Deliberate release – what are the risks?

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In amongst the discussion and debate on biosecurity little consideration has been given to the issue of deliberate criminal release of biological agents that would impact upon the business of forestry in New Zealand. Is it scaremongering to even consider the potential of such an act? It probably would have been prior to 1997, however in that year a group of individuals took it upon themselves to illegally release rabbit haemorrhagic disease in New Zealand for specific economic goals. Internationally, this event has been held up as an example of successful agricultural terrorism.

What is agroterrorism?
The threat of biological agent use is normally associated with the issue of human health, whereas their use against agricultural targets as strategic economic weapons receives less attention. In essence agricultural terrorism (agroterrorism) is the targeting of animals or plants with biological agents. The goals of agroterrorism will also generally differ from the traditional bioterrorism scenarios.

Of particular concern for businesses are the goals of altering supply and demand of commodities and the control of undesirable plants and animals. Further, given current attitudes of some elements of New Zealand society towards genetically modified organisms, this may place the forest industry at risk if genetically modified trees are utilised on a wide scale.

Why attack trees using biological agents? There are a number of advantages to using biological agents in a forestry context. Depending on the agent used an attack can appear to be a localised outbreak of an already present pest or pathogen. If the goal is trade interruption it may only take a few liberations of a pest followed by anonymously informing news media.

Forestry pests and pathogens are generally not hazardous to humans, making their use safe. There are few technical barriers to the simple act of releasing a few individual pests or inoculating material at a few sites (of course this would not necessarily lead to a sustained disease or pest cycle, but is that necessary where the goal is economic disruption). Finally, the security associated with forests is generally low making the illegal entry to and release of a pest or pathogen in a forest relatively simple.

Under current trade rules an outbreak of a pathogen or pest in New Zealand could potentially not only impact upon our ability to grow trees, but also our ability to trade. How would we react to the deliberate release in several forests of pine pitch canker? What if Asian gypsy moth was deliberately released? What would the added costs be to the industry generally and how would our markets view such incursions?

Countering deliberate release
Countering this type of threat is not dissimilar to countering a normal biosecurity threat although it must be remembered that as well as countering an incursion, there will be a need to preserve evidence for a criminal investigation. At a business level biosecurity management needs to be integrated as a part of wider risk management portfolio in strategic planning. Failure to do so is likely to impact upon businesses in two manners:

1. where pests and pathogens are able to establish, direct losses in production are likely to occur as tree resources are impacted upon (further there will be the direct costs of control);
2. depending on which pests and pathogens are able to establish, technical barriers to trade are likely to limit our ability to export wood products (additionally as technical barriers are removed there will be the cost of re-establishing markets).

But how do you integrate biosecurity into a wider risk management programme? The establishment of pests and pathogens is in itself merely the final stage of a lengthy process; pests need to be transported to New Zealand in some manner, they then need to successfully establish, and finally they need to find resources upon which they can thrive. The transportation and establishment phases can be thought of as a part of our pre-border and border focus, however once past this line the forest biosecurity management onus falls upon businesses (either collectively or individually). At this level businesses need to plan for regular surveillance of forest resources but also need to plan for and prepare contingency plans.

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to deal with possible incursions. This planning needs to include:

1. Review of internal reporting systems for unusual forest health observations by staff and contractors;
2. Identification of key personnel who are authorised to make potentially critical decisions regarding pest and pathogen response;
3. Models of spread through forest resources of different pests and pathogens;
4. Models of potential direct and indirect economic impact; and
5. Practice of response plans through exercising field and management staff in table-top type scenarios.

Management models are already available in terms of forest biosecurity management. Dr Gordon Hosking has produced an emergency response guide as a part of the Forest Research, Forest Health Group, PGSF output. Another system also exists, one that is being adopted as a standard protocol by New Zealand's emergency management agencies. The New Zealand Coordinated Incident Management System (CIMS) is aimed at the management of emergency situations and has been endorsed by, amongst others, the New Zealand Forest Owners Association. Such models provide an approach to managing risk associated with normal or deliberate biosecurity incursions, but they need to be implemented in a timely fashion and reviewed on a regular basis. Other questions also need to be answered. Does the deliberate release of an economic pest pathogen constitute a terrorist act or is it criminal in nature? If it is defined as terrorist in nature how does this affect business insurance?

Biosecurity in the forest industry: the spectre of deliberate release

While the deliberate release of pests or pathogens to impact upon either individual businesses or the New Zealand forest industry as a whole is unlikely, it is a scenario that needs to be considered industry-wide and factored in to current biosecurity risk management. It does differ from normal biosecurity incursions in that barriers to incursion will have been circumvented, there is generally a specific goal to the act, and that not only is it a biosecurity management problem, but is also a criminal act that will require investigation.

New psyllid pests found on eucalypts near Auckland International Airport

A recent forest health surveillance survey by Vigil has identified two new psyllids on Eucalyptus botryoides near Auckland International Airport. They are the lep-forming species Creis literatus and another free-living psyllid Anoeconeossa communis, often found in association with Creis (and also Cardiaspina) making use of the lerp for shelter and protection.

Creis is a known pest species in Australia where it causes significant damage to commercial plantations of some eucalyptus species including E. dumii, E. grandis, E. ovata, E. saligna, E. botryoides, E. goniocalyx, E. cordata, E. paniculata and E. robusta.

A. Communis is identified as a pest of species such as E. camaldulensis and the red flowering gum, E. leucoxylon. Heavy attack by these species causes leaves to turn red and necrotic, and gives the tree a purplish hue from a distance.

Creis is reportedly at outbreak numbers in northern NSW at present, previous spraying trials with malathion have only been partially successful, and insect numbers rebuild quickly. Heavy infestation can result in severe growth suppression and occasionally, tree death.

The population identified at Auckland International Airport appears to represent the remains of a generation grown up over the last summer on a stand of E. Botryoides, most adults have since dispersed and only a few early instars are present. Surveys have since located the same species on stands up to 2.5 km away in most directions.

The association of the same two species as occurs naturally in Australia, arriving at the same time suggests the likelihood that they arrived together on infected foliage. Even more interesting is the presence amongst the population of each species of a natural wasp predator, also both apparently new to New Zealand and arriving at the same time.

The likelihood of all four species making up this natural association blowing into Auckland Airport simultaneously is well outside the bounds of most statistical probability and almost certainly confirms transport on infected foliage. A recent container sampling trial by MAF found a relatively high percentage of containers with foliage amongst their contents, and up to 30% of this foliage was of Eucalyptus species so it is speculated that this was the method of transportation of the infected material. Trials suggest insects can remain alive for 4-10 days after leaves are pulled from trees, and as the relatively small amount known about the biology of the species indicates a 6 week life cycle it is possible at least 3 generations have occurred since the insect first arrived.

Retaining areas of potential host species around international airports and other gateways actually helps pests such as these establish. In this case the stands of E. botryoides near Auckland International Airport have acted as an entry pathway – the pests would have had far less chance of gaining a foothold here with no potential host species close at hand. The proposed Biosecurity Strategy might consider ways to minimise the presence of significant commercial plant and animal species around this and other potential points of entry for pests.

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