Biosecurity Monitoring Group

Used Vehicles Monitoring Survey September – November 2005 BMG/05-06/10

Biosecurity Monitoring Group

Used Vehicles
Monitoring Survey
September - November 2005
BMG 05-06/10

Authors: Sarah Wedde, Chris Waite, Neil Hyde, Carolyn Whyte

Contents

1 Executive Summary

1.1 Background

Approximately 175,000 used vehicles entered New Zealand in 2004-05, 93% of which arrived through the ports of Auckland, Wellington and Lyttelton. Used vehicles are visually inspected either in New Zealand, or in Japan. Most vehicles arrive on bulk vehicle carriers, while a small percentage, generally from North America, the United Kingdom and Singapore, arrive in sea containers. Used vehicles, while not in themselves a biosecurity risk, can carry a number of biosecurity contaminants, including high risk pest species like *Lymantria dispar* (Asian gypsy moth).

1.2 Survey methods

Between September and December 2005 the Biosecurity Monitoring Group (BMG) of Biosecurity New Zealand surveyed a total of 541 used vehicles at the ports of Auckland, Wellington and Lyttelton. The primary objectives of this survey were to determine the nature and quantity of slippage (entry of used vehicles carrying undetected contamination) and estimate the effectiveness of current biosecurity interventions, including assessing the appropriateness of visual inspection as a clearance technique.

Vehicles were visually inspected both internally and externally after they had been provided with biosecurity clearance for entry into New Zealand. Additionally, air filters were removed and inspected wherever possible. The slippage rates from a concurrent trial using a videoscope to inspect used vehicles were used to estimate the number of vehicles carrying contamination undetectable by visual inspection.

1.3 Effectiveness of the import health standard measures

The measures specified by the current Import Health Standard are adequate for 31% of used vehicles imported (6% that are uncontaminated and 25% that have only visible contamination). The remainder of used vehicles imported either have contaminated air filters and/or are carrying contamination that can not be seen with visual inspection. While the current standard requires vehicles to be clean, the method specified for verifying cleanliness (visual inspection) does not adequately address the range, or 'location' of contaminants present. This translates into an estimated 10,614 vehicles released in November 2005 with contamination present in air filters or in parts of the vehicles not able to be visually inspected.

1.4 Effectiveness of current operations

The current Import Health Standard for used vehicles specifies a 97% efficacy standard for visual inspections. Initial inspections identified 93% of vehicles with contamination and resulted in them being referred them for decontamination. However, the decontamination and re-inspection processes did not find and remove all visible contamination. Surveys of decontaminated vehicles found that 22% were released with some form of visible contamination still present. Overall, current operations were 73% effective at detecting and removing visible biosecurity contaminants from used vehicles. This translates into an estimated 2,531 vehicles cleared for entry into New Zealand in November 2005 while still contaminated with visible contaminants because contamination was not found at the post-decontamination re-inspection.

1.5 Contaminants found

Seeds and other plant material made up the majority of contaminants found during the survey. An estimated 1,064 vehicles were cleared for entry to New Zealand in November 2005 while still carrying one or more viable seeds, 7% of total arriving vehicles in that time period. Much of the plant material was highly desiccated and did not show any signs of viability or disease when inspected under the microscope in the BMG laboratory; only three specimens were sent for fungal identification. As a result, the presence of fungal pathogens cannot be ruled out, particularly as a previous study by the Forest Research Institute (Forest Health Group, 1996) found fungal pathogens on plant material that did not show any visible signs of disease.

1.6 Risk loading and exposure

The risk loading on the used vehicle pathway was estimated to be 187,567 risk units per month. This is much less than the risk loading for the air passenger baggage pathway, at 307,818 risk units (Wedde *et al.*, 2006), but more than the loading on the mail pathway, at 128,387 risk units (Chirnside *et al.*, 2005). However, the monthly risk exposure on the used vehicle pathway was estimated to be 145,883 risk units, which is 2.4 times the monthly risk exposure from passenger air baggage.

A full list of recommendations for each business group is presented in section 2.

2 Recommendations

2.1 Biosecurity Standards Group

Recommendation 1: Other novel methods of treatment and detection must be developed to supplement or replace visual inspection on the used vehicle pathway (page 18).

Recommendation 2: Include measures in the IHS to mitigate the risks associated with air filter contamination (for example replacement or cleaning of air filters) (page 23).

Recommendation 3: Consideration should be given to the use of offshore third party inspection and certification processes, to reduce compliance costs (page 27).

Recommendation 4: Management of the risks posed by used vehicles should be increasingly moved offshore to prevent contaminants arriving in New Zealand (page 17).

2.2 Risk Analysis Group

NOTE: The current risk analysis addresses these recommendations.

Recommendation 5: The risks associated with seed contaminants should be investigated further through scientific analysis of seed viability, invasiveness and the ability of seed to vector pathogens (page 25).

Recommendation 6: That further scientific study of plant material detected on used vehicles be undertaken to assess risk and determine appropriate risk mitigation measures, especially for material that is not visually detectable (page 25).

2.3 Biosecurity Monitoring Group

Recommendation 7: Investigate whether vehicles shipped in containers, particularly classic vehicles (typically shipped from North America) should be subjected to higher-intensity inspections, or additional biosecurity measures (page 21).

Recommendation 8: Investigate whether spider webs and dead arthropods are a reliable indicator of the presence of live arthropods (page 26).

Recommendation 9: The videoscope trial should be extended to used machinery (page 24).

2.4 MAF Quarantine Service

Recommendation 10: The standard of vehicle inspection facilities should be reviewed at the Port of Lyttelton (page 15).

Recommendation 11: Training and workplace assessments of inspection staff should be intensified to ensure inspection efficacy standards are consistently achieved (page 18).

Recommendation 12: Data collected at the initial inspection should be available to inspectors carrying out post-decontamination inspections to enhance the efficiency and effectiveness of the process, and ensure any contamination found at the initial inspection is addressed by the decontamination process (page 19).

Recommendation 13: Data collected on, and reporting systems for, imported used vehicles should be re-evaluated to ensure adequate data are available to manage risk on the pathway (page 19).

2.5 Biosecurity awareness

Recommendation 14: Targeted biosecurity awareness material should be provided to key industry stakeholders, such as LTNZ compliance centres, used vehicle importers and overseas used vehicle processing facilities (page 27).

2.6 Surveillance and response

Recommendation 15: Traps for Asian gypsy moth and other pests likely to establish from the used vehicle pathway should continue to be positioned in areas near high concentrations of used vehicles (page 28).

3 Definitions

Biosecurity	The exclusion, eradication or effective management of risks posed by pests and diseases to the economy, environment and human health.
Biosecurity clearance	A clearance that allows previously non-compliant risk goods to enter New Zealand. These are given under section 26 of the Biosecurity Act 1993.
Biosecurity Monitoring Group (BMG)	The group withing Biosecurity New Zealand that monitors biosecurity risk in entry pathways.
Biosecurity New Zealand	The lead agency in New Zealand's biosecurity system. It is tasked with a "whole of system" leadership role, encompassing economic, environmental, social and cultural outcomes. It also has international trade and animal welfare responsibilities.
Biosecurity Risk Analysis Group	The group within Biosecurity New Zealand is responsible for undertaking risk analyses including risk identification and assessment on imported goods, and for recommending risk mitigation measures. The group also undertakes risk analysis work in support of biosecurity surveillance, incursion response and pest management.
Biosecurity Standards Group	The group within Biosecurity New Zealand that develops import health standards, facility standards, border standards, and other instruments to manage the risks associated with the importation of goods and organisms, including the issuing of permits and approvals for facilities and operators.
Breakbulk vehicle	Imported in bulk within a specialised roll-on, roll-off vehicle carrier vessel (carship). Vessels may carry 2,000+ vehicles.
Containerised vehicle	Imported inside a shipping container, usually individually or in a small consignment of two or three vehicles.
Contaminant	A contaminant as defined by the current IHS: organic soil (no sand, gravel or road splash); fruit; seeds; plant materials; wood fungi; bark; insects and other live organisms (not part of the manifested cargo); animal products; wool; hair; and water;

	which may introduce pests, disease or unwanted species into New Zealand.
Decontamination	Treatment of a risk good to remove biosecurity risk
Efficacy	The proportion of estimated total risk on a pathway that is detected and mitigated by a particular process.
Germination testing	A viability test for seeds; a known number of seeds are planted and the resultant germination rate noted after a set period of time (in the survey 7-10 days).
Import Health Standard (IHS)	The formal document that sets out the conditions of entry for specific risk goods.
IMVDA	Independent Motor Vehicle Dealers Association
LTNZ	Land Transport New Zealand
MAF	Ministry of Agriculture and Forestry
MAF Biosecurity Authority	The agency responsible for New Zealand's biosecurity system between 1999 and July 2004
MAF IDC PEL	MAF Investigation and Diagnostics Centre, Plant and Environment Laboratory; the Biosecurity New Zealand Group that provides scientific identification advice
MAF Quarantine Service (MAF QS)	The branch of MAF that implements biosecurity mitigation and management processes at the border
NZCS	New Zealand Customs Service
Offshore inspected	Inspected prior to shipment in Japan
Onshore inspected	Inspected on arrival in New Zealand, at the port of discharge
Process procedure	Internal MAF QS instructions to facilitate and standardise the delivery of specific processes
Regulated organism	An organism for which phytosanitary actions would be required at the border
Risk	The likelihood of an event occurring and the likely magnitude of the consequences of that event
Risk exposure	The amount of risk (expressed in risk units) that New Zealand is exposed to as a result of slippage

Risk good	Any organism, organic material, substance or other thing that it is reasonable to suspect constitutes, harbours or contains an organism that may cause unwanted harm to natural and physical resources or human health in New Zealand; or that may interfere with the diagnosis, management or treatment, in New Zealand, of pests or unwanted organisms
Risk loading	The amount of risk (expressed in risk units) arriving at New Zealand's borders before any mitigation measures have been taken
Seizure	A risk good that does not immediately, on arrival, comply with an import health standard, and is either treated, destroyed, reshipped or held for further documentation or investigation
Slippage	Risk goods that enter New Zealand that, if detected at the border, would result in biosecurity action being taken.
Survey	An inspection carried out by a BMG surveyor, in accordance with the project terms of reference, survey guidelines, and the draft BMG process procedure on vehicle inspection
Surveyor	A member of the BMG survey team, warranted as an Inspector under the Biosecurity Act 1993, who is responsible for inspecting the vehicles selected for the survey for the presence of contaminants and other risk goods, and recording details of the vehicle and any risks found
Tetrazolium testing	A viability test for seeds; a dilute solution of 2,3,5-triphenyl tetrazoluim chloride will change colour in the presence of hydrogen ions (a by-product of seed respiration)
Transitional facility	A premises that is authorised to undertake particular, specified, biosecurity actions, such as cleaning, unloading or treating risk goods
Used vehicle	Any on or off-road vehicle that has been used overseas prior to importation to New Zealand, including buses, trucks, utilty vehicles, vans, cars and four-wheel drive vehicles, but excluding machinery.

Videoscope	A micro-camera at the tip of a flexible shaft that is used for the detailed examination of semi-enclosed areas
Visual inspection	An un-aided inspection carried out by a MAF QS officer using the naked eye
Volatile compound	A compound that vapourises at room temperature; these can sometimes be considered ‘odours’ or ‘smells’

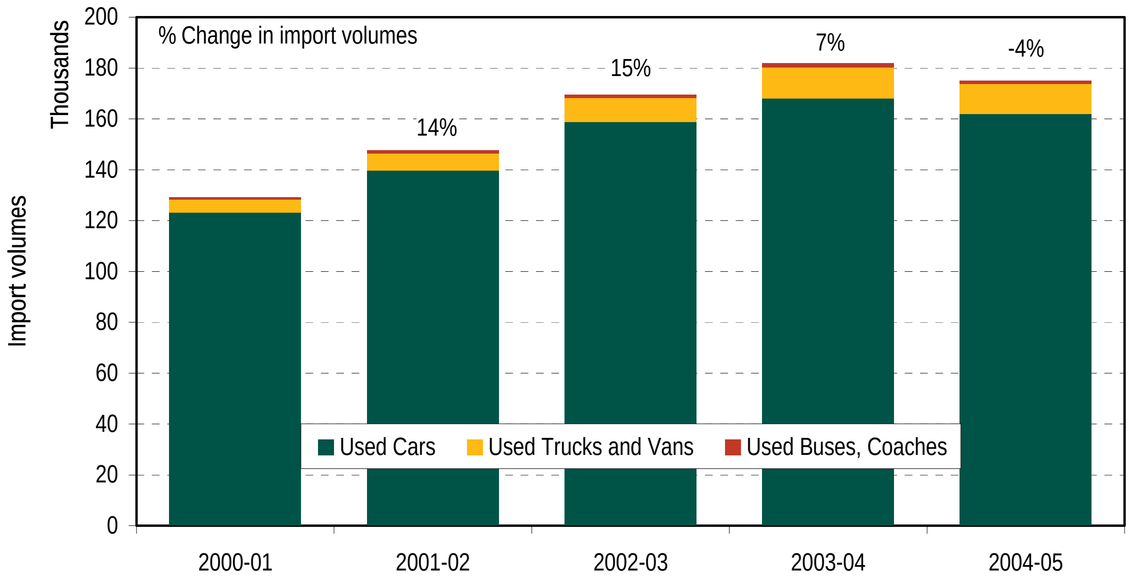
4 Introduction

Imported used vehicles pose a significant biosecurity risk to New Zealand. Used vehicles have been associated with species known to be pests or health problems overseas, including *Latrodectus* spp. (widow and red-back spiders), *Attagenus* spp. (carpet beetles), *Trogoderma* spp. (khapra beetle and relatives), and *Lymantria dispar* (Asian gypsy moth). Additionally, other biosecurity contaminants such as soil, seeds and other plant material are frequently found on imported used vehicles.

Imported used vehicles have, on average, travelled 80,000 km over 8.5 years in foreign ownership prior to being imported into New Zealand (F. Willett, IMVDA, pers. comm.). Many used vehicles are stored outside prior to import, and have been sourced from geographic areas where contamination risks are known to be high. Imported vehicles are distributed widely throughout New Zealand once they are given biosecurity clearance, increasing the dispersal of any residual biosecurity risk they may be carrying.

The quantity of used vehicles imported into New Zealand increased over recent years, but appears to have reached a plateau; in 2004-05 approximately 175,000 used vehicles were imported into New Zealand (Figure 4.1). The majority of these vehicles were imported from Japan (95%), while smaller proportions came from Singapore (2.6%), USA (0.9%), Australia (0.7%).

Figure 4.1. Import volumes of used vehicles imported into New Zealand between 2000-01 and 2004-05[1]



Used vehicles must be free of all contamination before being granted biosecurity clearance to enter New Zealand. Requirements for giving clearance to used vehicles are specified in two import health standards[2]. The standards specify that vehicles may be given clearance if they

[1] New Zealand Customs Motor Vehicle Statistics Reports 2000-2005
[2] Import Health Standard for used buses, cars, motorcycles, trucks, utility vehicles and vans from any country (11 September 2001) and Import Health Standard for treated used vehicles imported into New Zealand (October 2003).

are found free of contamination after a visual inspection. Used vehicles are inspected by MAF Quarantine Officers either in Japan or in New Zealand at an approved transitional facility or the port of discharge. The procedures used by MAF QS to inspect and clear used vehicles are described in MAF Process Procedure 48: Clearance of Used Vehicles, Parts, Tyres and Equipment.

