# Biocontrol of weeds in Northland: past and emerging successes


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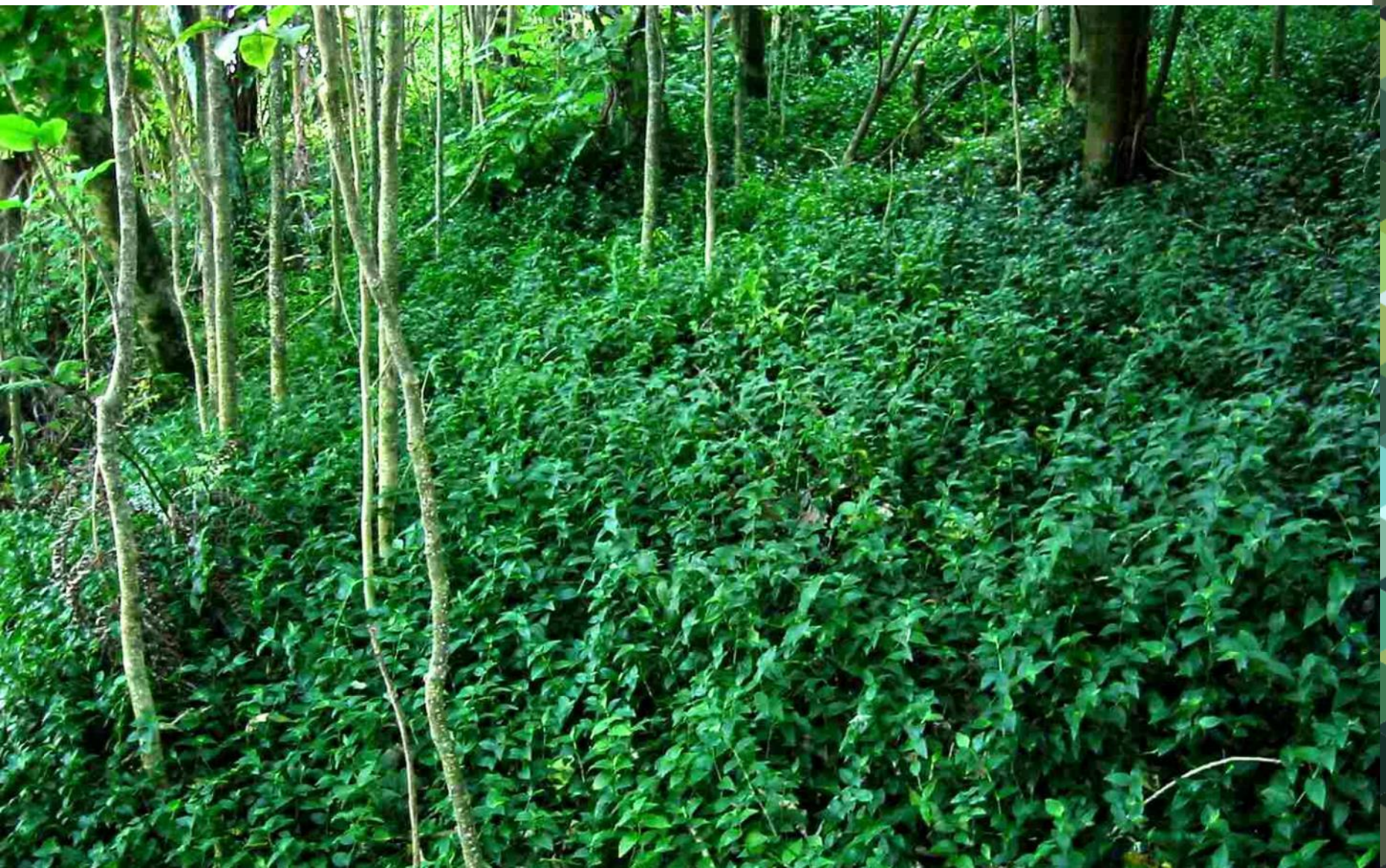
# Why Biocontrol?

