

## PATHOGENS ON CALIFORNIAN THISTLE

There are three fungal pathogens on Californian thistle of which you should be aware. None of them have been deliberately imported as biological control agents; all have been accidentally introduced to New Zealand.

### White soft rot (*Sclerotinia sclerotiorum*)

This common fungus attacks lots of plants including Californian thistle. White soft rot causes water-soaked brown or black lesions, usually near the bases of the thistle stems, which turn yellow and wilt and can be easily dislodged. However, it is rare to see large outbreaks of this disease on Californian thistle.

Researchers at AgResearch have attempted to develop this fungus into a mycoherbicide to control Californian thistle but have not been able to find a suitable formulation that produces reliable results. They are now working with other fungi that may be more suitable for this purpose instead. Research to develop white soft rot as a mycoherbicide for giant buttercup (*Ranunculus acris*) is continuing.

See *Inundative control using mycoherbicides*

### Phoma leaf blight (*Phoma exigua* var. *exigua*)

Some unusually sickly looking Californian thistles were noticed in the Manawatu in 1999 and phoma leaf blight was isolated from them. Since then phoma leaf blight has been seen attacking a range of thistles all over New Zealand. If you see plants over a wide area that are chlorotic (yellow-looking) and later turn brown as they die, it is likely to be due to an outbreak of this pathogen.

Research has shown that the impact of this fungus is highly variable with damaging systemic infection only occurring rarely. A more virulent strain of this fungus would be needed if it was to be developed into a mycoherbicide.



Plant infected with phoma leaf blight

### Californian thistle rust (*Puccinia punctiformis*)

You will commonly see this rust fungus on Californian thistle, as it is widespread throughout the country. Affected plants are usually covered in brightly coloured spores (yellow, orange or brown), and become chlorotic and stunted looking. Infected stems do not usually flower and root buds may also be affected.

The rust only attacks Californian thistle and appears to be limited in its ability to infect plants – usually you will only find some diseased plants in a patch of thistles, but occasionally more widespread outbreaks occur. A weevil (*Ceratapion onopordi*) is being released here that may be able to vector the rust and spread it around more widely.

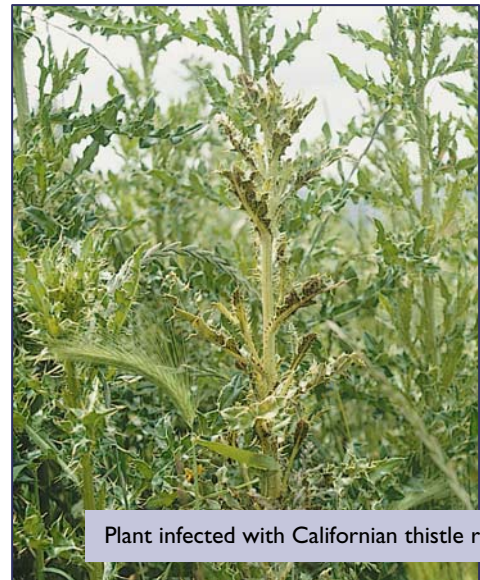
See *Californian thistle stem miner*

This rust is not a suitable candidate to develop into a mycoherbicide because it cannot be grown and bulked up in the laboratory on other media (it is an obligate parasite that requires a living host), and because it has a complex life cycle.

## Other pathogens

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A recent survey in New Zealand undertaken by AgResearch to look for other pathogens that could be used for Californian thistle control has yielded over thirty fungi and bacteria for further study. They include a fungus which may be responsible for the anecdote that mowing Californian thistle in the rain leads to its demise, and trials are underway to confirm this. Another fungus found is of particular interest because it is easily cultured, and its spores infect the thistle without the need for added nutrients. These two characteristics are highly desirable for mycoherbicide development, and AgResearch scientists are now studying this promising fungus in detail.



Plant infected with Californian thistle rust

### For further information contact:

**Graeme Bourdôt**  
AgResearch  
PO Box 60  
Lincoln 7640  
NEW ZEALAND  
Email: [graeme.bourdote@agresearch.co.nz](mailto:graeme.bourdote@agresearch.co.nz)  
Ph (03) 983 3973  
Fax (03) 325 2946