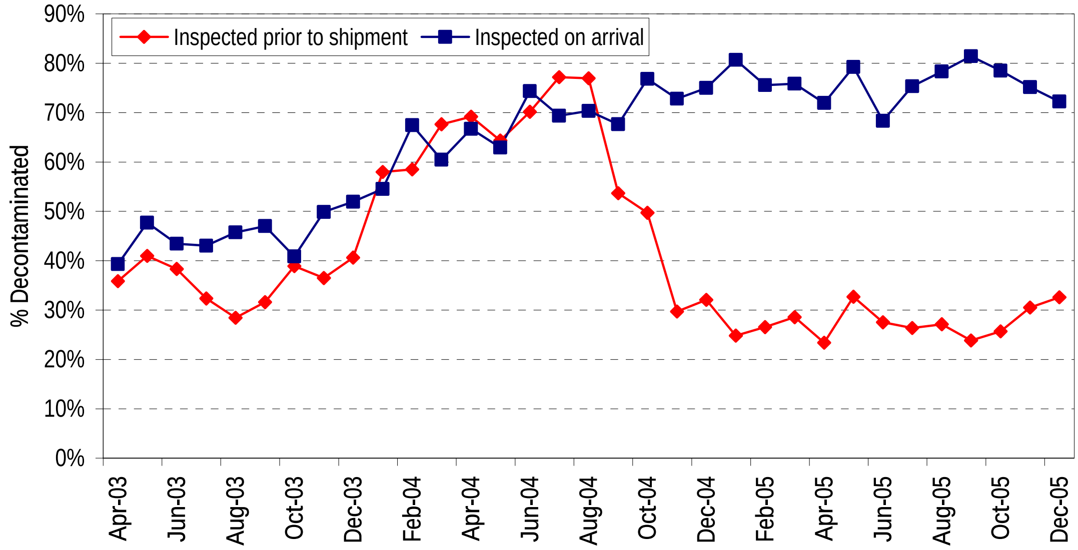
Contamination found during visual inspection is removed through treatment at an approved decontamination facility. The type of treatment used depends on the type and extent of the contaminant(s) found. Vehicles are steam cleaned (water blasted) externally and/or vacuumed internally to remove organic contaminants such as soil and leaves, while fumigation is used to kill live quarantine pests such as arthropods, snails, and certain types of fungi. Once a vehicle has been decontaminated it is re-inspected by MAF QS. Only when the re-inspecting Quarantine Officer is satisfied that the vehicle is free from contamination will it be given biosecurity clearance.

The proportion of used vehicles requiring decontamination has changed substantially over the last five years (Waite, 2005); contamination rates were approximately 30% for vehicles inspected prior to shipment and 40% for vehicles inspected on arrival during the period from 2001 to 2003.

Between April 2003 and March 2004 a series of audits were carried out on the used vehicle pathway (Wedde *et al*., 2004). As a result of these audits, which indicated the efficacy of the vehicle inspection process did not meet the expectations of the existing Import Health Standard, the average inspection time per vehicle was increased and all vehicles found with any biosecurity contaminants were required to be directed for decontamination at an approved treatment facility.

After these changes were implemented there was a substantial increase in both the inspection efficacy and the proportion of vehicles sent for decontamination. Changes in decontamination rates are shown in Figure 4.2.

Figure 4.2. The proportion of used vehicles and machinery requiring decontamination



By August 2004 approximately 75% of imported used vehicles were sent for decontamination. Since this time, the proportion of used vehicles requiring decontamination after being inspected offshore decreased substantially, to 25%. This decrease has been attributed to exporters examining and decontaminating vehicles offshore prior to presentation for MAF QS inspection. This process results in the quicker clearance of vehicles and reduces re-inspection costs. The lower proportion of used vehicles requiring decontamination offshore may also be a result of offshore MAF Quarantine Officers having the discretion to remove small amounts of contaminants at the time of the initial inspection, without requiring additional decontamination. The proportion of vehicles sent for decontamination after inspection onshore in New Zealand has remained at around 70-80%, as exporters reliant on onshore inspections have not implemented any additional pre-inspection cleaning processes.

To assess the effectiveness of the processes used to provide biosecurity clearance for used vehicles a monitoring survey was carried out at the major ports of import: Auckland, Wellington and Christchurch. Additionally, over the 2005 calendar year the BMG undertook a project in Auckland using a videoscope, which allowed detection of contaminants not able to be seen during a standard visual inspection (Mathew *et al*., 2006). The videoscope trial found that 51% of the vehicles and machinery inspected with a videoscope had non visible contaminants. These contaminants were mostly plant material and soil or clay; however, there were also nineteen vehicles contaminated with live arthropods or egg masses, and one vehicle carrying a live lizard. The results of the videoscope study provided an estimation of the efficacy of visual inspection, and were used in the analysis of the monitoring survey results.

5 Objectives

The objectives of the survey were to:

- Estimate the effectiveness of biosecurity clearance of used vehicles, including initial inspection and the decontamination and re-inspection process, for offshore, onshore and containerised vehicle inspections;
- Evaluate the effectiveness of visual inspection as a risk mitigation method for used vehicle clearance;
- Estimate the nature and quantity of slippage associated with used vehicles;
- Quantify the level of risk exposure on the used vehicle pathway.

6 Methods

6.1 Survey process

Vehicles that had passed MAF QS inspection and had been cleared for entry to New Zealand were surveyed by BMG surveyors. Vehicles arrived as breakbulk or containerised cargo. Breakbulk vehicles may be inspected and cleared either prior to shipment or on arrival in New Zealand, while containerised vehicles are all inspected and cleared on arrival. Proximity cleared vehicles (those that had been cleared prior to shipment but loaded close to un-inspected vehicles, and as a result required a further external inspection) were treated as onshore inspections. All three groups of vehicles (offshore, onshore breakbulk and containerised) were surveyed, with all vehicles randomly selected.

Vehicles inspected offshore were surveyed at the port shortly after unloading from the vessel. Approximately 40 vehicles were surveyed from each vessel; these were randomly selected and placed aside by port stevedores for surveying.

Onshore inspected vehicles are either provided with biosecurity clearance and released from initial inspection on the wharf, or sent for decontamination at a transitional facility, and then cleared after re-inspection. If given biosecurity clearance after the initial wharf inspection, vehicles were surveyed at the port. More frequently, onshore vehicles were surveyed at the decontamination facility after they had been given biosecurity clearance, as most onshore inspected vehicles failed the initial wharf inspection. In Auckland, where multiple facilities were used for decontaminating vehicles, facility choice was made depending on vehicle availability and whether the facility had already been surveyed. If sufficient time allowed then all available vehicles at the facility were surveyed, otherwise a random sample was taken.

Containerised vehicles proved very difficult to sample, and only a small number were surveyed in Auckland at the end of the survey period.

All selected cleared vehicles (onshore, offshore and containerised) were inspected by one or two surveyors. Vehicles were visually inspected externally for around 4 minutes[3] and internally for 20 minutes. The external inspection included visual inspection of the underside of the vehicle using a ramp or pit and a torch. The internal inspection included the removal and inspection of the vehicles air filter (if accessible and removable), as well as inspection of the engine bay, the interior cabin and the boot. Any contamination found was recorded and treated appropriately.

Live organisms, intact dead organisms and any substantial clumps of soil were sent to the MAF Investigation and Diagnostics Centre Plant and Environment Laboratory (MAF IDC PEL) for analysis and identification of any organisms found.

[3] Four minutes of surveying was taken to mean 2 minutes of surveying by two surveyors, or 4 minutes of surveying by one surveyor.

Plant material was inspected in the BMG laboratory under a dissection microscope for signs of viability or fungal disease. Specimens were sent to the MAF IDC PEL laboratory if thought to be viable or showed signs of infection.

Wherever possible, a sample of seed contaminants found was collected by the surveyors. Samples were sent to AgriQuality Ltd for identification and germination testing. If no germination occurred after 7-10 days but the seed remained in good condition, tetrazolium testing was carried out to assess viability. In some cases it was not possible to collect samples for testing. Untested seed contaminants were assumed to have a similar viability as tested seed in the analyses.

Information recorded included the vessel, voyage, clearance type, vehicle type, vehicle identification number, decontamination history and details of any contamination found during the survey.

The results of the videoscope survey were used to estimate the number of vehicles with contamination unable to be seen with the unaided eye. The videoscope trial included some machinery, while the used vehicle survey deliberately excluded machinery. As a result, videoscope inspections of machinery were excluded from analysis for this report. Additionally, the videoscope trial occurred over a wider time period (March – December 2005). However, there were no significant trends in the videoscope trial data over time, so videoscope trial results can be applied to the shorter November time period of the used vehicle survey with reasonable confidence.

Details of the statistical analysis carried out can be found in Appendix I, and the models used to calculate slippage rates and efficacy are given in Appendices II and III.

7 Results and discussion

7.1 General summary statistics

Some vehicles were unable to be surveyed both internally and externally due to logistics and delivery timetables (Table 7.1). There was an interaction between internal and external contamination; vehicles with one type of contamination (either internal or external) were more likely to be found with the other type of contamination as well. As a result, only vehicles that had been surveyed both internally and externally were used to calculate process efficacy and risk exposure.

Table 7.1. Numbers of vehicles with internal surveys, external surveys and with both

	Internal only		External only		Both internal and external	
Port	Number surveyed	%	Number surveyed	%	Number surveyed	%
Auckland	30	10%	20	6%	259	84%
Wellington	438	67%	7	1%	205	32%
Lyttelton	161	44%	125	34%	77	21%
Total	629	48%	152	11%	541	41%

Only a very small sample of containerised vehicles was surveyed (Table 7.2). The sample sizes for offshore inspected vehicles were greater than those for onshore inspected vehicles.

Table 7.2. Sample sizes for the air filter, videoscope and visible contaminant surveys

Inspection type	Accessible air filter	Internal and external	Videoscope*
Containerised	8	14	34
Onshore	182	208	258**
Offshore	430	319	

*Machinery was excluded from the videoscope results.
**Onshore and offshore results were pooled; 24 offshore and 234 onshore vehicles were surveyed with the videoscope.

15,406 used vehicles were imported into New Zealand in November 2005. Of these, 10,198 arrived as offshore inspected breakbulk, 4,656 arrived as onshore inspected breakbulk and 552 arrived as onshore inspected containerised cargo (Table 7.3).

Vehicles inspected offshore were more likely to pass the initial inspection than vehicles inspected onshore; 10% of onshore inspected breakbulk vehicles passed the initial biosecurity inspection, compared with 30% of vehicles inspected offshore. 36% of containerised vehicles passed the initial inspection.

Table 7.3. Numbers of vehicles cleared and decontaminated, by port in November 2005

		Auckland	Wellington	Lyttelton	Other	Total
Vehicles arriving	Onshore	2 572	684	955	445	4 656
	Containerised	N/A	N/A	N/A	N/A	552
	Offshore	6 595	919	1 985	699	10 198
Rejected at inspection	Onshore	2 422	610	776	369	4 177
	Containerised	N/A	N/A	N/A	N/A	352
	Offshore*	4 282	743	1 477	643	7 144

* The number of vehicles rejected offshore is estimated from the treatments recorded on partial manifests.

7.2 Slippage rates

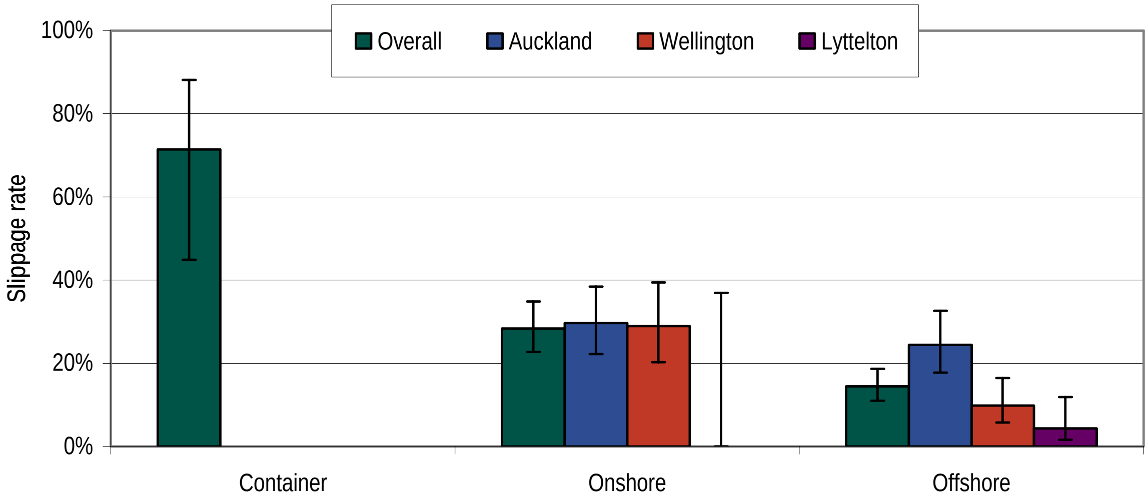
There were significant differences in slippage rates of visible contaminants between the different vehicle groups (Figure 7.1). Slippage rates were calculated as the number of contaminated vehicles in the survey sample, divided by the total number of vehicles in the survey sample. For more information on slippage rates and modelling, see Appendix I.

Slippage rates for vehicles inspected offshore were significantly different between ports; there were no differences between ports in slippage rates for onshore inspected vehicles.

While there was a significant difference in the slippage rate for onshore and offshore inspected vehicles in Wellington, there were no differences at Auckland or Lyttelton. As the majority of vehicles arrive into Auckland the results for Auckland strongly influence the overall slippage rates, leading to there being no difference in overall slippage rates between onshore and offshore vehicles.

Containerised vehicles had the highest slippage rate, but also the greatest margin of error (due to the small sample size; only 14 containerised vehicles were surveyed). Details of the contaminants found are recorded in Appendices IV and V.

Figure 7.1. Slippage rates for visible contaminants



Both MAF QS rejection rates and survey slippage rates were lower in Lyttelton than at other ports (Table 7.4). Given the source of vehicles is the same for Lyttelton and other ports, we would not expect a significantly lower contamination level. Therefore, the differences in slippage rate may be because the inspection conditions at Lyttelton prevented both Quarantine Officers and surveyors from detecting contamination. Surveyors noted that the inspection facilities at Lyttelton are located next to the port's coal discharge facilities, and coal dust and residue in the inspection pit made inspection of used vehicles difficult for both MAF QS officers and BMG surveyors, particularly in the rain.

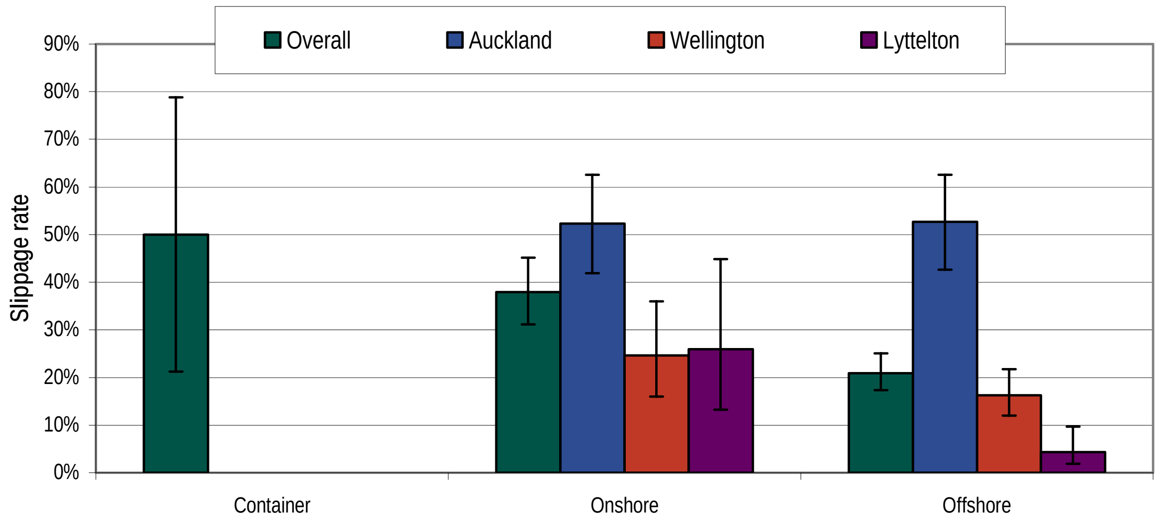
Table 7.4. Slippage rates for visible contaminants, by port

	Auckland		Wellington		Lyttelton		Overall	
	Slippage rate	95% confidence interval	Slippage rate	95% confidence interval	Slippage rate	95% confidence interval	Slippage rate	95% confidence interval
Containerised	71%	45%-88%					71%	45%-88%
Onshore	30%	22%-38%	29%	20%-39%	0%	0%-37%	23%	20%-32%
Offshore	24%	18%-33%	10%	6%-16%	4%	2%-12%	19%	16%-23%

Recommendation: The standard of vehicle inspection facilities should be reviewed at the Port of Lyttelton.

There were also significant differences in air filter contamination among vehicle groups (Figure 7.2). The slippage rate for air filter contamination was highest for containerised vehicles. The slippage rates for Auckland were higher than those for Wellington or Lyttelton.

Figure 7.2. Slippage rates for air filter contamination



The differences in slippage rates by port and vehicle group mean that the overall results can not be pooled and applied to the entire pathway; results for further analyses are calculated by port and vehicle group, and weighted by the proportion of vehicles in that part of the pathway.

8 Efficacy of the current system

Two Import Health Standards that control the entry of used vehicles into New Zealand.