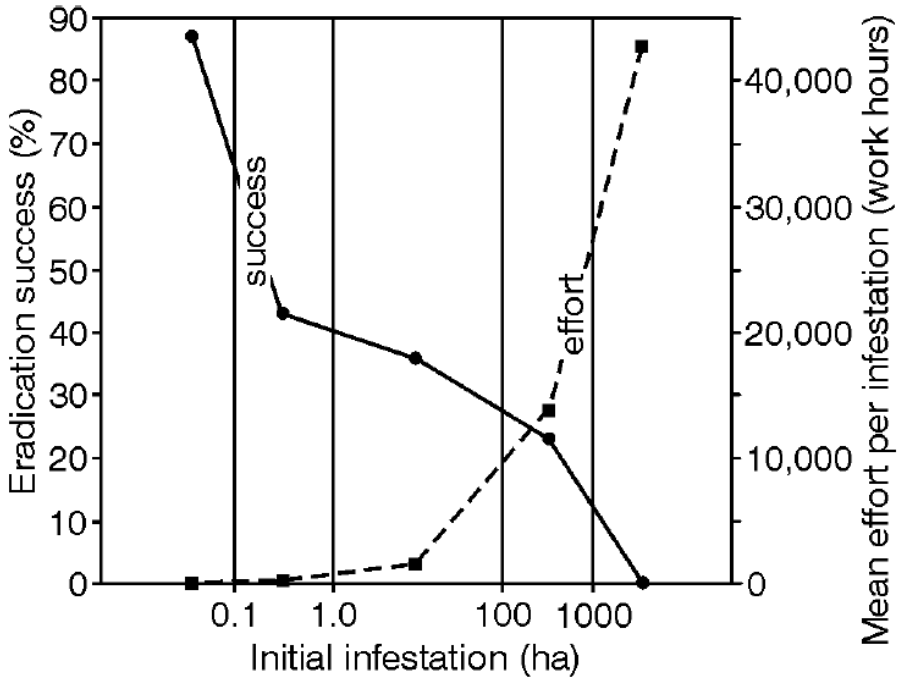
- Since 1769, at least 25,000 exotic species introduced (10% of world's flora), 90% deliberately.
- A species naturalises every 39 days.
- Now more naturalised than native species.
- ~500 species considered weeds at present.

# Why Worry?



# Eradication

- Most cost effective strategy when weeds are low incidence.
- Usually possible for infestations <1 ha.
- 33% success when 1-100 ha.
- 25% success when 100-1000 ha.

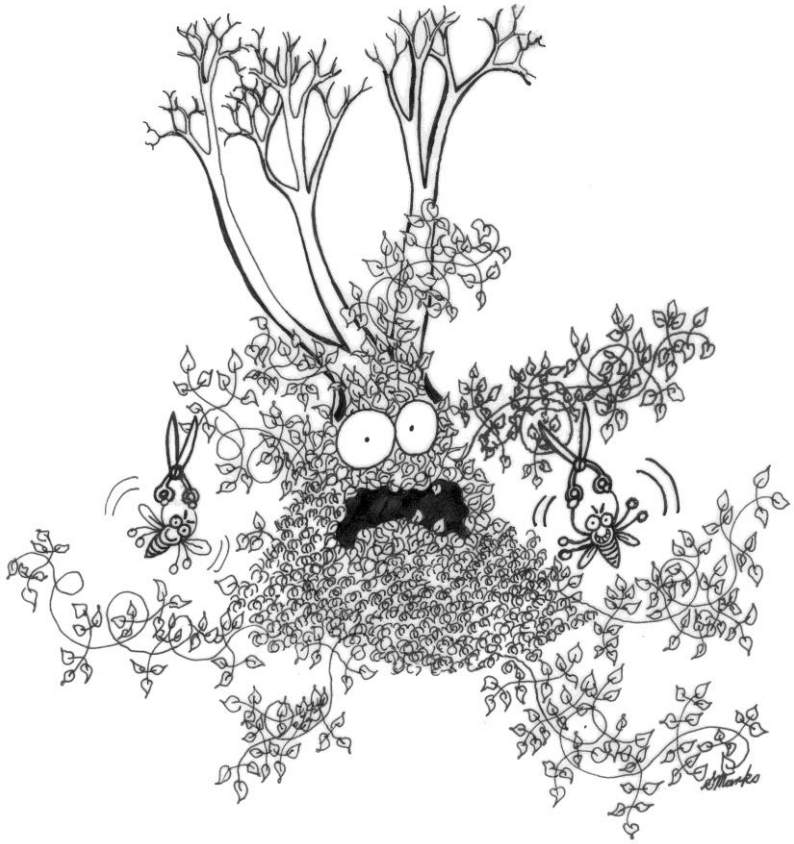


# When Eradication Is Not Feasible:

- In many situations biocontrol is the best or least damaging control method & probably the only sustainable one.
- Successful biocontrol can provide enormous benefits to communities.

