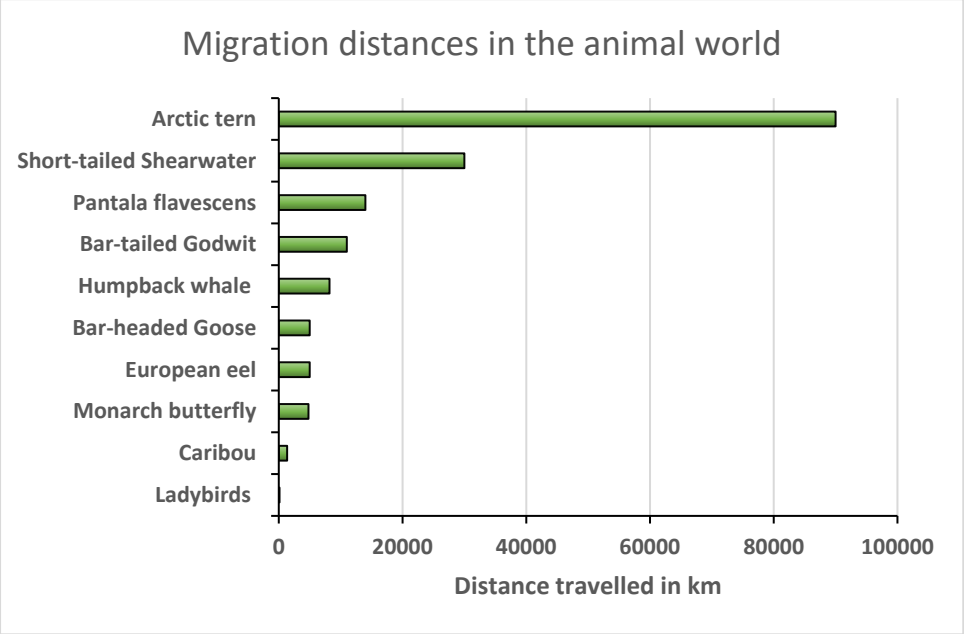
Insect Migration

Insect migration is the seasonal movement of insects from one region to another, often over long distances, in search of favourable climate, breeding grounds, or food sources. It is a survival strategy to escape harsh environmental conditions like cold, drought, or food scarcity.

Key features of insect migration

- Persistent and directed movement
- Not immediately influenced by local resources
- Involves long-distance travel (often hundreds or thousands of km)
- Usually seasonal or cyclical
- Often involves return or replacement generations (multi-generational)



Insect migration in comparison to migration in of other animals

Types of Insect Migration

Type	Description	Example
Obligate	Happens regularly every year regardless of conditions	Monarch butterfly (USA to and from Mexico)
Facultative	Triggered by environmental changes (e.g., drought)	Locusts
One-way	Only outward migration, no return	Armyworms
Two-way	Return migration after breeding or feeding	Monarch butterfly

Insects that migrate

- Monarch Butterfly (*Danaus plexippus*): Up to 4,000 km (Canada to Mexico), multi-generational round trip. Navigation is by Sun compass, circadian rhythm, and genetic cues.
- Desert Locust (*Schistocerca gregaria*): Thousands of km across Africa, Middle East, India, triggered by rainfall and food abundance, solitary phase develops into gregarious/swarming phase. Causes devastation of crops.
- Hoverflies (*Episyrphus* spp.): Migrates across Europe and Asia.
- Honeybees (*Apis dorsata*): Seasonal shifts in nesting sites (India, SE Asia) based on floral availability
- Fall Armyworm (*Spodoptera frugiperda*): Migration from tropical regions to temperate North America for breeding and feeding
- Brown Planthopper (*Nilaparvata lugens*): Migration from East Asia to temperate rice-growing areas

