

## News Article

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## Indiana's State Insect

Indiana has a state flower, a state tree, and a state bird. Did you know that we also have a state insect? Say's Firefly, *Pyraetomena angulata*, became Indiana's state insect in 2018. At the time, Indiana was one of only three states that did not have a state insect.



Say's Firefly; Photo:  
Purdue University

Tom Turpin, retired Purdue entomologist, said an insect should be a state symbol because insects are important cogs in the environment in many ways, such as herbivory, predation, recycling, pollination, etc. He said the firefly is representative of insects because they are so visible and do not cause problems in any way.

The insect is named after Thomas Say, who lived from 1787-1834, was an eminent naturalist who worked in New Harmony, Indiana in Posey County, and is considered the Father of American Entomology.

Fireflies, also known as lightningbugs, have fascinated young and old alike on warm summer days. I used to take my son and daughter into the yard for some "catch and release" fun with lightningbugs. I think the exercise helped my children become less fearful of insects, as many young children tend to be. We would put them in a glass jar for a while to watch them alternately produce their bright, yellow light, and then let them go. Fireflies are beneficial insects native to Indiana, with a light produced by some fascinating science.

Turpin said the fireflies' light comes from a chemical reaction that takes place in special cells in their abdomen, called "photocytes." (The term "photocytes" means light cells.) The photocytes contain two chemicals that are essential to making light, luciferin and luciferase. "The chemicals are named after Lucifer, the fallen angel of light," Turpin said.

When the firefly pushes oxygen into the photocytes, the oxygen, luciferin and luciferase combine with two other chemicals, magnesium and ATP. ("ATP" is short for adenosine triphosphate.) Turpin said that ATP is a compound that all living plants and animals use as energy in their cells; your body turns most of the food you eat into ATP.

When luciferin is combined with ATP, or the fuel, and oxygen, which adds even more fuel, the luciferin is transformed into a very-high-energy chemical. It is unstable in its high-energy form, however, and as it reverts to its normal state it gives off energy in the form of light. Turpin said scientists call this process "bioluminescence," because it's the production of light (luminescence) by a biological process.

“The chemical reaction is controlled by the amount of oxygen the firefly lets into its abdomen,” Turpin said. “That’s why if you smash a firefly, or if one gets smashed on the windshield of your car, it glows very brightly for a short time. Suddenly the luciferin is exposed to the unlimited oxygen supply in the air. It’s like using a bellows on a fire.”

Why do fireflies give off light? Turpin stated, “The ones flying around are the males. The females sit in the brush and respond by flashing their lights. This is how they find each other.” The light also repels potential predators, and it helps fireflies warn other fireflies of potential danger.

The immature larvae are called “glowworms.” As their name implies, they glow, and unlike the adults, their lights stay on. Glowworms feed on soft-bodied insects, slugs and snails. They are commonly found in damp areas, such as near ponds and streams.

Indiana DNR said the Say’s Firefly is one of the earliest emerging fireflies in Indiana. It may be seen from early May through mid-July. There are about 43 species of fireflies in Indiana. Of those species, 31 are lightningbug fireflies (those that flash). The others are called dark fireflies because they do not flash.

The terms “firefly” and “lightningbug” are each combined as one word because the insect is neither a fly nor a true bug. It is a beetle (Order: Coleoptera). Separating the words would indicate it is a fly (Diptera) or bug (Hemiptera).

Read more about our state insect at Indiana Department of Natural Resource’s webpage:

<https://www.in.gov/dnr/entomolo/9718.htm>.