DRAGONFLIES

ORDER: ODONATA (odus=tooth, refers to chewing mouthparts)
Suborder: Anisoptera (anisos=unequal, pteryx=wing, refers to 2 pairs of wings which are unequal in length)
Families: Aeshnidae (hawkers/darners)
Libellulidae (skimmers/darters)

IMPORTANCE: Both adults and nymphs are stages aggressive insect predators. Help reduce midge, moth and mosquito numbers. Some kill honeybees. Adults and nymphs commonly eaten by people in some Asian countries. Featured in British Columbia Haida and Tsimshian totem poles and spoon handles.


BIOLOGY: Eggs laid in summer. Ovipositor used to insert eggs in plant tissue or wet, rotten wood (Aeshnidae) near or below water surface. Libellulid eggs washed off abdomen in water during low flight, or brushed off on mud or vegetation that is later flooded. Some libellulid males continue to hold female during egg laying, others stay to fend off other males. Egg hatch: <1 month, egg to adult (10-15 instars): 1-2 years. Mature nymph emerges from water for final molt, sun-dried skin splits, teneral (newly emerged adult) emerges, wings must expand and harden before flight is possible, full colour obtained in several days. Adult: 6-8 weeks, sexually mature in 1-2 weeks. Tandem mating in flight or on land. Male transfers sperm to accessory sex organs before mating, catches female and initiates 'copulation wheel', grabbing her head with abdominal claspers, female arches body under male contacting accessory genitalia for sperm transfer (Fig. 3). Most overwinter as nymphs, some as eggs. Generation time: 1-4 years (Aeshna spp.). Hemimetabolic development (incomplete metamorphosis: naiads (aquatic nymphs) different from adults). Strong fliers, able to hover. Libellulids take short flights from perch to feed and defend territory.

FOOD SOURCE: Midges, moths, mosquitoes and other small insects. Rely on sight to hunt and catch moving prey. Form basket with legs to catch flying insects while in flight. Nymphs stalk or ambush prey.

SEASONAL OCCURRENCE: (Adults)

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MONITORING: Methods - Adults: malaise trap, aerial net (may be difficult to catch).
Nymphs: dip net.
Habitats - Adults: in flight, perching on flat surfaces such as tree trunks, branches, rocks or fence posts, near aquatic areas inhabited by nymphs, resting in trees during cloudy weather. Nymphs: aquatic areas such as streams, lakeshores, ponds, marshes and swamps.

CONSERVATION: Maintain unpolluted water bodies for nymph development.
Pesticide Toxicities - Safe: Bacillus thuringiensis var. israeliensis. (71,91)

RECOMMENDED READINGS: 13, 22, 88
DRAGONFLIES

DESCRIPTION

Adults  20-125 mm. Aeshnidae: long, slender abdomen, wingspan 65-90 mm, dark with striking blue, green or yellow marks, some very hairy (Fig. 1). Libellulidae: relatively shorter abdomen, wingspan 45-75 mm (much greater than body length), colourful (Fig. 2). Colours differ between sexes. 2 pairs of elongate clear or patterned wings (Libellulidae), held horizontally at rest, large compound eyes joined at top of large round head, chewing mouthparts (referred to by order name), short bristle-like antennae.

Eggs  Cream, turn red-brown in 24 hours, either smooth and elongate (Aeshnidae) or spherical, sometimes equipped with anchors (Libellulidae).

Imatures  Naiads (aquatic nymphs): short, stout, flattened, cylindrical body. May be hairy, spiny or camouflaged. Legs modified for walking or clinging. Longer antennae than adults, large mouthparts folded under head, shoot out to seize prey. Aquatic gill-breathers with rectal gill ridges. Water sucked in for respiration, expelled for propulsion. Climbers(Aeshnidae): streamlined, stalking predators, with highly developed eyes, live in submerged vegetation (Fig. 3). Sprawlers (most Libellulidae): slothful, among mud and bottom trash, concealed by mud and algae coating body, ambush approaching prey.

Figure 1 - Dragonfly (Aeshnidae).

Figure 2 - Dragonfly (Libellulidae).

Figure 3 - Mating dragonflies (Libellulidae).
DAMSELFIES

ORDER: Odonata (odous = tooth, refers to chewing mouthparts)
Suborder: Zygoptera (zygon = pair; joined, pteryx = wing, refers to joined wings)
Families: Coenagrionidae (narrow-winged damselflies)
          Lestidae (spread-winged damselflies)

IMPORTANCE Both adults and nymphs are predaceous. Help control midges and mosquitoes.


BIOLOGY Lay eggs in aquatic vegetation in summer. Use ovipositors to make slits in which eggs inserted (Fig. 6). Egg hatch: 1-3 weeks (months in overwintering eggs), egg to adult (10–15 instars): few months–12 years, nymph development: days to months (most overwinter). Final instar emerges from water for last molt. Adults: 3–4 weeks. Male transfers sperm to accessory sex organs before mating, catches female and initiates ‘copulation wheel’, grabbing her thorax with abdominal claspers, female arches body under male contacting accessory genitalia for sperm transfer. Male may continue to hold female during egg laying. Overwinter as eggs (Lestidae) or nymphs. 1 generation/year. Hemimetabolous development (incomplete metamorphosis: naiads (aquatic nymphs) different from adults). Spend much time perching, taking short flights to feed and defend territory.

FOOD SOURCE Midges, moths, mosquitoes and other flying insects. Hunt by sight, catch prey in cupped legs while in flight. Hold prey in mouth with front legs, chew with mandibles. Nymphs ambush prey with hinged mouthparts which shoot out from under head to seize prey.

SEASONAL OCCURRENCE: (Adults)

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Habitats - Adults: flying in warm sunny areas, perching on flat surfaces such as tree trunks, branches, rocks, fence posts, resting or sunning themselves on emergent vegetation, or remaining near aquatic areas suitable for nymph development. Rest in grass during cloudy weather. Nymphs: aquatic weeds, crawling on submerged objects, on water bottom among debris.

CONSERVATION
Pesticide Use - Use pesticides only as a last resort.
Maintain unpolluted ponds, lakes, and bodies of water. (71)

RECOMMENDED READINGS: 13, 22, 88
DESCRIPTION

**Adults** 20-60 mm long. Similar to dragonflies but smaller, broader head, eyes separate or stalked, 2 pairs of equal-sized long, narrow wings. Coenagrionidae: slender, weak fliers, with wings folded together above back at rest, males more brightly coloured than females, wingspan 20-45 mm (Fig. 4). Lestidae: usually larger than Coenagrionidae, hold body vertical at rest with wings partly-opened, bronze or green, wingspan 32-64 mm (Fig. 5). Whitish-blue colour in warm temperatures may change to purple-grey at cool temperatures.

**Eggs** Similar to dragonflies.

**Im matures** Naiads similar to dragonflies but with 3 leaf-like abdominal gills used for respiration and guiding movement through water. Either the middle gill filament is longest or all filaments are equal length (Lestidae). Body undulations provide propulsion.

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Figure 4 - Damselfly (Coenagrionidae) with prey.

Figure 5 - Damselfly (Lestidae).

Figure 6 - Damselfly (Coenagrionidae) female (green) ovipositing with male on guard.