

Aquatic insects of the central North Island

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Abstract

An account is given of the streams of the central North Island and the invertebrate fauna they contain.

Keywords: Trichoptera; Ephemeroptera; Plecoptera; Diptera; Neuroptera; Coleoptera; Hemiptera; volcanic plateau; central North Island; New Zealand.

Over the years streams of the central North Island Volcanic Region (CNIVR) have received little attention. Most of the earlier entomological work on these habitats involved the collection of insects for taxonomic purposes. More recently, due to possible oil pollution from the Turoa Ski Resort, the Mangawhero R. has been looked at in more detail by Freshwater Division, DSIR. Michaelis has published on the fauna of Hamurana Springs (Michaelis 1977) and is carrying out a survey of some of the main streams in Tongariro National Park (TNP). Workers have therefore been more interested in TNP than in the Rotorua region.

Types of Streams

There are a large number of streams in the CNIVR displaying a wide range of different types. These are:

a. Glacial. These have torrential waters, unstable substrates with large boulders, and cool temperatures (just above 0°C). The rocks and water in these systems are clean with very little plant growth, e.g., Mangaturuturu R. Insects are uncommon.

b. Stable (large and small). In this same region there are streams that are not so subject to abrasion or to very cold temperatures. These streams range from larger ones, e.g., Whakapapanui R. (rocks), Waihohonu R. (boulders), to smaller bush ones, e.g., Reids Creek, a tributary of the Mangawhero R. All can have large populations of insects.

In many of these mountain streams there is a lack of larger plant materials (leaves, twigs, and branches) because they are above the bush line or because their torrential waters do not allow the accumulation of such detritus, i.e., with the added lack of algae, major food sources are minimal.

c. Pumice. These have fine and coarse pumice substrates which are usually unstable though compacting sometimes allows algae and macrophytes to become established. Some streams of the Desert Road, e.g., Mangatoetoenui, along the sides of L. Taupo, e.g., Waitahanui, and around Rotorua, e.g., Ngongotaha, are of this type. Insects are found mainly on plants.

d. Springs. Usually these have clean waters with macrophytes, e.g., Humurana, the source of the Ngongotaha Stream, and many small springs along the sides of the Whangaehu R. These are often rich in life.

e. Polluted (may be of the above types). **(i)** Power schemes, e.g., Tongariro R. These have large quantities of silt both in suspension and coating the substratum. Life is reduced. **(ii)** Thermal springs, e.g., Whangaehu R., quite sulphurous with little life. **(iii)** Urban and farming. Most of these are between Taupo and Rotorua and also around Rotorua. They vary greatly in their state and the life they possess, e.g., Wharepapa R., Mangakakahi Str., Utahina Str., are all of this type. They have varying numbers of insects. **(iv)** Lake outflow, e.g., Kaituna R. This receives outflow from L. Rotorua and L. Rotoiti. It is rich in nutrients, phytoplankton, and zooplankton. Associated with this is its algal stench. Insect life is patchy.

The fauna

The main groups of insects found in the CNIVR are the same as in other streams elsewhere in New Zealand (Wise 1973). Trichoptera, Ephemeroptera, and Plecoptera are abundant. Diptera are represented commonly by Chironomidae, Simuliidae, and Tipulidae though other families occasionally occur. Neuroptera, Coleoptera, and Hemiptera vary in their presence.

At this time, with the relatively small amount of work that has been done, there appears to be no freshwater insect species unique to the region. There are however several interesting points I would like to make.

1. Type-species. The Chironomidae have 18 species whose types are from the CNIVR. This is due entirely to T. R. Harris' efforts at Ohakune in the early 1920's (Freeman 1959; Brundin 1966). One blepharicerid (*Peritheates harrisi* (Campbell)) was also described from Harris' collection. Nine species of caddisfly have their types from this region (Mosely & Kimmins 1953) although these were collected by several workers (E. G. Turbott, G. V. Hudson, R. J. Tillyard). Other groups do not have types from the CNIVR.

2. Commonness. Trichoptera (Rhyacophilidae: Hydrobiosinae) are very common. In *Hydrobiosis* alone more than 10 species have been recorded. Of the Sericostomatidae *Pycnocentria funerea* McLachlan is far more common in TNP than in other parts of the North Island. *Bereoptera roria* Mosely is also plentiful in some of the streams. Plecoptera. Most of the New Zealand species are found in the CNIVR. Of these *Austroperla cyrene* (Newman) *Megaleptoperla* spp., and *Zelandoperla agnetis* McLellan are reasonably common. *Zelandoperla decorata* Tillyard is found in nearly all of the streams (McLellan 1968; Winterbourn 1965). Ephemeroptera. Because of the uncertain taxonomic state of this group it is difficult to make accurate comments. *Austroclima sepia* (Phillips) is abundant in some streams; *Nesameletus* spp., *Zephlebia* spp., and *Deleatidium* spp. are found throughout the region (Towns 1978 a, b; Towns & Peters 1979; Phillips 1930).

