

Freshwater Fisheries Advisory Service

Marine Department

Investigation Report

Job No. 81

Acclimatisation Society District: Ashburton

Title of Job: Bottom and Drift Fauna sampling of Glenariffe Stream, Rakaia River.

Objectives: To ascertain the invertebrate fauna population in Glenariffe Stream.

Introduction

From July 1968 until December 1969, Drift and Bottom fauna samples were collected at two monthly intervals from six stations in the Glenariffe system.

Over the 18 month period 104 samples of each type were collected. These were analysed on a quantitative basis in the Christchurch laboratory and the results are enclosed in this report.

Methods

All bottom fauna samples were collected with a standard sq.ft. surber sampler. Drift fauna were collected in the type of drift fauna sampler described by Hardy 1968, as shown in Fig. 1.

Drift fauna sampling was done on a 24 hour basis usually from noon till noon. All samples were preserved in a solution of 4% Formalin.

The sampling stations selected were not uniform but were representative of the water conditions throughout the system, eg.

Station 1, Lower East Branch

Flow 27.51 cusecs - 1.37 ft. per sec.

Banks undercut, cover, tussock overhang 90%.

Station 6 - Main Stream Hydra

Flow 27.18 cumsecs - 2.12 ft. per sec.

Banks undercut, cover, matagourie 100%.

Although the volume of water is much the same at both stations the velocity is greater at station 6.

At certain times of the year, thick algal growth covers most of the stream bed, except where the current is fairly swift, e.g. Hydro Stm, Station 6. This proved to be a nuisance when taking the 24 hour drift samples because of the clogging effect the algae had on the fine mesh of the nets.

Stream flows at each station were taken with a Gurley (Pygmy) Current Meter.

Results

		<u>Current</u>	<u>Flow</u>
Station 1.	Lower East Branch	1.37 f.p.s.	27.5 cusecs
Station 2.	Upper East Branch	1.08 "	10.2 "
Station 3.	South Branch	2.15 "	40 "
Station 4.	Main Stream Boundary	2.22 "	54.46 "
Station 5.	Tributary Stream	1.44 "	8.25 "
Station 6.	Main Stream Hydro	2.12 "	27.18 "

Results: Invertebrate Fauna

Surber Sampling

The total numbers and percentages of bottom fauna in 104 samples taken in Glenariffe Stream are shown in Table 1.

The prevalent forms found in all samples were the mayflies Deleatidium, Coloburiscus, and the caddises Pycnocentria, Pycnocentroides. Tubifex worms were found at Stations 1, 2, 3, 5. The highest (260) in samples taken in the Upper East Branch.

The main stream depth was 3" high in September and $\frac{1}{4}$ " high in November 1968. Although the flows at the various stations would be swifter then, the water was never discoloured during sampling.

The Tributary Stream is always very stable, but not many mayflies were found in the samples. It has been noted during electric-fishing in this area that large numbers of Coloburiscus are

present throughout the year.

Fig. 2 shows the number of sandy cased caddises and mayflies per sq. ft. during the whole of the sampling period along with temperatures taken then.

Drift Sampling

Total numbers and percentages of drift fauna are shown in Table 1A.

Fig. 3 shows the number and frequency of sandy cased caddises and mayfly, for the whole sampling period.

Comparison of numbers found in samples varied a lot between stations both in drift and bottom samples, probably because of the difference in type of water. Table 2 shows the average number per sq. ft. for drift and bottom fauna at each station.

Table 2

DRIFT			BOTTOM	
	No. of Samples	Av. No. of Animals per cu.ft	No. of Samples	Av. No. of Animals per sq. ft
Stn. 1.	18	208	16	349
Stn. 2.	18	237	16	172
Stn. 3.	18	403	18	333
Stn. 4.	18	179	18	182
Stn. 5.	16	68	18	267
Stn. 6	16	225	18	131

A survey done by Boud and Eldon in 1959 on Glenarrife Stream, found an average of 244 animals per sq. ft. in 18 bottom fauna samples. Over 50% were mayfly nymphs and approximately 40% caddis larvae.

In the 1966-69 period the average of 104 bottom samples was 245. Of these 38% were mayfly nymphs and 47% caddis larvae.

The small caddis Oxyethira appeared in much larger numbers in the drift samples than in the surber. This was also found by Burnet (1968) in experiments on the South Branch and also by

McLay (1964-65) in the Kakanui River. Burnet also found more of the caddis Pycnocentria and the mollusc Potamopyrgus in the drift. This was not so in the Glenariffe. Chironomidae were more prevalent in drift samples as was found in the South Branch.

Discussion

The Glenariffe Stream supports a relatively low population of bottom and drift fauna throughout.

In the Tributary Stream, Station 5, few mayfly were found in the samples compared to what are caught in the dip nets while electric fishing.

