Mayflies
Susan C. Jones, Associate Professor, Entomology
Extension Specialist, Household and Structural Pests
Alicia Fager, Program Assistant, Horticulture
Amy Stone, Extension Educator, Horticulture

Mayflies are classified in the insect order Ephemeroptera, meaning in Greek “lasting but a day.” The name refers to the fact that the winged adults live only one to two days. Whereas mayfly adults are terrestrial, the immatures, called naiads, are aquatic. The majority of the mayfly’s life cycle is spent as a naiad. Mayfly naiads are found in wetlands, ponds, lakes, and slow to swift flowing streams and rivers. There are many species of mayflies, and they are most common and diverse in river habitats. Many species are relatively intolerant of pollution.

Identification
Different mayfly species range from about 1/4 to 1 inch long as adults. Their color also varies depending on the species, and some are black and others are yellow to brown.

The adult mayfly is a fragile, soft-bodied, elongate insect with two or three long, threadlike tails. Most mayflies have two pairs of triangular, membranous wings that are held upright and together over the body when at rest. The front wings are larger than the hind wings. However, the hind wings of some species are very small or absent. The head is large with round, prominent eyes and short, inconspicuous, bristle-like antennae. Adult mayflies do not feed because their mouthparts are greatly reduced and nonfunctional. In most species, the males’ forelegs are much longer than the other legs.

The naiads are sturdy, narrow, and elongate-oval, with shovel-like front legs and paired tracheal gills along the sides of the abdomen (rear body segment). They have three (rarely two) long, slender tails at the tip of the abdomen. All mayflies have only one tarsal claw at the end of each leg.

Naiads of a common burrowing mayfly, Hexagenia limbata, have seven pairs of gills; the first pair is small, whereas gills on segments 2–7 have feathered margins and are held over the abdomen. This species has three feathery tails. Its front legs are widened for burrowing.

Life Cycle and Habits
Eggs are deposited directly on or in the water, gradually sinking to the bottom. After a few days or several months, the eggs hatch into tiny aquatic naiads.

Mayfly naiads (nymphs) are well adapted to live in quiet bodies of water or rapidly flowing streams where
they feed mainly on algae and detritus. Their tracheal gills are used to obtain oxygen from air dissolved in the water. Depending on the species, the naiads may occur among rocks and gravel, submerged roots, or tangles of vegetation; some burrow into soft silt or sand. Many are most active at night. Mayflies remain as naiads for a year or two, during which time they molt (shed their skin) 20 to 30 times.

When mature, a naiad swims to the surface or climbs up plant stems or rocks where it breaks the nymphal skin; this subimago or subadult (sexually immature) then waits briefly for its wings to dry before it flies a short distance and alights on vegetation. Subimagos are somewhat hairy and dull in appearance, whereas true adults are smooth and shiny with longer tails and legs. The subimago period lasts a few minutes to 48 hours, depending on the species. Subimagos shed their skin, including the wing covering, and leave behind an exoskeleton to become sexually mature adults (imagos). Mayflies are unique in being the only insects that molt again after the wings become functional.

The adult normally mates the same day that it achieves adulthood. Mayflies engage in swarming flights, which typically occur in late afternoon or evening, during which mating takes place. Swarms vary in size from small groups to large clouds consisting of hundreds or thousands of males. A male seizes a female that enters the swarm then flies away with her. Mating occurs in flight, and the female begins laying eggs shortly thereafter (within minutes or a few hours). After laying her eggs, the female falls to the water and dies.

**Burrowing Mayflies in Western Lake Erie**

Burrowing mayflies (family Ephemeridae, *Hexagenia* spp.) were abundant and important in the food web of western Lake Erie prior to the mid-1950s, when populations virtually disappeared. In 1992–1993, mayfly naiads returned to sediments of western Lake Erie, in part due to pollution-abatement programs. By 1997, mayfly naiads were as abundant as during the mid-1950s. An unfortunate side effect is that annual mayfly swarms in late June and early July can create a major nuisance in some Ohio communities along the western basin of Lake Erie. Off-water breezes often blow mayfly swarms some distance inland.

