

Surveys of Giant Weta

Little Barrier Island, Pig Island (Foveaux Strait), and Mt
Faraday and Price's Basin (Southern Alps)

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Part I Giant Weta (*Deinacrida heteracantha*): Survey of Little Barrier Island, October 1992

1. Introduction

This survey of wetapunga (*Deinacrida heteracantha*) distribution and status on Little Barrier Island was conducted by the Weeds & Pests Division, Manaaki Whenua-Landcare Research, Taita, for the Department of Conservation, during October 1992.

2. Background

Wetapunga (*Deinacrida heteracantha*), the largest of the giant wetas, were once common in the northern parts of the North Island, but now exist only on Little Barrier Island. A short survey there in 1990 suggested wetapunga numbers were low (Meads & Ballance 1990). This prompted concern over the conservation status of wetapunga on Little Barrier Island, which must be clarified so that appropriate management strategies can be decided.

3. Objective

- To assess the distribution and population status of wetapunga on Little Barrier Island.

4. Methods

The survey was conducted on Little Barrier Island (3083 ha) during 6-20 October 1992 (Fig.1.). Night searching with headlamps and binoculars was used to find and briefly capture live wetas for measuring. Day searching techniques

concentrated on locating wetapunga faecal pellets to establish their presence, distribution, and habitat requirements.

4.1 FIELD SURVEY

The survey focused on the more accessible southern half of the island, but 5 days (7-11 October) were spent surveying forest in the Pohutukawa Flat area, including an area where wetapunga had been found previously (Whitaker & Daugherty 1991).

The remaining 10 days were spent in the southern half of the island around Te Maraeroa, and all tracks from Track 3 (near Ngamanauraru Bay in the west) to Track 16 (near East Cape Hut in the east) were searched from sea level up to the vicinity of Mt Hauturu. A different area was searched each day, with the exception of Te Maraeroa and the lower forested section of Te Waikohare Stream, which were searched several times.

Searching for wetapunga was conducted at night, using headlamps to search tree trunks. Most effort was concentrated on mature epiphyte-covered trees, and binoculars were used to search taller trunks and branches up to 20 m in height. The numbers of wetas found was expressed as an observation rate (person hours per weta found) to be consistent with earlier surveys.

Searches were also made for weta faecal pellets during daylight. These pellets are distinctive and cannot be confused with those of any other animal on Little Barrier Island. Wetapunga faecal pellets are most often found at the base of the trunks of old convoluted trees, inside refuge crevices in tree trunks, and in areas directly below epiphytes on overhanging branches. Wetapunga faecal pellets were difficult to find in the often dark, deep leaf-litter cover on the forest floor, and the relatively smooth, clear, dry creek beds were often the most productive.

Fresh foliage and hanging dead skirt material of low-growing *Astelia* clumps were checked both for wetas and their faecal pellets.

4.2 WETAPUNGA MEASUREMENTS

Wetapunga found were captured, weighed, and measured. The length of the rear tibia and the length of the thoracic shield, were recorded (Appendix 10.1).

