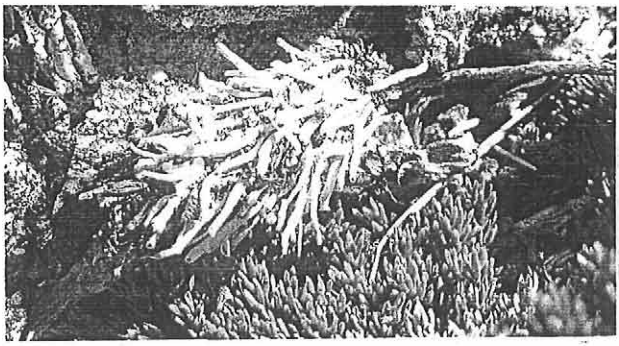

Case of alpine casemoth, *Orophora unicolo,* covered in cut strands of the white lichen, *Thamnolia vermicularis*. Old Man Range. *A. Knight*

There are two other large species in New Zealand; one an undescribed *Liothula* that is found in forests and gardens from about Greymouth north, and the alpine casemoth *Orophora unicolor*. The later is distributed throughout the South Island down to 600m in places in Central Otago and also on Mt Anglem on Stewart Island. Its cases are ornately decorated with various lichen or grass species making a spectacular sight as it hauls its cases across high-alpine tundra.

By far the majority of our casemoth fauna consists of much smaller species in the genera *Reductoderces, Scoriodyta, Mallobathra* and *Grypotheca*. The cases are diagnostic for each genus as are the larval feeding habits. Typically the female casemoth is flightless, either apterous or short-winged and either remaining inside the cases after emergence from the pupa or clinging to the outside of the case awaiting a male. Some *Mallobathra* females are fully winged and fly by day. These genera are found in specialised places from the sub-antarctic islands, through coastal cliffs up to the high-alpine zone, with each species living in a particular habitat and with larvae depending on a certain food source.

Good places to see aggregations of the larval cases of these smaller casemoths are rock faces, tree trunks and clay banks where a covering of algae provides sustenance for the larvae.

Another peculiarity of casemoths is that the fragile males often fly at dawn to seek a female, as this is the time when air is stillest and safest for them. Fewer species are day-flying, delighting to sunbathe and mate on the sunniest days of spring or summer. Because for the majority of species the females are flightless, dispersal is effected by the emerging larvae ballooning to new habitats or hosts with the use of silk in much the same way spiderlings do it.

Meeting reports

Gardens Without Weeds? Annual General Meeting 21 April 2004

Helen Leach, Dept. of Anthropology, Otago University. *Reviewed by Ian Radford*

A couple of months ago, at a conference in South Africa, saw a talk by Dave Richardson, a prominent plant invasion ecologist, suggesting that Australian *Eucalyptus* species were mere whimps when it came to invasiveness. Despite the fact that I obviously don't like weeds, my national pride was stung by the inference that Australia's best, the eucalypts, were somehow inferior in invasive ability compared to

say *Pinus*. But following the talk by **Helen Leach** at the AGM this year (21st April), I don't feel nearly so slighted. Clearly New Zealand indigenous plants are even more whimpy than the Australian eucalypts when it comes to invasiveness!

Helen set the scene of her talk soon after the arrival of Europeans into New Zealand with an account by Dr Monkhouse of Maori gardens at Anaura Bay. Apparently in a walk through these gardens Dr Monkhouse noticed very few weeds – something he found quite impressive, apparently, compared to equivalent European gardens.

Based on this, and other similar observations Helen posed the question:- Did the Maori actually have any weeds in their gardens? In other words, was the weed free nature of the gardens because there were no weeds, or because the Maori were meticulous gardeners? Following from this question Helen also asked, did Maori have a concept of weeds? If the Maori didn't have weeds, perhaps they didn't need a concept/word to describe them. These were the basic questions addressed in the rest of the talk.

Helen described the Maori gardening/cropping practices in order to set the context in which weeds may or may not have been present. Apparently Maori had a style of agriculture known as swiddening, where native bush is slashed and burnt, to remove most of the forest cover, the land was cropped for about 2 years, then the site is left fallow for 14 – 25 years. She suggested that such a system did not allow for the conditions in which weeds and other problems such as pathogens might develop. Maori apparently avoided problems with having to clear species like bracken in their gardens, by having that long fallow period. Long fallow periods perhaps allowed secondary woody regrowth to shade out problem species. Is this an example of an indigenous people being in tune with their environment?

