

World's first vaccine for honeybees

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In news— The United States Department of Agriculture (USDA) has granted a conditional license for a vaccine for honeybees to curb American foulbrood (AFB), a fatal bacterial disease for the insect.

What is an American foulbrood (AFB)?

- AFB is **caused by the spore-forming bacterium *Paenibacillus larvae***. Infected broods usually die at the pre-pupal or pupal stage.
- It is **not a stress-related disease and can infect the strongest to the weakest colony in an apiary**.
- Heavy infections can affect most of the brood, severely weakening the colony and eventually killing it.
- **The disease cannot be cured**, meaning that the destruction of infected colonies and hives or irradiation of infected material is the only way to manage AFB.
- **The bacteria *Melissococcus plutonius* causes another similar disease, European foulbrood**.
- However, the incidence of EFB is generally higher when the colony is under stress.
- Although AFB is not highly contagious, bacterial spores can easily be spread between hives and apiaries through beekeeping practices such as through the exchange of equipment and movement of infected combs. Adult bees are not affected by AFB but can spread spores within and between infected and clean hives through robbing and drifting.
- AFB spores can remain viable for over 50 years and are very resistant to freezing and high temperatures.

About the vaccine-

- **The first such vaccine, developed by biotechnology company Dalan Animal Health**, gives hope of a new weapon against diseases that routinely ravage colonies relied upon for food pollination.
- **The vaccine technology exposes queen bees to inactive (ie, "dead") bacteria**, which enables the larvae hatched in the hive to resist infection.
- The vaccine is mixed in queen candy – the primary food source for both the queen bees and the attendant bees living in cages.
- Worker bees consume the vaccine with the queen candy, which is then digested and transferred to the glands that produce the royal jelly. Worker bees then feed the royal jelly containing the vaccine to the queen bee.
- The queen digests the royal jelly and the vaccine is transferred to her ovaries. She is then released into the hive.
- **The vaccine gets transferred to the developing eggs.** The developing larvae get vaccinated and are more immune to infection as they hatch.
- The immune priming showed no negative impact on queen fitness in tests, the company claimed. Tests also showed no negative impact on honey.
- Vaccines for European foulbrood and Chalkbrood, a fungal disease, are in the pipeline by the company.