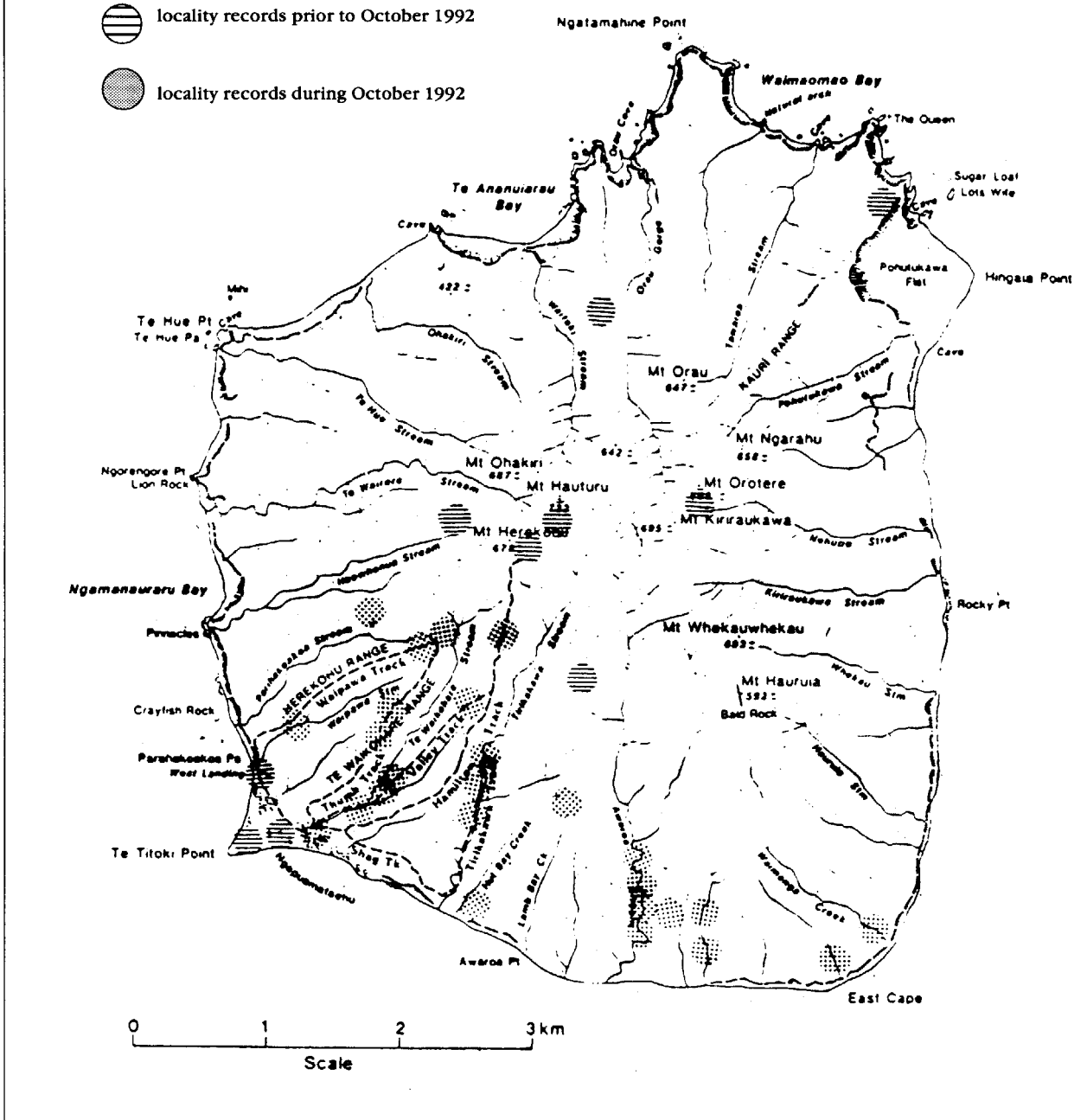
5. Results

5.1 SEARCH EFFORT

A total of 93 h were spent searching for wetapunga at night, and 117 h were spent searching for faecal pellets during the day. Effort was concentrated in the forest of Pohutukawa Flat and Kauri Ridge (28 person hours at night and a further 34 hours during the day) and in Te Maraeroa and the lower section of Te

Waikohare Stream (55 hours at night, 7 hours during the day). All tracks and many valleys in the southern part of the island from Ngamanauru Bay to East Cape were visited (Fig. 1).

FIG. 1 DISTRIBUTION OF WETAPUNGA (*DEINACRIDA HETERACANTHA*) ON LITTLE BARRIER ISLAND IN OCTOBER 1992.



5.2 WETAPUNGA CAPTURES AND FAECAL PELLETS RECORDS

A total of 25 wetapunga were caught, two in daytime (one sheltering under bark of a dead beech (*Nothofagus* sp.) stump and the other in a rata (*Metrosideros robusta*) crevice on thumb Track). All 23 caught at night were from the Te Maraeroa area near the Bunkhouse, or from the lower part of Te Waikohare Stream, near the ranger's house. In addition to the 25 captured, four wetas were observed in inaccessible places at night and their size was estimated.

On average, one wetapunga was caught or observed per 8.8 person hours searching.

A total of 39 wetapunga faecal pellets were found (average of one pellet per 3 person hours search time), all within the area encompassed by Ngamanaururu Bay in the west, Mt Hauturu to the North, and Waimanga creek to the east (Fig.1.).

