Webniar Report

Firefly, Ecology and Environment: A webinar report

Parvez[1] and A.K Chakravarthy[1], Amlan Das[2]

1 Environmental Management & Policy Research Institute, J P Nagar, Bengaluru, 560078, Karnataka, India

2 Department of Zoology, University of Calcutta, 35, Ballygunge Circular Road, Kolkata 700019, West Bengal, India

Corresponding author email: parveznou@gmail.com

Introduction

Fireflies are beetles belonging to Order: Coleoptera, Super family: Elateroidea, Family: Lampyridae. Globally there are about 2400 described species in 11 sub-families (Martin *et al* 2022, and Riley *et al* 2021). In India, about 45 species have been described. Fireflies are known by names such as forest star, lighting bugs, fire devils, flying embers, moon bugs, glow flies, blinkers, etc. Fireflies are two types: those that produce light and those that do not.

Fireflies are indicators of climax vegetation, found in tropical as well as temperate regions. Fireflies produce cold light with no infrared or other harmful frequencies. At times, adults serve as pollinators and predators and are essential for stable ecosystem functioning. Adults are generally identified by pronotum dorsally extending forward covering head, head, without median ocellus and base of antennae separated on head. Adults are with leathery dorsal elytra and luminous organs in ventral side of abdomen, generally more pronounced in males than females. Larvae are generally flat, cylindrical or worm-like with distinct segmentation and lateral expanded pleurae. Larvae in aquatic species are often with reduced sclerites and might have gills. Adults are found in moist grassy patches, verges, hedge banks and larvae under soil, stones, etc. Life stages may be in terrestrial or aquatic habitats, arboreal or subterranean. Larvae are carnivorous feeding on snails, slugs, earthworms, ants, termites, gastropods and decaying organic matter (Riley *et al* 2021).

The Webinar

The Environmental Management and Policy Research Institute (EMPRI), Bengaluru organized an **International Webinar** on the occasion of World Firefly Day on 22 July 2022 from 11:00 AM to 07:00 PM IST. Participants from 11 countries – Australia, Cuba, Japan, Malaysia, Vietnam, Pakistan, Philippines, Sri Lanka, the USA, Bangladesh and Singapore –attended the day-long webinar. This is the first webinar on fireflies conducted on **'World Firefly Day'** 22 July 2022 in India.

EMPRI has undertaken a study from January 2022 to document the firefly species found and their abundance in Karnataka. The populations of fireflies are believed to be declining globally. The webinar provided an opportunity to young researchers and learners to interact deliberate and share their experiences on firefly ecology, threats, mitigation and conservation.

Director General EMPRI Dr Jagmohan Sharma IFS inaugurated and addressed the webinar. He highlighted the intention to develop a breeding protocol for fireflies that will help in establishing of a **Firefly Park** on the lines of Bannerghatta Butterfly Park in the state. This will be first of its kind in the country and will promote nature awareness and tourism.

The distinguished speakers to the webinar included Dr Lesley Ballantyne, Charles Sturt University, Australia, Prof. Sara Lewis, Firefly Specialist Group – IUCN, USA, Dr Dammika Wijekoon, University of Ruhuna, Sri Lanka, Dr. Devanshu Gupta, Zoological Survey of India, Dr Anurup Gohain Barua, Gauhati University and Dr Nada Badruddin, Forest Research Institute Malaysia (FRIM), Malaysia. The daylong event also included an interaction and a quiz session for the participants.

The select highlights of the webinar included establishment of a portal for fireflies in India, a Field Guide and an *Asia-Pacific Network of Fireflyers*, which is likely to get recognition as an adjunct network to the IUCN Firefly Group. In India and several other countries fireflies are not legally protected. IUCN SSC Group on Fireflies can take up the initiative with governments to accord legal protection. Dr. Sara Lewis, the co-chair IUCN Firefly Group agreed to help the workers and governments in this regard. Concerted efforts at all quarters should be initiated to attract young researchers and enthusiast to study and conserve fireflies. Dr. Lesley Ballantyne, Charles Sturt University, Australia is ready to help and guide youngsters on firefly taxonomy, ecology and behaviour.

The Western Ghats

In Western Ghats of Karnataka, congregating populations of fireflies exist which should be conserved because these insects are ecologically and economically vital for the functioning of the ecosystem in Western Ghats. This comes in the wake of the Central government's Western Ghats notifications which declared 20,668 Sq. Km of area in Karnataka as eco sensitive area. People in Western Ghats may not be aware of the importance of preserving the habitats of these charismatic beetles and other creatures. The lives and livelihoods of rural people in and around Western Ghats are closely linked to the sustenance and perpetuation of keystone species such as the firefly beetles. This webinar and other initiatives by EMPRI will contribute to the awareness creation activities among people in the region.

Scientific information and studies on fireflies in India have not been conducted systematically so far. The scientific community, foresters, administrators, naturalists, and others have not paid the attention to fireflies they deserve. People in different countries are attracted to fireflies because of their synchronous switch-on and switch-off lights in massive numbers, thousands or millions. To the general public fireflies are associated with eco-tourism. Foresters and local people celebrate the event as firefly day, firefly count, firefly walk, and so on. For instance in the Western Ghats region of South India, in the evergreen tropical forests of Kerala, Karnataka, Tamil Nadu and Maharashtra Firefly Day are conducted at a few sites during monsoon and winter depending upon the rains. India should be concerned about fireflies because they are ecologically and economically vital, populations are declining and not much is known even on the basics of fireflies like species diversity, bio-ecology and behaviour.

Threats

- Habitat loss, pesticide use, invasive species, climate change.
- Artificial lights at night.
- Unplanned urbanization.
- Human interferences and habitat fragmentations.
- Water pollutions

Mitigation

- Should be declared as protected species-group by law.
- Large scale *in-situ* conservation.
- More research and outreach activities to create awareness.
- Firefly habitats having tourist potential should be declared ‘Protected habitats’.

References

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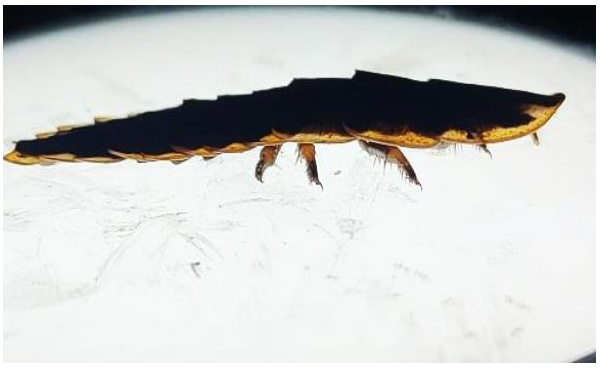
- Sara Lewis (2016) *The Silent Sparks*, Princeton University Press. Pp 239.

- https://lesleyballantyne.com/ (Website of Dr. Lesley Ballantyne)

The webinar was live-streamed on EMPRI website (https://empri.karnataka.gov.in/news/Fireflies,%20Ecology%20&%20Environment%20webinar%20recordings/en)

YouTube page - (https://www.youtube.com/watch?v=7-SlWJjWMBA).

Firefly eggs



Firefly larva

Firefly adults (ventral side showing light organ, white in color)

Firefly adult (lateral side)

Firefly adult (dorsal side)

Firefly larva feeding on snail

Congregation population of fireflies at night (http://indiasendangered.com/say-no-to-firefly-festival-period/)

All photographs are by the authors except otherwise stated.

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