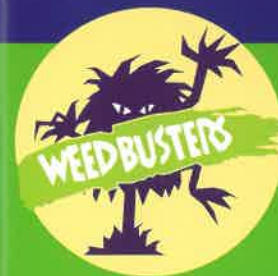


WEEDBUSTING



A guide to recognising and
controlling invasive weeds

What is a weed?

A weed is a plant growing where it's not wanted. Many of the invasive weeds that are causing environmental damage in New Zealand started off being planted in gardens as ornamentals, and only became a problem when they 'jumped the fence'. A beautiful plant in one setting can cause devastation in another.

Weeds can affect agriculture (for example, ragwort is poisonous to stock); cause health problems (flowering privet causes hayfever); destroy recreational areas (willows clog up waterways); and affect industry (hornwort increases the cost of hydro-electric power generation).

The invasive weeds mentioned in this booklet are ones that damage New Zealand's native ecosystems, threatening the survival of our native plants and animals.

Weeds are a growing problem

- Invasive weeds are one of the biggest threats to biodiversity worldwide. Weeds damage ecosystems such as rivers, forests, sand dunes and wetlands, destroying the habitats of native plants and animals that live in these areas.
- In New Zealand, 75% of invasive weeds are garden plants that have 'jumped the fence' and started growing where they are not wanted.
- Weeds adversely affect a third of New Zealand's threatened plant species.
 - New Zealand has around 300 significant invasive weed species at present, and this number is growing steadily; each year, 14 or so cultivated plants 'escape' into natural areas, with around two of these becoming serious pests.

Left: Chinese privet

Cover: Muriwai School pupils pulling pink ragwort

But there is a working solution

Everyone can help in the fight against invasive weeds by learning to:

- **Recognise weeds:** First we need to know what we're looking for. Department of Conservation (DOC) and regional council weeds staff are happy to share their knowledge. There are also people in your community with experience with weeds through their involvement in restoration of natural areas.
- **Prevent weeds establishing:** If everyone keeps an eye out for new weeds, they don't stand a chance of establishing.
- **Control weeds:** Community groups, landowners, and iwi can work with each other and with DOC and regional and local council staff to control the weeds that threaten natural areas.

The rest of this booklet will give you some useful advice on how you can take action against weeds in your local area. You should also contact your local DOC office or regional council for advice that is specific for the area you'll be working in and for the weeds you'll be controlling.

Let's get weedbusting!

This booklet tells you how to:

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Controlling Russell lupins



Weedbusters is an inter-agency weeds awareness and education programme designed to protect New Zealand against the spread of invasive weeds. The Weedbusters vision is that all New Zealanders are aware of, and take action to reduce the spread of weeds and their impact on the environment, economy and human health.

Recognise weeds

Weeds come in a variety of shapes and sizes. They can be groundcovers, small flowering plants, clambering vines or even large trees. They can look pretty or ugly; they can smell good or stink.

Weeds can be recognised by how they affect our natural areas:

- Some weeds collapse canopy trees, altering the forest structure
Old man's beard • *Madeira vine* • *Japanese honeysuckle* • *Blue morning glory*
- Some weeds form a blanket on the ground, preventing the growth of natives
Tradescantia • *Climbing asparagus* • *Wild ginger*
- Some weeds replace the plants that usually form the understorey of the forest
Darwin's barberry • *Evergreen buckthorn*
- Some weeds alter the soil, which in turn affects the types of native plants and animals that can survive in that area
Heather • *Wilding pines* • *Lantana*
- Some weeds burn easily and are also the first to invade an area after fire has been through it
Gorse • *Hakea* • *Boneseed* • *Pampas grass*
- Some weeds germinate and grow before native plants can establish
Buddleia • *Pampas grass*

Blue morning glory



Alligator weed

- Some weeds form a floating mass in or on top of rivers, streams and lakes, killing plants and fish, and blocking waterways and water intakes

Hornwort • *Alligator weed*

- Some weeds change landscapes dramatically, for example, from native tussock grassland to pine forest

Wilding pines

If you need help identifying weeds that are causing you concern, take a specimen (including the stem and leaves, and if possible flowers or fruit) to your DOC office or regional council. Be careful when taking plant samples not to damage the plant itself - some rare native plants can be mistaken for weeds.

