Northern rata (*Metrosideros robusta*): a species in decline?

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INTRODUCTION

Northern rata (*Metrosideros robusta* A.Cunn[2]) may be one of New Zealand's most fabulous native plants but Society members have previously held a very low opinion of the species. Zotov called it …*the killer*… (Zotov 1948) and John Dawson labeled it …*a strangling epiphyte*… (Dawson 1967). It is, nonetheless, a key component of forested ecosystems in the Wellington region and has even been the subject of re-worked children's stories (see Druce 1971).

Despite its wide New Zealand distribution and an apparently aggressive growth habit questions are now being asked as to whether northern rata will continue to survive throughout its natural range without human intervention. At plenty of sites it is thriving, but for how long? It is not currently regarded as threatened, nationally or regionally but does that mean the species is undeserving of conservation management attention?

Thankfully, the ecological role of northern rata in forested ecosystems and its importance as a flagship species in conservation management of New Zealand's native forests has been recognised. Project Crimson (www.projectcrimson.org.nz) has been promoting rata conservation since 1990. Several years ago the Department of Conservation obtained funding from Project Crimson to assess the wild status of northern rata in Wellington (McKessar and Sawyer 1999). The purpose of this work was to ascertain the extent to which the species had declined and to provide baseline information about the species' status against which future assessments can be made.

Description of northern rata

Northern rata typically grows in hardwood, podocarp and beech forests and in association with indigenous plants such as rimu, totara, tawa, hīnau, rewarewa, kamahi and māhoe. The tree typically begins as an epiphyte in the high light environment of the forest canopy, but also terrestrially following a disturbance (Knightbridge 1993). It will not grow in conditions that are too dry for epiphytes (Zotov *et al.* 1938). The epiphyte establishes itself in a host tree and sends down roots that grow a supporting trunk. Hence the trunk is not a true stem but is composed of a number of more or less fused roots. Northern rata trees grow up to 25 metres or more tall with a trunk of up to

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2 Here after referred to as northern rata.

2 metres in diameter (up to 3.5 m dbh specimens found) although epiphytic rata rarely grow larger than their host (Beaven 1998). The host can be anyone of a number of different species although the foster tree of epiphytic rata is commonly rimu. *Cordyline australis* (cabbage tree) is known to be host to northern rata at one site in the Wairarapa (Philip Simpson pers. comm.). The wood of northern rata is a reddish brown with a peeling, papery bark and a twisted grain due to the nature of its growth (Newhook and Power 1982). The small leaves are dark green and leathery and often have an indented tip, a feature which distinguishes them from the leaves of southern rata (Fig. 1) which has also been recorded from Wellington (Druce 1959). Small wind-dispersed seed are produced in autumn (Knightbridge 1993).

Figure 1. The indented tips of the leaves are a characteristic of northern rata. Photo Jeremy Rolfe.

If size is important to you, then in Gollans Valley (east of Eastbourne) you will find what must be one of Wellington's largest rata at 9.75 m (32 ft) circumference. Are there any larger in Wellington?

Distribution of northern rata

Northern rata is distributed in forests from New Zealand's North Cape southwards to Marlborough, Nelson and Westland. In the lower North Island it is an important component of the flora and grows in mixed coastal, lowland and montane forest communities, at altitudes of up to 700 metres (Allan 1961, Knightbridge pers. comm.). Distribution information about northern rata in Wellington has been collated since 1993 (Fig. 2). Information sources included New Zealand herbaria; plant checklists (Sawyer 2001); forest plot data (see Department of Conservation 1975, 1985); reports and publications (e.g., bulletin of the Wellington Botanical Society); and other databases (e.g., local authority heritage tree databases).

Northern rata is still a major component of some forest types in Wellington and subject to varying degrees of legal and physical protection throughout its range. It is widely distributed throughout the protected natural areas of the Tararua and Rimutaka Forest Parks as well as sites in Wellington and

