintain the biodiversity of Earth.** with their ecological services and their dynamic integration with other species, snakes promote the maintenance of biodiversity around the world. Unfortunately, howevermany different species of snake have become endangered and some are on the way of extinction. Snakes face various harmful factors that contribute to the reduction of their populations such as habitat destruction, wildlife diseases and

the introduction of invasive species. With all the good that snakes truly do, it is more important than ever that we do our best to keep them around in order to maintain the biodiversity of the planet.

**References**


- https://sciencing.com/importance-snakes-ecosystem-8078550.html
- https://www.tribuneindia.com/news/amritsar/snakes-role-important-for-ecosystem-say-experts-170945
- https://news.cornell.edu/stories/2018/02/snakes-act-ecosystem-engineers-seed-dispersal
- https://savethesnakes.org/s/why-snakes/


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**13.**

# SEA SNAKES: BIOLOGY, ECOLOGY AND DIVERSITY

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## Introduction

Sea snakes, or coral reef snakes, are a subfamily of elapid snakes,the Hydrophiinae,that inhabit marine environm ents for most or all of their lives. All sea snakes have paddle-like tails and many have laterally compressed bodies that give them an eel-like appearance. Unlike fish, they do not have gills and must surface regularly to breathe. Along with whales, they are among the most completely aquatic of all air-breathing vertebrates.

Most are venomous, except the genus *Emydocephalus*, which feeds almost exclusively on fish eggs. Sea snakes are extensively adapted to a fully aquatic life and are unable to move on land, except for the genus *Laticauda*, which has limited land movement. They are found in warm coastal waters from the Indian Ocean to the Pacific and are closely related to venomous terrestrial snakes in Australia.

Among this group are species with some of the most potent venoms of all snakes. Some have gentle dispositions and bite only when provoked, while others are much more aggressive. Currently, 17 genera are described as sea snakes, comprising 69 species.

## Evolving from Land to Sea

Sea snakes also could become established by making evolutionary transitions from terrestrial or freshwater habitats to marine habitats in the island systems of the Caribbean. We know that elapid snakes – a family of venomous snakes with short, fixed-front fangs, such as cobras – have done this in the Coral Triangle region.

Indeed, most of today's sea snakes originated and evolved into different species in this part of the globe between 2 to 16 million years ago. At that time, this region was a vast wetland complex associated with Southeast Asia and the Australasian archipelago.

Land and sea are interlaced throughout the Coral Triangle, and have been so for several million years. This region is also characterized by high rainfall, low and variable water salinity, and relatively stable tropical warm temperatures. Throughout much of its geological past, sea levels rose and fell many times, opening and closing marine corridors and causing mangrove fringes and mud flats to form and disappear. All of these conditions are favorable for evolutionary transitions from land to sea, and stable, shallow marine habitats have persisted for the past 3 million years.

Similar changes occurred in the Caribbean, but the Coral Triangle is a much larger and more complex system. Multiple ancestral lineages of snakes occur in Southeast Asia, and there are four to five times more viviparous (live-bearing), estuarine species within the Coral Triangle than occur in the Caribbean.

Indeed, the Coral Triangle, broadly defined, appears to be the only region where viviparity is characteristic of the majority of estuarine snakes. These snakes live in coastal waters contacting freshwater habitats, and they were most likely to undergo an evolutionary transition from terrestrial or freshwater to marine habitats and give rise to sea snakes.

**Description**

The majority of adult sea snakes species grow to between 120 and 150 cm (4 and 5 ft) in length, with the largest, *Hydrophis spiralis*, reaching a maximum of 3 m (10 ft). Their eyes are relatively small with a round pupil and most have nostrils located dorsally. The skulls do not differ significantly from those of terrestrial elapids, although their dentition is relatively primitive with short fangs and (with the exception of *Emydocephalus*) as many as 18 smaller teeth behind them on the maxilla.

Most sea snakes are completely aquatic and have adapted to sea environments in many ways, the most characteristic of which is a paddle-like tail that has improved their swimming ability. To a varying degree, the bodies of many species are laterally compressed, especially in the pelagic species. This has often caused the ventral scales to become reduced in size, even difficult to distinguish from the adjoining scales. Their lack of ventral scales means they have become virtually helpless on land, but as they live out their entire lifecycles at sea, they have no need to leave the water.

The only genus that has retained the enlarged ventral scales is the sea kraits, *Laticauda*, with only five species. These snakes are considered to be more primitive, as they still spend much of their time on land, where their ventral scales afford them the necessary grip. *Laticauda* species are also the only sea snakes with internasal scales; that is, their nostrils are not located dorsally.

Since a snake's tongue can fulfill its olfactory function more easily under water, its action is short compared to that of terrestrial snake species. Only the forked tips protrude from the mouth through a divided notch in the middle of the rostral scale. The nostrils have valves consisting of a specialized spongy tissue to exclude water, and the windpipe can be drawn up to where the short nasal passage opens into the roof of the mouth. This is an important adaptation for an animal that must surface to breathe, but may have its head partially submerged when doing so.

The lung has become very large and extends almost the entire length of the body, although the rear portion is thought to have developed to aid buoyancy rather than to exchange gases. The extended lung possibly also serves to store air for dives. Most species of sea snakes are able to respire through the top of their skin. This is unusual for reptiles, because their skin is thick and scaly, but experiments with the black-and-yellow sea snake, *Pelamis platura* (a pelagic species), have shown this species can satisfy about 25% of its oxygen requirements in this manner, which allows for prolonged dives.

Like other land animals that have adapted to life in a marine environment, sea snakes ingest considerably more salt than their terrestrial relatives through their diets, and when seawater is inadvertently swallowed. Because of this, a more effective means of regulating the salt concentration of their blood is required. In sea snakes, the posterior sublingual glands, located under and around the tongue sheath, allow them to expel salt with their tongue action.

Scalation among sea snakes is highly variable. As opposed to terrestrial snake species that have imbricate scales to protect against abrasion, the scales of most pelagic sea snakes do not overlap. Reef-dwelling species, such as *Aipysurus*, do have imbricate scales to protect against the sharp coral. The scales

themselves may be smooth, keeled, spiny, or granular, the latter often looking like warts. *Pelamis* has body scales that are "peg-like", while those on its tail are juxtaposed hexagonal plates.

**Sensory Abilities**

Vision, chemoreception (tongue-flicking), and hearing are important senses for terrestrial snakes, but these stimuli become distorted in water. The poor visibility, chemical dilution, and limitation of ground-borne vibrations under water suggest that sea snakes and sea kraits may have unique sensory abilities to compensate for the relative lack of other sensory cues.

Very little is known about sea snake vision. A study of retinal photoreceptors of spine-bellied, *Lapemis curtus*, and horned, *Acalyptophis peronii*, sea snakes found three classes of visual pigments all from cone cells. Despite the absence of rod cells in sea snake eyes, Simeos *et al.* found genes from rod-cells (*rh1*) were still being expressed suggesting that in sea snakes some cones may be transmuted rods. However, behavioral observations indicate that vision has a limited role for catching prey and mate selection, but sound vibrations and chemoreception may be important. One study identified small sensory organs on the head of *Lapemis curtus* similar to the mechanoreceptors in alligators and aquatic snake Acrochodus that are used to sense the movement of fish prey. Similarly, vision appears to be of limited importance for finding mates. Shine experimented with applying skin secretions (pheromones) to snake-like objects to see if male turtle-headed sea snakes, *Emydocephalus annulatus*, are attracted to female pheromones. Shine found that although vision may be useful over short distances (less than 1 m [3 ft]), pheromones are more important once the male comes in physical contact with an object.

The olive sea snake, *Aipysurus laevis*, has been found to have photoreceptors in the skin of its tail, allowing it to detect light and presumably ensuring it is completely hidden, including its tail, inside coral holes during the day. While other species have not been tested, *A. laevis* possibly is not unique among sea snakes in this respect.

Other unique senses, such as electromagnetic reception and pressure detection, have been proposed for sea

snakes, but scientific studies have yet to be performed to test these senses.

**Distribution and Habitat**

Sea snakes are mostly confined to the warm tropical waters of the Indian Ocean and the western Pacific Ocean, with a few species found well out into Oceania. The geographic range of one species, *Pelamis platurus*, is wider than that of any other reptile species, except for a few species of sea turtles. It extends from the east coast of Africa, from Djibouti in the north to Cape Town in the south, across the Indian Ocean, the Pacific, south as far as the northern coast of New Zealand, all the way to the western coast of the Americas, where it occurs from northern Peru in the south (including the Galápagos Islands) to the Gulf of California in the north. Isolated specimens have been found as far north as San Diego and Oxnard in the United States.

Sea snakes do not occur in the Atlantic Ocean. *Pelamis* possibly would be found there were it not for the cold currents off Namibia and western South Africa that keep it from crossing into the eastern South Atlantic, or south of 5°S latitude along the South American west coast. Sea snakes do not occur in the Red Sea, believed to be due to its increased salinity, so no danger exists of them crossing through the Suez Canal. A lack of salinity is also thought to be the reason why *Pelamis* has not crossed into the Caribbean via the Panama Canal.

Despite their marine adaptations, most sea snakes prefer shallow waters near land, around islands, and especially somewhat sheltered waters, as well as near estuaries. They may swim up rivers and have been reported as far as 160 km (100 mi) from the sea. Others, such as *P. platurus*, are pelagic and are found in drift lines, slicks of floating debris brought together by surface currents. Some sea snakes inhabit mangrove swamps and similar brackish water habitats, and two landlocked freshwater forms are found: *Hydrophis semperi* occurs in Lake Taal in the Philippines, and *Laticauda crockeri* in Lake Te Nggano on Rennell Island in the Solomon Islands.

**Behavior**

Sea snakes are generally reluctant to bite, and are usually considered to be mild-tempered, although variation is seen among

species and individuals. Some species, such as *P. platurus*, which feed by simply gulping down their prey, are more likely to bite when provoked because they seem to use their venom more for defense. Others, such as *Laticauda* spp., use their venom for prey immobilization. Sea snakes are often handled without concern by local fishermen who unravel and toss them back into the water barehanded, usually without getting bitten, when the snakes frequently become entangled in fishing nets. Species reported as much more aggressive include *Aipysurus laevis*, *Astrotia stokesii*, *Enhydrina schistosa*, *Enhydrina zweifeli*, and *Hydrophis ornatus*.

On land, their movements become very erratic. They crawl awkwardly in these situations and can become quite aggressive, striking wildly at anything that moves, although they are unable to coil and strike in the manner of terrestrial snakes.

Sea snakes appear to be active both day and night. In the morning, and sometimes late in the afternoon, they can be seen at the surface basking in the sunlight, and they dive when disturbed. They have been reported swimming at depths over 90 m (300 ft), and can remain submerged for as long as a few hours, possibly depending on temperature and degree of activity.

**Ecology**

They feed on small fish and occasionally young octopus. They are often associated with the sea snake barnacle (*Platylepas ophiophila*), which attaches to their skin.

**Reproduction**

Except for a single genus, all sea snakes are ovoviviparous; the young are born alive in the water where they live their entire lives. In some species, the young are quite large, up to half as long as the mother. The one exception is the genus *Laticauda*, which is oviparous; its five species all lay their eggs on land.

**Venom**

Like their relatives in the family Elapidae, the majority of the sea snakes are highly venomous; however, when bites occur, venom injection is rare, so envenomation symptoms usually seem nonexistent or trivial. For example, *Hydrophis platurus* has venom more potent than any terrestrial snake species in Costa

Rica based on $LD_{50}$, but despite its abundance in the waters off its western coast, few human fatalities have been reported. The death of a trawler fisherman in Australian waters during 2018 was reported to be the region's first sea snake fatality since a pearl diver was killed in 1935.

Bites in which envenomation does occur are usually painless and may not even be noticed when contact is made. Teeth may remain in the wound. Usually, little or no swelling occurs, and rarely are any nearby lymph nodes affected. The most important symptoms are rhabdomyolysis (rapid breakdown of skeletal muscle tissue) and paralysis. Early symptoms include headache, a thick-feeling tongue, thirst, sweating, and vomiting. The venom is very slow acting and symptoms that happen from little as 30 minutes to several hours after the bite include generalized aching, stiffness, and tenderness of muscles all over the body. Passive stretching of the muscles is also painful, and trismus, which is similar to tetanus, is common. This is followed later on by symptoms typical of other elapid envenomations, a progressive flaccid paralysis, starting with ptosis and paralysis of voluntary muscles. Paralysis of muscles involved in swallowing and respiration can be fatal.

**Taxonomy and Diversity**

Sea snakes were at first regarded as a unified and separate family, the Hydrophiidae, that later came to comprise two subfamilies: the Hydrophiinae, or true/aquatic sea snakes (now 16 genera with 57 species), and the more primitive Laticaudinae, or sea kraits (one genus, *Laticauda*, with five species).

Eventually, as just how closely related the sea snakes are to the elapids became clear, the taxonomic situation became less well-defined. Some taxonomists responded by moving the sea snakes to the Elapidae, thereby creating the subfamilies Elapinae, Hydrophiinae, and Laticaudinae, although the latter may be omitted if *Laticauda* is included in the Hydrophiinae. No one has yet been able to convincingly work out the phylogenetic relationships between the various elapid subgroups, and the situation is still unclear. Therefore, others opted to either continue to work with the older traditional arrangements, if only for practical reasons, or to lump all of the

genera together in the Elapidae, with no taxonomic subdivisions, to reflect the work that remains to be done.

**Conservation Status**

Sea snakes are exploited for their skin, organs, and meat. Although some species are taken in great numbers, they are not protected by CITES (A Washingon convention). Since 1934, meat and skin of sea snakes have been used commercially in the Philippines and local protection of sea snakes became necessary to avoid overexploitation.

Sea snakes are also exploited in Australia, Japan, Taiwan Province of China, Thailand, and Vietnam. The local government in Queensland, Australia has introduced a special license to collect sea snakes. However, most sea-snake fisheries in the Indian and Pacific oceans have not been reported in the literature and are not controlled by local governments. With the exception of the Philippines, the impact of exploitation on populations of sea snakes is almost unknown and some populations may already be in danger of extinction. Monitoring and control of the commercial catch is the only way to maintain a sustainable yield, giving local governments a chance to intervene before a catastrophic collapse of local populations occurs.

However, management of sea-snake fisheries and protection of the endangered species is not possible without a basic knowledge of the group and the ability to identify to the species level.

Most sea snakes are not on the CITES protection lists, however, one species, *Laticauda crockeri*, is classified as vulnerable. Several species of *Aipysurus* are listed with conservation status of greater concern, the Timor species *A. fuscus* is known to be endangered, and two others found in seas north of Australia, the leaf-scaled *A. foliosquama* and short-nosed *A. apraefrontalis*, are classified as critically endangered according to the IUCN Red List of Threatened Species.

**Fun Facts**

Sea snakes are front-fanged and highly venomous. A fold in the gums of a sea snake hides the fangs, and the fangs quickly emerge when biting. Sea snake fangs are fragile and may break off and remain in the wounds of their victims. To counter the problem of having weak fangs, sea snakes have potent venom that can easily paralyze, kill, and begin the digestive process of the fish they target.

**Sea Snake Facts**

Sea snakes evolved from two different snakes (the cobra in Asia and Australian terrestrial elapids). Marine sea snakes are viviparous: They give birth to fully-formed young at sea, without laying eggs. Sea snakes require fresh water for drinking and will dehydrate at sea without it.

They are restricted to coastal areas of the Indian and Western Pacific oceans, from the east coast of Africa to the Gulf of Panama. Except for the yellow-bellied sea snake, which is found in the open ocean from Africa eastward across the Pacific to the west coast of the Americas. All other species live mainly in waters less than 30 meters (about 100 feet) deep, as they must dive to the seafloor to find their food among coral reefs, among mangroves, or on the ocean bottom. Some species prefer hard bottoms (corals), while others prefer soft bottoms (mud or sand) in which to hunt their prey. Most sea snakes feed upon fishes of various sizes and shapes, including eels. Two primitive groups (genera *Aipysurus* and *Emydocephalus*) eat only fish eggs whereas, *Hydrophis* specialize in burrowing eels.

**References**


- https://en.wikipedia.org/wiki/Sea_snake
- https://animalcorner.org/animals/sea-snakes/
- https://www.britannica.com/animal/sea-snake
- https://seaworld.org/animals/facts/reptiles/sea-snakes/
- https://www.thoughtco.com/venomous-sea-snakes-4160683
- https://www.animalsaroundtheglobe.com/sea-snakes-a-complete-guide/


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**14.**

# SOME INTERESTING MYTHS AND SUPERSTITION ABOUT SNAKES

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## Introduction

" Snake is A Misunderstood Creature; Let's Save This Ecological Treasure '' Snakes are elusive, mysterious, more often than not misunderstood, but one of the most fascinating species that plays a vital role for our ecosystem to thrive and flourish.

## Importance of Snakes in the Ecosystem :

Snakes are important elements in their native environments, regulating the populations of their prey. They're exclusively carnivores, which means that they're predators. But, snakes can sometimes also be prey for other predators, including other snakes. They can present a threat when they're an invasive species in an ecosystem where there's little or nothing to regulate their population. Both the introduction and removal of snakes can have unforeseen effects on an ecosystem. The usefulness of snakes ranges from their ecological importance to the economic importance of snakes in both pet and healthcare industries.

The University of Nebraska estimates that mice cause $20 million in damage annually in Nebraska alone. Snakes can slowly prowl to hunt, able to enter burrows and tight spaces where other predators like cats or hawks can't go, and traps can't be set.

If snakes were in a popularity contest, among all other animals, they would surely lose. Around the world, snakes are often perceived as animals to be feared or hated. Unfortunately, the reality is that most of the antipathies that surround snakes are guided by ignorance or misunderstanding. While snakes may not be the most popular animal on the planet, have you ever wondered why they might be important? Or perhaps, why they shouldn't be

killed? There are actually many good reasons to respect snakes and maybe even appreciate them!

Here are three spectacular ways that snakes are important and worthy of your respect

**1) Snakes Maintain Balance in the Food Web :** Snakes play an integral role in maintaining balance in the ecosystem. In most systems, snakes can be both predator and prey. When a large prey population attracts and sustains a large snake population, those snakes become prey for birds, mammals and even other snakes! Some snakes specialize in preying on other snakes, like the kingsnake, which can prey on rattlesnakes because they are immune to rattlesnake venom. In Southeast Asia, the king cobra, the longest venomous snake in the world, is also a snake-eating specialist!

**2) Snakes are a Natural Form of Pest Control :** As predators, snakes keep prey populations in balance. For example, rodents reproduce exponentially in the absence of predators, as long as there is plenty of food. This is particularly true in environments dominated by humans. The University of Nebraska estimates that mice cause $20 million in damage annually in Nebraska! Most people try to control these pests with chemicals which end up polluting the environment. Snakes provide an easy, environmentally friendly, free and natural pest control service.

Another example, timber rattlesnakes in the eastern U.S. eat rodents who are hosts to ticks. Those ticks are a vector for Lyme disease, which is a dangerous bacterial infection that can be transmitted to humans. When the snakes reduce the rodent populations, the prevalence of Lyme disease in the environment is reduced.

**3) Snakes Deserve our Respect and Appreciation : Snakes, while feared around the world, are also revered and celebrated in many cultures. In some societies snakes are often viewed as good fortune and in others,** the snake created the world. Being predators, the benefits of snakes are now being recognized as providing humans with an ecological service. However, snakes are seriously under threat. Some snake species have become threatened due to habitat destruction, urban development, disease, persecution, unsustainable trade and

through the introduction of invasive species. Many snake species are endangered and some species are on the brink of extinction. As a society, we do not have to love snakes, but we can at least respect their right to exist without harm and appreciate their vital role in maintaining Earth's biodiversity.

**Economic Importance of Snakes**

While it isn't everyone's first thought, there are some important economic factors that snakes provide to the population. Snakes provide entertainment in zoos and as pets. The pet industry is worth over 72 billion dollars worldwide with snakes a key part of that industry.

**Eight myths about snakes and some common misconceptions**

There are many species of snake in Victoria and it is therefore natural that the Museum receives a lot of enquiries about dealing with pesky snakes.

In amongst these general enquiries are questions or statements that drift into the realm of myths, of which there are many. We've compiled the most common myths and misconceptions about snakes, along with some tips on keeping snakes away.

1) A bowl of milk will attract snakes : This is one of the more widespread beliefs, possibly originating with the Milk Snake (Lampropeltis triangulum) of North and South America. Locals saw snakes disappearing into barns in search of rodents and believed that the snakes were drinking the milk from cows' udders. In fact, reptiles can't digest dairy products and even if they could, it's unlikely cows would stand idly by whilst being milked. If dehydrated enough, snakes will drink milk, but if thirsty enough they will drink just about anything.

2) Blue-tongue Lizards and Shingle backs will discourage snakes in your garden : Snakes eat frogs, lizards and even other snakes. Some, such as the Orange-naped Snake below, specialise in feeding on skinks. Newly-hatched snakes of various species may fall prey to Blue-tongue Lizards, but as the snakes grow the reverse is usually true.

3) If a snake's head is cut off it will stay alive until sundown : This myth seems to be particularly popular in rural Australia. It may be based on the fact that a snake's body will continue to writhe for some time after decapitation, but this story is not even

remotely true.

4) A mother snake will swallow her young when threatened : Although the now-extinct Gastric-brooding Frog (Rheobatrachus species) and mouthbrooding fish do appear to swallow their young, any snake ingested by another snake will immediately succumb to digestive juices.

5) Snakes always travel in pairs : In general, the only time two snakes are in the same place is during courtship and mating. Otherwise the larger snake will usually kill and eat the smaller one.

6) If you kill a snake, its partner will come after you : Snakes do not have any sort of social bond, nor the intellect nor memory to recognise and remember an assailant. Apparently Bollywood may be partially responsible for this myth.

7) The Hoop Snake bites onto its own tail, forms a circle and rolls down hills : Another myth common to Australia's rural regions, but unfortunately no such snake exists. The story is also widespread in USA and Canada where records appear from as early as the 1700s. It may be based on the ancient Greek symbol ouroboros which depicts a serpent eating its own tail, representing constant re-creation.

8) Snakes are deaf : Although they lack eardrums, snakes possess inner ears which are able to pick up not only ground-borne vibrations but low frequency airborne sounds. They do have difficulty with sounds at a higher pitch.

**Few Common Misconceptions**

Snakes are cold and slimy : In fact, snake skin is dry and, depending on the surrounding temperature, can be quite warm and soft.

Snakes are poisonous : Technically snakes are venomous, not poisonous. But not all of them are venomous by any means. Australia has the highest proportion of venomous native snakes of any country in the world (100 out of the 140 species of land snakes), although only a handful can give a fatal bite to humans.

Poisons must be ingested, inhaled or absorbed through the skin, whilst venom must be injected into the bloodstream.

Snakes are out to get you : Humans are larger, generally faster and stronger than Australian snakes. Snakes have a number of predators, of which humans well and truly qualify.

When you encounter a snake it is usually caught off guard (as you are), but the vast majority of encounters are avoided by a snake vanishing as soon as it hears you coming.A surprised snake will pick the nearest escape route and aim to disappear as quickly as possible, particularly when faced with a potential predator 50 times its own size. However, snakes in general have poor eyesight and don't always pick the best route out of trouble. If a snake feels cornered, it will often stand and defend itself as a last resort.

Snake behaviour can also become more erratic in spring during the breeding season, and females become more defensive if eggs or young are nearby. However, the vast majority of bites to humans in Australia occur because someone decided not to leave a snake alone

**Snakes dislocate their jaws whilst feeding :** Snake jawbones aren't fused as ours are. A highly flexible ligament joins the bones of the lower jaw, which stretch to allow enormous expansion of the mouth. So the mechanism is not dislocation, just great flexibility.

Pythons asphyxiate their prey by squeezing them : Recent research has shown that technically pythons kill their prey by preventing blood circulation, not breathing. A constricting snake quickly stops the heart of its prey, and breathing fails soon afterwards

**Do snakes like music?**

Even though it is now proven that they can detect some airborne sounds, there is no evidence that snakes can appreciate music. Snakes are said to dance to music. While playing the flute, the snake charmer sways and the snake moves to the swaying movement. ... Milk is not part of a snake's natural diet.

**What you can do to keep snakes out of your yard**

Remove potential food sources, in this case usually rodents. Keep your property rodent-free and snakes will have less to eat.

Remove open water sources. Snakes do find water attractive, and need to drink water regularly to survive.

