

The impact of Darwin's barberry on biodiversity values

**Department of Conservation, West Coast**

On the Coast we control Darwin's barberry to very low densities, so a biocontrol agent isn't likely to benefit our control programme much (biocontrols normally need a reasonable population of the target species in order to establish and thrive).

**Department of Conservation, Southland**

...plants that may be affected by Darwin's barberry over time in The Blue Mountains, and Hokonui Hills and Clinton Reserve I have added their threat status as well.....

*Pseudopanax ferox*, fierce lancewood, naturally uncommon

*Olearia fragrantissima*, fragrant tree daisy, declining

*Olearia hectorii*, Hector's tree daisy, nationally endangered

*Olearia lineata*, declining

*Teucrium parvifolium*, teucrium, declining

*Uncinia strictissima*, bastard grass or hook sedge, nationally endangered

**Environment Southland**

I came across this map developed a couple of years ago by DOC It shows the presence/absence of DB in 10 sq km grids. It will have been done for the whole country as well.

**Department of Conservation, Hamilton**

We have Darwin's barberry in the Maniapoto area. Thomas Emmitt was in charge of the control operation before Christmas. He reported finding 888 flowering plants (185 more than the previous year) consisting of 294 large, 364 medium and 228 small flowering plants. The control operation used 6 people for 3 weeks so an intensive effort.

Thomas could send you a map showing the distribution of the barberry and any additional information you might require.

In theory biological control sounds an excellent suggestion. However the plants in this area are distributed over a number of kilometres and thus would need more information on how far the control agents travel in seeking new plants to feed on if they are scattered across an expanse of country.

**Department of Conservation, Invercargill**

We are undertaking Barberry control at a number of sites around the area but the major site is the Blue Mountains. This work is a major and if we had the budget could soak up a lot of money. There is a lot of barberry on private land in this area and while some farmers are doing control work there are a lot that aren't. At the moment DOC Murihiku is spending \$10,000 a year at different sites in this area, this is mainly just holding ground and trying to stop its spread.

## The threat of Darwin's barberry to regional values

### ***Northland Regional Council***

Darwin's barberry is not known in the Northland region and only limited amounts of barberry hedging (*Berberis glaucocarpa*) are evident in the region.

However we are aware of the invasive nature of weeds such as Darwin's barberry and would support the introduction of agents to assist in the control of this species.

### ***Greater Wellington Regional Council***

Darwin's barberry is a common pest plant species in the Wellington region, threatening both biodiversity and agriculture. It is particularly bad in the western hills of the Wellington suburbs, spreading from Karori Cemetery south across the retired regenerating hill country to the coast, north to Mt Kaukau and encroaching on the productive farmland of the Ohariu Valley. It is also spreading in the Hutt and Whiteman's Valleys and at sites in the Wairarapa.

It is a difficult species to control, with very hard woody stems and a small leaf area. It requires high rates of herbicide and penetrant to successfully poison with spray, and is difficult to target because it is commonly found amongst regenerating native. Cutting and stump treating is very labour intensive, with hard stems, sharp vegetation and the plant growing in dense thickets. Seeds are spread by birds, and with both exotic and native bird populations increasing from widespread possum and rat control in the region, the spread is becoming worse.

Unlike gorse it is slow to shade out by regenerating native and has no nitrogen fixing qualitative. It seeds profusely and has a large seed bank in the ground. Even when the existing plants are cut and treated the seed bank continues to re-sprout for a number of years. It causes problems for pest animal and other pest plant control, sprouting into light gaps and blocking access tracks.

GW has listed Darwin's Barberry as a Site-Led Species in the RPMS, meaning it is controlled in our Key Native Ecosystem sites where possible. A number of sites are too far gone to warrant any control. Wellington City and Hutt City Councils are also attempting to control Darwin's barberry, again relying on manual control at limited sites.

The following gives an example of the manual control costs –

It took ten man days to cut and stump treat 800 sqm of barberry mixed in with regenerating native. Less than 2 kg of vigilant gel was used in the two days, indicating the difficulty of the vegetation and the task.

Another site of 3.3 ha was controlled by cutting and stump treating. This took 37 man days during which 5125 trees, saplings and seedlings were destroyed. Almost 11 kg of herbicide was applied, with some of the seedlings pulled by hand.

For successful long-term control both sites will require annual visits to target any seedlings sprouting from the seed bank, and other seeds carried into the area by birds.

GW would be very supportive of the release of a biocontrol agent for Darwin's barberry. A species which targets the seeds is particularly useful because of the bird-spread nature of this plant and the seed bank in the ground. These biocontrol agents will do little to address the existing sites, but will help to slow the expansion of this species.

### ***Otago Regional Council***

Darwin's Barberry (DB) is well established in parts of Otago and has been for many decades. The areas where it is commonly found include areas of South Otago where while it may be localised, the infestations can range from individual plants, or small patches through to dense infestations. It can be found in pastoral, forestry and native bush situations.

It is present in areas around coastal areas of Dunedin City in varying degrees including the Otago Peninsular. In North, East and Central Otago it is believed that in large, it has not established or certainly not common and not yet established to any extent. An area in the Queenstown Lakes District where it is known to exist is in the Glenorchy area. There may be other areas but ORC has no record of this.

The Otago Regional Council have no information at all on the costs that may be spent on DB in Otago. It is not included in the RPMS. Any control work is done purely at the discretion of the landowner or property manager. There are no special interest groups in Otago that actively control DB or generate any great publicity about it apart from one community group in South Otago which has raised it as issue on two separate occasions.

There are no specific known positive attributes or benefits that this plant has to ORC. The proposal to introduce the biocontrol agents poses no issues to the ORC. It is believed that the introduction would be looked upon favourably by the community and therefore would be supported in this manner.

