

abdomen in a V-shape. Rapid butting contests would sometimes ensue until one or the other female retreated. More frequently, the threat posture deterred the advance of an approaching female, but several instances of butting were followed by grappling. Beaver (1967) reported similar agonistic behaviour in pteromalids competing for food resources or oviposition sites. *R. pulchripennis* and *E. pissodis* also compete for scolytid hosts such as *Dendroc-*

*tonus monticolae* Hopkins (Bushing, 1965). Agonistic behaviour between these competing parasite species is likely to promote dispersal of the gravid females in the field.

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#### REFERENCES

- Beaver, R. A. 1967. Hymenoptera associated with elm bark beetles in Wytham Wood, Berks. *Trans. Soc. British Entomol.* 17: 141-150.
- Bushing, R. W. 1965. A synoptic list of the parasites of Scolytidae (Coleoptera) in North America north of Mexico. *Can. Entomol.* 97: 449-492.
- Harman, D. M., and H. M. Kulman. 1968. Biology and natural control of the white pine weevil in Virginia. *Ann. Entomol. Soc. Amer.* 61: 280-285.
- Harman, D. M., and H. M. Kulman. 1967. Parasites and predators of the white-pine weevil, *Pissodes strobi* (Peck). *Univ. Maryland, Nat. Res. Inst. Contrib.* 323, 35 pp.
- Stevenson, R. E. 1967. Notes on the biology of the Engelmann spruce weevil, *Pissodes engelmanni* (Curculionidae: Coleoptera) and its parasites and predators. *Can. Entomol.* 99: 201-213.

## THE DISTRIBUTION OF *TANYPTERYX HAGENI* (ODONATA:PETALURIDAE) IN BRITISH COLUMBIA

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#### ABSTRACT

In British Columbia the petalurid dragonfly *Tanypteryx hageni* (Selys) is considered to be rare. A record in 1977 extends its known range almost to 51°N latitude. The record also disputes the belief that *T. hageni* normally is restricted to subalpine habitats. In the northern parts of its range it appears to occur naturally at sea level.

#### INTRODUCTION

*Tanypteryx hageni* (Selys) is the only western North American representative of the primitive dragonfly family Petaluridae. The family has a distribution so limited and disjunct that the nearest relatives of *T. hageni* are *T. pryeri* Selys in Japan and *Tachopteryx thoreyi* (Hagen) in eastern North America.

*Tanypteryx hageni* ranges from southwestern British Columbia south through the mountains to California and Nevada (Cannings and Stuart, 1977). American localities are discussed in Kennedy (1917), Whitney (1947), Smith and Pritchard (1956), Svihla (1959) and Paulson and Garrison (1977). In Washington and Oregon the larvae are known to inhabit

mountain bogs at high altitudes where they burrow in wet muck and mosses associated with springs (Svihla, 1959). Larvae have never been found in British Columbia.

By 1976, *T. hageni* had been recorded from only four localities in British Columbia (Scudder *et al.*, 1976): Black Mountain, North Vancouver (1080 m), 9 Aug. 1931 (H. B. Leech); Liumchin Creek, Cultus Lake (150 m), 8 Jul 1934 (W. E. Ricker); Hell's Gate, near Yale (150 m), 30 Aug 1938 (W. E. Ricker); and Diamond Head, Garibaldi Park (1000 m), Jul 1969 (R. H. Carcasson).

All these localities are within the Cadcade Mountains or the extreme southern Coast Mountains of southwestern British Columbia. The Black Mountain and Diamond Head localities are in subalpine forest at 1000 m or higher. These habitats are similar to those at high altitudes reported for *T. hageni* in the United States. Occurrences of this insect at lower elevations, such as the Liumchin Creek and Yale records, always have been considered accidental (Whitehouse, 1941; Walker, 1958).

A recent distribution record for *T. hageni* suggests that these low-altitude records are not exceptional. The location is the mouth of the Ahnuhati River on Knight Inlet, 50°52'N latitude, about 250 km northwest of Vancouver or about 230 km northwest of the previous most northerly record of the species. Two specimens, a male and a female, were captured on 20 and 21 Jul 1977. Each was salvaged by Mr. Kevin Lloyd after it had been caught and killed by a pet housecat. The specimens were deposit-

ed in the Spencer-Entomological Museum, University of British Columbia.

The dragonflies apparently were attracted to a muddy area on the beach where water gently flowed over it from the cliffs above. Five or six other large black and yellow dragonflies were sighted along the banks of the Ahnuhati River. Possibly some of these were *Cordulegaster dorsalis* and not *T. hageni*.

This is an important record because the dragonflies apparently were residents of the coastal western hemlock forest at sea level and not merely strays from the mountains above. Evidently, in the northern part of its range, *Tanypteryx hageni* is not restricted to high elevations, for of the six specimens from British Columbia, four were from elevations of 150 m or lower. As suspected by Ricker (*pers. comm.*), at low elevations these dragonflies may develop in muddy or mossy seepages like those which larvae are known to inhabit in subalpine environments to the south. This habitat occurs along streambanks and in other cool, damp locations in lowland forests. The species is probably distributed more extensively to the north in British Columbia than was previously recognized and may not be so rare as was once supposed.

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#### REFERENCES

- Cannings, R. A. and K. M. Stuart. 1977. The Dragonflies of British Columbia. B.C. Prov. Mus. Handbook No. 35, Victoria.
- Kennedy, C. H. 1917. Notes on the life history and ecology of the dragonflies (Odonata) of central California and Nevada. Proc. U.S. Nat. Mus. 52:483-635.
- Paulson, D. R. and R. W. Garrison. 1977. A list and new distributional records of Pacific Coast Odonata. The Pan-Pacific Entomologist 52:147-160.
- Scudder, G. G. E., R. A. Cannings and K. M. Stuart. 1976. An annotated checklist of the Odonata (Insecta) of British Columbia. Syesis 9:143-162.
- Smith, R. F. and A. E. Pritchard. 1956. Odonata, pp. 106-153 in R. L. Usinger, ed., Aquatic Insects of California. Univ. of California Press, Berkeley.
- Svihla, A. 1959. Life history of *Tanypteryx hageni* Selys (Odonata). Trans. Amer. Ent. Soc. 85:219-232.
- Walker, E. M. 1958. The Odonata of Canada and Alaska. Vol. 2. Univ. of Toronto Press, Toronto.
- Whitehouse, F. C. 1941. British Columbia dragonflies (Odonata) with notes on distribution and habits. Amer. Midl. Nat. 26:488-557.
- Whitney, R. C. 1947. Notes on *Tanypteryx hageni*. Ent. News 58:103.