



WHICH IS THE WORLD'S DEADLIEST ANIMAL: A LION, TIGER, SHARK, SNAKE OR MOSQUITO?

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Date of submission : 10th May, 2022

Date of revision : 22nd May, 2022

Date of acceptance : 26th May, 2022

The proverbial question, “*Which is the world's deadliest animal?*” is difficult to answer because of numerous ramifications of the question itself, e.g., mortality, morbidity, economy, health etc.

However, the question needs an answer and the best way we find is to measure the ‘deadliest’ (implying morbimortality causing nature) in terms of Disability-adjusted life years (DALYs) - *which not only looks at premature death due to disease, but also takes into account disability caused by disease. It combines both time lost due to premature mortality and non-fatal conditions.* The subject has been nagging the mind of scientists and rousing ceaseless debates for decades. We have gathered some information from internet and tried to pinpoint the animal which is behind the

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Cite this article as:

Tyagi BK, Tilak R. Which is the world's deadliest animal: a lion, tiger, shark, snake or mosquito? J Med Arthropodol & Public Health, 2022; 2(1):1-7.

most human deaths at present. However, the reader must understand that neither the list given below is comprehensive nor the data presented are up to a rigorously ratified reference work, save for molluscs and arthropods. So, let's review some of the scariest predators in the world.

- (1) *Sharks*: Sharks attack humans but they are pretty rare. Although worldwide sharks account for several hundred attacks on humans, but they only cause averagely 6-7 deaths per year. In the United States, sharks cause about one death every two years. The species responsible for the highest percentages of fatal attacks are the great white shark, the bull shark, and the tiger shark.
- (2) *Elephants*: Elephants in captivity are sometimes enraged to retaliate, and those in the wild can be territorial and protective of their family members. An average of 500 people per year are killed during encounters with elephants by being trampled, thrown, crushed, and other similarly unpleasant means. In contrast, far more elephants have been killed by people.
- (3) *Hippopotamuses*: Hippopotamuses are sometimes violent and aggressive toward humans, including tipping over boats. In Africa hippos were considered the most deadly animal for a long time. The animal ranks third in size amongst the largest land mammals behind the elephant and the rhinoceros, and they are responsible for about 500 fatal human encounters each year. They attack by biting, trampling, and holding their adversary underwater until they drown.
- (4) *Crocodiles*: One of the largest, most aggressive and dangerous animals in the world, crocodiles are responsible for somewhere between 1,000-5,000 deaths annually. Weighing over 2,000 pounds, crocodiles possess immense bite strength and can travel at a speed up to 40 kmph. The deadliest species is the Nile crocodile which lives in the regions surrounding the Nile river. According to Food and Agricultural Organisation of the United Nations, crocodiles are considered for the most human deaths in Africa.

- (5) *Tsetse flies*: Tsetse flies (*Glossina* spp.) exact about 10,000 deaths a year. They transmit a disease called sleeping sickness, a protozoan parasitic infection, that at first can lead to headache, fever, joint pain, and itchiness, but later can lead to some serious neurological problems, including death.
- (6) *Assassin bugs*: The assassin bug (Triatomidae), also called the kissing bug due a specific type of curved proboscis in about 150 species of insects, is responsible for carrying Chagas' disease, which kills about 12,000 people a year on average, in Central and South Americas. The propensity of these species to target the soft tissue regions around the mouth of humans is what earned them the sobriquet – the kissing bug. Chagas' disease is a parasitic infection passed by the bug to man. The death rate ranges from 12,000-15,000 per year as a result of organ failure due to the parasitic infection.
- (7) *Freshwater snails*: It is not the snail per se that directly kills humans but the disease that they transmit. The freshwater snail carries parasitic worms (*Schistosoma* spp.) that infect people with a disease called schistosomiasis that can cause intense abdominal pain and blood in the stool or urine, depending on the area that is affected. Millions of people contract the infection, and the WHO estimates that anywhere between 20,000 and 200,000 deaths can be attributed to schistosomiasis.
- (6) *Dogs or wolves*: Directly fatal dog and wolf encounters are exceedingly rare in comparison to the number of deaths resulting from canine transmitted rabies infections. Man's best friend is also one of his deadliest threats when enraged or maddened by the rabies virus. Dogs, specifically those infected by the rabies virus, are one of the deadliest animals out there in and around human habitation, though rabies can be prevented using vaccines. About 40,000-50,000 deaths annually are caused by the rabies virus alone. Rabies transmission from wolf species is much lower than those from dogs, but they are not zero.
- (7) *Snakes*: Snake bites kill 81 000 to 138 000 people each year with around three times as many amputations and other permanent disabilities as per WHO¹. Worse still, there is a shortage of safe and effective antivenom.

While many people fear large snakes like boa constrictors and anacondas, the snakes responsible for the most deaths are actually the vipers, cobras and krait etc. Aside from the high death rate, the saw-scaled (carpet) viper's venom causes an extremely high number of amputations in those victims that it doesn't kill outright. In India, it is estimated that 1.2 million deaths occurred due to snakebite envenoming between 2000-2019 (average of 58,000/year)².