#### ***Auckland Council***

To the best of my knowledge, Darwin's barberry has not been recorded as adventive in the Auckland region. We spend no resources on it at all. Best of luck with killing it though...

#### ***Gisborne District Council***

Barberry is included in our RPMS as a Containment plant pest and is known to be a plant that is difficult to control often established over broken or hilly ground. Birds are directly linked to seed spread and wider establishment of the plant. In many parts of NZ this plant was originally planted as a hedgerow and has since spread out of control in many areas.

We receive very few calls or complaints about Barberry in this region, it is present and scattered and any calls received are usually from the rural sector for information on suitable herbicides to control this plant. The only local group that may receive benefit from Darwin's barberry is most likely the local bee hive keepers as early flowering of this plant in September - October is attractive to bees.

The application by Environment Southland to EPA to introduce two biological agents (*Anthonomus kuscheli* and *Berberidicola exaratus*) to control Darwin's barberry may be of interest to the national beehive industry. I phoned local beehive keeper Barry Foster yesterday to gauge his thoughts on this proposal and potential impacts on the local beehive industry. He confirmed to me that Darwin's barberry is an important plant for bees during September and October.

I advised Barry that Darwin's barberry is a plant pest in the Districts RPMS and that there is a requirement for landowners to control this plant 20m back from adjacent property boundary which such land is clear of infestations.

Other than the beehive keeping industry there are no other parties locally that would be affected by the release of these agents.

#### ***West Coast Regional Council***

Though we support the application in principle, there is little application for biocontrol of Darwin Barberry here on the Coast. I am not aware of it encroaching on pasture land. It is a weed in DoC areas only.

### **Waikato Regional Council**

Please find attached information to be used in the biocontrol application for Berberis darwinii. If you need anything else at this stage let me know.

B. darwinii RPMS rule - <http://www.waikatoregion.govt.nz/Council/Policy-and-plans/Rules-and-regulation/Regional-Pest-Management-Strategy/Regional-Pest-Management-Strategy-2008-2013/Part-2/5-Pest-plants/53-Containment-occupier-control-pest-plants/536-Darwins-barberry-Berberis-darwinii/>

The threat of Darwin's barberry to economic values

### **Mark Ross, Federated Farmers**

I have some feedback from the Southland executive re your request. Much the same comments as passed onto Richard around host specificity etc. some specific comments as below:

*'I know DB (not the beer) is a real issue.*

*My only gut feel would be investigating whether it has any potential to impact on brassica crops, woody crops or potential future crops and also exotics such as shrub willows, poplars and also flax.'*

There was some concern around cost expressed as below:

*'A couple of scrub cutters and chainsaws would have this problem sorted by lunchtime and have the afternoon to paint the stumps with 'Round up'.*

Compare this with the budgeted cost of importing a couple of SA parasites with no species specific GPS'

Overall support for application and we look forward to making a submission in early January 2012.

### **QEII National Trust**

Attached are the figures for the occurrence of each of the species you requested, in each region across the country. Note that I've supplied the number of total registered covenants for each region to give context to each count of occurrence. Also, as I said in a previous email, these counts do not indicate abundance of the species within the covenants, they just indicate that one or more plants are known to be present in the covenant.

Other contributions

### **Entomologist, Auckland**

Yes I am still here some of the time. There are weevils that have larvae that live in fruit/seeds and others in flower buds and some in open flowers.

The best known complexes are those in *Hoheria* and *Pittosporum*.

*Peristoreus stramineus* (Broun, 1881) in *Hoheria* flower buds

*Peristoreus* sp. G (May 1987) in *Hoheria* flowers

*Peristoreus comptus* (Broun) in *Hoheria* green fruit

*Aneuma fulvipes* Pasco, 1876 in *Pittosporium tenuifolium* flower buds

*Aneuma rubricale* (Broun, 1880) in flowers

*Stephanorhynchus crassus* Broun, 1880 in fruit

This should all be available on Plant-SyNZ database

<http://plant-synz.landcareresearch.co.nz/> then go to search.

### **Entomologist, Agresearch**

An off the cuff response, before I delve deeper (if you would like me to) is that *Anthonomus grandis* is the famous boll weevil, which we don't have. I don't think there is anything in the same tribe (Anthonomini – seems to be mainly central American), but it is in the subfamily Curculioninae, which is quite large, and we have lots.

*Berberidicola exaratus* is in the tribe Cleogonini, which we don't seem to have, but in the subfamily Molytinae, we have a few, especially in the Phrynixini. Don't know how closely related they are off the top of my head.

Worth thinking about whether these weevils will be hit by *Microctonus* spp.?

### **Plant ecologist, Nelson**

Lindsay has recently received a shipment of weevils and is considering doing additional tests in containment to tie down the host range. The obvious test plants to choose would belong to the neighbouring native Ranunculaceae. Two questions:

1. Do any of our Ranunculaceae have fruits as such, or anything resembling a fruit?

No....you are safe here.

2. From your experiences defining bird fodder, are there any species even remotely related to the Ranunculales that have fruits similar to barberry?

Yes. Some of the more primitive families, ie "remotely related to the Ranunculales" *Hedycarya arborea* (Pigeon wood), of the Moniliaceae has a drupe (a 'stone fruit') up to 10 mm....*Macropiper excelsum* also has "drupes very close set", though each is tiny. *Pseudowintera axillaris* of the Winteraceae has a multiseeded fruit most similar to barberry.

Both these are eaten by birds. Neither are multiseeded fruit like barberry though.

Of course what the "bugs" key in on, may have little to do with superficial 'taxonomic' similarity with barberry and more to do with other fruit characteristics. That I don't know.