# What is Biological Control?

“ A technique used worldwide where we attempt to restore the balance between a weed & the environment by reuniting it with some of its key natural enemies.”



# Isn’t Biocontrol Risky?

# Excellent Safety Record

- NZ: ~90 yr history. 59 agents released. No significant non-target attack.
- Worldwide: 512 agents released. Only 4 (0.8%) have serious non-target impacts: all on plants in same genus as target weed & *all predictable.*
- Lower standards of biosafety in past, some releases would not be allowed today.
- Host-range testing has been improved to reduce potential risks still further.

# Agent Selection & Host-Range Testing

- Many insects can only use a very narrow range of plants
- We only select agents that appear to be host specific, then we prove it

# Does it Work?

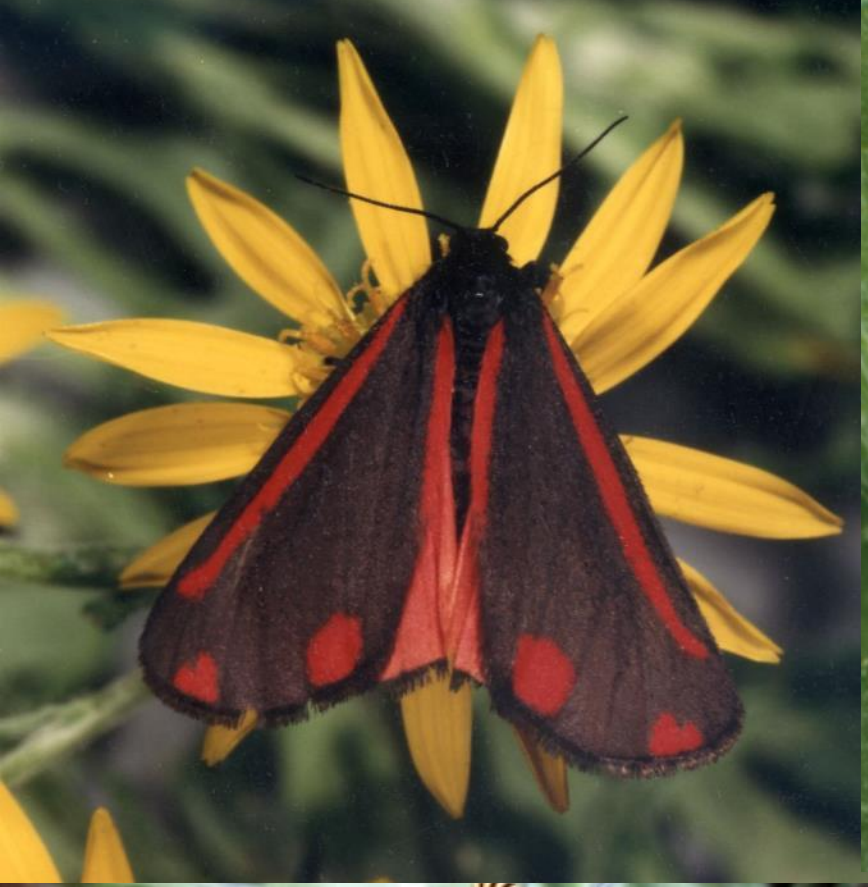
- ~$^1/_3$ of programmes so successful other control options are no longer required.
- ~$^1/_2$ are partially successful (e.g. biocontrol effective in some habitats, but not in others).
- ~$^1/_6$ are failures (no impact).
- We are working on improving success rate/cost-effectiveness!

# Boneseed

(*Chrysanthemoides monilifera monilifera*)

# Alligator Weed
(*Alternanthera philoxeroides*)

# **Ragwort** (*Jacobaea vulgaris*)




# Economic Benefits

- Current annual saving in herbicide use alone for the dairy industry from the ragwort flea beetle estimated to be NZ$44m.
- Benefit to cost ratio of $14:1.
- Potential for further savings of $20m p.a with the plume moth.
- Decision to not proceed with the flea beetle in the 1920s cost NZ $8.6b!

