Destructive Power of the Beetle-Fungi Association

Prelims - Current events of national and international importance | Science and technology

Why in News?

A recent study reported that the Ambrosia beetle has share a mutualistic relationship with two fungal species, Fusarium ambrosia and Fusarium solani.

Ambrosia beetle
• Invasive insects which is *native to Central and South America.* • **Scientific name -** Euplatypus parallelus. • The species has spread to other regions, including Africa, Asia, and Oceania. • It is a ***polyphagous pest*** that attacks a wide range of tree species, both broad-leaved and coniferous. • While it primarily infests stressed or dying trees, it can also breed in healthy trees, especially in thinner trunks. • This beetle is known for its symbiotic relationship with fungi, which it introduces into the tree, leading to potential damage and even tree death in severe cases. • Ambrosia beetles get their name from *the ambrosia fungi that call the beetle their home,* is not taxonomic but ecological

- **Symbiotic relationship with fungi** - Ambrosia beetles carry and cultivate ambrosia fungi within their galleries, which the larvae and adults feed on.
- **First reported -** In 2012, cashew trees of Ponda, Goa.
- **Process of destruction -** Attack stressed or infected trees by sensing a volatile compound of ethanol released by these trees.
- Beetles bore galleries in the bark, carry fungi into inside and farm the fungi to concentrate nutrients.
- Systemic infections progress through the plant xylem, blocking the xylem vessels.
- Fungus inside the xylem leads to sporulation, which leads to secrete several enzymes, weakening the wood strength and result in death of the plant.

In other insect hosts, the fungi are present in sacs called mycangia. In the present study the mycangia in the ambrosia beetle is absent.

- **Impact**
  - Weakening the structure, causing severe leaf fall, trunk drying, and in some cases even tree death.
  - Affects *total latex production* from rubber trees, causing economic and agricultural losses.

    - Affect other significant plants, such as coffee, cashew, mango, and coconut, vulnerable to infections.
- **Prevention -** Using antifungal agents, removing the infected part of trees, burning or chipping away any part that displays holes, and traps for ambrosia beetles.
- **Challenges**
    - Fungi reside in deeper parts of an infected plant, where insecticides or fungicides often don't reach.
    - If fungi have progressed systemically, it's difficult to save a plant.
- **Sustainable treatments -** Antagonistic fungi that can compete with the pathogens.
- Microbial consortia with a diversity of bacterial species that can live inside plants, mitigating fungal infections.

Quick Facts

• **India -** World's sixth-largest producer of rubber and second-highest in terms of productivity.
• Kerala produces 90% and accounts for 72% of India's rubber cultivation area.

Reference

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