Remove shelters, such as sheets of tin on the ground and piles of rocks or firewood.

Keep a clear area around your house. Make sure grass is cut low, remove fallen branches, and prune overgrown bushes. Most snakes prefer not to move across long stretches of open ground.

Patch up holes in buildings. Snakes will live under houses or outbuildings where the conditions are warm and dry, and can get through any gap larger than your thumb. Place wire mesh with holes no larger than 1cm square over all potential entry points.

**Snakes Are Important, Let's Save Them Together**

**References**


- Srinivasa, Kalyanaraman ''Snakes in Hinduism.'' Speaking tree. in, 20th Feb, 2014. Pimputkar, Sonali ''5 Nagas and Their Prominent Role in Hindu Mythology.''The Free Press Journal, 27th July, 2017. Chordate Zoology.


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# DIVERSITY OF SNAKES IN AMBAD DIST- JALNA, MAHARASHTRA (INDIA)

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## Introduction

Asia was considered among most diversity-rich continents; however, increase in human population has adversely affected the diversity due to agriculture intensification, urbanization, industrialization, and pollution (Gibbons et al., 2000; Altaf et al., 2018). Species are the backbone of biology (Uetz, 2010). Among vertebrates, reptiles are still poorly known and are highly threatened. Decline in population of reptiles is a major concern and causes of catastrophic decline are habitat loss, environmental pollution, lethal diseases, unsustainable use of natural resources and global climate change (Rodrigues et al., 2010; Koirala et al., 2016; Vignoli et al., 2017; Luiselli et al., 2020). With more than 3000 species known so far, snakes are a successful group of predatory vertebrates that occupy tropical and temperate areas, from deserts and mountain summits to oceans (Pauwels et al., 2008). Snakes are important groups of reptiles to conquer the terrestrial ecosystem and play an important role in the ecosystem as links in food webs, predators and prey, bio-monitors in controlling insect pests and ecological indicators owing to their high degree of sensitivity to even a slight change in the environment (Koirala et al., 2016; Bohm et al., 2017). India harbours 518 species of reptiles which include 279 species of snakes belonging to 28 families. All over the world, near about 3783 snake species are found, out of which 279 species of snakes are found only in the India (Janani et al., 2016). They constitute approximately 10 per cent of the total snake species found in the world and 80% of them are non-poisonous (Kale et al., 2019). The venomous snakes include only about 58 species and there are only 4 species of snakes that are dangerous to man, namely, Cobra, Krait, Russell's viper and Saw-scaled viper (Jadhav et al., 2018).

Details on diversity and distribution of snakes in India have been studied by Ganesh et al. (2013), Fellows (2014), Pradhan et al. (2014), Raut et al. (2014), Yadav et al. (2014), Bansode et al. (2016), Bawaskar and Bawaskar (2016), Janani et al. (2016), Manhas et al. (2016), Mukadam and Kadam (2016), Sirsat et al. (2016), Tambre and Chavan (2016), Joshi et al. (2017), Baishya and Das (2018), Lalremsanga et al. (2018). Although many studies have been undertaken to evaluate the species diversity and distribution of snakes in India, barring the work of Walmiki et al (2012), Masood (2012) reported that though the venomous snakes may be harmful to human life in some cases, they are also useful to human in many aspects of life and are required to be conserved by maintaining suitable natural habitat. Koirala et al. (2016) noted that protections of forest habitats are significantly important for conservation of herpetofauna diversity. According to Bohm et al. (2017), factors like altitude, habitat breadth and body size of snakes are also to be considered for effective conservation of reptiles. Luiselli et al. (2020) observed a positive correlation between habitat and abundance of venomous snakes and factors like human population density, dominant agricultural techniques and land use severely affects the relative abundance of venomous snake species.

Studies on biodiversity are very essential to understand and keep track of the rapid extinction of many flora and fauna every year due to enormous anthropogenic pressure on our environment. Island biodiversity are some of the most promising biodiversity areas as both terrestrial and marine flora and fauna coexist near close boundaries. The potential of marine flora and fauna is still not clear as many species are yet to be discovered. The marine biodiversity can be estimated by the fact that there are somewhere around 250,000 (Groombridge and Jenkins, 2000) to 274,000 (Reaka-Kudla, 1997) marine species and many still not known till date. India has very high potential of coastal and marine biodiversity considering the vast coast line (more than 8000 km) and its island territories. Venkataraman (2005) estimated the biodiversity of coastal and marine ecosystems in India and found the number of total described species to be around 13,000 or higher.Thus there is very little information is available on the diversity of the snake in Ambad,districtJalna. An attempt has been

made to document the diversity and distribution of snakes. The following is an account of the snakes recorded in the AmbadTahsil.

**Non-poisonoussnake:**

**Typhlopsbramineus.:** This small blind snake is found all over the district. It is locally called *kawdya.* It is seen more near human habitations and in gardens feeding on worms and other insects. It is thinner than the smallest human finger and does not grow beyond 8 inches. The body is covered all over by semicircular imbricate scales, the head and tail regions are both blunt and the lower side is faint brown, while dorsally the snake is chocolate brown. There are no distinctions between upper and lower scales and the snake being round is often mistaken to be an earthworm. It is absolutely harmless.

**Green keel back:**viper-like body with highly keeled scales but appears slightly glossy. The brightgreen dorsal with irregular black bands or patches.Wide head, round pupils and neck often has an inverted V with black and yellow.Juveniles are more brightly colored with bands, they fade and disappear as they grow.Grow to 2 feet on average.Lives in moist vegetation, dense bushes and leaf litter.Prefers close proximity to water-bodies.Feed primarily on toads and frogs. Hardly accepts other prey.Have long rear teeth specialized to catch slippery frogs.Nocturnal and crepuscular of terrestrial activity.Non-offensive and try to escape or freeze into an S when nervous.Flattens the neck and raises head showing hood pattern like a cobra if provoked.Show no aggressive behavior and can bite in a chew manner if harassed for long.

***Eryxconicus*.-**This blunt tailed snake is often mistaken to have two mouth ends. It is locally called *dutondya.* It is an absolutely non-poisonous snake, brown with reticulate grey markings dorsally and small cross pale scales ventrally. Many snake-charmers keep this snake for a show. In the dry black soil region another longer variety is found which is completely deep brown and devoid of grey markings. This is very docile and is scientifically known as *EryxJohnii.*

**Lycodonaulicus**.-This wolf snake along with *Oligodon species is* common in the district, especially in urban areas. This snake is harmless but is unfortunately mistaken to be a Krait, because of

the white bands on the brown body. In the case of a Krait, the central row of scales in the mid-dorsal region is hexagonal and the scales beyond the vent are not divided. This is not the case with wolf snake. These snakes stay in the gardens eating frogs, lizards and rats and are helpful to the gardeners in controlling the vermin.

**Python molurus.-**This snake which, in northern regions is called Ajgar is known as *Chiti* in the south. It is met within waterfall areas of the forest region, particularly in the areas where rocks jut out into water. The snake is deep brown with variegated yellow patches all over the body. The head region is pink with a faint whitish pink lancet-shaped mark on the skull. The snake has small abdominal cross scales and near the vent has two anal spurs which indicate the rudiments of past limbs. These spurs can cause serious injuries by scratching. The snake grows upto 14 feet in length and may be 2 feet in girth, when full-grown. It has very powerful muscles with which it strangulates the prey to death before it feeds on them. It has been observed to kill quite big animals like a goat, a stag and even a boar.

**Ptyas mucosus.-**This rat snake is found all over the area. It is locally called *dhaman. It* is yellow with black dots more in the tail region. It has been seen to grow more than 10 feet. It is very agile and has been observed to jump from trees. One of the curious habits of this snake is to tie a knot by its tail on whatever perpendicular object it comes across and thus get an anchor to hold the prey. It is quite likely that the snake may be tying this knot against thin trees when lying in wait for rats. The snake is locally called *Dhaman* and is a great friend of farmers in as much as it reduces the number of rats by feeding on them. Many people unfortunately mistake this to be a poisonous snake and kill it.

**Natrix piscator**-This checkered keel-black snake is seen all over the district near ponds or places where water accumulates. It is locally called *diwad.* It grows to 4 feet in length and has, on an ash-coloured body, black squares or stripes which give it the peculiar name of "Checkered keel-black". Sometimes a little ash colour gives it an impression of olive green, particularly during the rainy season. It feeds primarily on frogs and avoids human interference, but when cornered, it attacks fiercely and can cause serious physical injuries

**Natrix stoleta**.-This snake is buff coloured with white spots and a number of longitudinal thin brown stripes all over the body. It is predominantly found during the rainy season all over the area and is locally called *naneti*. *It* is docile and one could handle it without any danger. These snakes are thin.They are absolutely harmless

**Dryophisnasutus**.- *This is* a long parrot green snake growing to more than 5 feet in length and having a markedly pointed long head. It has the peculiar habit of remaining twined on vegetation, keeping the head separate as if to hypnotise the prey. The triangular head often times continues to shake and many a time people have been unaware of the snake on a tree till the head has come right up to the nose. The bite of the snake is painful though it is not poisonous enough to kill a man. It feeds on sparrows and on other smaller birds but could be handled with care. It is more seen in places of dense vegetation or on top of green trees.

**Ahaetullagrandoculis**.-This olive green snake with fine black spots near the neck and the tail region is found on trees in the semi-forest regions of this region. It grows to about two feet and is thicker than a human thumb. It jumps from tree trunks, shows an indication of a triangular head which is often times lifted in defiance. There are thin white cross stripes all along the body. The smoothness of the skin, with these thin stripes may give it an appearance of a Krait in darkness, but this snake has serrated scales near the neck, same size scales on the mid-dorsal and divided scales beyond the vent. All these characters are absent in the krait snake. It is non-poisonous, though the bite may give some minor general neuro- toxic symptoms.

**Poisonoussnake:**

*Family Elapidae--Najanaja.*-This is a very common snake found all over the district. It is found more near human habitation than in the interior. It is locally called *nag* .The longest could be 5 feet 6 inches. This snake can never be mistaken because of the spreading of the hood which is seen in no other snakes. There are spectacle marks on the hood and 3 faint dark strips on the under surface of the hood. These two characteristics will always distinguish this snake from any other snake. Apart from this, the snake hisses before striking a prey. Though it is a poisonous snake, it avoids human approach, but if disturbed, it will attack with

ferocity, even pursuing the victim to some distance. The poison of this snake is neuro-toxic. The snake is worshipped on *Nag-panchmi* day during the rainy season and there are some images of the snake in a number of temples and caves of the district.

**Bungaruscaeruleus**.-This snake is called *Manyar* or *Karayat*. It is steel blue in colour with white cross bars all along the body. The central row of the dorsal scales is hexagonal and the scales beyond the vent are complete. It is a very timid snake growing to about 4 feet in length. It lives in crevices between stones and often times in the thatch. It is extremely poisonous and the poison is neuro-toxic. There is a belief that this snake during movement at night emits a sound akin to a long chirping of birds.

Family: *Viperidae*.

**Vipera russelli**.-This snake locally known as *Ghonas* is seen more in the scanty forest regions. It grows to 4 feet in length, is brown in colour and has three rows of deep brown elliptical spots all over the body. The head is triangular and the scales on the head are very small. It hisses very loudly and continuously, The fangs are an inch long and lie tucked on the sides of the jaw inside a sheath. It is very vicious and can strike in any direction. 'The venom is vaso-toxic.

**Echis carinatus.-**This snake, which is so common in Jalna district, is found in small numbers during the rainy season in the areas that have red soil.The local people call it *Dhul Nagin* or *phoorsa*. It does not grow to more than 18 inches in length. It has brown spots on the body and a white arrow shaped mark on the head. It moves side-ways and can jump while striking. The poison may not kill the victim immediately; the victim however suffers front secondary reactions.

## References

1. Altaf M, Arshad J, Abdul MK, Khan MSH, Muhammad U and Zulfiqar A. (2018). Anthropogenic impact on the distribution of the birds in the tropical thorn forest, 299 Punjab, Pakistan. J. Asia-Pacific Biodiver. 11: 229- 236. https://doi.org/10.1016/j.japb.2018.03.001.

2. Baishya B and Das AN. (2018). A preliminary survey on diversity and distribution of snake fauna in Nalbari District of Assam, North Eastern India. Asian Resonance 7: 25-31.
3. Bansode SA and More VR. (2018). An updated list of serpent from Palghar district of Maharashtra, India. J. Entomol. Zoology Studies 6: 375-379.
4. BawaskarPrakas S and Bawaskar Kiran S. (2016).Herpetofauna diversity from Khamgaon, district Buldhana (M.S.) Central India. Int. J. Life Sci. 4: 412-418
5. Bohm M, Kemp R, Williams R, Ana DD, Andrés G, Kirsten MMcMillan, Huw RB and Ben C. (2017).Rapoport's rule and determinants of species range size in snakes. Diversity Distributions 23:1472-1481. https://doi.org/10.1111/ddi.12632
6. Groombridge B, Jenkins MD. (2000).Global biodiversity: Earth's Living Resources in the 21 st Century. World Conservation Press, Cambridge.
7. Jadhav PL, Shivaji PC and Harshad ST. (2018). Snake species diversity and their distribution in and around Nanded city, Maharashtra, India. J. Entomol. Zoology Studies 6: 1855-1860.
8. Janani S, Maheshwaran EG, Leenu J, Samuel T and Raveen R. (2016). Diversity of snakes rescued at Chennai, Tamil Nadu, India. Intern.l J. Fauna Biol. Studies 3: 81-86.
9. Joshi PS, Charjan AP and Tantarpale VT. (2017). A herpetofaunal inventory of Vidarbha region, Maharashtra, India. Bioscience Discovery 8: 582-587
10. Kale GB, Vairale S and Ghait SN. (2019). Study of snake species diversity in rural and semi urban areas of Buldhana district of Maharashtra, India. Intern. J. Life Sci. A13: 219-225.
11. Koirala BK, Gurung DB, Lhendup P and Phuntsho S. (2016).Species diversity and spatial distribution of snakes in JigmeDorji National Park and adjoining areas, western Bhutan. J. Threat. Taxa 8: 9461- 9466.
12. Lalremsanga HT, Saipari S and Chinliansiama. (2018). Diversity of Snakes (Reptilia: Squamata) and role of environmental factors in their distribution in Mizoram, Northeast India. Adv. Environ. Chem. 79: 265-268.
13. Luiselli L, Leonardo S, Godfrey CA and Giovanni A. (2020). Venomous snake abundance within snake species' assemblages worldwide. Diversity. 12, 69. doi:10.3390/d12020069.
14. Manhas A, Rajni R and Ashwani W. (2016).An assessment of reptilian diversity and their distribution in Jammu and Kashmir state from Jammu city in northern India: A case study. Intern. J. Fauna Biol. Studies 3: 20-23.

15. Masood MF. (2012).Ecological studies on the diversity of terrestrial poisonous snakes "Proteroglyphous" of Jazan region Kingdom of Saudi Arabia (Reptilia: Ophidia). Egyptian J. Hospital Med.. 49: 839- 856.
16. Mukadam M and Gautam K. (2016). A preliminary survey on the snakes of Ratnagiri and Sindhudurga districts of Konkan region of Maharashtra. Intern. J. Adv. Res. Sci. Engineering Technol. 3: 3072-3077.
17. Pauwels OSG, Van W and Patrick D. (2008). Global diversity of snakes (Serpentes; Reptilia) in freshwater. Hydrobiologia 595: 599-605.
18. Pradhan S, Devraj M and Sahu KR. (2014). An inventory and assessment of snake diversity of Gandhamardan hills range of western Orissa, India. Int. J. Pure Appl. Zool. 2: 241-245.
19. Raut SR, Shantaj MD, Jyotsna AM, Vijay KH, Singh AJ and Mehta Gayatri U. (2014). Recent studies on the biodiversity of snakes in Palghar region, Thane, Maharashtra, India. Adv. Appl. Sci. Res.. 5: 373-381.
20. Reaka-Kudla ML. (1997).The Global Biodiversity of Coral Reefs: A Comparison with Rainforests. Biodiversity II, Washington. Joseph Henry Press, 83 - 1 08
21. Rodrigues ASL, Gray CL, Crowter BJ, Ewers RM, Stuart SN, Whitten T and Manica A. (2010).A global assessment of amphibian taxonomic effort and expertise. Bioscience 60: 798–806.
22. Sirsat CV, Patil M and Ujiwal V. (2016). Analysis of data on snakes diversity and ecological status from Aurangabad district, (MS) India. Bioscience Discovery 7:162-165
23. Tambre GN and Chavan SP. (2016).Snake species diversity of Swami RamanandTeerthMarathwada University, Nanded, Maharashtra State, India. Int. J. Curr. Res. Aca. Rev. 4: 104-115.
24. Uetz P. (2010). The original descriptions of reptiles. Zootaxa 2334: 59 - 68. (ISSN 1175-5334).
25. Venkataraman K. (2005).Coastal and Marine Biodiversity of India. Indian Journal of Marine Sciences 34(1), 57-75
26. Vignoli L, Andrea C, Giuseppe L, Luca L and Daniele S. (2017). The distribution and diversity of reptiles in a species-rich protected area of Central Italy. Herpetol. Conser. Biol. 12: 279–291.
27. Walmiki N, Siddhesh K, Bhaskar Y, Manisha K, Vishal W, Rishab P and Swapnil D. (2012) Herpetofauna of Bassein Fort and surrounding region, Thane, Maharashtra, India. Trends Life Sci. 1: 1-11

28. Yadav OV, Yankanchi SR and Amol MP. (2014). Diversity, threats and conservation of herpetofauna in Shivaji University Campus, Kolhapur, Maharashtra, India. Int. J. Curr. Microbiol. App. Sci. 3: 742-749.






**16.**

# THE SNAKES : AN INDICATORS AND MONITORS OF ECOSYSTEM

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## Introduction

Snakes have intrigued humans for centuries, and were incorporated into several mythologies and cultures. There is also considerable enthusiasm for snakes in a rapidly growing and dedicated sector of the commercial pet trade. Sadly, the considerable amount of effort by researchers and enthusiasts has not translated into public support for snakes. Declines in the sizes of snake populations do not receive the same level of attention. The same enthusiasm for snakes observed among commercial breeders might be exacting a negative, but poorly quantified, impact on wild populations . Other human activities are known sources of declines in wild snake populations , even among venomous species. In the United States, the continued sanctioning of rattlesnake round-ups clearly does not provide any benefits for the populations of these species. The troubling nature of this treatment of snakes is compounded by the fact that many of these species represent the highest levels in their respective trophic webs. As such, continued declines in snake populations are likely to leave their prey populations unchecked. The field of snake ecology has advanced considerably over the last 15 years—conceptual frameworks have been revised in light of new findings, and improvements in technology have afforded opportunities for new avenues of research.

In comparison with concerns about the populations of organisms deemed important for recreational, economic, or aesthetic reasons, snakes in need of protection may be overlooked or deprioritized. In some cases, snakes have been harmful to humans or to at-risk species that might be potential snake prey items . The conservation efforts directed at the improvement of ecosystem properties and processes could benefit by viewing

snakes as indicator organisms whose physiological, ecological, and population characteristics yield information about the status of the system as a whole.

**The Importance of Ecosystem Monitoring**

The aspects of ecosystem monitoring in the context of using snakes as indicators for monitoring ecosystem patterns and processes. Thecriticalevaluation the quality of data available in many studies of disturbances and address failures to establish comprehensible and universally applicable definitions and standards for ecosystem management. The possible use of mechanistic ecology to improve the predictive power of models for use in novel situations, as well as the special features of snakes that make them useful as bio-indicators.

**Use of Organisms in Ecosystem Monitoring**

Animals may also be used as indicator species. Bird species are commonly used because they are both sensitive to changes and easily observed.

Often, species are selected and numerical responses are measured according to the interests of managers whose goals may be conservation, game populations, recreation, or forestry. In such situations, the species selected for monitoring may have little or no relationship to important ecosystem properties. Monitoring a selected species may not even be conducive to the goal of protecting the monitored organism itself, because a consideration of community and ecosystem features may be necessary to understand changes observed even in a single species.

Species whose presence can be associated with species richness in a particular landscape type have sometimes been used as indicators of biodiversity. Some studies have selected abundant species or those that occur at a majority of habitat sites for monitoring.

A few studies have used top predators as indicators in an ecosystem. Top predators can be useful in examining ecosystem processes because of their dependence on other organisms and tendency to influence trophic dynamics . Species with important impacts on trophic dynamics fulfil a functional role in their communities that can make them useful indicators.

Indicator organisms are often used for monitoring the population trends of species other than the indicator organisms. Organisms may also be grouped according to habitat preferences, with population size trends in one species assumed to apply to others with similar habitat requirements .

In particular, such species tend to be those with large body size, specific habitat requirements, permanent residency in the area of interest, slow reproduction, sit-and-wait foraging mode, and large home range sizes Thesnakes have a largely untapped potential to act as excellent indicator organisms.

In addition to frequently possessing many of the properties deemed desirable in indicator species, snakes can, in many cases, avoid the problems associated with a poor mechanistic understanding that impede the effectiveness of many indicator organisms.

**Snakes as Bio-assessment Tools**

While snakes have seen some use as indicator organisms by some biologists their use by resource managers has been almost non-existent, largely because the priorities of managers are typically set according to non-biological considerations associated with public opinion and economic. Snakes have been identified as a group having a high correlation with performance in other organisms and a good predictive ability for sites of conservation importance .

Snakes in general, and pit vipers in particular, tend to have life-history characteristics that make them vulnerable to population declines, such as long life spans, late sexual maturity, relatively high annual survival in undisturbed populations, low reproductive frequency, site fidelity, and high mortality among neonates and juveniles. There are differences in these respects among snake species or populations. Vulnerability to change associated with habitat destruction, climate change, or other long term trends affecting ecosystems makes these organisms useful as indicators of processes affecting their ecosystems.

Many snake species have additional features that make them excellent model organisms in detailed field studies. Snakes have thermally dependent physiological functions , making them excellent models for studies of environmental effects on growth

and reproduction. Many snake species can be easily captured during spring or fall aggregations and tracked for behavioral observations, physiological studies, and routine mark-recapture. For snakes with low diet variation, foraging and digestion models can be constructed to aid in an understanding of snake behavior and time and energy budgets .Behaviours can also be identified based on the location and body posture of an animal and, in many species, a behaviour may be continuous for hours if not days.

As ectotherms, snakes specialize in surviving in low-energy environments; therefore, they may be slower to respond numerically to changes in food availability than terrestrial endotherms. Low-energy specialization tightly couples snakes to their resource environmentand allows prolonged periods of inactivity during winter months in temperate climates, or during dry seasons in the tropics, with a population's activity following relatively stable patterns among years .It is propose that this relative stability may act as an advantage in using snakes as indicators. Snakes can be excellent indicators of longer-term trends, making them useful in studies of ecosystem-scale processes that might occur over several years.

The high biomass conversion efficiency in many snakes also contributes to a tight linkage between variation in resource availability or the physical environment and properties measured in the snakes. Snakes are excellent model organisms for mechanistic investigations of the impacts of ecosystem-scale changes, particularly in studies that attempt to use physiological changes in organisms for assessment of community or population changes.

The use of a variety of habitats during periods of hibernation, foraging, mate searching, and gestation or oviposition also makes snakes useful indicators of habitat quality .

Many snake species are large enough for the implantation of temperature sensingradio transmitters. Telemetry enables the repeated location of the same individuals, which allows the collection of useful information for indicator organisms, such as data about their movements, mortality, and habitat use . Temperature-sensing radio telemetry is uniquely beneficial because it allows an examination of the thermal environment,

which enables the estimation of the thermal impacts of the environment on ectoderm physiological processes, nearly all of which are temperature-dependent .

**Chemical Monitoring**

Snake ecology has been used in a number of studies examining the effects of contamination. Snake tissues have been analysed for the presence of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane roethane (DDT), beta-benzene hexachloride, heavy metals, and other chlorinated hydrocarbons in toxicity studies .One series of studies that tested for residues of organochlorine insecticides in snake fat bodies associated changes in organochlorine residues over time with changes in the presence of pesticides in the ecosystem.

