

Big fangs coming in small packages

Despite the stigma surrounding venomous snakes, they have been celebrated on stamps from many countries. It's a theme you can really sink your teeth into

■ Report by Steven Allain

Despite the fact that snakes are deeply entrenched in human cultures around the world, from the talking serpent in the Bible to the rainbow serpent in Aboriginal mythology, they are also amongst the most maligned groups of animals.

The main reason they are portrayed negatively is that some are venomous, causing many of us to fear them.

In truth, of the 4,000 known species of snakes, only about 600 are venomous, and only about 200 of these are capable of causing death or serious injury. Not every venomous snake species poses a threat to human life.

Nevertheless, an estimated 2.7 million people around the world are bitten by venomous snakes each year, of whom approximately 100,000 die.

A number of countries around the world have featured venomous snakes on their stamps, especially where endemic species are considered iconic.



ABOVE: Rwanda stamp issued in 1975 depicting the legendary black mamba, the most feared venomous snake in sub-Saharan Africa

DEADLY DOSES

There is no single taxonomic group of snakes that are venomous; it is a trait that is shared among a number of unrelated groups.

Venom has evolved through 'convergent evolution', a process where distantly related species evolve similar traits.

There are three main types of snake venom:

- Cytotoxic venoms kill tissue and cause necrosis (death of body tissue);
- Haemotoxic venoms destroy red blood cells or disrupt the formation of blood clots;
- Neurotoxic venoms affect the nervous system.

Adders

The only venomous snake found in Britain is the adder, *Vipera berus*, and it is in decline in most regions, due to climate change, habitat loss and persecution.

In a decade's time, adders may be gone from most of the countryside, except in their strongholds or areas where strict conservation efforts have been undertaken.

As a species, however, the adder is one of the most adaptable and widespread, occurring from Iberia to the far east of Russia.

It is even found within the Arctic Circle, thanks to its ability to incubate eggs internally rather than laying them in a nest, keeping them at a constant temperature

before giving birth to live young.

Adders have not yet been featured on any stamp released by Royal Mail, but have appeared on the stamps of many other Eurasian countries.

Eurasian vipers

Adders belong to the viper family, of which there are around 375 species, all of them venomous. They can be distinguished from other venomous snakes by their hinged fangs, which they fling forward before striking.

Another species found in Europe is the horned viper, *Vipera ammodytes*, which sports a distinctive horn on its nose.

It has a reputation for being the



ABOVE: European venomous snakes include the adaptable adder, illustrated by Liechtenstein in 1974, and the distinctive horned viper, featured by Albania in 1966

'Vipers, such as the adder, have hinged fangs, which they fling forward before striking at prey'

most dangerous snake in Europe, although deaths from its bites are infrequent, as treatment is widely available. This species has been depicted on stamps from a range of European countries.

Arid areas of Eurasia, from Afghanistan to Mongolia, are home to the Siberian pit viper, *Gloydius halys*, so-called because it is one of a group of snakes which use infrared-sensing pit organs on their upper lip to locate their prey.

As with many venomous snakes, surprisingly little is known about the effects of envenomation by this species, highlighting the need for more research.

The same can be said of the Tibetan bamboo pit viper, *Trimeresurus tibetanus*, which occurs in Tibet and Nepal. This is one of a number of Asian vipers which are a conspicuous green colour.

South Asian vipers

Russell's viper, *Daboia russelii*, accounts for 43% of all snakebites in India, and is therefore the most prominent member of the so-called 'big four', the species responsible for the greatest number of medically significant bites on the subcontinent.

Envenomation can have devastating impacts in areas where medical treatment is hard to access; not all bites are fatal, but most leave



ABOVE: Siberian pit viper, shown by Kazakhstan in 1994

ABOVE: Tibetan bamboo pit viper, shown by Nepal in 1998

ABOVE: Russell's viper, shown by Pakistan in 1995

ABOVE: Malayan pit viper, shown by Thailand in 1981

the victim with injuries which restrict their ability to work, and to care for their families.

Elsewhere in Asia, the Malayan pit viper, *Calloselasma rhodostoma*, is known for being bad-tempered and quick to strike when provoked. In northern Malaysia it is responsible for around 700 incidents a year, with a mortality rate of 2%.

American rattlesnakes

Potentially deadly vipers may also be found in North America, in the form of rattlesnakes.

