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**METHODS FOR THE CONTROL OF WANDERING JEW
(*TRADESCANTIA FLUMINENSIS*) AT "RANGITAWA",
RANGITIKEI DISTRICT, AND NOTES ON OTHER ASPECTS
OF CONSERVING THIS FOREST REMNANT**

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**METHODS FOR THE CONTROL OF WANDERING JEW
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NOTES ON OTHER ASPECTS OF CONSERVING THIS FOREST REMNANT**

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ABSTRACT

Methods for the control of wandering Jew (*Tradescantia fluminensis*) are reviewed and one selected to eradicate this weed from a forest remnant near the lower Rangitikei River. The botanical importance of the forest is assessed in the context of Manawatu Plains Ecological District. Its future conservation management is related to other problem weeds, notably *Cobaea scandens*, *Solanum jasminoides*, *Passiflora mollissima*, *Wisteria sinensis*, *Aegopodium podagraria*, *Lonicera japonica*, and *Hedera helix*.

At the invitation of the owner, Mr Bruce McKelvie, representatives of Queen Elizabeth II National Trust (E. Suckling) and Department of Conservation (B. Lovelock, C Ogle) visited a 12.4ha remnant of forest beside the "Rangitawa" homestead Pryce Line, Kakariki, near Marton, on 15 June 1989.

The remnant is fully fenced and divided by a gravelled vehicle track. We inspected both parts of the forest on foot and much of the forest perimeter and the sides of the vehicle track. A list was made of all native plants, and invasive (or potentially invasive) adventive plants. The special problems of controlling wandering Jew (*Tradescantia fluminensis*) were discussed with the landowner.

This paper is a revision of that sent to the Queen Elizabeth II National Trust in July 1989. Changes to the earlier script mostly involve the more formal citing of plant names references.

2. VEGETATION AND LANDFORM

The forest has been substantially stock-free for many years, and its structure contrasts strongly with most other forest remnants of the district, where stock grazing has generally eliminated the understorey and native ground cover. The following are the main forest types observed; there are various mixtures intermediate between the broad types:

(a) A canopy dominated by totara (*Podocarpus torara*) with scattered titoki (*Alectryon excelsus*), hinau (*Elaeocarpus denratus*) and matai (*Prumnopitys taxifolia*); upper understorey of mahoe (*Melicytus ramiflorus*); lower understorey shrubs of Melicope simplex and *Coprosma areolata*, with the scrambling ground cover of locally common *Phymatosorus scandens*, replaced by dense mats of wandering Jew in some places.

(b) Similar to (a), except that the canopy is dominated by tawa (*Beilschmiedia tawa*); this appears to occur on less well-drained sites.

(c) Titoki forest with locally scattered tawa and occasionally common akeake (*Dodonaea viscosa*), kanuka (*Kunzea ericoides*), and kowhai (*Sophora microphylla*), mostly with a dense understorey of kawakawa (*Macropiper excelsum*), and locally abundant ground cover of wandering Jew. This forest type occurs mostly on better-drained sites, and is probably younger forest than (a) and (b), i.e. regeneration following past clearing.

The terrain is almost all flat, being the surface of an uplifted marine terrace which has been cut by the nearby Rangitikei River and a series of alluvial terraces superimposed upon it. That the soils are of high natural fertility is indicated by the presence of indigenous species like matai, titoki, kowhai, *Melicytus micranthus*, kaikomako (*Pennantia corymbosa*), NZ passionflower (*Passiflora tetrandra*), *Rubus schmideliodes* and *Parsonsia capsularis*. Vigorous growth of wandering Jew is also indicative of high fertility soils.

3. THE FLORA

A list of all native species and adventive plants (weeds) is appended.

3.1 Native Flora

About 70 naturally occurring native species were found and a further seven which were planted, or are now self-establishing from original plantings. The most local native species present, in a district and national sense, is bamboo rice grass, *Microlaena polynoda*. It seems to be very local in the forest; one patch was seen of c. 20 plants close to the vehicle track. Stands of akeake are uncommon in the district, especially as a grove of mature and regenerating trees, such as occurs at Rangitawa (J. Howard, pers. comm.).

3.2 Adventive Flora

The only widespread weed in the forest is wandering Jew. However, there are local patches of other potentially threatening weeds which appear to be garden escapes. These can be divided into two groups on the basis of their capacity to spread in the forest or on its edges. Old man's beard (*Clematis vitalba*), which is common Manawatu-Rangitikei area, was not seen in this forest remnant.