**Numerical Monitoring**

Numeric trends in snake populations can be useful, particularly in observing long-term variability . Although accurate population estimates in snakes have long been considered difficult to obtain due to problems associated with low detectability and biased sampling methods.Mark-recapture studies using a variety of capture methods are often used as a baseline for conservation assessments of a snake population. Numerous studies have also observed long term or short-term trends in snake populations . Many broad observations about populations have been used to support decisions about snake conservation. Several population studies have associated numerical trends with changes in the ecosystem and, particularly, with changes in prey .Trends in population numbers should be carefully examined by creating accurate demographic models so that sampling problems do not lead to spurious conclusions . Numerical responses of two distinct ratsnake populations had been suggested to parallel one another in annual changes in long-term studies . The two populations monitored did not parallel one another in age structure or in overall long-term trend, however, implying that different processes produced parallel changes . In

The lack of mechanistic understanding is most likely a problem with most numerical monitoring endeavours. Population size or density data simply describe populations, and changes in their values do not imply a specific mechanism. Therefore,

drawing conclusions about biological processes acting among populations requires additional assumptions about the underlying causes of population size changes. In ratsnakes, different mechanisms could be deduced because of differences in population structure between the two monitored populations . A study using one species as an indicator for other unmonitored species would be ineffective at determining whether the mechanism behind a population change in the indicator species reflects anything about the mechanisms governing population changes in unmonitored organisms.

One benefits of using snake populations for monitoring efforts is their trophic position. As obligate predators, snake populations necessarily reflect the populations of their prey items, among other factors. If food availability is insufficient, snakes eventually starve . But because snakes are low-energy specialists, they may not respond numerically to prey population changes as rapidly as the prey populations themselves change. Snake populations do change over longer time periods, however, and remain useful for detecting long-term trends in prey populations.

Snake populations have also been shown to respond numerically to the indirect effect of a prey base increase in response to the removal of large herbivore.

In addition, snake abundance, prey preferences, distribution, habitat specialization, population structure, body size, foraging mode, and reproductive frequency all influence the applicability of information about a particular snake species to other species. Because of their unique properties, snakes can respond to resource availability at an intermediate time scale. Monitoring efforts using snake numerical responses can avoid some of the spurious conclusions that might result from monitoring populations that change too rapidly, but monitoring snake population sizes alone still produces an incomplete mechanistic understanding of observed changes.

**Ecological Monitoring**

Aspects of snake ecology have occasionally been used to monitor ecosystems.Predation by snakes can have clear impacts on prey species. Although prey populations are typically

unaffected , the alteration of the foraging behaviours and preferences of prey species is possible.

In one obvious exception, the introduction of an invasive snake predator to an area with unadapted prey species, prey populations themselves can be decimated . The correlation between snake population size and prey bird nest failure rates varied with habitat characteristics and bird species .An understanding of the ecological relationships between predator and prey species could therefore enable the use of snakes as ecological indicators even when the direct application of snake population estimates is of limited utility.

**Physiological Monitoring**

Physiological monitoring of variables in snakes has been conducted repeatedly. Some snake species search available habitat for small mammal activity and select foraging sites accordinglywith observable physiological changes in the animals over relatively short periods. Even short-term changes in resource environment can result in physiological changes in snakes.

The application of physiological monitoring to the use of snakes as indicator species has been relatively unexplored. Studies focusing on physiological processes in individuals can therefore provide important early-warning mechanistic information about processes observed at the population or community scales. This body of theory explicitly represents the mechanistic connections among operative environments; behavioural and physiological allocations; and individual patterns of growth, reproduction, and mortality. Each behaviour-time, or mass-energy, allocation decision carries with it a risk of mortality. Individual organisms can be considered as integrators of their local operative environments. Changes in the environment are manifested first by effects on behaviour and mass-energy budgets of individuals, and later by shifts in growth, reproduction, mortality, and ultimately, population density.

Many bioenergetics variables are easy to measure and can be obtained during routine mark-recapture and telemetry studies. Both techniques have enjoyed extensive use in snake ecology. A more readily measured bioenergetics variable, body condition,

can be easily obtained from routine measurements upon capture and recapture.

Recently, body condition has been identified as a useful variable for monitoring and understanding organismal function in the context of conservation .

When food resource conditions are poor, body condition is expected to decline; when food resources are abundant, body condition should improve. Such species may be less amenable to traditional numerical population analysis. During routine mark-recapture and radiotelemetry studies, captured snakes are weighed and measured . Body condition is an easily measured response variable that serves as a barometer for feeding rates in snakes . The monitoring of physiological responses of snakes may be particularly useful in degraded systems in which snakes serve as near top predators.

**Future Research**

Snake species possess numerous features that make them ideal as ecological indicator species. In particular, large-bodied snakes support telemetry studies that enhance monitoring and data collection, and they facilitate a high degree of mechanistic understanding. Unlike many other long-lived or large-bodied species, snakes exhibit limited migratory behavior and few long-distance movements to complicate the association of observed responses with a particular landscape. In addition, the home-range sizes of snakes are large enough that snakes can be useful for integrating the effects of environmental changes such as, climate, habitat structure, or restoration. Furthermore, snake behaviour and physiology are tightly coupled with environmental variation. Snakes have been used as indicators in a variety of contexts, including in studies of environmental toxicity resulting from contamination and in population studies as proxies for other organisms that are presumed to change in parallel. In both types of studies the mechanisms responsible for any changes observed in snakes are not determinable from population or mortality data alone. Parallel population changes in the absence of knowledge regarding parallel mechanisms may generate misleading conclusions and inappropriate management strategies.

Novel environmental change presents tremendous challenges to managers, who typically rely on past experience to make decisions. The behavioural and physiological properties of snakes can also be used as indicators of ecosystem function. Snakes respond relatively quickly to environmental change, with physiological changes rapid enough to garner information about very short-term fluctuations but with population sizes stable enough to reflect long-term effects. In the case of physiological monitoring, snakes are used less as indicators for other species and more as monitors for species with which they are known to interact. Although mechanistic monitoring efforts are doubtless more time consuming and research-intensive than surveys of populations, they are much more useful in novel circumstances.

A clear understanding of the mechanisms that affect physiology and behaviour is required before monitoring of individual responses can become a useful assessment tool. To this end, ecologists must shift their focus from phenomenological approaches to more mechanistic approaches. Many of the common data collected in conservation-oriented studies, such as information about the thermal environment, prey base, weight and length, movement, and habitat choice, could be used in developing a more mechanistic understanding of the system.

There are four critical areas of research in need of attention and funding. First, continued research must establish functional relationships between various aspects of environmental change like natural or anthropogenic changes in food availability, thermal environment, and hydric environment and the physiological and behavioural responses of individuals.

Second, research must relate individual responses to longer-term population ttrends like, birth rates, death rates, and density.

Third, efforts should be expended to examine the interactions among critical mechanisms associated with operative environments like., thermal balance, energy balance, and water balance. Such efforts should yield an improved understanding of the relative importance of candidate mechanisms in specific systems and improve our ability to select appropriate candidate species for monitoring. Finally, a clear understanding of the candidate species' role in its community or ecosystem is required

to draw strong conclusions about higher levels of function based on individual responses. The more understand about mechanism, the greater will be ability to anticipate and predict the responses of individuals, communities, and ecosystems to novel environmental change.

## References


1) Alfaro, M.E., D.R. Karns, H.K. Voris, E. Abernathy, and S.L. Sellins. 2004. Phylogeny of Cerberus (Serpentes: Homalopsinae) and phylogeography of Cerberus rynchops: Diversifi cation of a coastal marine snake in Southeast Asia. J. Biogeogr. 31:1277–1292.
2) Ali, B.A., T.H. Huang, D.N. Qin, and X.M. Wang. 2004. A review of random amplified polymorphic DNA (RAPD) markers in fi sh research. Rev. Fish Biol. Fish. 14:443 – 453.
3) Boyd, I.L., and A.W.A. Murray. 2001. Monitoring a marine ecosystem using responses of upper trophic level predators. J. Anim. Ecol. 70:747–760.
4) Callicott, J.B., and K. Mumford. 1997. Ecological sustainability as a conservation concept. Conserv. Biol. 11:32– 40.
5) Carpenter, R.A. 1996. Ecology should apply to ecosystem management: A comment. Ecol. Appl. 6:1373 –1377.
6) Campbell, K.R., T.S. Campbell, and J. Burger. 2005. Heavy metal concentrations in Northern Water Snakes (Nerodiasipedon) from East Fork Poplar Creek and the Little River, East Tennessee, USA. Arch. Environ. Contam. Toxicol. 49:239 –248.
7) Dodd, C.K., Jr. 1993b. Strategies for snake conservation. In R.A. Seigel and J.T. Collins, eds., Snakes: Ecology and behavior, pp. 363 – 393. New York: McGraw-Hill.
8) Fitzgerald, L.A., and C.W. Painter. 2000. Rattlesnake commercialization: Long-termtrends, issues, and implications for conservation. Wildl. Soc. Bull. 28:235–253.
9) Murphy, J.B., and D. Chiszar. 1989. Herpetological masterplanning for the 1990s. Int. Zoo Yearb. 28:1–7.
10) Shine, R., and X. Bonnet. 2000. Snakes: A new “model organism” in ecological research? Trends Ecol. Evol. 15:221–222.
11) Webb, J.K., and R. Shine. 1998a. Ecological characteristics of a threatened snake species, Hoplocephalusbungaroides (Serpentes, Elapidae). Anim. Conserv. 1:185–193
12) Zhao, E., and K. Adler. 1993. Herpetology of China. Oxford, Ohio: Society for the Study of Amphibians and Reptiles.


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**17.**

# BIOLOGY OF SNAKE

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## Introduction

Snakes are belongs to the Kingdom- Animalia , phylum - Chordata, subphylum-Vertebrata, class- Reptilia, order- Squamata, suborder -Serpentes. There are about 3900 species of snakes in the world have been classified with 25 families. The two infraorders of serpentes are Alethinophidia and Scolecophidia are separated on the basis of morphological characteristics and mitochondrial DNA sequence similarity. Infraorder Alethinophidia consists of 19 families, 486 Genera and 3189 species. These are the families Acrochordidae , Aniliidae, Anomochilidae, Boidae, Bolyeriidae, Colubridae, Cylindrophiidae, Elapidae, Homalopsidae, Lamprophiidae, Loxocemidae, Pareidae, Pythonidae, Tropidophiidae, Uropeltidae, Viperidae, Xenodermidae, Xenopeltidae, Xenophidiidae belongs to infraorder Alethinophidia. Infraorder Scolecophidia consists of 05 families, 38 Genera and 442 species. Infraorder Scolecophidia composed of the families Anomalepidae, Gerrhopilidae, Leptotyphlopidae, Typhlopidae, Xenotyphlopidae. In India only 5 families found that are Colubridae, Pythonidae, Elapidae, Viperidae and Boidae. Snakes are present all over the world except few places like Antarctica, New Zealand, Ireland, etc. Besides the scientific classification, for the lay people snakes have been differentiated into two groups, venomous and non-venomous snakes. They play a very important role in ecosystem and help in balancing the food web. Being predator, it regulates the population of their prey thereby helping from losing huge economic loss in controlling pests. They are also the prey of many other animals and thus help in maintaining biodiversity on earth for future sustainable development.

**Morphology of Snake**

Snakes are limbless, elongated, cylindrical, carnivorous reptile. They are evolved from Lizards. They are ectothermic (ecto=from the outside, thermic=temperature) animals. It means they require adequate heat for proper digestion and to carry out other biological activities. To acquire heat from the surrounding, to maintain the heat or to alter body temperature they use different stratagies like by varying their exposure to the sunlight or shade. Basking in the sun is the most effective and common strategy for them to keep warm.

They can also absorb radiant heat reflected off the ground or surrounding. Snake ate 2 meals in a week, 9 meals in a month and 110 meals in a year.

**Habit and Habitat**

**Habit :** Snakes are carnivorous; being predator they eat wide variety of small animals including lizards, other snakes, small mammals, birds, eggs, fish, snail, young birds, rodents, frogs, and insects. They are unable to bite or tear their food to pieces so that they swallowed their prey as whole. Some snakes inject their venom into prey & kill it before eating it. Other snakes kill their prey by constriction. They have a very slow metabolism. Once they eat food it takes a day or more to digest it. Due to this reason, they don't come outside for hunting regularly. They also find their prey in a variety of ways: by visual observation, by using heat sensing pits, by sensing vibration and by tasting the air with their tongue to see what's nearby.

**Habitat :** Depending upon the climate and food availability each continent has different species of snakes. They live in a wide variety of habitats including grasslands, forests, desserts, woodlands, meadows, Swamps and in both fresh and marine water. Many species live in close proximity to humans, in areas like garden, flower beds with heavy mulch, lawns with long grass, basements, farms, parks, attics in houses where rodents or bats are present. Many species live under the rocks or in burrows, banks of streams and ponds. Green snakes primarily live in trees. Generally, they live in cool, dark, damp areas where prey is available.

Some are active during day and other are active at night.

**Skin :** The skin of snake's plays very important role. It protects the body from the external environments. It protects the body from microbes, parasites also helps to prevent drying out and helps snake to minimize friction. It is covered in scales. It holds other tissues and organs in place while being elastic enough to allow for respiration, movement and growth. It also serves other roles such as physiologic regulation, sensory detection and coloration. Snake skin is divided into two main layers A) The Dermis and B) Epidermis. Epidermis is highly keratinized, is composed of four layers. The outer layer of a snake's skin is shed periodically and is a temporary layer. Under the outer layer is the corneal layer called stratum corneum, which is thick and flexible. Beneath the corneal layer there is an intermediary zone called stratum granulosum or stratum germinativum which divides continuously to replace the outer layer of dead keratinous cells. The basal layer called stratum basale respectively. The stratum corneum is composed of three layers- the oberhautchen layer, the beta-keratin layer and the alpha-keratin layer respectively. The dermis located beneath the epidermis. It is fibrous in nature and not very prominent. The dermis consist of two layers, the stratum compactum and the stratum spongiosum. The stratum compactum is the inner most layer of dermis and consists of densely knit connective tissue. The stratum spongiosum consists of connective tissue, blood vessels, glands, nerve endings and other cellular structures. Nerve fibres extend into the epidermis and anchor near scales generally at the rostral or head, end of the snake, specifically nerves anchor to sensory spines and pits, which are touch and thermal detection organs, respectively. The hypodermis is below the dermis. This layer mainly stores fat. Ecdysis or shedding of the skin is a normal occurance throughout the snake life. Young snake will shed much more often and begin to have a longer resting period as they reach adult size. Young snake may shed every month. The shedding process usually takes about 2 weeks.

**Fig. :** Shedded Skin

**Scales :** Snakes body is entirely covered with scales or scutes of various sizes and shapes, except for the head, they overlap each other. Scales are cornified folds in the epidermal layers of the skin. The shape and number of scales on the head, back and belly are often characteristics and use for taxonomic or identification purposes. The scales do not increase in number as the snakes grow nor do they reduce in number over time. The scales grow larger in size and may change shape with each molt. Snakes have smaller scales around the mouth and sides of the body which allows expansion so that a snake can consume prey of much larger size and width than itself. Scales are of two type smooth or keeled scales. Smooth scales give the snake a shiny appearance. Keeled scales have a raised ridge along their mid-line, giving the snake a rough-textured appearance. These scales are usually arranged in rows along the body. The scales in some species have sensory structures on the posterior margins called apical pits and all scales have various micro-ornamentations consisting of hair-like projections, holes, spicules (small spines) and other specialization visible only through an electron-microscope. The scales on the ventral surface of the body are modified into broad plates in the majority of species and are used in locomotion. Most snakes use specialized belly scales to travel, allowing them to grip surfaces. The eyelids of a snake are transparent spectacle scales also called as brille which remain permanently closed. Scales protects the body of the snake, help in locomotion, allows moisture to be retained within, serve to reduce friction as it moves.

**Fig. :** Smooth, Shiny Scale **Fig. :** Keeled Scale

**Eye :** Snake have two eyes, but they do not have eyelids, covered by a transparent cap or scale of epidermis called spectacle that covers and protect the eye, which is shed with the rest of the skin at each molt. They have poor Eyesight, but can be able to detect movement. Tree living snakes generally have best vision and worst in burrowing snakes. Some snakes having binocular vision means they can use both eyes to focus on the same object. Diurnal snakes species have round pupils, while the nocturnal species have a vertical or slit pupil. The eye has been almost completely lost in the burrowing families, in which it is visible only as a black spot and may be covered with a scale or flesh. Arboreal snakes often have a bulging, laterally placed eye, which permits them to see activities directly below as well as above and around them.

Fig. : **Round Pupil** Fig.: **Slit Pupil**

**Head :** A snake head contains the eyes, nostrils, mouth, brain and special sensory structure called the vomeronasal or Jacobson's organ. The skull of a snake is very delicate and is characterized by mobility. It consist of a solid and complete neurocranium, to which many of the other bones are loosely attached, specially the highly mobile jaw bones**.**

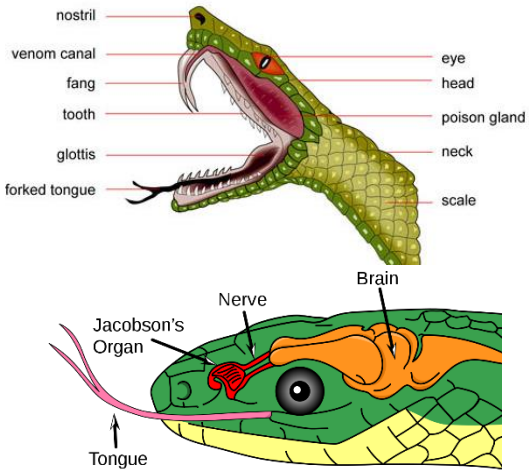


**Fig. :** Snake head showing different parts **Fig. :** Snake head showing Jacobson's organ

## Heart

Snake has three chambered heart, right and left atria and one ventricle that controls the circulatory system. It is enclosed in a sac called pericardium. The right atrium receives deoxygenated blood from the systemic circulation and the left atrium receives oxygenated blood from lungs via the left and right pulmonary veins. The ventricle is divided into three cavities that are cavum arteriosum, cavum pulmonale and the cavum venosum. The cavum venosum receives deoxygenated blood from the right atrium and the cavum arteriosum receives oxygenated blood from the left atrium. The cavum pulmonale pumps blood to the pulmonary trunk.

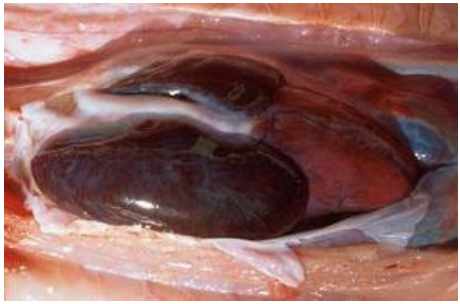

**Fig:** Heart of Snake

**Trachea :** The snake respiratory system consists of trachea, bronchi, lungs and air sac. The trachea originates at the glottis and terminates near the heart. The trachea has incomplete cartilaginous rings. The ventral portion is rigid cartilage while dorsal fourth is membranous. Trachea branches into two bronchi. The right bronchus leads to the right lung, which is elongated. The left bronchus leads to the left lung, which is vestigial.

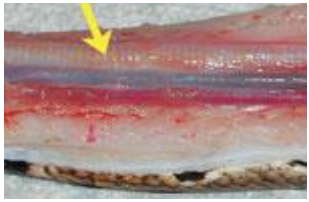

**Fig. :** Trachea

**Lungs :** The left lung is reduced or vestigial. The anterior portion of the right lung is vascular and functions in gas exchange, but the second half of the lungs is an avascular air sac that extends into the tail region. In most of the snakes the air sac performs a hydrostatic functions, regulate pressure inside the body cavity. As diaphragm is absent in snakes, air enters and leaves the lung due to action of the body muscles and movements of the ribs.

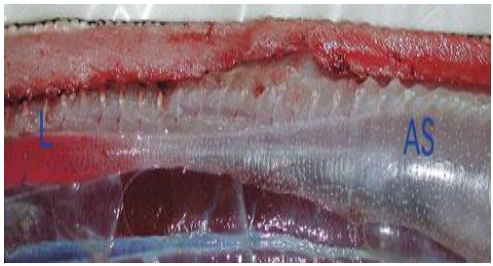


**Fig. :** Snake lung & Air sac portion

**Oesophagus :** The digestive system is composed of the oesophagus, stomach, small intestine, colon and glands. Oesophagus runs adjacent to the air sac from the pharynx to the stomach. It has very little muscles and from this food is moved to the stomach more by movement of the entire body.

**Stomach :** It is not very advanced.it is muscular and distensible. It is a short, thick walled, spindle shaped or filiform shaped with

interior longitudinal folds to increase the surface area for digestion and absorption.

**Intestine :** The small intestine is simple having few loops or folds, but for the most part it is a long tube that receives food from the stomach and absorbs nutrients from it then transport it to the colon or large intestine.

**Colon :** The colon then carries the fecal matter to the cloacal opening where it is disposed

**Liver :** The liver is the elongated internal organ is divided into several separate lobes in a snake filling the space between the heart and stomach. The main function of the liver is to produce bile, a digestive enzyme. The gall bladder and spleen are found near the posterior tip of the liver. The gall bladder stores bile produced by the liver and releases it into the small intestine.

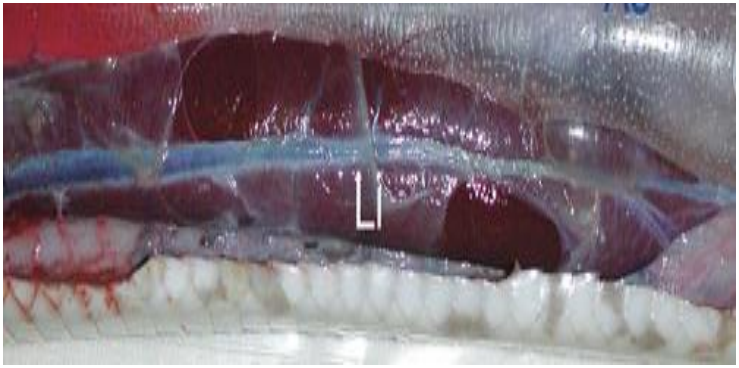


**Fig.** : Liver

**Pancreas :** The pancreas also secretes digestive enzymes into the small intestine also it produces hormones that regulate blood sugar.

**Cloaca :** The cloaca is common chamber, receiving material from the digestive, urinary and reproductive systems.

**Kidney :** In the snake paired kidney are located in the dorsal coelomic cavity. They are elongated, lobulated responsible for urinary output. The right kidney is situated closer to the head than the left. These organs filter the blood and remove waste products,

which are then transported via ureters to the cloaca. Snakes have no bladder. The ureters are hollow tubes transporting urine directly in the cloaca.

**Ovaries :** In females the ovaries are elongated and are located near the pancreas, carry eggs to the uterus before they enter the cloaca. The right ovary is cranial to the left.

**Fig.** : Ovaries

**Oviduct :** The oviduct is divided into infundibulum, magnum which secretes albumin, uterus and vagina. The region receptaculum seminis in the oviduct serves for sperm storage. The oviduct empty into the urodeum through the urogenital papillae.

**Testes :** The testes are elongated and light colored consist of seminiferous tubules, interstitial cells, blood vessels and connective tissue. Their size is variable according to season. An epididymis is absent that's why sperms stored in a bladder like structure formed from part of the ureter. Sperms formation takes place in seminiferous tubules transported in the wolffian ducts and discgarged at the base of the hemipenes.

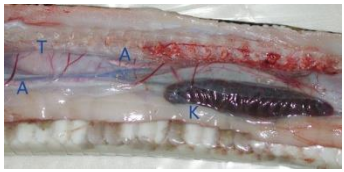


**Fig.**: Testis and Right Kidney

**Hemipenes :** The male has an organ called hemipenes, located posterior to the cloacal opening. The hemipenes are fully functional paired copulatory organ, though only one at a time is used to transfer sperm to the female.