The DOC or regional council or www.weedbusters.org.nz will have lists and colour photos of plants considered to be weeds in your area. While these lists are not exhaustive, they'll give you a good idea of what to look out for.

There may also be local experts in your community who can help you identify weeds that are a problem in your area.

Prevent weeds establishing

The best way to stop weeds is to prevent them establishing in the first place. This means we need to act quickly once new weeds are found, so that they don't mature and produce seeds and strong root systems. Once weeds have taken hold, eradicating them is extremely hard and costly.

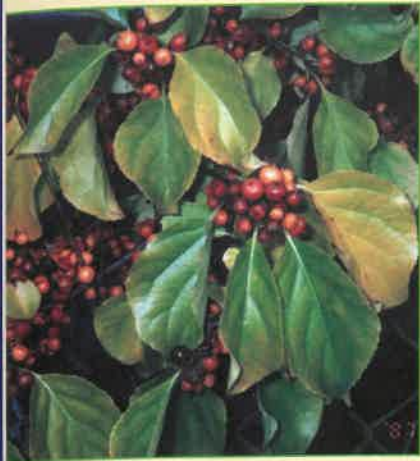
Weeds are spread in a variety of ways: on tramper's boots, socks and clothing; on vehicles and boats; by wind, water, birds and animals; and by dumping of garden rubbish. New weed infestations often start in odd places, such as roadsides or wastelands. It's worthwhile keeping an eye on these less attractive areas and spending time controlling weeds there. This will stop weeds establishing and spreading elsewhere.

Look out for weeds new to your area – this includes weeds that are already problems in other parts of New Zealand but are just beginning to appear near you.

To find out about new weeds causing concern in New Zealand and in your area in particular:

- Keep an eye on national and local newspapers
- Contact your local DOC or regional council office for information about weeds to watch out for.
- Check out www.weedbusters.org.nz

If you see any suspicious looking plants in natural areas, reserves or wastelands, tell your local DOC or regional council weeds staff. Remember to note the precise location of the plants.

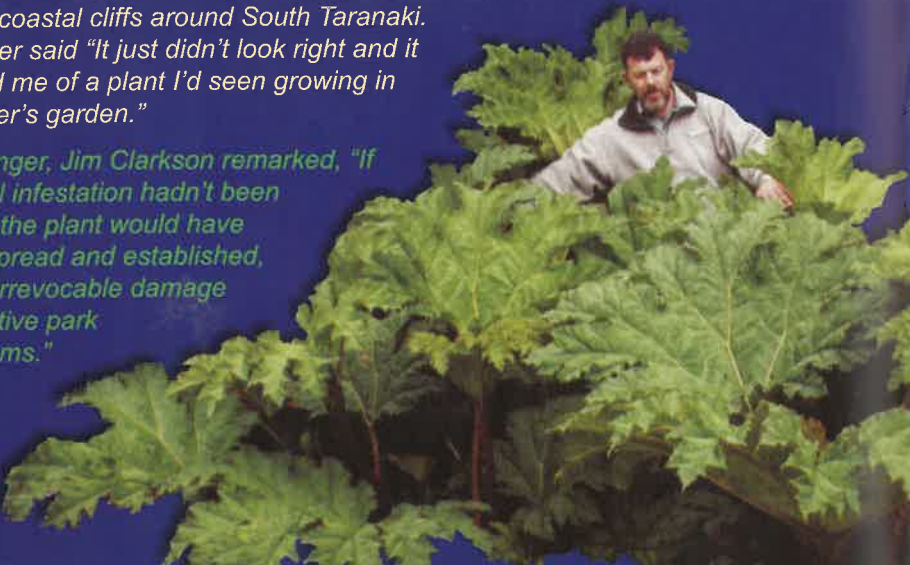


Above: Climbing spindleberry
Below: Chilean rhubarb

Hunter saves forest

While working in a remote area of Egmont National Park, a goat hunter saw something that made him suspicious - a strange, tropical-looking plant. It was Chilean rhubarb (*Gunnera tinctoria*), already a serious threat to coastal cliffs around South Taranaki. The hunter said "It just didn't look right and it reminded me of a plant I'd seen growing in my mother's garden."