Longest migration by an insect

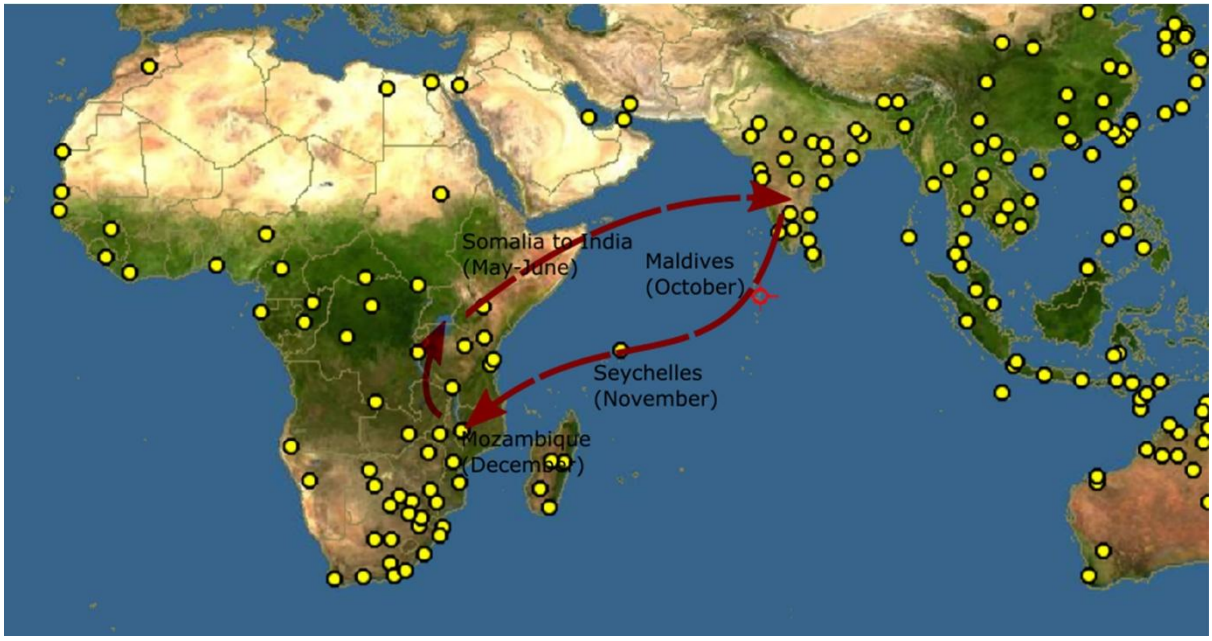
Pantala flavescens a dragonfly in the family Libellulidae, is the world's most widespread and far-traveling insect even farther than that of the monarch butterfly. It performs a **transoceanic, multi-generational migration**, driven by the search for rain-fed habitats to reproduce. The migratory globe skimmer dragonfly (*Pantala flavescens*) is hypothesised to migrate from India across the Indian Ocean to East Africa in the autumn, with a subsequent generation thought to return to India from East Africa the following spring. This journey covers thousands of kilometres, making it a marvel of insect endurance and navigation. Its route spans India, Maldives, Seychelles, East Africa and return.

- Its flight across the Indian Ocean is a phenomenon not known in any insect before.
- It uses monsoon wind currents to assist long-distance travel.

Before the confirmation of the distance travelled by *Pantala*, the monarch butterfly had the distinction of the longest migrating insect in the world.

- Monarch butterfly migration is the phenomenon, mainly across North America.
- The subspecies *Danaus plexippus plexippus* migrates each autumn to overwintering sites on the West Coast of California or mountainous sites in Central Mexico.
- This massive movement of butterflies has been recognized as "one of the most spectacular natural phenomena in the world.

- Monarchs are considered **"Endangered"** by the IUCN (as of 2022).
- Monarchs can fly up to 80 km (50 miles) in a day. The overwintering sites in Mexico are so densely packed that millions of butterflies weigh down tree branches.



Proposed migration route of *Pantala flavescens* (Anderson, 2009). The yellow dots indicate locations where *Pantala flavescens* have been reported, Source: http://www.discoverlife.org