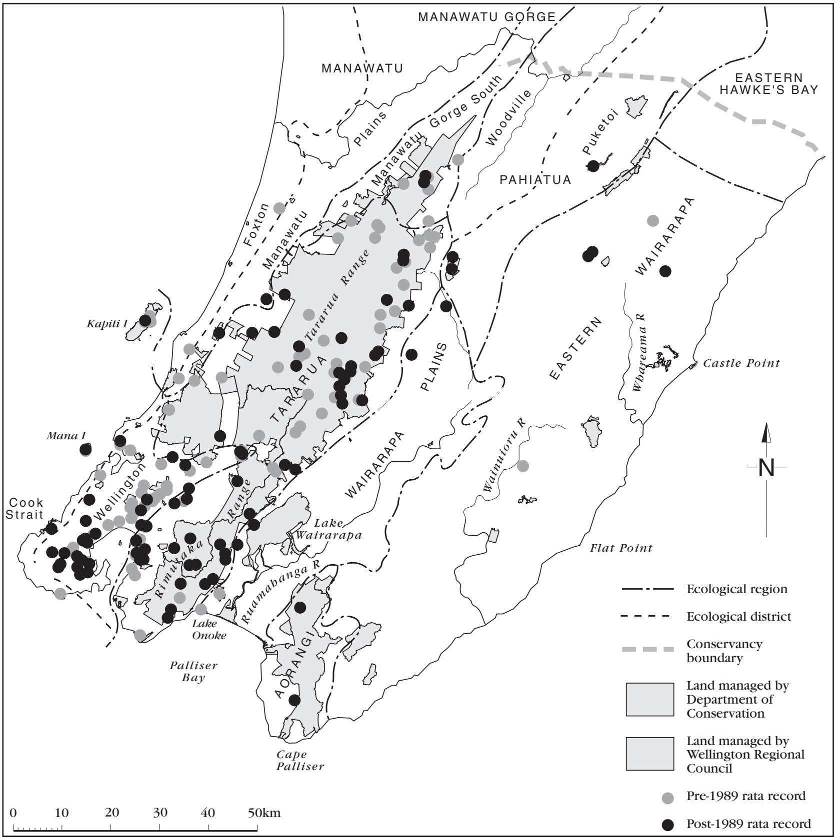

Figure 2. Map showing the current and former distribution of northern rata (*Metrosideros robusta*) in Wellington Conservancy.

Cook Strait Ecological Districts. In contrast the species is very uncommon in the Eastern Wairarapa hill country and in Aorangi Forest Park (where one population has been re-discovered in the last 5 years). On Kapiti Island, regeneration of northern rata has occurred since the eradication of possums in 1986. On Mana Island a few wild plants survive with many more being planted. Northern rata is also found at Wellington Botanic Garden, Belmont Regional Park and at various places in Wellington City where it is listed as a 'heritage tree'.

In the eastern Wairarapa it is found at Rocky Hills Sanctuary and in the vicinity of Mount Rewa and Mount Meridith in the taipo dominated hill country. In the Foxton dune country it is found only at Papaitonga Scenic Reserve. In the Eastbourne Hills there is a large population and some individual trees are banded and there is possum control to protect the forest. Northern

rata is also found in the upper catchments of the Wainuiomata River and the Orongorongo River on land administered by Greater Wellington Regional Council and the Department of Conservation. The species is uncommon on the Wairarapa Plains and in northern Wairarapa it is found only at Mount Bruce National Wildlife Centre and Waewaepa Scenic Reserve.

ECOLOGY OF NORTHERN RATA

Northern rata, with its high nectar output, is important in forest ecosystems as a food source for indigenous honey-eating birds and insects. Indigenous animals often found in association with rata communities include invertebrates, lizards, native bats and nectivourous birds such as tui, bellbird, and kaka. Zotov *et al.* (1938) regarded rata as a dominant of climax plant associations in the wetter areas of the Tararua ranges. In parts of New Zealand, it is a major component of the forest canopy, protects understorey vegetation from exposure, and provides a supportive role as host to a range of epiphytes. It has also been suggested that the water holding capacity of the plant ensures a stable forest hydrology (Simpson 1996a).

THREATS TO NORTHERN RATA SURVIVAL

Northern rata is thought to have undergone a large contraction in its natural distribution in Wellington and there are now several areas from which it has disappeared. The abundance of northern rata has also been considerably reduced during the past two hundred years due to its susceptibility to pests and other threats. Possums threaten rata survival by eating leaves, buds, flowers and young shoots of the tree and can kill a mature tree within two years. In certain areas, such as the Orongorongo Valley and in parts of the Eastbourne hills, possums may have been a contributing factor in dieback of northern rata populations. Other factors may also play a role in the local decline of northern rata populations such as severe drought and synchronous senescence of cohorts of the species. Severe browsing by possums and consumption of seedlings by feral ungulates or stock prevents regeneration and that leads to an ageing population. A more insidious threat to the survival of rata in Wellington is the potential for hybridisation with the related terrestrial coastal species pohutukawa (*Metrosideros excelsa*). The indiscriminate planting of pohutukawa in Wellington has already led to instances of hybridism and if not contained, could alter the purity of northern rata stands. Hybridisation within small relict populations of northern rata will quickly lead to its local extinction.

The decline in abundance and distribution of native pollinators of northern rata, such as lizards and nectar-feeding birds, may also threaten the survival of the species in some places (Burns 1996). Other potential threats include forest clearance for roads, building construction, fire, cutting for firewood,

and natural disturbances such as landslides, flooding and windthrow. It is perhaps not surprising then that questions have been asked about the conservation status of rata.