DOC Ranger, Jim Clarkson remarked, "If this small infestation hadn't been reported the plant would have quickly spread and established, causing irrevocable damage to the native park ecosystems."



Control weeds

Controlling invasive weeds will protect nearby ecosystems, and stop weeds from spreading to other areas.

Tackling weeds takes a lot of determination. You should always go back at least annually to make sure that your control methods have been effective. It's likely that repeat visits will be necessary to clear an area of weeds.

Set realistic goals for your weed work. You may be able to get rid of only some of the weed species in your area; others can be contained and stopped from spreading further (for example, by removing seed heads).

There are some important things you need to think about before you start any weed control work, especially if you are working in a large area:

- **Get permission.** If the area you want to do weed control in is not on your property, get permission from the owner (for example, regional council, DOC, local council) before you do any work.
- **Get advice.** Find out what weeds you're dealing with first. Ask DOC or regional council weeds staff for help in identifying both the weed species and the best method to use for the control of these weeds. Talk to them about what you plan to do once the weeds have been removed.
- **Plan your control and disposal methods before you start.** Find out what control method works on the weeds you want to tackle. Decide on the best disposal method before you start working; remember to avoid any unnecessary movement of plants that can spread seeds or fragments that could grow again.
- **Start small and work in stages.** Not only will this make the task seem more manageable, but by replacing weeds with natives or non-weedy plants as you go, you avoid creating large cleared areas that can allow new and different weeds to establish. If possible, kill weeds before they fruit or seed, as you don't want a new generation of weeds growing inside your work area. Tackle outlying weed patches first to slow the rate of weed spread before starting on the worst areas.

Herbicides

Sometimes it may be difficult to physically remove weeds (for example, if they are covering a large area, or if they are weeds that grow back from cut stumps). In these instances, it may be necessary to use herbicides.

Before using herbicides

- **Identify** the weeds to be controlled, which herbicide to use on them, and the best time of the year to apply this herbicide. Plants usually absorb herbicides best during growth spurts prior to flowering or fruiting.
- **Seek advice** on the herbicide you intend to use and what damage it might do to desirable plants in the area you are working in.
- **Read** the herbicide manufacturer's information before you start and follow instructions regarding mixing and application.
- **Check** with your regional council for rules relating to herbicide application, especially when you intend to spray over water or in public places.
- **Apply** the herbicide correctly and safely. Cover new plantings when spraying nearby. When appropriate, you could add a sticking agent (surfactant) to improve the effectiveness of the spray, marker dye to see where you've been, or a foaming agent to minimise spray drift. Always check that any additives are compatible with the herbicide you will be using. Wait for fine, calm weather before spraying; a very light breeze away from desirable vegetation and neighbouring properties can help you control the direction of spray drift.

The following sections describe some of the control methods suitable for use on different groups of invasive weeds.

Lantana



Controlling weedy vines

Weedy vines (like old man's beard, banana passionfruit, and Japanese honeysuckle) cause serious damage to the forest canopy as well as to individual trees. These vines smother the tops of trees, preventing light from reaching the leaves below, and eventually cause the forest canopy to collapse.

Cutting and treating stumps works well on single vines or small infestations.



Cut vines left in tree

First: cut the stems at ground level, leaving the cut vines up the tree to wither and die well above the ground. Avoid the temptation to pull cut vines down as you might damage the trees the vine is growing over. With some species (for example, climbing spindleberry), vines left lying on the ground may resprout and start new infestations.