5.3 WETAPUNGA MEASUREMENTS

With the exception of the two wetapunga caught on the Thumb Track, most wetapunga measured were from the forest in Te Waikohare Stream area adjacent to the ranger's house. At least one animal was observed in the rimu tree in the ranger's garden.

A summary of the measurements data is presented in Appendix 10.1.

5.4 WETAPUNGA HABITAT

Wetapunga are herbivores, feeding generally over a wide range of plant species, large and small. However, they were found only under or immediately adjacent to stands of mature forest, which appeared to provide good cover and safe refuge. We consider this illustrates the importance of large, convoluted trees with retreats, cover, and crevices necessary to shelter large wetas such as *D. heteracantha* from predators. The importance of safe cover for wetapunga is further illustrated by wetapunga and weta faecal pellets from at least three age groups of *D. heteracantha* being found on or under the rimu (*Dacrydium cupressinum*) in the ranger's garden (one of two known on the island). Rimu trees, particularly their spiny, drooping foliage, also provide good cover for giant wetas. These factors suggest that predation pressure and not the availability of food supply is the main influencing factor on wetapunga numbers and distribution.

The *Muehlenbeckia complexa* community covering boulder banks around the boat shed was recognised by Richards (1973) as being an easy site to locate wetapunga. However, though we closely inspected these areas no wetapunga or sign was observed.

We consider the high numbers of *D. heteracantha* that were observed in the past (Richards 1973) and during this survey around the ranger's house may be

attributable to rat control activities there (including poisoning). Certainly there is evidence of varying efforts at rat control in the vicinity of the ranger's station extending back to the 1930s. Seven rat stations are currently operated around the ranger's house, and boat landings.

In general, the forest in the southern part of Little Barrier Island has been disrupted by milling and fires. The ridges have early successional forest, typically medium-sized kauri (*Agathis australis*), beech, and kanuka (*Kunzea ericoides*) forest in which tree trunks were mostly clean of epiphytes. Occasional mature trees were present. In several places (Thumb and Summit Tracks), significant stands of mature trees were present on the ridges. These were the only ridges where we found wetapunga sign.

Valley floors typically had numbers of very old large trees (mostly taraire (*Beilschmiedia tarairi*) and puriri (*Vitex lucens*), which were peppered with puriri moth larvae burrows). This was particularly so for the valleys in the south-eastern corner of the island. Wetapunga faecal pellets were most frequently encountered at these sites. We consider that the frequency of observations on or around puriri trees during this survey most likely reflects the presence of suitable refuges not a diet preference.

Generally, kanuka forest on the island had very few refuges suitable for giant weta. However, wetapunga faecal pellets were recovered from kanuka stands on Thumb Track and the lower sections of Valley Track, where mature kanuka trees with epiphytes were present.

In the Pohutukawa Flat area there were numerous very large trees that might have been suitable for wetapunga. However, many of these trees were leaning at a considerable angle (near horizontal) and would have been accessible to rats. The extreme height of many trees in this area made it difficult to survey them satisfactorily, even with binoculars. No wetas were found.

5.5 WETAPUNGA BEHAVIOUR

Captive giant wetas are not active on all nights. When they are active, they leave their daytime refuges soon after dark and move to forage in the foliage above. Thus searching started soon after dark, as we considered that success beyond the early part of the evening would be unlikely. This was especially critical for the Pohutukawa Flat site where there were particularly tall trees. Any wetas that had refuges low on trunks would be expected to climb quickly up to the high foliage and become difficult to observe. However, there was some indication that the wetapunga near the ranger's house (Te Waikohare Stream) were active or resting in the open quite low down on bark and tree trunks at late hours (after midnight).

The moon was half full during the survey and provided relatively bright lighting after 10 pm. This made searching difficult, and may have influenced weta activity (in order to reduce the possibility of predation, wetas may be less active on bright nights). The activity notes in the supplement record most wetas as resting on branches or foliage. Three different wetapunga near the bunkhouse were observed in the same vicinity or in their daytime refuges during the night.

For example a large female wetapunga, observed in a small crevice 1 m from the ground, was still in its daytime refuge as late as 2300 h on 3 nights.

A few of the larger wetapunga males displayed defence actions not easily evoked in *Deinacrida* species. On several occasions wetas dug their rear tibial spines into the captor's hands or bit handlers without apparent provocation, but the mandibles did not pierce the skin. These behaviours may be defensive responses developed against kiore disturbances.

