

Expansion of Butterfly Ranges

Prelims: Current events of national and international importance | Environment

Why in News?

Recently, A global study published in *Nature Ecology & Evolution* assessed 1,758 butterfly species across 105 countries.

Key Findings

- **Range Expansion** - 80% species expanded into new territories; 79% shifted to cooler regions.
- **Range Contraction** - 27% species contracted ranges; 22% shifted along elevational gradients.
- **Europe** - Hotspot of range shifts; Sweden reported 61% expansions and 85% contractions.
- **UK** - Highest horizontal contraction (63%) and elevational shifts (18%).
- **Mexico** - Key hotspot for vertical shifts (39% species).

India's Case - Tawny Coster

- **Species** - Tawny Coster (*Acraea terpsicore*), native to Indian subcontinent.
- **Expansion** - Rapidly spread across South Asia into Australia at 135 km per year.
- **Comparison** - Painted Lady shifted upslope in Mexico at 83 m/year and Queen butterfly downslope at 32 m/year.
- **Significance** - Example of "niche conservatism" - tracking suitable climates across vast distances.

Horizontal and Vertical Shifts

- **Horizontal Expansions** - Reported across all continents, including tropics (Brazil, Benin).
- **Horizontal Contractions** - Concentrated in temperate countries

(Belgium, UK, Sweden).

- **Elevational Shifts** - Detected mainly in Northern Hemisphere; fewer records from tropics despite steeper lapse rates.
- **Mountain Species** - Two-thirds of butterflies are mountain dwellers; highly vulnerable as mountain climates degrade.

Threats Identified

- **Climate Change and Extreme Weather** - Main driver of expansions and contractions.
- **Human Intrusions and Disturbance** - Linked to contractions in 143 species.
- **Agriculture and Aquaculture** - Major factor in range contractions.
- **Other Threats** - Residential/commercial development, invasive species, mining, energy production.
- **Under-representation** - Amazon Basin, Southeast Asia, Central Africa lack adequate monitoring despite high diversity.

Conservation Implications

- **Phenotypic Plasticity** - Butterflies expand more than contract due to adaptive strategies.
- **Micro-refugia** - Forested/shaded areas act as refuges during hot days.
- **Adaptive Planning** - Shift from static conservation to dynamic strategies.
- **Paris Agreement Context** - Limiting warming to 1.5-2°C crucial; mitigation must pair with adaptation.
- **Measures** - Protect micro-refugia, buffer habitat edges, improve landscape connectivity.

Reference

[Down To Earth | Wildlife-Biodiversity](#)