8.1 Import Health Standard for Used Vehicles

The standard under which all used vehicles are currently imported is the Import Health Standard for Used Buses, Cars, Motor Cycles, Trucks, Utility Vehicles and Vans from Any Country. This standard requires visual inspection for contamination either offshore before shipment or onshore in New Zealand. If contamination is found, the vehicle is moved to an approved facility for decontamination. After decontamination the vehicle is re-inspected to confirm compliance. The standard does not require the removal of vehicle parts (including air filters) to inspect for contamination, with the exception of easily removed hubcaps.

This standard and the risk analysis that underpins it are being reviewed by the Biosecurity Standards and Biosecurity Risk Analysis groups. The effectiveness of the provisions in this standard is considered in section 8.3.

8.2 Import Health Standard for Treated Used Vehicles

This standard allows heat treatment as a means of dealing with the risks associated with arthropods, but, while current, no vehicles have ever been imported under this standard. Because the treatment pertains only to arthropods, inspection and decontamination for other contaminants such as soil, animal products and seeds, is still required.

The Biosecurity Standards Group is currently reviewing this standard, which was developed as a result of a request to the then MAF Biosecurity Authority in October 2003.

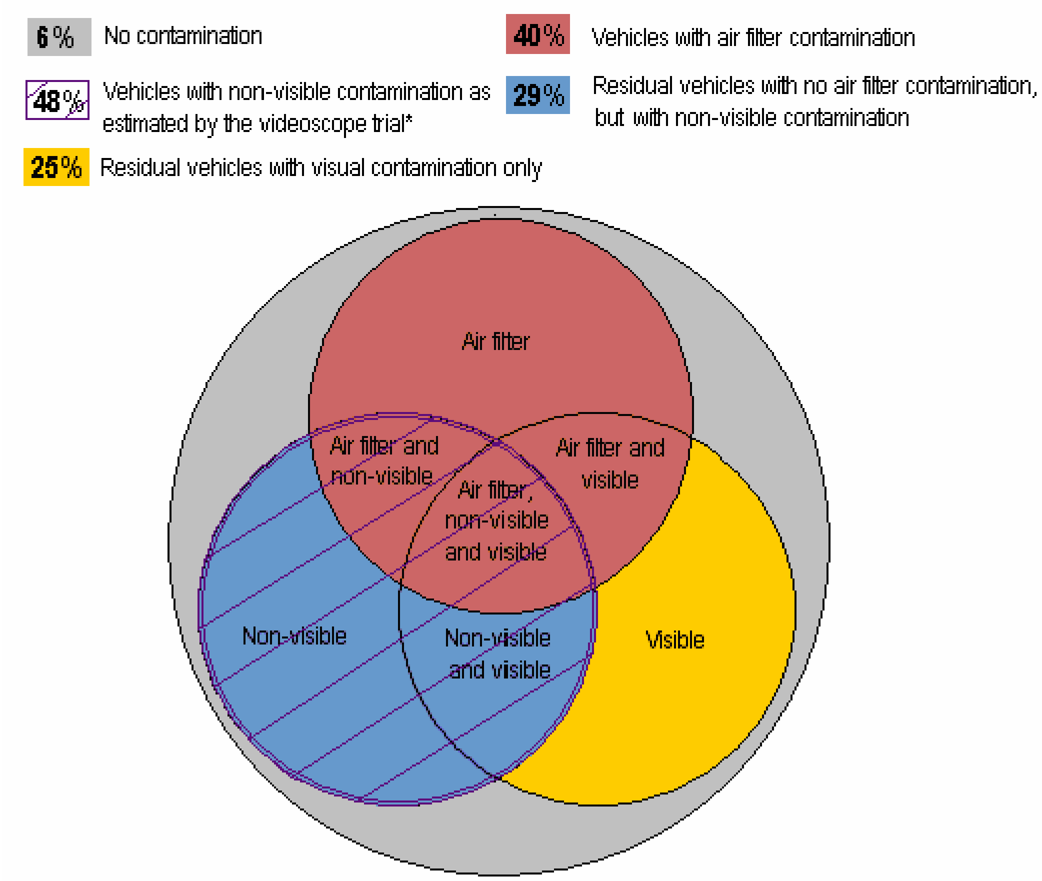
8.3 Effectiveness of the standard

Almost all used vehicles presented for MAF inspection carry some form of contamination; it is estimated that only 6% of used vehicles are free of contamination when presented for inspection (Figure 8.1). Because 34% of vehicles are cleared on arrival in New Zealand, and only a small proportion (3%) of these have no contamination when presented for inspection, a lot of contamination currently arrives onshore.

Recommendation: Management of the risks posed by used vehicles should be increasingly moved offshore to prevent contaminants arriving in New Zealand.

Of the 15,406 used vehicles imported in November 2005, an estimated 14,428 were contaminated when presented to MAF QS for inspection. 69% of total imports, an estimated 10,614 vehicles, had contamination that couldn't be detected with current inspection methods, either in the air filter or in areas not able to be visually inspected. This means that only 3,814 vehicles (25% of total imports) had biosecurity risks of a nature that was entirely detectable under the provisions of the current standards.

Figure 8.1. Estimated vehicle contamination on the used vehicle pathway



An estimated 6,197 vehicles had contaminated air filters (40%). The current standard does not require the inspection of vehicle components that need tools for disassembly. This has been taken to include air filters as some filters are not easily removed without tools.
The videoscope trial estimated that 48% of used vehicles (excluding machinery) carry contamination only visible with the videoscope. The survey estimated that 40% of vehicles have contaminated air filters. Because the two surveys were carried out independently, the proportion of vehicles with both contaminated air filters and non visible contamination was estimated as 40% x 48%, or 19%. Therefore, 29% of vehicles arriving were estimated to have non visible contamination, but no air filter contamination. Figure 8.1 shows the sources of slippage on the pathway.

These results indicate that even if inspections as required by the standard are performed with maximum effectiveness they are unable to detect all contamination present on used vehicles.

Recommendation: Other novel methods of treatment and detection must be developed to supplement or replace visual inspection on the used vehicle pathway.

8.4 Efficacy of inspections

The used vehicle IHS requires that an inspection efficacy level of 97% is achieved. Current visual inspection results in the detection and resultant decontamination of 73% of the used vehicles with visible biosecurity contaminants (Table 8.1). This is comparable to audits of the used vehicle pathway by MAF Biosecurity Authority in 2003-04 that found the efficacy of visual inspections to be between 54% and 98% (Wedde *et al.*, 2004).

Table 8.1. Efficacy and 95% confidence intervals for current inspections

	Efficacy	95% confidence interval
Initial inspection	93%	(92-94%)
Re-inspection after decontamination	78%	(73-81%)
Total process efficacy*	73%	(68-76%)

*Efficacy is the percentage of total contaminated vehicles that were detected and successfully decontaminated

Initial visual inspections are more effective than visual inspections after decontamination. Of the 11,673 vehicles directed for decontamination by MAF QS in November 2005, an estimated 2,531 vehicles (22%) were given clearance while still contaminated with visible contaminants because contamination was not found at the post-decontamination re-inspection. Initial inspections detected 93% of vehicles with visible contaminants, while re-inspections after decontamination only detected 78% of such vehicles.

The lower effectiveness of post-decontamination inspections may be due in part to poor communication of the location of contamination. Initial and decontamination inspections are usually undertaken by different staff. Information on the type and location of contaminants found at the initial inspection is not readily available for MAF QS staff carrying out inspections after decontamination. New methods of ensuring MAF QS staff have contaminant information available when carrying out post-decontamination inspections are being trialled as part of the MAF Sentry VEC (Vehicles, Equipment and Craft) project.

Recommendation: Training and workplace assessments of inspection staff should be intensified to ensure inspection efficacy standards are consistently achieved.

Recommendation: Data collected at the initial inspection should be available to inspectors carrying out post-decontamination inspections to enhance the efficiency and effectiveness of the process, and ensure any contamination found at the initial inspection is addressed by the decontamination process.

Recommendation: Data collected on, and reporting systems for, imported used vehicles should be re-evaluated to ensure adequate data are available to manage risk on the pathway.

9 Onshore and offshore breakbulk vehicles

There were no differences in contamination rates between onshore and offshore inspected breakbulk vehicles. Similarly, there were no differences in the effectiveness of the IHS, or in the efficacy of visual inspections (Table 9.1). See Appendix II and III for models of how these figures have been generated.

Table 9.1. Comparison of onshore and offshore pathway and inspection efficacy

	Standard efficacy	Inspection efficacy
Onshore	29% (25%-33%)	75% (65%-78%)
Offshore	26% (23%-30%)	75% (70%-79%)

10 Containerised vehicles

Only a small sample of containerised vehicles were inspected during the survey; 14 containerised vehicles were inspected for visible contamination, and 8 containerised vehicles had air filters inspected. The videoscope trial also inspected containerised vehicles, with 34 containerised vehicles inspected for non visible contamination.

Despite these small sample sizes, the slippage and videoscope surveys found significant differences between containerised and breakbulk vehicles in the effectiveness of both the IHS and current operations.

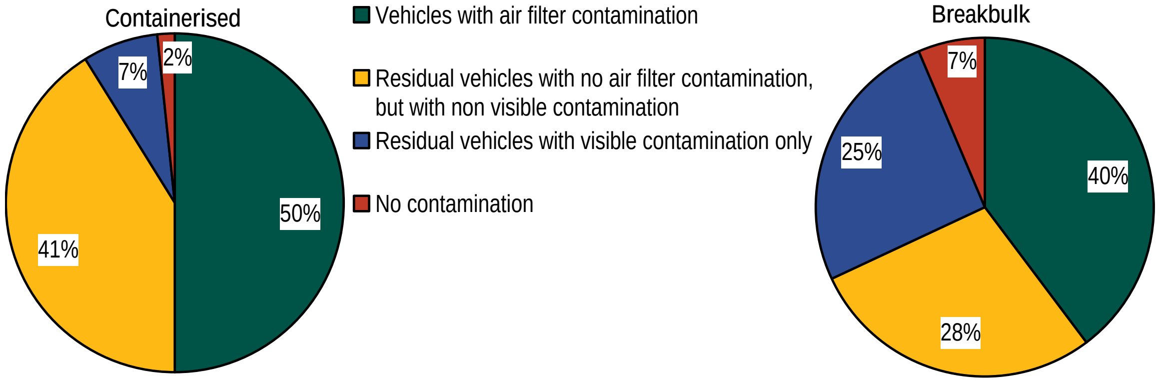
The efficacy of the measures specified in the current standard was poor on containerised vehicles, compared with breakbulk imported vehicles (both onshore and offshore inspected). The efficacy of current measures was only 7% for containerised vehicles, compared with 27% for breakbulk vehicles (Table 10.1).

Table 10.1. Efficacy of the measures in the current IHS

	Efficacy	95% confidence interval
Containerised	7%	(3 - 15%)
Breakbulk	27%	(25 - 30%)

A greater proportion of containerised vehicles than breakbulk arrived with air filter and non visible contaminants that were unable to be detected using visual inspection as specified in the current IHS (Figure 10.1).

Figure 10.1. Proportion of vehicles with contamination



Visual inspection processes were also significantly less effective at detecting visible contamination on containerised vehicles compared with vehicles imported as breakbulk. Current operations were only 20% effective for containerised vehicles, yet were 75% effective for breakbulk vehicles (Table 10.2).

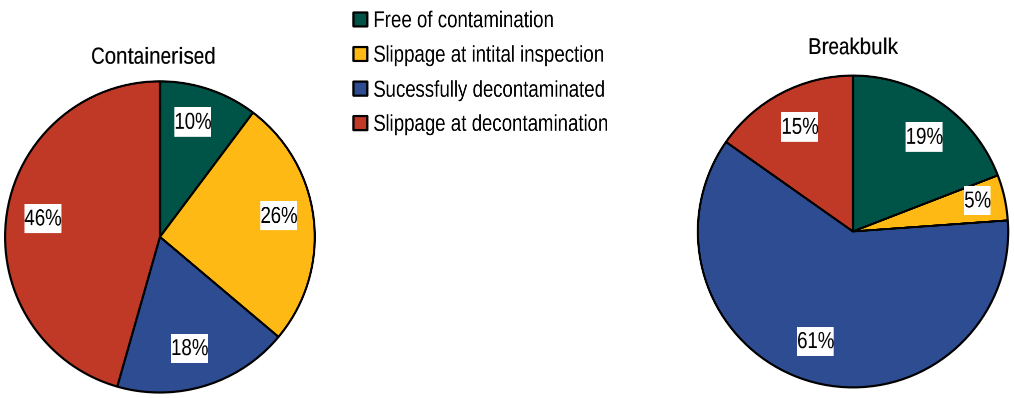
Table 10.2. Efficacy of current inspection processes

	Efficacy	95% confidence interval
Containerised	20%	(8-40%)
Breakbulk	75%	(70-78%)

Most of the slippage comes from failure to detect residual visible contamination after the vehicles has undergone the decontamination process (Figure 10.2). 26% of all containerised vehicle imports are released from the initial inspection with visible contamination still present. Another 46% of all containerised vehicles are released after the decontamination process but have visible contaminants still present. Only 10% of containerised vehicle imports do not have any visible contamination on them when they are presented for MAF QS inspection (a sizeable proportion of these will have non visible and air filter contamination that can not be detected with visual inspection).

The inspection process after decontamination appeared to be particularly ineffective for containerised vehicles; 71% of containerised vehicles sent for decontamination were released with some visible contaminants still present, compared with only 20% of breakbulk vehicles.

Figure 10.2. Inspection efficacy (for visible contaminants) for containerised and breakbulk vehicles



The lower efficacy of interventions for containerised vehicles may be due to the amount of contamination present on these vehicles. Many of the surveyed vehicles had more than one instance of contamination. Table 10.3 shows the number of instances of contamination detected during the survey; this includes air filter contamination, but excludes vehicles with non visual contamination as these vehicles were surveyed as part of the videoscope survey, not the slippage survey.

Table 10.3. Instances of contamination on vehicles

Instances of contamination	Number of containerised vehicles	%	Number of breakbulk vehicles	%
0	3	21%	345	65%
1	3	21%	105	20%
2	2	14%	55	10%
3	2	14%	17	3%
4	1	7%	3	1%
5	1	7%	2	0%
6	1	7%	0	0%
8	1	7%	0	0%

Survey inspections showed containerised vehicles were more heavily contaminated than breakbulk vehicles; 43% of containerised vehicles had 3 or more instances of contamination, while only 6% of onshore and 3% of offshore breakbulk vehicles had 3 or more instances of contamination. One containerised vehicle had 8 instances of contamination, and another had 6 instances. Both of these heavily contaminated vehicles came from the United States of America (USA), supporting anecdotal evidence that used vehicles (particularly classic vehicles) arriving in containers from the USA tend to be heavily contaminated. While only a very small part of the used vehicle pathway, these vehicles pose higher than average risk, and may require additional risk management measures to deal with the greater level of contamination.

Recommendation: Investigate whether vehicles shipped in containers, particularly classic vehicles (typically shipped from North America) should be subjected to higher-intensity inspections, or additional biosecurity measures.

11 Contaminants

11.1 Visible contaminants

Around 20% of breakbulk and 71% of containerised vehicles were found with contamination that the visual inspection process should have detected. This contamination was predominantly plant material and seeds, but also included some instances of live insects, spider egg masses, soil and feathers. Table 11.1 shows the estimated monthly numbers (based on November 2005 figures) of vehicles with visible contaminant slippage (excluding air filter contamination). When scaled, an estimated 3,367 used vehicles enter New Zealand each month with contamination that should have been detected during visual inspection, some with multiple contaminants.

Table 11.1. Estimated monthly numbers of vehicles with visible contaminant slippage for November 2005

Contaminant	Estimated number of vehicles	95% Confidence interval
Plant material	2181	(1977 - 2840)
Seeds	873	(205 - 1471)
Soil	480	(494 - 1049)
Live insects and spiders	591	(579 - 1166)
Animal material	181*	(251 - 734)

Note: As vehicles may have more than one visible contaminant the numbers in this table are not additive.
"Live insects and spiders" includes all life stages, including egg masses.
*While the point estimate (181) is based on the binomial distribution, when sample sizes are small the mean of the beta distribution deviates from the point estimate, particularly when '0' counts are recorded in some categories

11.2 Location of visible contaminants

Plant material and seed contamination was generally located in the engine bay, the vehicles interior cabin and on the chassis or under the wheel arches (Table 11.2). Soil contamination was predominantly found under the vehicle on the chassis or in the wheel arches. Live organisms were found in protected areas of the vehicle like underneath the vehicle, in the wheel arches and inside the vehicles cabin. Similarly, animal material was generally found under the vehicle and inside the cabin.

