A PUBLICATION OF MAF BIOSECURITY NEW ZEALAND

biosecurity

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FEBRUARY 2009

Safeguarding New Zealand's forests

Government agencies join forces to fight kauri disease

European House Borer – Australia's response

Ridding Lyttelton of Mediterranean fanworm

Wood packaging in sea containers

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Biosecurity magazine

Biosecurity is published six-weekly by MAF Biosecurity New Zealand. It is of special interest to all those with a stake in the protection of New Zealand's economic, environmental and social assets from the dangers posed by pests and diseases. Animal welfare issues are also covered. The articles in this magazine do not necessarily reflect government policy.

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ISSN 1174 – 4618

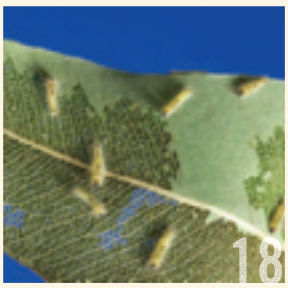
Production and printing management by City Print Communications in association with Context Public Policy Communications.

BIOSECURITY NEW ZEALAND

Environmental Paper Profile

Biosecurity Magazine is printed on Sumo Gloss.

Sumo is an environmentally responsible paper manufactured under the environmental management system ISO 14001 using Elemental Chlorine Free (ECF) pulp sourced from sustainable, well managed forests.



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"Good biosecurity plays an important part of ensuring the sustainability of all of our forest environments…"

EDITORIAL

Natural or indigenous trees form nearly 24 percent of forested areas and are an important part of our geographical and social identity.

These areas provide a backdrop to how our country looks, to our lifestyle and to the value forests and bush areas provide New Zealanders for recreational activities. Production forest comprises another 7 percent of our land area and, while this figure seems relatively small on paper, production forests form an important part of our economic base. Covering 1.8 million hectares, production forests represent over 3.2 percent of our GDP and offer employment to around 24,000 New Zealanders. While urban trees are largely overlooked, these also play an important part in our social tapestry, wellbeing and health by providing shade, colour and in some cases a source of food in what would otherwise be a drab environment.

The recent global recession has put our commercial forests under economic pressure. Indigenous forests are equally under pressure from pests, diseases and potentially from climate change.

Good biosecurity plays an important part in ensuring the sustainability of all of our forest environments, and over recent years much attention has been given to better managing the biosecurity risks relevant to forests. Recent measures put in place specifically targeted at protection of our forests include:

- Significant eradication programmes for pests threatening plantation, indigenous and urban trees including Asian gypsy moth, painted apple moth, fall web worm and a range of termites.
- Introduction of international standards requiring treatment of all wood packaging used in international trade.
- Strengthening of MAF Biosecurity New Zealand's High Risk Site Surveillance programme operating around border entry points and where there are high concentrations of transitional facilities.
- The New Zealand Forest Owners' Association (NZFOA) has reviewed its industry-funded pest and disease detection surveys, made adjustments and has now received international reviews commending it for proactive work.

MAF Biosecurity New Zealand (MAFBNZ) is structured functionally to address the intervention points along the biosecurity continuum, and the activities carried out ensure that the interests of all sectors and the environment are addressed in a robust way. This issue of *Biosecurity* magazine highlights a wide range of activities being carried out across multiple players in the biosecurity system. Each is designed to improve biosecurity outcomes for our forests through research, border controls, communications, surveillance, response, and pest and disease management.

The NZFOA is an industry group representing the interests of the plantation owners and growers. It is very proactive within the biosecurity system, with an investment of $700,000 a year in surveillance and forest health training of staff and contractors. On pages 10 and 11 we look at the NZFOA's Forest Health Surveillance programme, and on pages six and seven we provide information about its initiative to limit the risk overseas visitors provide to our forests.

The NZFOA is also a leading and significant funder of forest biosecurity research, with forest owners providing over $400,000 through the Forest Biosecurity Research Council (www.fbrc.org.nz) and the Forest Health Research Collaborative (www.fhrc.org.nz). On page 12 we look at how, as a result of this research, bio-protection is being used to provide more sustainable approaches to pest and disease management.

Crown Research Institute Scion is another major player in forest biosecurity research and New Zealand's leading provider of forestry biosecurity research. One serious pest incursion alone is capable of costing New Zealand up to $600 million, with the cost of eradicating just one pest around $63 million. Research in this area is paramount to the protection of our natural resources. Scion is organising an International Biosecurity Conference in March this year, for which MAFBNZ is a sponsor.

Protecting New Zealand's native forests is a big task. Kauri dieback, caused by *Phytophthora* taxon *Agathis*, is a serious threat to kauri forest and individual kauri trees in the upper North Island. In order to protect native kauri, MAFBNZ is collaborating with the Department of Conservation and four regional councils (Auckland Regional Council, Northland Regional Council, Environment Bay of Plenty and Environment Waikato) to tackle the problem. This is the first time MAFBNZ's new response model has been used for a joint agency response.

Articles in this edition also look at how MAFBNZ surveillance is protecting native forests and how Scion research is determining whether a new invasive pest is a specific risk to our forests.

■ Peter Thomson, Director Post Border, MAF Biosecurity New Zealand

SAFEGUARDING OUR FORESTS

A RESEARCH PERSPECTIVE

Eucalypt species and radiata pine grow side by side in New Zealand plantation forests. Eucalypts are susceptible to all manner of insect pests, while pine is relatively resilient. Photo courtesy Scion.

Pests and diseases are one of the greatest threats to a viable forest industry, potentially affecting production, wood quality and export market access for logs, chips and green lumber. They also threaten the health of New Zealand's indigenous ecosystems and urban trees.

Despite New Zealand's advantage of being surrounded by ocean, the global increase in transport and trade exposes forest resources to greater risks than ever before. The most effective way to mitigate these risks is a comprehensive biosecurity system, underpinned by high-quality research.

Rotorua-based Crown Research Institute Scion is the largest provider of forest biosecurity research in New Zealand. The group has been providing these services for 60 years, since the early days of the Forest Research Institute, and has plenty of evidence to show the benefit of specialised forest-health expertise.

Scion's head of forestry science Dr Brian Richardson says that a recent New Zealand analysis demonstrated returns of between $3.5 billion and $5.9 billion from investment in forest biosecurity research. Broader spin-offs from a successful research programme include the protection of many intangible values, such as tourism and export market perceptions, which rely on the continued viability of our indigenous ecosystems and urban parks.

"One risk analysis study showed us that one serious disease incursion alone is capable of costing the country up to $600 million. Furthermore, the cost of eradicating just one pest species can be up to $63 million, so it is worth making the effort to keep them out," Dr Richardson says.

To address biosecurity issues it is necessary to draw on a vast array of basic and applied sciences and use them to answer specific questions. Dr Richardson cites the example of pitch canker, which has long been recognised as a potential threat to New Zealand's commercial forests. In 2003, Scion's research into rapid identification of *Fusarium circinatum*, the fungal agent causing pine pitch canker, led to the detection of this potentially devastating disease in a shipment of Douglas fir cuttings from the United

Top left: Scion's quarantine facility in Rotorua allows scientists to carry out research on pests within a controlled environment. Photo courtesy Scion.

Above: Biosecurity research is vital to the protection of New Zealand's forest resources and the valuable wood product exports that they produce. Photo courtesy Scion.

Top right: *Cleobora mellyi*, the southern ladybird, was introduced into New Zealand from Tasmania in 1977 for control of the eucalypt tortoise beetle, *Paropsis charybdis*. Photo courtesy Scion.

Left: The arrival of the wood wasp *Sirex noctilio* in the early days of New Zealand plantation forestry triggered the formation of a specialised research group to address forest biosecurity issues. The specialised group established at the Forest Research Institute lives on to this day within the Crown Research Institute, Scion. Photo courtesy Scion.

States of America that were held in a Ministry of Agriculture and Forestry (MAF) supervised quarantine facility. This early detection enabled MAF Biosecurity New Zealand (MAFBNZ) to act quickly to save the New Zealand forest industry from huge costs.

Few Aucklanders will have forgotten the 1996 programme for eradicating the white-spotted tussock moth, which threatened the country's fruit trees and native beech forest, and the sustained campaign that successfully eradicated the serious pest, painted apple moth. Scion scientists were important players in the downfall of both winged invaders, providing technical advice on the insects and helping to design the aerial spray operations that combated them.

"These are only a few of the many examples that illustrate how science works to protect forests from unwanted pests and diseases," Dr Richardson says.

International forest conference

The worldwide importance of forest biosecurity research will be discussed at length when experts converge on Rotorua to attend the Global Network for Forest Science Cooperation (IUFRO) International Forest Biosecurity Conference from 16 to 20 March this year. As the first international conference on this topic, it will provide a forum for scientists, forest managers and policy makers to share knowledge, create networks and promote international actions to protect forests from invasive pests.

Hosted by Scion, the conference is sponsored by MAFBNZ. The programme includes a full-day seminar on Tuesday 17 March that will focus on how to integrate biosecurity science into policy and regulation. The seminar will feature a range of international keynote speakers who are leading authorities on biosecurity research and management, including Peter Thomson, MAFBNZ's Director of post border biosecurity; Dr Mark Lonsdale, Chief Entomologist with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO); and Dr Hugh Evans, head of Tree Health for the United Kingdom's Forestry Commission.

Day rates for registration are available. For more information see www.forestbiosecurity.com

■ Margaret Richardson, Senior Communications Adviser, Scion, Margaret.Richardson@scionresearch.com, www.scionresearch.com

BIOSECURITY SURVEILLANCE FOR TOURIST RISK SITES

Pohutukawa being inspected as part of High Risk Site Surveillance. This location is one of many close to a New Zealand port. Photo courtesy of SPS Biosecurity Ltd.

MAF Biosecurity New Zealand (MAFBNZ) has taken a Department of Conservation (DOC) biosecurity surveillance programme and expanded it significantly to increase the protection of New Zealand's indigenous forests from invasive pests and diseases.

New Zealanders recognise the beauty and magnificence of our native forests and scenery. We celebrate them every year by visiting in our hundreds of thousands, and, as their fame has spread overseas, tourists travel from far away to visit. The introduction of new organisms, and changes in the distribution of risk organisms already present, could cause significant harm to our unique range of flora and fauna. Without biosecurity surveillance of native forests, harmful organisms could have the opportunity to go undetected for long periods.

Why is there a problem?

Tourism is a recognised pathway for exotic organisms into New Zealand. Although baggage and personal effects are inspected at ports of entry, this is not 100 percent effective in detecting exotic organisms.

In the mid-1960s, air travellers' shoes and clothes were found to contain fungi (65 species in one trial) that could be a potential hazard for plants. In the early 1980s, tourists' camping gear was found to be a prospective pathway for the invasion of pathogenic fungi and live insects.

A major area of concern is where tourists initially camp after arriving in New Zealand, exposing tents and other camping equipment for the first time. Even just visiting scenic tourist spots and walking through indigenous forests has the potential to establish exotic organisms, for example from unclean boots, and to disperse weeds into previously clear areas.

Some history

The risk to the indigenous estate and the risk pathways have been recognised for many years. Out of 93 newly discovered pathogens and pests recorded in New Zealand in the 1990s, 18 were associated with indigenous hosts. For example, polyphagous (Latin for "eating many") exotic moths found in Auckland in the 1990s were proven to be a significant threat to the indigenous forests as well as plantation and amenity trees. One, the white-spotted tussock moth, was able to live and reproduce on native beech trees.