# Mist Flower

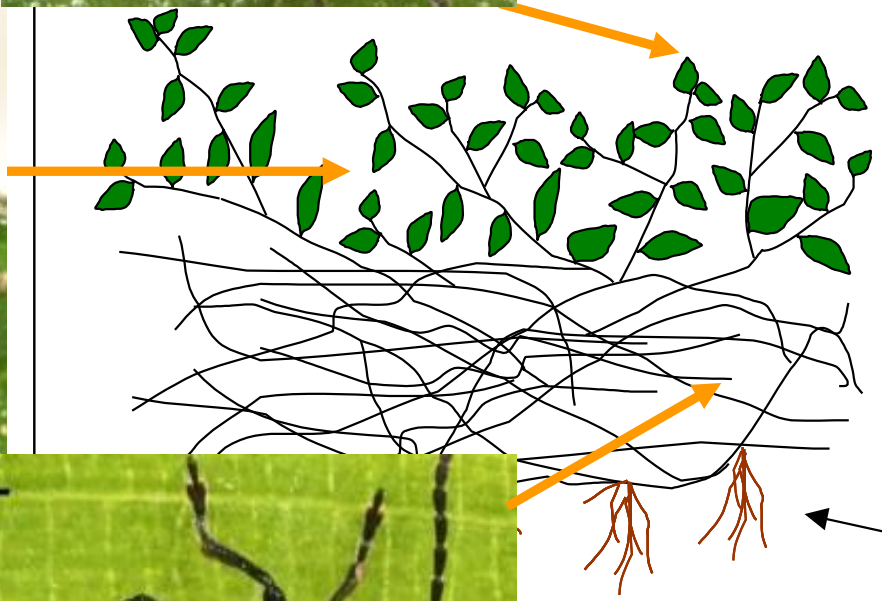
(*Ageratina riparia*)