Table 11.2. Estimated numbers of vehicles with visible contaminants by location, during November 2005

	Windshield or windscreen wiper	Cabin	Engine bay or bonnet	Door	Chassis or wheel arch
Initial inspection					
Animal material	0	45	0	0	14
Plant material	19	155	250	85	149
Soil	0	0	17	3	124
Seeds	0	76	108	0	70
Live animals	0	42	33	2	123
After decontamination					
Animal material	0	97	0	0	25
Plant material	70	462	814	349	453
Soil	0	0	40	13	322
Seeds	0	171	288	0	192
Live animals	0	142	62	23	277
Total					
Animal material	0	142	0	0	39
Plant material	89	617	1064	434	602
Soil	0	0	57	16	446
Seeds	0	246	396	0	262
Live animals	0	183	95	24	400

NOTE: Numbers in the table are not additive as some vehicles may have more than one contaminant type, or the same contaminant in multiple locations

11.3 Low frequency contaminants

The detection of low-frequency contaminants is restricted by sample size. Based on this survey, with 541 vehicles surveyed, there is a 95% chance of detecting visible contamination affecting 1 in 182 of used vehicles. If a contaminant occurs less frequently than this in the general population then the survey is increasingly unlikely to detect it. Very large samples are required for 95% confidence in detecting a contaminant that occurs at a very low frequency; for example to detect a contaminant occurring once in every 5,000 vehicles, a sample size of approximately 15,000 vehicles would have to be surveyed.

11.4 Air filters

The slippage survey found that 40% of imported used vehicles had contaminated air filters. The current IHS does not require the inspection of air filters. During the survey accessible air filters were examined for contamination. Just over half of the vehicles surveyed had accessible air filters.

The survey found 163 vehicles with contaminated air filters (some vehicles had more than one instance of air filter contamination). Most contaminated air filters contained seeds and plant material, with small numbers of filters contaminated with live arthropods (mostly spiders), animal products (feathers) and soil also found (Table 11.3). The presence of two live arthropods in air filters is of particular biosecurity concern.

Table 11.3. Estimated number of vehicles with air filter slippage, by contaminant type, during November 2005

	Estimated vehicles with contamination	95% Confidence interval
Seeds	5 053	(4 521 – 5 765)
Plant material	1 862	(1 601 – 2 511)
Live animals	380	(372 - 900)
Animal material	294*	(298 - 811)
Soil	33*	(125 - 457)

Note: As vehicles may have more than one type of air filter contaminant the numbers in this table are not additive.
*While the point estimates are based on the binomial distribution, when sample sizes are small the mean of the beta distribution deviates from the point estimate, particularly when '0' counts are recorded in some categories

Recommendation: Include measures in the IHS to mitigate the risks associated with air filter contamination (for example, replacement or cleaning of air filters)**.**

11.5 Non visible contaminants

Data to assess non visible contamination of used vehicles was taken from the videoscope trial (Mathew *et al*., 2006). During this trial small numbers of live insects, spiders, and egg masses were found, but the majority of finds were of dried plant material and soil (Table 11.4).

Table 11.4. Estimated monthly numbers of vehicles with non visible contaminant slippage

Contaminant	Estimated number	95% confidence interval
Plant material	6 081	(5 384 – 6 802)
Soil	1 562	(1 211 – 2 093)
Live organisms*	945	(692 – 1 387)
Seeds	839	(601 – 1 273)
Animal material	230	(141 - 534)

* "Live organisms" includes all life stages, including egg masses

In addition to used vehicles, 8 pieces of machinery were surveyed with the videoscope. Anecdotal evidence suggests that machinery is usually more heavily contaminated than road vehicles. To fully assess the risks associated with non visible contamination a separate videoscope study of should be undertaken.

Recommendation: The videoscope trial should be extended to used machinery.

11.6 Seed contaminants

Seeds were one of the main contaminants associated with used vehicles and were found in air filters, with the videoscope, and during normal inspection processes. Where possible, seeds found were sent for identification and germination testing, to determine species and viability and enable subsequent risk analysis.

Only some seed contaminants were sent for testing as many of the seeds found were unable to be collected. The percentage of tested samples with one or more viable seeds was determined; this percentage was then applied to the untested seed contaminants to estimate the overall seed viability. It was assumed that the untested seeds had a similar level of viability to tested seeds.

5,995 vehicles contaminated with seeds were estimated to have entered New Zealand during November 2005. Of these, 1,064 (18%) were estimated to have arrived carrying one or more viable seeds (Table 11.5).

Table 11.5. Estimated numbers of vehicles with at least one instance of seed contamination

Vehicles with:	Any seed contamination		Viable seed contamination	
Slippage from the air filter*	5 053	(4 519-5 762)	637	(575-1 203)
Slippage unable to be found visually**	564	(491-726)	209	(183-380)
Slippage able to be found visually	378	(427-824)	218	***(262-701)

* These vehicles may also have instances of slippage unable to be found visually and/or slippage able to be found visually
** These vehicles may also have instances of slippage able to be found visually
***While the point estimate (218) is based on the binomial distribution, when sample sizes are small the mean of the beta distribution deviates from the point estimate, particularly when '0' counts are recorded in some categories.

Seed viability varied slightly depending on where in the vehicle the seed was found. 13% of vehicles with seed contamination found in the air filters were carrying one or more viable seeds (637 vehicles out of 5,053 estimated to have seed contamination). It is thought that the airflow through the filters, and the length of time that seed may be trapped in the filters, results in substantial desiccation and subsequent mortality. By comparison, 45% of vehicles with seed contamination found elsewhere on the vehicle were carrying one or more viable seeds (427out of an estimated 942 vehicles with seed contamination).

The species of seed contaminants was not able to be determined in all cases. Further research is required to determine the level of risk posed by seed contamination of air filters and other areas of used vehicles[4].

Recommendation: The risks associated with seed contaminants should be investigated further through scientific analysis of seed viability, invasiveness and the ability of seed to vector pathogens.

11.7 Plant material contaminants

Plant material was the most frequently found contaminant in both the visual survey and in the videoscope trial, and the second most frequently found contaminant in air filters. A study of plant material contamination of used vehicles was conducted by the Forest Research Institute in 1996 (Forest Health Group, 1996). While this study found substantial amounts of potentially pathogenic fungi on plant material intercepted off used vehicles, it did not consider the wider effects, such as the introduction of invasive weed species through vegetative reproduction, non-forestry fungal introductions and plant health effects on crops other than forestry products.

Only three samples of plant material found during the survey showed evidence of fungi and were sent to the laboratory for fungal culturing. Of these, two identifications were inconclusive and one was identified as the non-regulated, ubiquitous fungus *Cladosporium cladosporioides.*

The degree of biosecurity risk assigned to dried plant material will have substantial resource implications. Dried plant material made up the majority of slippage found on used vehicles, both during the visual inspection survey and during the videoscope trial. The current standard requires this material to be removed. Managing this slippage could potentially require large investment of resources; therefore, it would be prudent to further evaluate the risks associated with plant material to ensure risk mitigation measures are cost effective[5].

Recommendation: That further scientific study of plant material detected on used vehicles be undertaken to assess risk and determine appropriate risk mitigation measures, especially for material that is not visually detectable.

11.8 Spider webs and dead organisms

The videoscope trial found a number of instances of spider webs in vehicles where no spiders were seen. Spider webs are not a biosecurity contaminant in themselves; however, there are

[4] Note that the risk analysis for used vehicles, currently being prepared, addresses the risk associated with seeds found on used vehicles

[5] Note that the risk analysis for used vehicles, currently being prepared, addresses the risk associated with plant material found on used vehicles.

concerns that the scope was relatively slow and that motile contaminants (e.g. live arthropods) could have easily evaded detection. If this is the case, the spider web contamination may indicate a greater presence of live spiders than was actually seen. In addition, twenty-two vehicles in the visual inspection survey were also found with spider webs. The possibility of spider webs indicating the presence of unseen spiders should be investigated further.

There were 58 vehicles contaminated with dead insects and spiders found with visual inspection during the survey. Again, while not a biosecurity contaminant, dead arthropods may act as a vector for pathogens, as well as potentially being an indicator of live arthropods. The association between the presence of dead and live arthropods in vehicles should be investigated further.

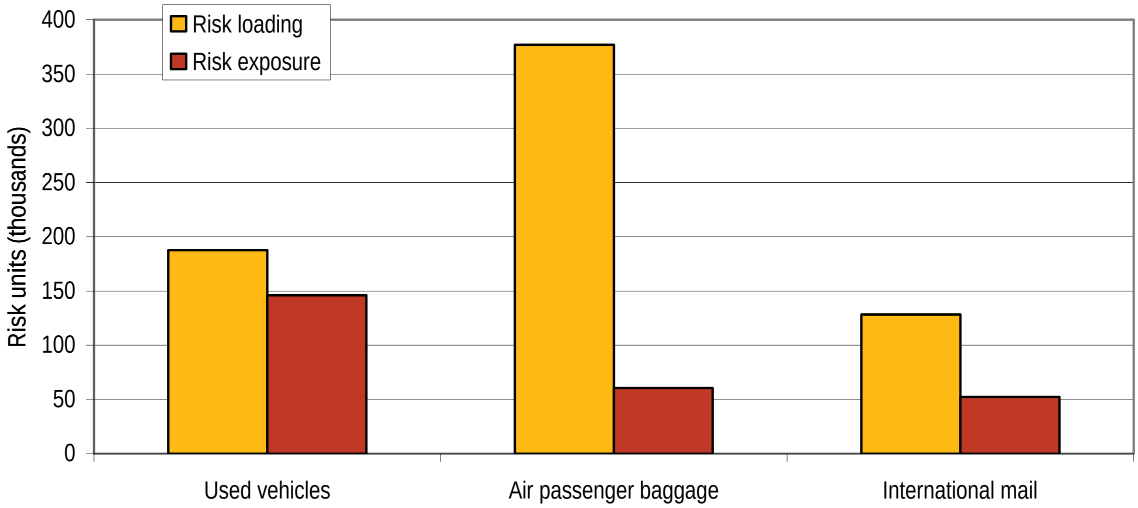
Recommendation: Investigate whether spider webs and dead arthropods are a reliable indicator of the presence of live arthropods.

12 Risk loading and exposure

Risk loading is the total risk arriving at the border[6], including risk mitigated by current biosecurity processes, expressed in risk units. For an explanation of risk units, see Appendix VII. The risk loading on the used vehicle pathway was estimated at 187,567 risk units in November 2005. This is less than the risk loading from air passenger pathway (Wedde *et al.*, 2005; Song *et al.*, 2005; Chirnside *et al.*, 2005b), but greater than risk loading in international mail pathway (Chirnside *et al.*, 2005a) (Figure 12.1).

Risk exposure is the measure of how much residual biosecurity risk is entering New Zealand after all biosecurity processes have been completed, and is expressed in risk units. The risk exposure on the used vehicle pathway is estimated at 145,883 risk units (Figure 12.1). This is 2.4 times the monthly risk exposure from the air passenger pathway (60,692 risk units), and 2.8 times the monthly risk exposure from the international mail pathway (52,286 risk units). The risk exposure from the used vehicles pathway is the highest measured in any survey undertaken by the Biosecurity Monitoring Group.

Figure 12.1. Comparison of risk loading and risk exposure among pathways



[6] In the case of offshore inspected vehicles, risk loading is the total risk posed by vehicles presented for MAF clearance in Japan.

13 Cost effectiveness

There are very significant biosecurity system costs in the way risks are currently managed in this pathway. This is mainly attributable to the inspection processes used. The majority of vehicles are submitted for MAF inspections without any attempt by the submitter to determine if they are contaminated and to deal with the contamination. As the majority of vehicles are contaminated, they are rejected, sent for decontamination and then submitted to MAF for re-inspection after decontamination to determine if they comply.

The compliance costs in 2005, excluding inspection fees, associated with this pathway were estimated to be $37 to $54.4 million (Price-Waterhouse-Coopers, 2005).

The costs and benefits of approving compliance centres, where more substantial vehicle disassembly is undertaken, as transitional facilities should be investigated. There is potential for a higher level of inspection at such points, which could result in better contaminant detection.

Significant cost reductions are likely to result if an offshore approach to managing risk, using third party certification, in this pathway is adopted. In such an approach, used vehicles are first examined, decontaminated if necessary, and certified by a third party as complying with the BNZ standard. The vehicles would then be subject to sample verification inspection on arrival in New Zealand. This would align the processes for used vehicles to those for most commercial goods entering the country (e.g. fresh produce) and result in a significant reduction in MAF inspection costs; there are significant marginal costs in flying inspectors to and from Japan, apartments and utilities, site allowances and other operational costs. It also puts the onus for detecting and decontaminating vehicles on the importer.

From a risk management perspective, there are distinct benefits in having the third party inspection and certification processes conducted offshore. This approach is also consistent with Expectation 30 in the Biosecurity Strategy, which states “that there is a continuous targeted programme to move risk reduction measures offshore”.

Recommendation: Consideration should be given to the use of offshore third party inspection and certification processes, to reduce compliance costs.

14 Enforcement

There is no apparent need for enforcement activity in this pathway.

15 Biosecurity awareness programmes

Under the existing IHS there is a significant quantity of slippage in this pathway. Until this risk mitigated by alternative interventions there is merit in providing awareness material on targeted contaminants to Land Transport Safety Authority inspection facilities, the Toyota Signature Class factories, IMVDA, used vehicle importers and others involved in this pathway.

Recommendation: Targeted biosecurity awareness material should be provided to key industry stakeholders, such as LTNZ compliance centres, used vehicle importers and overseas used vehicle processing facilities.

16 Post-border programmes

As there is substantial slippage on the pathway, it is advisable to continue to monitor for high risk pests known to be associated with the pathway, such as Asian gypsy moth. To maximise the efficiency of monitoring, traps should be positioned near to areas of high used vehicle density. Facilities processing large numbers of used vehicles should also be included in the development of high-risk site surveillance.

> **Recommendation:** Traps for Asian gypsy moth and other pests likely to establish from the used vehicle pathway should continue to be positioned in areas near high concentrations of used vehicles.

17 Conclusions

The survey and associated videoscope trial have shown that nearly all used vehicles are presented for MAF clearance in a contaminated state, and that contamination associated with used vehicles can not be detected by visual inspection alone. Both the current standards and operations require work to reduce the number of contaminated used vehicles given biosecurity clearance.

The risk analysis currently underway will evaluate the biosecurity risks associated with contamination found in this survey. This will ensure that risk management measures on this pathway are sustainable in the long term.

18 Acknowledgements

The success of this survey is very much a result of the goodwill and co-operation of:

- The MAF QS staff and management at the ports of Auckland, Wellington and Lyttelton;
- Ports of Auckland Ltd, Centreport Ltd and the Lyttelton Port Co Ltd;
- Those involved commercially in the used vehicle import pathway, especially vehicle transporting companies and vehicle decontamination facilities.

19 References

Chirnside, J, Hyde, N, Song, V, Wedde, S, Whyte, C. 2005a. *International Mail Pathway Survey April – May 2005*. Biosecurity Monitoring Group, Report BMG 04-05/01

Chirnside, J, Hyde, N, Whyte, C. 2005b. *Christchurch International Airport Passenger Survey September – October 2005*. Biosecurity Monitoring Group, Report BMG 05/06-04.

Forest Health Group. 1996. *The Risk to New Zealand's Forests and Trees Posed by Plant Debris and Soil on Imported Second Hand Vehicles and Machinery*. New Zealand Forest Research Institute.

Mathew, G, Hyde, N, Knight, G, Law, X, Mavengere, T, Whyte, C. 2006. *Pilot Videoscopic Survey of Imported Used Vehicles and Machinery*. Biosecurity Monitoring Group, Report BMG 05/06-06.

New Zealand Customs Service. 2000-2005. *Motor Vehicle Statistics Report*, Unpublished

Price-Waterhouse-Coopers. 2005. *Costs of Compliance for Achieving Biosecurity Clearance*. MAF Information Paper No:2005/03

Song, V, Hyde, N, Whyte, C. 2005. *Wellington International Airport Passenger Survey September – October 2005*. Biosecurity Monitoring Group, Report BMG 05/06-05.

Waite, C, Hyde, N. 2005 *Pathway Analysis Annual report 2004-05.* Biosecurity Monitoring Group, Report BMG 05/06-02

Wedde, S, Whyte, C. 2004. *Border Operational Efficacy Report: Audit Inspection of Used Vehicles.* Border Management Group, MAF Biosecurity Authority.

Wedde, S, Hyde, N, Whyte, C. 2005. *Auckland International Airport Passenger Survey July–August 2005*. Biosecurity Monitoring Group, Report BMG 05/06-03.