A report produced for DOC in 2000, evaluating threats to New Zealand's indigenous forests from exotic pathogens and pests, recommended that a structured surveillance system for indigenous forests be developed so that limited resources could be used to look at the highest risk sites in a way that would provide the greatest chance of detecting newly introduced pests or diseases.

"Without biosecurity surveillance of native forests, harmful organisms could have the opportunity to go undetected for long periods."

In response to the recognition of risk from tourists, DOC began surveying the most popular first-night campsites (68 in total). The project began in 2001, with the main objective being the early detection of newly introduced invertebrates and diseases, and weeds that would be harmful to New Zealand's indigenous forests. Responsibility for this surveillance programme was transferred to the Ministry of Agriculture and Forestry (MAF) on 1 July 2005, under the re-organisation of biosecurity that gave MAF accountability for end-to-end management of the biosecurity system.

Tourist-related high-risk sites in mid-upper North Island. Current High Risk Site Surveillance transects are in red and the new tourist risk sites are in yellow.

What is MAFBNZ doing now?

The original "first-night campsites" programme initiated by DOC has now been amalgamated with MAFBNZ's High Risk Site Surveillance programme (HRSS) and expanded to provide wider and more risk-based coverage. The range of risk sites surveyed and priorities for extending cover have also been reviewed using visitor numbers provided by DOC. For example, one of the most popular visitor areas is Huka Falls with over 600,000 visitors annually, including a significant number of overseas tourists.

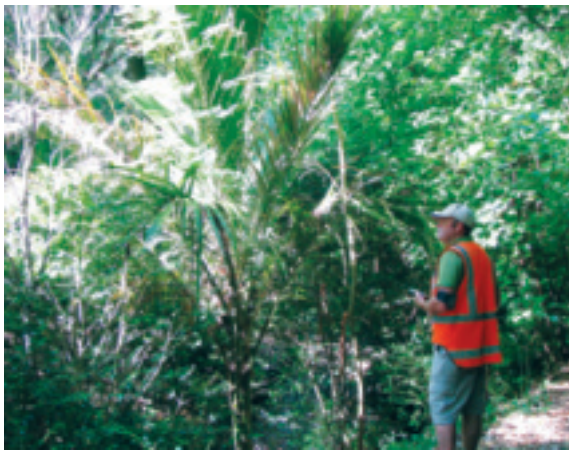
Each of the selected risk sites has been carefully mapped and inspected, with efforts now concentrated on looking for new and significant pests. During the 2008/09 season, 130 tourist risk sites were visited and over 380 transects intensively surveyed. While a total of 14 samples were submitted to the Crown Research Institute Scion for analysis, no new pests were found.

In addition to tourist risk sites, urban HRSS sites around New Zealand, particularly including ports and airports, are inspected in the same way.

Who does the site inspections?

AsureQuality Ltd currently manages the HRSS contract for MAFBNZ. The main provider of field surveillance is SPS Biosecurity Ltd, whose directors have been involved in the quarantine, forestry and biosecurity fields for over 20 years. Many of the surveyors are extremely well qualified and have over 40 years of experience working in forest health and biosecurity.

More than 600,000 people visit Huka Falls every year – each visitor could be a biosecurity risk.



SPS Biosecurity Director Brent Rogan inspecting native vegetation in a transect. Information gathered is recorded in a hand-held PDA before being transferred to a GIS database. Photo courtesy of SPS Biosecurity Ltd.

What does the future hold?

In the future, risk data, such as updated tourist visitor numbers, results of slippage surveys and border pest interceptions, will allow improved profiling and ranking of tourist risk sites. This will allow direct comparison of risk between different types of risk sites.

While compiling a full list of all woody, herbaceous and aquatic weeds would be a significant undertaking, and regarded as a separate project, there is scope as part of the HRSS programme to collect woody weed data and record any new species without significantly increasing the work component of the surveillance. This would allow changes in weed composition to be measured over time, and could provide an early warning of new invasive weed species.

■ Paul Stevens, Senior Adviser (Plants Surveillance), Post Border, MAFBNZ, paul.stevens@maf.govt.nz

New requirements for general transitional facilities

The new General Transitional Facilities for Uncleared Goods standard, which replaces several older standards, came into effect on 1 February this year.

Finalising the standard was a significant piece of work for the MAF Biosecurity New Zealand (MAFBNZ) Operations and Facilities Group. The standard underwent two rounds of public consultation, as well as extensive internal consultation, to ensure a smooth transition from old to new.

To communicate the changes to the more than 6000 transitional facilities across New Zealand, a series of public information sessions was held in major centres in early December last year. These sessions were led by MAFBNZ Group Manager, Operations and Facilities, Clive Gower-Collins and Team Manager, Operations and Facilities, Tania Marinas, and provided information about how businesses would be affected.

The sessions attracted representatives from about 1000 businesses, including staff from transitional facilities, customs brokers and freight forwarders, transport companies, industry bodies and approved training providers. Feedback so far has been positive.

"People genuinely appreciated the opportunity to meet with MAFBNZ staff face-to-face and find out a little more about how these new changes might affect them," Ms Marinas said.

The main changes for transitional facilities include: operators must undertake a MAFBNZ-approved training course, some may require a deputy operator, and all need approved signage and must undertake periodic self-assessment. The new standard also contains a flexible MAFBNZ assessment component to reward compliant facilities with fewer audits, which allows MAFBNZ to focus resources on facilities that are not meeting their obligations.

"The changes to the majority of facilities won't be drastic, and our staff and inspectors will be available to ensure businesses receive the support they need during the transition," Mr Gower-Collins said.

The new standard is available on the MAFBNZ website at: www.biosecurity.govt.nz/border/transitional-facilities/bnz-std-tfgen

For more information, email: standards@maf.govt.nz

- Liz Phillips, Adviser, Operations and Facilities Group, Border Standards, MAFBNZ

MAKING SURE FOREST VISITORS ARE CLEAN

New Zealand's plantation forests are worth billions of dollars, but as with dropping a match and starting a forest fire, the accidental introduction of a dangerous pest organism can be devastating.

To reduce the risk of new damaging insects and fungi getting into our exotic forests, the forest industry has developed a "forest hygiene" policy to cover international visitors as well as staff returning from overseas.

Insects, although small, are relatively easy to spot compared with fungal pathogens, which can produce billions of spores and remain infective for long periods. Propagules (plant material that can grow) of soil-borne pathogens, such as *Phytophthoras*, can also remain infective in small volumes of soil.

Spores can stick to clothing; fragments of plant material bearing fruit bodies of pathogenic fungi may be caught in clothing; and the soil sticking to footwear can carry soil-borne pathogens. Visitors to our forests may become unintentional carriers of disease-causing organisms.

The Ministry of Agriculture and Forestry (MAF) operates biosecurity defence systems at the border that stop some of the potential pests. The forest industry has also put in place additional requirements to further minimise the risks to New Zealand's forest estate. These are relatively simple and include ensuring that before entering a New Zealand plantation forest, any clothing and footwear worn during nursery, forest, port, or processing site visits overseas is thoroughly cleaned. Similar requirements apply to field equipment, such as pocket knives, pruners and even cameras and binoculars.

Many overseas golf courses harbour pests and diseases that could damage our plantation estate and so golfing equipment should be cleaned before arrival in New Zealand. For example, in a review of the global situation for pitch canker, Dr Rebecca Ganley, with the Crown Research Institute Scion, reported that "In California, pitch canker initially spread through *P. radiata* planted in urban regions and on golf courses".

Dave Lowry, Technical Forestry Manager for Hancock Forest Management NZ Ltd, who had a major hand in developing the forest hygiene policy, believes that "industry needs to be especially focused on forest hygiene and alerting overseas visitors in 2009, as Scion will be hosting a major international forest biosecurity conference in March".

It is important for people returning from overseas to consider the forest hygiene policy, not only for the protection of New Zealand's plantation estate, but for our native forests and other primary industries as well.

Copies of the policy can be downloaded from the New Zealand Forest Owners' Association website: www.nzfoa.org.nz/index.php?/content/download/2441/18542/file/hygiene_policy_july_2008.pdf

- Bill Dyck, science and technology broker and NZFOA Forest Health Administrator

Monitoring forest condition

Forests change through time. This occurs both because trees get older and form changes, but also, in many cases, because tree nutrition and health change in much the same way as they do for people.

Low transparency tree with dense foliage that obscures the stem (left) compared with a medium-to-high transparency tree with a relatively thin crown. Photo courtesy Scion.

It is important to know if the condition of a forest is changing for several reasons, but primarily to ensure that optimal profitability is achieved. This is relevant not only for wood production, but, in the post-Kyoto environment, also for carbon stocks, which provide a totally new market for forest owners and government.

The New Zealand forest industry, through the New Zealand Forest Owners' Association (NZFOA), has operated a Forest Health Surveillance System for more than 50 years. However, this system is only designed to detect new incursions of unwanted organisms that may damage our plantation estate. It is not designed to provide a robust forest condition monitoring system that can readily determine if the health and vigour of a forest is declining, or perhaps improving, through time.

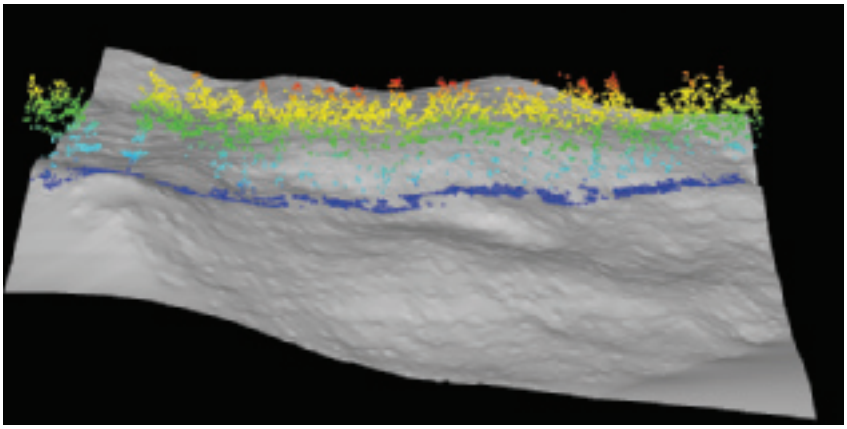
The NZFOA is currently working with researchers in the Crown Research Institute Scion and other organisations to develop a forest condition monitoring system that can provide a systematic means to monitor and report on the condition of our forests so that we can state with a high degree of certainty the impact of any management practices, biotic agents or environmental influences on our forests over time. This is important not only to forest managers wanting to maintain production levels, but also for international marketing purposes to support claims of sustainability and to contribute to environmental certification systems.

The project is half way through a three-year term that will see permanent sample plot monitoring integrated with forest canopy assessment of crown transparency, linked with forest health inspections and nutritional monitoring. The system will be linked with the Government's Land Use and Carbon Analysis System (LUCAS)[1] to piggyback on what is already being done, and also to avoid duplication. Research on the application of LiDAR[2] (light detecting and ranging) technology to assess crown transparency looks promising and may provide a cost-effective means to assist monitoring forest condition in the future.