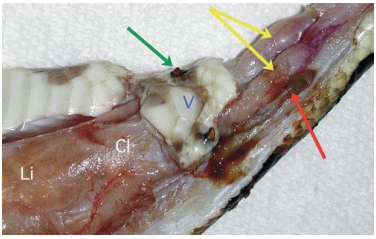


**Fig.** : Large intestine, Cloaca, Hemipenes( Yellow Arrow) (Courtesy:All images are taken from internet i.e. available online print media)

**References**


1. Mader, D.R. (2005). Reptile Medicine and Surgery. Saunders. pp. 47. ISBN 072169327X
2. Jensen B, Moorman AF, Wang T (May 2014). "Structure and function of the hearts of lizards and snakes". *Biological Reviews of the Cambridge Philosophical Society*. **89** (2): 302–36. doi:10.1111/brv.12056. PMID 23998743. S2CID 20035062.
3. Aldridge RD, Sever DM (19 April 2016). *Reproductive Biology and Phylogeny of Snakes*. CRC Press. ISBN 978-1-4398-5833-2.
4. "Snake eyes: New insights into visual adaptations". ScienceDaily. 16 August 2016.
5. Babcock,H.L.(1925). Rattlesnakes in Massachusetts.Bull Bost.Soc.Nat.Hist.35:5-10.
6. Douglas Mader, M.S., DVM, DABVP, December 1, 2011, Snake Respiratory System Anatomy, Snake Respiratory System - WikiVet English.
7. Douglas Mader, M.S., DVM, DABVP, December 1, 2011, Snake Gastrointestinal Tract Anatomy.
8. Snake Reproductive System - WikiVet English https://en.wikivet.net › Snake_Reproductive_System
9. Snake Respiratory System - WikiVet English https://en.wikivet.net › Snake_Respiratory_System
10. Snake Cardiovascular System - WikiVet English https://en.wikivet.net › Snake_Cardiovascular_System
11. Snake scale - Wikipedia https://en.wikipedia.org › wiki › Snake_scale
12. Unit 1 Snake Biology - Toronto Zoo http://www.torontozoo.com › rattlesnake_cur › un...


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# AN OVERVIEW OF SNAKES AND ITS CONSERVATION

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## Introduction

Snakes have intrigued humans for centuries, and were incorporated into several mythologies (e.g., the staff of Aesculapius) and cultures. Among the biologists who study snakes, there is little question of their fascination about the natural history of snakes. In spite of a limbless ectothermic body, snake species have radiated to inhabit all of the Earth biomes except the polar regions - even then, species can be found within the Artic circle. Snakes are among the most misunderstood of animals. Myths abound: Most snakes are poisonous, snakes can jump two feet, snakes will not cross a rope, snakes only strike when coiled and snakes travel in pairs. All of these myths are untrue as are many of the others that circulate, but in the absence of information, people often believe them. In this fact sheet, we provide facts about Oregon's native snakes that dispel myths and promote a better understanding of these wonderful, ecologically important and often beautiful animals. In general, snakes are relatively inactive except when looking for a spot in the sun or shade or when hunting. Like other reptiles, snakes are ectotherms meaning their body temperature is regulated directly by the surrounding temperature. They generally have poor eyesight and hearing, but have a well-developed sense of smell and the ability to "taste" their immediate environment.

## Morphology

The English word snake comes from Old English snaca, itself from Proto-Germanic snak-an- (cf. Germanic Schnake 'ring snake', Swedish snok 'grass snake'), from Proto-Indo-European root (s)neg-o- 'to crawl to creep', which also gave sneak as well as Sanskrit naga 'snake'.

Snakes are the most modern of reptiles, first appearing in the fossil record during the time of the dinosaurs. It is thought that they evolved from ground dwelling or burrowing lizards that

exploited the survival advantages to be found in a cylindrical, legless body. They gave up external ears and developed clear scales to shield their ever-open eyes from dust and damage. They evolved elongated internal organs, specialized muscles and resilient, scaled skins of varied pattern and color that provided camouflage and some limited protection from predators and the elements. They also evolved a host of instinctive behaviors that enabled them to find and catch prey, hide from predators, reproduce and survive in a great variety of climates. Tunnelling beneath dirt and sand, swimming in the seas, climbing in the crowns of trees and crawling on the land, snakes became integral components of varied ecosystems throughout the world.

Snakes are elongated, limbless, carnivorous reptiles of the suborder Serpentes. Like all other squamates, snakes are ectothermic, amniote vertebrates covered in overlapping scales. Many species of snakes have skulls with several more joints than their lizard ancestors, enabling them to swallow prey much larger than their heads with their highly mobile jaws. To accommodate their narrow bodies, snakes' paired organs such as kidneys appear one in front of the other instead of side by side, and most have only one functional lung. Some species retain a pelvic girdle with a pair of vestigial claws on either side of the cloaca.

Snakes are found almost in every part of the world. They range in size from very small to very large. Snakes are beautiful animals, and nothing compares to their graceful, lithe movements or the feel of their smooth, dry scales. They range in size from the tiny, 10.4 cm-long (4.1 in) Barbados threadsnake to the reticulated python of 6.95 meters (22.8 ft) in length. The fossil species Titanoboa cerrejonensis was 12.8 meters (42 ft) long. Snakes are thought to have evolved from either burrowing or aquatic lizards, perhaps during the Jurassic period, with the earliest known fossils dating to between 143 and 167 Ma ago. The diversity of modern snakes appeared during the Paleocene epoch (c. 66 to 56 Ma ago, after the Cretaceous–Paleogene extinction event). The oldest preserved descriptions of snakes can be found in the Brooklyn Papyrus.

**Distribution**

Living snakes are found on every continent except Antarctica, and on most smaller land masses; exceptions include some large islands, such as Ireland, Iceland, Greenland, the Hawaiian archipelago, and the islands of New Zealand, as well as many small islands of the Atlantic and central Pacific oceans. Additionally, sea snakes are widespread throughout the Indian and Pacific oceans. More than twenty families are currently recognized, comprising about 520 genera and about 3,900 species.

## Difference Between Venomous and Poisonous

When people talk about dangerous snakes like black mambas and cobras, at least one person in the conversation will ask whether the snake is poisonous. Bolstered by medical references and haphazard mentions on television and elsewhere in the mass media, the phrase "poisonous snake" has been drilled into our collective consciousness. But this phrase is not technically correct—strictly speaking, most dangerous snakes are venomous.

According to biologists, the term *venomous* is applied to organisms that bite (or sting) to inject their toxins, whereas the term *poisonous* applies to organisms that unload toxins when you eat them. This means that very few snakes are truly poisonous. The vast majority of snake toxins are transferred by bite. One exception is the garter snake (*Thamnophis*), which is small and harmless in terms of its bite but is toxic to eat because its body absorbs and stores the toxins of its prey (newts and salamanders).

## Poisonous Snakes and Non-Poisonous Snakes

**Non-Poisonous Snakes**

**Colour:** Usually not brightly coloured, but pythons, common sand boa, red sand boa, anaconda, wart snakes (*Acrochordus granulatus*), etc. are brightly coloured.

**Shape of head:** Head is usually narrow and elongated.

**Neck:** No constriction in the neck.

**Hood:** Hood absent.

**Tail:** Tail tapered and long except burrowing snakes. In Typhlopidae and Leptotyphlopidae the tail is short and stumpy. In

Uropeltidae the tail is very short and rough. In sand boas also the tail is short and blunt.

**Head scales:** Scales on the top of the head are large but in sand boas(Eryx conicus) the head scales are small

**Dorsal scales:** Scales on the dorsal surface are longer but spinal (vertebral) scales are not longer and hexagonal.

**Ventral scales:** Ventral scales are either across the belly completely (e.g., Colubridae), or not completely across the belly (e.g., Boidae, Uropeltidae).

**Loreal shield:** Absent

**Mental shield:** Small

**Caudal scales:** Uniform and solid

**Teeth:** Uniform and solid

**Poison gland:** Absent

**Muscular system**: Well-developed strong muscular system.

**Lungs:** Both lungs are present.

**Hypophysis:** Hypophyses absent or present on the posterior dorsal vertebrae.

**Streptostylism**:Less marked.

**Example:** Rat Snake (Ptyas mucosus), Indian Python (Python molurus), Sand Boa (Eryx conicus), Checkered keel back [Natrix (Xenocrophis) piscator], Wolf Snake (Lycodon aulicus), Striped Keel back (Amphiesma stolata).

**Poisonous Snakes:**

**Colour:** Generally brightly coloured

**Shape of head:** Head is long, triangular and posterior portion is wide.

**Neck:** Neck always constricted.

**Hood:** Present in majority cases; highly developed in Cobra group (Naja sp.); absent in Coral snakes, Krait, Russell's viper, etc.

**Tail:** Tail is abruptly tapered, but in sea snakes (Hydrophidae) the tail is flat- tend to form an oar-shaped structure and in land snakes the tail is cylindrical.

**Head scales:** Scales on the top of the head are usually small.

**Dorsal scales:** Dorsal surface scales are smaller but the spinal (vertebral) scales are larger and hexagonal in kraits

**Ventral scales:** Ventral scales are usually completely across the belly but in sea snakes ventral scales are not completely across the body.

**Loreal shield:** Present, shapes may be variable.

**Mental shield:** Fourth one is large.

**Caudal scales:** Mostly undivided except coral and cobra snakes.

**Teeth:** Most of the teeth are solid and uniform except maxillary teeth which are large, and provided with groove or canal. These large teeth are called 'Fangs'.

**Poison gland:** Present. Paired poison glands are on upper jaw.

**Muscular system:** Less-developed muscular system.

**Lungs:** One of the lungs has either been reduced or absent.

**Hypophysis:** Hypophysis developed throughout the vertebral column.

**Streptostylism:** Well-marked.

**Example:** Saw Scaled Viper (Echis carinatus), Common Krait (Bungarus caeruleus), Banded Krait (B. fasciatus), Russell's Viper (Vipera russelli), King Cobra (Ophiopagus hannah), Indian Monocled Cobra (Naja naja kaouthia).

**Conservation of Snake**

Snakes have fascinated and frightened humans for thousands of years. But in many ways, snakes have a critical role to play in our ecosystem. They prey on animals, such as rats and mice that we regard as pests. The venom of the snake can be used in treating certain type of diseases and in making antivenin for snakebites. Many people think that all snakes are poisonous and thus attack it. But snakes fear humans. Sadly due to deforestation and loss of their habitat they are wandering into cities, where their existence is threatened by human activities.

Some snake species have become threatened due to land clearing for agriculture, urban development and through the introduction of animals such as domestic pets. Maintaining a high level of biodiversity is important to all life on Earth, including humans, and snakes are an important part of that biodiversity. We

forget that snakes and other reptiles make up a significant proportion of the middle-order predators that keep our natural ecosystems working. Without them the numbers of prey species would increase to unnatural levels and the predators that eat snakes struggle to find food.

Snakes Maintain Balance in the Food Web. Snakes play an integral role in maintaining balance in the ecosystem. In most systems, snakes can be both predator and prey. When a large prey population attracts and sustains a large snake population, those snakes become prey for birds, mammals and even other snakes. Save The Snakes is dedicated exclusively to snake conservation and human-snake conflict mitigation. Together with our worldwide network of snake conservationists, the main mission of various NGO's is to protect snake populations around the world through education and community outreach to create a harmonious relationship between humans and snakes. To organize snake awareness workshops, media campaigns and community outreach programs is necessary for conservation point of view.

**References**


- .https://en.wikipedia.org/w/index.php?title=Snake
- Hsiang AY, Field DJ, Webster TH, Behlke AD, Davis MB, Racicot RA, Gauthier JA (May 2015). "The origin of snakes: revealing the ecology, behavior, and evolutionary history of early snakes using genomics, phenomics, and the fossil record". BMC Evolutionary Biology. 15: 87. doi:10.1186/s12862-015-0358-5. PMC 4438441. PMID 25989795.


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# SNAKE AS A FARMERS' FRIEND

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Our culture is agrarian. The snake is a major component of the environment among the animals that is useful to the farmer. Its importance in medicine, importance in the food chain and it protect of farmer's crop by eradicating farm rodents, insects, amphibians, reptiles etc. So not all snakes are venomous only few species are venomous. The Snakes are extremely quiet, eating and drinking as well as quiet sleeping creature living in the farm.

Snakes are friends of farmers because snakes help reduce pests that would otherwise decimate crops and they also provide protection from other predators that might hurt livestock or humans. The snakes are said to bring luck to crops and even control other snake population by eating other animals and it is therefore praised for to set free farms of plagues, however snakes are not all bad ant it can actually be super beneficial, Farmer know that if they don't disturb the snakes, then the snake won't bite them. We can see lot of snakes if you visit a farm and you might get scared, but the farmers are not afraid of them. It is as if they don't care.

Snakes have been an iconic symbol of fertility in the history, so farmers keep them because they think snakes will make their land more fertile. Snakes have long been seen as mysterious creatures. Who possess supernatural powers because there was no one around back then to explain them scientifically, these beliefs led farmer to worship snakes as gods and create stories about how we could obtain their wisdom. The snakes are very helpful for farmers in the sense that they can help with agricultural problems such as snake diets on small animals like rodents, mice, rats, amphibians, insects, beetles, slugs and birds make them better than any pesticide farmer could put in their field. Snakes are mid-level predators that mean they are also a prey. They help feed other animals and connect the links of the food chain.Which might

otherwise much away at livestock or crops. But snakes may not be great for a farmer's safety that can provide financial benefits and protection from the other predators.

Mostly reducing the need to put out less insecticide and other chemicals is a big point for snakes for their contribution to the ecosystem and the farm business. Their more direct effects are impressive as well. They are predator, which help keep invasive species and over population of rodents without snake the number of these species could become out of control. Snakes are essential for keeping a ecosystem balanced. This is why all too common impulse to kill snakes it is so damaging. If we come across a snake in the farm, tell it thank you and walk away without trying to touch but most of people pickup trap or kill it not only will be asking for a bite we provoke a snake, It will be harming the environment.

Snakes are beneficial to farmer because a single snake can kill up to hundred rodents per year, They eat mice, rats and other pests in the field that cause harm to crops, so it's an appropriate solution for pest control on farmland. If there were no such thing as snakes. There would have rodent infestations that could have destroyed agricultural production. So it's an appropriate for pest control on farm land. If there were no such thing as snakes, there would have rodent's infestation that could have destroyed agricultural production.

Many farmers release snakes into their fields intentionally by releasing captured snakes into their farm or through accidental release from transporting them between farms. As long as this is done responsibly with consideration given towards environmental impacts.

They are usually viewed as creepy, scary and undesirable to have around but in truth snakes are great to have on farms because rats, mice and other rodents dig holes in fields and damages the crops, while insects such as slugs, aphids and beetles can carry diseases and even kill entire plants. All of these pests can be a farmer's worst nightmare but snakes help to control these damaging creatures, without reaching for rat poisons or insecticides which can themselves impact the natural ecosystem, so snakes are great neighbors to have on farm, they can protect crops and livestock, you likely have the local snakes population to

thank for it play an important role in food chain, by playing the role of predators, as well as prey in short. They help maintain a healthy ecosystem and environment; well snakes are on this planet for a reason. They are not here to scare us or keep our numbers in check. They form a key link in the food chain. We all know how important it is to conserve wildlife. However, when many people hear the suuu word, their conserve wildlife. Stands literally want to confront the farmer; it is true that when you leave a snake alone, it will leave you alone. This statement is true for most part.

Non-venomous snakes are the ones that we see in farmer's farms. These are typically smaller snakes, like brown snakes and garter snakes. They don't threat to humans, so they are not usually hunted down. Some species of these small non-venomous snakes feed primarily on insects while others may be predatory. If you happen to live in an area where there is enough space for them, snake populations can help control pests which helps out farmers. This is because many types of rodents will avoid areas with high densities of this reptile population. These snakes might not bad when it comes to farming, but they could still pose a threat if they get in the wrong place. You see, snakes are excellent at climbing up walls and trees, so when they are seeking shelter from unbearable weather or just trying to find prey, those places can be right near our home. Most of the snakes which are probably find on farm, but they are small size snakes, with a thick black stripe down the length of their bodies such as.

**Black rat snake:** They are excellent climbers and may even make their way to the rafters of your barn to hunt down rats and mice. These species are long, thick bodies, black rat snakes may look intimidating, they are completely harmless.

**Rat snakes:** It's not hard to guess what these herpes eat from their name. Rat snakes are so named because of their love for eating rats, moles, mice, chipmunks, and other rodents. They average about 6 feet in length, but some can reach up to 10 feet. There are a number of subspecies of rat snake. They come in nearly every color of the rainbow and can be found on farms.

**Garter snake:** They are typically too small to eat rodents, and like to feast on slugs, crickets, earthworms, grasshoppers, and frogs. These are one of the most common snakes which are found on

farms, so much so that people often mispronounce their name as garden snakes.

**King snake:** King snakes are distinguished by their yellow, black, and red stripes. They look very similar to the venomous coral snake, and like corn snakes, are often killed by humans for this resemblance. King snakes like to feed on rodents, birds, eggs, and even other snakes, especially the venomous ones king snakes are diurnal, meaning they are active during the day and sleep at night. This makes kings nakes a great pet.

**Corn snakes:** They are slender, red and yellow snakes that grow between 3 and 6 feet long. Corn snakes earned their name from slithering through corn fields to hunt down rats and mice. Unfortunately, they often are confused with venomous copperhead snakes, and are killed because of it.

**Venomous snakes**: Both of the snakes in this section are members of the pit viper family, they are often found on the outskirts of farms, where food and water from irrigation systems are likely to be present. Like rattlesnakes, they follow their food source and will be attracted to rodents that call your farmland home.

When it comes to protecting yourself from non-venomous snakes, there is not much you will need other than some deep breaths and patience while you wait for the pain to subside. It is possible that you might not even know the snake is there until it starts to bite. Farmers avoid getting biting with the help of Gloves, flashlight, Plastic bags, Sturdy long Bole etc.

**Gloves:** Gloves are more effective than plastic bags because the bag could slip off while trying to catch them. The farmers will use gloves to handle the snake if they see one. Gloves are essential because the snake may bite when feeling threatened or startled by being touched unexpectedly. Naturally snakes have an instinctive behavior, but we should not put ourselves at risk unnecessarily either.

**Flashlight:** At night farmer use a bright flashlight to avoid snake. Shining this powerful beam on to the ground helps the farmer discover the snake if it is hiding behind plants. The sudden burst of brightness will startle the snake since they usually prefer dark places like caves or deep forest area.

**Plastic bags:** Sometimes, catching the snake in plastic bags is the easiest and most appropriate solution. Not all the snakes will be cooperate, so farmers take precautions when handling them, like gloves, long poles or even write that can pin their head down for easier control

**Sturdy long Bole:** If the farmers see a snake, they may use a sturdy, long pole to capture it and then relocate it to another place.

Snakes are cold blooded creatures and may bite if startled by touch. In some cases, farmers might wear thick clothing over loose clothes for better protection against bites since these reptiles have sharp teeth. After that, farmers use scissors or a knife to cut open bags from outside, ensuring that the snake doesn't bite them. We totally understand that having snakes around your farm can seem troubling and scary especially for your workers, family members or even other animals. However, snakes are not all that bad can actually be super beneficial

We therefore encourage you to spread the word regarding beneficial species of snakes which are great for keeping rodent populations down, and therefore saving your crops from any further damage. Additionally, some species are even known to deter away deadlier species of snakes which may cause even more harm to us or your family. The preservation of the knowledge of beneficial species is therefore vital so that farmers and families are able to co-exist and benefit from an unlikely alliance. You can do this in four main ways. Understand different species of local snakes. Understand snake bite care and danger levels of all species in your local area.

Black rat snake

Rat snake

Garter snake

King snake

Corn snake

**References:**


1. Marathi Book review Saap apla mitra: Loksatta: http://www.loksatta.com
2. Reptiles of India: Indraneil Das and Abhijit Das
3. Snake Wikipedia: http://mr.m.wikipedia.org
4. Snake information, snake bites and effective treatment: Haffkine
5. Snakes are farmer's friend: Maharashtra Times.
6. Snakes: Nilamkumar Khaire
7. साप: निलमकुमार खरे, Jyotsna Prakashan.
8. सापाला शेतकर्यांचा मित्र म्हटले जाते: https://mr.quora.com.
9. साप आपला मित्र: प्रदीप कुलकर्णी, प्रकाशन: सर्प, निसर्ग, संवर्धन संस्था खोपोली
10. सर्पमित्रांचा सापांचा जीवितासाठी संघर्ष: http://www.lokmat.com


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**20.**

# REVIEW ON MYTHS AND AMAZING FACTS ABOUT SNAKES

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**Introduction**:

The snake is a powerful symbol in Indian Mythology and Hinduism. India is often called the land of snakes and there are many traditions regarding snakes. Snakes are worshiped as gods even today. Women pour milk on snake pits, snakes are venerated and worshiped on Nag Panchami festival. The cobra is seen around the neck of lord Shiva. Another god, lord Vishnu rests on seven headed snake or within coils of a serpent. There are several temples in India solely for cobras. It is believed that snakes are symbol of fertility. Some mythological snakes are considered as 'protectors' and some are considered as 'destroyers' There are hundreds of references to snakes with mythical powers in Indian stories. They symbolize life, rebirth, resurrection, regeneration, destruction and so on. They play a significant role in many mythologies and cultures. These have made the snake a powerful symbol in Indian Culture.Snake belong Kingdom: Animalia, Phylum: Chordata, Class: Reptilia, Order: Squamata, Suborder:Serpentes. Here are some common myths about snakes.

**Myths:-**

There are thousands of myths and belief about snakes, widespread in country and they are misleading. Most of these myths are spread by snake charmers and peoples for their benefits.

1) Snakes drink Milk:-

This is very famous and old myth about snakes but fact is that snakes drink water they do not drink milk. They are reptiles and have no association with milk, the enzyme lactase which digest the milk is absent in snakes. The milk act as poison in snakes as they cannot digest the milk causing indigestion, inflation and infection. Many snakes do not survive after drinking milk. But

when they are kept cruely dehydrated by snake charmer they drink any liquid which is present near to them.

2) If you kill a snake, its partner will come after you.

This is completely false, Snakes are not vengeful animals and their brain is not developed enough to generate empathy. Even snakes do not have any sort of social bond, they are not intellect and do not have a memory to recognize and remember the every detail of attackers.

3) Baby venomous snakes are more dangerous than adults.

This myth was born out of the human fascination with irony. But the fact of the matter is that baby venomous snakes are not more venomous than their parents. Adults have far more virulent venom than the young snakes. Venom studies in older adults demonstrate that the “activity level of some venom enzymes tends to increase with the size and age of the snake".

4)The snakes dislocate their lower jaws while feeding.

Python engulf an entire animal that’s bigger than its own head. So there is this myth that serpent detaching their jaws for easy swallowing of their prey. But this is not true. This is due to the flexibility and not by dislocation. Snakes lower jaw is split into two halves called 'mandibles'. At rest their tips touch to form the snaky equivalent of a chin . Yet, these bones arent fused together like ours. Instead of that stretchy ligaments connects the mandibles and enables to separate once they start eating. Similar mechanism is for upper jaws to enhance the maneuverability.

5) Snakes go blind during summer.

This is so surprising but snakes do not go blind based on temperature or time of year. Snakes experience temporary loss or inhibition of vision during the period of shedding their skins, as their old ocular scales , protective scales covering the eyes, begins to separate from new ones below. During this time, their eyes appear milky gray-blue and ability to see become less. When snakes are captive this period of temporary blindness may happen anytime before shed. In nature, some great snakes slips their shed cycles during summer. So this may be the reason for originating this myth.

6)Snakes are deaf.

Snakes lack eardrums, naturalists thoughts that snakes couldn't hear air born noises. Scientists have long struggled to understand how snakes, which lacks external years can sense sounds. New study shows that sound waves cause vibrations in a snakes skull that are then "heared" by the inner ear. Snakes lack external ears but have fully formed inner ear structures but no eardrum. Instead, their inner ear is connected directly to their jawbone, which rests on the ground as they slither. Previous studies have shown that vibrations traveling through the ground—such as the footsteps of predators or prey—cause vibrations in a snake's jawbone, relaying a signal to the brain via that inner ear. To know the vibrations that are pass through the air. In 2011, biologist Christian Christensen monitored the brains of a few ball pythons (Python regius). As he discovered, his test subjects had no trouble hearing low-frequency airborne sounds because their skulls vibrated in accordance with them. However, Christensen's pythons weren't as sensitive to higher-pitched noises.

7)Snakes are cold and slimy

They're covered with dry scales, and can feel like smooth sand running through your fingers when held and depending upon the surrounding temperature they can be quite warm and soft.

8)Pythons asphyxiate their prey by squeezing them.

Boas and pythons have long been accused of fatally choking their victims. But it turns out that they actually kill by halting blood flow. A constricting snake quickly stops the heart of its prey, and breathing fails soon afterwards Dr. Scott Boback and his colleagues deduced by measuring constriction's effects on the heart rate, blood iron balance, blood gasses, and blood pressure of anesthetized rats. And they from this they concluded that boa can wrap tightly enough around its prey to stop the blood circulation altogether. Asphyxiation or cutting off the blood supply by coiling around the prey. This causes cardiac arrest and instant death. Thereby reducing the chance of the snake getting hurt.