Personal Communications

Frank Willett, Services Consultant, Independent Motor Vehicle Dealers Association Incorporated (IMVDA)

Appendix I. Data analysis

As the survey was carried out in three locations and on three different clearance methods (onshore, offshore and containerised clearances) there were likely to be differences in slippage rates and effectiveness between different port and clearance type combinations. Any differences would mean that the results must be scaled by incoming volumes, and added in a model, rather than simply added cumulatively. Therefore, slippage rates were calculated for each clearance type and port, with 95% confidence intervals as :

$$\textit{Slippage rate} = \frac{\textit{Number contaminated in the sample}}{\textit{Number in the sample}}$$

95% confidence intervals were modelled from a beta distribution with the parameter:

$$\frac{\textit{Number contaminated in sample} + 1}{\textit{Number in sample} - \textit{number contaminated in sample} + 1}$$

If there was no overlap of the 95% confidence interval between different port/clearance type combinations then they were deemed to be significantly different.

There were significant differences in slippage rates between Auckland, Wellington and Lyttelton; therefore the three ports were analysed individually and the overall pathway result weighted by number of used vehicles imported by each port. Ports that were not surveyed (accounting for only 11% of the total vehicles imported) were assumed to have the average slippage rate. There were also significant differences between different import types (breakbulk and containerised vehicles), so these groups were analysed separately as well. Only partial data were available for treatments applied to offshore inspected vehicles, so even though there was no significant difference between onshore and offshore inspected breakbulk, these are shown separately for analysis. Finally, to look at the relative effectiveness of the initial inspection and the decontamination and re-inspection processes, separate slippage rates were calculated for the two processes.

Slippage rates from the videoscope trial were also calculated, to estimate the number of vehicles entering New Zealand with contamination that could not be seen through standard visual inspection.

The slippage (number of vehicles entering New Zealand with contamination) for each combination of port, import type and process was estimated as:

Slippage = Slippage rate x vehicles arriving

Total overall slippage was calculated by adding the slippage estimates for each port, clearance type and process combination. 95% confidence intervals were modelled using an @RISK[7] simulation.

[7] @RISK Advance Risk Analysis for Spreadsheets, Palisade Corporation 2004

Vehicles may be contaminated with any combination of air-filter contamination, non visible (videoscope) contamination and visible contamination. If a vehicle has contamination in the air filter, or has contamination that can not be seen by visual inspection then it will enter New Zealand contaminated, regardless of the effectiveness of any visual inspection. Therefore, the number of vehicles slipping with contamination and the efficacy of the clearance process was looked at in two ways. Firstly, the effectiveness of the entire process, including air-filter and non visible contamination slippage was calculated and the number of vehicles slipping with each type of contamination estimated. Then the effectiveness of the visual inspection process was looked at in isolation.

The effectiveness was estimated as:

$$\textit{Effectiveness (\%)} = \frac{\textit{Number of contaminated vehicles detected}}{\textit{Number of contaminated vehicles detected + slippage}}$$

Appendix II. Model developed to determine IHS effectiveness

Containerised vehicles		Auckland	Wellington	Lyttelton	Other	Total
a	Pass initial inspection	-	-	-	-	200
b	Air filter survey sample	-	-	-	-	8
c	Air filter contaminated in survey sample	-	-	-	-	4
d	Estimated number of vehicles with air filter contaminants (c/b x a)	-	-	-	-	100
e	Non visible survey sample	-	-	-	-	34
f	Non visible contaminated in survey sample	-	-	-	-	28
g	Estimated number of additional vehicles with non visible contaminants (f/e x (a-d))	-	-	-	-	82
h	Visible survey sample	-	-	-	-	14
i	Visible contaminated in survey sample	-		-	-	7
j	Estimated number of additional vehicles with visible contaminants (i/h x (a-d-g))	-	-	-	-	9
k	Estimated number of clean vehicles (a-d-g-j)	-	-	-	-	9
l	Fail initial inspection – sent for decontamination	-		-	-	352
m	Air filter survey sample	-	-	-	-	8
n	Air filter contaminated in survey sample	-	-	-	-	4
o	Estimated number of vehicles with air filter contaminants (n/m x l)	-	-	-	-	176
p	Non visible survey sample	-	-	-	-	34
q	Non visible contaminated in survey sample	-	-	-	-	28
r	Estimated number of additional vehicles with non visible contaminants (q/p x (l-o))		-	-	-	145
s	Estimated with visible contamination (l-o-r)	-	-	-	-	31
t	Total vehicles with air filter slippage (d+o)					276
u	Total vehicles with non visible slippage (g+r)					227
v	Total with contamination dealt with under standard (l+j)					40
w	Total contaminated vehicles (l+j+g+d)					543
	Efficacy (v/w)					7%

	Onshore-inspected vehicles	Auckland	Wellington	Lyttelton	Other	Total
a	Pass initial inspection	150	74	179	76	479
b	Air filter survey sample	86	69	27	-	-
c	Air filter contaminated in survey sample	45	17	7	-	-
d	Estimated number of vehicles with air filter contaminants (c/b x a)	78	18	46	27 [#1]	170 [#2]
e	Non visible survey sample	258	258	258	-	-
f	Non visible contaminated in survey sample	121	121	121	-	-
g	Estimated number of additional vehicles with non visible contaminants (f/e x (a-d))	34	26	62	23 [#3]	145 [#4]
h	Visible survey sample	118	83	7	-	-
i	Visible contaminated in survey sample	22	22	0	-	-
j	Estimated total number of vehicles with visible contaminants (i/h x (a-d-g))	7	8	0	3 [#5]	18 [#6]
k	Estimated number of clean vehicles (	31	22	70	23	146
l	Fail initial inspection – sent for decontamination	2 422	610	776	369	4 177
m	Air filter survey sample	86	69	27	-	-
n	Air filter contaminated in survey sample	45	17	7	-	-
o	Estimated number of vehicles with air filter contaminants (n/m x l)	1 267	150	201	157 [#6]	1 776 [#8]
p	Non visible survey sample	258	258	258	-	-
q	Non visible contaminated in survey sample	121	121	121	-	-
r	Estimated number of additional vehicles with non visible contaminants (q/p x (l-o))	542	216	270	99 [#9]	1 126 [#10]
s	Estimated with visible contamination (l-o-r)	613	244	305	113	1 275
t	Total vehicles with air filter slippage (d+o)					1 946
u	Total vehicles with non visible slippage (g+r)					1 271
v	Total with contamination dealt with under standard (l+j)					1 293
w	Total contaminated vehicles (l+j+g+d)					4 510
	Efficacy (v/w)					29%

#1 calculated as $(d_{[Auckland]} + d_{[Wellington]} + d_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]})$ x $a_{[other]}$

#2 calculated as $d_{[Auckland]} + d_{[Wellington]} + d_{[Lyttelton]} + d_{[other]}$

#3 calculated as $(g_{[Auckland]} + g_{[Wellington]} + g_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]})$ x $a_{[other]}$

#4 calculated as $g_{[Auckland]} + g_{[Wellington]} + g_{[Lyttelton]} + g_{[other]}$

#5 calculated as $(j_{[Auckland]} + j_{[Wellington]} + j_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]})$ x $a_{[other]}$

#6 calculated as $j_{[Auckland]} + j_{[Wellington]} + j_{[Lyttelton]} + j_{[other]}$

#7 calculated as $(o_{[Auckland]} + o_{[Wellington]} + o_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]})$ x $a_{[other]}$

#8 calculated as $o_{[Auckland]} + o_{[Wellington]} + o_{[Lyttelton]} + o_{[other]}$

#9 calculated as $(r_{[Auckland]} + r_{[Wellington]} + r_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]})$ x $a_{[other]}$

#10 calculated as $r_{[Auckland]} + r_{[Wellington]} + r_{[Lyttelton]} + r_{[other]}$

	Offshore-inspected vehicles	Auckland	Wellington	Lyttelton	Other	Total
a	Pass initial inspection	2 313	176	508	56	3 054
b	Air filter survey sample	93	221	116	-	-
c	Air filter contaminated in survey sample	49	36	5	-	-
d	Estimated number of vehicles with air filter contaminants (c/b x a)	1 219	29	22	24 [#1]	1 293 [#2]
e	Non visible survey sample	258	258	258	-	-
f	Non visible contaminated in survey sample	121	121	121	-	-
g	Estimated number of additional vehicles with non visible contaminants (f/e x (a-d))	513	69	228	15 [#3]	826 [#4]
h	Visible survey sample	127	122	70	-	-
i	Visible contaminated in survey sample	20	12	3	-	-
j	Estimated total number of vehicles with visible contaminants (i/h x (a-d-g))	92	8	11	2 [#5]	112 [#6]
k	Estimated number of clean vehicles (	490	71	247	15	823
l	Fail initial inspection – sent for decontamination	4 282	743	1477	643	7 144
m	Air filter survey sample	93	221	116	-	-
n	Air filter contaminated in survey sample	49	36	5	-	-
o	Estimated number of vehicles with air filter contaminants (n/m x l)	2 256	121	64	241 [#7]	2 682 [#8]
p	Non visible survey sample	258	258	258	-	-
q	Non visible contaminated in survey sample	121	121	121	-	-
r	Estimated number of additional vehicles with non visible contaminants (q/p x (l-o))	950	292	663	188 [#9]	2 093 [#10]
s	Estimated with visible contamination (l-o-r)	1 076	330	750	213	2 369
t	Total vehicles with air filter slippage (d+o)					3 975
u	Total vehicles with non visible slippage (g+r)					2 918
v	Total with contamination dealt with under standard (l+j)					2 482
w	Total contaminated vehicles					9 375
	Efficacy (v/w)					26%

#1 calculated as $(d_{[Auckland]} + d_{[Wellington]} + d_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]}) \times a_{[other]}$

#2 calculated as $d_{[Auckland]} + d_{[Wellington]} + d_{[Lyttelton]} + d_{[other]}$

#3 calculated as $(g_{[Auckland]} + g_{[Wellington]} + g_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]}) \times a_{[other]}$

#4 calculated as $g_{[Auckland]} + g_{[Wellington]} + g_{[Lyttelton]} + g_{[other]}$

#5 calculated as $(j_{[Auckland]} + j_{[Wellington]} + j_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]}) \times a_{[other]}$

#6 calculated as $j_{[Auckland]} + j_{[Wellington]} + j_{[Lyttelton]} + j_{[other]}$

#7 calculated as $(o_{[Auckland]} + o_{[Wellington]} + o_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]}) \times a_{[other]}$

#8 calculated as $o_{[Auckland]} + o_{[Wellington]} + o_{[Lyttelton]} + o_{[other]}$

#9 calculated as $(r_{[Auckland]} + r_{[Wellington]} + r_{[Lyttelton]})/sum(a_{[Auckland]} + a_{[Wellington]} + a_{[Lyttelton]}) \times a_{[other]}$

#10 calculated as $r_{[Auckland]} + r_{[Wellington]} + r_{[Lyttelton]} + r_{[other]}$

	Pathway total
Vehicles with air filter slippage	6197
Vehicles with non visible slippage	4417
Vehicles with contamination dealt with under standard	3814
Contaminated vehicles	14428
Efficacy	26%

Appendix III. Model developed to determine operational effectiveness

		Auckland	Wellington	Lyttelton	Other	Total
	Containerised					
a	Vehicles arriving	-	-	-	-	552
b	Passed at initial inspection	-	-	-	-	200
c	Surveyed (internally and externally)	-	-	-	-	14
d	Found in survey sample with visible contamination	-	-	-	-	10
e	Slippage rate (d/c)	-	-	-	-	71%
f	Estimated slippage at initial inspection (e x b)	-	-	-	-	143
		-	-	-	-	
g	Sent to decontamination	-	-	-	-	352
h	Surveyed (internally and externally)	-	-	-	-	14
i	Found in survey sample with visible contamination	-	-	-	-	10
j	Slippage rate (j/h)	-	-	-	-	71%
k	Estimated slippage at decontamination (j x g)	-	-	-	-	251
	Onshore					
a	Vehicles arriving	2 572	684	955	445	4 656
b	Passed at initial inspection	150	74	179	76	479
c	Surveyed (internally and externally)	118	83	7	-	-
d	Found in survey sample with visible contamination	35	24	0	-	-
e	Slippage rate (d/c)	30%	29%	0%	-	-
f	Estimated slippage at initial inspection (e x b)	44	21	0	12 #1	78 #2
g	Sent to decontamination	2 422	610	776	369	4 177
h	Surveyed (internally and externally)	118	83	7	-	-
i	Found in survey sample with visible contamination	35	24	0	-	-
j	Slippage rate (j/h)	30%	29%	0%	-	-
k	Estimated slippage at decontamination (j x g)	718	176	0	87	981
	Offshore					
a	Vehicles arriving	6 595	919	1 985	699	10 198
b	Passed at initial inspection	2 313	176	508	56	3 054
c	Surveyed (internally and externally)	127	122	70	-	-
d	Found in survey sample with visible contamination	31	12	3	-	-
e	Slippage rate (d/c)	24%	10%	4%	-	-
f	Estimated slippage at initial inspection (e x b)	565	17	22	11	615
g	Sent to decontamination	4 282	743	1 477	643	7 144
h	Surveyed (internally and externally)	127	122	70	-	-
i	Found in survey sample with visible contamination	31	12	3	-	-
j	Slippage rate (j/h)	24%	10%	4%	-	-
k	Estimated slippage at decontamination (j x g)	1 045	73	63	117	1 298

#1 Calculated as $(f_{[Auckland]} + f_{[Wellington]} + f_{[Lyttelton]}) / (b_{[Auckland]} + b_{[Wellington]} + b_{[Lyttelton]}) \times b_{[Other]}$

#2 Calculated as $f_{[Auckland]} + f_{[Wellington]} + f_{[Lyttelton]} + f_{[Other]}$

	Containerised	Onshore	Offshore	Total
Total slipping with visible contamination at the initial inspection	143	78	615	836
Total decontaminated successfully	101	3196	5846	9 142
Total slipping still contaminated after decontamination	251	981	1298	2 531
Total vehicles slipped with visible contamination	394	1060	1913	3 367
Efficacy of initial inspection	71%	98%	92%	93%
Efficacy of decontamination and re-inspection	29%	77%	82%	78%
Total efficacy	20%	75%	75%	73%

Appendix IV. Visible contaminants found during the survey

Vehicle ID	Contaminant type	Location	Quantity	Viability[8]	Clearance	Arrival method	Port
109	Plant material	Bonnet	Little	Not viable	Offshore	Breakbulk	Auckland
113	Soil	Wheel arch	Moderate	Viable	Offshore	Breakbulk	Auckland
114	Insect	Boot	1	Not viable	Offshore	Breakbulk	Auckland
115	Plant material	Front door hinge	1	Not viable	Offshore	Breakbulk	Auckland
118	Plant material	Bonnet	Little	Not viable	Offshore	Breakbulk	Auckland
126	Insect	Boot	1	Viable	Offshore	Breakbulk	Auckland
133	Insect	Under rear seats	2	Not viable	Offshore	Breakbulk	Auckland
136	Animal material	Interior	2	Not viable	Offshore	Breakbulk	Auckland
136	Plant material	Inside	2	Not viable	Offshore	Breakbulk	Auckland
137	Soil	Wheel arch	Little	Unsure	Offshore	Breakbulk	Auckland
139	Animal material	Interior	1	Not viable	Offshore	Breakbulk	Auckland
139	Plant material	Interior	Little	Not viable	Offshore	Breakbulk	Auckland
148	Egg mass	Underside	1	Viable	Offshore	Breakbulk	Wellington
156	Plant material	Engine bay	Little	Not viable	Offshore	Breakbulk	Wellington
158	Plant material	Engine bay	1	Not viable	Offshore	Breakbulk	Wellington
250	Plant material	Radiator	1	Not viable	Onshore	Breakbulk	Wellington
253	Plant material	Interior	Little	Not viable	Onshore	Breakbulk	Wellington
253	Plant material	Under rear seats	Little	Not viable	Onshore	Breakbulk	Wellington
254	Plant material	Under rear seats	Little	Not viable	Onshore	Breakbulk	Wellington
257	Egg mass	Underside	1	Not viable	Onshore	Breakbulk	Wellington
258	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
260	Soil	Wheel arch	Little	Unsure	Onshore	Breakbulk	Wellington
260	Plant material	Underside	Little	Not viable	Onshore	Breakbulk	Wellington
262	Plant material	Underside	Little	Not viable	Onshore	Breakbulk	Wellington
262	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
262	Insect	Under rear seats	1	Not viable	Onshore	Breakbulk	Wellington
265	Insect	Radiator	10	Not viable	Onshore	Breakbulk	Wellington
265	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
265	Plant material	Door panel	Moderate	Not viable	Onshore	Breakbulk	Wellington
265	Plant material	Door panel	Little	Not viable	Onshore	Breakbulk	Wellington
265	Plant material	Door panel	Little	Not viable	Onshore	Breakbulk	Wellington
266	Bark	Underside	1	Not viable	Onshore	Breakbulk	Wellington
266	Plant material	Boot	Little	Not viable	Onshore	Breakbulk	Wellington
267	Plant material	Door panel	Little	Not viable	Onshore	Breakbulk	Wellington
267	Insect	Radiator	5	Not viable	Onshore	Breakbulk	Wellington
269	Plant material	Engine bay	Little	Not viable	Onshore	Breakbulk	Wellington
347	Plant material	Front panel	Little	Unsure	Onshore	Breakbulk	Wellington
350	Plant material	Wiper base	Little	Unsure	Onshore	Breakbulk	Wellington
358	Plant material	Chassis	2	Unsure	Onshore	Breakbulk	Wellington
399	Insect	Boot	1	Not viable	Offshore	Breakbulk	Auckland
401	Plant material	Bonnet	2	Unsure	Offshore	Breakbulk	Auckland
402	Plant material	Boot	1	Not viable	Offshore	Breakbulk	Auckland
402	Plant material	Front wheel	2	Not viable	Offshore	Breakbulk	Auckland
405	Plant material	Bonnet	1	Not viable	Offshore	Breakbulk	Auckland

[8] Plant material and bark was recorded as non-viable if it was desiccated and showed no signs of insects or pathogenic fungal attack. Seeds were recorded as non-viable if they failed to germinate and showed no change of colour with tetrazolium testing, and unsure if they were not sent for testing. Egg mass viability was based on the laboratory's assessment, or recorded as unsure if the egg mass was not sent to the laboratory. Soil was recorded as viable if viable organisms were found during laboratory studies, otherwise soil viability was recorded as unsure.