- (8) *Humans*: According to the United Nations Office on Drugs and Crime, there were about 437,000 homicides in 2012, making humans the second most deadly animal (and the deadliest mammal) to humans.
- (9) *Mosquitoes*: The pesky bugs, mosquitoes, suck blood and transmit parasites, worms, and viruses from person to person, and are responsible for the most animal-related deaths. Malaria (>400,000 in 2020), a global disease transmitted by *Anopheles* mosquitoes, is by itself responsible for more than half of mosquito-related deaths, predominantly in Sub Saharan Africa (SSA). Dengue fever, transmitted by *Aedes* mosquitoes, is another mosquito-borne disease that has become a predominantly leading cause of hospitalisation and death among children in some Asian and Latin-American countries, surpassing malaria in levying a huge disease burden measured in terms of DALYs. It is notable that all vector-borne diseases combinedly account for more than 700 000 deaths annually besides causing >17% of all infectious diseases globally (Table 1)^{3,4}.

By this inference mosquitoes (>3500 species, with a worldwide population of more than 100 trillion!!) have certainly proved to be the greatest villains on earth. Man today is in direct conflict with mosquitoes for his own survival and it's no strange that, in India alone, more than half of the health budget is invested only in eliminating these critters and the various deadly and/or debilitating diseases transmitted by them.

Table 1. Major mosquito-borne diseases and DALYs*

VECTOR SPECIES	DISEASE	DALYS	DISTRIBUTION
<i>Anopheles</i> spp. (<i>An. gambiae</i>)	Malaria	4,02,13,000 5,62,01,200	Tropics, Sub-Saharan Africa
<i>Culex</i> spp. (<i>Cx. quinquefasciatus</i>)	filariasis Lymphatic filariasis	55,49,000 11,89,000	Tropical urban areas
<i>Culex</i> spp.	Encephalitides Japanese encephalitis	4,26,000	S. and SE Asia, linked to irrigated rice/pigs
<i>Simulium</i> spp. (<i>S. damnosum</i>)	Onchocerciasis	951,000	West Africa, Central America
<i>Aedes</i> spp. (<i>Ae. aegypti</i>)	Arboviral diseases Dengue, Yellow Fever	433,000 29,46,900 374,000	Global, Urban tropics Africa, Central and South Americas
<i>Aedes</i> spp. (<i>Ae. albopictus</i>)	Arboviral diseases Chikungunya	25, 588	Asia, Pacific, Europe
<i>Sandflies</i> (<i>Phlebotomus</i> spp.) (<i>Lutzomyia</i> spp.)	Leishmaniasis Old world New world	1,810,000	Old World (semi-arid zones) New World humid forests
<i>Tsetseflies</i> (<i>Glossina</i> spp.)	Trypanosomiasis African trypanosomiasis (Sleeping sickness)	1,585,000	Patch, in W. & S. Africa
Triatomid bugs	American trypanosomiasis (Chagas' disease)	680,000	S.- and C.- America linked to poor housing

* Note: Figures in black are at 2000 level and those in red are by GBD 2017; figures for chikungunya (in blue) are for India by Krishnamoorthy et al., 2009

There are a number of reasons why in the whole world people should be more interested in mosquitoes among all insects/arthropods worldwide. First, mosquitoes do not only trouble people (both sexes and of all age groups) by their irritating, painful and allergic bites, but secondly, in the process, they also mediate

transmission of many life-threatening and fatal diseases such as, for example, malaria, yellow fever, dengue, chikungunya, Zika, West Nile, filariasis and Japanese encephalitis, besides a plethora of vexations of varied nature including psychological disturbance⁵⁻⁷. These diseases are responsible for wasting humongous national resources, impoverishing health, stunting intelligentsia and, above all, emaciating national economy. Mosquitoes (Class Insecta: Order Diptera; Family Culicidae) are some of the most deadly creatures on the planet⁸. Among all animals on earth fewer can match the popularity and importance that these tiny creatures, the mosquitoes, carry to the human life! In fact no animal on earth has affected human lives so directly and profusely as is brought about by the mosquito. A mosquito is small in size but is giant of a killer.

From the Table 1 it is more than apparent that at least two different groups of mosquitoes are in direct contest to take on the zenith, viz., *Anopheles* and *Aedes*. Malaria levies an astronomical disease burden of 5,62,01,200 DALYs, causes an estimated 219 million cases globally, and results in more than 400,000 deaths every year, 90% of which is in Africa alone (where *An. gambiae* is the most dominant vector species (DVS); and causes most of the deaths in children under the age of 5 year⁹. In comparison, dengue is the most prevalent viral infection transmitted by *Aedes* mosquitoes (mainly *Aedes aegypti*), putting more than 3.9 billion people in over 129 countries at risk, with an estimated 96 million symptomatic cases and an estimated 40,000 deaths every year.

Conclusively, therefore, it appears that *Anopheles gambiae* is deadlier than *Aedes aegypti*, although the manner in which *Ae. aegypti* – least to speak at the moment of another highly virulent mosquito, *Ae. albopictus* – is spreading through the world and carrying at the same time, just like its kin, multiple deadly arboviruses (e.g., dengue, chikungunya, Zika etc.) will certainly be a serious contender for the *numero uno* position in near future!

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