CONSERVATION MANAGEMENT OF NORTHERN RATA

To ensure that northern rata continues to survive throughout its natural range a number of conservation management activities are necessary. They include: protection of rata populations and their associated ecology; restoration of the species to sites where it formerly occurred (where appropriate); and enhancement planting at sites to bolster existing populations. Protection may be achieved by legal measures (such as covenants) and/or by physical intervention (such as fences or wild animal control). Additional survey may also be required to determine the condition of northern rata populations and the extent of possum impacts and other threats.

Physical protection for northern rata depends on the threat posed. Threats from feral ungulates and stock browsing can be minimised by building fences. A variety of methods are used to minimise possum damage to northern rata. Banding, for example, is used to protect isolated trees and in built up areas and in the short term requires relatively little maintenance. In areas with surrounding canopy trees, all trees must be banded or pruned to prevent possums jumping between the trees. The banding technique involves a sheet of foil being secured around the trunk of the tree to prevent access to possums. The bands must be tight enough to prevent animals crawling underneath and must be flat without a lip to prevent the creation of a step for the possum (Jones 1993). Rivets should be used to secure the bands as they cannot be used for footholds and can be adjusted to cater for growth in the young tree. Banding is not the end of it as trees must be inspected regularly to ensure the band does not strangle the host as the tree grows, leading to the demise of northern rata.

Ground control of possums can be useful for smaller areas and where the nature of the terrain is readily accessible. Quick methods of possum trapping include 'soft catch' leg-hold traps, and '*Timms*' traps that are safe to use in urban areas. Alternatively, poison can be placed in '*bait stations*' (plastic containers attached to tree trunks above ground level) into which poison bait is placed and maintained (Simpson 1996b). Poisons such as Talon, or Feratox (encapsulated cyanide) can be used, although possums have been known to detect cyanide and become '*bait shy*'. A sequence of baits and toxins may be the most effective way to avoid bait shyness and the potential build up of toxins in the environment (Knightbridge 1996).

Aerial poisoning is used for large-scale possum control, particularly in difficult terrain and in dense forest. Currently, aerial poisoning relies on 1080 (sodium monofluoroacetate) applied with a bait such as carrots or cereal

pellets. Extensive research has shown that 1080 breaks down easily into the receiving environment and thus places little threat of pollution or damage to wildlife populations (Haydock and Eason 1997). Birds and most insects are less susceptible than mammals but potential risks can be reduced if the chemical is used correctly. Livestock and domestic animals are at risk from 1080.

Restoration of rata and its plant community is a worthy goal provided the reasons for the original demise of the species have gone. Natural regeneration of rata may be enough albeit slow. It might take a minimum of 45 years for a descending root of a northern rata seedling, 20 m up in the canopy, to reach the forest floor (Knightbridge 1993).

Most restoration projects involve a more active, interventionist approach. For example, possum control may have to be undertaken. An integrated approach to restoration is necessary in areas where possum browsing is a concern. Options such as scattering seed in appropriate sites, or a planned replanting programme to replace dead or dying trees may be a much quicker way of restoring northern rata to a site. Restoration projects may seek to restore northern rata habitat and/or its associated plant and animal community, involving planting associated species and introduction of fauna. Growing seedlings is preferable to taking cuttings because of their genetic variability and ease of propagation (Knightbridge 1993). The use of northern rata of local provenance should be encouraged in planting schemes of local authorities, schools and other organisations involved in conservation of the species.

CONSERVATION INITIATIVES

Throughout Wellington there are many conservation projects underway to protect northern rata. "Project Crimson" is one vital ally in the implementation of rata protection and species recovery. The Native Forest Restoration Trust, Greater Wellington Regional Council and Queen Elizabeth II National Trust protect rata as part of their land conservation initiatives. At Karori Wildlife Sanctuary, in Wellington City, a large terrestrial northern rata (circa 1850) was, prior to fence construction, protected using poison and bait stations. Seedlings have been grown for introduction. The Forest and Bird (Lower Hutt branch) are also working to restore northern rata to Matiu/Somes Island. Planting will be on the eastern side of the island to prevent hybridisation with pohutukawa (*Metrosideros excelsa*) on the west. The Department of Conservation is also growing northern rata on Mana Island (sourced from an existing tree) as part of a long-term re-vegetation project. At Wilton Bush possum control is undertaken by Wellington City Council to protect approximately 15 mature northern rata trees. In perhaps the largest rata protection project in the region MIRO, a community group

based in Eastbourne, are working effectively with Greater Wellington Regional Council and Hutt City Council to protect the impressive stands of rata on the Eastbourne Hills. Long may this form of collaboration continue.

CONCLUSIONS

The future looks good for northern rata—provided human intervention continues. Project Crimson should be congratulated for their work helping to secure the long-term survival of the species. Sightings of northern rata by Society members may be sent to the Department of Conservation for inclusion on the national BIOWEB plant database.

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