(a) Slow Dispersers

The first group comprises species whose spread will be mainly or solely vegetative, they will spread relatively slowly because they seldom or never set fruit under the local conditions, or conditions needed for their seeds to germinate are not present here. These include canna lily (*Canna indica*), red cestrum (*Cestrum elegans*), montbretia (*Crocasmia x crocosmiiflora*), arum lily (*Zantedeschia aetheopica*), and hydrangea (*Hydrangea macrophylla*). Opportunities for establishment of holly (*Ilex aquifolium*), broom (*Cytisus scoparius*), and barberry (*Berberis glaucocarpus*) seedlings are also fairly limited where there is no grazing.

Webb *et al.* 1988) state that wisteria (*Wisteria sinensis*) and potato vine (*Solanum jasminoides*) do not commonly produce fruit in New Zealand, but their potential for rapid vegetative spread by overground runners which root at the nodes makes both potentially serious weeds in this forest. Potato vine is especially smothering on one part of the margin of Rangitawa forest.

Wandering Jew, whose spread is mostly vegetative also, is discussed separately below.

(b) Fast Dispersers

The second group comprises freely seeding species which germinate readily on the forest edges or in canopy gaps. The most rampant of these is the vine cathedral bells (*Cobaea scandens*), but Japanese honeysuckle (*Lonicera japonica*) and banana passionfruit (*Passiflora mollissima*) are also very aggressive vines. Ivy (*Hedera helix*) tends to be slower growing, but its seedlings can establish under shade, i.e. under an intact forest canopy. Little is known of the rate of spread of goutwort (*Aegopodium podagraria*), but it is present over 100m or so of road edge. Hutchinson (1945) states that goutweed in Great Britain is notorious weed that is difficult to eradicate once established. Goutweed is very local in New Zealand, especially in the North Island, but Webb *et al.*, (1988) regard it as being similarly difficult to eradicate. In view of these warnings, control of goutweed should be considered, or at least its possible spread monitored.

(c) Wandering Jew

Wandering Jew constitutes a special case. Its dispersal is mainly by fragmentation rather than seeds. This means the presence of livestock, although able to reduce the of the weed, is likely to disperse pieces of it more widely. An entire ground cover of wandering Jew resulted from grazing a forest remnant in Linton Army Camp.

Other attempts to control wandering Jew have had mixed success. In small areas such as home gardens, rolling up dense patches like a carpet, then hand weeding remaining fragments can be successful, and Hamilton City Council staff succeeded in clearing a small reserve, Claudelands Bush, in this manner (S. Timmins, pers. comm.). On the other hand, Petone Borough Council staff failed remove to wandering Jew from Korokoro Reserve by manual methods. Such differences in the effectiveness of hand weeding might be the result of habitat differences or the precise nature of the weeding techniques.

The only documented trials of herbicide on wandering Jew of which we are aware is by Kelly and Skipworth (1984). The fieldwork for this trial was in 1979, and numerous new herbicides have become available since then. At that time, paraquat was the only effective control found, a herbicide which has fallen into disfavour because of its risk to the operator. It should be noted that the trial did include glyphosate (the active ingredient of "Roundup").

S. Timmins (pers. comm.) reports that 2% Roundup had little effect on wandering Jew in her Wellington section, although the timing of application is unknown. Staff of the Department at Palmerston North achieved limited control with Roundup in an early trial, but more recently have eliminated wandering Jew in a trial using Roundup at 3% concentration, preferably with an additive such as Multifilm, applied by knapsack sprayer in the spring.

Losses of some indigenous seedlings and herbs, including sedges, are likely to result from use of Roundup, but the patchy distribution of wandering Jew means that there will be adequate replacements for these in unsprayed areas. The only indigenous species which may need special protective measures is bamboo rice grass (*Microlaena polynoda*) because all the known plants are in areas of dense wandering Jew.

To achieve total coverage at Rangitawa, the area should be divided into grids for spraying. The following spring the grids would be checked and hand-weeded, or resprayed if necessary. There would need to be further checks for the odd survivor. From our brief inspection of Rangitawa Bush, it appeared that approximately 10% of the area is infested with wandering Jew. This equates to a maximum area of 1.5 hectares of the weed. The largest expense will be gridding and searching. A rough estimate for the

year would be 45 litres of Roundup required at about \$20/l = \$900. Person days are estimated at about 20. Labour would cost about \$1,500 if DOC staff or similarly paid workers were used, and nil if voluntary labour were available. Transport costs would be approximately \$100.