9) Diamond ( Naagmani ) on the forehead of snake.

Some believed that the diamond (Nagmani) embedded in a snake's forehead can cure any disease or defect miraculously. This

is totally false because of no evidences. Mu. Dhanasekaran a herpetologist, there is no such thing called as Naagmani. He is working on snakes and many times he does necropsy on snakes and found only stones but no Naagmani as such. According to him Sialolithiasis -that is formation of stones in the salivary glands especially could be the cause of formation of Mani ( Dhir, 2016).

**Conclusion :-**

Snakes play vital role in our environment and they are key stone species of ecosystem. Losing them can cause the catastrophic damage to balance of ecosystem so its our responsibility to protect and save them. So if we burst all these myths to common people, nobody will kill or harm snakes. Also most important to humans is the role of venom produced by snakes, as well as other venomous creatures, in the development of medicines. Diabetes and heart disease medicines have been derived from snake venom, which is also being used to develop treatments for autoimmune diseases, cancer and pain. Snakes feeds on: primarily mice and rats. You may be terrified of snakes, but imagine for a moment a world overrun by rodents. A single pair of rats can have a million descendants in just a year and a half

**Reference:**


- Alirol E, Sharma SK, Bawaskar HS, Kuch U, Chappuis F (2010) Snake Bite in South Asia: A Review. PLOS Neglected Tropical Diseases 4(1): e603. https://doi.org/10.1371/journal.pntd.0000603
- Alves RRN, Vieira KS, Santana GG, Vieira WLS, Almeida WO, Souto WMS, Montenegro PFGP, Pezzuti JCB, (2012). A review on human attitudes towards reptiles in Brazil. Environ Monit Assess.;184(11):6877–901. doi: 10.1007/s10661-011-2465-0.
- Attuquayefio,DK(2004). The snakes of Ghana: myth, science and reality. Ghana J Sci. 44: 73-86.
- Boback, Scott & Hall, Allison & McCann, Katelyn & Hayes, Amanda & Forrester, Jeffrey &Zwemer, Charles. (2012). Snake modulates constriction in response to prey's heartbeat. Biology letters. 8. 473-6. 10.1098/rsbl.2011.1105.
- CB Christensen, J Christensen-Dalsgaard, C Brandt, PT Madsen,(2012). Journal of Experimental Biology 215 (2), 331-342.

- Dhir, Anju (2016)"Unbelievable Secrets -Naagmani", International Journal of Science & Engineering Development Research (www.ijsdr.org), ISSN:2455-2631, Vol.1, Issue 4, page no.338-340, http://www.ijsdr.org/papers/IJSDR1604059.pdf
- Encyclopaedia of religion and ethics,(1922). Serpent-worship. In: Hastings J, Selbie JA, Gray LH, editors. Encyclopaedia of religion and ethics. New York: Charles Scribner's Sons; pp. 399–422.
- Ernst, Carl H. (1992). Venomous Reptiles of North America. Smithsonian Institution Press, Washington, D.C.
- Khan, Muhammad. (2015). Snakes facts and myths---treatment. 10.13140/RG.2.1.1028.5920.
- Knight,AJ(2008).. "Bats, snakes and spiders, Oh my!" How aesthetic and negativistic attitudes, and other concepts predict support for species protection. J Environ Psychol. 28 (1): 94-103. 10.1016/j.jenvp.2007.10.001.
- Miller H. The cobra, India's "good snake" Natl Geogr. 1970;138:393–409. [Google Scholarr]
- Mills LS, Soulé ME, DoakDF,(1993).The keystone-species concept in ecology and conservation. Bioscience. 43(4):219–24. doi: 10.2307/1312122.
- Sasaki K, Sasaki Y, Fox SF, (2010).Endangered traditional beliefs in Japan: influences on snake conservation. HerpetolConserv Biol. 5(3):474–85.
- Wojnowski D, (2009).Scientific and traditional conceptions of snakes in Kenya: herpetologists as teacher mentors. Herpetol Rev. 40(2):158–62.


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**21.**

# ECOLOGICAL ROLE OF SNAKE FOR THE WELFARE OF MANKIND

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**Abstract -**

Snakes are called farmers friend because the help the farmer in many ways. In India snake are the primary source of human wildlife conflict. Conservation of snake is very important now a days to stop their extinction. Also used for the infotainments purpose. There are different festivals are celebrated all over the world dedicated to worship of snakes. A long limbless reptile which has no eyelids, a short tail, and Jaws that are capable of considerable extension. Some snakes have a venomous bite. Snakes are the most specialized group of reptiles. Many species of snake are found all over the world boas and python are two snakes that are nonpoisonous but they are most powerful and large. Their length is more than about 30 feet. The largest species of the snakes are found in the African jungle. Snakes are both small and large. Snakes do not have eyelids. Evolutionary history of snake venom in the matter of the debate. In this paper evolution, biology, ecology and importance of snake were discussed.

**Introduction:**

What are snakes?

We know that snakes are coir Mats and deeply embedded in the lizard phylogeny. In fact snakes are simply a very specialized group of extremely diverse limbless Lizard. At the search snakes are members of the second most specious group of living reptile.

**Evolution of snake -**

Evolution of limitlessness is quite common in lizard and including snakes, has evolved independently at least 25 times. However, no limbless lizard claim is as successful as a snake with 3150 species occurring in nearly every Habitat on every continent except Antarctica. Snakes from a monophyletic group and the best available phylogenetic evidence using molecular data free from

morphological convergence due to reduction in characteristics suggest that snakes are not related to other limbless lizard like Amphisbaenids or Dibamids, but rather group with Iguanians, Lacertiforms and Anguimorphs. The exact placement of snakes within the lizards has yet to be determined but using multiple independently evolving look I were both Townsend et al.(2004) and Vidal and Hedges(2005) stated a close relationship between Snakes and anguimorphs.

The Early evolutionary history of snakes infrared from the Fossil record portrays fancy knitting story about the independent evolution of living reduction in serpents. The earliest identify the snake, Najash rionergina, in upper Cretaceous deposits in Argentina, was a small terrestrial of borrowing Serpent with sacral vertebrae, pelvic elements and Hind Limbs. This study conflicts with some theory that suggest snakes originated in aquatic habitats as this earliest snake Fossil provides solid evidence for a borrowing or Terrestrial origin of snakes. Other Cretaceous fossil provides solid evidence for a problematicus, Haasiophis terrasanctus, and Eupodophis descouensi are all shallow Marine species from Northern Gondwana, found along the Tethyan Coast. These three taxa have Hind Limb bones but lakh differentiated sacral vertebrae for anchoring pelvic elements. moreover, Apesteguia and Zaher phylogenetic Analysis of morphological data demonstrated that this three Fossil tax are do not represent the earliest snakes but are rather nested within the radiation of macro -stomata and Snakes on along with some extent groups (e.g., Scolecophidians, Boids, Pythonids and Annelids), is fossils show that complete limb loss has occurred independently throughout the early evolution of snakes. The classification of snakes begin with Linnaeous in 1758 received various rearrangements by herpetological luminaries like Dumeril (1853), Cope (1894,1895), Boulenger (1896) and Hoffstetter (1946,1962) most of modern treatments of taxonomic can be traced to understood in (1967).

**Biology of snake -**

A snake is a limbless elongated reptile that evolved from lizards. All snakes are carnivorous animals and many species produce when I'm with helps to kill their prey. Being reptiles, they are cold blooded animals lay eggs, and have scales. There are over 3500 species of snakes. Of this, approximately 600 species are venomous.

Besides of you exceptions, snakes are found all around the World. They found in six continents but are uncommon in the Arctic and are not found in Antarctica former Iceland or Greenland. Snakes have also never managed to colonize Ireland and New Zealand. This handful of places, snakes are found in all other countries or regions.

Being cold blooded reptiles, snakes 3 for warmer areas and current typically found in Alpine environments. They can be found in forests, in particular, tropical forest and are also common in grassland ecosystem. Snakes along with other reptiles, are the most successful vertebrate animals in one of the earth's harshest environments, desserts. As being found on land for snakes are also very successful in water and many spaces spend their entire lives in the sea or share their time between the land and the water.

Evolutionary age of snakes is not very well known because of poor Fossil records. It is thought that snakes have been living on Earth for over 100 million years since the late cretaceous period but some people believe they may have been around for as long as 300 million years. The oldest snake fossils are found in the Middle East and South America and are both Marine and land dwelling

spaces. Compared to other reptiles individual snakes usually live relative Lee short life. The average lifespan of snake is around 9 years although in captivity some snakes have lived for a 50 years. There are different methods of movement in snake include

1) Side-winding- Similar to undulation but only a couple of sections are in contact with the surface and the raised Parts of the body are pushed forward towards the advanced in "contact-section"

2) Concertina - A snake pull the body into bands and then straightens out again.

3) Rectilinear- A snake moves in a straight line by manipulating its underside skills to live forward and then lower into the surface before moving backward using the friction of the scale is the body forward.

Snakes play very important role in our ecosystem and in balancing the food web regulating the population of their prey thereby helping from losing huge economic loss in controlling paste. They also exhibit both Predator and Prey characteristics and help in maintaining biodiversity on Earth for future sustainable development.

**Snake venom -**

Many snakes such as cobras and wipers have you what Venom which they used to help kill Prey or as a defense tool in dangerous situations. Venom is a modified saliva that contains a number of toxic compounds which have a range of effects including paralysis, digestion, blood clotting and Cardiac Arrest. It is usually injected during a bite through unique through unique fangs although some species are able to spit their venom. Because there is no distinct evolutionary relationship that separates venomous Snakes and nonvenomous snakes it is believed that Venom evolved more than once.

**Diversity of snake -**

If snakes where in a popularity contest, among all of the animals they would surely lose. Around the world snakes are often perceived as animals to be paired or hated. Unfortunately, the reality is that most of the antipathies that surrounds snakes are guided by ignorance or misunderstanding.

Here are the three spectacular ways that snakes are important and worthy of your respect:

1. **Snakes maintain balance in the food web -**

Snakes play an integral role in maintaining balance in the ecosystem. In most systems commerce snakes can be both Predator and prey. Main a large Prey population attracts and sustains a large snake population, those snakes the company for birds mammals and even other snakes.

**2. Snakes are a natural form of pest control -**

Predators, snakes keep pray populations in balance. For example, rodents reproduce X potentially in the absence of predators, as long as there is plenty of food. This is particularly true in environment dominated by humans. Another example, Timber Rattlesnake in the Eastern U.S. eat rodents who are host to ticks. Those ticks who are a vector for lyme disease which is the dangerous bacterial infection that can be transmitted to Humans.

**3. Snakes deserve our respect and appreciation -**

Snakes, while feared around the world, are also revered and celebrated in many cultures. In some societies snakes are open viewed as fortune and in others, the snake created the world. Being predators, the benefits of snakes are now being recognized as providing humans with an ecological service. Some snake species have become threatened due to habitat destruction,urban,development,disease,persecution,unsustainable trade and through the introduction of invasivespecies. Some species are on the brink of extinction.

**Ecological role of snake -**

Snakes are important components of any natural ecosystem that they are found in. In fact in most systems, snakes fill the important role of being both Predator and Prey and are an integral part of nature's balance. Most people try to control this paste with chemicals which end up polluting our environment. Snakes provide an easy, environmentally friendly free and natural pest control service. Researchers have recently discovered that snake venom has harmless toxins which may hold the key to treating a range of life threatening conditions like cancer, diabetes and high blood pressure. The snake play the same role as any of the Predator on earth. Let's take an example: you have a pond. In this

pond coma 5 Goldfish are swimming. Fish usually have a 100-150 eggs, and since there is no predator in this pond pretty much all of them survive. Which means that after a few years you have 1000 fish swimming in your pond. Like all animals in the wave of life former snake play an important role in our ecosystem by maintaining a balance to the food web. Because snakes are both Predator and prey former they kept the paste population down by feeding on and other small rodents that damage crops and carry diseases. Snakes also provide food for larger mammals, birds and even other snakes. Snakes a part of life in the south east corner but North Carolina State parks knows that everyone feels comfortable coexisting with the reptile especially because venomous snakes do live in our region. To celebrate the important role of snakes play in our ecosystem North Carolina State parks.

**Snakes as a farmer's friend -**

Snakes kill animals like rat that damage food crops. As they prevent the destruction of food crops that a farmer grows for his livelihood and hence snakes are farmer’s friends. You are a farmer, you should be thrilled to have beneficial snakes around your farm. Their diets of rats and insects like aphids’ beetles and slugs make them better than any pesticides you could put in your field. Snake are mild level predators meaning that they are also pray. In most regions of India rat snakes are the largest common snakes one can find. The length of an adult snake Orphan process a spectacular 3 M forma which is the width of most country Roadways and you will find that often that the snake is recounted with amazement as one which covered the entire Road as it slithered past. Other Diagnostic feature of this snake if it's larger Eyes, spanning the width of its head within which are contained round black pupils with skin stricking Shine.

The rat Snake you will find is a rather hot tempered creature. It is a diurnal snake. The Rat Snake is at home in land water and on trees, from where uh have had the opportunity to have it fall squarely upon the shoulder. It occurs in many Shades just like the spectacled cobra.

**Conclusion:**

We have a lot of baseless, fictional stories about snakes. In fact, although the snake was useful, we were freed by misunderstanding it as an enemy. The snake has a unique significance in the food chain. The snake is not only a friend of man but also a friend of nature. The main food of the snake is rat. In addition, snakes control crop pests, mosquito larvae, and fleas. A Dhaman eat hundreds of rats and mice in a year. The technique of catching snake rats is effective. Snakes are considered to have religious significance in Indian culture. In fact, snakes are an important part of the food chain. In our agricultural country, it is a friend of nature to the farmers. We should not only worship him, we should not kill him just because he saw a snake, and we should protect and nurture him by giving him life. Awareness is also needed for that.

**References:**


- Boulenger, G. A. 1896. Descriptions of new reptiles and batrachians from Colombia. Annals and Magazine of Natural History, Series 6, 17: 16–21.
- Cope, E.D. 1894 [1895]. The Batrachia and Reptilia of the University of Pennsylvania West Indian expedition of 1890 and 1891.
- Dumeril, A.H.A. (1853) Monographie de la tribu des Scylliens ou Roussettes (poissons plagiostomes) comprenant deux espèces nouvelles. Revue et Magasin de Zoologie Pure et Appliquée,(serie 2) 5: 8–25, 73–87,119–130, pl.
- Nicolas Vidal &. Blair Hedges (2005): The phylogeny of squamate reptiles (lizards, snakes, and amphisbaenians) inferred from nine nuclear protein-coding genes. VL - 328 JO - Comptes rendus biologies DO - 10.1016/j.crvi.2005.10.001
- Robert Hoffstetter (1908-1999)" (PDF). Bull. Inst. Fr. études andines. 29 (1): 139. 2000.


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**22.**

# SNAKE BITE AND HERBAL MEDICINE

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## Introduction :-

Snake bite till date a major public hazard in our country . At an average every year 25000 snakebite cases are recorded . There are about 52 poisionous snake species are available in India of which majority of bites and mortality is due to King Kobra (*Ophiophagushannah*), Spectacled Cobra (*Naga naja*), Daboiarusselli(*Russell's viper*), Common Krait (*Bungaaruscaeruleus* ) and Saw-scaled Viper (*Echiscarinaatus*) .

The treatment for snake bite is variable as per snake bite. Only available treatment is to use antivenom against snakebite which neutralizes the venom and stops further tissue damage. The alternative treatment involves the use of medicinal herbs as antidote on snake bite in traditional medicine. In Ayurveda different plants and plant parts were reported to possesantivenom activity.

In almost all parts of the world numerous plants species are used to treat snake bite. An aqueous methnol or ethnol extract of plants or plant part is prepared and used for washing snake bite area which may help to counteract venom activity.The first scientific investigation on medicinal plants as antidote was done byKnowles(1), he had screened a list of medicinal plants or plant parts used by peoples having antivenom activities, he screened out 314 plants and 184 combinations against venoum (2).Various reports were obtained on the effectiveness of herbal antidote against toxicity and lethality. The ether soluble extract of Aristolochia species inactivates Cobra venom (3) and reduces haemorrhage caused by Viperarusellii venom (4). Experiments on mice against cobra venom was found to be inactive due to rhizome extracts of *Curcuma longaL.*(5) . Partial protection of haemorrhage was also shown by *Aristolochia grandiflora, Sidaacuta* ,leaves and branches of*Hyptiscapitata, Ipomoea cairica ,Ocimumsanctum,Piperpulchrum ,Allamandacathrtica* , the fruits

of *capsicum frutescens*,leaves and branches of *Piper arboretum* and *Passifloraquadrangularis* (6).The ripe fruits of *Citrus lemon* demonstrated 100% neutralizing capacity of snake venom within 48 hours. Partial protection was also shown by whole plant of *Sidaacuta*,*Aristolochia grandiflora* .*Echiscarinatus*venum was inhibited by aqueous extract of *Mucunapuriens* seed extract.Alcoholic and aqueous extract of dried roots of *Mimosa pudica*inhibitestoxicity of kobravenum same activity shown by oral administration of garlic cloves (7).

The methnol extract of Vitex root and Emblicaofficinales root nuteralized the poison of Vipera and Najasnakes .Hemidesmusindicus root extracts effectively neutralized viper venom.

**Conclusion:-**

According to WHO 80% of worlds population depends on herbal medicine for their primary health care .Use of medicinal plants in curing snakebite is recorded from ancient time and many countries of the world are infested in documenting the use of medicinal plants . Once these ethno medicinal preparations are scientifically evaluated will help in improving health hazards of local peoples. But one should have to identify ,cultivate and use perfect medicinal plant on particular alignment as wellas for future conservation of these plant wealth .

**References:-**


1) Knowels R – The mechanism and treatment of snakebites in *India.Trans R Soc Trop Med Hyg*,15(1921)72.
2) MhaskarK.Sand Caius J F - Indian Plant remidies in snake bite, *Indian J.Med.Res.*19(1931)28.
3) Vishwanath B S and Godwda T V - Interaction of aristolochic acid with *Viperarasselli*phospholpase A2 : its effect on enzymatic and pathological activities, *Toxicon*,25(1987)929.
4) VishwanathB.S. ,Kini R M and Gowda T.V. - Characterization of three edema inducing phospholipase A2 enzymes from habu(T.Flavoridisvenon and their interaction with alkaloid aristolochic acid . *Toxicon*,25 (1987)501.
5) Otero R etal – ethnobotany in northwest region of Colombia part III: neutralization of haemorrhagic effect of *Bothropsatrox* venom, *J Ethnopharmacol* .73(2000)712.

6) Mahanta M and Mukherjee A.K Neutralization of lethality,mycotoxicity and basic enzymes *of Najakaouthia* venom by *Mimosa pudica* root extract, *J Ethnopharmacol*,75 (2001)55.
7) Rahmy T R and Hemmaid K Z , Prophylactic action of garlic on the histological and histochemical patterns of hepatic and gastric tissues in rats injected with snake venom. *J .Nat Toxins*. 10 (2003) 763.

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**23.**

# ROLE OF SNAKES IN THE ECOSYSTEM AND THEIR CONSERVATION

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## Abstract:

There are more than 3700 living snakes' species on the planet and they are inhabiting everywhere except polar regions. All snakes lack external limbs, but not all legless reptiles are snakes. Snakes have intrigued humans for centuries, and been incorporated into several mythologies, and cultures. Biologists who study snakes, there is little question of their fascination about the natural radiated snakes. The variety of locomotory modes observed in snakes. There is also considerable enthusiasm for snakes in a rapidly growing and dedicated sector of the commercial pet trade. Studies have shown that globally, about 138000 people die and 2.7 million suffer from serious injuries and permanent disabilities every year worldwide due to snake bite. However, about 85 to 90 percent of snakes' species throughout the world are non-poisonous. The killing of snakes is problematic for the environment but also for humans. Snakes serve a critical role as predators, as prey, as ecosystem engineers, and provide economic and therapeutic benefits to humans. This paper focuses on the role of snakes in our ecosystem and how it is important to conserve them.

**Keywords:** *snakes, ecosystem, conservation, bio-indicator, engineer*

## Introduction:

Snakes play an integral role in maintaining the natural environment and their presence has a direct impact on the ecosystem. In most systems, snakes can be both predator and prey. It is no surprise that the snake has touched so many societies throughout history and been included in countless cultural and religious stories. However, human population's explosion and associated acceleration of habitat destruction and degradation,

have led to a rapid increase in human-snake encounters (Chinnasamy & Prabhakaran, 2019). Especially with an increase in human population coupled with habitat loss and habitat degradation, the frequencies of humans and wildlife interactions also increased rapidly (Dickman, 2010). As these reptiles are predators, they are particularly effective at controlling the rodent population providing natural pest control, thus reducing the need for harmful pesticides and poisons that have adverse effects on the environment. In the food chain snakes have an important role by providing other predatory species with a source of food. The Indian subcontinent has rich biodiversity with a high level of endemism. It's known to harbor around 700 species of reptiles of which 52 percent are snakes (Das & Das, 2017). A total of 73 species are venomous, belonging to families *Elapidae* and *Viperidae.* Besides its bewildering (extremely confusing) biodiversity, South Asia, particularly India is the most densely populated region in the world and has the highest incidence and mortality rates due to snakebite (Alirol *et al.*, 2010).

**Discussions:**

Snakes are important to biodiversity and overall ecosystem health. Snake species throughout the world are facing threats from a variety of sources including pollution, emerging diseases, invasive species and habitat destruction. Research studies on herpetology shows that many snake species are listed as threatened or endangered.

***Evolutionary history of snakes***

The fossil record of snakes is quite scattered and scanty, and piecing together the origin of snakes. Fossil record shows that snakes are *tetrapods* which are four-limbed vertebrates including amphibians, reptiles (including birds), and mammals. Thus, snakes represent a specialized branch of vertebrates that descended from limbed ancestors (Harvey, 2014). Snakes have lived on earth for millions of years; their lizard ancestors shared their habitat with the dinosaurs during the late Cretaceous period more than 135 million years ago. Through extensive evolutionary developments, snakes became reptiles that we know and recognize around the world today (Charlotte, 2021). Both

terrestrial and aquatic species of snakes existed in the mid-Cretaceous (about 95 million years ago), and there is still debate about which type evolved first. The ecological and evolutionary origins of snakes have long been debated in light of the clade's incredible extant diversity, and the distinctive snake body plan. Among the major questions surrounding snake origins are whether snakes first arose on the Mesozoic supercontinent of Gondwana or Laurasia, whether snakes originated on land or in the sea, terrestrial, or arboreal in their habits (Allison *et al.,* 2015). Studies tackling the evolutionary origin of snakes have largely ignored morphometric and ontogenetic information, as well as the importance of developmental mechanisms for understanding the ecological origins of snakes (Filipe *et al.,* 2018).

***Snakes and humans***

Snakes exist almost everywhere on earth, and certainly everywhere in human myth, they live a famously secret life. Snakes that live near human habitations are more interested in our unwanted rodent companions than in us. Human-snake conflict has been present for centuries. The country has over 300 identified species in its various environments, out of which more than 60 are venomous. Humans are mostly envenomed by four of these species that encroach upon human habitats and agricultural fields as well as the areas around them (Whitaker, 2008). Human expansion and urbanization have caused an escalation in human-wildlife conflicts worldwide. Of particular concern are human-snake conflicts, which result in over five million reported cases of snakebite annually and significant costs (San *et al.,* 2019). Throughout history humans have had an uneasy relationship with serpents. Snakes are important in many religions. This prominence in so many religions may be the result of humans' fear of snakes.

***Snakes acts as ecosystem engineers***

Ecosystem engineers are organisms that directly or indirectly modulate the availability of resources to other species, by causing physical state changes in biotic or abiotic materials. Species that are invariably important to their communities and ecosystems include keystone species, umbrella species, and ecosystem engineers (Caro, 2010). In doing so they modify, maintain and

create habitats. Snakes as *ecosystem-engineers* facilitate *secondary seed dispersal*, thus contributing to reproduction of plants (Glaser, 2018). The seeds are expelled through their faecal matters into the environment in an intact manner. As snakes have longer home ranges, seeds tend to disperse at greater distances from the parent plant. This mechanism supports survival of plant species in biodiversity. Ecosystem engineers are species whose traits have significant impacts on the physical structures of their habitats (Jones *et al.*, 1994).