5.6 PREVIOUS WETAPUNGA OBSERVATIONS

The ranger and caretaker log books for Little Barrier Island contain six records of giant weta, the first stating six giant wetas were caught for the Museum in 1941, a live female for the Auckland Museum in 1952, and a further seven the following year. A 1960 report stated, "Giant weta inhabits a wider range than originally thought". Two and three giant wetas were caught for DSIR on separate dates in February 1976.

The records and notes of wetapunga observed during kakapo research from Oct 1989 to Nov 1990 record two adult females caught in rat traps, and two adult females crossing track. Fresh weta faecal pellets were noted from three localities.

A specimen was observed by George Gibbs in 1991 close to the top of Hingaia Cliffs at the northern end of Pohutukawa Flat, and an adult male wetapunga and sign were found just north of Parihakoakoa Stream, North of Te Maraeroa flat (Whitaker & Daugherty 1991). No other observations have been formally recorded.

5.7 KIORE ACTIVITY

Kiore sign (litter scratched clear with lots of kiore faecal pellets and husked seeds) was common throughout the Island. Every mature puriri and taraire tree checked had a kiore "husking" station at its base. Most likely looking crevices and retreats close to the ground that may have been suitable for wetapunga had indications of kiore activity.

In areas where wetapunga faecal pellets were present, kiore activity appeared to be low. For example on the Valley Track in the Te Waikohare valley floor where weta faecal pellets were relatively frequently encountered, several complete shells of the snails *Serpbo kivi* and *Phacussa* sp. were also found in the litter. This contrasted with the Summit Track, where kiore-damaged invertebrates and fewer wetapunga faecal pellets were observed.

Similarly there was less kiore sign in beech and kauri forest on Thumb Track where wetas and weta sign were encountered, than on the lower kanuka/puriri forest around track 20 and the upper sections of track 3 where kiore sign (husking and droppings etc) were frequently encountered, but no wetas.

Kakapo research workers recorded only five wetapunga (two in rat traps) and saw three faecal pellets during a 13-month period of regular and routine rat trapping and kakapo observation in 1992.

Eighteen kiore traps set at each of the nine kakapo feeding stations for the year September 1991-92, caught a total of 648 kiore for the 12 month period. The monthly average (54) and range (15 - 137), showed highest capture rates in Autumn (March - May), and lowest in winter through to spring (July - January).

The kiore-eaten remains of a wetapunga abdomen was observed near the bridge to the ranger's house adjacent Te Waikohare Stream.

6. Conclusions

6.1 NUMBER OF WETAPUNGA

- The observation rate of 8.8 person hours per weta is consistent with the results from Meads & Balance (1990) and suggests that weta numbers have not declined markedly since then.
- Weta faecal pellets are present over much of the southern part of the island. No evidence of wetas was found from the northern part of the island during this survey.
- Wetapunga faecal pellets were unevenly distributed, but were the most readily encountered evidence of wetapunga.
- Considering the level of research activity over much of the island and several teams working at night (kakapo, tuataras and bats), very few wetapunga have been reported (six since 1989) outside the base camp and vicinity of ranger's house.
- The population of wetapunga on Little Barrier Island are the **last** survivors of this species and are in our opinion under threat from large numbers of kiore.
- The populations recorded during 1950's from Te Maraeroa kanuka and Titoki Point *Muehlenbeckia* and coastal pohutukawa have gone.

7. Recommendations

- The impact of kiore on wetapunga and the general invertebrate fauna should be investigated immediately. In the meantime rodent control in the vicinity of the ranger's house should be maintained and extended to the entire Te Maraeroa area.

- To ensure the conservation of the heaviest and most distinctive species of our giant weta, a captive breeding programme should be established immediately with the aim of translocating the species to rat-free islands.
- Nest boxes and artificial refuges for wetapunga should be investigated as a means of protecting wetapunga where kiore control is not feasible or affordable.
- The population near the ranger's house should be regularly monitored, and the monitoring programme should be used to assess density, behaviour, and biology of wetapunga.
- Future surveys should establish the distribution of wetapunga in the northern half of the island.

