

Avian Botulism

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Why in news?

According to government report Avian botulism has killed 18,000 birds at Sāmbhar, Rajasthan.

More information:

- **Botulinum** is a natural toxin produced by bacteria known as **Clostridium botulinum**.
- It produces the toxin when it starts reproducing.
- The bacteria are commonly found in the soil, river, and sea water.
- There are around **eight types of botulinum toxins – A, B, C1, C2, D, E, F, and G**.
- All types of toxins attack the neurons, which leads to **muscle paralysis**.
- It reproduces through spores and these spores remain dormant for years.
- They are resistant to temperature changes and drying.
- Under favorable conditions, the spores are activated.
- **Botulinum affects both humans and animals but botulinum C affects birds and A, B and E affects humans.**

Case in Sambhar Lake:

- The avian botulism that caused the mass die-off at Sambhar was **caused by the climate**.
- Due to a good monsoon, the water level reached the lake bed after a gap of 20 years which provided a favorable environment for the bacteria to spread.
- The **temperature of the water was about 25 degree Celsius and its pH ranged between 7.4- 9.84, thus providing anaerobic conditions for bacteria to grow.**
- The monsoon brought with it a large population of crustaceans (like shrimps, crabs, and prawns),

invertebrates (snails) and plankton (like algae) which are capable of hosting the bacteria for a long period of time.

- After the monsoon, when the water levels receded, due to increase in salinity levels these living organisms would have died and the spores could have been activated.
- According to another theory, '**a bird-to-bird cycle**' has led to the tragedy. In this case, maggots feeding on dead birds can concentrate the toxin. Birds feeding on dead birds can get affected. This was observed in Sambhar too as **researchers found only insectivorous and omnivorous birds affected and not herbivores.**
- However external factors like water pollution and eutrophication have been rejected.

Other instances of botulism:

- Sambhar lake is not the first instance where deaths due to botulism have been recorded. According to reports 7,000 water birds died in Lake Michigan in 2007 and 2008, followed by another 4,000 in 2012. In Hawaii, the toxin killed around 183 Laysan Ducks in 2008.