***Snakes as indicators and monitors of ecosystem***

Monitoring keeps us informed, and alerts us to future problems that may arise. Monitoring ecosystems is similar to monitoring human health. Biological variables over time to provide information on ecosystem change. Sea snakes can serve as bioindicators for other rare or cryptic tropical marine fauna, they can help monitor marine habitats to gauge the effects of climate change, habitat change and loss, decline in biodiversity and other anthropogenic changes (Arne *et al.*, 2020). Water snakes (i.e. *Nerodia sipedon*) are very useful as bioindicators because they are very common aquatic organisms that are top-level predators. The snakes spend a great deal of time in the water, forage in the water (King, 1993).

***Snakes as source of medicines***

Traditionally, people believe that snakes are dangerous and represent a threat to their lives with little appreciation for the fact that snake venom components can represent beneficial medical tools for the treatment of human diseases. Animal venoms are used as defence mechanisms or to immobilize and digest prey. In fact, venoms are complex mixtures of enzymatic and non-enzymatic components with specific pathophysiological functions. Peptide toxins isolated from animal venoms target mainly ion channels, membrane receptors and components of the homeostatic system with high selectivity and affinity (Tare *et al.*, 2019). According to the WHO recommendation, the most effective treatment for envenomation is the use of an antivenom serum. Snakes are the source of many medicines. The only proven and effective therapy for snakebite is the snake-antivenom. Snake

venom is injected into horses and sheep. The animal's plasma with antibodies against the venom is collected and used as snake anti-venom. In addition, the use of venom components as a natural product resource of materials for biotechnology applications has received much attention, recently, from pharmaceutical industries and experts in the fields of applied research (Peigneur & Tytgat, 2018).

***Snakes provides benefits to agricultural communities***

Snakes are mid-level predators, by serving this role for animals like owls, hawks, foxes, and racoons. They help to feed other animals and connect the links of the food chain. Snake species are essential for keeping a balanced ecosystem. Snakes also play a role in disease prevention and provide benefits to agricultural communities. Rodents carry zoonotic diseases and an increased population of rodents might lead to zoonotic disease outbreaks. Snakes are sneaking about fields and they prey on gophers, field mice, rats, rabbits and other rodents that damage crops by feeding on them or burrowing into their roots (The Nature Conservancy). It was estimated that nearly 200 million people can be fed by food grains that are destroyed by rodents every year. Offering natural, environmentally-friendly free service to mitigate against rodents, snakes are truly *farmers' friends.*

***Conservation of Snakes'***

Snakes play a critical role in our ecosystem by preying on rats and mice that are regarded as pests. The venom of the snake can be used in treating certain types of diseases and in making antivenom for snakebites. Recently, human-wildlife conflict has momentum in the tropics with a launch of a number of conservation efforts to mitigate and manage such negative interactions (Agarwal *et al.*, 2016; GIZ, 2018). Some species of snake have become threatened due to land clearing for agriculture, urban development and through the introduction of animals. Snakes are important in maintaining a high-level biodiversity on Earth, including humans, and snakes are an important part of the biodiversity. Along with all Australian animals, snakes are protected under the Nature Conservation Act 1992 and cannot be killed or taken from the wild. Some water snakes can be found in extremely high densities and thus form a large portion of the animal biomass and *stored*

*energy* in the ecosystems in which they live (Whit, 2005). Snakes can also serve as important *bioindicators* of environmental integrity.

**Conclusion:**

It is high time we now start valuing the importance of snakes in biodiversity to make our societies healthier. The presence and death of snakes in the ecosystem has a positive impact. Efforts to conserve snake species with conservation plans related to other organisms. In comparison with concern about the population of organisms, important recreational, aesthetic reasons, snakes in need of protection may be overlooked. The typical snake conservation efforts require persuasion of landowners, farmers, and other stakeholders of the value of snakes in ecosystems and the importance of preserving these unique organisms. The conservation efforts of snakes to improve ecosystem properties and processes could benefit by viewing snakes as bio-indicator organisms whose physiological, ecological, and population characteristics yield information about the status of the system. Thus, there is a need for public awareness, especially of school and college students.

**References:**


1. Agarwal P.K. (2016). Human-wildlife conflict. *Current Science*, 111: 1581-1582.
2. Alirol E (2010). Snake Bite in South Asia: A Review, *PLOS Neglected Tropical Diseases*, 4(1): e603.
3. Allison Y. Hsiang, Daiel J. Field, Timothy H. Webster, Adam DB. Behlke, Matthew A. Racicot, Jacques A. Gauthier (2015). The origin of snakes: revealing the ecology, behavior, and evolutionary history of early snakes using genomics, phenomics and the fossil record, BMC Evolutionary Bio, 15(87).
4. Arne Redsted Rasumussen, Anders Hay-Schmidt, Farnis Boneka, Morten E. Allentoft, Kate Laura Sanders, Johan Elmberg (2020). Viviparous sea snakes can be used bioindicators of diverse marine environment, *Philippine Journal of Systematic Biology*, 14(2): 1-16.
5. Charlotte Penhaligan (2021). Snakes: Essential Ecology,

6. Chinnasamy Ramesh and Prabhakaran Nehru (2019). Living with snakes in India: The intensifying health crisis over snakebites - challenges and way ahead, *Asian Jr. of Conser. Bio.*, 8(2): 220-223.
7. Coelho C.M. *et al.,* (2019). Are Humans preparing for Detect, Fear, and Avoid Snakes? The Mismatch Between Laboratory and Ecological Evidence, *Frontiers in Psychology,* 10:2094-2094.
8. Clive G. Jones, John H, Lawton, Moshe Shachak (1994). Organisms as ecosystem engineers, *OLKOS*, 69: 373-386.
9. Das I, and Das A (2017). A naturalist's guide to the reptiles of India, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka, John Beaufoy Pub. New Delhi.
10. Deepti Beri and Sumyadeep Bhaumik (2021). Snakes, the ecosystem, and us: it's time we change. *The George Institute of Global Health. Available online at www.georgeinstitute.org*.
11. Diana Morgan (2008). Snakes in myth, magic, and history, *Praeger Pub.*
12. Dickman A.J. (2021). Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict. *Animal Conservation,* 13(5): 458-466.
13. Filipe O. Da Silva, Anne-Claire Fabre, Yoland Sarriama, Joni Ollonen, Kristin Mahlow, Anthony Herrel, Johannes Muller, Nicolas Di-Poi (2018). The ecological origins of snakes as revealed by skull evolution, Nature Communications, 9(376).
14. Glaser LB (2018). Snakes acts as ecosystem engineers in seed dispersal, *Cornell Chronicle.*
15. Harvey B. Lillywhite (2014). How Snakes Work, *Oxford University Press.*
16. King R B (1993). Microgeographic, historical, and size-correlated variation water snake diet composition, *J. Herpetol,* 27(90).
17. Meyers S.E. and Tadi P (2009). Snake Toxicity, *Available from: Available from: https://www.ncbi.nlm.nih.gov/books/NBK557565/*.
18. Mullin J and Richard A. Seigel (2009). Snakes Ecology & Conservation, *Cornell University Press, London.*
19. Peigneur S, Tytgat J (2018). Toxins in drug discovery and pharmacology, *Toxins,* 10(126).
20. Sam Yue, Timothy C. Bonebrake, Luke Gibson (2019). Human-snake Conflict Patterns in a Dense Urban-Forest Mosaic Landscape, *Herpetological Conservation and Biology,* 14(1): 143-154.

21. Steven J. Beaupre, Lara E. Douglas (2011). Snakes as Indicators and Monitors of Ecosystem Properties, *Snakes, Cornell University Press.*
22. Tarek Mohamed Abd El-Aziz, Antonio Garcia Soares, James D. Stockand (2019). Snake venoms in drug discovery: Valuable therapeutic tools for life saving, *Toxins (Basel),* 11(10): 564.
23. Whit Gibsons and Mike Dorcas (2005). Snakes of the Southeast, *The University of Georgia Press.*
24. Whitaker R, Captain A. (2008). Snakes of India – The field guide, 1st ed. Chennai: *Draco Books.*
25. WHO (2021). Factsheet: Snakebite evening, *Available from: https://www.who.int/news-room/fact-sheets/detail/snakebite-envenoming.*

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**24.**

# SOME IMPORTANT MYTHS OF SNAKES IN INDIA

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## Introduction

Snakes have the ability to both attraction and scare. All over history of humans have had ananxious relationship with serpent. Snakes are important in many religions including the Judeo Christian traditions, Hinduism, Egyptian and Greek mythology. The snake is a powerful symbol in Indian mythology and Hinduism. The snake, commonlycalled as Nag" in Hindi and Marathi language is worshipped by people across the country. Snake worship is a tradition being followedin India since ages and is present several ancient cultures, where snakes are portrayed as an entity of strength. Due to snake's nature of casting its skin, it represents rebirth, death and mortality.

The picture of Indian God Lord Shiva is incomplete without the cobraaround his neckanother Indian God, Lord Ball Vishnu, rests on a seven headed Snake. There are hundreds of references to snakes with mythical powers in Indianreligious books. These have made the snake aPowerful symbol in Indianculture. Several Hindutemples, houses snake: idols and images carved on rocks. These idolsand images are worshipped with flowers, diyas, milk and incense sticks to gain wealth, fameand knowledge.

But there are thousands of benefits and myths surrounding Snakes, widespread in thecounty, which are misleading most of these myths, are spreadbySnake Charmers. OnceIndiawas considered a land of snake charmers and jugglers. This impression of Indiawas particularly there for the mind of the foreigners, especially those belonging to western counties. It is quite likely that this fear of Snakes has prompted many of the myths or tall tales about snakes.

Many of these myths are extremely for fetched and are easily debunked. We will discussed a fewSnake myths mostly common in India. The first common most popular myth is Snakes drink milk, but fact's snakes drink water and do not drink milk. Snakes

belong to reptiles and they don't have Lactase enzyme for digestion of milk. But in a crises when severely dehydrated, a snake might drink any liquid available. The milk acts as a poison for the Snakes body as it can never actually digest it, causing it indigestion, in inflation and infection many snakes do not survive after drinking milk.

Snakes carry a diamond to theirforehead is another common and very popular by mythin India. The mythological status attached with aSnake in Indiais probably responsible for spread this myth,but another factory responsible for spreading this myth is Indian Movies and T. v serial. Nagmani is supposedly a mystical gem which who so ever shall possesses receives unlimited wealth, magical powersand immortality. This particular gem or stone is said to be found in aCobra's head. But fact is Snakesnothing but creaturesof flesh and blood, so they have brains in their head and not some stone or diamond. Unfortunately,big numbers of cobras are still hunted down and their heads are ruthlessly chopped in search ofthis gem. Another well-known myth is ‘snakes’ remember you if you hurt them? But reality is Snakes are not revengeful, neither have they had suchsharp memory or such highly developed brain. The belief that they store the image of the person in minds to take revenge from even after decades for absolutely a superstition given by the Bollywood cinema.

One more widely Knado myth is ‘’headed Snake” sheshnaag of Anantha is mythologicalcharacter and a connect to Gods like Vishnu and Krishna and many others. Sheshnaag had many as thousand heads, few images that went viral on many social media platforms reached an exceeding number of people, luring them to believe it as sheshnaagin flesh & blood but truth is These kind of snakedo not exist and could never exist, in the wildbecause morphologically the body cannot support theweight of so many heads at once.

However, there is something calledas a two headed snake. No, not a myth but a rare phenomenon that can be found in snakes, turtles, tortoises and geckos.

This is called bicephaly andis a genetic mutation or a deformity. Usuallythese snakes are sold in exotic andstrong pet trade for quite a lot of money. Another known myth of snakes are ‘’Rat Snakes mate with cobras" but facts is rat snakes or any other

snakes will not made with any snake out of its own species, cobras eat other snakes so a mating between a cobra and rat snake is not possible. One another myth about Rut snakes are ‘’Rat Snakes are poisonous” but reality is Rat Snakes are non-poisonous, rodent eatingreptiles. One more very famous myth of snakes are ‘’some snakes grow a beard as they get older ’’ but factuality is snakes belongs to reptiles and they do not have any ability to growing hairs on their bodies. We discuss here a one well known myth is ‘’Flying Snakes and Vine snake can pierce somebody’s forehead or put out their eyes and suck the blood’’ but fact is a flying snake does not actually fly butonly glides throughthe air by extending its ribs and pulling in the underside. It can glide a distance 330 feet of 100 metre. It has an elongated head, which gives scary feeling that it can pierce a person’s head or eyes & blood sucking. Myths are stories based on tradition. Some may have factual origins, while others are completely fictional. But mythos are morethan mere stories they serve a more profound purpose in ancient s modern cultures. Myths aresacred tales that explain the world’s manis experience; myths are as relevant to us today as they were to the ancients. The myths answer time less questions and as a compass to each generation.

It is very popular myths of Indian society that is ‘’snake dance to the charmers tunes’’ Snake charmers used to be a big thing in India until recently. Families used to this professionto their generation and their generation further down and has been in practice for centuries. Thankfully the government of Indiahas legally banned this profession now snake charming surely is fascinating to which but ultimately to cruel for the snakes. But fact about this myth is, snakes areefficient hunter and fierce creatures if threatened. They will often replicate the movement of theirprey or whatever is threatening them to be the attaching range. Snake Charmers Play “Pungi" or “been" which is a long instrument that intimidate 'Snakes, Snakes lack true ears andcannot hear high frequency sounds. However they can sense Vibrations pretty well and this exactly what thesnake charmers use toattract the snake's attention towards them. Theycreate vibrations by rapidly tapping their feet on the ground. “Snakes have sting in their tails / Hoopsnakes’’ is one of known myth of Indian society, it is believed that some snakes have sting in their tails that can inject

Venom or poison. Hoop snake is a snake that bites its own trail creating a hoop; myth has it that it you engagein a bad deed, the snake will chase you in the hoop form by rolling down with sting tail pointed at you. Butreality, Snakes does not have stings in their tails, but have Venom fangs, venom glands poisonous nuchal gland for attack anddefence.

Stings can often be confused for modified tails scales found in some snake species. Examplesare shield tails, Boas and pythons. This isnothingbut an example of defence mechanism. One more myth found in our society is “snakes funds in India can spit venom’’ butreality is Spitting Snake are not found in India.Only spitting cobra (*Najanigricollis*) is species of cobra have spitting ability and it is not found in India. People believed that ‘’Snakes dislocate their lower jaws to swallow" but fact is Swallowing is not about dislocation but flexibility thatlower jaw is split into two halves called ‘’mandibles". These mandibles are connected by stretchy ligament, so when a Snake engulf its foods, this stretchy ligament enables the mandiblesto separate. Another myth or confusion in people about snake is “Snakes are venomous Or Poisonous? But these two are not Synonyms although people tend to use the two terms interchangeably. Snakes are venomous as venom is a toxic that is injected into the target through a fang or stringer. Whereas, poison is either eatendinhaled or absorbed through the skin, it is very rare for a Snake to be poisonous. However calling a Snake poisonousis not completely wrong. It has been recently discovered many species ofKell back snakes around the world have both poison or venoms in their body. Theseabout seventeen Natricine species, it is afantasticexample of evolution. Oneanother myth or deadly misconception ‘’Identifying 'venomous snakes based on the shapeof their head" Snakes come in all shapes, sizes and coloursworldwide. These gorgeous creatures have unique characteristicsis themselves. A lot of people believe that you can identity a venomous Snake if it has a V-Shaped head, and the non- venomous snakes have a round, broad shaped head. Probably due to the typical (V - Shaped head in Vipers. However this totally, is not true with other venomous Snakes. Butreality is here identifying Snakes require a knowledge of Snakes morphology and years of study. Every snake is different in its body Characteristics. For example, wolf snake gets its name

because of narrow snout like a wolf and is a completely harmless, and non-venomous Snake on other hand, the common kait is often confused with the wolf Snake, has a broad shaped round head and is one of the deadliest most venomous snake of India. Cobras, coral Snakes and Kraits also have broad shaped round heads, all above mins don't judge poisonous and non-poisonoussnakes on Shape of their head. Another quite interesting myth about snake is ''pythons and Boa constrictors Kill their prey by breaking their bones" it was believed until now that these Snakes bite the prey, by their head and coil aroundthem and crushing their bones but recent studies haveproved that though bones donot break in the hunting process that is not the intention of the snake, instead what they actually do isasphyxiation or cutting off the blood supply, by coiling around the prey. This causes Cardiac arrest and instant death. Another quite interesting and popular myth found in a common in Americaand India. In America itabout milk snake (*Lampropeltistriangulum*) and inIndiait about rat snake (*Ptyas mucosa*) in a Same intention,it claims that milk snakes will arrive at a barn or granary at night to drink milkfrom the cows. This is actually false and is easily explained. Barns often attract mice, which are a main food source of many Snakes including mill snakes and rat snakes. Therefore these snake may be attracted to barns because of the mice , However, if a farmer notices a milk Snake around the bar on a day when milk production is low, he may concluded that the snake drank the milk fromthe cow during the night. This myth seems particularly irrational and likely is the result ofcompletely unfounded assumptions. Finally discuss a most popular myth in our country that '' If one Snake is killed its partners will trace you, no matter wherever you are. but factuality is Snakes are not vengeful animal and are not interested in tracing people who hurt them. They do not have the necessary memoryand intellect to remember people traced them back. Neither snakes don't have feelings of Love emotions nor do snakes pair for life, once againBollywood is responsible for this myth. Myths about Snakes are found in Indiaand all over world, but we should check or examine theScientific fact and then trust. Snakes are important element of environment, regulating the populations of their prey. SnakePlayan integral role in maintaining balance in the ecosystem. As a society, we do not have to love snakebut we

can at least respect their right to existwithout harm and appreciate their vital role inmaintaining earth's biodiversity.

**References:-**


- Moore C.B. 1949. America's mythical snakes. The scientific monthly 68:52-5.
- Jonathan W. Stanley: 2008 : Snakes : objects of Religion, Fear and Myth. https // Pdf slide.net/darinload, 61-75.
- The Curious Symbolism of Snakes in literature and myth. https:// interestingliterature.com.
- Sonalipimputkar2019 :5 nagas and their porominent rolesin Hindu mythology. The Free PŘESS Journal - https: // www.freepress journal. in.
- Top myths about snakes in india.https:// www.pugadundee safaris.com/blog/myths about snakes.


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**25.**

# SNAKE BITE: EFFECTS & CONTROL MEASURE

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## Introduction

Snakes are thought to have evolved from terrestrial lizards as early as the Middle Jurassic Epoch (174.1 million to 163.5 million years ago). Snake**,** also called serpent. All snakes lack external limbs as well as external ear openings. Internally, they have lost the urinary bladder. The visceral organs are elongated, with reduction of the left member in relation to the right; the left lung is greatly reduced or even lost entirely.

All snakes are predators, onlya small percentage (fewer than 300 species) is venomous, and of those only about half are capable of inflicting a lethal bite. Although snakebite mortality worldwide is estimated at 80,000–140,000 people per year.

## Venomous Snakes

**Figure 1: Black mamba**

**Figure 2: Banded krait**

**Figure 3: King Kobra**

**Figure 4: Rattle snake**

**Snake Venom**

Snake venom is produced in modified parotid glands normally responsible for secreting saliva. It is stored in structures called alveoli behind the animal's eyes, and ejected voluntarily through its hollow tubular fangs.

Venom is composed of hundreds to thousands of different proteins and enzymes, all serving a variety of purposes, these toxics substances work to destroy cells, disrupt nerve impulses, or both. Such as interfering with a prey's cardiac system or increasing tissue permeability so that venom is absorbed faster.

Snakes use their venom cautiously, injecting amounts sufficient to disable prey or to defend against predators. Snake venom works by breaking down cells and tissues, which can lead to paralysis, internal bleeding, and death for the snake bite victim. For venom to take effect, it must be injected into tissues or enter the bloodstream.

Although snake venoms are composed of a complex collection of toxins, enzymes, and non-toxic substances, they have historically been classified into three main types: **cytotoxins, neurotoxins, and hemotoxins**.

**Cytotoxins:** Cytotoxins are poisonous substances that destroy body cells. Cytotoxins lead to the death of most or all of the cells in a tissue or organ, a condition known as **necrosis**.

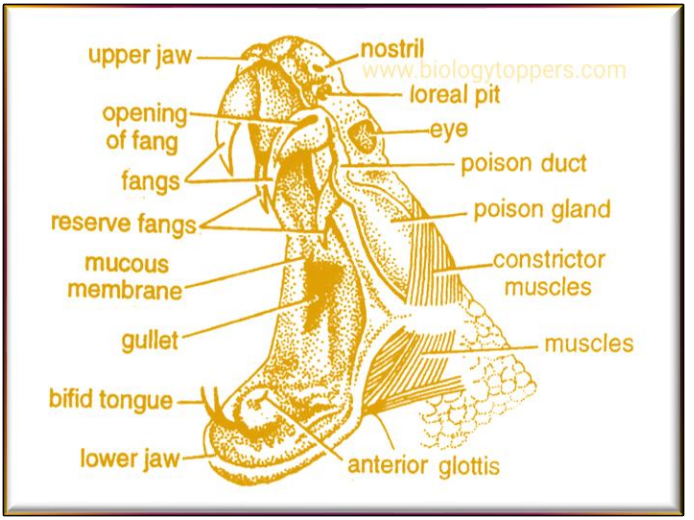
**Neurotoxins:** are chemical substances that are poisonous to the nervous system. Neurotoxins work by disrupting chemical signals (neurotransmitters) sent between neurons. They may reduce neurotransmitter production or block neurotransmitter reception sites.

**Hemotoxins**: are blood poisons that have cytotoxic effects and also disrupt normal blood coagulation processes. These substances work by causing red blood cells to burst open, by interfering with blood clotting factors, and by causing tissue death and organ damage.

**Snake Bite**

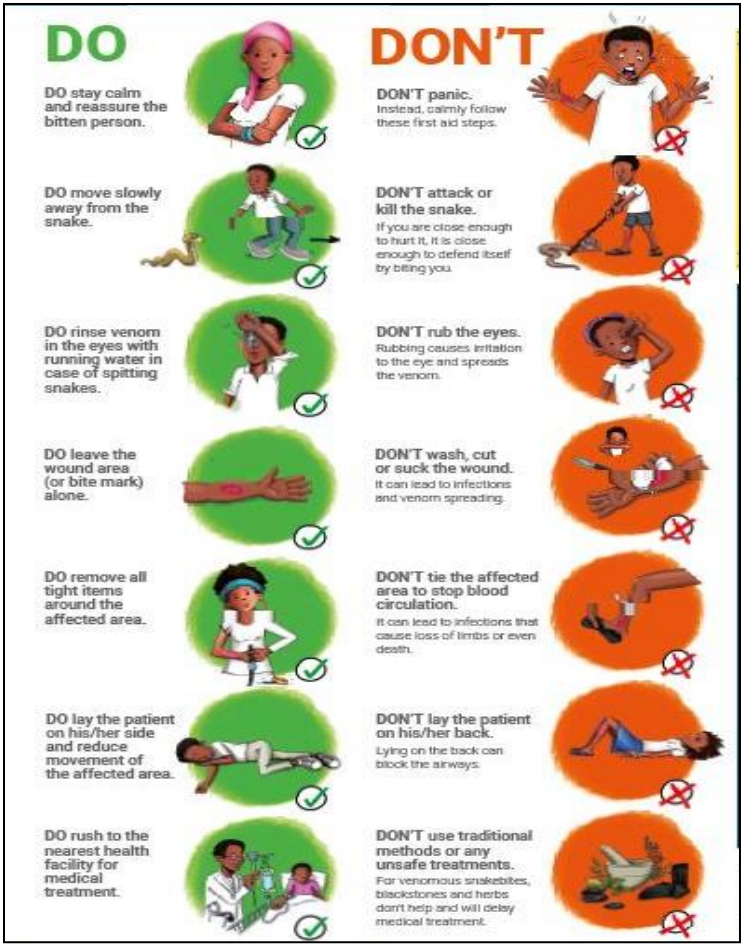
The biting mechanism serves two purposes, Erection offangs and Injection of venom or poison in victim’s body.

The biting apparatus taking part in biting mechanism are-Poison gland, Poison duct and Fangs.




Effects of snake bite:

- Redness,
- Swellingthat spreads away from the bite,
- Bruising,
- Bleeding, or blistering around the bite.
- Severe pain and tenderness at the site of the bite.
- Nausea, vomiting, or diarrhoea
- A fast heart rate or changes in heart rate,
- Numbness or tingling,
- Weakness and
- Trouble breathing.




