

Question: I have been watching for lightningbugs all summer but have seen very few. Do you know where all the lightning bugs have gone?

Answer: Lightningbugs have to be one of the most fascinating creatures known to man and almost everyone can recall the unique pleasure of catching lightningbugs or fireflies (for you non-southerners) in a mason jar and watching them do their thing in a dark room. "Lightningbug" and "firefly" are two different names for the same thing. Paradoxically, they are neither a bug nor a fly. In fact they are beetles in a specific family called the Lampyridae which literally means, "shining one". There are literally scores of species in the United States, mostly in the East and South. Like all beetles, they have a complete life cycle consisting of four stages: egg, larva, pupa and adult. The lightningbug contains luciferin and luciferase, two rare chemicals used in research on cancer, multiple sclerosis, cystic fibrosis and heart disease among other things. The ability of these insects to produce "cold" light has led to new flashlights and flares on the market today. Nevertheless, scientist have not been able to synthetically manufacture these exact chemicals.

The adults live for one to two weeks. They may feed on nectar and pollen or other insects, but most of the time is spent in the process of reproduction. The flashing lights are an integral part of the process. The lights help the males and females of the different species find and recognize each other. This is especially important for the male because if he tries to mate with the wrong species he will likely become a mid-night snack. After mating, the adult females lay their eggs in moist places such as in tall grass and under mulch and leaf litter. The eggs hatch later in the summer and the larvae live until next summer when they complete the transformation to the adult stage.

Lightningbug larvae are found in moist areas such as under the loose bark of dead trees, under mulch and debris and within moist, loose soil. This need for moisture may explain in part or full why this years populations are seemingly very low. Larvae have six legs and are usually brown with a full-grown length of about 3/4 inch. Lightningbug larvae are active at night and are predacious; they feed on small insects, worms, snails and slugs which in my book makes them beneficial.

Lightningbug larvae and adults produce light by an interesting reaction of chemicals and enzymes. As mentioned, the light produced is a "cold" light. That is, the chemical reaction produces nearly all light and very little heat. The light flashing is regulated according to a genetically fixed pattern and is used by the adults for courtship. Each species has a distinctive pattern of flashes, varying in flash number, duration, interval between flashes, motion accomplished during the flash, height of the flash above ground and so forth.

As spectacular and special as fireflies seem to us, they are not the only organisms capable of producing light. In addition to some bacteria and sea creatures there is another group of insects colloquially known as dismalites, they are the larval stage in the life of an insect called the fungus gnat, or *Arachnocampa luminosa* that emits a bright blue-green light to attract food, in the form of other flying insects. These amazing insects can be

seen in very few places outside of New Zealand but interestingly one of the few heavily populated sites is just to our north in Phil Campbell, Alabama at Dismal Canyons. I visited there several years ago for a night time tour where we saw a few but it was also during 2000 which was another very dry year.

Explanations other than drought conditions range from pesticide usage to artificial lights in urban areas (which may confuse the adults seeking a mate) to habitat loss but I think drought is a safe bet in a year like we have had in 2007. This is especially true when you consider how dry it was during the times when numbers should have been peaking in late May and June.

For more information on Dismal Canyons you may want to visit their web site at: <http://www.dismalscanyon.com> and for more information on lightningbugs go to: <http://ohioline.osu.edu/hyg-fact/2000/2125.html>