

Wilding Conifer Control in New Zealand.

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Three way -collaboration



Department of Conservation
Te Papa Atawhai



Landcare Research
Manaaki Whenua



Introduction

- Conifers planted for **erosion** control (1880's) and subsequent **commercial** plantations have created unwanted wilding tree spread.
- Wildings cover >**200 000** ha Department of Conservation administered land in the South Island of New Zealand.
- Area increases to over **500 000 ha** when private land is included.
- The New Zealand Department of Conservation requires wilding pines to be lawfully controlled in terms of Reserves, National Parks & Conservation Acts.



History

- Diquat desiccant spray, followed by fire.
- Very effective, dry fuel, hot fires.
- Fire no longer an acceptable management option.
- Diquat alone not effective, especially for larger trees.
- Mid Dome drift incident – January 2004.
 - Fixed wing aircraft
 - 80ℓ/ha
 - small droplets, VMD < 250µm
- **2005 – DoC national workshop on management of Wilding Conifers, identified two clear problems :**
 - **Herbicide choice**
 - **Application methods**



Objectives

- Conduct aerial herbicide trials to investigate the efficacy of environmentally acceptable **alternative** herbicide treatments to diquat.
- **Cost effective** compared to current, ground-based control methods.
- Optimise and improve **aerial application** methods.
 - Low drift potential – VMD 350 to 450 μm
 - Sufficient coverage



Wilding species

Initial trials, three biggest problem conifer species:

- *Pinus contorta*
- *Pinus mugo*
- *Pseudotsuga menziesii*

Additional two conifer species identified:

- *Pinus nigra*
- *Pinus sylvestris*



Two different problems

Development of systems for Wilding Conifer control

- Boom spray of dense conifer infestations
- Spot treatment of scattered outliers



Program history & progression

- Scion subcontracted by Landcare, Beating Weeds program.
- Developed in collaboration with DoC (Pete Raal & Peter Willemse).
- 19 field trials, 11 boom field trials & 8 spot trials.



Application methods – boom spraying

- 1st boom trials, helicopter calibrated to deliver **150 ℓ/ha.**
- 2nd boom trials, helicopter calibrated to deliver **400 ℓ/ha.**
- Calibrated helicopters.
- Hydraulic nozzles.
- 8m boom.
- Release height, 10 m.
- VMD of approximately 350 - 450 μm
- Low drift potential.



Application methods – spot spraying

- Designed & developed a calibrated spot gun. (Eschenmoser, Willemse, Raal & Gous)
- 1st spot trials, spot gun calibrated to deliver 500ml / spot.
- 2nd spot trials, spot gun calibrated to deliver 1ℓ / spot.



Results – Boom Spray

Lucifer Brew!!!

- 20 ℓ Grazon + 20 ℓ Tordon + 10 ℓ Dicamba + 4 kg Ammonium Sulphate + 20 ℓ Kwiken oil, applied in 400 ℓ / ha.
- 98% kill, *Pinus contorta*, *P. nigra*, *P. sylvestris*, *Ps. menzesii*
- Trees up to 10 m tall.



Results – Spot Spray

- 20% Grazon in paraffinic spray oil.
- Applied at 1 ℓ/tree into tree crown.
- 100% kill, *Pinus contorta*, *P. nigra*, *P. sylvestris*, *P. mugo* & *Ps. menziesii*
- Trees up to 12 m tall.



Hughes/MD 500 Notar
Main Rotor Diameter 8.03m
Rotor speed 480rpm



Central South Island
Helicopters
Twizel 2010

Conclusions

For the 2011/2012 spraying season, the Department of Conservation has gone fully operational with both the boom and spot treatments based on the preliminary results of this projects results.



Publications

- Herbicide screening trial to control dormant wilding *Pinus contorta*, *P. mugo* and *Pseudotsuga menziesii* during winter. BY Stefan Gous Michael Watt, Brian Richardsons and Mark Kimberley.
- Herbicide screening pot trial for wildling conifer control *Pinus contorta*, *P. mugo* and *Pseudotsuga menziesii*. BY Stefan Gous Michael Watt, Brian Richardsons and Mark Kimberley.

In Press

- Aerial spot treatment to control *Pinus contorta* and *P. nigra ssp. Laricio*. By Stefan Gous, Peter Raal, Michael S. Watt.
- Aerial herbicide spraying to control wilding *Pinus contorta* in New Zealand. By Stefan Gous, Peter Raal, Michael S. Watt.