Then: either dig the stump out, or paint the cut surface with herbicide within 30 seconds of cutting to ensure that the herbicide is taken into the stump while the sap is still flowing. Use a squeeze bottle or paintbrush to just wet the surface, avoiding excess run-off of herbicide onto surrounding plants and soil. A chemical paste or gel formulation is ideal for this control method.

Cutting, waiting and spraying regrowth

is best for large areas of vines, and requires a two-stage approach.

First: cut all the vines. Leave the cut vines hanging in trees to die off.

Then: on a second visit at a later date when the regrowth is a metre long, spray the new foliage.

Controlling weedy shrubs and trees

Weedy shrubs and trees invade forests, areas along waterways, high country, wetlands, and coastlines. They alter natural ecosystems by shading the ground, changing the soil conditions, and displacing native species.

Several methods can be used to control weedy shrubs and trees; choose one depending on the size of the infestation, and how persistent the species is. Be aware that most weedy shrubs and trees will resprout if you simply cut them down.

Hand pulling can be used for smaller plants. Try not to disturb the soil more than is necessary or new weed seeds will germinate.

Ringbarking has limited effectiveness as many trees can re-sprout from the base, or heal the wound in their bark (for example, sycamore).

First: use a sharp chisel, axe or saw to make two parallel deep cuts right around the base of the tree. Make the cuts into the sapwood at least 5cm apart.

Then: remove all bark between the cuts.

Cutting and treating stumps is the best method to use for most situations, particularly with smaller trees and shrubs and those that are likely to resprout from the base (such as elderberry and Darwin's barberry). This method minimises the release of herbicide into the environment while still being effective.

First: cut the trunk of the plant close to the ground with a straight flat cut. The cut must be flat so that the herbicide sits on the cut area.



Above: Ringbarking
Right: Cutting a trunk

Then: paint the stump with herbicide within 30 seconds of cutting to get uptake of the herbicide before the sap stops flowing. Use a squeeze bottle or paintbrush to just wet the surface, avoiding excess run-off of herbicide onto surrounding plants and soil. A chemical paste or gel formulation is ideal for this control method.

Drilling / slashing and injecting stems

is useful for large shrubs and trees (for example, crack willow) in places where felling them would damage the surrounding vegetation. You can use a sheep drench pack and gun, or a plastic squeeze bottle with a long nozzle. As this method involves leaving dead shrubs and trees standing, you will need to consider the potential danger from falling dead branches to people using the area.

First: drill holes sloping down into the sapwood at regular intervals around the base of the shrub or tree. Alternatively, use a sharp chisel or axe to make deep cuts into the sapwood at regular intervals around the base of the shrub or tree.

Don't completely ringbark it as this will reduce the uptake of herbicide.

Then: place the correct dose of herbicide into each hole or cut as soon as possible.

Overall spraying can be effective on large infestations and young plants less than a metre high. Spray all parts of the plant using a knapsack sprayer or handgun. Follow label directions carefully and don't let the herbicide come in contact with desired plant species.

Spraying gorse



Controlling weedy herbs and ground covers

Weedy ground covers and herbs can smother native plants and prevent native seeds from germinating and growing.

Weeds like wild ginger, montbretia, and tradescantia are notoriously hard to get rid of and need ongoing control efforts. If you are unlucky enough to have these weeds, here are some options:

Digging or pulling is good for small infestations.

First: make sure you remove *all* the weed growth from the ground including leaves and underground stems, corms and roots, since many pest herbs can grow from the tiniest of stem fragments (for example, selaginella, tradescantia).

A variation on this treatment for tradescantia is to roll the plant material up like a carpet to avoid breaking it into too many pieces.

Then: remove plant material from the site, taking care that you don't drop any pieces. Put it in a plastic bag and dispose of this greenwaste carefully (see section on disposal of weeds).

Revisit the site regularly to remove any new weed growth.

Controlling
tradescantia



Overall spraying may be needed for large infestations; seek advice on what herbicide to use and how best to apply it. Follow label directions carefully and don't let the herbicide come in contact with desired plant species.

Controlling weedy grasses

Weedy grasses range in size from the tall and tufted pampas grass, to shorter grasses like Mexican feather grass. Weedy grasses can form dense covers that exclude all other plants.

