Potential beneficial and adverse effects to be addressed in the EPA application to introduce the Chilean flame creeper beetle, *Blaptea elguetai* (Coleoptera: Chrysomelidae) as a biocontrol agent for Chilean flame creeper

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The potential risks, costs and benefits of the introduction of biocontrol agents to New Zealand for invasive weeds have been identified through formal brainstorming and through consultation with the public and professionals. There is a suite of possible risks, costs and benefits that are common to most biocontrol agents proposed for release, and other effects that may be specific to each biocontrol agent. These are outlined below for the proposed introduction of a biocontrol agent for Chilean flame creeper. *Tropaeolum speciosum.* The effects of the introduction of exotic biocontrol agents can result from: (1) the introduction of a new organism to the New Zealand environment; and (2) a reduction in the target pest through successful biocontrol. Those effects considered to be significant (in terms of the magnitude of the effect and the frequency of or likelihood of the effect) are highlighted in bold and are discussed more extensively in the application.

Potential impacts on Māori values were addressed in a separate consultation process and will be done accordingly for the Chilean flame creeper application.

Please contact Angela Bownes if you have any comments about the approach used in the application, or to report additional potential effects.

Potential Beneficial Effects

On the Environment

Source of potential benefit	**Comments**
Maintenance of habitats	
Reduced competition from Chilean flame creeper leads to increased survival and diversity of native and other desirable plants in affected habitats.	This is the major expected benefit from the biological control programme. Chilean flame creeper scrambles over short stature native vegetation in many habitats, killing plants, replacing vegetation and halting regeneration. Chilean flame creeper overtops taller plants in forest margins, and can break down trees. Successful biological control will reduce those adverse effects wherever the weed occurs, acting far beyond the reach of existing management efforts. Successful control will reduce the future development of adverse effects of the weed as it spreads. Successful control will reduce the risk of reinvasion of Chilean flame creeper from roadsides into high value habitats.
Sustainability of flora and fauna	
Reduced damage to underlying foliage from spraying.	Chilean flame creeper commonly grows like a curtain using valued vegetation as a framework. Spraying Chilean flame creeper with herbicides damages both the target and non-target plant species. Successful biological control will reduce the need for spraying Chilean flame creeper with herbicides.
Improved access to underlying resources for birds.	Chilean flame creeper curtains hide flowers and fruits of underlying vegetation. Benefit limited because probably not a significant proportion of overall resource.
Reduced mortality of seedlings and improved succession of vegetation.	Chilean flame creepers scrambles over the ground and short stature native vegetation in many habitats, killing plants, replacing vegetation and halting regeneration. Successful biological control will reduce seedling mortality wherever the weed occurs, and will facilitate a return to indigenous/desirable succession.

Ecosystem processes	
Benefits to parasitoids, predator and disease relationships in trophic webs	Increased plant diversity as Chilean flame creeper monocultures break up will increase the diversity and complexity of trophic webs. Effects will vary locally, spatially and temporally.
Reduced contamination of air, soil and water from reduced Chilean flame creeper spraying.	Although likely a real local benefit of successful biological control, Chilean flame creeper is not widely distributed throughout the country. Infested sites currently occupy a small percentage of the overall estate.
Intrinsic value of ecosystems	
Improved look and feel of native bush for visitors.	Successful control limits the development or reduces the occurrence of monocultures of Chilean flame creeper.
Increased carbon accumulation in affected trees.	Reduced shading following control increases tree health, but benefit limited because the number of severely affected trees is currently limited.
Inherent genetic diversity in New Zealand	
Loss of endangered species is slowed.	Not a significant effect. No species are known to be at risk primarily because of Chilean flame creeper
New Zealand's biodiversity is increased.	Not a significant effect. Species increases by one.
Reduced cover by Chilean flame creeper improves cross-pollination.	Not a significant effect. Chilean flame creeper curtains unlikely to be limiting cross-pollination at present.
Reduced cover by Chilean flame creeper improves availability of nest spaces for birds.	Not a significant effect. Chilean flame creeper curtains unlikely to be limiting nesting sites for birds at present.

<u>On Human Health and Safety</u>

Source of potential benefit	
Reduced frequency of control operations lowers the incidence of occupational health issues for gardeners and conservation workers.	Not a significant benefit. Current situation unknown, but such benefits are likely to be rare nationally.