Vehicle ID	Contaminant type	Location	Quantity	Viability[8]	Clearance	Arrival method	Port
405	Plant material	Boot	1	Not viable	Offshore	Breakbulk	Auckland
406	Seed	Bonnet	Few	Not viable	Offshore	Breakbulk	Auckland
406	Seed	Interior	1	Not viable	Offshore	Breakbulk	Auckland
409	Plant material	Bonnet	1	Not viable	Offshore	Breakbulk	Auckland
415	Plant material	Bonnet	5	Not viable	Offshore	Breakbulk	Auckland
415	Plant material	Boot	2	Not viable	Offshore	Breakbulk	Auckland
416	Plant material	Bonnet	Little	Unsure	Onshore	Breakbulk	Auckland
416	Plant material	Under rear seats	Moderate	Unsure	Onshore	Breakbulk	Auckland
474	Insect	Boot	Few	Not viable	Offshore	Breakbulk	Auckland
476	Plant material	Wheel arch	1	Unsure	Offshore	Breakbulk	Auckland
484	Seed	Inside	5-10	Not viable	Offshore	Breakbulk	Auckland
485	Insect	Bonnet	3	Viable	Offshore	Breakbulk	Auckland
485	Insect	Inside	1	Viable	Offshore	Breakbulk	Auckland
486	Insect	Engine bay	1	Not viable	Offshore	Breakbulk	Auckland
487	Seed	Engine bay	Moderate	Not viable	Offshore	Breakbulk	Auckland
492	Soil	Wheel arch	Few	Unsure	Offshore	Breakbulk	Auckland
494	Plant material	Boot	5-10	Not viable	Offshore	Breakbulk	Auckland
498	Plant material	Door panel	1	Unsure	Offshore	Breakbulk	Auckland
500	Egg mass	Wheel arch	1	Unsure	Offshore	Breakbulk	Auckland
502	Plant material	Chassis	3	Unsure	Offshore	Breakbulk	Auckland
503	Spider web	Underside	Moderate	n/a	Offshore	Breakbulk	Auckland
507	Spider	Underside	1	Viable	Offshore	Breakbulk	Auckland
507	Egg mass	Underside	1	Unsure	Offshore	Breakbulk	Auckland
511	Plant material	Wheel arch	1	Unsure	Offshore	Breakbulk	Auckland
514	Plant material	Bonnet	4	Not viable	Onshore	Container	Auckland
515	Plant material	Bonnet	15-20	Unsure	Onshore	Container	Auckland
515	Soil	Engine bay	Lots	Unsure	Onshore	Container	Auckland
515	Plant material	Rear door seal	Moderate	Unsure	Onshore	Container	Auckland
515	Egg mass	Chassis	Moderate	Unsure	Onshore	Container	Auckland
515	Soil	Chassis	Lots	Unsure	Onshore	Container	Auckland
515	Seed	Chassis	Few	Not viable	Onshore	Container	Auckland
515	Plant material	Underbody	Lots	Unsure	Onshore	Container	Auckland
515	Spider web	Underbody	Lots	n/a	Onshore	Container	Auckland
515	Insect	Underbody	Lots	Not viable	Onshore	Container	Auckland
517	Seed	Bonnet	1	Viable	Onshore	Container	Auckland
518	Plant material	Engine bay	Moderate	Unsure	Onshore	Container	Auckland
518	Seed	Engine bay	Lots	Not viable	Onshore	Container	Auckland
518	Soil	Rear bumper	Lots	Unsure	Onshore	Container	Auckland
518	Plant material	Underbody	Lots	Unsure	Onshore	Container	Auckland
518	Insect	Underbody	Lots	Not viable	Onshore	Container	Auckland
518	Spider web	Underbody	Lots	n/a	Onshore	Container	Auckland
520	Plant material	Firewall	9	Not viable	Onshore	Breakbulk	Auckland
520	Insect	Firewall	2	Not viable	Onshore	Breakbulk	Auckland
520	Seed	Bonnet	2	Unsure	Onshore	Breakbulk	Auckland
520	Plant material	Radiator	4	Not viable	Onshore	Breakbulk	Auckland
522	Plant material	Under battery	8	Not viable	Onshore	Breakbulk	Auckland
527	Plant material	Engine bay	1	Not viable	Onshore	Breakbulk	Wellington
528	Plant material	Door panel	1	Not viable	Onshore	Breakbulk	Wellington
579	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
579	Plant material	Engine bay	1	Not viable	Onshore	Breakbulk	Wellington
580	Spider web	Engine bay	Little	n/a	Onshore	Breakbulk	Wellington
582	Plant material	Windscreen wiper	1	Unsure	Offshore	Breakbulk	Wellington
583	Soil	Engine bay	Little	Unsure	Onshore	Breakbulk	Wellington
595	Plant material	Radiator	1	Not viable	Onshore	Breakbulk	Wellington

Vehicle ID	Contaminant type	Location	Quantity	Viability[8]	Clearance	Arrival method	Port
595	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
596	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
600	Plant material	Engine bay	Little	Not viable	Onshore	Breakbulk	Wellington
600	Plant material	Radiator	Little	Not viable	Onshore	Breakbulk	Wellington
600	Plant material	Driver side floor	Little	Not viable	Onshore	Breakbulk	Wellington
601	Plant material	Engine bay	Little	Not viable	Onshore	Breakbulk	Wellington
601	Plant material	Windscreen wiper	1	Not viable	Onshore	Breakbulk	Wellington
627	Seed	Interior	1	Not viable	Offshore	Breakbulk	Auckland
627	Insect	Windscreen wiper	1	Not viable	Offshore	Breakbulk	Auckland
631	Seed	Underbody	4	Not viable	Offshore	Breakbulk	Auckland
637	Seed	Boot	1	Not viable	Offshore	Breakbulk	Auckland
637	Forest debris	Bonnet	1	Not viable	Offshore	Breakbulk	Auckland
641	Plant material	Bonnet	1	Unsure	Offshore	Breakbulk	Auckland
647	Soil	Wheel arch	Few	Unsure	Offshore	Breakbulk	Auckland
651	Spider	Underbody	1	Viable	Offshore	Breakbulk	Auckland
757	Soil	Engine bay	Little	Unsure	Offshore	Breakbulk	Wellington
758	Soil	Door panel	Little	Unsure	Offshore	Breakbulk	Wellington
758	Plant material	Door panel	Little	Unsure	Offshore	Breakbulk	Wellington
758	Plant material	Door panel	Little	Unsure	Offshore	Breakbulk	Wellington
771	Plant material	Underbody	1	Not viable	Offshore	Breakbulk	Wellington
775	Plant material	Door panel	Few	Unsure	Offshore	Breakbulk	Wellington
792	Spider web	Underside	1	Not viable	Offshore	Breakbulk	Wellington
854	Seed	Radiator	2	Not viable	Onshore	Breakbulk	Auckland
854	Plant material	Radiator	2	Not viable	Onshore	Breakbulk	Auckland
854	Plant material	Door hinge	1	Not viable	Onshore	Breakbulk	Auckland
854	Spider web	Underside	Moderate	n/a	Onshore	Breakbulk	Auckland
938	Spider web	Underside	1	n/a	Onshore	Breakbulk	Auckland
939	Insect	Radiator	Few	Not viable	Onshore	Breakbulk	Auckland
940	Insect	Radiator	Few	Not viable	Onshore	Breakbulk	Auckland
940	Plant material	Under back seat	Little	Not viable	Onshore	Breakbulk	Auckland
941	Plant material	Engine bay	1	Not viable	Onshore	Breakbulk	Auckland
941	Plant material	Wheel arch	Little	Unsure	Onshore	Breakbulk	Auckland
942	Plant material	Interior	Little	Not viable	Onshore	Breakbulk	Auckland
942	Plant material	Underside	Little	Not viable	Onshore	Breakbulk	Auckland
943	Plant material	Door hinge	1	Not viable	Onshore	Breakbulk	Auckland
943	Plant material	Wheel arch	1	Unsure	Onshore	Breakbulk	Auckland
944	Spider	Door panel	1	Viable	Onshore	Breakbulk	Auckland
944	Plant material	Door panel	1	Not viable	Onshore	Breakbulk	Auckland
944	Spider web	Underside	Little	n/a	Onshore	Breakbulk	Auckland
945	Plant material	Under rear seats	Little	Not viable	Onshore	Breakbulk	Auckland
945	Plant material	Under rear seats	Little	Not viable	Onshore	Breakbulk	Auckland
946	Plant material	Door panel	1	Not viable	Onshore	Breakbulk	Auckland
946	Plant material	Door panel	1	Not viable	Onshore	Breakbulk	Auckland
949	Plant material	Door panel	Little	Not viable	Onshore	Breakbulk	Auckland
949	Spider web	Engine bay	Little	n/a	Onshore	Breakbulk	Auckland
958	Spider	Chassis	1	Viable	Onshore	Breakbulk	Wellington
959	Plant material	Engine bay	1	Unsure	Onshore	Breakbulk	Wellington
959	Spider	Wheel arch	1	Viable	Onshore	Breakbulk	Wellington
1012	Plant material	Engine bay	3	Unsure	Offshore	Breakbulk	Wellington
577	Spider web	Wheel arch	Little	n/a	Onshore	Breakbulk	Wellington
1083	Forest debris	Engine bay	1	Not viable	Offshore	Breakbulk	Lyttelton
1104	Seed	Engine bay	-	Unsure	Offshore	Breakbulk	Lyttelton
866	Animal material	Backseat	1	Unsure	Offshore	Breakbulk	Lyttelton
1 238	Spider	Wheel arch	1	Not viable	Offshore	Breakbulk	Wellington

Vehicle ID	Contaminant type	Location	Quantity	Viability[8]	Clearance	Arrival method	Port
1 241	Insect	Window ledge	1	Not viable	Offshore	Breakbulk	Wellington
1 310	Plant material	Bonnet	1	Not viable	Onshore	Breakbulk	Auckland
1 312	Plant material	Bonnet	3	Not viable	Onshore	Breakbulk	Auckland
1 313	Plant material	Wheel arch	3-5	Unsure	Onshore	Breakbulk	Auckland
1 313	Seed	Wheel arch	3	Not viable	Onshore	Breakbulk	Auckland
1 313	Plant material	Under wiper	1	Not viable	Onshore	Breakbulk	Auckland
1 314	Plant material	Under radiator	50	Not viable	Onshore	Breakbulk	Auckland
1 314	Insect	Under radiator	1	Not viable	Onshore	Breakbulk	Auckland
1 314	Plant material	Under radiator	3	Not viable	Onshore	Breakbulk	Auckland
1 314	Insect	Under radiator	15-20	Not viable	Onshore	Breakbulk	Auckland
1 316	Spider	Boot	1	Viable	Onshore	Breakbulk	Auckland
1 316	Soil	Wheel arch	Little	Unsure	Onshore	Breakbulk	Auckland
1 316	Spider web	Underbody	Moderate	n/a	Onshore	Breakbulk	Auckland
1 317	Seeds	Bonnet	1	Viable	Onshore	Breakbulk	Auckland
1 319	Plant material	Bonnet	1	Not viable	Onshore	Breakbulk	Auckland
1 320	Plant material	Front bonnet	Moderate	Not viable	Onshore	Breakbulk	Auckland
1 324	Egg mass	Spare wheel	2	Unsure	Onshore	Breakbulk	Auckland
1 324	Plant material	Boot	Lots	Unsure	Onshore	Breakbulk	Auckland
1 324	Plant material	Wheel arch	-	Not viable	Onshore	Breakbulk	Auckland
1 327	Insect	Boot	-	Viable	Onshore	Breakbulk	Auckland
1 328	Insect	Boot	1	Viable	Onshore	Breakbulk	Auckland
1 338	Seed	Cabin	Little	Unsure	Onshore	Breakbulk	Auckland
1 339	Spider web	Inside of front tyre	Little	n/a	Onshore	Breakbulk	Auckland
1 349	Spider web	Spare wheel	Moderate	n/a	Onshore	Breakbulk	Auckland
1 349	Seeds	Spare wheel	Moderate	Viable	Onshore	Breakbulk	Auckland
1 350	Insect	Boot	1	Not viable	Onshore	Breakbulk	Auckland
1 369	Insect	Door (interior)	1	Not viable	Onshore	Breakbulk	Auckland
1 374	Plant material	Door (interior)	1	Not viable	Onshore	Breakbulk	Auckland
1 375	Plant material	Back seat	1	Unsure	Onshore	Breakbulk	Auckland
1 381	Plant material	Door (interior)	Little	Unsure	Onshore	Breakbulk	Auckland
1 381	Soil	Underside	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 381	Plant material	Underside	Little	Not viable	Onshore	Breakbulk	Auckland
1 382	Plant material	Door (interior)	Little	Unsure	Onshore	Breakbulk	Auckland
1 382	Soil	Wheel arch	Little	Unsure	Onshore	Breakbulk	Auckland
1 383	Seed	Spare wheel	1	Not viable	Onshore	Breakbulk	Auckland
1 386	Soil	Underbody	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 386	Plant material	Underbody	2	Not viable	Onshore	Breakbulk	Auckland
1 387	Plant material	Under front seat	1	Not viable	Onshore	Breakbulk	Auckland
1 387	Plant material	Engine bay	Little	Not viable	Onshore	Breakbulk	Auckland
1 393	Plant material	Bonnet	1	Not viable	Onshore	Breakbulk	Auckland
1 394	Seed	Bonnet	2	Not viable	Onshore	Breakbulk	Auckland
1 404	Insect	Radiator	Few	Not viable	Onshore	Container	Auckland
1 405	Spider web	Under body	Little	n/a	Onshore	Container	Auckland
1 405	Insect	Under body	Little	Unsure	Onshore	Container	Auckland
1 405	Seed	Underbody	Little	Unsure	Onshore	Container	Auckland
1 406	Plant material	Under back seat	Moderate	Not viable	Onshore	Container	Auckland
1 407	Egg mass	Underbody	1	Unsure	Onshore	Container	Auckland
1 407	Spider web	Underbody	Little	n/a	Onshore	Container	Auckland
1 407	Plant material	Underbody	3	Not viable	Onshore	Container	Auckland
1 407	Insect	Underbody	1	Not viable	Onshore	Container	Auckland
1 407	Animal material	Underbody	2	Not viable	Onshore	Container	Auckland
1 410	Plant material	Rear window	1	Unsure	Onshore	Container	Auckland
1 410	Insect	Radiator	Few	Unsure	Onshore	Container	Auckland
1 410	Seed	Radiator	Few	Unsure	Onshore	Container	Auckland