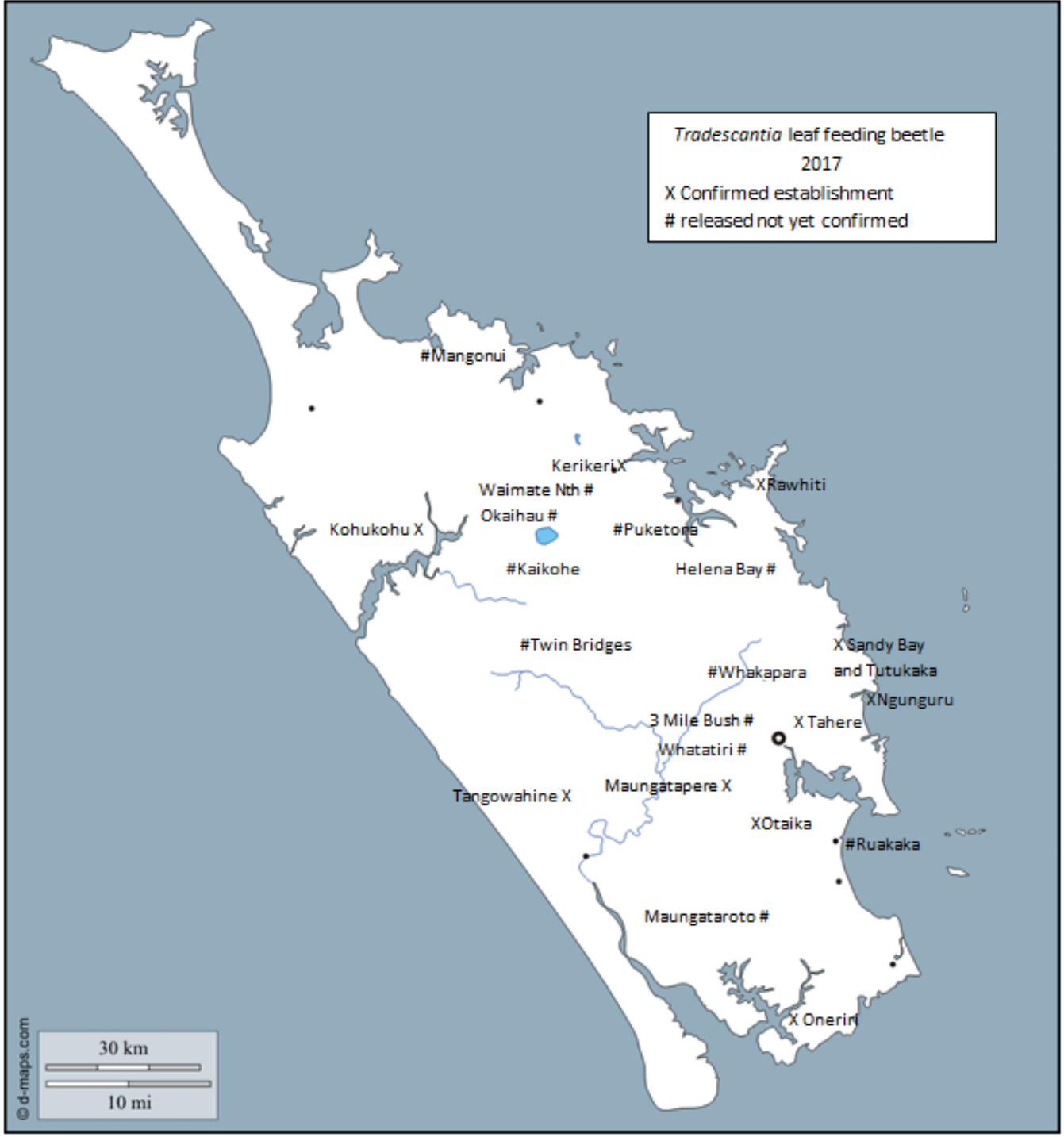
# **Lantana** (*Lantana camara)*

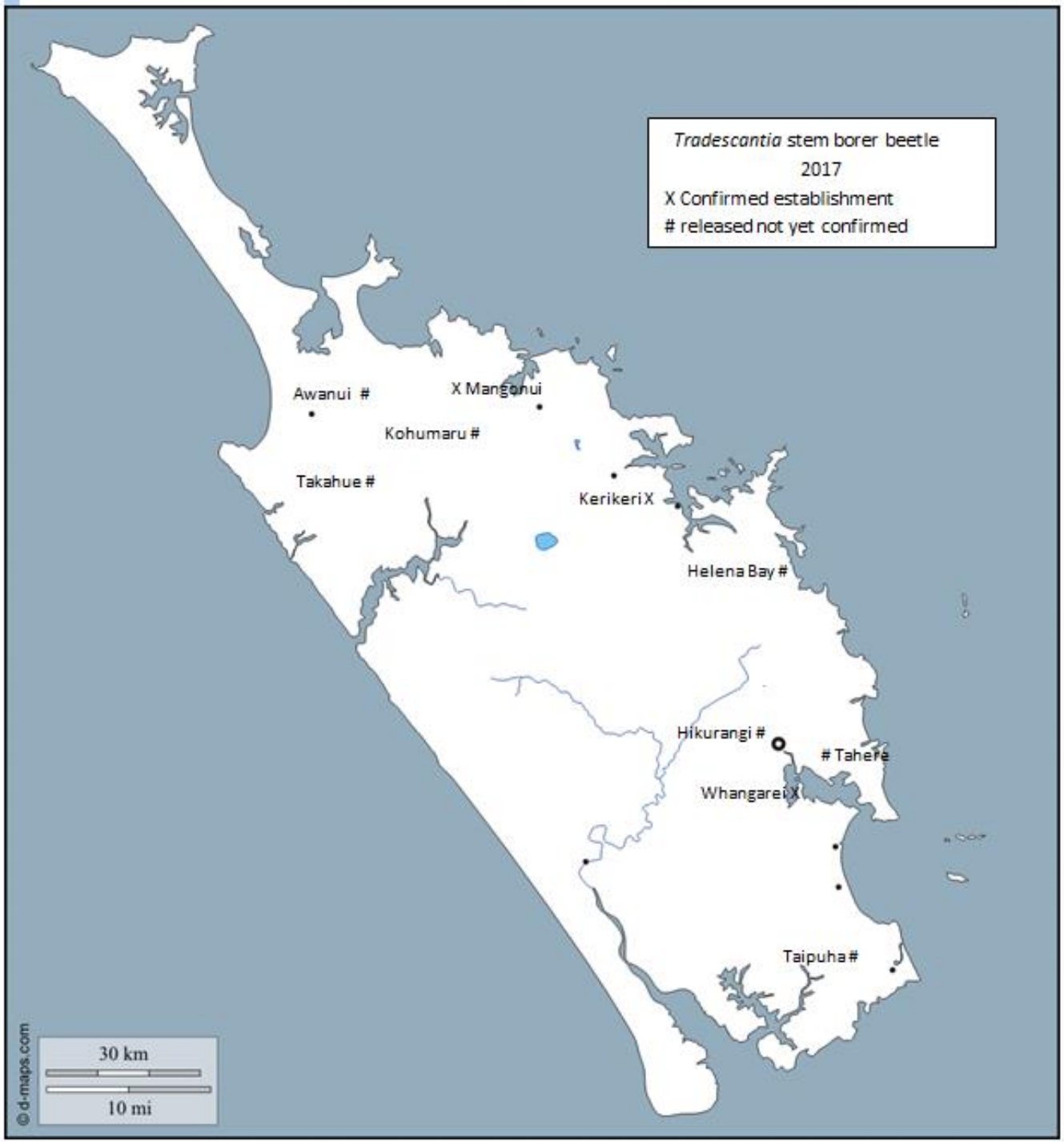
# **Smilax** (*Asparagus asparagoides*)

