

Lights Out: Saving Our Fireflies

by Danae Wolfe



LIKE MANY people, I have fond childhood memories of summer evenings spent catching fireflies with the kids in my neighborhood. Seeing the twinkling glow of these insects rising up from the grass at night was a rite of summer as anticipated as longer days and warm weather. Today, with children of my own, my fascination with fireflies has been rekindled as I relive the magic through the eyes of my two young boys.

Throughout the last few years, invertebrate conservation organizations have placed increasing importance on protecting insects, including non-pollinating insects like the enchanting firefly. While pollinators have had an advantage in the conservation conversation because they contribute to healthy food production systems, we must not forget about the hundreds of thousands of other species of insects that also deserve attention and protection.

FIREFLIES 101

Despite their common colloquial

names—including fireflies and lightning bugs – fireflies are neither flies nor true bugs. Fireflies are beetles in the family Lampyridae. Like all beetles, fireflies undergo complete metamorphosis, developing through four life stages including egg, larva, pupa, and adult. These insects spend the majority of their lives in larval form, feeding voraciously on soft-bodied invertebrates, including worms, snails, and slugs—which makes them great beneficial bugs for the garden!

Female fireflies lay eggs in midsummer; most species lay eggs in the ground.



An adult flashing firefly rests on a leaf.

Eggs hatch during late summer after about three weeks, and larvae generally persist until the following spring, though some species of fireflies spend up to two seasons as larvae before pupating and emerging as adults in their second spring. You can expect to see adult fireflies beginning to emerge in early summer and persisting throughout the summer months, though regional weather and temperature patterns affect emergence. Adult fireflies generally live for three to four weeks, just long enough to mate and lay eggs.

While all larval forms of fireflies glow, only the adults of some species emit light. This process of producing light is called bioluminescence and serves different functions depending on the insect's life stage. In larvae, bioluminescence is believed to ward off predators by offering a clue to one's toxicity. In adults, glowing and flashing are usually methods of attracting a mate.

There are three types of insects we generally refer to as fireflies: **Daytime dark** or **diurnal fireflies** are active during the daytime. Most diurnal species do not glow, but some species that inhabit shadowy areas might produce light. **Glow worms** can refer to the glowing larval forms of all species of fireflies or the flightless, glowing adult females of some species. Finally, we have **flashing fireflies**, which represent our most familiar nocturnal species of fireflies that emit short, bright flashes of light during nighttime hours.

Fireflies live in tropical and temperate regions of every continent except Antarctica. In the U.S., fireflies thrive in warm, humid environments like wooded areas, marshes, and fields near ponds, rivers, and streams. While fireflies occur in all lower 48 states in the U.S., many of the western species are diurnal, which means they are active during the day and

may communicate with pheromones rather than flashing lights. Altogether, there are over 2,000 species of fireflies in the world, with over 160 species documented in the United States.

PROTECTING OUR NIGHTTIME JEWELS

Like many insects, fireflies face a variety of threats including habitat loss and fragmentation, climate change, and pesticide use. As with most insects, research on declines is greatly lacking. However, in “A Global Perspective on Firefly Extinction Threats,” published February 2020 in *BioScience* by the American Institute of Biological Sciences, researchers polled firefly experts from across the globe on



If you have a lawn, reduce mowing to create a more suitable environment for fireflies.

the most significant threats to firefly populations. The study found that experts believe habitat loss is the greatest threat to firefly populations, followed, respectively, by light pollution and pesticide use. (Read the study at <https://academic.oup.com/bioscience/article/70/2/157/5715071>.)

Thankfully, gardeners can help preserve and protect fireflies in the home landscape with just a few simple practices.

Because most fireflies lay their eggs in the ground, you can start by providing pesticide-free natural areas for firefly larvae to thrive. Leave moisture-retaining organic material like leaf litter or decaying branch-

es and stumps in your landscape and create areas of dense vegetation of varying heights that will provide shade and protection. Practice mowing moderation. Adult fireflies spend their days on the ground. Less frequent mowing will offer undisturbed habitat for our glowing friends.

Plant trees that have dense foliage to create shadier spots in your landscape. Native pines are a great choice as they not only provide dense overstory shade, but their fallen needles help retain moisture at ground level, which is perfect for firefly larvae.

Consider creating a rain garden. Tall vegetation and moisture combine to make a perfect environment for adult fireflies.

THE SIGNIFICANCE OF LIGHT POLLUTION

Reduce light pollution in your landscape if possible. Light pollution, defined as extraneous light in the night sky, is a contributing factor in the decline of insects around the globe. In the United States, 99 percent of the population lives under light-polluted skies. This human-made phenomenon can have devastating consequences for wildlife.

Artificial nighttime glow from street lamps, security lights, neon signs, and billboards disrupts natural processes in many nocturnal insects. For fireflies in particular, light-polluted environments make it difficult for females to differentiate between males and artificial light when looking for a mate.

But fireflies aren't the only insects affected by light pollution. Moths move through the night sky by keeping a fixed angle on the distance source of light provided by the moon—a process called transverse orientation. In light-polluted areas, moths orient to light sources that are much closer than the moon, resulting in erratic flight patterns and confusion.

Light pollution also affects insects whose larval forms are aquatic (like mayflies, dragonflies, damselflies, caddisflies, and stoneflies) and spend their days attached to stream or river substrate. To avoid being eaten by fish, these larvae move under cover of night by detaching themselves from the water substrate and drifting downstream on the water's surface, before attaching themselves to new substrate. Artificial light from above creates silhouettes as larvae drift, making them easy prey for hungry fish below.

CATCH WITH CARE

Catching fireflies is a good way for children to connect with nature. Thankfully, catching—and releasing—fireflies is not considered a major threat to firefly populations, as long as we approach the activity with care and conservation in mind. Wild-caught fireflies should always be handled gently. Make sure any jar you collect them in has a ventilated lid to allow the fireflies to breathe. Include a moistened paper towel to create a humid environment. Be sure to release the fireflies after a few days, preferably at night. —D.W.

Resources

Firefly.org, www.firefly.org.

International Dark Sky Association, www.darksky.org. Offers research and resources of light pollution.

Silent Sparks: The Wondrous World of Fireflies by Sara Lewis. Princeton University Press, 2016.

Xerces Society for Invertebrate Conservation, www.xerces.org/Endangered-species/fireflies.

FLIP THE SWITCH ON LIGHT POLLUTION

Want to help? Be proactive about finding ways to protect our nocturnal insects. Turn off unnecessary lights at night and consider removing unnecessary garden lights that aren't serving a protective purpose. If you must have a security light for safety reasons, keep it on a motion timer. You can also close the curtains or draw the blinds inside your home at night to prevent indoor light leaking outdoors. These measures, when married with the many landscape management practices previously noted, will ensure your garden is a safe haven for insects—including the delightful firefly!

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