



# UPDATES IN WEED RESEARCH

Minimising the environmental impacts of forest weeds in New Zealand.

## WEED KILLERS

Weed control during the establishment of plantation forests improves tree survival, growth and timber yield. The most cost effective way to manage weeds in New Zealand forests is to use herbicides; most commonly terbuthylazine and hexazinone. However, these herbicides do not comply with some eco-certification criteria and they have been classified as prohibited pesticides by the Forest Stewardship Council (FSC). Scion's weed research programme provides the science to overcome common weed problems faced by the forestry sector. The programme, aimed at managing forest weeds, is based around 'maintaining licence to operate' and includes identifying acceptable herbicides, reducing spray volumes and investigating the fate of herbicides in different forest environments.

The status of terbuthylazine and hexazinone as 'highly hazardous' is under review by the FSC. Regardless of the outcome of the review, Scion's weed research will provide the forest industry with robust information on environmentally sound weed control practices that minimise potential off-site impacts of herbicides while maintaining productivity. To date, our work to find acceptable herbicides, as well as to understand the behaviour of prohibited herbicides in forest soils, has played a key role in supporting their continued use under derogation. Our recent publication<sup>1</sup> on the use and fate of herbicides in New Zealand planted forests was the most highly accessed paper for the New Zealand Journal of Forestry Science for this year, highlighting the importance of this area of research to forestry and New Zealand.

## ALTERNATIVE HERBICIDES

Herbicide mixes with the potential to replace terbuthylazine and hexazinone were screened in field trials in 2012 and 2013. The best alternative, compared with current industry standards, was a mixture of triclopyr, clopyralid and haloxyfop. Terbuthylazine in combination with mesotrione or triclopyr or clopyralid was also very effective, should its use be permitted.

As the trees in the trials mature to canopy closure over the next 2 to 3 years they will continue to provide information on the viability and effectiveness of alternative treatments.

This work is funded by the FSC Cluster group and the Sustainable Farming Fund (SFF). Funding ends in June 2015.

## FATE OF HERBICIDES IN A FOREST ENVIRONMENT

The potential for continued use of terbuthylazine in FSC-certified forests depends in part on whether it is retained and breaks down in forest soils, or whether it leaches into waterways.

A two year study to evaluate the fate of terbuthylazine and hexazinone in a Pumice soil has been completed. The environment was considered to be most at risk in the month following aerial spray application; after that time the concentrations of the herbicides were low due to rapid degradation.

Pumice soil is only one forest soil type; others, likely to be especially vulnerable to leaching, include Recent and Raw soils. The lack of information about the fate of herbicides used in New Zealand forests with different soils types means uncertainty remains about the risk they pose to the environment. Similar trials on vulnerable soils will need to be carried out to ascertain if terbuthylazine and/or hexazinone will leach into waterways at dangerous levels.

This work was funded by AgResearch up to June 2014. For it to continue, financial support from forest sector is needed.

## LOOKING TO THE FUTURE

It is vital to identify stakeholder priorities so a strategy to provide science and solutions that allow the forestry sector to grow productive, certified and sustainable forests can be developed.

Preliminary indications are that research to support forest owners 'licence to operate' as FSC-certified continues to be a major priority for the sector. Other potential areas of priority include:

- Management of wilding conifer spread
- Remote sensing technology for precision weed control systems
- Intensive weed control for productive clonal forests
- GE herbicide resistant trees and development of sterile conifers
- Pesticide application systems that optimise uptake and reduce drift.

A workshop for primary sector providers and users involved in weed management will be held at the end of 2014 to determine the future priorities for weeds



research for New Zealand. Scion will be contributing and needs forestry sector feedback and support to ensure forestry is strongly represented.

## FUNDING

Further work around minimising herbicide use, finding viable alternatives to prohibited herbicides and understanding the fate of herbicide in forest environments will not proceed without financial support from the forest sector.

Forest weed research at Scion has largely been funded by an MBIE grant 'Undermining Weeds' in collaboration with AgResearch. Additional funding has been received from the forest industry through Future Forests Research and the FSC Cluster Group. However, most of this funding ended in the 2013/2014 financial year. The SFF grant investigating alternative herbicides finishes at the end of June 2015. To continue with the work supporting the forest sector's 'licence to operate' we will need co-funding from the forest industry to leverage additional investment through MPI in the Sustainable Farming Fund or elsewhere.

### COLLABORATORS AND CONTACTS

**Partners** within the forestry sector to June 2014 have included Future Forests Research, Forest Stewardship Council Cluster Group and the Farm Forestry Association.

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