■ Bill Dyck, science and technology broker, NZFOA Forest Health Administrator and Project Manager for the forest condition monitoring system

1 More information can be found at: www.mfe.govt.nz/issues/climate/lucas/index.html

2 LiDAR, "light detecting and ranging", is a remote sensing technology that can be used to measure distance to a surface using laser pulses. More information can be found at: www.mfe.govt.nz/issues/climate/lucas/structure/method-development/lidar.html



An extract of LiDAR imagery of a *Pinus radiata* Kyoto forest. This extract clearly shows the profile of several trees. The ground surface is coloured blue and the tree foliage is coloured light blue through green and yellow to red, where yellow and red colours denote the highest points above the ground surface. The absence of lower branches, in some cases, indicates trees that have been pruned. Photo courtesy Ministry for the Environment.

KEEPING AN EYE ON OUR PLANTATION FORESTS

Close inspection of foliage is required to find cryptic disease organisms. Photo courtesy SPS Biosecurity Ltd.

The Ministry of Agriculture and Forestry (MAF) keeps a close eye on the border to prevent pest organisms getting through, but it is recognised that from time to time unwanted agents will slip through because complete control would be too disruptive to trade, while wind- and water-carried pests cannot be readily detected.

To provide an additional line of defence, the forest industry, through the New Zealand Forest Owners' Association (NZFOA), runs a Forest Health Surveillance System (FHS) across its members' more than a million hectares of plantation forest. This scheme has been operating for more than 50 years, although adjustments have been made to the design and implementation as additional knowledge has come to hand.

What is the FHS?

The FHS is implemented on an annual basis and tendered, through the NZFOA, to forest health providers. SPS Biosecurity Ltd currently provides the bulk of the service, and a smaller area is surveyed by Baigent Pest Control. Forest health providers are required to conduct aerial and ground surveys, followed up by more intensive plot investigations where results from aerial surveys warrant it. All staff are well trained in forest biosecurity investigations and provide a dedicated service to the industry.

Increasing attention is paid to what are termed "High Risk Forest Sites". These sites are where there is considered an increased chance that new organisms could be found. These are often associated with risk pathways such as machinery movement, heavy industry and recreation.

A critical component of the FHS is the collection and diagnosis of suspicious samples collected in the field. These are sent to the Crown Research Institute Scion, where they are quickly analysed to determine if there is a potential threat to the forest plantation. With the development and introduction of molecular techniques, this service is becoming very sophisticated, not unlike that provided for crime scene investigations.

The FHS is funded by forest owners through a voluntary levy, which also provides funding to cover research and the administration of industry forest health activities. While the cost appears nominal on a per hectare basis, the amount becomes significant across the million-hectare estate of NZFOA members.

Who are the forest health providers?

The main forest health provider is SPS Biosecurity Ltd. The directors (Paul Bradbury and Brent Rogan) have each been involved in the quarantine,

ABOVE: The New Zealand forest industry would be devastated if a pest reached epidemic levels similar to the Mountain Pine Beetle in Canada.
Photo courtesy Natural Resources Canada.

LEFT: Paul Bradbury, Director of SPS Biosecurity Ltd, beating a pine tree to gather insect samples.
Photo courtesy SPS Biosecurity Ltd.

forestry and biosecurity fields for over 20 years and have worked for a range of government agencies, private companies and research organisations. In mid-2007 they saw an opportunity for a specialist private provider of environmental and biosecurity services and established SPS Biosecurity Ltd. Mr Bradbury and Mr Rogan are well supported by a highly experienced team of well-qualified forest health professionals.

As well as conducting the bulk of the FHS work, SPS Biosecurity staff are also involved in the MAF-operated High Risk Site Surveillance, along with other forest health and biosecurity operations. Thus they are able to provide a sound overview of what is being done throughout New Zealand in biosecurity surveillance.

What do they find?

The forest health providers are specifically looking for new and potentially dangerous pests and diseases that have been introduced to New Zealand's plantation forest estate. However, the expectation and hope is that few, if any, will be found. To date this has been the case, although the plantation forests do have several well-established diseases that are monitored, such as Dothistroma and Cyclaneusma needle casts. The forest health providers report on the extent and intensity of these forest health issues to the respective forest owners and may also provide additional information on other aspects of forest condition, such as nutrition and snow damage, as required.

How well does it work?

The NZFOA conducts periodic audits of the FHS to ensure it is working as designed. In November 2007, it commissioned a major external review by two overseas experts: Dr Andrew Liebhold, a research entomologist with the United States Department of Agriculture (USDA) Forest Service in Virginia, and Dr Brenda Callan, a pathologist with the Canadian Forest Service in Victoria, BC.

They concluded: "Overall, we found the FHS system to be well-conceived, valuable to the New Zealand forest industry and generally well executed. The program deserves commendation as part of a progressive approach to forest biosecurity that exceeds the sophistication level attained by forest health surveillance programs elsewhere in the world."

The reviewers also recognised the role the Government played in providing a "world leading" level of biosecurity effort, which had resulted in the exclusion of many serious pests, and the forest industry's foresight for "advancing a highly progressive approach to alien pest exclusion".

Much of the credit for the success of the forest surveillance programme could be attributed to the forest health providers' staff. "These individuals are the 'eyes' of the program and their skill, dedication and hard work are evident, as is the very competent diagnostic service provided by NZFRI [the New Zealand Forest Research Institute, Scion] in analysing field samples. Accomplishing this goal is no simple matter given that causal organisms may often be cryptic and difficult to identify (e.g., species that are new to science or previously not associated with a particular host or disease complex)."

Despite the top marks scored from the review, the NZFOA has made several minor adjustments to the current system in line with the review's recommendations. In particular, increased attention is being focused on high-risk sites, where there is a greater likelihood of new pests and diseases being found.

How does the FHS work with MAF?

The FHS system is closely linked to MAF biosecurity operations, and new organisms identified are recorded in the MAF biosecurity database. Additionally, the FHS High Risk Forest Site network is modelled after MAF's High Risk Site network, and similar investigative procedures are used for both.

There has been a long-standing partnership between the forest industry and MAF to protect New Zealand's plantation and native forests from biosecurity threats. To date, this has worked well and the most damaging agents have been excluded.

- Bill Dyck, science and technology broker and NZFOA Forest Health Administrator

Making trees more disease resistant – quickly and naturally

Already established diseases are costing the New Zealand forest industry tens of millions of dollars a year in lost productivity, but researchers are fighting back.

The Lincoln University-based Bio-Protection Research Centre is developing innovative technologies to create improved resistance in radiata pine by managing the organisms that can live in pine tissues.

Dr Robert Hill, who heads the Centre's forestry programme, previously developed a seed coating formulation, ArborGuard™, which enhances the performance of radiata pine seedlings in the nursery, not only improving growth rates but also reducing the need for nursery managers to apply fungicides. This product is now being used in forest nurseries, and, in collaboration with forestry services company PF Olsen, large field trials have been established to determine how much of the beneficial effect carries over into forest plantings.

New research is investigating the application of beneficial endophytes (organisms that live naturally in plants) to determine if manipulating these populations can lead to enhanced resistance against existing disease organisms and insects, but also those not yet in New Zealand. Scientists from Lincoln University, Massey University, AgResearch, HortResearch and the Crown Research Institute Scion are involved in the project, which has both Foundation for Research, Science and Technology and New Zealand Forest Owners' Association (NZFOA) funding. Researchers from South Africa, Spain and California will be collaborating in this project. Treated material from New Zealand will be tested against serious radiata pine disease organisms that are not yet in New Zealand, such as those causing pine pitch canker and DFP (Daño Foliar del Pino, a serious new radiata pine disease in Chile).

Dr Jenny Aitken with tissue culture plant. Photo courtesy The Tree Lab.

Dr Hill is working with Dr Jenny Aitken and her company The Tree Lab to introduce potentially beneficial endophytes into radiata pine tissue-cultured plantlets under sterile conditions. These will be grown and tested in lab conditions, and then further tested in greenhouse and eventually field situations. Because The Tree Lab has a Level 3 Quarantine Facility (high security), it is also possible to collaborate and exchange material with overseas research organisations without threatening the biosecurity of New Zealand.

If successful – and similar technology has now been commercialised with grasses – the enhanced radiata pine should perform better against existing diseases, thus improving forest industry profitability, and should also provide another weapon against possible new incursions to New Zealand.

Seed coating – with Wei-Young Wang from PF Olsen Ltd. Photo courtesy Robert Hill.

■ Bill Dyck, science and technology broker and NZFOA Forest Health Administrator

How do epidemics of fungal forest pathogens occur?

Scientists are investigating the potential for biocontrol against Dothistroma (red-band) needle blight, which has a major affect on New Zealand's forest plantations.

Dothistroma needle blight is a fungal disease of trees, mainly affecting pines, that was first found in New Zealand 50 years ago. The impact on the forest plantation industry includes:

- Significant loss of growth in affected trees:
  - without spraying, the likely cost to the industry would be in the order of $60 million a year in lost productivity;
  - with spraying, the loss is probably closer to $20 million a year.
- High cost of control:
  - depending on rainfall (which increases infection levels), the forest industry sprays 70,000 to 180,000 hectares a year at an average cost of about $35 per hectare.
- Reduction in the number of pine species that can be grown economically and limits on the range of species, such as *Pinus nigra* and *Pinus ponderosa*.

Dothistroma needle blight has now reached epidemic levels in parts of Canada and Europe. Although climate change has been implicated, it is not known whether genetic changes in the pathogen have also contributed to these epidemics.

Dr Rosie Bradshaw, from Massey University, and Dr Rebecca Ganley, from the Crown Research Institute Scion (both organisations being members of the Bio-protection Research Centre), are in the initial stages of a research project to investigate how the Dothistroma pathogens have evolved over the short to long term.

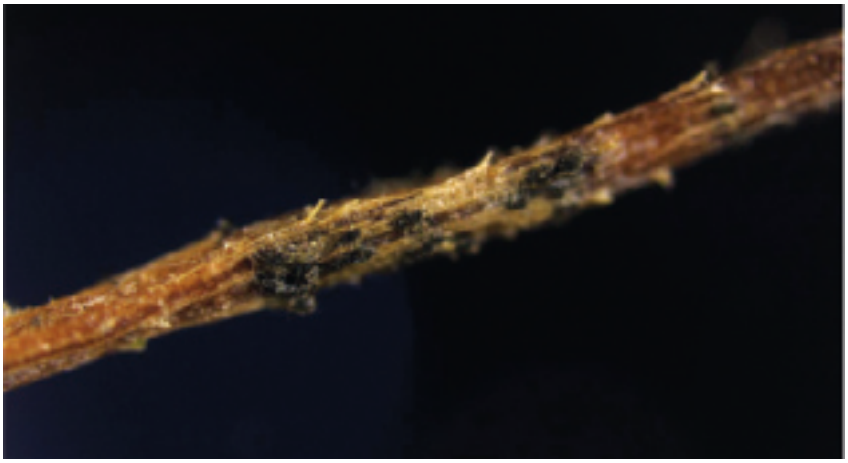
Dr Bradshaw has also been investigating the role of the toxin dothistromin, which is present in Dothistroma-infected needles. She and co-workers have recently disproved the hypothesis that the toxin is required for pathogenicity of the Dothistroma fungus (*Dothistroma septosporum*) on radiata pine.

However, there is evidence that dothistromin may play a role in competition against other fungi in pine needles.

