Forest biosecurity – challenges for the future

Ruth Frampton[1]

Everyone's responsibility

Pest and disease incursions are inevitable – let us not be under any illusion. Regardless, this is no reason to roll over and go belly up. Indeed, everyone can contribute to curbing the rate of pest incursions. You may well ask how. For starters - as a traveller returning to New Zealand, remember to declare risk goods. As a farmer, forester, gardener or horticulturist, if you suspect you have found an odd or new pest or disease, firstly check the *Protect New* Zealand exotic pests and diseases web pages. Foresters in particular, are well provided for in that the identification of suspect new organisms can be obtained free of charge through either the Ministry of Agriculture and Forestry's National Plant Pest Reference Laboratory or Forest Research's Forest Health Reference Laboratory. This is not an excuse to make any assumptions, and leave it to the professional diagnosticians or forest health advisers – your observations may be critical. Hopefully, you will have been reminded of such things during Protect New Zealand Week (8-14 July 2002).

Early detection – the key to useful response

However, efforts shouldn't stop there. We can all influence how well prepared New Zealand is to deal with pest invaders and consequently how effectively we respond to incursions. Like so many things, early detection is the key to useful response, be that an eradication attempt or a researched management strategy. However, we do need to be realistic about how effective our surveillance/monitoring and response systems can be.

The best surveillance systems are based on having the appropriate tools. Here I choose to make the distinction between forest pest surveillance and forest health surveillance. By its very nature forest health surveillance does not, on its own, provide an effective early warning system. Pest surveillance focuses on predetermined pests of concern and makes use of specific tools or sampling techniques. For example, there is a pheromone-based trapping system for gypsy moth (*Lymantria dispar*). Another example is a recently implemented wood boring beetle trapping system that uses a combination of pheromone-based and other (host volatiles-based) attractants.

However, such techniques must be viewed in context – these examples are relatively rare. What about all the pest insects for which attractants have not been identified and synthesised or for which efficient sampling techniques have yet to be researched? What about the disease-causing organisms, inevitably invisible unless conditions allow disease symptoms to develop?

The Hard Reality

Going a step further, questions can well be asked about the tools/strategies available for pest and disease management generally. The very well publicised response in west Auckland to painted apple moth highlights the difficulties in designing an appropriate cost-effective approach to eradication. Indeed, Foray 48B, the insecticide based on *Bacillus thuringiensis kurstaki* (a naturally occurring soil bacterium), is one of the key weapons in the armoury against painted apple moth. This is one of the safest insecticides available yet this doesn't mean that it can be, or should be, used without taking account of non-target effects (e.g., human health effects, non-target Lepidoptera). The public outcry from some sections of the Auckland community, albeit a minority of the population, is certain evidence of this.

In endeavouring to address the community's concerns it can be easy to forget the silent majority. In the painted apple moth response, a series of resident surveys (polls) have confirmed that the majority of residents support the eradication programme. The most recent survey was conducted in late March/early April this year and had a margin of error of plus or minus 3.5%. This survey, of 800 people resident in the west Auckland suburbs of Glendene, Kelston, Avondale, Mt Wellington, Titirangi, Glen Eden, Waterview and Pt Chevalier, showed an increase in support for the eradication programme and for aerial spraying since the previous survey, carried out in November/December 2001. Overall, support for the eradication programme was up by 4% with 77% saying it was very important or important. Similarly, overall support for aerial spraying over affected areas increased by 7% from the previous survey with 69% strongly agreeing or agreeing. Furthermore, overall 64% of the sample said they had no concerns about aerial spraying. How can such support be brought to the fore?

In general, it is inevitable that not all sections of the community will be happy with any approach adopted. Officials should be fully aware that community concerns with any proposed approach will continue to restrict the opportunities available for pest management.

Maintaining research capability

Needless to say ongoing input from researchers from a range of scientific disciplines is becoming increasingly important. When it comes to dealing with pests and diseases, New Zealand forest owners are extraordinarily

[1] *Ruth Frampton specialises in biosecurity matters, both nationally and internationally, and until May 2002 was MAF's Director, Forest Biosecurity.*

lucky. They have access to a fantastic group of plant protection scientists presently working in a range of CRIs (including AgResearch, Crop and Food Research, Forest Research, HortResearch, Landcare) and universities (notably Lincoln University, University of Canterbury, Waikato University). These people are well able to provide state-of-the-art advice and/or pursue the necessary research. Whether one is dealing with large or small plants, researchers from these organisations have relevant plant protection experience and know-how. Government departments such as the Department of Conservation and Ministry of Agriculture and Forestry must draw upon this expertise more and more.

