

Chautauqua Watershed Notes
From the Chautauqua Watershed Conservancy
For July 12, 2009

Twilight Fire
By Tina Nelson



A firefly (actually a member of a family of beetles) lights up its abdomen by bioluminescence.

“The firefly’s flame
Is something for which scientists have no name
I can think of nothing eerier
Than flying around with an unidentified glow on a person’s posterior”

Ogden Nash

These countless unidentified glows that dance over the Chautauqua Watershed’s misty fields on a summer evening appear more magical than eerie. They are twilight fire and awe even the most prosaic among us.

Catching fireflies in a jar is a famous summer pastime. Doing so enables one to discover that fireflies are not flies at all. They are beetles. Flies have one set of wings. Beetles

have two sets of wings. One pair is for flying; the other is a protective cover that covers the beetle's back when it is not flying.

Science does have a name for the firefly's flame, bioluminescence. Unlike a campfire, another famous summer pastime, a firefly's fire emits little heat. Its cold light is the result of a chemical reaction within the insect's abdomen involving oxygen, magnesium, a light emitting bio-pigment called luciferin and the enzyme luciferase that acts as a catalyst. This reaction emits about 98% light energy and only 2% heat energy in contrast to the combustion reaction of a campfire which emits about 2% light energy and 98% heat energy. Other organisms bioluminesce but fireflies are the only ones that can flash it on and off. Scientists really do have no name for this ability, yet.

They do, however, know why fireflies flash – love and for a select few to satisfy their cannibalistic appetites. The flashes are signals between male and female fireflies. He, dancing above the grass, flashes a particular pattern that is unique to his species. She, of the same species and lying close to the ground, recognizes the pattern as one of her species and answers with her own flashes. They flash back and forth, the male drawing ever closer to his lady love until they at last meet and mate. Unfortunately for some males lady love turns out to be femme fatale. A female of a particular species of fireflies imitates the flashes of a female of another species. This ploy draws some deluded male into her waiting jaws instead of a nuptial tryst.

After a successful mating the female firefly lays her eggs on the damp ground. In about four weeks trilobite-like larvae emerge. By then the adult fireflies have succumbed to old age and are no longer flash dancing above the tall grass. Instead their offspring, also known as glowworms, illuminate the ground. Their glow warns potential predators that this prey is toxic. Glowworms themselves are voracious predators. Their prey is worms, slugs and other small creeping crawling creatures. The toxins that protect the glowworms are used in their bite to paralyze the little victims.

As winter approaches the firefly larvae burrow into the soil. In spring they form pupal chambers covered with a body secretion that hardens into a waterproof coating. By summer these larvae pupate and emerge as adult fireflies to awe us once more as tiny dancing flames of twilight fire over fields of the Chautauqua Watershed.

The CWC is a local 501(c)(3) not-for-profit supported primarily by membership donations whose mission is to preserve and enhance the water quality, scenic beauty and ecological health of the lakes, streams and watersheds of the Chautauqua region. To support these efforts, call 716-664-2166.