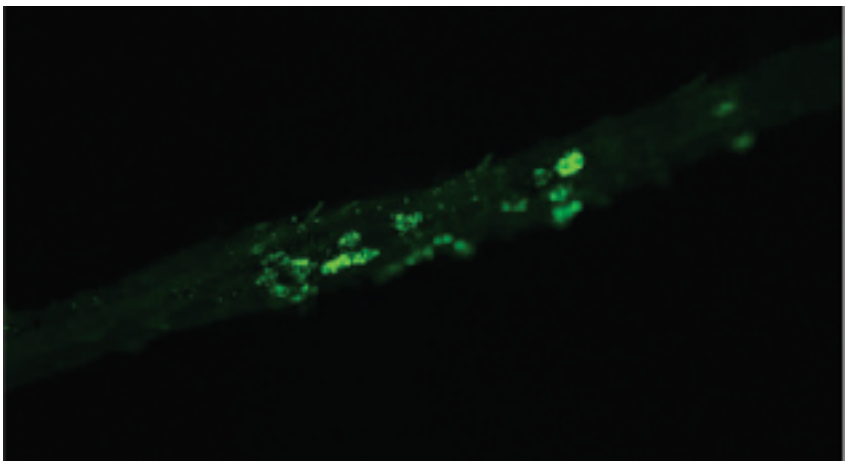
The researchers are currently investigating the potential for biocontrol against pathogenic fungal infection. Should this be successful, it may be possible, for example, to manipulate the endophytes (organisms that live naturally in plants) living in radiata pine needles to enhance the presence of the most beneficial ones thereby increasing the resistance of radiata pine to needle cast diseases.

This would be worth many tens of millions of dollars a year to the New Zealand plantation forest industry if disease-resistance trees were deployed on a large scale.

■ Dr Rosie Bradshaw, Massey University, R.E.Bradshaw@massey.ac.nz



Radiata pine needle infected with Dothistroma.



Glowing fruit bodies, resulting from needle infection with the toxin-deficient mutant, indicating that dothistromin is not required for needle infection. Photos courtesy Massey University.

NEW ZEALAND'S PART IN AUSTRALIA'S FIGHT WITH THE EUROPEAN HOUSE BORER

Big clean up of EHB infested material.

EHB (*Hylotrupes bajulus*) adult. Photo courtesy Department of Agriculture and Food, Western Australia.

Australia is working to eradicate European House Borer, which without action has the potential to spread across the southern half of the country and cost billions of dollars to control and in repairing damage to wooden homes.

In January 2004, the Department of Agriculture and Food in Western Australia received a phone call from member of the public who had heard scraping noises coming from a wooden beam installed in an extension to her house. She also found some sawdust on the ground below the beam.

Entomologists responded to the call and found a single adult female beetle emerging from the pine beam. The beetle was identified as *Hylotrupes bajulus*, or European House Borer (EHB).

EHB is a pest of seasoned softwood timber exotic to Australia. It specifically attacks seasoned pine, spruce and fir. Its larvae are known to cause significant damage in structural softwood timber in buildings, and can also attack furniture. In this instance, in the Perth suburb of Parkerville, the timber beam was infested prior to installation and originated from a local pine wood dealer.

The Western Australian (WA) State Government initiated a response programme involving large scale delimiting surveillance and containment of the pest. John Bain, from the New Zealand Crown Research Institute Scion Forest Protection team, got involved at an early stage of the programme because of his considerable experience with long horn beetle larvae and the difficulty in identifying the borer larvae.

New Zealand also has a significant interest in this incursion in Western Australia because the likely impact, should EHB establish here, would be very high. EHB is occasionally intercepted at the New Zealand border and is listed as a regulated pest in the Biosecurity Organisms Register for Imported Commodities. Radiata pine, New Zealand's most-used framing timber, is susceptible to infestation, as are native podocarp timbers. Podocarps are little used in construction these days but commonly used for furniture and decorative purposes.

In 2005, the WA State Government commissioned an external review of the EHB response. The review panel was chaired by Mal Nairn, Chair of the Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease. The other panel members were Robert Eldridge, Research Leader Forest Resources with the New South Wales Department of Primary Industries, and John Bain. Mr Bain was invited to participate because of his knowledge of wood-boring beetles and his close association with several eradication campaigns in New Zealand (Dutch elm disease, white-spotted tussock moth, painted apple moth and gypsy moth). The review panel concluded that the eradication campaign was on track and feasible but required more funds. It also recommended setting up a Science Advisory Panel, which was done and included Mr Bain as a member.

Since then, the EHB Response Programme has attracted national funding shared between the Australian Commonwealth and State Governments as well as the forestry and softwood timber industry.

It is believed that the beetle was introduced into Western Australia in the 1950s, possibly in prefabricated houses imported from Europe,

EHB detector dog Jed indicating on infested trap log. Photo courtesy Department of Agriculture and Food, Western Australia.

EHB detector dog Lara in training. Photo courtesy Department of Agriculture and Food, Western Australia.

which were based on pine framing. Pine was not commonly used in the construction of houses in Perth until the year 2000, when logging of old growth forests was banned. Since 2000, untreated pine has been extensively used in the construction of roof frames in houses and other buildings.

Delimiting surveillance has been carried out on an annual basis since 2004. This involves travelling every road in the south-west of Western Australia (the area from Geraldton, 400km to the north, to Esperance, 700km to the south-east of Perth) and checking for the presence of pine trees and any evidence of EHB. Repeated surveillance has shown that EHB is confined to the greater Perth metropolitan area.

EHB is mainly found in dead pine trees, logs or dead parts of live pine trees in Western Australia. There are 136 infested sites including nine pine plantations. EHB has not yet been found infesting structural timber that was already in a house prior to EHB appearing in Western Australia. However, the potential for infestation is great since many residential developments are occurring adjacent to infested pine plantations.

In the infested areas, some 70,000 homes and businesses have been visited in order to raise awareness of the pest and obtain an inventory of the possible host materials present, such as pine trees, pine wood and timber, and pine furniture. This will allow the regulatory officers to focus their containment programme on high-risk areas, and thereby reduce the human-assisted spread of the pest.

It is hard to imagine anyone living in Perth who is not aware of the eradication programme, such is the extent of the supporting communications campaign. High levels of community and industry awareness have been achieved through the formation of local consultative committees, production of a range of information leaflets and brochures, advertising in local media, displays at local events, installation of road signs in infested areas, a dedicated website and a hotline for general enquiries and to report possible sightings of the pest.

Eradication of EHB is a long-term project that will potentially cost around A$50 million. Eradication from infested urban sites is anticipated in 2010, whereas in infested pine plantations it is expected in 2015. The pest's slow lifecycle and slow natural spread favour the eradication attempt. Eradication can be achieved by removing its host materials from infested areas, particularly pine trees, but also other pine wood such as timber and firewood. Because most pine trees contain a certain amount of deadwood, such as branch stubs and "drysides" within the trunk where EHB can survive, entire live trees need to be removed.

The eradication will be verified by a six-year monitoring programme, where pine trap logs are installed in previously infested areas to act as sacrificial hosts. If any EHB remain in the area, they are likely to infest the logs. Close monitoring of the logs will verify their presence or absence. The trap logs can be inspected visually through cutting and splitting them to search for larvae and/or galleries, although this is extremely time consuming and costly. The EHB team therefore includes two detector dogs who have been specially trained to sniff EHB larvae inside the trap logs.

The eradication programme is also supported by a research programme into the borer's biology and detection methods. Research activities are focusing on the biology of the pest by maintaining a laboratory colony to monitor emergence times and mating behaviours, and to build up numbers of adults for use in various experiments.

Research is also focusing on development of new detection methods, such as acoustic detection. The research team is working with a university on the development of a network of acoustic sensors programmed to recognise the audio signal produced by chewing EHB larvae and, when detected, to send a signal to a base station. If successful, the sensors will be stuck to the trap logs and thereby form a network throughout the previously infested area.

The EHB programme is governed by a national consultative committee, which bases its decisions on the advice from a scientific advisory panel that regularly reviews the programme to determine progress and the ongoing feasibility of eradication.

- John van Schagen, Director, EHB Response, Department of Agriculture and Food, Western Australia
- John Bain, Scion

Forest Industry Development Agenda a driver for growth

Ensuring a vibrant and internationally competitive forest industry is important for New Zealand given the rapidly expanding available harvest, its potential to be a major driver of future growth and its positive contribution to many environmental outcomes, including climate change.

Cabinet agreed in 2004/05 that the Government engage with the forest industry on a joint industry development process called the Forest Industry Development Agenda (FIDA).

The Government's high-level objectives for the FIDA are to ensure forestry can make its optimal contribution to New Zealand's sustainable development, and that it plays a key role in New Zealand's environmental goals, such as:

- promoting sustainability and carbon neutrality by producing New Zealand's only truly renewable and sustainable construction material;
- climate change mitigation; and
- mitigation and prevention of water pollution and soil erosion.

From a climate change perspective, increased use of wood can reduce fossil fuel energy consumption and CO_2 emissions by increasing the pool of carbon stored in wood and wood products, and displacing fossil fuel by burning wood waste materials.

The FIDA provides a means for the Government and the industry to develop a strategic approach for the industry's future growth. It has been running since April 2005, when the Government allocated $18.2 million to the initiative through to July 2009 (although some funds have been carried forward beyond that time). Industry co-funding is required for some projects on a 75 percent government and 25 percent industry basis. The topic areas are shown in the table.

FIDA funding ($ million GST excl)

Initiative area	Government funds	Industry funds
Market access	1.2	0.4
Bio-energy	2.5	N/A
Labour and skills	4.4	N/A
Excellence in wood design	2.1	0.7
Market development	8.0	2.7

Market access: This budget is managed by the Ministry of Foreign Affairs and Trade (MFAT) and funds projects that MFAT would not normally undertake, such as contracting industry and research experts. Most of the projects are about non-tariff barriers to trade, for example, building standards that discriminate against New Zealand radiata pine. The budget is almost fully committed.

Bio-energy: MAF contracted the Energy Efficiency and Conservation Authority (EECA) to manage this part of the FIDA. Funding has been fully committed and was used on:

- grants for demonstration projects using wood as a fuel source; and
- pilot projects to fund the conversion of school boilers to wood pellets or wood chips.

Labour and skills: This fund was managed by the Tertiary Education Commission and was a contribution to a wood processing training centre in Rotorua. It has been fully committed.

Excellence in wood design: This initiative part funds two professorship positions, one each at the universities of Auckland (Professor Pierre Quenville) and Canterbury (Professor Andy Buchanan) to teach and research the use of wood in commercial-style buildings.

Market development: This is managed by MAF and includes several projects, the largest by far being the NZWood initiative, a generic wood promotion programme. The fund is virtually fully committed on 30 projects, with a balance of only $45,000 out of the $8 million budget remaining. As well as NZWood, it includes projects ranging from new ideas for building houses with solid wooden walls to reducing the use of pesticides in forests.

■ John Eyre, MAF Policy, john.eyre@maf.govt.nz

LOG EXPORTERS SAVE TONNES OF METHYL BROMIDE

New Zealand's use of methyl bromide to fumigate log exports has been steadily increasing over the past five years because of increased trade, and would be considerably higher if the fumigation company Genera, log exporters and MAF Biosecurity New Zealand (MAFBNZ) had not pioneered an alternative treatment.

