Green Pill Millipede

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Why in News?

A new study has revealed the self-cleaning mechanism of the green pill millipede (Arthrosphaera lutescens), demonstrating advanced hydrophobic properties similar to the 'lotus effect'.

- **Scientific Name –** Arthrosphaera lutescens.
- **Family –** Arthrosphaeridae.
- **Kingdom –** Animalia.
- **Habitat –** Decaying organic matter and vegetable waste in moist forest ecosystems.
- **Distribution –** Endemic to Western Ghats, Primarily Munnar (Idukki) and Nelliampathy (Palakkad), Kerala.
- **Appearance -** Vibrant green, small pill-shaped body.
- **Defense -** Unlike other millipedes that use chemical defenses, pill millipedes (Order Sphaerotheriida) rely on rolling into an armored, impenetrable ball.
- **Self-cleaning mechanism -** It has a complex surface filled with microscopic "peaks and valleys".
- This uneven structure, along with tiny hair-like projections and a water-repellent coating, allows water droplets to bead up and roll off easily, thereby removing dirt particles and microbes.
- The mechanism closely resembles the well-known "lotus effect", where surfaces naturally clean themselves.
- The exoskeleton acts like a highly evolved natural system that resists contamination even in muddy conditions.



- **Ecological importance**
  - **Ecosystem Indicator –** Reflects the health of the Western Ghats ecosystem.
  - **Regional Variation –** Colours of pill millipedes vary across Western Ghats regions.
- **Scientific Importance**
  - **Bio-inspired design -** The millipede's surface structure could inspire new water-repellent materials for industries like textiles, coatings, and packaging.
  - **Durability -** Its shell is mineral-rich, lightweight, and strong, offering insights into sustainable material engineering.
- **Threats -** Deforestation, climate change, and human encroachment.
- **Conservation value -** Protecting this species preserves biodiversity and supports ongoing biomaterial research.

Reference

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