One of the largest is the western diamondback rattlesnake, *Crotalus atrox*, which lives in the southern USA and northern Mexico. Its

VIRTUES OF VENOM

Although venomous snakes can be a danger to humans, they can also prove useful in a number of ways.

They are a sign of a healthy ecosystem, and they prey on species which we often view as pests, such as rats. This helps to reduce the instances of disease that those animals might pass on to people.

In a world where our antibiotics are starting to fail, venoms (which are a complex cocktail of proteins, salts and other molecules) offer real promise for helping us to create new drugs to stop infections, and perhaps even eventually to cure cancer.

VENOMOUS SNAKES



venom affects the blood, blood vessels and the heart, and is usually fatal, unless immediate medical treatment is administered.

Given the large number of rattlesnake species found across the Americas, it is surprising that they have only featured on the stamps of a handful of countries.

African vipers

Vipers can also be found throughout Africa, among them the infamous Gaboon viper, *Bitis gabonica*. This has the largest fangs of any snake, up to 5cm (2in) long, and the largest venom yield from a single bite.

It has one of the most complex

camouflage patterns of any snake, blending seamlessly into leaf litter, where it waits to ambush prey. It tends to be reluctant to bite people, unless it is provoked, or inadvertently stepped on...

Found across western and northern Africa is the relatively small and innocuous white-bellied

carpet viper, *Echis leucogaster*. It doesn't come into conflict with people very often, although another member of its genus, the saw-scaled viper, is another member of India's 'big four'.

Local people regard the colourful Ethiopian mountain adder, *Bitis parviocula*, as an extremely venomous species, although there are few written records of bites, and in the best documented case the victim survived.

Relatively new to science, this species is on the Red List drawn up by the International Union for the Conservation of Nature (IUCN), which means it is likely to become extinct in its native range without human intervention.

Cobras and rinkhals

Another group of venomous snakes are the elapids, characterised by the permanently erect fangs which sit at the front of the mouth. The best known are the cobras, famous for their upright pose and flattened neck.

The black-necked spitting cobra, *Naja nigricollis*, found across most of sub-Saharan Africa, is able to spit venom from its fangs, hitting targets over 7m (23ft) away. This can cause permanent blindness if it makes contact with eyes.

The Cape cobra, *Naja nivea*, is restricted to southern Africa, and regarded as one of the most dangerous of African snakes. Its



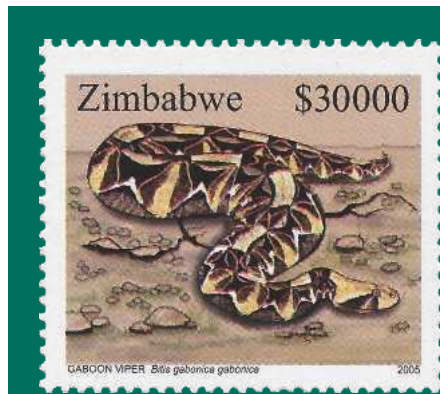
ABOVE: The black-necked spitting cobra, illustrated in 1976 by the French Territory of the Afars & Issas



ABOVE: The Cape cobra, illustrated in 2000 by Sierra Leone



ABOVE: The cobra-like swamp-dwelling rinkhals, illustrated on a Lesotho stamp issued in 1979



ABOVE: Gaboon viper, on a Zimbabwe stamp of 2005



ABOVE: White-bellied carpet viper, from Burkina Faso in 1972



ABOVE: Ethiopian mountain adder, on a 2016 Ethiopia stamp



ABOVE: Puff adder, on a Botswana design of 1980

'Elapids, such as the black mamba, have permanently erect fangs which sit at the front of the mouth'

venom is potent and it frequently enters houses, which leads to high human mortality rates from bites.

The largest venomous snake of all is the king cobra, *Ophiophagus hannah*, of south-east Asia which can grow to lengths of 5m (16ft). Unlike most snakes, it will feed on

other snake species.

Another elapid which looks very similar to a cobra is the rinkhals, *Hemachatus haemachatus*, of South Africa. Usually found in swamps, where it feeds primarily on toads, it will spray venom at a potential threat, aiming for the target's face.

THEORIES OF EVOLUTION

Have you ever wondered why snakes have no legs? There are two main hypotheses as to how snakes evolved from limbed species of lizard, losing their legs in the process.

The first is that they adapted to live underground, and this adaptation helped them move through the soil more easily.

An example of a venomous subterranean snake is the bolo, *Ogmodon vitianus*, which is endemic to the island of Viti Levu in Fiji.