New Zealand log exporters saved 220 tonnes of ozone depleting methyl bromide in the year ending 30 June 2008 by fumigating logs destined for China with an alternative product, Phosphine.

However, Phosphine fumigation can only be carried out on two-thirds of a shipment of logs (those contained in a ship's hold) during transit, as the treatment requires 10 days' saturation compared with 24 hours for methyl bromide. While China is currently the only country to accept this alternative method of treatment, MAFBNZ and industry are working to change this.

Methyl bromide has been used extensively and safely around the world for quarantine and pre-shipment (QPS) purposes for over 70 years, and $728 million in forestry trade in export logs and sawn timber from New Zealand still relies on methyl bromide fumigation as a market access tool.

But approaches are changing because methyl bromide is now listed as an ozone depleting substance under the Montreal Protocol, which aims to phase out all ozone depleting substances.

New Zealand has stopped importing methyl bromide for non-quarantine use, and while use for quarantine pre-shipment treatment is exempt from the Montreal Protocol phase-out process, all countries are urged to reduce and eliminate methyl bromide as a treatment. The quantity of methyl bromide used in New Zealand for QPS purposes is now four times that used five years ago because of the increase in exports as well as requirements by other countries for pre-shipment treatment, particularly for forest products.

New Zealand's use of Phosphine has bought about a significant reduction in methyl bromide use. Internationally, the Montreal Protocol has led to methyl bromide consumption steadily dropping from around 64,000 tonnes in 1991 (for non-quarantine use) down to around 10,000 tonnes in 2006. Quarantine and pre-shipment use has declined from around 14,000 tonnes to 10,000 tonnes over the same period.

Meanwhile, the Ministry of Agriculture and Forestry (MAF) is funding research and working with stakeholders in the Methyl Bromide Reduction (STIMBR) group, researchers, fumigation companies and industry to source funding for further work on alternative treatments to reduce New Zealand's reliance on methyl bromide.

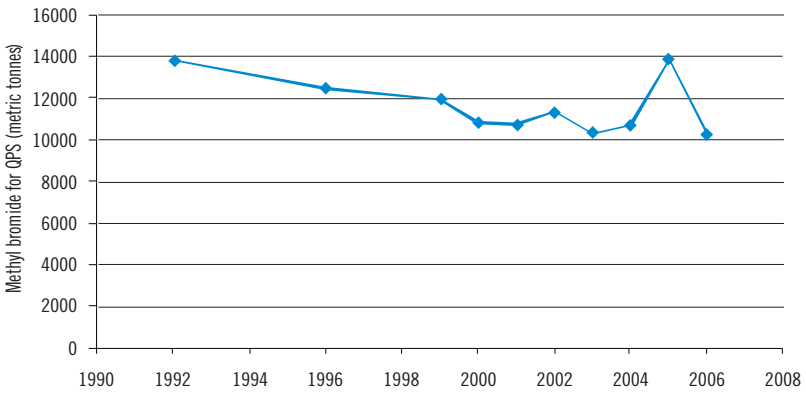
Fumigation trials such as this one, testing efficacy on infested logs, will provide more data on alternative treatments to methyl bromide.

After China, India is New Zealand's second largest log export market requiring pre-export treatment, and there is significant potential for further methyl bromide reduction. Indian log volumes have grown significantly over recent years and MAF, along with other industry parties, is actively working to facilitate change towards alternatives in this market. Negotiations have been in progress for several years and trials to provide more data on the alternative treatment for logs destined for India are underway.

While New Zealand is actively seeking and will move to alternatives at the first opportunity, until acceptable alternatives can be implemented and accepted by trading partners, New Zealand trade and biosecurity cannot phase out QPS use of methyl bromide quite yet.

■ Ken Glassey, Senior Adviser, Border Standards, MAFBNZ, ken.glassey@maf.govt.nz

Reported or estimated global QPS production



Source: Methyl Bromide Technical Options Committee presentation, Montreal Protocol meeting November 2008, Doha.

GUM LEAF SKELETONISER
is it a risk to native plants?

Uraba lugens eggs – the photo shows a rare instance of eggs laid on pohutukawa in a laboratory study. Studies show that gum leaf skeletoniser does not pose a threat to native species in the wild. Photo courtesy Scion.

Scientists at the Crown Research Institute Scion have found New Zealand's native plants are fortunately not a popular menu choice for an unwelcome Australian caterpillar.

Gum leaf skeletoniser (*Uraba lugens*), a caterpillar that feasts on gum trees in Australia, is a relatively recent arrival to New Zealand. As with other immigrant pests, it is necessary to learn what foods the insect may develop a taste for here.

Better Border Biosecurity-funded scientists based at Scion in Rotorua have been exploring whether they can accurately predict the field host range of the insect using host specificity tests in the laboratory.

Because of the complexity of the gum leaf skeletoniser's biology, numerous testing methods have been trialled in a bid to accurately predict which native trees might be targeted by this pest. By testing the dietary range in the laboratory, scientists can stay a step ahead of the insect by predicting risks as it spreads into new areas.

Scion entomologist Dr Toni Withers says it is good to know about the insect's likely feeding habits before it gets the opportunity to make the decisions itself on what is palatable and attractive for its larvae to eat.

So how have Dr Withers and her colleague Dr Lisa Berndt gone about this tricky task?

"We start by looking at what New Zealand plants are the closest native relatives to the gum leaf skeletoniser's main hosts in Australia. These hosts include species of Eucalyptus and Angophora, which belong in the family *Myrtaceae*. Notable New Zealand trees such as *Metrosideros* spp., which include pohutukawa and rata, are in this family, so this is a logical place to start host testing," Dr Withers explains.

"For a native plant to be considered a true host, it must be attractive enough to provide food and lodging for the insect's complete life cycle. This means the mother moth has to also be willing to lay her batch of eggs onto the plant, so that the hatching larvae can begin to feed on it."

Laboratory tests suggest that while gum leaf skeletoniser larvae will nibble on certain native plants (see table), they will only do so if they fall off Eucalyptus trees onto the native plants. However, only some of those native plants, such as southern rata, are palatable enough for the larvae to feed for the remaining instars (development stage between each moult of an insect's skin). Gum leaf skeletonisers can moult up to 14 times before spinning into a pupa.

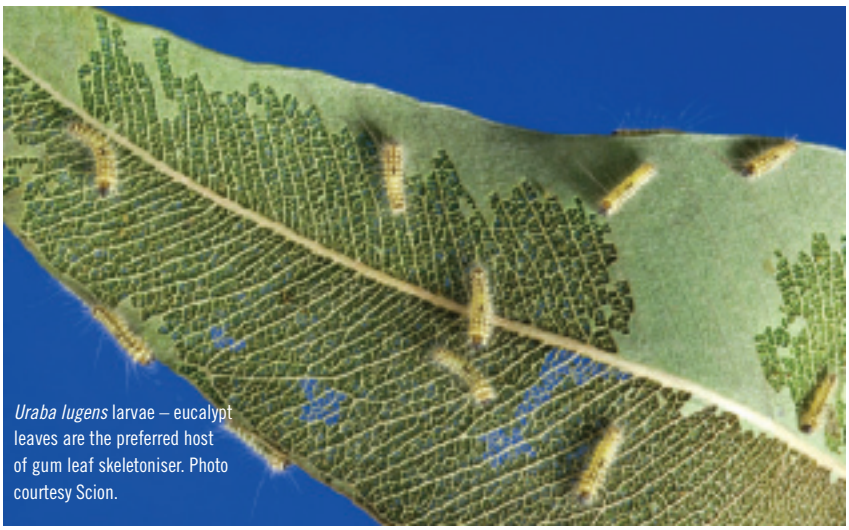
"All our oviposition [egg-laying] testing has shown that the moth is more likely to lay her eggs on a neutral substrate such as part of the cage frame or netting, than on any of the indigenous New Zealand Myrtaceae and Nothofagaceae. This is good news for New Zealand because our native plants are quite simply not attractive oviposition substrates for moths," Dr Withers says.

This result adds confidence to the prediction made previously that gum leaf skeletoniser poses little threat to New Zealand native flora. The only damage likely to occur is from spill-over feeding, when a half-grown larvae gets a fright or is disturbed from its feeding on a host tree, and spins on a silken thread or gets blown off its leaf onto a native plant growing beneath or close by.

Field surveys revealed that as many as 10 percent of pohutukawas growing within approximately 100 metres of infested Australian trees may show damage during the peak feeding times of the larvae (early spring and late summer).

Are there any other plant hosts?

Egg-laying and some defoliation of trees by larvae in the field has been recorded on a range of northern hemisphere tree species including *Betula pendula*, *Fagus sylvatica purpurea*, *Fraxinus excelsior*, *Liquidambar styraciflua, Populus* sp., *Quercus coccinea* and *Quercus paulstris*.



Uraba lugens larvae – eucalypt leaves are the preferred host of gum leaf skeletoniser. Photo courtesy Scion.

"We were able to confirm some of these are potential host associations by observing egg-laying in the laboratory on *Liquidambar styraciflua*, *Fagus sylvatica purpurea* and *Quercus coccinea*. We will now need to check if larvae can rear through to adult moths on these trees," Dr Withers says.

Scion and HortResearch scientists, under the Better Border Biosecurity Foundation for Research, Science and Technology (FRST)-funded research programme, are keen to investigate why the insect is targeting species so different from its native range.

"We do know that any impact on these trees is likely to be minimal, especially as they lose their leaves in winter, which is when the winter generation of gum leaf skeletoniser larvae feed. So only the summer generation is likely to be able to complete a generation on any of these northern hemisphere trees species, returning to utilise their Australian hosts again over winter," Dr Withers says.

Gum leaf skeletoniser larvae research

Plants palatable enough for larvae to chew	Likelihood of larva surviving to adulthood?	Moth ever laid eggs on plant?	Risk of attack
Metrosideros umbellata Southern rata	6/73 = 8%	Once from 765 ♀	Low Observed only once in the field
Metrosideros carminea Carmine rata	3/100 = 3%	Never from 765 ♀	Nil
Metrosideros parkinsonii Parkins's rata	0	Not tested	
Metrosideros robusta Northern Rata	Only by older larvae 8/50	Four times from 925 ♀	Low
Metrosideros excelsa Pohutukawa	1/50 = 2%	Once from 925 ♀	Low
Metrosideros diffusa White rata vine	Only by older larvae 9/100 = 9%	Not tested	
Lophomyrtus bullata Ramarama	0	Once from 160 ♀	Nil
Syzgium maire Maire tawaki	0	Twice from 160 ♀	Nil
Leptospermum scoparium Manuka	Only by older larvae 1/50 = 0.5%	Never from 160 ♀	Nil
Nothofagus solandri var *solandri* Black beech	0	Not tested	
Nothofagus truncata Hard beech	10/100 = 10%	Never from 765 ♀	Nil

■ Margaret Richardson, Senior Communications Adviser, Scion, Margaret.Richardson@scionresearch.com, www.scionresearch.com

A CAREER IN TREES

Paul Stevens, MAFBNZ.

Thirty years ago Paul Stevens started out pruning trees for the New Zealand Forest Service. His career in forestry has since turned full circle and he is back working for the Government, having joined the Post Border Directorate of MAF Biosecurity New Zealand (MAFBNZ) in 2006 as a Senior Adviser.