Reduced importance of Chilean flame creeper reduces use and adverse effects of herbicides.	A real but not significant benefit. Herbicide use against Chilean flame creeper in New Zealand is not currently extensive or notably hazardous.
<u>On society and communities</u>	
Source of potential benefit	
Successful biological control reduces costs of Chilean flame creeper management to regional and territorial authorities	A significant benefit.
Successful control reduces the need for Chilean flame creeper control operations, leading to better targeting of community resources	A significant benefit.
Successful control of Chilean flame creeper increases the survival of newly restored native vegetation on farms leading to increased wellness and wellbeing for landowners	A significant benefit.
<u>On the market economy</u>	
Source of potential benefit	See section 5.x.x
Reduced control costs to businesses required to control Chilean flame creeper	Successful control would mitigate costs to businesses of complying with RPMS.
Reduced control costs to infrastructure managers required to control Chilean flame creeper.	Successful biological control could mitigate costs to infrastructure companies.
Reduced time and cost for landowners protecting their riparian plantings and native forest remnants from Chilean flame creeper invasion.	Successful biocontrol would mitigate costs for landowners.
Reduced control costs/increased production in forests.	Not a significant effect. Chilean flame creeper is not seen as a limitation to forestry (Hill 2011).
Reduced machinery maintenance costs for contractors.	Not likely to be a significant effect.

Management of control agents creates business opportunities for Manaaki Whenua – Landcare Research.	A real effect, but a small and transient contribution to Manaaki Whenua – Landcare Research revenue.

Potential Adverse Effects

<u>On the Environment</u>

Source of potential adverse effects

Sustainability of flora and fauna

Non-target feeding by newly established control agent significantly reduces native plant populations.	Host range testing and evidence from the native range indicates no such effect is likely. Native plants are not at risk.
Adults of the biocontrol agent compete with native species for food.	Not a significant risk. Adults of the biocontrol agent also feed on the target host plant and other exotic species within the same genus.
Reduced habitat quality for some native fauna.	Not significant. Replacement vegetation will also support invertebrate fauna. No fauna of special significance found on Chilean flame creeper in surveys (McGrannachan et al. 2022).
Swift evolutionary change in insect leads to unexpected non-target damage to valued plants and/or alterations to food webs	Not a significant risk. There is little evidence of adaptive host range expansion to non-target species in weed biocontrol agents.

Ecosystem processes

Food web interactions are adversely affected by the introduction of new prey species	Adverse effects are conceivable but not expected. Increased plant diversity as Chilean flame creeper monocultures break up will increase the diversity and complexity of trophic webs, but effects will vary locally, spatially and temporally.

Intrinsic value of ecosystems

No significant effects have been identified

Inherent genetic diversity

***Blaptea elguetai* hybridises with native chrysomelid beetles**	Not a significant risk. No chrysomelid species in New Zealand are closely related to enable hybridisation.
Indirect competition causes extinction of native insects	Not a significant risk. No indication that vulnerable or endangered species are associated with Chilean flame creeper infestations (McGrannachan et al. 2022), and any measurable indirect competition would be restricted to the immediate vicinity of the host plant.

On Human Health

Source of potential adverse effect	
Public phobia of the new beetle.	Unlikely
The beetles generate an allergic response.	Not a significant risk. Literature search reveals no such cases, and there are no reports from the native range that the beetle causes harm.
Beetles need spraying with adverse effects to humans.	Not a significant risk. No predicted large-scale attack on non-target plants requiring remedial action

On the Market economy

Source of potential adverse effect	See section 5.x.x
Successful biological control reduces revenue for contractors and suppliers.	Not a significant effect. Revenues directly related to Chilean flame creeper management are not a key revenue source for many or any contractors or suppliers.
The beetle attacks Brassica fodder crops	Highly unlikely. Host range testing and evidence from the native range indicate no such effect is likely. Beetle populations cannot be sustained on Brassica species. No evidence from the native range of the beetle attacking Brassica crops.

On Society and Communities

Source of potential adverse effect

Fear and distrust of exotic species and their possible non-target effects	Firmly held opinion in a proportion of the New Zealand population.
Control reduces aesthetic values of Chilean flame creeper.	Not a significant risk. Chilean flame creeper is not strongly valued by the public, and the negative impacts of infestations are more widely recognised.