



Natural Heritage & Endangered Species Program

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Riverine Clubtail Dragonfly *Stylurus amnicola*

State Status: **Endangered**
Federal Status: None

DESCRIPTION: The Riverine Clubtail is a large, semi-aquatic insect in the order Odonata, suborder Anisoptera (the dragonflies). Like all dragonflies, the Riverine Clubtail has a long, slender abdomen comprised of 10 segments, four wings (two forewings and two hindwings) with dense venation, and a large head with huge eyes and powerful, chewing mouth parts. It is a member of the family Gomphidae (the clubtails), a large, diverse group comprising nearly one hundred species in North America. Clubtails are named for the lateral swelling at the tip of the abdomen (the seventh through ninth segments) that produces a club-like appearance. The extent of this swelling varies greatly, from extreme to non-existent, depending upon the species. The club is generally more pronounced in males than females. The purpose of the club is uncertain, but it may be used for displays, or it may provide some aerodynamic benefits to the males. Clubtails are further distinguished from other dragonflies by their widely separated eyes, wing venation characteristics, and behavior. Many species are very elusive and thus poorly known.

The Riverine Clubtail is in the genus *Stylurus*, sometimes referred to as the “hanging clubtails”, a group characterized by having moderately flared clubs and relatively short legs. They typically perch on the top surface of leaves high in the tree tops, oriented in a more or less vertical position. Riverine Clubtails are dark brown to black in coloration with pale yellow to greenish markings on the body and bright green eyes. The top of the thorax is marked with thin, pale yellow or greenish stripes. The sides of the thorax are mostly pale with narrow dark markings. The pale thoracic markings are bright yellow in the young adults, but become a dull, grayish-green as the insect matures. The abdomen is black with small, yellow spots on the dorsal surface of segments one through eight, and large yellow patches on the sides of segments one, two, eight and nine. The face is dull yellowish-green, and the legs are blackish, but with distinct yellowish tibiae on the rear legs. The sexes are similar in appearance, though the females have thicker abdomens and a less developed club.

Riverine Clubtails range in length from 1.7 to 1.9 inches (43 mm - 49 mm), with a wingspan averaging about 2.4 inches (62 mm). The nymphs average just over one inch in length (27.5 mm - 29 mm) when fully mature.

SIMILAR SPECIES: The Riverine Clubtail is one of three species in the genus *Stylurus* in Massachusetts, but differs from the other two species in a number of features. As in most dragonflies, the shapes of the male’s terminal appendages and hamules (located on the underside of the second abdominal



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segment) and the female’s vulvar lamina (located on the underside of the eighth and ninth abdominal segments) provide the most reliable means of identification. The Riverine Clubtail can also be distinguished by its smaller size and yellowish tibiae on the rear legs. The Arrow Clubtail (*Stylurus spiniceps*) differs further in having an extremely long ninth abdominal segment. The Zebra Clubtail (*Stylurus scudderi*) has distinctive yellow abdominal rings. Other similar species in Massachusetts are the Cobra Clubtail (*Gomphus vastus*), the Midland Clubtail (*G. fraternus*), and the Skillet Clubtail (*G. ventricosus*). All differ in having dark tibiae and thicker pale stripes on the top of the thorax, in addition to features of the male terminal appendages and hamules, and the female vulvar lamina.

The nymphs of the Riverine Clubtail can be distinguished by subtle features given in the keys of Walker (1958), Soltesz (1996), and Needham *et al.* (2000).

HABITAT: Riverine Clubtails inhabit primarily medium to large rivers.

LIFE-HISTORY/BEHAVIOR: Riverine Clubtails are elusive and little is known about their life history. Although most species of *Stylurus* fly late in the season, Riverine Clubtails are on the wing from late June through mid-August.

RIVERINE CLUBTAIL FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Like most Clubtails, the nymphs are burrowers and voracious predators, feeding upon a variety of aquatic life. When ready to emerge, the nymphs crawl out onto exposed sections of shoreline, where they undergo transformation to adults — a process known as “eclosion.” Eclosion generally takes place very early in the morning, presumably to reduce exposure to predation. The cast nymphal exoskeletons, known as exuviae, are easily found and can be identified to species, providing a reliable means of confirming the presence of a breeding population.