In spite of its huge importance to biosecurity, New Zealand plant protection research capability cannot be taken for granted. It must be valued and maintained. Unfortunately, although absolutely indispensable, those skills needed are right now being seriously eroded through government funding shifts. Consider the recent loss of 41 staff from HortResearch and the ongoing funding-based restructuring of CRIs. Regrettably, it would seem that a proper understanding of the importance of underpinning research to biosecurity has yet to be recognised in some quarters of government.

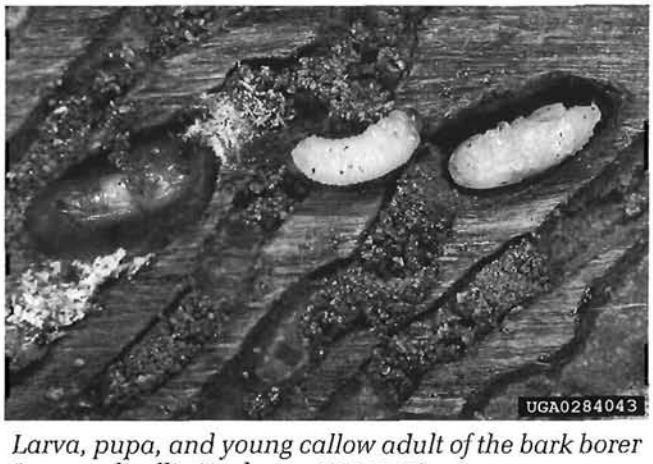
In summary, new pest and disease incursions are detected with unfortunate frequency. We must ensure that realistic efforts are made to target those organisms with the greatest pest potential. It is unreasonable to expect that all new pests will be or should be subject to eradication attempts. In fact, one should expect that few, if any, pests will be amenable to eradication when they are discovered. A well coordinated science capability is necessary to deal with potential pest invaders pre-emptively and effectively manage new incursions.

Pine - what's killing it overseas?

Geoff Ridley, John Bain, Margaret Dick, and Toni Withers[1]

Introduction

New Zealand's exotic forests are largely free of the world's most serious pests and diseases because of the country's geographic isolation, its relatively late European settlement, and stringent quarantine measures (Flux *et al.* 1993). Since this observation was published the exotic estate planted in *Pinus radiata* has grown from 1.1 to 1.59 million ha and now represents 90% of the exotic forest estate in New Zealand (MAF 2001). To continue to protect this investment it is important to be vigilant to the changes in the magnitude and spread of pest organisms overseas. What follows is a brief report on the status of five significant pine pests that have the potential to cause significant losses should they ever become established in New Zealand.



Larva, pupa, and young callow adult of the bark borer Ips grandicollis (Anderson 0284043).

Bark beetles

Bark beetles, particularly *Dendroctonus* and *Ips*, feature prominently in forest entomology textbooks as a major cause of tree mortality and degrade, particularly with softwoods. *Ips* contains a greater number of species but *Dendroctonus* tends to have more aggressive species. All species breed under the bark of the trunk of living or dying trees, or in fresh stumps or logs of their hosts. Some species attack only felled, weak, or dying trees, whereas others attack and kill apparently healthy trees, especially during outbreaks. As they are found under the bark they are easily and frequently transported around the world on logs, dunnage, casewood etc and are relatively common interceptions at ports (Forest Research BUGS database).

Numerous species have established outside their native range, *I. grandicollis* in Australia, *D. micans* in England, and *D. valens* in China for example. *Ips grandicollis* can be a serious problem in *P. radiata* plantations in Australia particularly in drier years and *D. valens*, which was introduced in China in the 1980s, is currently killing millions of *P. tabulaeformis* there (Stephen & Gregoire 2001). *Dendroctonus valens* is considered to be one of the less aggressive species in North America, however the extensive damage that it is causing in China exemplifies the difficulty of predicting the behaviour of an organism in a new environment, particularly when that organism is associated with a new host. All species of *Dendroctonus* and *Ips* should be regarded as potential and significant threats to our softwood resource.

European pine shoot moth

The European pine shoot moth (*Rhyacionia bouliana*), native to Europe, Asia and North Africa, was accidentally introduced into North America about 1914 (Baker 1972). Since then, despite early attempts with chemical, biological and quarantine controls it has spread across the northern United States and southern Canada. The moth became established in Argentina in 1939 and has now reached Uruguay and Chile. It spreads naturally

[1] *Geoff Ridley (mycology), John Bain (entomology), Margaret Dick (pathology) and Toni Withers (entomology) are scientists in the Forest Health and Biosecurity group at Forest Research, Rotorua.*