The second is that they evolved from ancestors that lived in the ocean, and benefited from being more streamlined.

Fully aquatic snakes inhabit the tropical waters in the Indian Ocean and the Western Pacific, and a venomous example is the yellow-lipped sea krait, *Laticauda colubrina*, which has a paddle-like tail to help propel it through the water.



ABOVE: Fiji stamp of 1986 illustrating the bolo



ABOVE: New Caledonia stamp of 1983 illustrating the yellow-lipped sea krait

RIGHT: The semi-aquatic Malayan krait, illustrated on a Malaysia stamp of 2002, can be deadly to fishermen retrieving their nets or traps



Tropical elapids

Two very different elapid species found in the Tropics have a deadly reputation.

The Malayan krait, *Bungarus candidus*, is a semi-aquatic species found in south-east Asia, with a striking pattern of black and white bands. It is sometimes encountered by fishermen retrieving their nets or traps, and the mortality rate from its bite, if left untreated, can be as high as 70%.

In sub-Saharan Africa resides one of the most feared snakes of all, ▷



ABOVE: MacClelland's coral snake, on a stamp from Vietnam in 1970



ABOVE: Common capuchin coral snake, shown by Venezuela in 1972

VENOMOUS SNAKES



ABOVE: The yellow-faced whip snake, illustrated by Australia in 1982, is not usually a big danger to humans



ABOVE: The eastern brown snake, illustrated by Australia in 2006, is the second most venomous in the world

the black mamba, *Dendroaspis polylepis*. Grey in colour (its name comes from the its jet-black mouth), it can reach lengths of 2m (6ft 6in) or more, making it the second-longest venomous snake, and it can move at speeds up to 10mph.

It lives in a wide range of habitats, which can bring it into contact with humans, but today's effective anti-venoms mean that most bites are not lethal.

Coral snakes

A spectacular group of elapids are coral snakes, which have evolved

with coloured bands to warn potential predators that they are venomous.

One example is MacClelland's coral snake, *Sinomicrurus macclellandi*, which occurs throughout southern and eastern Asia. Another is the common capuchin coral snake, *Micrurus dumerilii*, of South America.

Conspicuously 'advertising' toxicity is known as aposematism. Aposematic species often use similar colours and patterns, which explains why most coral snakes resemble each other (and also why venomous insects such as wasps, hoverflies and bees look similar).

Australian elapids

The country best known for its venomous snakes is probably Australia, and some of its elapids have been featured on its stamps.

The yellow-faced whip snake, *Demansia psammophis*, is a fast-moving species found in every state except Tasmania. The venom is not regarded as dangerous to human adults, with symptoms varying from localised pain to temporary paralysis.

At the other end of the spectrum is the eastern brown snake, *Pseudonaja textilis*, the second most venomous in the world.

It is found throughout eastern Australia, where it often comes into conflict with people. With its venom being both haemotoxic and neurotoxic, death usually results from cardiac arrest, sometimes within half an hour of being bitten.

'Colubrids, such as the boomslang, have their fangs positioned towards the rear of their mouths'

Colubrids

The final family of snakes which include venomous species are the colubrids, distinctive for the way their fangs are positioned further back in their mouths.

Notoriously dangerous is the boomslang, *Dispholidus typus*, a well-camouflaged tree-living species of southern Africa. It can open its jaws up to an angle of 170°, maximising the likelihood of those 'rear' fangs sinking into flesh, and its venom, although slow-acting, is potent.

Native to South America is the green racer, *Philodryas olfersii*, whose venom is comparatively mild, causing swelling and bruising but few deaths. Nevertheless, bites occur frequently enough to be a major concern to Brazilian health officials.

A strikingly beautiful colubrid is the mangrove snake, *Boiga dendrophila*, of south-east Asia, which is black with gold bands. Although it is venomous, there are no recorded human deaths attributed to it.

Appreciating snakes

A number of snake species are facing the threat of extinction, thanks to habitat loss, persecution and in some cases overharvesting (collection for the pet trade or for food).

July 16 is designated World Snake Day, raising awareness of these fascinating and beautiful yet misunderstood creatures and trying to reduce the stigma surrounding them.

Philately can play a part in this, as countries show national pride in their endemic species by featuring them on their stamps. Snakes often make for colourful and visually striking designs. ■



ABOVE: Boomslang, shown by Namibia in 2014



ABOVE: Green racer, illustrated by Uruguay in 2001



ABOVE: Mangrove snake, shown by Laos in 1986