

MAYFLIES

Order: Ephemeroptera



- ▶ **Type of Metamorphosis:** Aquatic Incomplete
- ▶ Mayflies are easily identified by their delicate appearance and upright wings. The males have large, contiguous, **turbinate** eyes. They are most unique because they are the only insect group to molt as adults. When the nymphs emerge as terrestrial adults, they are in the **dun** or **subimago** form. Their wings are opaque and within hours, they molt into a sexually mature adult with clear wings. This form is known as the **spinner** or **imago**. The males gain length in their forearms to make grasping females for in-flight mating easier. They then proceed to mate and die. Tail numbers often change from immature to adult.

MAYFLY ECOLOGY

Movement Groups

- ▶ Burrowers- use tusks to burrow into the silt substrate at the bottom of a river.
- ▶ Clingers- Evolved flattened bodies in order to cling to rocks & other structures in rushing waters
- ▶ Crawlers- Have stout, often spiny in appearance bodies that are designed to move along rocks and other substrate in high water flows
- ▶ Swimmers-Have torpedo-shaped bodies, very minnow-like for swimming in river systems

Functional Feeding Groups

- ▶ Filterer- have modified mouthparts to filter sediments and water to feed
- ▶ Gatherer- gathers or collects food and stores it or eats immediately
- ▶ Scraper- scrapes rocks or plant matter for nutrients and food
- ▶ Shredder- shreds plant detritus, an important part of the ecosystem
- ▶ Predator- hunts other invertebrates for food

IDENTIFYING FEATURES

Nymphs

- ▶ Two or three tails
- ▶ One tarsal claw on each leg
- ▶ Gills on abdomen (main identifying factor, especially for family identification)

Adults

- ▶ Hindwing not always present
- ▶ When hindwing is present, it's much smaller than forewing
- ▶ Forewing large, upright like a sailboat and triangular
- ▶ Two or three tails

FAMILY: AMELETIDAE



Photo Credit: Gunnisoninsects.org; Genus *Ameletus* Nymph



Photo Credit: Troutnut.com; Genus *Ameletus* Dun

Common Name(s): Brown Dun

Key ID Feature for Adults: Mottled-winged dun, 2 tails

Key ID Features for Nymphs: Band across the tail, oval abdominal gills with a dark edge, comb-like mouthparts for filter-feeding, torpedo-shaped body, 3 tails

Ecology: Swimmer

Feeding Group: Scraper/Gatherer

Life Cycle: Univoltine

Immature Size: $\leq 14\text{mm}$

Immature Color: Grey

Adult Size: 10-14mm

Adult Color: Brown, sometimes with deep red undertones

Additional Info: Sensitive to pollution, often confused with Baetidae as a nymph and Siphonuridae as an adult

Approximate Local Emergence: May-October

FAMILY: BAETIDAE



Genus: *Baetis* Nymph



Genus: *Baetis* Dun

Common Name(s): Blue-Winged Olives (BWOs), Minnow Mayflies, *Callibaetis*

Key ID Feature for Adults: Small with a green body and grey wings, often seen in the dun or subimago form, 2 tails

Key ID Features for Nymphs: Slender, torpedo or minnow-shaped bodies, three tails, oval-shaped gills, 2 or 3 tails, greenish-grey color

Ecology: Swimmer

Feeding Group: Scraper/Gatherer

Life Cycle: ≥ 1 generation per year; 2 generations every 3 years; can be univoltine or bivoltine

Immature Size: ≤ 12 mm

Immature Color: Greenish-grey, sometimes with black wingpads

Adult Size: 3-12mm

Adult Color: Grey/Black/Green

Additional Info: Moderately sensitive to pollution

Approximate Local Emergence: March-December (Can be all year)

FAMILY: EPHEMERIDAE



Common Name(s): Brown Drakes

Key ID Feature for Adults: Mottled wings, dark brown spots on top of abdomen, three tails

Key ID Features for Nymphs: Tusks on head, u-shaped projections at front of head, three tails

Ecology: Burrower

Feeding Group: Filterer/Gatherer

Life Cycle: Univoltine

Immature Size: 12-20mm

Immature Color: Brown & yellow variations

Adult Size: 15-20mm

Adult Color: Yellowish-brown mix with dark brown spots on the top of the abdomen and mottled wings