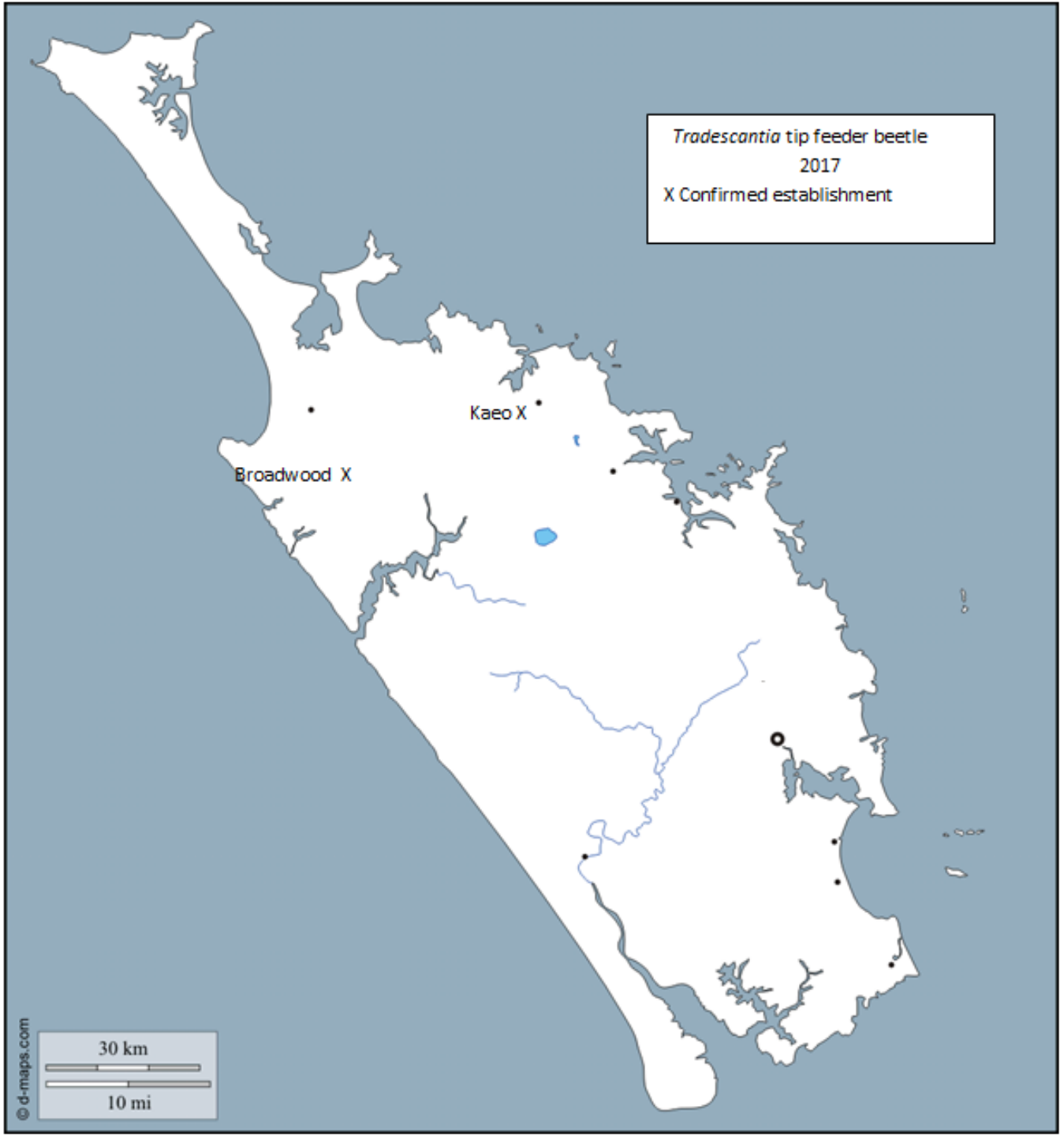
# Tradescantia

(*Tradescantia fluminensis*)


