Global Insect Biodiversity Realignment (2026)

Prelims: *Current events of national and international importance | Environment*

Why in News?

A recent ecological study published in the Proceedings of the National Academy of Sciences (PNAS) has upended structural entomological metrics.

- The discovery highlights that over ***90%*** of global insect biodiversity remains entirely unknown.
- Instead of attempting to count every bug blindly, researchers focused on ***Microgastrinae***, a highly diverse subfamily of parasitoid wasps.
- These wasps lay their eggs inside living caterpillars; the developing larvae consume the host from the inside out before emerging.
- The team deployed 15 Malaise traps (specialized tent-like mesh structures designed to catch flying insects) across both undisturbed core zones and modified peripheral zones of the ACG.
- They captured a total of 1.63 million tropical insects.
- Scientists used ***DNA barcoding***, a molecular technique that sequences a short, standardized fragment of mitochondrial DNA to rapidly identify and differentiate species.
- The core Malaise traps alone revealed an astonishing 53,945 distinct insect species.
- When combined with specimens bred directly from collected caterpillars, the team cataloged 1,414 distinct species of Microgastrinae wasps within the reserve alone.
- The ACG reserve contains between 1,200 and 1,500 tree species.
- By comparing this to the world's estimated 73,000 tree species, scaling up the math yielded a preferred global estimate of 20.3 million insect species.
- Alternative Checks: The researchers cross-checked this math by scaling against other well-mapped local groups, including amphibians, mammals, and *Saturniid* (emperor) moths.
- These alternative calculations yielded a conservative global range of 14.2

million to 20.3 million species.

- The massive gap underscores the *severe shortage of specialized taxonomists and the critical need for rapid molecular tools like DNA barcoding.*
- Human activities, habitat fragmentation, and climate change are causing unprecedented drops in global insect populations.
- This study shows we are at risk of losing millions of species before we even discover they exist.

Reference

Down to Earth | Area de Conservacion Guanacaste (ACG)