The stations differ considerably, both physically and in type of water, i.e. pools, riffles, slow, fast, etc., but they are representative of the Glenariffe system.

The presence of Tubifex worms is usually an indication of pollution.

Their presence in the Upper East Branch could be caused by leeching of waste materials from Glenariffe Station, which is situated on the terrace directly above this stream.

The seasonal variation between sandcased caddis and mayflies is much the same.

Conclusions and Recommendations

1. The bottom fauna density has not changed since 1959 (refer Job 18). Ephemeroptera and Tricoptera remain the dominant forms in Surber samples.
2. The temperature of the water affects the numbers of drift fauna much more severely than the bottom fauna, see Figs. 2,3,4.
3. There is a large resident population of large and small Brown Trout in Glenariffe stream. If these were removed or partially removed it would undoubtedly improve feeding conditions for salmon fry and smolts.

Executed by: Technical Field Service

Supervised by: R.W. Little

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References:

- Burnet, A.M.R. (1961): A study of the inter-relation between eels and trout, the invertebrate fauna and the feeding habits of the fish. Fisheries Tech. Report No. 36.
- Allen, K.R. (1951): The Horokiwi Stream. Fish. Bull. No. 10 Marine Dept. N.Z.
- McLay, C.L. (1968): A study of drift in the Kakanui River, New Zealand. Aust. J. Mar. Freshwater Res. 1968, 19, 139-49.
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- Hardy, C.J. (1968): Freshwater Fisheries Field Techniques Fisheries Tech. Report No. 27.

TABLE 1A

			<u>Numbers</u>	<u>Percentage</u>
Platyhelmia			48	.23
Annelida	Oligoch spp.	147		
	Tubifex	184		
		-	331	1.62
Nematoda			14	.06
Mollusca	Potamopyrgus	54		
	Physastra	1		
	Similimnea	1		
	Planorbis	36		
		-	92	.45
Ephemeroptera	Coloburiscus	1549		
	Imago	12		
	Nesameletus	17		
	Zephlebia	326		
	Onisgicaster	2		
	Deleatidium	4585		
	Imago	227		
		-	6718	33.0
Plecoptera	Stenoperla	54		
	Leptiperlidae	233		
		-	287	1.41
	Archichauliodes		28	.13
Trichoptera	Pycnocentria	2665		
	Pycnocentrodes	1292		
		-	3957	19.47
Sericostomitidae	Olinga	1292		
	Helicopsyche	4		
	Oecetis	7		
	Imago	1		
		-	1304	6.41
Leptoceridae	Triplectides	2		
	Hudsonema	9		
		-	11	.05
Hydropsychidae	Hydropsyche		370	1.82
Rhyacophilidae	Hydrobiosis	518		
	Psilochorema	14		
	Neurochorema	9		
		-	541	2.66
Hydroptilidae	Oxyethira		2729	13.42
Coleoptera	Elmidae	683		
	Costelytra	12		
		-	695	3.42
Diptera	Simuliidae	135		
	Dixidae	6		
	Chironomidae	1419		
	Syrphidae	38		
	Tipulidae	28		
	Tahanidae	229		
	Muscidae	16		
		-	1871	9.2
Arachnidae			11	.05
Miscellaneous			47	.23
Trout Fry			18	.08
Salmon Fry			1249	6.14
Grand Total:			20321	99.9

TABLE 1

			<u>Numbers</u>	<u>Percentage</u>
Platyhelminia			315	1.23
Annelida	Oligoch spp.	228		
	Tubifex	370		
		-	598	2.33
Nematoda			82	.32
Mollusca	Potamopyrgus	1099		
	Pysastra	1		
	Planorbis	9		
			1109	4.33
Ephemeroptera	Coloburicus	2167		
	Nesameletus	50		
	Zephlebia	144		
	Deleatidium	7361		
	Imago	21		
		-	9743	38.06
Plecoptera	Stenoperla	145		
	Leptiperlidae	85		
		-	230	.89
Archichauliodes			236	.92
Trichoptera	Pycnocentria	7490		
	Pycnocentroides	2007		
			9497	37.1
Sericostomatidae	Olinga	1708		
	Helicopsyche	4		
	Oecetis	1		
			1713	6.69
Leptoceridae	Hudsonema		6	.02
Hydropsychidae	Hydropsyche		559	2.18
Rhyacophilidae	Hydrobiosis	172		
	Psilochorema	2		
	Neurochorema	11		
		-	185	.72
Hydroptilidae	Oxyethira		42	.16
Coleoptera	Elmidae	491		
	Hydophilidae	2		
		-	493	1.92
Diptera	Simuliidae	112		
	Chironomidae	356		
	Tipulidae	2		
	Tabanidae	273		
	Dixidae	2		
	Muscidae	34		
		-	779	3.04
Arachnidae			2	.007
Salmon Fry			9	.03
Grand Total:			25,598	99.947