While working full-time in the bush for the New Zealand Forest Service, Mr Stevens put himself through a New Zealand Certificate in Forestry, then gained a Bachelor of Forestry Science from the University of Canterbury.

He joined Tasman Forestry Limited (now Fletcher Challenge Forests) in 1987 and progressed through several technical and management roles. In 1998, he joined Carter Holt Harvey (CHH) Forests and at various times was responsible for research management, forest health and nutrition, and silviculture overview. Mr Stevens joined Evergreen Forests in December 2005 as Resource Manager responsible for forest operational management, the valuation process and yield forecasting at tactical and strategic levels. He is a member of the New Zealand Institute of Forestry.

After more than 25 years in the commercial forest industry, Mr Stevens' role with MAFBNZ has offered him a chance to broaden his horizons while still contributing to enhancing New Zealand's environment and economy. His position of Senior Adviser in the Biosecurity Surveillance Group involves managing several surveillance programmes that find invasive pests (for example, the gypsy moth) before they damage New Zealand's trees and other plants.

Mr Stevens also provides a liaison role between the New Zealand forest industry and MAFBNZ. This involves representing MAFBNZ at various forest industry biosecurity related forums, including the New Zealand Forest Owners' Association (NZFOA) Forest Health Committee, the Forest Biosecurity Research Council (FBRC) and the Forest Health Research Collaborative.

The forestry sector liaison role also involves organising an annual forest health workshop that MAFBNZ runs in conjunction with NZFOA. In 2008 the theme was "New developments in Forest Biosecurity Surveillance". Presentations given at the 2008 workshop can be found on the FBRC website: www.fbrc.org.nz/7th_workshop.html.

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Forest health in a changing world

Representatives from more than 19 countries and 45 organisations, including MAFBNZ, attended the Asia and the Pacific Forest Health Workshop on Forest Health in a Changing World in Kuala Lumpur in December 2008.

An Asia Pacific Forest Invasive Species Network (APFISN) workshop "Forest Health in a Changing World" was an opportunity to build linkages and share knowledge across the region.

A significant proportion of New Zealand's trade comes from the Asia and Pacific regions, as does a significant proportion of our biosecurity risk. Many of our neighbours have a lower appreciation of the risk than New Zealand, less knowledge about international biosecurity reporting requirements and insufficient capacity to undertake biosecurity work that New Zealand sees as essential.

The APFISN forest health workshop, held in Kuala Lumpur, Malaysia, in December last year, provided a forum for MAF Biosecurity New Zealand (MAFBNZ) to exchange information with representatives from the 19 Asia–Pacific countries and 45 organisations attending. It also provided an opportunity to build collaborative linkages and better align programmes to capture synergies; to share strategies, experiences and knowledge; and to assess gaps and capacity needs related to forest health in the Asia–Pacific region.

Specifically, the workshop outcomes included:

- raised awareness of emerging risks in trade partners (for example, new pests reported from Viet Nam);
- improved understanding of where trade partners have biosecurity knowledge gaps;
- increased knowledge about where future biosecurity problems might arise;
- improved relationships with forest health and biosecurity organisations in the Asia–Pacific region;
- improved networks to transfer knowledge to the Asia–Pacific region to improve overseas biosecurity;
- increased understanding of the capacity needs of the Asia–Pacific region biosecurity network; and
- improved support for the biosecurity needs of the Asia–Pacific region.

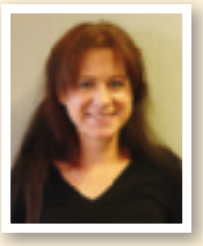
The APFISN was launched in 2004 in recognition of the danger of invasive species to the sustainable management of forests in the Asia–Pacific region. It is a co-operative alliance of 32 Asia–Pacific Forestry Commission (APFC) member countries and operates under the umbrella of the United Nations Food and Agricultural Organization. The APFISN focuses on inter-country co-operation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia–Pacific region.

For New Zealand, the APFISN provides a forum for the exchange of biosecurity information and an avenue to readily improve biosecurity in the region by pushing risk offshore, thereby leading to a reduction in incursions.

Abstracts of papers presented at the workshop and audio files of presentations can be found at: www.apafri.org/forestHealth08/index.htm

■ Paul Stevens, Senior Adviser (Plants Surveillance), Post Border, MAFBNZ, paul.stevens@maf.govt.nz

BIOSECURITY PEOPLE



Vivien Thomson has joined MAF Biosecurity New Zealand (MAFBNZ) as a Plants Surveillance Adviser in the Post Border Directorate's Surveillance Group. She is originally from Canberra, where she worked for the Australian Department of Agriculture, Fisheries and Forestry in the area of quarantine export policy. Vivien spent most of 2008 living and working in Samoa as a post-harvest physiologist, which involved research into the best harvesting and handling practices for fruit crops intended for export. She holds a Bachelor of Science degree in ecology from the Australian National University.

Agencies join forces to fight kauri disease

Six government agencies have joined forces to try to stop the spread of a disease that affects kauri trees.

The newly identified disease – Kauri dieback (*Phytophthora* taxon Agathis or PTA) – has been confirmed as attacking trees in Northland, Auckland and on Great Barrier Island.

The six agencies – MAF Biosecurity New Zealand (MAFBNZ), the Department of Conservation (DOC) and four regional councils, Auckland Regional Council, Northland Regional Council, Environment Bay of Plenty and Environment Waikato – have set up a response team to identify and manage the risks to kauri.

Kauri is a nationally and regionally significant species that is a Taonga of great significance to Māori and has cultural value for many New Zealanders. Kauri are among the worlds tallest trees and once covered much of the upper North Island. They are part of New Zealand's history, and an essential part of the ecosystem as they are home to many other trees, plants and threatened wildlife.

A collaborative effort is needed to ensure the survival of kauri as a species. The six agencies working together to protect kauri, known as the Joint Agency Response team, have committed to co-ordinating a management approach across all land in affected regions.

While each agency involved has unique expertise to offer the response, all share a common mandate to protect New Zealand's environmental, social and cultural values.

PTA, or kauri dieback as it's more commonly known, is a serious threat to kauri forest and individual kauri trees in the upper North Island. Believed to be a soil-borne disease caused by a soil pathogen, PTA is specific to kauri and can kill trees and seedlings of all ages. Affected trees show yellowing leaves, canopy thinning, dead branches and lesions that bleed resin across the lower part of the trunk.

It is believed to be spread mainly through soil and soil water movement, and it is strongly suspected PTA can be transferred by people, tracked from place to place on shoes, equipment and tyres.

PTA has been found at sites in the Waitakere Ranges Regional Park and at DOC reserves at Great Barrier and Trounson Kauri Park in Northland. Symptoms of kauri dieback have also been observed in other areas within the greater Auckland region.

Formally identified in April 2008, this *Phytophthora* is new to science and there is limited information on its impacts, how it spreads and effective treatments, and there is currently no known cure. A technical advisory group (TAG) has been established to provide the Joint Agency Response team with information and advice as to the biology, ecology and potential surveillance and management tools for this *Phytophthora*. The TAG has identified areas of research that need to be undertaken so that a better understanding of the disease is obtained and appropriate measures are put in place to manage it.

"This information will allow us to develop future management plans and a co-ordinated way forward that ensures kauri ecosystems and individual trees are protected. We are aiming to have these plans finalised by the end of February," Joint Agency Response Manager Fiona Bancroft says.

The Joint Agency Response team has prioritised immediate research in three particular areas: getting good methodology in place by optimising sampling and diagnostic techniques; defining symptoms that can be linked to PTA; and developing detailed best practices, including control/hygiene methods to limit any further spread. The research will be contracted and take place over the coming months as environmental conditions make it feasible.

Canopy thinning and bleeding lesions on kauri trees as a result of kauri dieback. Photo courtesy Auckland Regional Council.

Until more is known about PTA, one of the strongest chances of containing it lies with public education. The Joint Agency Response team has been liaising with iwi, local councils and landowners in the Upper North Island, as well as members of the public using kauri areas, asking for their help in stopping the disease from spreading further.

Information sheets and track signs have been distributed encouraging simple behaviours people can adopt right now to stop further spread – namely keeping to defined tracks in parks and reserves, and cleaning footwear and tyres, or any other equipment that comes into contact with soil, before and after leaving kauri forest areas.

A specially created website – www.kauridieback.co.nz – has been set up by the Joint Agency Response team to provide more information, including details about particular regions. A free phone number – 0800 NZ KAURI – has also been set up so that the most up-to-date information is readily available 24 hours a day, seven days a week.

The Joint Agency Response team is striving to ensure the integrity of kauri ecosystems, protect high value kauri areas and iconic kauri trees.

■ Lisa Gibbison, Communications Adviser, MAFBNZ, lisa.gibbison@maf.govt.nz

Show jumpers help with influenza project

MAF Biosecurity New Zealand (MAFBNZ) staff visited the Central Districts Show Jumping event in Foxton at the end of November – not for the fun of horse riding but to help be prepared should equine influenza ever be suspected in New Zealand.

MAFBNZ's Andy McFadden takes a blood sample while Reinhold Kittelberger writes down the details. Photo: Cathy Getafe.

MAFBNZ Incursion Investigator Andy McFadden and Principal Adviser Reinhold Kittelberger, both vets, needed to collect blood samples from New Zealand horses that hadn't been overseas and so weren't vaccinated for equine influenza.

In all, 300 samples were needed so that four different methods of testing for equine influenza could be evaluated. At the Foxton event, 159 samples were collected over two days.

The support of the event organisers was invaluable, in particular Trish Pearce, who represents Equestrian Sport New Zealand on the New Zealand Equine Health Association and is a keen show jumper, and her husband Tim Pearce, twice vet for the New Zealand Olympic Show Jumping Team, who had advertised MAFBNZ's presence and asked horse owners for their co-operation.

Since the Foxton event, Dr Pearce has collected another 115 samples during his veterinary rounds in the Rangitikei and Manawatu, and Dr McFadden another 62 samples in the South Island from standardbreds. MAFBNZ now has all of the samples it needs from non-infected, non-vaccinated horses. Other samples (vaccinated, non-infected New Zealand horses and previously infected Australian horses, but not carrying the live virus) have been also been obtained.

Analysis of the blood samples will take place in contained conditions at the Animal Health Laboratory in Wallaceville. One of the key things to work out is the sensitivity and specificity of each of the four test methods.

Because equine influenza isn't present in New Zealand horses, any "positive" result will be considered false. Samples from infected Australian horses will be used as the positive controls. Based on testing the negative and positive control panels, the sensitivity and specificity of each test method can be determined.

The method that performs best will be selected and kept available for use. While MAFBNZ hopes the test will never be needed, it needs to be prepared. The Australian equine influenza outbreak in 2007 required more than 70,000 blood tests to be carried out.

MAFBNZ's work means an informed decision on test methods can be made well ahead of any possible episode of equine influenza in New Zealand.

BIOSECURITY SURVEILLANCE STRATEGY UPDATE

Public consultation on the draft Biosecurity Surveillance Strategy was held in October and November last year.

As part of the process, MAF Biosecurity New Zealand (MAFBNZ) held six public meetings in November – two each in Auckland and Wellington, and one each in Christchurch and Rotorua. At each meeting MAFBNZ staff outlined the draft strategy, explained the approach taken and answered questions. Over 100 people with a role or interest in biosecurity surveillance participated.