The second year's programme may be about half of this cost, i.e. \$1,250. Annual inspections for up to four years will be necessary. Depending on the amount of regrowth, control should be achieved by hand-weeding by a few volunteers, or spraying by one or two persons in a single day.

It should be noted that Amitrole and Weedazol have label claims for wandering Jew. Roundup has been proven against the weed, however, and is preferred by applicators because of its lower toxicity.

Kelly and Skipworth's trial gave inadequate results from Roundup perhaps because very low concentrations of the chemical were used. The highest concentration of Glyphosate used (4kg/ha) equates to only a 1% concentration of Roundup. A 3% concentration is recommended for effective control of wandering Jew. The Manawatu Branch of the Royal Forest and Bird Protection Society successfully removed wandering Jew from Keebles Bush near Palmerston North through a combination of herbicide (Roundup) and manual weeding.

4. CONCLUSIONS

Largely because it has been fenced from livestock for many years, the forest at "Rangitawa" is in much better condition than most other forest remnants of the lower Rangitikei River catchment. The Manawatu Plains Ecological District retains very little of its native forest, especially on flat terrace surfaces. Protection of Rangitawa forest is strongly recommended as a representative of a depleted vegetation type in the ecological district.

There is justifiable however, about the actual and potential impacts of weeds in this forest. Some can (and should) be tackled manually, but others will need chemical control. Protection from its most serious threat, wandering Jew, could be achieved for a total cost of approximately \$4,200. If voluntary labour were used, this cost would be reduced by as much as half. Knapsack spray units owned by the Department may be available for this work. Voluntary labour could reduce herbicide costs still further by undertaking weeding as outlined earlier.

Both herbicides and grazing could threaten bamboo rice grass. Some plants of this native grass should be transplanted to safer locations if herbicides or stock were to be used in its present location.

5. ACKNOWLEDGMENTS

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6. REFERENCES

- Hutchinson, J, 1945: British Wild Flowers, Vol. 2. Pelican.
 Kelly, D; Skipworth, J P. 1984: *Tradescantia fluminensis* in a Manawatu (New Zealand) forest: I. Growth and effects on regeneration. *NZ Journal of Botany* 22: 393-397.
 Ibid. 1984: *Tradescantia fluminensis* in a Manawatu (New Zealand) forest: II. Management by herbicides. *NZ Journal of Botany* 22: 399-402.
 Webb, C J; Sykes, W R; Gamock-Jones, P J. 1988: Flora of New Zealand, Vol IV, Botany Division, DSIR, Christchurch. 1365p.

APPENDIX I

Vascular Plants of forest patch 'Rangitawa', Pryce Line, Kakariki,
(on east side of Rangitikei River near Marton).

C C Ogle

15 June 1989

- * = adventive species
 + = native species probably present as planted specimens only
 ++ = native species, probably planted originally, but now self propagating
 u = uncommon (very few individuals or small colonies present)
 o = outside fenced area of forest only

Adventive plants which are present as planted specimens and not apparently spreading are not listed here (eg oaks, elms, Rhododendrons).

GYMNOSPERMS

<i>Dacrycarpus dacrydioides</i>	kahikatea	
<i>Dacrydium cupressinum</i>	rimu	u, +
<i>Podocarpus totara</i>	totara	
<i>Prumnopitys taxifolia</i>	matai	

DICOT TREES AND SHRUBS

<i>Alectryon excelsum</i>	titoki	
<i>Beilschmiedia tawa</i>	tawa	
* <i>Berberis glaucocarpa</i>	barberry	u
<i>Brachyglottis repanda</i> var. <i>repanda</i>	rangiora	u
<i>B. repanda</i> var. <i>fragrans</i>		u, +
* <i>Cestrum elegans</i>	red cestrum	u
<i>Coprosma areolata</i>		
<i>C. crassifolia</i>		
<i>C. rhamnoides</i>		
<i>C. robusta</i>	karamu	u
<i>Corynocarpus laevigatus</i>	karaka	++
* <i>Cytisus scoparius</i>	broom	
<i>Dodonaea viscosa</i>	akeake	
<i>Elaeocarpus dentatus</i>	hinau	
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	hangehange	u
<i>Hedycarya arborea</i>	pigeonwood	
<i>Hoheria populnea</i> var. (= <i>H. sexstylosa</i>)	lacebark	++
* <i>Hydrangea macrophylla</i>	hydrangea	u
* <i>Ilex aquifolium</i>	holly	u
<i>Knightia excelsa</i>	rewarewa	
<i>Kunzea ericoides</i>	kanuka	
<i>Macropiper excelsum</i>	kawakawa	
<i>Melicope simplex</i>		
<i>Melicytus micranthus</i>		
<i>M. ramiflorus</i>	mahoe	
<i>Myoporum laetum</i>	ngaio	
<i>Myrsine australis</i>	mapou	
<i>M. salicina</i>	toro	u, o