8. Acknowledgements

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10. Appendices

10.1 MEASUREMENTS OF LITTLE BARRIER ISLAND WETAPUNGA 6-20 OCTOBER 1992

DATE IN 1992	SEX OF ANIMAL	TIME	LOCATION OR GRID REF.	WEIGHT (g)	THORAX LENGTH (mm)	REAR TIBIA (mm)	HABITAT	ACTIVITY
6 Oct	M	2135	955514	4.5	8.6	22.7	mahoe dead branch	resting
7 Oct	M	1000	Garden rimu tree	approx 10			rimu foliage	resting
12 Oct	M	2152	Outside bunk room	16.5	13.4	37.1	mahoe dead branch @ 5 m	resting/feeding ?
12 Oct	F	2212	Outside bunk house	17.1	14.0	37.8	pohutukawa trunk	resting
13 Oct	F	1200	Thumb track @ 700'	37.5	16.5	53.2	dead beech bark	resting
13 Oct	M	1302	Thumb track @ 900 m	20.0	15.1	52.5	rata crevice	resting
13 Oct	M	2050	House bridge pohutukawa	7.3	10.6	28.2	karaka branch @ 2 m	resting
13 Oct	F	2125	House bridge pohutukawa	10.0	12.15	31.4	pohutukawa branch @ 6 m	resting
13 Oct	F	2140	as above	29.2	14.6	45.7	pohutukawa trunk	resting
13 Oct	NR	2200	as above	NR approx 5	NR	NR	under-side of pohutukawa branch	retreating into crevice

DATE IN 1992	SEX OF ANIMAL	TIME	LOCATION OR GRID REF.	WEIGHT (g)	THORAX LENGTH (mm)	REAR TIBIA (mm)	HABITAT	ACTIVITY
13 Oct	NR min	2216	Garden rimu tree	NR approx 5	NR	NR	dead rimu foliage	resting
13 Oct	F	2258	Gate nikau	16.8	13.0	38.6	under nikau skirt	resting
15 Oct	M	2356	Creek near garden	4.3	8.0	20.0	pohutukawa bark	resting
15 Oct	F	2357	as above	17.3	15.2	48.35	pohutukawa bark	resting
15 Oct	F remeasure	2356	as above	27.1	14.5	45.15	pohutukawa bark	resting
16 Oct	M	0006	as above	3.8	8.75	23.5	dead pohutukawa	resting
16 Oct	M		Bridge pohutukawa	17.8	14.4	48.5	bark @ 3 m	resting
16 Oct	M		Mahoe adjacent	12.3	12.5	34.6	dead stem adjacent	resting
16 Oct	F		as above	34.0	15.7	48.6	dead stem retreat	resting
16 Oct	F		Bridge pohutukawa	10.3	10.8	31.8	bark	resting
16 Oct	M		as above	12.3	11.8	33.85	bark	resting
16 Oct	M		Collopermum on above	8.3	11.6	36.7	dead skirt mat.	resting
16 Oct	M	0030	as above	15.0	12.3	35.7	bark	resting

DATE IN 1992	SEX OF ANIMAL	TIME	LOCATION OR GRID REF.	WEIGHT (g)	THORAX LENGTH (mm)	REAR TIBIA (mm)	HABITAT	ACTIVITY
16 Oct	F remeasure		as above	17.8	13.2	39.0	CollospERMum	resting
16 Oct	F		as above	10.8	11.5	30.2	dead skirt mat.	resting
16 Oct	F		Taraire tree opposite	large	female	unobtainable	trunk	resting
18 Oct	F	2144	Garden adjacent rimu	NR moulting?	13.4	40.4	kanuka epiphytes	ecdysing
18 Oct	F	2146	Bridge pohutukawa	41.0	17.6	51.7	trunk bark	resting
18 Oct	M	2150	as above	12.1	12.0	33.0	pohutukawa trunk	resting
18 Oct	F	2158	as above	31.3	15.8	48.1	rope on tree @ .5 m	eating mahoe
18 Oct	F	2206	as above	10.5	10.6	29.2	epiphyte on pohutukawa	resting
18 Oct	M	2208	as above	7.6	12.0	36.4	epiphyte on pohutukawa	resting
18 Oct	M	2210	as above	17.1	13.15	38.35	CollospERMum skirt	resting
18 Oct	F	2214	as above	7.5	9.8	25.5	CollospERMum foliage	resting
18 Oct	F wild remeasure	2216	as above	16.7	14.4	50.6	CollospERMum skirt	resting

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