Pulling or grubbing can be effective for weedy grasses, but only if you have something to replant in their place or can go back regularly to control new weeds or grass regrowth in the cleared area.

First: use a spade or grubber to remove the main root mass, shake off any soil, and leave the roots exposed to die; cutting grasses without removing the root system won't work because the growing points of grasses are too close to the ground to reach. Ensure that you remove any grass seed from your clothing and equipment before you leave the site.

Then: revisit the site regularly to pull or grub out any grass regrowth or new seedlings.

Pulling
Mexican
feather grass



Pampas grass

Overall spraying is the best option for controlling large infestations of weedy or low-growing grasses. Herbicides are available that kill only grasses and won't damage other plants. Ask for advice on which herbicide to use and how best to apply it. Follow label directions carefully and don't let the herbicide come in contact with desired grass species.



Controlling weedy aquatic plants

Controlling aquatic weeds is very difficult. There are also very strict rules in place regarding the use of herbicide around waterways. If you do wish to tackle weeds in streams or lakes, ask for advice from your regional council first.

The best thing you can do is to stop aquatic weeds from reaching waterways in the first place. This involves:

- Cleaning all weed from boating equipment, gear and trailers before moving to another area.
- Removing all fragments of weed from fishing nets and gear before leaving an area.
- Emptying aquarium contents onto the compost heap, NOT into or near a waterway or drain.



Transporting waterweeds

Replacing one problem with another?

Because many of our weeds are early colonisers, removing one lot will often open up the area and offer ideal conditions for other weeds to grow. You've then replaced one problem with another. To stop this happening, it's good to be prepared with a restoration plan.

Some options are to:

- Provide shelter to help existing native seedlings grow.
- Mulch the area and plant fast-growing natives (such as manuka, coprosmas, wineberry).
- Revisit the site regularly to control weeds.
- Use selective herbicides so non-weedy plants survive.

The best follow-up method depends on the environment in which you are working, so ask for advice from DOC or regional council weeds staff, or other people in your area who have done similar weed control work.

Dispose of weed waste wisely

- Make sure that weed waste isn't dumped - it just makes the problem worse! Even if most of the weed vegetation rots away, many weeds can grow from seeds or small stem or root fragments. Many weeds such as tradescantia are easily spread from dumped piles. Piles of dead weeds also look bad, take up space, and may be a fire risk.



What not to do

- Choose a suitable disposal method for the weeds you are controlling before you start work. Some weeds regrow from fragments or root systems, so you need to take this into account when choosing your disposal method.
- Before composting or burying weeds, you should remove seeds or fruit and dispose of them at a landfill. Finely shredding the remaining weed material in a garden mulcher before burying or composting will reduce the time it takes for the plant material to decompose.

The following sections describe ways to dispose of some types of weeds.





Weeds that grow from fragments

Vines and ground covers such tradescantia, selaginella, and blue morning glory can grow from small fragments. Make sure that you don't leave any plant pieces behind when you remove these weeds from an area.

First: treat the plant material so it can't regrow. In warm areas, lay the weeds in the sun on concrete or a similar surface to completely dry out and reduce bulk. Another way to kill off this plant material with heat is to either put it into plastic bags in the sun, or pile it up in one area and cover the pile with black plastic. In cooler areas, place the plant material in plastic bags or containers, cover it with water, then leave it to rot.

Then: once the weed waste is completely dried or rotted, leave it on site to compost, or take it to a landfill.

Weeds with tubers, rhizomes and corms

Some weeds (such as wild ginger and Madiera vine) have tubers, rhizomes or corms that are likely to re-sprout. Others (such as climbing asparagus) have tubers that are only for water storage. As a general rule, however, tubers, rhizomes or corms should not be composted.

First: remove tubers, rhizomes and roots to a managed landfill for deep burial or dry them out (for example by hanging them in surrounding trees) and burn them.

Then: compost the remaining plant material.

Contact your local district or city council for information on greenwaste disposal sites.