<i>Nestegis lanceolata</i>	white maire	u
<i>Pennantia corymbosa</i>	kaikomako	
<i>Pittosporum eugenioides</i>	tarata, lemonwood	++ (?)
<i>P. tenuifolium</i> var. <i>tenuifolium</i>	kohuhu	
<i>Pseudopanax arboreus</i>	five finger	u
<i>P. crassifolius</i>	lancewood	u
* <i>Solanum pseudocapsicum</i>	Jerusalem cherry	
<i>Sophora microphylla</i>	kowhai	
<i>Streblus heterophyllus</i>	small-leaved milk tree	
<i>Urtica ferox</i>	shrub nettle	u, o

DICOT LIANES

<i>Calystegia sepium</i>	convolvulus	u
<i>Clematis</i> sp. [dead?]	clematis	u, o
* <i>Cobaea scandens</i>	cathedral bells	
* <i>Hedera helix</i>	ivy	u
* <i>Lonicera japonica</i>	Japanese honeysuckle	
<i>Metrosideros diffusa</i>	white rata vine	u, o
<i>Muehlenbeckia australis</i>	pohuehue	
<i>Parsonsia capsularis</i>	NZ jasmine	u
<i>P. heterophylla</i>	"	
* <i>Passiflora mollissima</i>	banana passionfruit	
<i>P. tetrandra</i>	NZ passionflower	
<i>Rubus schmidelioides</i> var. <i>schmidelioides</i>	lawyer	
<i>R. squarrosus</i>	leafless lawyer	
<i>R. schmidelioides</i> X <i>R. squarrosus</i>		
* <i>Solanum jasminoides</i>	potato vine	
* <i>Wisteria sinensis</i>	wisteria	

DICOT HERBS

* <i>Aegopodium podagraria</i>	goutweed	
* <i>Conium maculatum</i>	hemlock	
<i>Hydrocotyle heteromeria</i>	pennywort	
* <i>Solanum chenopodioides</i>	velvety nightshade	
* <i>S. nigrum</i>	black nightshade	
* <i>Stachys sylvatica</i>	hedge woundwort	
<i>Stellaria decipiens</i>	NZ chickweed	u, o

MONOCOT TREE

<i>Cordyline australis</i>	cabbage tree	
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MONOCOT LIANE

<i>Ripogonum scandens</i>	supplejack	
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MONOCOT HERBS

* <i>Canna indica</i>	canna lily	u
<i>Collospermum hastatum</i>	perching lily	
* <i>Cortaderia selleana</i>	pampas	u
* <i>Crocasmia x crocosmiiflora</i>	montbretia	
<i>Earina mucronata</i>		u
<i>Echinopogon ovatus</i>	hedgehog grass	u, o
<i>Juncus pallidus</i>		u
<i>Microlaena avenacea</i>	bush rice grass	
<i>M. polynoda</i>	bamboo rice grass	
<i>M. stipoides</i>	meadow rice grass	
<i>Oplismenus imbecillus</i>		

Phormium tenax
 * *Tradescantia fluminensis*
 * *Zantedeschia aethiopica*

NZ flax +, u
 wandering Jew
 arum lily u

FERNS

Arthropteris tenella
Asplenium bulbiferum
A. flaccidum
A. gracillimum
A. oblongifolium
A. polyodon
Cyathea dealbata
Diplazium australe
Hypolepis ambigua
Lastreopsis glabella
Marattia salicina
Paesia scaberula
Pellaea rotundifolia
Phymatosorus diversifolius
P. scandens
Polystichum richardii
Pteridium esculentum
Pteris tremula
Pyrrhosia elaeagnifolia

hen and chicken fern
 hanging spleenwort
 shining spleenwort
 ponga
 king fern
 ring fern
 button fern
 hound's tongue
 hard fern
 bracken

u
 u, o
 o
 +
 u, o
 u
 o, u