**Control measures:**

- Immediately move away from the area where the bite occurred.
- Remove anything tight from around the bitten part of the body (e.g.: rings, anklets, bracelets) as these can cause harm if swelling occurs.
- Reassure the victim.
- Immobilize the person completely.
- Provide proper medical treatment.

## References


- https://my.clevelandclinic.org/health/diseases/15647-snake-bites
- https://www.who.int/activities/preventing-and-controlling-snakebite-envenoming
- https://www.cdc.gov/disasters/snakebite.html
- https://www.cdc.gov/niosh/topics/snakes/symptoms.html
- https://www.thesilverlining.com/safety-tips/snake-bite-prevention-and-treatment
- https://www.thesilverlining.com/safety-tips/snake-bite-prevention-and-treatment
- https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(19)30275-X/fulltext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**26.**

# SOME FACTS ABOUT COBRA

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## Introduction

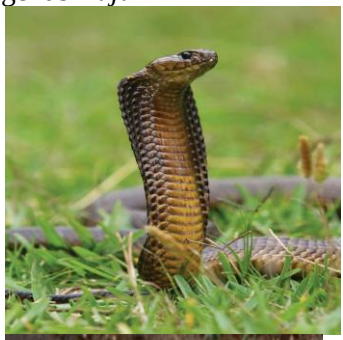
Reptiles are first true terrestrial vertebrates evolved from amphibians and later on from reptiles birds and mammals were evolved. Snakes belongs to class reptilian commonly known as Serpentes, which is often shortened to the serpent in mythical stories, comes from the Latin word "serpo," means creep or crawl. Cobra belongs to Kingdom :Animalia, Phylum:Chordata, Class Reptilia, Order:Squamata. Suborder: Serpentes, Family: Elapidae, **Cobra** highly venomous snakes, most of which expand the neck ribs to form a hood. While the hood is characteristic of cobras, not all of them are closely related. Cobras are found from southern Africa through southern Asia to islands of Southeast Asia. The short fangs at the front of the mouth have an enclosed groove, which delivers the venom. Cobra venom generally contains neurotoxins active against the nervous system of prey, i.e small vertebrates and other snakes. can be fatal depending on the amount of venom injected. Neurotoxins affect breathing, and although antivenin is effective, it must be administered soon after the bite. Thousands of deaths occur each year in South and Southeast Asia. Most elapids are commonly referred to as "cobras." These snakes are characterized by the erect, venomous fangs at the front of their mouths, and species can be terrestrial or aquatic. Elapids are endemic to tropical and subtropical regions throughout the world. All of the known cobras are venomous and many are capable of rearing upwards and producing a hood when threatened

The Indian cobra or Indian spectacled cobra, (*Najanaja*) was formerly considered a single species with much the same distribution as the king cobra. Recently, however biologists have discovered that nearly a dozen species exist in Asia, some being venom spitters and others not. They vary both in size ranging between 1.25 and 1.75 metres and in the toxicity of their venom. Spitters propel venom through the fangs by muscular contraction

of the venom ducts and by forcing air out of the single lung other snakes known as "cobras".

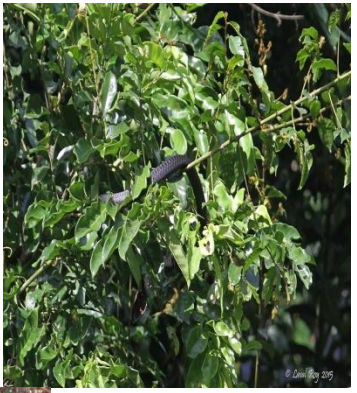
**1. Rinkhals / Ringhals**

In Africa there are also spitting and nonspitting cobras, but the African cobras are not related to the Asian cobras, nor are they related to each other. The ringhals, or ring necked spitting cobra (*Hemachatushaemachatus*), of southern Africa and the black-necked cobra (*Najanigricollis*), a small form widely distributed in Africa, are spitters. Venom is accurately directed at the victim's eyes at distances of more than two metres and may cause temporary, or even permanent, blindness unless promptly washed away. The rinkhals generally prefers grassland habitats because it allows them to blend in with the surroundings. Rinkhals also may live in swamps around southern Africa. It is not a true cobra in that it does not belong to the genus *Naja*, but instead belongs to the monotypic genus *Hemachatus*. While rinkhals bear a great resemblance to true cobras they also possess some remarkable differences from these, resulting in their placement outside the genus *Naja*



**Asian*Najanaja*African cobras Rinkhals*Najanigricollis***

**2. The Egyptian cobra** (*Najahaje*) is a dark narrow hooded species of venomous snake in the family Elapidae, classified within the subgenera *Uraeus*. It averages roughly 1.4 metres (4.6 ft), with the longest recorded specimen measuring 2.59 metres (8.5 ft)ranges over much of Africa and eastward to Arabia. The Egyptian cobra ranges across most of North Africa north of the Sahara, across the savannas of West Africa to the south of the Sahara, south to the Congo basin and east to Kenya and Tanzania. Older literature records from southern Africa and the Arabian Peninsula Its usual prey consists of toads and birds.


**NajahajePseudohajenigraPseudohajegoldii**

**3. Pseudohaje**:In equatorial Africa there are tree cobras of the family Elapidae,genus: *Pseudohaje*, along with the mambas, are the only arboreal members. Pseudohajegoldii: Goldie's tree cobra (*Pseudohajegoldii*), also in error known as Gold's tree cobra is a speciesof venomoustree cobra.*Pseudohaje* means "false cobra" endemicto Central and Western Africa. This species

is one of the two tree cobras in Africa, the other being the black tree cobra (*Pseudohajenigra*). Goldie's tree cobra is one of the most venomous snakes and creatures in Africa.*Pseudohajegoldii* is oviparous. The female will lay 10 to 20 eggs.*Pseudohajegoldii* mainly preys on amphibians and arboreal mammals, such as squirrels. Goldie's tree cobra is one of the largest venomous snakes in Africa, measuring 2.2–2.7 metres (7.2–8.9 ft) in total length including tail. The dorsal body color of this species is glossy black. It has a cylindrical body with a long, spiky tail, which makes the snake more adaptable to arboreal life. The head is small with exceptionally large eyes, giving the snake excellent eyesight.

**Pseudohajenigra:**is found in Ghana, Guinea, Ivory Coast, Liberia,Nigeria,Sierra Leone, and Togo. *P. nigra* is black dorsally, and brown ventrally. Adults may attain a total length including tail of 2.13 m (7.0 ft)

**4. King Cobra**: The world's largest and longest venomous snake is the king cobra, or hamadryad (*Ophiophagushannah*). Found in forests from India through Southeast Asia to the Philippines and Indonesia, it preys chiefly on other snakes. Maximum confirmed length is 5.6 metres (18 feet), but most do not exceed 3.6 metres (12 feet). King cobras guard a nest of 20 to 40 eggs, which are laid in a mound of leaves gathered by the female. The guarding parent will strike if a predator or a person approaches too closely. Not all cobras are egg layers.Allmember of the genus *Ophiophagus*,is distinguishable from other cobras, most by its size and neck patterns. Its skin colour varies across the habitats, from black with white stripes to unbroken brownish grey.It preys chiefly on other snakes includingits own species. Unlike other snakes, it rarely hunts non reptilevertebrates, such as rodents and lizards.When provoked, however, it is capable of striking a target at long range and well above the ground. Rather than biting and retreating, it sustain its bite and inject a large quantity of venom, which is a medical emergency. Regarded as the national reptile of India this species has an eminent position in mythology and folk traditions of India, Sri Lanka and Myanmar Threatened by habitat destruction, the king cobra has been listed as Vulnerable on the IUCN Red List since 2010. The king cobra's diet consists primarily of other snakes and lizards, including Indian

cobra, banded krait, rat snake, pythons, green whip snake, keelback, banded wolf snake and Blyth's reticulated snake.



**King CobraAspidelapslubricusAspidelapsScutatus**

**5. Aspidelaps:**(Genus: **Aspidelaps)**,

**a. Aspidelapslubricus,** commonly known as the Cape coral snake or the Cape coral cobra, is a species of venomous snake in the family Elapidae. The species is endemicto parts of southern Africa.The Cape coral snake is a small elapid. *A. lubricus* is a relatively small, slender bodied snake, around 1.6–2.0 ft (49–61 cm) in total length including tail, with some growing up to 2.5 ft (76 cm) in some cases.It has an enlarged rostral scale, which is the scale located at the front of the snout above the mouth opening on the snake. The head relative to the body is very short making it very easy to distinguish it from the neck and rest of the snake. Colors range from red-orange to yellow, slightly resembling the coloration patterns seen on some corn snakes. The Cape coral snake has thick black rings along the length of the body, fully encircling on the body while not fully on the tail

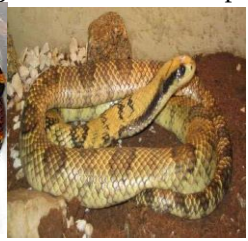
segment. There are around 20–47 total rings spanning the length of the snakes body. This species also contains a narrow hood right below the head, much like other cobras. The breeding period starts in the winter, with the cooling down of winter temperatures. The snakes then increase their uptake of food to help cope with the extra energy needed to reproduce. If mating occurs at this time, the eggs will usually be laid in May or June. After that, there is a period of about 65 days before the eggs begin to hatch. There are usually between 3 and 11 eggs hatched per clutch, with sometimes multiple clutches per breeding period. Each hatchling can be around 17–18 cm (6.7–7.1 inches) in total length

**b.AspidelapsScutatus:**

The shield-nosed cobra (*Aspidelapsscutatus*) is avenomousasnake in the family Elapidae.It is found in South Africa, Botswana,Mozambique, Zimbabwe, Swaziland and Nami bia. They live 20-28 years old in captivity.

**6. Walterinnesia aegyptia,** also known as the desert cobra or desert black snake, is a species of venomous snakes in the family Elapidae that is native to the Middle East. The specific epithet *aegyptia* "of Egypt" refers to part of its geographic range.The range of the species encompasses southern Israel, north-western Saudi Arabia, western Jordan, Egypt's Sinai Peninsula and possiblyLebanon The desert cobra is highly venomous similar to those of the indicating a close relationship.





**WalterinnesiaaegyptiaMicrurusfulvius**, **Hydrodynastesgigas**

**7. Micrurus fulvius**, commonly known as the eastern coral snake,common coral snake, American cobra, and more, is a species of highly venomous coral snake in the family Elapidae. The species is endemic to the southeastern United States.*M. fulvius* is generally less than 80 cm (31 inch) in total length including tail. The maximum reported total lengths are 121.8 cm

(48.0 in) for a specimen in Florida (Neill,1958) and 129.5 cm (51.0 in) (Roze,1996). Males have longer tails than females, but females reach a greater total length.

The color pattern consists of a series of rings that encircle the body: wide red and black rings separated by narrow yellow rings. The head is black from the rostral scale to just behind the eyes.The red rings are usually speckled with black.

**8. Hydrodynastesgigas** is a New World species of large, rear-fangedsnakeendemicto South America. It is commonly and alternatively known as the false water cobra and the Brazilian smooth snake. The false water cobra is so named because when the snake is threatened it "hoods" as a true cobra. Unlike a true cobra, though, it does not rear up, but remains in a horizontal position.

**References**


- B. Branch (1988). Field Guide to the Snakes and Other Reptiles of southern Africa. Struik, Cape Town
- S. Hunter (2000). "Venomous Reptiles"
- https://en.wikipedia.org/wiki/King cobra
- Mehrtens, J. (1987). "King Cobra, Hamadryad (Ophiophagushannah)". Living Snakes of the World. New York: Sterling. p. 263–. ISBN 0-8069-6461-8.
- "Pseudohajegoldii ". The Reptile Database. www.reptile-database.org.
- https://en.wikipedia.org/wiki/Hydrodynastes_gigas
- https://en.wikipedia.org/wiki/Micrurus_fulvius
- https://en.wikipedia.org/wiki/Walterinnesia_aegyptia
- https://en.wikipedia.org/wiki/Aspidelaps_lubricus
- https://en.wikipedia.org/wiki/Goldie%27s_tree_cobra
- https://en.wikipedia.org/wiki/Rinkhals
- https://www.britannica.com/animal/cobra-snake
- https://en.wikipedia.org/wiki/Egyptian_cobra
- https://reptile-database.reptarium.cz/species?genus=pseudohaje&species=goldii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**27.**

## ROLE OF SNAKE FRIEND IN SOCIETY AND ECOLOGY

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After hearing the word "snake" you might be able to recall all the incidences related to a snake, that you may have experienced till today. You may have also got encountered a snake from very little distance or even from far away. But I am damn sure, all of them were full of excitement. This is because many of us have a phobia about snakes and that is natural since our brains have been programmed to do so. Having fear about dangerous things like "deadly snakes" is a good thing but holding misconceptions and misunderstanding about snakes may end up with some disastrous results. We are well known for the fact that whenever people see the snake, they end up killing them or harming them so badly that they can never survive again. But trying to kill a snake may also kill the person who is attempting this crime, because many times snakes bite in self-defence which may kill the person if not treated in time, of course in hospital only. Fortunately, we can save both lives by taking small efforts and showing some mercy towards one of the most beautiful creatures present on the face of this planet i.e snakes. Instead of killing or trying to catch a snake on our own, we can call a person who is well known as Snake's friend (Sarpamitra in Marathi).

Snake friend is a personality who is totally devoted to serve snakes as well as humans. Whoever saves the snake is a Snake friend in my opinion. In our society, few people are working 24x7 for the sake of the conservation of snakes and we should admire spirit and their dedication. By saving snakes, they are not only serving Mother Nature but also they are saving the valuable lives of people. Snake friends safely rescue snakes that are seen in the human residence and release them into their natural habitat. Anyone who is catching snakes without proper knowledge of their species, type (venomous or non-venomous) and habitat, should not be considered a Snake friend. There are self-claimed snake friends in the society,who have not much knowledge about snakes,

they try to rescue snakes and end up either killing snakes or themselves. So what are the guidelines under which we can consider someone as a genuine snake friend?

**Who should be called a "Good Snake Friend?''**

Good Snake friends should have proper identification knowledge of snakes. He/ she should be able to identify the exact species of snake whether it is venomous or non-venomous. Along with in-depth knowledge He/ She should be well experienced when it comes to the handling of snakes, because being snake friend, they might often have handle the snakes with their hands. Snake friend should know how to handle venomous as well as non-venomous snakes properly in order to maintain their calm. In this way they will not try to bite and it rescuing them becomes bit more easy.Doing such rescues for earning and publicity might be troublesome for both snake and the person. When it comes to snakes, many people try to catch them for publicity purposes, to become famous by posting stunts on social media. You might have seen such disturbing yet horrifying pictures on social media in which people trying to kiss Indian cobra and other dangerous snakes. Such stories do not end with happy endings. One who wants to save a snake and the life of people will never urge fame and that person should be considered as a true snake friend. Snake friend should always take care of the safety of snakes as well as their own. He/she should use tools to catch snakes like snake hook stick and tong which help to keep snakes away from the body, eventually reducing the chances of a snake bite during the rescue. They should always try to keep residents or mob away from snake. Fake babas, snake charmers, fake snake friends, and smuggler's activity should be reported by snake friend to the police department and respected forest department to avoid any kind of misleading of society.

**Why do we need them?**

We cannot possibly save every snake that may come across, we are not trained for that even if we have theoretical knowledge about snakes. For that matter, our society needs people who are completely dedicated and devoted themselves to the conservation of snakes. Snake friend is a full-time service with almost no financial outcome. Of course, people may offer them money if they wish to. But no one should exploit money under the name of

rescue. Things like these happen a lot and they can only be avoided if a good snake friend is present in our society.

After working genuinely for a long period snake friends tend to gather valuable information about snakes like their habitat, food and feeding habit, reproduction, and many other aspects. These things we cannot simply learn in the book without field knowledge, at this situation snake friends come into play and they may reveal many things that could be used in the research and literature. This gathered information may play a vital role in educating researchers, farmers, and teachers. Snake friend play a bridge role between society and the snakes. Information about the snake bite and their prevention, first aid, proper medical help after snake bite all can be collected from snake friends, hence they are also a mobile repository of all this information.

Educating our society about snakes is their primary job. He/she should make people aware of snakes. In school, colleges, and universities, seminars should be arranged in which Snake diversity and its conservation importance should be taught by snake friends or snake researchers. In this way, snake friends will be able to educate more people about snake and their importance. If people get to know about snakes they will not try to kill snakes and eventually this will help in the *in situ* (in natural habitat) conservation of snakes.

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|  |  |
| Fig.1.Venomous snake : Russell's viper (*Daboia russelli)* | Fig.2. Snake friend educating farmers about non-venomous snake Red Sand Boa. |
|  |  |
| **Snake friend and veterinary doctor treating injured snake.** | **Snake friend releasing snake in natural habitat away from human residency.** |

**Role of snake friend in Ecology:**

Since we know that how snake friends play a cornerpiece role in the conservation of snakes, they are not only catching and releasing the snake into their natural habitat but they are also keeping the ecosystem healthy. Snakes are exclusive carnivorous animals and they feed on a variety of organisms such as insects, birds, some mammals (never a human), and mostly rodents. Being active predators they help farmers to keep the insects, birds, and rodents population in control. Without snakes, we cannot possibly control the population of such field pests. Hence, when a snake friend rescues a snake and releases it into its natural habitat he/she is placing an important tropic level into its proper place, which could be missing without the active role of a snake friend. You must know about the fact that Red Sand Boa snake is called a farmer's friend because, despite being non-venomous they keep the rodent population under control and make the soil loose by making borrows in it. This keep soil well aerated, improve soil productivity.

Often people fear snakes and other creatures and try to avoid visiting dense forests and this thing may be game-changing when it comes to saving the natural flora and fauna. This is possible only because snake friend is working selflessly. We should always show great respect towards snake friends who are doing their job very well. I have been working as a snake friend for the last five years in Nanded city; I can jump to the conclusion that, educating people about snakes and their importance is the most effective way of their conservation. We should make people aware who are in direct exposure to snake encounters, such as farmers and people working in fields. By sharing small pieces of information we can literally save a number of innocent lives.

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**28.**

# SNAKE BITE: CURATIVE AND PREVENTIVE MEASURES

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Snakes that have venom have modified salivary glands. Venom is a form of saliva and probably evolved to help the reptile digest food. Some venom is more toxic than others and can be useful in killing prey. Snakes bite either to capture prey or for self-defense. But since there are so many different types of snakes including both venomous and non-venomous. Not every snake bite is treated equal. There are two different types of snake bites.

**Dry bites:** These occur when a snake doesn't release any venom with its bite. These are mostly seen with non-venomous snakes and sometimes with venomous snakes also.

**Venomous bites:** These are much more dangerous. They occur when a snake transmits venom during a bite.

Venomous snakes voluntarily emit venom when they bite. They can control the amount of venom they discharge, and 50 to 70% of venomous snake bites result in envenoming or poisoning. Even with a less serious type of bite, every snake bite should be treated as a medical emergency unless you're absolutely sure that the bite came from a non-venomous snake. Any delay in treatment following a venomous snake bite could result in serious injury or, in the worst-case scenario, death.

**Most Common Victims**

It has been estimated that up to 1.8 million snakebites occur worldwide each year, causing 20,000 to 94,000 deaths. Up to 95% of snake bites occur in either tropical or developing countries. Those who live in South Asia, Southeast Asia and sub-Saharan Africa are particularly affected by venomous snake bites, as they often don't have access to adequate healthcare services or antivenoms. Snake bites are also especially common in poor communities, often in rural areas. People with specific jobs are

also more at risk, including Agricultural workers, Herders, Fishermen, Hunters etc.

**Diversity of Venomous Snakes**

There are two major groups of venomous snakes i.e., Elapids (cobra family) and Vipers.

There are about 300 venomous species of *Elapidae*, including kraits, mambas, coral snakes and sea snakes. They have short fangs in the front of the upper jaw and strike downward, followed by chewing. Their venom is mainly neurotoxic but it can also harm body tissue or blood cells. If a cobra bites you, you can die from paralysis of the heart and lungs very quickly after the bite.

There are more than 200 species of *Viperidae*, which includes pit vipers (like rattlesnakes, copperheads, water moccasins, or cottonmouths) and Old-World vipers (adders). They have long, hollow, venomous fangs attached to movable bones in their upper jaw. They fold their fangs back into their mouth when they're not in use.

Most species of the most widely distributed and diverse snake family, the Colubrids, lack venom that is dangerous to humans. But some species, including the boomslang (*Dispholidustypus*), twig snakes (*Thelotornis*), the Japanese garter snake (*Rhabdophistigrinus*), and brown tree snake (*Boigairregularis*), can be dangerous. Other members of this family, including American garter snakes, kingsnakes, rat snakes, and racers, are harmless to humans.

**Categories of Venom –**

Different species carry different types of venom. The major categories are as bellows –

Cytotoxins: Cause swelling and tissue damage wherever you've been bitten.

Haemorrhagins: Disrupt the blood vessels.

Anti-clotting agents: Prevent the blood from clotting.

Neurotoxins: Cause paralysis or other damage to the nervous system.

Myotoxins: Break down muscles.

Cardiotoxins: act directly on the heart.

**Symptoms and Causes –**

If snake bites, the symptoms will differ depending on type of the snake. If there's a drybite, there likely occurs just swelling and redness around the area of the bite. But if it's a venomous bite, there occurs more widespread symptoms. The common symptoms are as belows:

- Bite marks on skin. These can be puncture wounds or smaller, less recognizable marks.
- Burning pain around the bite may not feel for a little while after the bite.
- A bite from a coral snake can be almost painless at first, but still deadly.
- In the area of bite there may occurs redness, swelling, tissue damage or complete destruction.
- Abnormal blood clotting and bleedings may occur. Severe bleeding can lead to a hemorrhage or kidney failure.
- Low blood pressure, a faster heart rate and a weaker pulse.
- Nausea and vomiting, diarrhea, anxiety, headaches, dizziness and blurred vision.
- Difficulty in breathing, or in serious cases, complete loss of breath.
- Increased production of saliva and sweat.
- Weakness in muscles and numbness in the face or limbs.
- If victim has an allergic reaction to a snake bite, it could suffer from anaphylactic shock.
- Many of the symptoms are the same or very similar to the above, but more severe. There are some additional symptoms viz., difficulty in speaking due to extreme tightness in the throat & a swollen tongue, young children may become very pale and constant cough and/or wheezing.

**Treatment –**

First and foremost, seek immediate medical attention. This means emergency services as soon as possible, because even if the bite isn't that painful initially, it still need to treat it as if it's potentially life-threatening. Properly identifying the snake can help with the treatment, though it's very difficult to do so. Also be sure to take the following steps immediately:

- Remove any jewelry or watches, as these could cut into the skin if swelling occurs.
- Keep the area of the bite below the heart in order to slow the spread of venom through the bloodstream.
- Keep victim still, calm and in the recovery position. Moving around a lot will cause the venom to spread faster through the body.
- Cover the bite with a clean, dry bandage. Try to use a pressure immobilization bandage if possible.

While these are all useful precautionary measures, the ultimate treatment for a snake bite is antivenom. Try to get the victim of the bite antivenom as quick as possible. Knowing the size, color and shape of the snake can help the doctor to determine which antivenom is best for that particular situation. Antivenoms are created by immunizing horses or sheep with the venom of a particular snake. Their blood serum (the watery part of the blood) is then processed, as it will contain antibodies capable of neutralizing the effects of venom. There are antivenoms that treat bites from a specific type of snake (monospecific antivenoms) and also those that treat bites from a number of snakes found in a particular geographic region (polyspecificantivenoms).

The antivenom will be given either in an injection or through an IV, so that it can take action as quickly as possible. While either of these methods may produce side effects, they've proven to be the most effective. One of those side effects is serum sickness disease, which can appear four to 10 days after receiving the antivenom. If victim experience rashes, itching, joint pain, fever, kidney failure, swollen lymph nodes etc contact your healthcare provider or doctor to ask about serum sickness disease.

**What shouldn't Victim do when treating a snake bite?**

A snake bite can cause people to panic and act irrationally. Even so, there are certain things you should avoid doing immediately following a snake bite, including:

- Don't pick up the snake or try to wrap it up or kill it, as this will increase chance of getting bitten again.
- Don't apply a tourniquet.
- Don't cut into the wound at all.
- Don't try to suck out the venom.

- Don’t apply ice or use water to submerge the wound.
- Don’t drink alcohol.
- Don’t drink beverages with caffeine.
- Don’t take any pain-relieving medication.

