

Colorado Insects of Interest

Fireflies (Lightningbugs)

Scientific Name: See Table 1

Order: Coleoptera (Beetles)

Family: Lampyridae (Fireflies and Lightningbugs)



Figure 1. *Photuris* sp. firefly from Routt County.

Identification and Descriptive Features:

Despite their name - and the alternate name lightningbugs - fireflies are neither flies (Order Diptera) nor bugs (Order Hemiptera) but are beetles (Order Coleoptera). Adult fireflies have an elongate-oval body form and are slightly flattened. Their forewings (wing covers) are generally dark gray or brown and relatively soft compared to most beetles. The prothorax is broad and plate-like, concealing most of the head, and is usually edged with yellow, red, or orange. Sizes of most species range from 10-15 mm; *Pyropyga minuta* is a smaller species. Among the luminescent species capable of producing light flashes, the tip of the abdomen is yellow to yellow-green.

The larvae have an elongated body and a narrow head. Species that have adults that use light flashes are also luminescent.



Figure 2. *Pyropyga minuta*, a non-luminescent firefly that can be found in yards and gardens.

Distribution in Colorado: Distribution of many fireflies is extremely localized within the state, particularly among the luminescent species (*Photuris* spp., *Photinus pyralis*). These are found only in association with permanent wetland areas, usually those well shaded by cottonwoods or other local features. However, luminescent species are known to occur over a wide area of the state with individual confirmed reports of *Photuris* spp. from Weld, Larimer, Boulder, Adams, Pueblo, Yuma, Routt, Alamosa and Saguache

counties. Anecdotal reports suggest that they are also present in many West Slope counties and previously existed in Denver County. *Photinus pyralis* has only been recovered from Baca County, which is at the far western range for this species.



Figure 3. A firefly of the *Ellychnia corrusca* complex, a species found in eastern Colorado that spends winter in the adult stage.

Non-luminescent species (*Pyropyga minuta*, *Ellychnia corrusca* complex) are much more abundant and some can be fairly common species associated with irrigated lawns and gardens in many areas of eastern Colorado.

The historical distribution of fireflies within Colorado has likely changed quite a bit due to human activities. Drainage of wetlands and damage by heavy cattle traffic along waterways has undoubtedly exterminated some local populations that previously were present. On the other hand, water diversions and irrigation may have provided some sites of new wetland habitat that fireflies have recently colonized. Many of the non-luminescent species associated with irrigated yards must also have extended range.

Life History and Habits: Fireflies develop as predators of snails, slugs, and soft-bodied insects, such as caterpillars. They typically hunt in moist grassy areas near springs, ponds and creeks and some of these may be found on shaded mud flats next to waterways during the day. For the majority of Colorado firefly species the overwintering stage is a larva, which completes development in late spring. Larvae of the luminescent species within the genera *Photinus* and *Photuris* can produce a faint glow.



Figure 4. A *Photuris* sp. of firefly showing the light producing organ on the tip of the abdomen.

Adults of most species are also predators, feeding on a variety of small insects on plants, including aphids and scales. Adults of most species are usually most abundant during June and July. Those species that produce light are active at night while the non-luminescent species are day active. After mating eggs are laid in areas of moist soil. A one year life cycle is assumed to occur among all of the Colorado fireflies.

The ability of some fireflies to produce light is achieved by specialized organ located at the tip of the abdomen. Light production occurs from combination of the compound luciferin with the enzyme luciferase. Oxygen, ATP and water are also needed to achieve the light producing chemical reaction and light flashing is precisely regulated, with each species producing unique

light flash patterns. These are used to locate mates, with males and females each producing different flashes. (Non-luminescent species are presumed to use chemical cues - sex pheromones - for mate recognition.) Light flash patterns are also needed to identify many of the *Photinus* species of fireflies, which do not have external physical features that can be used for species separation.

The life history of the *Ellychnia corrusca* complex differs from other fireflies, spending winter in the adult stage, sheltered in cracks of tree bark. They resume activity and emerge in early spring to feed on plant sap and flower nectar. They are day-flying species, quite similar in appearance to *Photinus* spp., but lack the light-producing organs. Mating occurs in late spring with larvae developing through early summer.

Many, if not all, of the fireflies produce distasteful chemicals that help protect them from predators, including compounds known as lucibufagins. These may also reflex bleed when disturbed, exposing droplets of blood containing these defensive materials.

Table 1. Partial Checklist of the Fireflies of Colorado

Scientific Name	County Records
<i>Ellychnia corrusca</i> complex	Boulder, Larimer, Weld, Douglas, Jefferson, Yuma, Jackson, Saguache, Mesa, Conejos
<i>Ellychnia flavicollis</i> (LeConte)	Baca
<i>Pyropyga minuta</i> LeConte	Larimer, Otero, Sedgwick, Prowers, Huerfano, Denver, Baca, Gilpin, Kiowa, Arapahoe
<i>Photinus pyralis</i> (Linnaeus)	Baca
<i>Photuris</i> spp.	Adams, Alamosa, Boulder, Delta, Larimer, Pueblo, Routt, Saguache, Weld, Yuma

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