Wild ginger



Join in and take action

New Zealand needs Weedbusters like you!

- **Learn to recognise weeds, and report unusual ones.** Knowing what to look for is the first step. Contact your local DOC or regional council weeds staff - they will be more than happy to help.
- **Use the techniques in this book to control weeds** and replace them with plants that won't spread.
- **Dispose of your weed waste wisely.**
- **Get involved** in local weed control programmes and environmental groups - visit www.weedbusters.org.nz for information about Weedbusters in your region.

Further information

- For details about conservation and threats to our biodiversity, visit www.doc.govt.nz
- To check out plants that are banned from sale, distribution and propagation in New Zealand, visit www.biosecurity.govt.nz
- To find out about Weedbusters, visit www.weedbusters.org.nz

Native Forest Restoration: A practical guide for landowners. Tim Porteus (1993) QEII National Trust.

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An illustrated guide to common weeds of New Zealand. Bruce Roy, Ian Popay, Paul Champion, Trevor James, Anis Rahman. Order online from Manaaki Whenua Press: www.mwpress.co.nz



Weed species mentioned in this booklet

COMMON NAME	SCIENTIFIC NAME	TYPE
Alligator weed	<i>Alternanthera philoxeroides</i>	Aquatic (& land)
Banana passionfruit	various <i>Passiflora</i> species	Vine
Blue morning glory	<i>Ipomoea indica</i>	Vine
Boneseed	<i>Chrysanthemoides monilifera</i>	Shrub
Buddleia	<i>Buddleja davidii</i>	Shrub
Chilean flamecreeper	<i>Tropaeolum speciosum</i>	Vine
Chilean rhubarb	<i>Gunnera tinctoria</i>	Huge herb
Chinese privet	<i>Ligustrum sinense</i>	Shrub/tree
Climbing asparagus	<i>Asparagus scandens</i>	Ground cover
Climbing spindleberry	<i>Celastrus orbiculatus</i>	Vine
Darwin's barberry	<i>Berberis darwinii</i>	Shrub
Elderberry	<i>Sambucus nigra</i>	Shrub/tree
Evergreen buckthorn	<i>Rhamnus alaternus</i>	Tree
Gorse	<i>Ulex europaeus</i>	Shrub
Grey willow	<i>Salix cinerea</i>	Tree
Hakea	<i>Hakea</i> sp.	Shrub
Heather	<i>Calluna vulgaris</i>	Herb
Hornwort	<i>Ceratophyllum demersum</i>	Submerged aquatic
Japanese honeysuckle	<i>Lonicera japonica</i>	Vine
Kiwifruit	<i>Actinidia deliciosa</i>	Vine
Lantana	<i>Lantana camara</i> ssp. <i>aculeata</i>	Shrub
Madeira vine	<i>Anredera cordifolia</i>	Vine
Mexican daisy	<i>Erigeron karvinskianus</i>	Herb
Mexican feather grass	<i>Nassella tenuissima</i>	Grass
Montbretia	<i>Crocsmia x crocosmiiflora</i>	Herb
Old man's beard	<i>Clematis vitalba</i>	Vine
Oxygen weed	<i>Lagarosiphon major</i>	Submerged aquatic
Pampas grass	<i>Cortaderia selloana</i> , <i>C. jubata</i>	Grass
Selaginella	<i>Selaginella kraussiana</i>	Ground cover
Sycamore	<i>Acer pseudoplatanus</i>	Tree
Tradescantia (wandering Jew, wandering Willie)	<i>Tradescantia fluminensis</i>	Ground cover
Wild ginger (kahili)	<i>Hedychium gardnerianum</i>	Herb
Wild ginger (yellow)	<i>Hedychium flavescens</i>	Herb
Wilding pines	Various <i>Pinus</i> species	Tree

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Photo credits

Front cover:	Muriwai School pupils pulling pink ragwort at Wherowhero Lagoon (Robyn Wilkie) Tradescantia (Plant Protection Society)
Inside cover:	Chinese privet (Carolyn Lewis)
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