Fifty-four submissions were received, and MAFBNZ has since been reviewing the feedback and assessing where changes to the draft strategy are required.

The majority of submitters agreed favourably with the statements made in the strategy document, with more than 95 percent supportive of working together on biosecurity surveillance. In order to achieve the agreed goals, a common theme is the recognition that more resources are required, and most groups are eager to get on and clarify how all participants envisage balancing competing objectives.

MAFBNZ has also taken the recommendations for priority actions and used them to start planning the next stages, so that when a final strategy is approved work can commence. More details on this work will be provided in the future.

- If you have any questions or comments, or to receive updates on the Biosecurity Surveillance Strategy, please email NZBiosecuritySurveillance@maf.govt.nz

GO-AHEAD FOR LYTTELTON MARINE PEST ELIMINATION

The Government has given MAF Biosecurity New Zealand (MAFBNZ) the green light for a five year local elimination programme to rid Lyttelton Port of the marine pest Mediterranean fanworm, signing off on $3.5 million to carry out the operation.

Mediterranean fanworm specimens from Lyttelton Port. Photo courtesy G. Read, National Institute of Water and Atmospheric Research (NIWA).

Divers working on initial surveying for the fanworm. Pictured left is Chris Denny, who was with the Cawthron Institute when the photo was taken, and is now a MAFBNZ Marine Adviser based in Auckland.

The fanworm (*Sabella spallanzanii*) was detected in the port last year through MAFBNZ's targeted marine pest surveillance programme. It is a notifiable and unwanted organism under the Biosecurity Act 1993.

Fanworm Response Manager Dr Peter Stratford says the fanworm can have significant negative effects, being an invasive species with no known predators and an ability to thrive in a wide range of habitats.

"The fanworm could displace existing native species, threaten high value conservation and biodiversity areas, and foul port structures, vessels and aquaculture farms. This pest generally thrives in sheltered bays and harbours where it is likely to successfully compete with scallops, oysters and mussels, amongst other species, for food and space. It may also alter the fish species present in an area.

"It is important that we carry out these measures to try to rid the Lyttelton Port of this pest and prevent its spread to other high value areas such as the wider Lyttelton harbour, the Marlborough Sounds, Fiordland and even many areas of the North Island."

MAFBNZ has so far undertaken diver search and removal of existing populations, which research has shown to be an effective method to treat the pest. Information obtained from these removal operations indicates that the fanworm arrived in New Zealand relatively recently and appears to be confined to Lyttelton Port.

From here, search and removal treatment work will continue for up to two years as long as the methods remain viable. Regular monitoring for populations will provide information on the effectiveness of the treatment, as well as identify any new populations that may establish during the course of the programme. During this time the overall effectiveness of the elimination programme will be closely monitored. The programme will also be reassessed if the fanworm is detected outside of Lyttelton Port, if the treatment rounds are not reducing the population by an acceptable level, and after an evaluation in 2010.

There will be a communications programme to encourage the owners of moored vessels in the area to keep their boat hulls clean to avoid spreading the pest.

"To date we have distributed information packs to all owners of vessels moored in the port and have also held a meeting with local boaties to bring them up to speed with the situation and how they can play their part," Dr Stratford says.

"Fouling pests such as the Mediterranean fanworm hitchhike rides to other locations on dirty boat bottoms – large or small – so it's vital boat owners support this elimination programme."

Further information is available at: http://www.biosecurity.govt.nz/pests/mediterranean-fanworm

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WOOD PACKAGING IN SEA CONTAINERS

While wood packaging in sea containers can potentially contain forestry pests and pathogens, a new study indicates that contamination levels are low thanks to generally good adherence to a New Zealand import health standard introduced about two years ago.

Wood is one of the most common packaging materials used in sea containers. It includes dunnage, crates, fillets, spacers, pallets, drums, reels and peeler cores. Wood is used as a packaging material because it is cheap and durable, however, the often low quality of wood used means it is also a potential host of timber pests and diseases. As a result, an international standard (ISPM-15) was introduced in 2002 to decrease the likelihood that forestry pests are transported internationally in packaging materials.

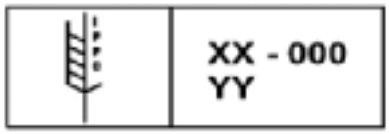
In this article, we summarise the results of a survey examining both the quantity of wood packaging imported into New Zealand and compliance with the ISPM-15 standard. The survey was conducted on a sub-category of containers that carry goods for multiple importers – Freight of All Kinds (FAK) sea containers, and which are believed to contain particularly high levels of wood packaging.

ISPM-15 standard

Wood packaging materials imported into New Zealand are governed by the "Import Health Standard: Wood Packaging Material from All Countries", which was first introduced in May 2006 (Biosecurity New Zealand, 2006). This Import Health Standard (IHS) is based on the international "ISPM-15" standard for wood packaging materials under the International Plant Protection Convention (IPPC), 2002. The main purpose of the ISPM-15 standard is to provide a consistent basis on which to assess both the origin and phytosanitary status of wood packaging material, and thus to reduce the worldwide spread of timber pests and diseases through wood packaging.

The ISPM-15 standard requires that wood packaging materials are treated, stamped, and free of bark and pests. The stamp consists of the IPPC symbol, a two letter country code, a unique number assigned to the treatment provider, and an abbreviation relating to the type of treatment applied (See Figure 1: IPPC, 2002).

Figure 1: Generalised ISPM-15 stamp



Note: The stamp contains the IPPC logo (left), the country of treatment (XX), the treatment facility code (000), and the treatment type (YY).

Purpose

MAF Biosecurity New Zealand (MAFBNZ) does not currently record wood packaging materials in sea containers unless they are non-compliant. When non-compliant wood packaging is found it is sent for treatment, destruction or reshipment by a MAFBNZ Quarantine Inspector or Accredited Person. Even in these cases, information is not recorded on the type of packaging material, or the volume of wood. As a consequence, there is no ready source of information relating to wood packaging materials entering New Zealand.

This study assessed wood packaging in FAK sea containers, which contain multiple consignments for different importers, and were believed to be potentially higher risk for non-compliant wood packaging than Full Container Load (FCL) sea containers. There are several reasons for this perceived high risk: FAK containers are believed to contain higher volumes of wood packaging than other sea containers, and the wood is expected to come from a wider variety of sources. In addition, FAK importers are often private individuals or small businesses, which are potentially less aware of New Zealand's biosecurity regulations than larger importers.

The survey

Wood packaging material was sampled from FAK containers devanned at Auckland Transitional Facilities (TFs) between February and April 2008. Most containers sampled contained wood packaging materials (91 percent), with twice as much wood packaging present in 40-foot containers (1.18 m^3) compared with 20-foot containers (0.57 m^3).

A very high percentage (89 percent) of all wood packaging sampled was stamped according to the ISPM-15 standard. The most common ISPM-15 treatment in the sample was heat treatment. The two most common origins of stamped wood packaging materials were Australia and the United States of America – two of New Zealand's largest trading partners (see Figure 2). It was common for a single container to have wood packaging from several different countries, with some of the wood heat treated, some methyl bromide treated, and a small volume of wood not treated at all.

The role the wood packaging plays in the container is a good indication of the likelihood of whether or not the wood is ISPM-15 stamped. The most common function of wood packaging is for holding goods – either in the form of pallets, or other types of products. These types of packaging material had very good compliance with the standard (see Figure 3). Although wooden bracing and cable reels constitute only a small percentage of the wood packaging in FAK containers, more than half of the wood packaging found in these forms (56 percent and 100 percent, respectively) was unstamped.

A pleasing result from this study was that wood packaging materials were very clean, with little contamination found. Only one piece of wood sampled had bark as a contaminant.

In addition, there were only six interceptions of hitchhiker organisms, and no wood-boring insects or fungal contaminants were found.

Two of the organisms found were seeds (*Panicum* sp. and *Sonchus oleraceus*) – one of these is an unregulated species (*S. oleraceus*), and the regulatory status of the other is unknown as it was not able to be identified to species level. There were four spiders identified, one of which was a regulated species (*Crossopriza lyoni*). The remaining three spiders could not be identified below family level and thus their regulatory status is unknown.

While wood packaging can potentially contain forestry pests and pathogens and will continue to be monitored closely by MAFBNZ, this study indicates that contamination levels within wood packaging material are low. It also shows that consolidators of FAK containers generally adhere to the ISPM-15 standard. The ISPM-15 standard appears to be effective at ensuring a reasonably high level of cleanliness for wood packaging materials.

References

Biosecurity New Zealand (BNZ), 2006. Import health standard for wood packaging material from all countries. Ministry of Agriculture and Forestry, New Zealand.

International Plant Protection Convention (IPPC), 2002. Guidelines for regulating wood packaging material in international trade. International Standard for Phytosanitary Measures No. 15.

- Anthea Craighead, Senior Data Analyst, MAFBNZ, anthea.craighead@maf.govt.nz; Lisa Rowsell, Monitoring Surveyor, MAFBNZ, lisa.rowsell@maf.govt.nz

Figure 2: Countries recorded on ISPM-15 stamps of wood packaging material for those countries with more than 2 m3 of wood packaging

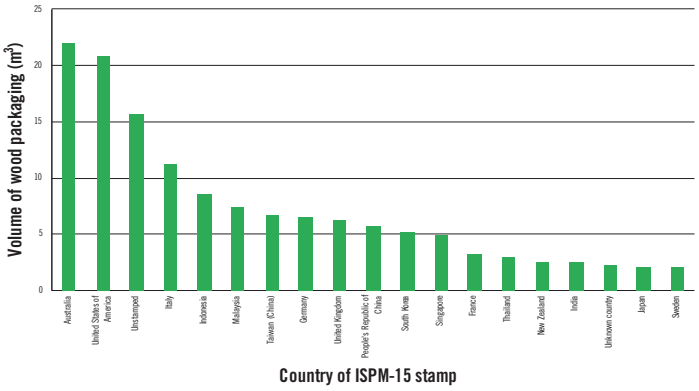
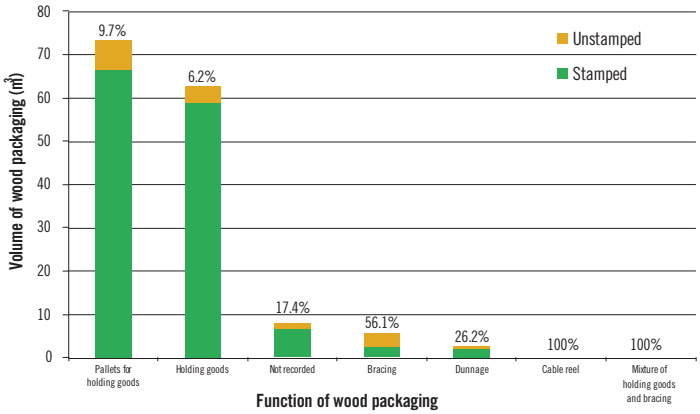


Figure 3: Volume of stamped and unstamped wood packaging according to function in the container



Note: Percentages refer to the proportion of wood packaging that was unstamped for a given function.

