

Fireflies as Ecological Indicators

Source: IE

A Tamil Nadu Forest Department study in the **Anamalai Tiger Reserve (ATR)** identified eight **firefly** species and their population dynamics, emphasizing their role as **ecological indicators**.

Fireflies (*Lampyridae*)

- **Classification & Habitat:** **Bioluminescent beetles** , also known as lightning bugs or fireflies, are crucial for environmental balance .
 - Found in diverse habitats, including **tropical forests and temperate grasslands**, they belong to the ***Lampyridae* family**.
 - They thrive in undisturbed soils, high humidity, clean water, and low artificial light.
- **Morphology:** Seasonal, active **during or after rains** , otherwise remain as **larvae in soil and** they live around **2 months** .
- **Ecological Significance:**
 - Bioluminescent beetles produce **cold, efficient light** in abdominal organs through a biochemical reaction involving **luciferin, luciferase, oxygen** , and **ATP (Adenosine Triphosphate)** , with light colors ranging from green to yellow.
 - This bioluminescence plays key roles in mating signal and **predator deterrence**.
 - **Large-scale synchronous flashing** of fireflies are **bioindicators** of **pollution-free areas** , with population changes signaling environmental disruptions.
 - Which can impact other species like **moths, bats, and amphibians**.
- **Threats:** **Threats** like urbanization, deforestation, pesticides, and light pollution are linked to their declining populations.

Anamalai Tiger Reserve (ATR)

- Declared a **Tiger Reserve in 2007** , it is surrounded by **Parambikulam Tiger Reserve(PTR)** , **Chinnar Wildlife Sanctuary** and **Eravikulam National Park** .
- **Kariyan Shola, Grass Hills, and Manjampatti** of ATR is recognized as a **UNESCO World Heritage Site** .
- It hosts **evergreen, deciduous, and shola forests** , **montane and marshy grasslands** , and key fauna like **tiger, Asiatic elephant, sambar, leopard** , and others.

(Order: Coleoptera; Family: Lampyridae)

Bioluminescent soft-bodied beetles that use light to attract mate, scare predators, and lure prey

Larva feeding on snail

Fireflies

SPECIES
~2,000
species globally

-50
species from India
(Each species has a unique light signal)

DID YOU KNOW?

- Most female fireflies cannot fly
- Not all fireflies glow

LIFESPAN
~2 months

THE GLOW
HOW? A tiny chemical reaction inside the firefly creates that magical glow. Light is produced in their abdomen when the chemical luciferin combines with oxygen, and the enzyme luciferase and is fuelled by ATP and magnesium ions.

WHY? To send mating signals, identify species, and as a defence mechanism

SYNCHRONISED FLASHING

- In some species, thousands of males may flash their lights in perfect harmony by watching and mimicking each other

GEOGRAPHICAL DISTRIBUTION

Across India's forests, wetlands, grasslands, and hills.

HOTSPOTS: Goa, Northeast India, Western Ghats, Odisha, and parts of Central India.

Found in temperate and tropical regions across the world

HABITAT

Moist, undisturbed habitats – forests, mangroves, stream banks, rice fields.

Love humidity and leaf litter

AKA

Glow worms,
lightning bugs

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