As soon as the freshly emerged adults are dry and the wings have hardened sufficiently, they fly off to seek refuge in the vegetation of adjacent uplands. Here they spend several days or more feeding and maturing, before returning to their breeding habitats. Riverine Clubtails are seldom encountered during this phase of their life; it may be that they spend most of this time high in the tree tops. Clubtails feed on aerial insects which they capture by making short sallies from their perches.

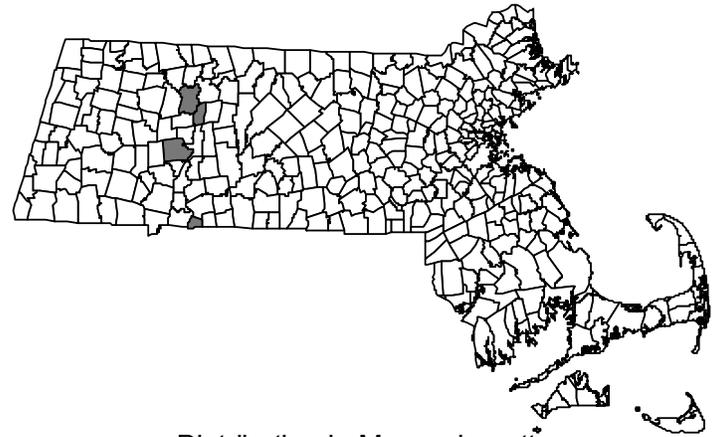
When mature, the males return to the water where they search for females and drive away competing males. They are very wary and, unlike many clubtails, seem to avoid perching on the shore, or protruding rocks and logs. When not over the water, they apparently spend their time high in the tree tops. *Stylurus* Clubtails in general are most active late in the day, but it's not clear if this is true of Riverine Clubtails.

Females generally appear at water only for a brief period when they are ready to mate and lay eggs. When a male encounters a female, he attempts to grasp the back of her head with claspers located on the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the tip of her abdomen upward to connect with the male's secondary sexual organs located on the underside of the second abdominal segment, thus forming the familiar heart-shaped “wheel” typical of all Odonata — the male above, the female upside down underneath. In this position, the pair flies off to mate, generally hidden high in nearby trees where they are less vulnerable to predators. The duration of mating in Riverine Clubtails has not been recorded, but in similar-sized odonates typically lasts from several minutes to an hour or more. Females oviposit by flying low over the water, periodically striking the surface with the tips of the abdomen to wash off the eggs. It is not known how long the eggs of Riverine Clubtails take to develop.

RANGE: Riverine Clubtails range throughout much of eastern North America from Minnesota, Quebec, and southwestern Maine south to Georgia, Louisiana, and Kansas. In addition to Massachusetts, the species has been recorded in New England from Connecticut (several recent records from the Connecticut River) and southwestern Maine (one recent exuviae record).

POPULATION STATUS IN MASSACHUSETTS: The Riverine Clubtail is listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc...) and sale under the Massachusetts Endangered Species Act. All records of Riverine Clubtail in the state are from the Connecticut River, particularly in the

Sunderland area where the preponderance of field work has been conducted. Increased field work has produced several recent records and the species may prove to be fairly common along this river system. The Housatonic and Merrimack rivers may have suitable habitat and the species should be looked for on these river systems.



Distribution in Massachusetts
1977 - 2002

Based on records in Natural Heritage Database

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact management needs of Riverine Clubtails are not known. Water quality certainly is a primary concern. Potential threats to the water quality of the Connecticut River include industrial pollution from businesses located along the river, salt and other road contaminant run-off, and siltation from construction or erosion. The disruption of natural flooding regimes by dams and water diversion projects also may have a negative impact on odonate populations. Extensive use of the river by power boats and jet skies is a serious concern, particularly during the early summer emergence period of Riverine Clubtails (as well as several other clubtail species). Many species of clubtails, and other riverine odonates, undergo their emergence low over the water surface on exposed rocks or vegetation, or exposed sections of the river bank where they are imperiled by the wakes of high-speed watercraft. Low-level recreational use from fisherman and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged and preservation of the remaining undeveloped upland bordering the river should be a top priority.

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Updated May 2003