UPDATES

Notification of consultation: 155.02.06 *Vaccinium* spp. nursery stock from all countries

MAFBNZ is proposing changes to the specific schedule for *Vaccinium* spp. (blueberry) nursery stock from all countries. The proposed changes can be viewed at: www.biosecurity.govt.nz/biosec/consult/vacciniu m-consult

Submissions on these changes should be forwarded to MAFBNZ by close of business on **20 February 2009**. MAF encourages respondents to email comments to: plantimports@maf.govt.nz. Written submissions can be sent to: Vivian Dalley, MAF Biosecurity New Zealand, PO Box 2526, Wellington.

Notification of consultation: 155.02.06 *Persea* spp. nursery stock from all countries

MAFBNZ is proposing changes to the specific schedule for *Persea* spp. (avocado) nursery stock from all countries. The proposed changes can be viewed at: www.biosecurity.govt.nz/biosec/consult/persea-consult

Submissions on these changes should be forwarded to MAFBNZ by close of business on **20 February 2009**. MAF encourages respondents to email comments to: plantimports@maf.govt.nz. Written submissions can be sent to: Vivian Dalley, MAF Biosecurity New Zealand, PO Box 2526, Wellington.

Notification of consultation: 155.02.06 *Rubus* spp. nursery stock from all countries

MAFBNZ has made the draft import health standard (IHS) schedule for *Rubus* spp. (raspberry, blackberry, boysenberry) nursery stock from all countries available for public consultation. The draft schedule can be viewed at: www.biosecurity.govt.nz/biosec/consult/draft-ihs-rubus

Submissions on these changes should be forwarded to MAFBNZ by close of business on **6 March 2009**. MAF encourages respondents to email comments to: plantimports@maf.govt.nz. Written submissions can be sent to: Vivian Dalley, MAF Biosecurity New Zealand, PO Box 2526, Wellington.

Import health standard for horses from Australia now available

The import health standard for horses from Australia is now current and available for use. The standard may be found on the MAFBNZ website at: www.biosecurity.govt.nz/imports/animals/standards/horaniic.aus.htm

- Animal Imports, animalimports@maf.govt.nz, phone 04 894 0459

Public consultation on UK budgie imports

The draft import risk analysis for budgerigars (*Melopsittacus undulatus*) from the United Kingdom was released for public consultation on 6 January 2009 and is available at www.biosecurity.govt.nz/biosec/consult

This risk analysis was conducted according to the domestic and international requirements for the effective management of biosecurity risks under the Biosecurity Act 1993. Copies have been sent to key stakeholders.

Submissions are welcomed, closing **Friday 27 February 2009**, and should be addressed to: Risk Analysis Team Support Officer, MAFBNZ, PO Box 2526, Wellington. Phone 04 894 0310, Email Risk.Analysis@maf.govt.nz

Pest watch: 15/11/2008 – 19/12/2008

Biosecurity is about managing risks – protecting the New Zealand environment and economy from exotic pests and diseases. MAF Biosecurity New Zealand devotes much of its time to ensuring that new organism records come to its attention, to follow up as appropriate. The tables here list new organisms that have become established, new hosts for existing pests and extensions to distribution of existing pests. The information was collated between 15 November and 19 December 2008. The plant information is held in the Plant Pest Information Network (PPIN) database. Wherever possible, common names have been included.

ANIMAL KINGDOM RECORDS 15/11/2008 – 19/12/2008

Validated new to New Zealand reports

No new to New Zealand records during this period.

Significant find reports

No significant find records during this period.

New host reports

No new host records during this period.

New distribution reports

No new distribution records during this period.

- Ranuka Robinson, Team Support Officer – Surveillance, MAF Biosecurity New Zealand, phone 04 894 0281, ranuka.robinson@maf.govt.nz

PLANT KINGDOM RECORDS 15/11/2008 – 19/12/2008

Validated new to New Zealand reports

Organism	Host	Location	Submitted by	Comments
No new to New Zealand records during this period.				

Significant find reports

Organism	Host	Location	Submitted by	Comments
No significant find records during this period.				

New host reports

Organism	Host	Location	Submitted by	Comments
Chaetomium trignosporum (fungus: no common name)	*Pinus radiata* (radiata pine)	Bay of Plenty	Scion (high risk site surveillance)	
Hylastes ater (black pine bark beetle)	*Cedrus atlantica* (Atlas cedar)	Nelson	Scion (public enquiry)	
Priates optandus (beetle: no common name)	*Pittosporum tenuifolium* (pittosporum)	Auckland	Scion (high risk site surveillance)	
Trachymela sloanei (Australian tortoise beetle)	*Eucalyptus johnstonii* (eucalyptus)	Nelson	Scion (high risk site surveillance)	
Leucaspis morrisii (insect: no common name)	*Meryta sinclairii* (puka)	Auckland	Scion (high risk site surveillance)	
Acizzia hakeae (insect: no common name)	*Grevillea rosmarinifolia* (rosemary grevillea)	Marlborough Sounds	Scion (high risk site surveillance)	
	Hakea salicifolia (willow-leaved hakea)	Wellington	Scion (high risk site surveillance)	
	Grevillea banksii (grevillea)	Wanganui	Scion (high risk site surveillance)	
Cephaleuros virescens (algal leaf spot)	*Cunonia capensis* (butterknife bush, spoon bush)	Auckland	Scion (high risk site surveillance)	
Lindingaspis rossi (Ross's black scale)	*Callistemon viminalis* (weeping bottlebrush)	Bay of Plenty	Scion (high risk site surveillance)	
	Osmanthus heterophyllus (holly osmanthus)	Waikato	Scion (high risk site surveillance)	
	Knightia excelsa (New Zealand honeysuckle)	Hawkes Bay	Scion (high risk site surveillance)	
Ceroplastes sinensis (Chinese wax scale)	*Callistemon viminalis* (weeping bottlebrush)	Bay of Plenty	Scion (high risk site surveillance)	
	Corymbia ficifolia (red flowering gum)	Hawkes Bay	Scion (high risk site surveillance)	
Saissetia oleae (black scale)	*Encephalartos longifolius* (plant: cycad, no common name)	Hawkes Bay	Scion (high risk site surveillance)	
	Syzygium sp. (plant: no common name)	Auckland	Scion (high risk site surveillance)	
Pseudaulacaspis eugeniae (white palm scale)	*Chrysanthemoides monilifera* (boneseed)	Hawkes Bay	Scion (high risk site surveillance)	
Furchadaspis zamiae (cycad scale)	*Encephalartos longifolius* (plant: cycad no common name)	Hawkes Bay	Scion (high risk site surveillance)	
Coccus hesperidum (brown soft scale)	*Pomaderris apetala* (tainui)	Wellington	Scion (high risk site surveillance)	

Organism	Host	Location	Submitted by	Comments
Aspidiotus nerii (oleander scale)	*Pomaderris apetala* (tainui)	Wellington	Scion (high risk site surveillance)	
	Garrya elliptica (silk-tassel bush)	Marlborough	Scion (high risk site surveillance)	
	Grevillea alpina? (plant: no common name)	Nelson	Scion (high risk site surveillance)	
Hemiberlesia rapax (greedy scale)	*Pomaderris apetala* (tainui)	Wellington	Scion (high risk site surveillance)	
Epiphyas postvittana (light brown apple moth)	*Psidium* sp. (guava)	Auckland	Scion (high risk site surveillance)	
Parlatoria fulleri (insect: no common name)	*Callistemon citrinus* (crimson bottlebrush)	Hawkes Bay	Scion (high risk site surveillance)	
Coccus hesperidum (brown soft scale)	*Corokia buddleioides* (korokio)	Bay of Plenty	Scion (high risk site surveillance)	
Coccus longulus (long brown scale)	*Buxus sempervirens* (box)	Auckland	Scion (high risk site surveillance)	
Epelidochiton piperis (peppercorn scale)	*Coprosma acutifolia* (plant: no common name)	Auckland	Scion (high risk site surveillance)	
Monteithiella humeralis (insect: no common name)	*Pittosporum eugenioides* (lemonwood)	Wellington	Scion (high risk site surveillance)	
Oemona hirta (lemon tree borer)	*Alnus incana* (grey alder)	Wellington	Scion (high risk site surveillance)	
Seiridium cupressi (fungus: no common name)	*Chamaecyparis nootkatensis* (Nootka cypress)	Marlborough	Scion (ad-hoc collection)	
Parlatoria pittospori (pittosporum scale)	*Grevillea alpina?* (plant: no common name) *Callitris rhomboidea* (Port Jackson pine)	Nelson	Scion (high risk site surveillance)	
Phoma exigua (fungus: phoma leaf spot, phoma rot)	*Ajuga reptans* cv. Black Scallop (carpet bugle)	Waikato	IDC (general surveillance)	
Aphelenchoides fragariae (foliar nematode)	*Sisyrinchium bermudianum* (blue eyed grass)	Auckland	IDC (general surveillance)	
Puccinia iridis (fungus: no common name)	*Iris ensata* (Japanese iris)	Auckland	IDC (general surveillance)	
Aphelenchoides ritzemabosi (chrysanthemum foliar nematode)	*Nicotiana* sp. (tobacco)	Auckland	IDC (general surveillance)	
Nepovirus (Group A) Tobacco ringspot virus (TRSV)	*Hemerocallis fulva* (orange day lily)	Auckland	IDC (general surveillance)	
	Sophora microphylla (kowhai)	Auckland	IDC (general surveillance)	
Bactericera cockerelli (tomato/potato psyllid)	*Solanum laciniatum* (poroporo)	Auckland	IDC (general surveillance)	

New distribution reports

Organism	Host	Location	Submitted by	Comments
Chaetomium trignosporum (fungus: no common name)	*Pinus radiata* (radiata pine)	Bay of Plenty	Scion (high risk site surveillance)	
Trachymela sloanei (Australian tortoise beetle)	*Eucalyptus johnstonii* (eucalyptus)	Nelson	Scion (high risk site surveillance)	
Acizzia hakeae (insect: no common name)	*Grevillea rosmarinifolia* (rosemary grevillea)	Marlborough Sounds	Scion (high risk site surveillance)	
Anisoplaca cosmia (Norfolk Island hibiscus moth)	*Lagunaria patersonia* (Norfolk Island hibiscus)	Nelson	Scion (high risk site surveillance	
Furchadaspis zamiae (insect: cycad scale)	*Encephalartos longifolius* (plant: cycad no common name)	Hawkes Bay	Scion (high risk site surveillance)	
Acrocercops laciniella (black butt leaf miner)	*Eucalyptus nitens* (eucalyptus)	Kaikoura	Scion (high risk site surveillance)	
Frankliniella intonsa (European flower thrips)	*Actinidia deliciosa* (kiwifruit)	Bay of Plenty	IDC (export pre-clearance)	
Pseudonectria rousselliana (fungus: no common name)	*Buxus sempervirens* (box)	Bay of Plenty	Scion (high risk site surveillance)	
Rhypodes sericatus (insect: no common name)	*Actinidia deliciosa* (kiwifruit)	Bay of Plenty	IDC (export pre-clearance)	
Creiis liturata (jumping plant lice)	*Eucalyptus botryoides* (eucalyptus)	Gisborne	Scion (high risk site surveillance)	
Luteovirus Barley yellow dwarf virus strain PAV (BYDV-PAV)	*Microlaena stipoides* (weeping grass)	Auckland	University of Auckland	

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Exotic disease and pest emergency hotline: 0800 80 99 66

Animal welfare complaint hotline: 0800 32 70 27

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