Additional Info: Sensitive to pollution

Approximate Local Emergence: June-August

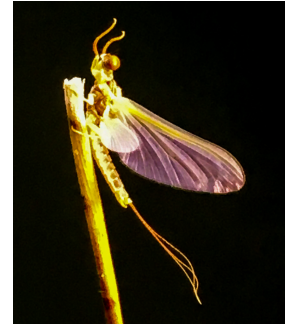
FAMILY: EPHEMERELLIDAE



Genus: *Drunella* Nymphs



Genus: *Drunella* Dun



Genus: *Ephemerella* Dun

Common Name(s): Pale Morning Duns (PMDs), Green Drakes, Flavs

Key ID Feature for Adults: 3 Tails; large for a mayfly

Key ID Features for Nymphs: No gills on second abdominal segment, 3 tails, spiny, stout bodies with “muscular-looking” legs (*Drunella*)

Ecology: Crawler

Feeding Group: Scraper/gatherer/predator

Life Cycle: ≥ 1 generation per year; Univoltine

Immature Size: ≤ 15 mm

Immature Color: Green/Grey/Brown

Adult Size: 7-15mm

Adult Color: Green/Grey/Brown

Additional Info: Sensitive to pollution

Approximate Local Emergence: June-September

FAMILY: HEPTAGENIIDAE



Common Name(s): Flat-Headed Mayflies, March Browns, Pale Evening Dun, Yellow Quill

Key ID Feature for Adults: 2 tails, flat head

Key ID Features for Nymphs: Flat head, 2 or 3 tails, brown to red in color, gills form a “suction cup” underneath in *Rhithrogena* (see middle photo)

Ecology: Clinger

Feeding Group: Scraper/Gatherer

Life Cycle: Univoltine

Immature Size: ≤20mm

Immature Color: Dark brown to bright red

Adult Size: 6-15mm

Adult Color: Variant from creamy yellow to a dark brown, mottled dun phase

Additional Info: Moderately sensitive to pollution

Approximate Local Emergence: March-June

FAMILY: LEPTOHYPHIDAE



Photo Credit: Troutnut.com



Photo Credit: Whitney Cranshaw, Colorado State University, Bugwood.org

Common Names: Tricos

Key ID Features for Nymphs: Two large triangular gills on abdomen, 3 tails

Ecology/Feature for Adults: Small, stout bodies; 3 tails; No hind wings

Key : Clinger/Sprawler

Feeding Group: Scraper/Gatherer

Life Cycle: ≥ 1 generation per year; can be univoltine or bivoltine

Immature Size: ≤ 10 mm

Immature Color: Brown variations to light greenish-yellow

Adult Size: 3-6mm

Adult Color: Black

Additional Info: Moderately sensitive to pollution

Approximate Local Emergence: July-September

FAMILY: LEPTOPHLEBIIDAE



Photo Credits: Troutnut.com

Common Name(s): Mahogany Duns

Key ID Feature for Adults: Rounded hind wings; 3 tails

Key ID Features for Nymphs: Pronged fork in the abdominal gills, 3 tails, uniformly shaped oblong body

Ecology: Crawler

Feeding Group: Scraper/Gatherer

Life Cycle: Univoltine

Immature Size: $\leq 15\text{mm}$

Immature Color: Dark brown to dark reds

Adult Size: 7-9mm

Adult Color: Red/Brown

Additional Info: Sensitive to pollution, Called "mahogany" for its color

Approximate Local Emergence: Late Spring/ Early Summer

FAMILY: SIPHLONURIDAE



Photo Credit: Troutnut.com



Common Names: Grey Drakes

Key ID Feature for Adults: Large size, large hind wing & slate gray color, 2 tails

Key ID Features for Nymphs: Double-flapped gills on the first abdominal segment, 3 tails

Ecology: Swimmer

Feeding Group: Predatory/Gatherer

Life Cycle: Bivoltine; Summer & Fall emergence

Immature Size: ≤ 17 mm

Immature Color: Light grey or brown

Adult Size: 12-15mm

Adult Color: Grey/Black

Additional Info: Moderately sensitive to pollution, can be a few large hatches per season

Approximate Emergence: July- September