

# PLECOPTERA



## Stoneflies

The name Plecoptera, derived from the Greek "*pleco*" meaning folded and "*ptera*" meaning wing, refers to the pleated hind wings which fold under the front wings when the insect is at rest.

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## Life History & Ecology:

Stoneflies are generally regarded as the earliest group of Neoptera. They probably represent an evolutionary "dead end" that diverged well over 300 million years ago. Immature stoneflies are aquatic nymphs (naiads). They usually live beneath stones in fast-moving, well-aerated water. Oxygen diffuses through the exoskeleton or into tracheal gills located on the thorax, behind the head, or around the anus. Most species feed on algae and other submerged vegetation, but two families (Perlidae and Chloroperlidae) are predators of mayfly nymphs (Ephemeroptera) and other small aquatic insects. Adult stoneflies are generally found on the banks of streams and rivers from which they have emerged. They are not active fliers and usually remain near the ground where they feed on algae

or lichens. In many species, the adults are short-lived and do not have functional mouthparts. Stoneflies are most abundant in cool, temperate climates.

## Distribution:

**Common in and around fast-moving streams in temperate and boreal climates.**

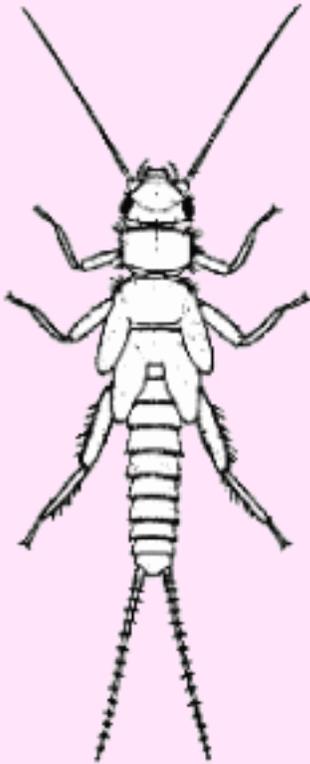
	<b>North America</b>	<b>Worldwide</b>
<b>Number of Families</b>	<b>10</b>	<b>15</b>
<b>Number of Species</b>	<b>465</b>	<b>&gt;2000</b>

## Classification:

Hemimetabola  
incomplete development (egg, nymph, adult)

Orthopteroid  
closely related to Orthoptera and Embioptera

## Physical Features:

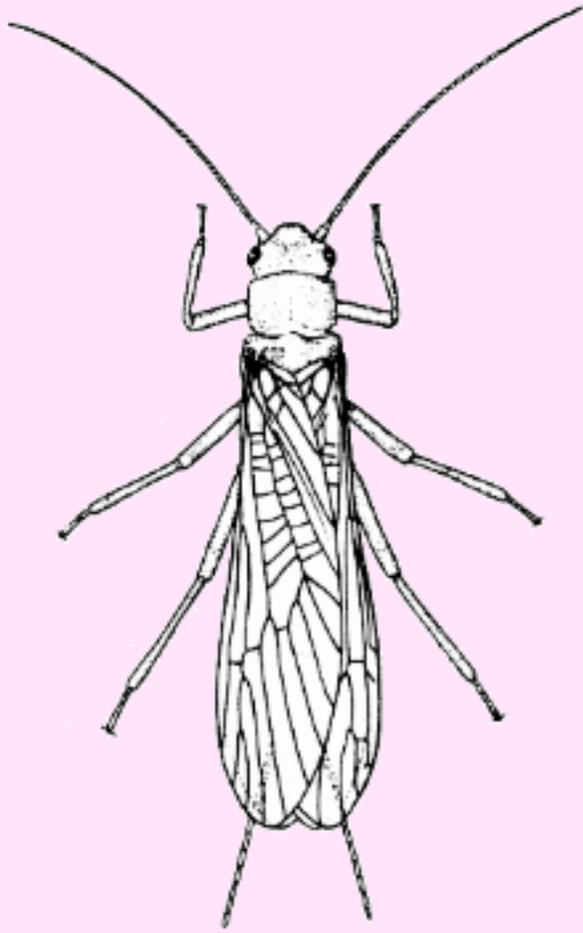


**Immatures:**

1. Antennae long, filiform
2. Body flattened, legs widely separated
3. Tracheal gills present as "tufts" behind the head, at base of legs, or around the anus
4. Each segment of thorax is covered by a large dorsal sclerite
5. Cerci long, multi-segmented

**Adults:**

1. Antennae long, filiform
2. Front wings long and narrow; M-Cu crossveins form distinctive boxes near



- center of front wing
3. Hind wings shorter than front wings; basal area of hind wing enlarged and pleated
  4. Cerci long, multi-segmented

### **Economic Importance:**

Stoneflies require clean, well-oxygenated water to survive. They are extremely sensitive to water pollution and are used by ecologists as indicators of water purity. Stoneflies are also an important source of food for game fish (e.g., trout and bass) in cold mountain streams.

### **Major Families:**

- **Perlidae** (Common Stoneflies) -- largest family in the order

- **Taeniopterygidae** (Winter Stoneflies) -- adults emerge January to April; often seen on snow banks
- **Nemouridae** (Spring Stoneflies) -- adults emerge April to June

### Fact File:

- In some species, a male attracts a female by drumming his abdomen against the substrate.
- Stonefly eggs are coated with a sticky slime that adheres to rocks and keeps the eggs from washing away in fast moving water.
- Adults of some Australian stoneflies consume rotten wood as part of their diet. The wood apparently contains a nutrient that is essential in egg production.
- A secondarily wingless species (family Capniidae) passes its entire life cycle in the depths of Lake Tahoe, U.S.A.

### Hot links and Illustrations:

- [Gordon Ramel's Plecoptera Page](#)
- [Ecowatch Plecoptera Page](#)
- [Tree of Life Web Project - Plecoptera](#)
- [Discover Life - Plecoptera](#)

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