

stream species fly relatively slowly up and down the stream, often patrolling a stretch of 90 meters or more. These dragonflies fly at a height and a speed that are characteristic for the species. Some of the gomphids, when flying over open land areas, fly with a very undulating flight, each undulation covering 1.2–1.8 meters vertically and 0.6–0.9 meters horizontally. Many of the corduliids and aeshnids fly from 1.8 to 6.1 meters or more above the ground, and their flight seems tireless. Many of the smaller damselflies fly only 25–50 mm above the surface of the water.

Most dragonflies feed on a variety of small insects that are caught on the wing in a basketlike arrangement of the legs. The dragonfly may alight and eat its prey or may eat it on the wing. The prey is chiefly small flying insects such as midges, mosquitoes, and small moths, but the larger dragonflies often capture bees, butterflies, or other dragonflies. Odonata normally take only moving prey, but if captured they will eat or chew on almost anything that is put into their mouth—even their own abdomen!

Many pond species are frequently found with large numbers of small, rounded, usually reddish bodies attached to the under side of the thorax or abdomen; these bodies are larval water mites. The mite larvae attach to the dragonfly nymph and, when the nymph emerges, move onto the adult. The mites spend 2 or 3 weeks on the dragonfly, feeding on its blood and increasing in size, and eventually leave it. If they get back into water, they develop into adult mites, which are free-living and predaceous. The mite larvae do not appear to do a great deal of damage to the dragonflies. It is not unusual to find dragonflies with dozens of mite larvae on them.

Classification of the Odonata

A synopsis of the Odonata occurring in North America north of Mexico is given below, with synonyms and alternate spellings in parentheses. The numbers in parentheses following each family are the num-

bers of North American species, taken from Westfall (1984).

Suborder Anisoptera—dragonflies

Superfamily Aeshnoidea

Petaluridae (2)—graybacks

Gomphidae (93)—clubtails

Aeshnidae (Aeschnidae) (38)—darners

Superfamily Cordulegastroidea (Aeshnoidea in part)

Cordulegastriidae (Cordulegasteridae) (8)—biddies

Superfamily Libelluloidea

Macromiidae (Epopthalmiidae) (10)—belted skimmers and river skimmers

Corduliidae (50)—green-eyed skimmers

Libellulidae (93)—common skimmers

Suborder Zygoptera—damselflies

Calopterygidae (Agriónidae, Agriidae) (8)—broad-winged damselflies

Léstidae (18)—spread-winged damselflies

Protoneuridae (Coenagriónidae in part) (2)—protoneurid damselflies

Coenagriónidae (Coenagriidae, Agriónidae) (93)—narrow-winged damselflies

The separation of the families of Odonata is based primarily on characters of the wings. There are three major interpretations of the wing venation in this order. We use the Comstock-Needham interpretation (which includes a number of special terms not used in other orders), illustrated in Figures 11–5 and 11–6. Riek and Kukulová-Peck (1984) have recently proposed a reinterpretation of dragonfly wing venation on the basis of fossil specimens; a comparison between their scheme and that used here is presented in Table 11–1. The separation of genera and species is based on wing venation, color pattern, structure of the genitalia, and other characters. Many species of Odonata can be recognized in the field by their characteristic size, shape, color, or habits.

Key to the Families of Odonata

This key deals only with adults. Westfall (1987) provides a key to the nymphs of Odonata.

1. Front and hind wings similar in shape and both narrowed at base (Figures 11–6 and 11–7D,F); wings at rest held either together above body or slightly divergent; head transversely elongate; males with 4 appendages at end of abdomen (figure 11–4C,D) (damselflies, suborder Zygoptera)2