Helen spent a large part of the talk tracing the origins of plants that may or may not have been present in Maori gardens. These included apparently indigenous New Zealand plants that could have come up in gardens. Plants like woody seedlings of *Solanum aviculare,* tree fuchsia, *Cassinia* spp., wineberry (*Aristotelia serrata*), manuka, kanuka and *Coriaria* spp. In addition herbaceous species including *Erechtites minima* and *Chenopodium pusillum* were observed, or could have occurred in Maori gardens. These species do not become serious weeds in gardens, compared to European weeds such as the *Brassica* spp., docks (*Rumex* spp.), parsnip, celery, carrot and spinach, which arrived soon after the first Europeans. The lack of invasiveness in native species, Helen thought, was and is due to their relatively slow growth, and the ease with which they can be pulled out/removed by hand.

The other group of plants discussed were exotic species present at the time of European arrival – the plants that arrived in association with Polynesian people. Helen traced the historical passage of some of these species through Polynesia. Species including *Oxalis corniculata,* swamp shield fern, glossy nightshade, *Sigesbeckia orientalis, Bidens pilosa* and *Sonchus oleraceus* were shown to have been present at various Polynesian islands when the European explorers first arrived. These species, like the native New Zealand species, appear to be fairly minor in terms of their impacts in gardens compared to the problems reported once the European weeds started to appear in gardens in New Zealand. Although some Polynesian associated plants did become weeds on other

Pacific islands, a temperate climate seems to have prevented the spread of most of these to New Zealand.

So, in answer to the first of Helen's questions, it appears that Maori really didn't have invasive species in their gardens; certainly not compared to those which came later. Did the Maori therefore have a weed concept? Helen fairly convincingly showed that traditional Maori/Polynesian words for bush only later, once Europeans and their plants had arrived, came to have the negative connotation of weediness.

New Zealand/Polynesian garden plants were therefore fairly non-invasive (whimps) compared to their European counterparts. Not so the woody plants and bracken found across many of the lower rainfall areas of New Zealand – these plants were and are seen as vigorous invaders. Why does there seem to be this contrast in weediness of indigenous garden and rangeland weeds?

What I found particularly interesting in Helen's talk was the apparent contrast between Helen's portrayal of the almost benign cropping practices of the Maori, on the one hand, and the increasingly accepted view of the wholesale decimation of woody vegetation in much of eastern New Zealand through Maori burning. How could one people have had such contrasting management of garden and rangeland environments?

Perhaps, as Helen suggested, Maori were careless with fire and often accidentally burnt large areas. Or perhaps, as others have suggested, Maori deliberately burnt these areas. It is interesting to speculate that the large scale burning by Maori may have been related to hunting of moa and also many of the smaller birds necessary for them to obtain their protein – perhaps a more limited resource than carbohydrates in New Zealand. There is a long global human history of the use of fire for hunting – perhaps the Maori were no different. And perhaps the comparative invasiveness/resilience of many native woody species in the rangelands of New Zealand, compared to their whimpy garden counterparts, is directly related to the much greater exploitative pressure Maori put on this environment. While relatively little effort and land allowed Maori to grow enough vegetables (e.g. kumara) to keep them going, perhaps Maori needed to maintain large areas of open grassy vegetation, to provide habitat for the game they needed to live on. Perhaps the problem of bracken and woody regeneration faced by pastoralists of today are the same as those faced by Maori for hundreds of years prior to European arrival! Deliberate and continual burning over hundreds of years in these areas would certainly be a better explanation for the almost treeless nature of central Otago than Maori carelessness, or lack of understanding of fire.

It would be good to see Helen's work on weediness/invasiveness of garden plants published in a place more accessible to invasive biologists. I think it is very biologically interesting that few invasive plants have evolved in cropping systems in New Zealand – contrary to Europe, the Middle East, India and China, where cropping systems and associated weeds have co-occurred for much longer. It would also be good to see if anthropology could shed more light on the management/hunting/burning practices of the Maori in New Zealand – particularly in the areas of open rangelands which apparently have such a long history of burning since the Maori arrived.

Thank you Helen for a very interesting and stimulating talk.