**Nuisance Aspects**

Mayfly swarms can cause traffic hazards when masses of crushed bodies create slippery and dangerous roads, streets, and sidewalks. City crews may post warning signs to alert drivers of slick mayfly-covered roads. Some communities need street sweepers and dump trucks to clean up the mayflies. Residents often need to shovel away mayflies near their homes. Heavy populations of swarming mayflies have been blamed for brownouts at power plants, and even putting out campfires.

Some people are hypersensitive to airborne pieces of mayfly bodies, and they come down with seasonal hay fever (allergies) and asthma from inhaling these insect fragments. Note that mayflies do not bite, sting, or feed on homes, furnishings, food, etc. Mayflies can create an annoyance by splattering car windshields and by flying into one’s face, ears, hair, and clothing.

Along lakeshore, decaying mayfly bodies often drift onto beaches and accumulate in nuisance piles or windrows, creating an offensive fish-like odor. The decomposing bodies also serve as a breeding site for flies and other scavenger insects.

Nuisance aspects of mayflies can discourage tourism during the July 4th holiday along Lake Erie. Fortunately, the swarming season is temporary and lasts just a few weeks. Many people feel that the inconvenience caused by nuisance mayfly swarms each summer is more than offset by benefits to the sport and commercial fisheries of Lake Erie.

**Beneficial Aspects**

Mayflies typically are an indicator of clean water and a healthy environment because most species are relatively intolerant of pollution. Burrowing mayflies thrive in shallow, productive lakes with soft, organically rich sediments. Some species, such as small minnow mayflies (family Baetidae), however, may be common in polluted streams.

---

**Fisheries**

The chief importance of mayflies lies in their value as food for fish, although they also are food for many other animals, including birds, amphibians, spiders, and insects. Anglers imitate the adults in dry flies, referred to as “spinners” or “duns”; they pattern wet flies after the naiads to catch trout and salmon in streams. Lures, known as “mayfly rigs,” imitate this seasonal prey item and an estimated three million walleyes are caught annually in Lake Erie, which has been crowned “The Walleye Capital of the World.”

---

**Composting**

Some communities have obtained financial grants for composting mayflies. Composting is currently being done in Port Clinton in northwestern Ohio. The proposed composting recipe is similar to that used for fish waste,
differing slightly from typical gardening composting. Composting is usually done with leaves, grass clippings, brush, and vegetable scraps. It allows normal decomposition to occur without the odor usually associated with rotting organic material. Gardeners can then use this recycled material in their garden as mulch or fertilizer.

For additional information on mayfly literature and composting, contact:

Fred L. Snyder
The Ohio State University
Sea Grant Extension
Camp Perry, Bldg 1
Port Clinton, Ohio 43452
Telephone: 419-635-1022
Fax: 614-336-6286
Snyder.8@osu.edu

Integrated Pest Management Strategies

There are no effective widespread controls for nuisance mayflies. The brief mayfly swarming season (late June through early July) is a “window” that one can wait out.

**Exclusion**
- Install tight-fitting screens on windows and doors.
- Install yellow or sodium vapor light bulbs outdoors since these are less attractive to insects.
- Practice nightlight discipline, especially during the swarming season from late June through early July, because adult mayflies are highly attracted to bright lights. Residents should turn off outdoor lights and keep window coverings drawn at night. Some communities currently shut off or reduce lighting at public places, including ball fields, parks, streets, etc.

**Insecticides**

Insecticides cannot be used at the source to kill nymphs, because these chemicals also would kill other valuable organisms, and the water could be made unsafe for fish and people. Fogging to kill the adults would require frequent heavy insecticide use and is not practical.

The authors would like to acknowledge William Lyon as author of the 1997 version of HYG-2166. Fred Snyder and John Hageman reviewed and commented on this fact sheet.

EMPOWERMENT THROUGH EDUCATION
Visit Ohio State University Extension’s web site “Ohioline” at: http://ohioline.osu.edu