



The biology of the limnephilid caddisfly *Dicosmoecus gilvipes* (Hagen) in Northern California and Oregon (USA) Streams

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Abstract

The limnephilid caddisfly *Dicosmoecus gilvipes* (Hagen) occurs in many streams of northwestern United States and British Columbia. Because of the large size of the fully grown larva, its synchronous emergence pattern, and its frequent imitation by fly-fishing anglers, *D. gilvipes* is one of the best known North American aquatic insects. Egg masses are found at the bases of *Carex* sedges. Cases of early larval instars are made of organic material and detritus; 3rd and 4th instars incorporate pebbles into cases. The 5th-instar case is made entirely of mineral material. Larvae can travel up to 25 m per day, and are predominantly scraper-grazers. Fifth instars attach their cases to the underside of boulders in mid-summer and remain dormant until pupation in autumn. All northern California populations known are univoltine. Adult females use sex pheromones to attract males; most males come to trapped females in the 1st hour after sunset. In laboratory studies, males and females fly during the mate attraction period but generally not at other times. Males but not females exhibit circadian rhythms that govern flight periodicity. In enclosures to study biotic interactions, the density of *D. gilvipes* larvae has a negative effect on the densities of sessile grazers. This species has been widely used in trophic and behavioral studies conducted in the laboratory and field, and may be a model organism for ecological studies of caddisflies and other benthic macroinvertebrates.

Key words: Trichoptera, life history, sessile grazers, Northwest USA

Introduction

The limnephilid caddisfly *Dicosmoecus gilvipes* (Hagen, 1875) occurs in streams from northern California and Colorado, north to British Columbia, and east to Alberta, Montana, Idaho, and Nevada (Anderson 1976; Nimmo 1977; Morse 2009). Because of the large size of the fully grown larva (25–30 mm), its high population densities, and its synchronous emergence pattern, *D. gilvipes* is one of the best known aquatic insects in California and the Pacific Northwest. Fly-fishing anglers refer to it as the "October caddis" or "Autumn caddis" because of its fall emergence period. This species is also called the "giant orange sedge" by these anglers, perhaps for its large adult size and ruddy color.

A variety of studies have been conducted on this species over the past 3 decades at the University of California, Berkeley, and at Oregon State University. For example, in the McCloud River (Siskiyou Co., CA), substrate relationships, movement patterns, foraging ecology, and larval behavior were examined (e.g., Resh 1978, 1979; Lamberti & Resh 1979; Hart & Resh 1980). In Big Sulphur Creek (Sonoma Co., CA), detailed studies on adult behavior such as flight activity, pheromone production, mating, and larval behavior were conducted (e.g., Hart 1981; Resh & Wood