**Preventive Measures –**

The snake is almost always more scared of human than human are of the snake. Giving the snake the opportunity to escape prevents most bites. Depending on where you live (or choose to vacation), you may or may not have a hard time avoiding snakes. But if you're going to be in snake territory, there are some useful tips to avoid getting bitten:

- Always be careful where you put your hands and feet. Don’t reach into unknown spaces and holes, or underneath objects without first being sure a snake isn’t hiding underneath.
- Don’t lie down or sit down in areas where there might be snakes.
- Wear high-top leather boots when walking through or working in areas with dense vegetation.
- Do not attempt to capture, handle or keep venomous snakes.
- If you’re going camping, take extra care around swamps and other places where snakes typically live.
- If you come across a snake, slowly back away from it and avoid touching it.

**References –**


- https://my.clevelandclinic.org/health/diseases/15647-snake-bites
- https://www.webmd.com/first-aid/snakebite
- https://www.health.qld.gov.au/news-events/news/what-to-do-if-you-get-bitten-by-a-snake
- https://www.fairview.org/patient-education/116550EN


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**29.**

## DIVERSITY OF NON-VENOMOUS SNAKES

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Snakes are one of the most successful living vertebrates. All snakes belongs to reptiles. More than 3,400 species of snakes in the world have been classified with more than 25 families with a set of particular characters related to that group,India is home to more than 350 species of snakes, Of all the snakes in India, only 15% to 17% are venomous including sea snakes. This number is increasing constantly as a result of new discoveries.

According to scientific classification, snakes have been differentiated in two groups: Venomous and Non-venomous snakes.

India is home to a variety of snake species ranging from extremely venomous snakes like the Cobra and Common krait and in some rare cases, saw scaled viper and Russell's viper, to relatively harmless and non-venomous ones like the Common sand boa, Red sand boa, Wolf snake, Rat snake and Black-headed royal snake.

Non-Venomous Snakes are usually harmless to humans with the exception of large constrictor snakes like the Burmese Python. These snakes have teeth, just like venomous snakes so in the event of a bite from a non-venomous snake, as with any small injury care should be given to avoid infections.

Present study was aimed to determine the diversity, distribution and distinctivecharacters of some Non venomous snakes in India. Common Non venomous snakes which found in India vary as per the region. 17 types of Non venomous snakes are listed as follows:

1. **Indian Rock Python**

   Scientific Name- ***Python morulus***Hindi- AjgarMarathi – Ajgar

Indian Rock Python can be found on grasslands, swamps as well as rocky places. Their natural habitat is from the eastern Himalayas to the mangrove forests of Sunderbans. They are excellent swimmers and water is their second home.Indian Rock Python having average length 210 -360 cm (7 ft -12) and maximum length- 750cm (25ft). The Indian python is also known to crush their victims, which includes warm-blooded mammals, birds and reptiles.

**Distinctive character-**

1. It is heavily bodied, smooth scaled snake with a lance shaped head and short tail.
2. The bright, blotched pattern may be yellowish to dark brown.
3. The underside is whitish, yellowish or light orange.
4. These snakes are equipped with heat sensors, small slits near the nostrils.

**2. Common Sand Boa**

Scientific Name- ***Eryx conicus***Hindi- Dumuka Marathi – Durkya Ghonas

Belonging to Boa species, Sand Boa is referred to as 'do-muha' snake in Hindi due to the resemblance of its tail to its head. Sand boa is having average length-50cm and newborn is 12.5cm in length. They are mostly found in agricultural lands, garden, rat holes, brick piles and rock piles. Their diet consists of rodents, small mammals, birds and geckos. Their bite is not venomous. This snake is distributed in all over India.

**Distinctive character-**

- The overall colour of the common sand boa varies from yellowish white to dark brown with irregular blotches all over the body.
- They are stumpy snake with a very rough tail and a square nose.
- Superficially they resemble like a Russell's viper.

3. **Earth Boa**

Scientific Name- ***Eryx johnii***Hindi –Domuhi Marathi – Mandul .

The Common earth Boa in Hindi is known as a “do-muhi” snake. This is because its tail looks like its head. Length is 1 meter. Found in whole of India excluding North-east states after North-Bengal; also not found in Indian islands. The Easternmost boundary of this species is in West Bengal's Central-southern parts. States- Andhra Pradesh, Bihar, Chattisgarh, Delhi, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Punjab, Tamil Nadu, Telangana, Uttar Pradesh, Uttrakhand, West Bengal.

**Distinctive Characters-**

1. The overall colour of the Red sand boa varies considerably, from reddish brown and speckled grey or yellowish to black.
2. The thick body is well adapted for burrowing.
3. The shovel shape nose and a tail so blunt that it appears to have been chopped off make them easy to recognize.

4. **Common Trinklet Snake**

Scientific Name: ***Coelognathus Helena*** Hindi: Alankrat Saap Marathi: Taskar

One of the largest species kraits snake found in India’s diverse biosphere is the Banded Krait. It can be easily recognized by its distinctive cross bands in black-yellowish color. The common trinket snake is most commonly found in Vishakhapatnam. If they sense a threat approaching them, they can become rather aggressive, which is why it is essential to be careful of them. Their maximum size is 11 Feet, and you can also find them at places with higher altitudes of Pakistan, Nepal, Sri Lanka, and Bangladesh.

**Distinctive Character:**

1. It is tan and chocolate brown with two prominent dark stripes on the later part of the body and light band light band and checks on the fore part.

2. Two short and dark lines on the either side of the neck may join medially to form and inverted V shape

3. Underside is pearly white

4. The scales are smooth and glossy

5.Indian Rat Snake

Scientific Name: ***Ptyas mucosus***Hindi: Dhaman Marathi: Dhaman

Indian rat snake also termed as "Oriental rat snake" belongs to the colubrid snake species. This snake can thrive in almost any environment though they prefer urban areas, where their most desired prey "rat" is easily available. Locals also call them Dhaman Snake.Dhaman snakes are one of the longest and fast-moving snakes found in India. Dhaman snake is non-poisonous. Newborn having size- 32-47cm, Average length is 210cm (7ft) and Maximum length- 350cm (11ft & 6inch).

**Distinctive character:**

1. Rat snake may be light yellow (on the planes) to jet black in the hills and many shades of green, olive or brown in between.

2. The underside often has cross bars that are quite prominent.

3. Lower lip often has black horizontal lines.

4. The body is uniformlycolour but the skin bears interscale markings which show up when the snake puffs itself up in defense.

6. **Banded Racer**

Scientific Name: ***Argyrogena fasciolatus***Marathi: Dhool Nagin

Banded racer is a small sized snake having average length-134cm that lives in between bushes, tall grass and foliage. Another colubrid species, this snake is small in size as compared to the other non-venomous snakes. They can easily climb to good heights in search of shelter and prey.Banded racer feed on lizards, rodents, frogs and bird chicks.

**Distinctive character:**

1. It is light or dark brown, younger ones have white cross bands, regularly placed.

2. The head is little wider than the neck, the nose slightly pointed.

3. The scales are smooth but not glossy.

4. The underside is white or yellowish.

7. **Slender Racer**

Scientific Name: ***Coluber gracilis***Hindi- Dumuka Marathi – Durkya Ghonas

Slender Racer is small having maximum length 930 mm, slender, smooth scaled. Head broader than neck, large eye with round pupil. Tail long and thin. Narrow white, black edged cross bars on the back, which widen on the sides to connect with adjacent bands .Marking indistinct on hind body. Feeds on Skinks and geckos. Found in Recorded only from Maharashtra and Madhya Pradesh.

**Distinctive character-**

1. It light greyish brown above with narrow white black edge, cross bars which expands on the outer sides of the body and tail.

2. A bar across the snout in front of the eye and forward fonting V shaped marks on the top of the head.

3. Lower parts whitish or yellowish, the outer margins of the ventral are with black spots.

**8. Banded kukri Snake**

Scientific Name: ***Oligodon arnensis*** Hindi: Kukri Marathi: Kukri

Banded kukri Snake is having average length- 50cm and Maximum length- 70cm.Commonly found in throughout India including deserts and Himalayas region of India, though, they can also be spotted in Bangladesh, Bhutan, Nepal and Sri Lanka but not in the Northeast.Found near dense vegetation with loose soil, rocky areas and wetness.Hide in rock piles, crevices, under wooden logs and loose roots during day.

**Distinctive character-**

1. Banded Kukris are reddish or greyish brown with 10-20 black or dark brown brands.

2. The top of the head has a distinct chevron or arrow head design.

3. The underside is white.

4. The scales smooth and glossy, head thin with a blunt tip, eyes round pupilled.

5. Kukri snakes get their name from their sharp, curved teeth, perfect for holding strong prey such as geckos.

**9. Common Bronze back / Tree Snake**

Scientific Name: ***Dendrelaphistristis***Hindi: Karsala sanpMarathi: Ruka

Common Bronzeback Tree snakes usual preference is treetops rather than grounds. With its quick movement both on ground and trees, bronzeback snakes are hard to catch.This snake is very common throughout India. Inhabits forests and human habitations with lots of trees. Usually found in the open on trees, dense bushes and rarely hide. This type of non-venomous snake mainly feed on frogs, lizards and small birds too. Diurnal and Arboreal, use vision and fast locomotion to hunt. This snake can have average length- 100cm and Maximum length is 169cm.

**Distinctive character-**

1. It is longer and slender with flat heads and large eyes.

2. The sides are dark brown or black with wide light bronze stripes down the center of the back. 3. The underside is whitish, grey or light green.

4. The outer edges of the belly scales are notched, forming a fold on either side of the body which serves the snake when it is climbing.

**10. Common Wolf Snake**

Scientific Name: ***Lycodonaulicus***Hindi: Kawadiwala Marathi: Kawadiya

Wolf snakes, this species has enlarged teeth, giving it the name "wolf" snake. These teeth do not inject venom, but their rear fangs do. These snakes are usually around 03 feet long, though many individuals are smaller.

Because of their uniquely shaped teeth, they have a relatively square snout. Their scales range in color from black to reddish brown, and they have various speckles and patterns of lighter color across their bodies.

Common wolf snakes found in all over India but mostly found in the Andaman Islands. They prefer hiding in narrow cracks or under heavy objects during the daytime and rocky terrain is their natural habitat.

**Distinctive character-**

1. It is grey, brownish or black with 10-20 thin white or yellow bands.

2. The jet black eyes are protruding slightly and the pupil is invisible.

3. The head is flattish and somewhat pointed; the scales are smooth and slightly glossy.

4. The underside is white.

**11. Dumerils Black Headed Snake**

Scientific Name- ***Sibynophissubpanctatus***

Black Headed Royal Snake is another non-venomous snake found in India. This snake can have average length- 150cm. (5ft) and maximum length- 200m.They are mainly found in the semi-deserts and deserts of India, precisely from Kutch to non-Himalayan parts of Jammu.These snakes are nocturnal species so they are most active at night and also hunt during that time.They hunt their prey in the dark. If threatened, they hiss loudly like a pressure cooker otherwise their innate nature is calm, composed and non-venomous.They feed on rodents, birds, lizards and small mammals.

**Distinctive character-**

1. Pale brown above, with a vertebral series of small round black spots.

2. Rostral Scale nearly twice as broad as deep.

3. Head and nape dark brown or black; lips, canthus rostralis, a transverse line between the eyes, and two broad cross-bands, one in front and one behind the nape.

**12. Checkered Keel back**

Scientific Name: ***Xenochropis piscator***Hindi: Pani Samp Marathi: Pandiwad

This snake is found near rivers or freshwater lakesor rivers, and this type is having average length- 90cm and Maximum length- 175cm.They have a blackish patched surface on brown, greenish or yellow ground colour. Be extra careful if you encounter them, they are not venomous, but they are highly aggressive if they sense danger.This type of snake is distributed in all over India. Checkered Keelback feeds on fishes, frogs, toads and rejected meat pieces.

**Distinctive character-**

1. Vary in colour from black with light markings to bright yellow colour with the characteristics black and white Checkered pattern.

2. The one or two black eye streaks are distinctive and head is obtusely pointed and distinct from neck.

3. Underside is usually shiny and pure white.

**13. Striped Keelback**

Scientific Name- ***Amphiesma stolatum***Hindi- SeetalatiMarathi – Nanoti

The Buff Striped keelback is usually 40 to 50 cm (about 16 to 20 inches) in total length. The maximum length recorded is 90 cm.It is closely resembled the water snake.Found in throughout India.Feeds on Frog,toads,snails,small lizards,rodents.

**Distinctive character-**

1. The overall colour is light or dark brown with two tan or yellow stripes running down the body length, these stripes are especially bright on the last half of the body.
2. The head is light brown, and the sides of the head, lip area and chin are white or yellow.

**14. Common Cat Snake**

Scientific Name- ***Boigatrigonata***Hindi-ManjaryaMarathi – Manjarya

Cat snakes can be easily identified due to their triangular head structure which is broader than their neck. Being a nocturnal species, they showcase activity from early night to early morning. They are also known as Indian gamma snake and thereaverage length is 70cm and maximum length- 125cm.This snake is mostly found in high altitudes, near the Himalayas and some areas of Maharashtra. Additionally, it is easy to spot them in undisturbed gardens, rocky hills and scrubs.Cat snakes mostly feed on lizards, frogs, rodents as well as other snakes but they are not poisonous.

**Distinctive character-**

1. The common cat snake is thin with a long body and a tail that tappers to a fine point.

2. The colour is light brown or tan with a darker pattern of zig-zag markings

3. The top of the head has a clear Y mark.

4. The bottom side is whitish or tan,sometimes with tiny spots on each belly scale

5. The scales are smooth but not glossy.

**15. Worm Snake**

Scientific Name- ***Carphophis amoenus*** Hindi-Andha Sanp Marathi- Danav

Worm snakes are small 33.5 cm, brown snakes with smooth shiny scales, tiny eyes, and a pointed tail tip. Worm snakes are among the most fossorial (living underground). Distributed in all over the India.Feeds onAnts,other small insects and other larvae.

**Distinctive Characters-**

1. Snake is brown with a shining chocolate hue above, lighter below and the head tail region slightly whitish.

2. It is found in rotting vegetation and is sometimes recovered from uncleaned bathrooms in rural homes.

3. Superficially they look like earthworm; the tail is similar to the blunt head, but bears tiny spines.

4. The eyes are barely visible dots and covered by scales.

**16.Brahminy Blind Snake**

Scientific Name- ***Ramphotyphlops brahminus***Hindi-Andha Samp Marathi- Kadu

It is a myth that these snakes are venomous and deadly.They have a lot of energy when you pick one up. You will likely find them in soil in your potted plants or climbing up through your drain in your restroom.Theseare ground dwelling and burrowing snakes. They are shy. They are easily eaten by many other predators like birds, monitors, and other snakes. It has a length 15cm found in all over India.

**Distinctive Characters-**

1. Snake is Reddish or brownish in color
2. The blind snakes have very small eyes
3. Snake mouth is too small
4. It is found at night and daylight – under leaves or other litter on damp ground

17. **Beaked worm Snake**

Scientific Name: ***Grypotyphlops acutus***Hindi- chonchwala Andha Sanp Marathi- Talia

Beaked worm Snake is commonly called as "Chonchwala sanp" in Hindi. Found in south of Ganges basin and south of Rajasthan, range extends up to Baroda.This type of snake is having maximum length 600mm. feeds on Worms, soft bodied insects and larvae.

**Distinctive features-**

1. Head same width as body.
2. Snout pointed with large, hooked beak like scale.
3. Nostrils below the beak.
4. Tiny scale covered eye visible as black dot.
5. Glossy brown above distinctly paler below.
6. Short tail ends in spine.

All the venomous and nonvenomous snake species bite except worm snakes. Snake bite is not due to mistake of snake but only due to mistake of human being. Misunderstanding on difference between venomous and non-venomous snakes leads to the death of all type of snake.Lack of knowledge, fear of bite, mishandling and careless behavior were the main reasons behind the snake killing. Snakes were not at all responsible for any mishap. Continuous monitoring on the snake species diversity of this region is essential, it is possible through the special awareness program for the people, common man, farmers, students so that snake bite, snake kills may be prevented and snake diversity, food chain and food web of this ecosystem will be conserved. This will help to protect the survival of human and snakes both.

**References:-**

**Books:-**


- Daniel JC. The Book of Indian Reptiles. Bombay Natural History Society, Bombay. 2002, 227.
- Devrus PJ. Snakes of India, National Book Trust (NBT), New Delhi, 1970.
- Gharpurey KG. Snakes of India and Pakistan, 4th edition, The Popular Book Depot, Lamington Road, Bombay, 1954. 4

**Research Papers:-**

- Kale GB, Vairale Shiva and Ghait SN; (2019)Study of Snake Species Diversity in Rural and Semi Urban Areas of Buldhana district of Maharashtra, India, International journal Life Science Special Issue A 13, ISSN:2320-7817(p) 2320-964X(0)
- Pavan L. Jadhav, Shivaji P Chavan and Harshad S. Trimukhe (2018);Snake species diversity and their distribution in and around Nanded city, Maharashtra, India,Journal of Entomology and Zoology Studies; 6(4): 1855-1860
- Sonali R. Raut, Shantaj M. Deshbhratar, Jyotsna A. Mahaley, Vijay K. Hile, Ankita J. Singh and Gayatri U. Mehta; (2014);Recent studies on the biodiversity of snakes in Palghar region, Thane, Maharashtra, India. Pelagia Research Library, Advances in Applied Science Research, 5(2):373-381

**Websites:-**

- https://www.zoobarcelona.cat/en/animals/indian-rock-python
- https://eol.org/pages/793505
- https://animalia.bio/indian-sand-boa
- https://indiabiodiversity.org/species/show/278747
- https://indiabiodiversity.org/species/show/262557
- https://reptile-database.reptarium.cz/species?genus=Grypotyphlops&species=acutus
- https://indiabiodiversity.org/species/show/278671

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# SNAKES IN LITERATURE

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The snakes are one of the most important animal in the literature, religion and myth. Snakes can appears in whatever the author chooses to write. Whether it's an ancient myth about the beginning of the gods or modern romance, revenge novel obsessed over by teenage girls, snakes serve the same metamorphic purpose along with the upcoming novels snakes deserves place. The snakes were mentioned in different culture from very ancient times. Snakes played very crucial role in blooming of the literature. In religion like Buddhism, Hinduism and Jainism Naga (snake) shown to be half human and half cobra. The snake is an equivocal creature in literature and myth. Snake and dragon are often interchangeable under the heading 'dragon' or 'wyrm.' Because of its shape the snake has often been used as a phallic symbol, a creature representing masculinity.

In other traditions the serpent represents chthonic forces of destruction and transformation. We see this very plainly in the old tale of the infant Herakles' defeat of the snakes sent by Hera to kill him.

**Snakes in Hindu literature**

In Hindu literature, its shown that snakes ( Nagas) live in an underground kingdom called naga-loka which is filled with very precious,diamonds and ornaments. The creator god sent nagas to the nether(lower in position) religions when they become highly populous on earth and ordered to bite only the true evil and sentenced to die early. Snakes are also associated with fire, water's, seas, and guardian's of precious gems.

Nagas have very special role in Hindu literature as being important mythological beings mentioned in the Hindu scriptures. They are supernatural serpents in Hindu mythology and are shown as either complete snakes, complete humans with multiple snake hoods emerging from their back, beings with half-snake and half-

human body, and some having the ability to shift between these forms. They are said to live in Patal-Lok, an aquatic realm under the surface of the earth that is filled with treasures, unimaginable to humankind, and anthills are often considered as holy portals to this semi-divine underworld. Apart from that underworld, Nagas also have ability to dwell in other water bodies like lakes, rivers and oceans. These divine creatures with mystical powers are similar with nature spirits and are a symbol and mark of of rebirth, death, fertility, sin,immortality, medicine, health and wealth. Due to this, snake worship has been a practice in India since very ancient times. An iconic festival dedicated to snakes in India is Nag Panchmi. People all over the country offer Naivaidyam and they pray to these nature spirits as a part of the celebrations.

According to Mahabharata written by Vyasa its stated Kashyap rishi and Kadru( Dakshas daughter) , are the parents of all nagas. Out of the five nagas, Shesha was the eldest, and then came Vasuki, Manasa,Takshaka and Iravati. Kashyapa had another wife, who was also Kadru's sister, Vinata. She gave birth to Vishnu's vahana, Garuda, an eagle-human hybrid and he became the arch-nemesis of the nagas since eagles consume snakes. In the Ramayana, Indrajit used the Nagapasha astra on Rama and Lakshmana, which hurled venomous snakes over them. The two fell unconscious and Garuda came to their rescue. He got rid of the venomous snakes. There are various stories of enmity between Garuda and nagas in the scriptures, which depict the aggressive nature of the nagas. But on the contrary, there are also some nagas that are mentioned in the scriptures for their good deeds, in both Vaishnavism and Shaivism.

The Bhagavata Purana describes how Krishna climbs up a lofty Kadamba tree nearby that stands bare because of the poisonous vapours emanating from the pool because of very venoumous Kalia mardan snake.

In ancient literature namely Vishnu puran it's stated that the lord Vishnu rested on the Sheshnaag is one of the most notable Nagas. Other notable nagas which is younger brother of Sheshnaga is vasuki which is termed as Shiva's snake. In literature it's said that it has gem called Nagmani on his head. Vasuki temple is found in Kerala and Andhrapradesh in India. The Vasuki naga

is known in Chinese and Japanese literature as being one of the eight dragon kings.

Manasa Devi, Nagamaa are hindu cultures snake goddess are also mentioned in the ancient hindu literature. Snakes of India by Ashok captain and Whitakar Written by one of the most celebrated herpetologist, working extensively in the Southern part of India! The book has some very clear and precise pictures for the species which are very helpful for beginners in the field.

**Snakes in Buddhism literature**

In Buddhism literature Mucalinda is a naga who protected Gautama Buddha after his enlightenment**.**

**Snakes in Egyptian literature**

In Egyptian mythology, the ancient Egyptian God's Ra and Sun created Amduat ,a serpent that was reborn every morning, sometimes snake's in literature can tie in with other concept such as anastasis and rebirth**.**

**Snakes in Christianity literature**

The most famous serpent temptation story is Adam and Eve. Ever since Eve's transgression in the Garden of Eden, snakes in Christian tradition have been associated with lies, evil and temptation. But in other cultures, as far-flung as ancient Greece and Egypt and indigenous North America, snakes symbolize fertility, rebirth, renewal and even immortality.

**In ancient Celtic Literature**

The ancient Druids( member of the high-ranking class in ancient Celtic cultures) wore serpent bracelets or tattooed themselves with serpents wrapping arms and wrists. This was an acknowledgement of the ancient, primitive wisdom and knowledge of the reptile. Some think that the legend of St. Patrick expelling the serpents from Ireland is an attenuation of Christianity's defeat of the Druids and their expulsion from positions of power and authority**.**

**Snakes in English literature**

In a popular book series "Harry Potter", Nagini is a reoccurring snake is is owned by lord voldemort. Nagini is both the protector of voldemort and and the destroyer of all his enemies. Relates to yet another topic in mythology and literature

"silence" it also displays how Harry could have two sides to him his good and evil. In a book "Snake" by DH Lawrence there are poems which expressed the snake's in stanzas. In the another book " The reptile room" by Lemony snicket shows orphaned children is kept in the room having deadly viper. In another book, the snake in "The poisonwood Bible" by Barbara Kingsolver its showed a younger child dies by a green mamba snake. Along with this, "president snake" is an music album in which president snake is a fictional politician made up of five snakes running for the United States president election.

In the William Shakespeare's literature namely "Antony and Cleopatra" showed Cleopatra commits suicide using a poisonous Asp (venomous snake species found in the nile region) . In a world famous literature "paradise" by John milton showed satan as snake.

**Snakes in comics**

The comics such as Naagraj, python, snake and snavely also enriched the literature**.**

Literature on snake in Disney movies

Literature on snake is also present even in Disney movies. In the story "the Jungle Book" the python Kaa is actually a positive mentor towards Mowgli. believe it or not when Mowgli is captured by monkey's Kaa rescues him by hypnotising his captures.

Viper is one of the supporting characters of the Kung Fu Panda franchise. She is a member of the Furious Five and the daughter of Great Master Viper, as well as one of Master Shifu's students at the Jade Palace. She is a master of the Viper Style of kung fu.

**References**


- Interesting literature web
- http://classroom synonym.com/symbolism-snakes-literature-3024html
- https://www.britannica.com/topic/naga-Hindu-mythologye
- https://bookglow.net/top-10-snakes-in-literature/


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