Vehicle ID	Contaminant type	Location	Quantity	Viability[8]	Clearance	Arrival method	Port
1 410	Spider web	Above wind shield	1	n/a	Onshore	Container	Auckland
1 413	Amphibian	Under back seat	1	Unsure	Onshore	Container	Auckland
1 413	Plant material	Inside	Lots	Viable	Onshore	Container	Auckland
1 413	Plant material	Under body	6	Unsure	Onshore	Container	Auckland
1 415	Soil	Rear bumper	Moderate	Unsure	Onshore	Container	Auckland
1 415	Seed	Bonnet	Moderate	Not viable	Onshore	Container	Auckland
1 415	Plant material	Bonnet	Moderate	Unsure	Onshore	Container	Auckland
1 415	Plant material	Door (interior)	Moderate	Not viable	Onshore	Container	Auckland
1 421	Plant material	Radiator	Little	Not viable	Offshore	Breakbulk	Wellington
1 424	Soil	Door panel	Lots	Unsure	Offshore	Breakbulk	Wellington
1 429	Plant material	Door panel	1	Not viable	Offshore	Breakbulk	Wellington
5 15	Seed	Chasis	Few	Not viable	Onshore	Container	Auckland
1 336	Seed	Unknown	3	Not viable	Onshore	Breakbulk	Auckland
113	Seed	Wheel arch	Few	Viable	Offshore	Breakbulk	Auckland

Appendix V. Air filter contaminants found during the survey

Vehicle ID	Contaminant	Quantity	Viability[9]	Clearance	Arrival method	Port
38	Seed	Little	Unsure	Onshore	Breakbulk	Auckland
63	Seed	Little	Unsure	Onshore	Breakbulk	Wellington
64	Seed	Little	Unsure	Offshore	Breakbulk	Wellington
68	Seed	Little	Unsure	Offshore	Breakbulk	Wellington
70	Plant material	Moderate	Unsure	Offshore	Breakbulk	Wellington
70	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
77	Seed	1	Unsure	Offshore	Breakbulk	Wellington
83	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
85	Seed	Little	Unsure	Offshore	Breakbulk	Wellington
86	Plant material	1	Unsure	Offshore	Breakbulk	Wellington
86	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
87	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
87	Plant material	3	Unsure	Offshore	Breakbulk	Wellington
92	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
92	Plant material	Moderate	Unsure	Offshore	Breakbulk	Wellington
111	Seed	Little	Not viable	Offshore	Breakbulk	Auckland
115	Plant material	Moderate	Not viable	Offshore	Breakbulk	Auckland
116	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
117	Insect	1	Not viable	Offshore	Breakbulk	Auckland
117	Plant material	Little	Not viable	Offshore	Breakbulk	Auckland
118	Seed	Little	Unsure	Offshore	Breakbulk	Auckland
125	Seed	Moderate	Unsure	Offshore	Breakbulk	Auckland
137	Seed	Little	Not viable	Offshore	Breakbulk	Auckland
146	Plant material	Little	Not viable	Offshore	Breakbulk	Auckland
188	Seed	Little	Not viable	Offshore	Breakbulk	Wellington
255	Plant material	Little	Not viable	Onshore	Breakbulk	Wellington
265	Plant material	Little	Not viable	Onshore	Breakbulk	Wellington
267	Insect	3	Not viable	Onshore	Breakbulk	Wellington
273	Plant material	1	Not viable	Onshore	Breakbulk	Wellington
274	Plant material	2	Not viable	Onshore	Breakbulk	Wellington
274	Plant material	Little	Not viable	Onshore	Breakbulk	Wellington
275	Plant material	Little	Not viable	Onshore	Breakbulk	Wellington
280	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
283	Plant material	8	Not viable	Offshore	Breakbulk	Wellington
300	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
334	Plant material	Moderate	Unsure	Offshore	Breakbulk	Wellington
334	Seed	Moderate	Not viable	Offshore	Breakbulk	Wellington
339	Seed	Little	Unsure	Offshore	Breakbulk	Wellington
377	Plant material	Moderate	Unsure	Onshore	Breakbulk	Wellington
381	Plant material	Little	Unsure	Onshore	Breakbulk	Wellington
382	Seed	1	Not viable	Offshore	Breakbulk	Auckland
385	Plant material	Little	Unsure	Offshore	Breakbulk	Auckland
387	Seed	Moderate	Viable	Offshore	Breakbulk	Auckland
389	Seed	1	Unsure	Offshore	Breakbulk	Auckland

[9] Plant material and bark was recorded as non-viable if it was desiccated and showed no signs of insects or pathogenic fungal attack. Seeds were recorded as non-viable if they failed to germinate and showed no change of colour with tetrazolium testing, and unsure if they were not sent for testing. Egg mass viability was based on the laboratory's assessment, or recorded as unsure if the egg mass was not sent to the laboratory. Soil was recorded as viable if viable organisms were found during laboratory studies, otherwise soil viability was recorded as unsure.

Vehicle ID	Contaminant	Quantity	Viability[9]	Clearance	Arrival method	Port
390	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
392	Seed	1	Unsure	Offshore	Breakbulk	Auckland
394	Plant material	1	Unsure	Offshore	Breakbulk	Auckland
398	Insect	1	Not viable	Offshore	Breakbulk	Auckland
401	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
405	Seed	Moderate	Viable	Offshore	Breakbulk	Auckland
407	Seed	1	Not viable	Offshore	Breakbulk	Auckland
409	Seed	Few	Viable	Offshore	Breakbulk	Auckland
412	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
414	Seed	1	Not viable	Offshore	Breakbulk	Auckland
415	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
415	Insect	Moderate	Unsure	Offshore	Breakbulk	Auckland
417	Plant material	Little	Unsure	Offshore	Breakbulk	Wellington
417	Seed	Little	Unsure	Offshore	Breakbulk	Wellington
418	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
419	Plant material	Little	Unsure	Offshore	Breakbulk	Wellington
426	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
427	Insect	10	Viable	Offshore	Breakbulk	Wellington
428	Plant material	Moderate	Unsure	Offshore	Breakbulk	Wellington
428	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
432	Seed	Little	Unsure	Onshore	Breakbulk	Lyttelton
450	Insect	Moderate	Not viable	Onshore	Breakbulk	Lyttelton
450	Seed	Moderate	Unsure	Onshore	Breakbulk	Lyttelton
452	Insect	3	Not viable	Onshore	Breakbulk	Lyttelton
452	Seed	2	Unsure	Onshore	Breakbulk	Lyttelton
290	Seed	Moderate	Unsure	Onshore	Breakbulk	Wellington
462	Plant material	Little	Unsure	Onshore	Breakbulk	Wellington
462	Seed	Little	Unsure	Onshore	Breakbulk	Wellington
465	Plant material	Moderate	Unsure	Offshore	Breakbulk	Wellington
465	Seed	Moderate	Unsure	Offshore	Breakbulk	Wellington
470	Seed	15	Unsure	Offshore	Breakbulk	Wellington
474	Insect	Moderate	Unsure	Offshore	Breakbulk	Auckland
475	Insect	Few	Not viable	Offshore	Breakbulk	Auckland
477	Seed	Little	Not viable	Offshore	Breakbulk	Auckland
478	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
480	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
483	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
483	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
485	Seed	0-5	Not viable	Offshore	Breakbulk	Auckland
486	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
487	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
489	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
489	Plant material	1	Unsure	Offshore	Breakbulk	Auckland
490	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
491	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
491	Plant material	Moderate	Unsure	Offshore	Breakbulk	Auckland
491	Insect	Moderate	Unsure	Offshore	Breakbulk	Auckland
493	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
493	Plant material	Few	Unsure	Offshore	Breakbulk	Auckland
497	Seed	Moderate	Not Viable	Offshore	Breakbulk	Auckland
497	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
499	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
499	Plant material	7	Unsure	Offshore	Breakbulk	Auckland
499	Animal material	2	Unsure	Offshore	Breakbulk	Auckland

Vehicle ID	Contaminant	Quantity	Viability[9]	Clearance	Arrival method	Port
502	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
502	Animal material	1	Unsure	Offshore	Breakbulk	Auckland
503	Seed	Few	Unsure	Offshore	Breakbulk	Auckland
505	Seed	Moderate	Unsure	Offshore	Breakbulk	Auckland
505	Plant material	Moderate	Unsure	Offshore	Breakbulk	Auckland
508	Seed	1	Unsure	Offshore	Breakbulk	Auckland
509	Plant material	Few	Not viable	Offshore	Breakbulk	Auckland
509	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
509	Insect	Few	Not viable	Offshore	Breakbulk	Auckland
510	Plant material	2	Unsure	Offshore	Breakbulk	Auckland
510	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
510	Plant material	1	Unsure	Offshore	Breakbulk	Auckland
511	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
513	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
514	Seed	Moderate	Unsure	Onshore	Container	Auckland
518	Plant material	Lots	Not viable	Onshore	Container	Auckland
519	Plant material	Moderate	Unsure	Onshore	Breakbulk	Auckland
519	Seed	Moderate	Not viable	Onshore	Breakbulk	Auckland
519	Insect	1	Not viable	Onshore	Breakbulk	Auckland
524	Seed	Moderate	Not viable	Onshore	Breakbulk	Auckland
524	Insect	3	Not viable	Onshore	Breakbulk	Auckland
525	Seed	Few	Unsure	Onshore	Breakbulk	Auckland
525	Insect	Few	Not viable	Onshore	Breakbulk	Auckland
532	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
533	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
541	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
579	Plant material	Little	Not viable	Onshore	Breakbulk	Wellington
594	Plant material	2	Not viable	Onshore	Breakbulk	Wellington
628	Seed	Moderate	Not viable	Offshore	Breakbulk	Auckland
632	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
633	Insect	Little	Not viable	Offshore	Breakbulk	Auckland
634	Insect	Little	Not viable	Offshore	Breakbulk	Auckland
635	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
635	Insect	Few	Not viable	Offshore	Breakbulk	Auckland
635	Animal material	3	Unsure	Offshore	Breakbulk	Auckland
638	Seed	2-3	Unsure	Offshore	Breakbulk	Auckland
644	Seed	1	Unsure	Offshore	Breakbulk	Auckland
644	Plant material	2	Not viable	Offshore	Breakbulk	Auckland
646	Plant material	1	Not viable	Offshore	Breakbulk	Auckland
649	Insect	Few	Not viable	Offshore	Breakbulk	Auckland
650	Seed	1	Not viable	Offshore	Breakbulk	Auckland
673	Insect	10	Not viable	Offshore	Breakbulk	Lyttelton
688	Insect	20	Not viable	Offshore	Breakbulk	Lyttelton
721	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
719	Insect	Moderate	Not viable	Offshore	Breakbulk	Wellington
719	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
733	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
739	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
740	Insect	1	Not viable	Offshore	Breakbulk	Wellington
740	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
746	Plant material	Little	Not viable	Offshore	Breakbulk	Wellington
841	Plant material	2	Not viable	Onshore	Breakbulk	Wellington
842	Seed	Lots	Unsure	Onshore	Breakbulk	Wellington
842	Plant material	Lots	Unsure	Onshore	Breakbulk	Wellington

Vehicle ID	Contaminant	Quantity	Viability[9]	Clearance	Arrival method	Port
852	Plant material	Little	Not viable	Onshore	Breakbulk	Auckland
852	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
854	Seed	Moderate	Not viable	Onshore	Breakbulk	Auckland
855	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
926	Insect	Moderate	Not viable	Onshore	Breakbulk	Lyttelton
931	Insect	Lots	Not viable	Onshore	Breakbulk	Lyttelton
931	Seed	Lots	Unsure	Onshore	Breakbulk	Lyttelton
943	Plant material	2	Not viable	Onshore	Breakbulk	Auckland
944	Seed	2	Not viable	Onshore	Breakbulk	Auckland
944	Insect	Few	Not viable	Onshore	Breakbulk	Auckland
949	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
115	Insect	Moderate	Not viable	Offshore	Breakbulk	Auckland
1 014	Plant material	2	Unsure	Onshore	Breakbulk	Wellington
1 041	Seed	Few	Unsure	Onshore	Breakbulk	Wellington
1 041	Plant material	Few	Unsure	Onshore	Breakbulk	Wellington
1 043	Insect	Few	Unsure	Onshore	Breakbulk	Wellington
1 043	Plant material	Little	Unsure	Onshore	Breakbulk	Wellington
1 182	Plant material	1	Not viable	Onshore	Breakbulk	Lyttelton
1 230	Insect	-	Not viable	Offshore	Breakbulk	Lyttelton
1 230	Seed	-	Not viable	Offshore	Breakbulk	Lyttelton
1 236	Insect	-	Not viable	Offshore	Breakbulk	Wellington
1 236	Seed	-	Viable	Offshore	Breakbulk	Wellington
1 248	Insect	-	Not viable	Offshore	Breakbulk	Wellington
1 248	Seed	-	Viable	Offshore	Breakbulk	Wellington
1 249	Insect	-	Not viable	Offshore	Breakbulk	Wellington
1 249	Seed	-	Not viable	Offshore	Breakbulk	Wellington
1 252	Insect	Lots	Unsure	Offshore	Breakbulk	Wellington
1 252	Seed	Lots	Viable	Offshore	Breakbulk	Wellington
1 259	Seed	-	Unsure	Onshore	Breakbulk	Lyttelton
1 265	Seed	-	Unsure	Onshore	Breakbulk	Lyttelton
1 265	Insect	-	Not viable	Onshore	Breakbulk	Lyttelton
1 291	Insect	Lots	Not viable	Offshore	Breakbulk	Lyttelton
1 291	Seed	Lots	Not viable	Offshore	Breakbulk	Lyttelton
894	Seed	1	Unsure	Offshore	Breakbulk	Lyttelton
1 302	Insect	Lots	Not viable	Offshore	Breakbulk	Lyttelton
1 302	Seed	Lots	Not viable	Offshore	Breakbulk	Lyttelton
1 303	Insect	Lots	Not viable	Offshore	Breakbulk	Lyttelton
1 303	Seed	Lots	Unsure	Offshore	Breakbulk	Lyttelton
1 307	Insect	1	Not viable	Offshore	Breakbulk	Lyttelton
1 307	Insect	1	Not viable	Offshore	Breakbulk	Lyttelton
1 307	Insects	Lots	Not viable	Offshore	Breakbulk	Lyttelton
1 308	Plant material	Little	Unsure	Onshore	Breakbulk	Auckland
1 312	Plant material	7	Not viable	Onshore	Breakbulk	Auckland
1 313	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
1 313	Insect	Little	Unsure	Onshore	Breakbulk	Auckland
1 318	Seed	Moderate	Not viable	Onshore	Breakbulk	Auckland
1 318	Insect	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 319	Seed	1	Not viable	Onshore	Breakbulk	Auckland
1 322	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
1 322	Insect	Little	Unsure	Onshore	Breakbulk	Auckland
1 326	Plant material	1	Not viable	Onshore	Breakbulk	Auckland
1 327	Seed	-	Not viable	Onshore	Breakbulk	Auckland
1 329	Seed	3	Viable	Onshore	Breakbulk	Auckland
1 329	Insect	Few	Viable	Onshore	Breakbulk	Auckland

Vehicle ID	Contaminant	Quantity	Viability[9]	Clearance	Arrival method	Port
1 330	Seed	Few	Unsure	Onshore	Breakbulk	Auckland
1 330	Animal material	Few	Unsure	Onshore	Breakbulk	Auckland
1 331	Seed	Few	Unsure	Onshore	Breakbulk	Auckland
1 340	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
1 343	Seed	1	Viable	Onshore	Breakbulk	Auckland
1 344	Seed	1	Not viable	Onshore	Breakbulk	Auckland
1 345	Seed	5	Not viable	Onshore	Breakbulk	Auckland
1 345	Plant material	Little	Unsure	Onshore	Breakbulk	Auckland
1 346	Plant material	Few	Unsure	Onshore	Breakbulk	Auckland
1 346	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
1 347	Seed	2-3	Not viable	Onshore	Breakbulk	Auckland
1 348	Seed	Few	Viable	Onshore	Breakbulk	Auckland
1 348	Animal material	1	Not viable	Onshore	Breakbulk	Auckland
1 349	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
1 354	Plant material	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 354	Seed	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 356	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
1 357	Seed	Moderate	Not viable	Onshore	Breakbulk	Auckland
1 357	Plant material	Moderate	Unsure	Onshore	Breakbulk	Auckland
1 359	Seed	Few	Unsure	Onshore	Breakbulk	Auckland
1 369	Insect	-	Not viable	Onshore	Breakbulk	Auckland
1 369	Seed	-	Not viable	Onshore	Breakbulk	Auckland
1 374	Seed	-	Unsure	Onshore	Breakbulk	Auckland
1 375	Insect	-	Not viable	Onshore	Breakbulk	Auckland
1 375	Plant material	1	Unsure	Onshore	Breakbulk	Auckland
1 380	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
1 381	Soil	Little	Unsure	Onshore	Breakbulk	Auckland
1 388	Seed	1	Unsure	Onshore	Breakbulk	Auckland
1 389	Seed	3-5	Not viable	Onshore	Breakbulk	Auckland
1 391	Seed	Few	Not viable	Onshore	Breakbulk	Auckland
1 392	Seed	3	Unsure	Onshore	Breakbulk	Auckland
1 393	Seed	1	Unsure	Onshore	Breakbulk	Auckland
1 399	Seed	2	Not viable	Onshore	Breakbulk	Auckland
1 400	Seed	1	Not viable	Onshore	Breakbulk	Auckland
1 400	Insect	2	Not viable	Onshore	Breakbulk	Auckland
1 404	Plant material	Few	Not viable	Onshore	Container	Auckland
1 413	Seed	10	Not viable	Onshore	Container	Auckland
1 413	Seed	7	Not viable	Onshore	Container	Auckland
1 413	Seed	1	Not viable	Onshore	Container	Auckland
1 413	Seed	1	Not viable	Onshore	Container	Auckland
409	Seed	Few	Not viable	Offshore	Breakbulk	Auckland
1 308	Seed	Little	Not viable	Onshore	Breakbulk	Auckland
1 346	Seed	Few	Viable	Onshore	Breakbulk	Auckland
1 345	Seed	1	Viable	Onshore	Breakbulk	Auckland
489	Seed	1	Viable	Offshore	Breakbulk	Auckland
1 252	Seed	3	Not viable	Offshore	Breakbulk	Wellington
1 248	Seed	4	Not viable	Offshore	Breakbulk	Wellington

