

## Bats - Evolutionary Origin

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

### Why in News?

*A comprehensive analysis of bat genomes and fossil records suggests that bats originated in Europe approximately 65 million years ago.*

- **Study conducted by** - 137 scientists from 64 countries under the **Bat1K consortium**.
- **Key Findings** - It challenges earlier hypotheses that bats originated in **Africa or North America**.

# Key Findings on Origin and Evolution of Bats

|                                                                                     |                             |                                                      |
|-------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------|
|    | <b>Animal</b>               | <b>Bats</b>                                          |
|    | <b>Classification</b>       | <b>Mammals</b>                                       |
|    | <b>Unique feature</b>       | <b>Only mammals capable of true sustained flight</b> |
|    | <b>Estimated origin</b>     | <b>~65 million years ago</b>                         |
|    | <b>Geological period</b>    | <b>Late Palaeocene</b>                               |
|    | <b>Proposed origin</b>      | <b>Europe</b>                                        |
|    | <b>Initial dispersal</b>    | Europe → Africa → Asia → Americas → Australia        |
|    | <b>Antarctica</b>           | <b>Absent</b>                                        |
|   | <b>Modern species</b>       | <b>~1,500</b>                                        |
|  | <b>Study consortium</b>     | <b>Bat1K</b>                                         |
|  | <b>Dataset</b>              | <b>103 bat species</b>                               |
|  | <b>Families represented</b> | <b>All 21 extant bat families</b>                    |
|  | <b>Publication</b>          | <b><i>Nature</i></b>                                 |



**Bats evolved around 65 million years ago during the Late Palaeocene in Europe and later dispersed across the world.**

## Initial Dispersal Route



## About the Study



- Global research consortium: Bat1K
- Analysed 103 bat species
- Included all 21 extant bat families
- Published in the journal *Nature*

- **Evolutionary Significance** - The study demonstrates that two key characteristics, flight and echolocation, emerged **early in bat evolution**.
  - **Flight** - It provided bats with a significant advantage in dispersal.
  - Some modern bat species are capable of migrating **thousands of kilometres**.
  - **Echolocation**
  - Bats emit vocalizations or calls.
  - They detect and interpret returning echoes.
  - This information is used to **navigate and locate prey**, particularly in low-light conditions.
- Fossil evidence indicates that echolocation evolved prior to **the diversification of modern bats**.
- **Ecosystem Services**
  - Pollination of plants supports the maintenance of biodiversity.
  - Regulation of insect pest populations contributes to reduced crop damage.
  - Seed dispersal facilitates forest regeneration.

- **Connections to Human Health**

- Bats host a wide range of viruses without exhibiting disease symptoms.
- Unique immune system adaptations contribute to their resilience.
- Bats exhibit unusually long lifespans relative to their small body size.

- **Bat-Inspired Medicine**

- Genetic studies provide insights into mechanisms of **disease resistance and longevity**.
- These findings have potential applications for advancing human health innovations.

### **Bat 1K Genome Project**

- This international scientific collaboration aims to sequence and analyze **bat genomes**.
- The study employed the following methodologies:
  - DNA sequencing
  - Comparative genomic analysis
  - Analysis of fossil evidence
  - Phylogenetic and evolutionary analyses
- **Objective** - To advance understanding of bat evolution, genetics, and species diversity

### **Reference**

[The Hindu | Bat's Evolutionary Origin](#)