



PESTS, DISEASES AND WEEDS

The impact of pests, diseases and weeds cause significant economic losses in planted forests. These risks are expected to increase with climate change as average temperatures rise.

FOREST PESTS AND DISEASES

The distribution of insects and pathogens in New Zealand is strongly determined by climatic conditions. Changes in climate are therefore likely to result in shifts in the geographic range of many species.

Early detection of pests and diseases is key to managing the growing risks associated with climate change.

- ▶ **Insect pests** - Warmer temperatures generally result in greater abundance of insect pests due to their better survival over winter. It is also likely that climate change will increase the establishment risk of new species from warm temperate or subtropical regions. The extent to which changes in insect abundance and distribution could influence plantation productivity is unclear.
- ▶ **Pathogens** - Climate change is unlikely to greatly influence the distribution of the main needle-cast diseases of radiata pine in New Zealand as these are already found throughout the country. Climate change is, however, likely to change the regional incidence and severity of some fungal diseases.



Dothistroma needle blight (*Dothistroma septosporum*)

- Severity varies widely throughout New Zealand.
- Over the long term disease severity is likely to decline in the North Island and increase within the South Island.

Swiss needle cast (*Phaeocryptopus gaeumannii*)

- Swiss needle cast is the most widespread disease of Douglas-fir.
- Likely to increase with climate change throughout the country as pathogen abundance is strongly correlated with winter air temperature.



INVASIVE PLANTS

Growth rates of weeds are likely to increase as a result of increasing CO₂ concentration, root-zone water storage, temperature and changing length of the growing season.

Weeds will adapt to change more quickly than trees and there is likely to be a proliferation of ornamental and potentially invasive weed species such as *Melaleuca quinquenervia* (broad-leaved paperbark) and *Pueraria montana* (kudzu).

Changes to weed composition and growth rates resulting from climate change are likely to have a detrimental effect on tree growth. In dry regions, young trees could have increased weed competition for water.

Weed control is already the single biggest establishment cost in New Zealand's planted forests and has a major influence on the overall productivity of a stand. This is not likely to change in the future, but forest managers may need to adopt new regimes to control different invasive species.

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IN SUMMARY

- The incidence and severity of some fungal diseases is likely to change with increased rainfall and temperatures.
- Warmer average temperatures will generally result in greater abundance of insect pests due to their better survival over winter.
- Higher temperatures and rainfall are likely to increase the risk of new species from warm-temperate or subtropical regions establishing in New Zealand.
- Species composition and distribution of weeds is expected to change.

Maintaining good biosecurity and forest surveillance systems will be vital to managing the risks associated with a changing climate.

Climate change will affect planted forests in New Zealand

Over the next two or three forestry rotations, NIWA projects the following likely climate trends in New Zealand:

- Warmer by about 2.0°C (mid-range projection)
- Wetter in the west and drier in the east
- More extreme weather events

Some of these changes will create opportunities. Others will require higher levels of risk management.