3. Geographical distribution. This is probably the most interesting aspect of stream insects of the CNIVR as some species that are common in the South Island have a range extending north along the upland regions of the North Island.

Trichoptera. *Pycnocentrella eruensis* Mosely has a present known distribution from TNP (Reids Crk, Erua, Mangahua Stm, Waimarino Stm) to the Nelson region and Hawkes Crag Crk (Buller Gorge). *Aoteapsyche tepoka* (Mosely in Mosely & Kimmins) is found in the CNIVR (600 m) in other upland areas of the North Island and has a widespread distribution in the South Island. *Helicopsyche albescens* Tillyard has a similar distribution to *A. tepoka* whereas *H. poutini* McFarlane has much the same range as *Pycnocentrella* (Cowley 1978).

Diptera. Of the 4 species of *Austrosimulium* found in the CNIVR 2 have interesting distributions. *A. tillyardianum* Dumbleton is found in TNP and the southeast of the North Island. It is confined to the eastern side of the South Island. *A. multicornis* Tonnoir has only been found at Ohakune in the North Island and is widespread in the South Island (Dumbleton 1973). *Peritheates harrisi* (Campbell) is a North Island blepharicerid species of the alpine/subalpine regions (Craig 1969).

Although these distributions look interesting many streams in the CNIVR and other parts of New Zealand have not been sampled. The example of one caddisfly species illustrates the need for caution. Until recently *Pycnocentria sylvestris* McFarlane had only been collected from the Nelson region and from Cass in the South Island. It has recently been taken from the Hatcheries stream at Ngongotaha. This species has very restricted habits being found only on certain forms of decaying wood. Distribution may therefore only reflect the collector's interests, ability, and the streams visited.

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REFERENCES

- BRUNDIN, L. 1966: Transantarctic relationships and their significance as evidenced by chironomid midges. *Kungl. Svenska vetenskapsakademiens handlingar* (4) 11 (1):1-472.
- COWLEY, D. R. 1978: Studies on the larvae of New Zealand Trichoptera. *New Zealand Journal of Zoology* 5: 639-750.
- CRAIG, D. A. 1969: A taxonomic revision of New Zealand Blepharoceridae and the origin and evolution of the Australasian Blepharoceridae (Diptera: Nematocera). *Transactions of the Royal Society of New Zealand, Biological Sciences* 11 (9):101-151.
- DUMBLETON, L. J. 1973: The genus *Austrosimulium* Tonnoir (Diptera: Simuliidae) with particular reference to the New Zealand fauna. *New Zealand Journal of Science* 15:480-584.
- FREEMAN, P. 1959: A study of the New Zealand Chironomidae (Diptera, Nematocera). *Bulletin of the British Museum (Natural History) Entomology* 7 (9):393-437.
- MCLELLAN, I. D. 1968: New gripopterygids (Plecoptera) of New Zealand. *Transactions of the Royal Society of New Zealand (Zoology)* 9 (1):1-15.
- MICHAELIS, F. B. 1977: Biological features of Pupū Springs. *New Zealand Journal of Marine and Freshwater Research* 11 (2):357-373.
- MOSELY, M. E; KIMMINS, D. E. 1953: The Trichoptera (Caddis-Flies) of Australia and New Zealand. British Museum (Nat. History), London.
- PHILLIPS, J. S. 1930: A revision of New Zealand Ephemeroptera part 1 and 2. *Transactions of the New Zealand Institute* 61:271-390.
- TOWNS, D. R. 1978 a: First records of *Siphlaenigma janæ* (Ephemeroptera: Siphlaenigmatidae) from the North Island of New Zealand. *New Zealand Journal of Zoology* 5:365-370.
- 1978 b: Some little-known benthic taxa from a northern New Zealand river and its tributaries. *New Zealand Entomologist* 6 (4):409-419.
- ; PETERS, W. L. 1979: Three new genera of Leptophlebiidae (Ephemeroptera) from New Zealand. *New Zealand Journal of Zoology* 6:213-235.
- WINTERBOURN, M. J. 1965: Studies on New Zealand stoneflies 1. Taxonomy of larvae and adults. *New Zealand Journal of Science* 8 (3):253-284.
- WISE, K. A. J. 1973: A list and bibliography of the aquatic and water-associated insects of New Zealand. *Records of the Auckland Institute and Museum* 10:143-187.