



# FACT SHEET

MAY 2019

## CALIFORNIAN THISTLE CONTROL—MOWING IN THE WET

This fact sheet outlines Beef + Lamb New Zealand funded research to reduce Californian thistle infestations.

Mowing when wet gives 30% better control than mowing during dry weather.

The research investigated the use of naturally occurring thistle diseases as bio-control agents, and the impact of mowing Californian thistle when wet.

## SURVEY TO IDENTIFY THISTLE DISEASES

The first part of the research project involved a nationwide survey in 2005-06 of Californian thistle stands on 134 randomly selected farms throughout New Zealand. Fungi from thistle shoots and leaves were cultured and 20 different fungal genera were identified.

The most common fungus was *Verticillium dahliae*, occurring on about half of the farms. This fungus causes a vascular wilt disease. A laboratory study showed that it can kill thistle shoots with minimal risk to desirable forage species.

Another fungus, found on 36 per cent of farms, is being investigated as a bio-herbicide by AgResearch.

Photo A: Californian thistle shoots with vascular wilt disease



## MOWING WET PASTURE GETS RESULTS

The second part of the research tested a Southland farmer's observation that there was a difference in the vigour of Californian thistle after mowing in the rain compared to mowing in dry weather. The difference, according to the farmer, was astounding. The thistle stand was much less dense where it had been mown in the rain. Other farmers confirmed this observation.

A possible explanation is that the wet mowing blade is transferring naturally occurring thistle disease causing pathogens from infected to uninfected shoots.

## TESTING THE THEORY

Field trials were set up on nine farms during autumn 2008 to test farmer observations—one in Hawke's Bay, Waikato and Marlborough, and two in Canterbury, Otago and Southland. All were selected from the initial survey group.

Farmers were asked to mow two patches of the thistle (one when it was raining and one when the weather was dry). A third patch was left unmown.

This trial was repeated the following summer on new patches of the thistle on nine of the original farms, plus three new farms.

Another experiment was set up in a glasshouse to test if a thistle disease causing pathogen could be transferred by blade from infected to uninfected shoots. *Verticillium dahliae* was transferred on wet and dry scissor blades.

## RESULTS

The field trial results showed that mowing when wet improved the control of Californian thistle by approximately 30 per cent compared to dry mowing.

The glasshouse trials showed that *Verticillium dahliae* is easily transferred from infected to uninfected shoots. This suggests a wet mower blade could easily spread this fungus and the disease it causes through the thistle stand. However researchers are unsure how much rain is needed.



Photo B: Californian thistle plants 10 weeks after inoculation using scissors that had previously cut an infected plant. The plant on the left was inoculated with wet scissor blades; the one on the right with dry blades



Photo C: Mowing when wet

- Mowing before flowering (usually January or February) will significantly reduce the chance of seed blowing away and establishing in bare soils.
- It is likely that mowing when wet spreads helpful diseases like vascular wilt (yellowing and wilting) and Californian thistle rust (orange/brown spores on underside of leaves during late spring/summer).

## POTENTIAL FOR A COMMERCIAL BIOLOGICAL HERBICIDE

During the research a previously unknown fungus was identified and found to be effective in killing Californian thistle shoots. As it does not damage desirable pasture species, the fungus, *Plectosphaerella cucumerina* has the potential to be used as a spray or granule herbicide to control this weed.

AgResearch has evaluated its commercial potential in collaboration with a Canadian Government research group. Further research is necessary to improve the shelf life of the fungus before commercialisation.

## CONCLUSIONS

- Mowing Californian thistle when wet is currently the most effective and affordable way to control the weed.
- Mowing twice each growing season, once in December then again in February, will cause a rapid decline in the thistle population, particularly if conducted during rainfall.



For more see the four-minute video clip on the Beef + Lamb New Zealand YouTube channel: [youtube.com/user/beeflambnz](https://www.youtube.com/user/beeflambnz)

## ACKNOWLEDGEMENTS AND MORE INFORMATION

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For detailed information on the lifecycle of Californian thistle, see Controlling Californian thistle fact sheet 158.

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This fact sheet was reviewed by Dr Graeme Bourdôt, AgResearch, in May 2019.