Growing stems with leaves
Dense mat of live stems without leaves
Thin, short roots


*Tradescantia* leaf feeding beetle
2017
X Confirmed establishment
# released not yet confirmed
#Mangonui
Kerikeri X
Waimate Nth #
Okaihau #
X Rawhiti
Kohukohu X
#Puketona
#Kaikohe
Helena Bay #
#Twin Bridges
X Sandy Bay
and Tutukaka
#Whakapara
X Ngunguru
3 Mile Bush #
X Tahere
Whatatiri #
Maungatapere X
Tangowahine X
X Otaika
#Ruakaka
Maungataroto #
X Oneriri
30 km
10 mi
© d-maps.com


*Tradescantia* stem borer beetle
2017
X Confirmed establishment
# released not yet confirmed
Awanui #
X Mangonui
Kohumaru #
Takahue #
Kerikeri X
Helena Bay #
Hikurangi #
# Tahere
Whangarei X
Taipuha #
30 km
10 mi
© d-maps.com


*Tradescantia* tip feeder beetle
2017
X Confirmed establishment
Kaeo X
Broadwood X
30 km
10 mi
© d-maps.com

# Woolly Nightshade

*Solanum mauritianum*


Woolly nightshade lacebug
2017
X Confirmed establishment
# released not yet confirmed
X Waiharara
X Rangiputa
X Mangonui
x Awanui
X Oruru
X Kohumaru
x Ahipara
Kerikeri x
Waitangi x
Kohukohu x
x Kaikohe
Helena Bay x
Otaua #
x Twin Bridges
Tutumoe x
Whangarei X
x Whg Heads
#Ruakaka
Dargaville #
Poutu #
30 km
10 mi
© d-maps.com

# Reality Check!

- May take decades to achieve results.
- Not all weeds are suitable targets.
- Level of control can vary.
- May only result in stopping further spread.
- Will not eliminate weeds.
- Many challenges!

# Funding

- MBIE - underpinning science to maximise success and safety of biocontrol.
- Regional councils + DOC = National Biocontrol Collective - operational research to develop biocontrol programmes
- Community groups often secure funds from MPI Sustainable Farming Fund for additional projects.

# National Biocontrol Collective

- 14 key organisations pool resources.
- Undertake collective decision-making.
- Take into account NZ Inc.
- Meet annually.
- Support development of biocontrol for multiple weed targets.

# Current Projects

- Alligator weed
- Banana passionfruit
- Boneseed
- Broom
- Chilean needle grass
- Darwin’s barberry
- Field horsetail
- Giant reed
- Japanese honeysuckle
- Lagarosiphon
- Lantana
- Moth plant
- Old man's beard
- Pampas
- Privet
- Tradescantia
- Thistles
- Tutsan
- Wild ginger
- Woolly nightshade

# In a Nutshell

- Slow
- Safe
- Selective
- Sustainable
- Successful

Much more needed!

# BIOCONTROL & ECOLOGY OF WEEDS


## BIOCONTROL & ECOLOGY OF WEEDS

- Research
- Using biocontrol
- Weed biocontrol education resources
- Approvals
- Videos
- Weed Biolocontrol


## KEY POINTS

- Landcare Research is a world leader in weed biocontrol research
- Our research aims to improve management of weeds through a better understanding of weed ecology

Controlling weeds in New Zealand is a challenging and expensive task. Widespread weeds can be found in inaccessible locations and alongside native and economically important plants. Herbicides are expensive to apply, often kill desirable plants, can contaminate the environment, and need to be reapplied regularly in order to control weeds.

Biocontrol offers a cost-effective, environmentally friendly, and permanent solution to weed control. Carefully selected biocontrol agents target only weeds. They don't harm desirable plants, and don't pollute the environment. Once established, they travel wherever the weed spreads and can return again and again to kill off new weed growth—all without human input.

## KEY CONTACT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Contact Lynley

View profile


Research

Using biocontrol in New Zealand

Weed biocontrol education resources

Approvals to release biocontrol agents

Videos


Weed Biolocontrol newsletter

Thank you!

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