Appendix VI. Lab identifications made during the survey

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
920056112	Unrecorded	Unrecorded	Japan	IDC	Arthropod	Araneae: Theridiidae	Identification not possible	Live	Some species regulated in BORIC
14637	491	EP910443761	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14638	486	GF1011975	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14640	493	QU14001284	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14631	852	SV40-0007852	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14635	484	LH1780002139	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
320052634	427	SALLPAMJ3TA3X1326	Japan	IDC	Arthropod	Psocoptera: Liposcelidae	*Liposcelis* sp.	Live	Some species regulated in BORIC
14415	113	LH1721032269	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Puccinellia* sp.	Live	Some species present in NZ
14416	137	TCR101248098	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14418	116	GC21W161855	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
920056463	137	TCR101248098	Japan	IDC	Nematode	Tylenchida: Aphelenchoididae	*Aphelenchoides* sp.	Unrecorded	Some species regulated in BORIC
920056463	137	TCR101248098	Japan	IDC	Nematode	Rhabditida: Rhabditidae	Identification not possible	Unrecorded	Some species regulated in BORIC
920056463	137	TCR101248098	Japan	IDC	Nematode	Araeolaimida:	Identification not possible	Unrecorded	Some of this family are in NZ
920056453	492	LH1821001669	Japan	IDC	Nematode	Rhabditida: Cephalobidae	Cephalobidae	Unrecorded	Non regulated - not in BORIC **
14413	111	Z10072978	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14413	111	Z10072978	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14634	478	UA21027122	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14634	478	UA21027122	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14633	480	GA33076597	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14630	855	SXM100032420	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Lactuca* sp.	Dead	Some species present in NZ
14414	115	SXV200035681	Japan	AgriQuality	Seed	Apiales: Apiaceae	*Torilis nodosa*	Dead	Present in NZ
14414	115	SXV200035681	Japan	AgriQuality	Seed	Polygonales: Polygonaceae	*Polygonum* sp.	Dead	Some species present in NZ
14629	854	F31A0102058	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum officinale*	Dead	Present in NZ
14629	854	F31A0102058	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Crepis* sp.	Dead	Some species present in NZ
14629	854	F31A0102058	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14636	485	PR11017249	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14641	497	FIN EKS1016857	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
14642	502	EK21012854	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum officinale*	Dead	Present in NZ
14643	509	WFY10130456	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum officinale*	Dead	Present in NZ
14645	513	FN15833233	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14646	487	FN15829711	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14646	487	FN15829711	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus oleraceus*	Dead	Present in NZ
14647	477	Z10092114	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Crepis* sp.	Dead	Some species present in NZ
14647	477	Z10092114	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14648	487	FN15-829711	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum officinale*	Dead	Present in NZ
14648	487	FN15-829711	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
15006	518	62J099849	U.S.A	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum officinale*	Dead	Present in NZ
14985	637	GF8033808	Japan	AgriQuality	Seed	Asterales: Asteraceae	Identification not possible	Dead	Some species present in NZ
15002	515	60L121876	Unknown	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14644	511	EL21011429	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Digitaria* sp.	Dead	Some species present in NZ
15003	515	60L121876	Unknown	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14993	414	SCP100403968	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14632	483	HR33092426	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14632	483	HR33092426	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14632	483	HR33092426	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14997	388	UCS69DW7102489	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14639	490	EU14627613	Japan	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
15146	1319	A32406065	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
15150	1314	WF0AXXWPDAYL4488 5	Singapore	AgriQuality	Seed	Unknown	Identification not possible	Dead	Unable to be determined
14654	334	KZJ950030050	Unknown	AgriQuality	Seed	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
14986	650	GC8050045	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
920056457	1270	GD11741842	Unknown	IDC	Arthropod	Diptera: Chironomidae	Identification not possible	Dead	Some species regulated in BORIC
920056465	497	EKS1016857	Japan	IDC	Arthropod	Diptera: Tipulidae	Identification not possible	Dead	Some species regulated in BORIC
920056447	1303	AE1117055350	Unknown	Unknown	Arthropod	Coleoptera: Anobiidae	*Lasioderma serricorne*	Live	Non regulated in BORIC
920056450	114	GF8034109	Unknown	IDC	Arthropod	Hemiptera:	Identification not possible	Dead	Some species regulated in BORIC
920056454	1291	ST2104035732	Unknown	IDC	Arthropod	Coleoptera: Cicindelidae	Identification not possible	Dead	Some species regulated in BORIC
920056444	133	SXA150011508	Japan	IDC	Arthropod	Isopoda: Armadillidiidae	*Armadillidium* sp.	Dead	Regulated in BORIC

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
920056456	507	CRX100119801	Japan	IDC	Arthropod	Araneae: Theridiidae	Identification not possible	Live	Some species regulated in BORIC
920056464	115	SXV200035681	Unknown	IDC	Arthropod	Hymenoptera: Formicidae	Identification not possible	Dead	Some species regulated in BORIC
920056464	115	SXV200035681	Unknown	IDC	Arthropod	Coleoptera:	Identification not possible	Dead	Some species regulated in BORIC
920056448	485	PR11107249	Japan	IDC	Arthropod	Hymenoptera: Formicidae	*Ochetellus glaber*	Live	Non regulated in BORIC
920056620	658	WTP12002355	Japan	IDC	Arthropod	Araneae:	Identification not possible	Dead	Unable to be determined
14992	409	FN15430999	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14992	409	FN15430999	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Crepis* sp.	Dead	Some species present in NZ
14992	409	FN15430999	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Live	Some species present in NZ
14649	489	P11534702	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14649	489	P11534702	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus oleraceus*	Live	Present in NZ
14650	510	HR11001643	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14995	382	VZN1850017282	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14998	390	P11540023	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14999	386	WVWZZZ9CZ3M605208	Japan	AgriQuality	Seed	Fabales: Fabaceae	Identification not possible	Dead	Some of this family are in NZ
15004	518	62J099849	U.S.A	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
15004	518	62J099849	U.S.A	AgriQuality	Plant	Fabales: Fabaceae	*Medicago* sp.	Dead	Some species present in NZ
14980	631	GF8042209	Japan	AgriQuality	Seed	Geraniales: Oxalidaceae	*Oxalis* sp.	Dead	Some species present in NZ
14984	635	WBABN52090JU73228	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14984	635	WBABN52090JU73228	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14987	401	FN15839341	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14988	405	DW5WF101496	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Live	Some species present in NZ
15005	518	62J099849	U.S.A	AgriQuality	Seed	Sapindales: Aceraceae	*Acer* sp.	Dead	Some species present in NZ
15005	518	62J099849	U.S.A	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
15005	518	62J099849	U.S.A	AgriQuality	Plant	Cyperales: Poaceae	Identification not possible	Dead	Some species present in NZ
15007	517	SALLMAMC33A138497	U.K	AgriQuality	Seed	Myrtales: Onagraceae	*Epilobium* sp.	Live	Some species present in NZ
14994	415	P11530580	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14651	1285	ST202016942	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14651	1285	ST202016942	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14651	1285	ST202016942	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14652	1302	Z25A0043374	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14652	1302	Z25A0043374	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
14652	1302	Z25A0043374	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14653	1291	ST2104035732	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14653	1291	ST2104035732	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Crepis* sp.	Dead	Some species present in NZ
14653	1291	ST2104035732	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14990	406	ST2060026990	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Live	Present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Hypochoeris* sp.	Dead	Some species present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Crepis* sp.	Dead	Some species present in NZ
14996	387	BHE005765	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus oleraceus*	Live	Present in NZ
15000	519	EA1W0020584	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
15000	519	EA1W0020584	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
15001	524	SF5003871	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
15001	524	SF5003871	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
15145	1318	FJ15001754	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
15148	1308	K11472851	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
15148	1308	K11472851	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
15951	1327	SAJAC23EOYLF00706	Singapore	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14655	188	SXN100006818	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14655	188	SXN100006818	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
14655	188	SXN100006818	Unknown	AgriQuality	Seed	Asterales: Asteraceae	Identification not possible	Dead	Some species present in NZ
14981	661	Z21A0206147	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Live	Present in NZ
14982	627	S14147875	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Bromus willdenowii*	Dead	Present in NZ
14989	406	ST2060026990	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14991	407	MCV210034640	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
0920056783	1316	AE1115002561	Japan	IDC	Nematode	Araeolaimida:	Identification not possible	Live	Some of this family are in NZ
15894	1400	NRR33C13000305	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
14983	628	MCV2315011351	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
14983	628	MCV2315011351	Japan	AgriQuality	Seed	Asterales: Asteraceae	Identification not possible	Dead	Some species present in NZ
15896	1399	NPR58P7106027	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
15956	1336	DB52T221620	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
15956	1336	DB52T221620	Unknown	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
15957	1415	IFTRXL17L22KC95229	U.S.A	AgriQuality	Seed	Sapindales: Aceraceae	*Acer* sp.	Dead	Some species present in NZ

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
16012	944	CT2115000112	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
1515215151	1313	P11533195	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
1515215151	1313	P11533195	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
15147	1317	KR20-603202	Unknown	Unknown	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Live	Present in NZ
15958	1413	2GCEC1445F1106797	U.S.A	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Dead	Some species present in NZ
15958	1413	2GCEC1445F1106797	U.S.A	AgriQuality	Seed	Asterales: Asteraceae	*Lactuca* sp.	Dead	Some species present in NZ
15958	1413	2GCEC1445F1106797	U.S.A	AgriQuality	Seed	Cyperales: Poaceae	*Puccinellia* sp.	Dead	Some species present in NZ
16011	1338	SHOP148034	Japan	AgriQuality	Seed	Unknown	Identification not possible	Dead	Unable to be determined
16013	1230	Z23W0206604	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16013	1230	Z23W0206604	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Hypochoeris* sp.	Dead	Some species present in NZ
16015	1249	Z23W0206483	Japan	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Dead	Some species present in NZ
16015	1249	Z23W0206483	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Hypochoeris* sp.	Live	Some species present in NZ
16015	1249	Z23W0206483	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
16016	1340	WG64T102598	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
16016	1340	WG64T102598	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
15952	1413	2GCEC1445F	U.S.A	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Dead	Some species present in NZ
15953	1411	IGTCC14D8BB512037	Canada	AgriQuality	Seed	Sapindales: Aceraceae	*Acer* sp.	Dead	Some species present in NZ
15895	1391	P4723008388	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
15895	1391	P4723008388	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
15895	1391	P4723008388	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
15955	1011	AE1150031761	Japan	AgriQuality	Seed	Urticales: Ulmaceae	*Zelkova serrata*	Live	Unable to be determined
16014	1236	Z23W0206420	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Hypochoeris* sp.	Dead	Some species present in NZ
16026	1322	ST1950105326	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
16026	1322	ST1950105326	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
16027	1248	Z23W0206485	Japan	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Live	Some species present in NZ
16027	1248	Z23W0206485	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Poa* sp.	Dead	Some species present in NZ
16027	1248	Z23W0206485	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Phalaris* sp.	Dead	Some species present in NZ
16027	1248	Z23W0206485	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16027	1248	Z23W0206485	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus asper*	Live	Present in NZ
16028	1252	Z23W0206588	Japan	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Live	Some species present in NZ
16028	1252	Z23W0206588	Japan	AgriQuality	Seed	Hamamelidales: Plantanaceae	*Platanus* sp.	Dead	Some species present in NZ
16028	1252	Z23W0206588	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16028	1252	Z23W0206588	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Phleum pratense*	Dead	Present in NZ

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
16029	1380	Z25A0020937	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16033	1358	EA1A2633	Japan	AgriQuality	Seed	Typhales: Typhaceae	*Typha* sp.	Dead	Regulated in BORIC
16033	1358	EA1A2633	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
16033	1358	EA1A2633	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
16034	1357	AT2100009871	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
16036	1345	NKR71L7405355	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16036	1345	NKR71L7405355	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Live	Some species present in NZ
16036	1345	NKR71L7405355	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Live	Present in NZ
16038	1346	NKR66E7531345	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
16038	1346	NKR66E7531345	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Dead	Some species present in NZ
16038	1346	NKR66E7531345	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus asper*	Live	Present in NZ
16038	1346	NKR66E7531345	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
16038	1346	NKR66E7531345	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Dead	Present in NZ
16041	1408	F10YRM41737	U.S.A	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Live	Some species present in NZ
16041	1408	F10YRM41737	U.S.A	AgriQuality	Seed	Cyperales: Poaceae	*Hordeum* sp.	Dead	Some species present in NZ
16042	1349	FE638EV52115	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Live	Some species present in NZ
16042	1349	FE638EV52115	Japan	AgriQuality	Seed	Fagales: Betuladae	*Betula* sp.	Dead	Some species present in NZ
16043	Unrecorded	NKR66E7448973	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
16043	Unrecorded	NKR66E7448973	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Digitaria* sp.	Dead	Some species present in NZ
16043	Unrecorded	NKR66E7448973	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
16043	Unrecorded	NKR66E7448973	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Conyza* sp.	Live	Some species present in NZ
16043	Unrecorded	NKR66E7448973	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus oleraceus*	Dead	Present in NZ
16044	1383	AKR66E7749246	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16031	1356	A32133444	Unknown	AgriQuality	Seed	Typhales: Typhaceae	*Typha* sp.	Dead	Regulated in BORIC
16031	1356	A32133444	Unknown	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
16032	1343	FRR33K43000250	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Sonchus oleraceus*	Live	Present in NZ
16037	1348	WG64T102666	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Live	Present in NZ
16030	829	EN15402050	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Digitaria* sp.	Live	Some species present in NZ
16049	1389	NF4F23005118	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
16049	1389	NF4F23005118	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
920056325	237	LH1031034571	Japan	IDC	Arthropod	Blattodea: Blattidae	*Periplaneta americana*	Live	Non regulated in BORIC
16048	Unrecorded	Unrecorded	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
16047	1394	WBAAN92040NJ02859	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
16046	1369	FB14057823	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
16046	1369	FB14057823	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Miscanthus* sp.	Dead	Some species present in NZ
16045	1408	F10YRM41737	U.S.A	AgriQuality	Plant	Unknown	Identification not possible	Dead	Unable to be determined
16040	1349	FE638EV521152	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Senecio* sp.	Dead	Some species present in NZ
16035	1344	FE561BT520054	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
16039	1347	NPR66P7403938	Japan	AgriQuality	Seed	Asterales: Asteraceae	*Taraxacum* sp.	Dead	Some species present in NZ
16039	1347	NPR66P7403938	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Imperata cylindrica*	Dead	Present in NZ
16010	1329	KZJ950046341	Japan	AgriQuality	Seed	Cyperales: Poaceae	*Andropogon virginicus*	Live	Present in NZ
920056624	384	RA61080564	Japan	IDC	Arthropod	Coleoptera: Dermestidae	*Anthrenus* sp.	Dead	Some species regulated in BORIC
920056449	1307	SXA100051771	Japan	Unknown	Arthropod	Odonata: Libellulidae	*Sympetrum* sp.	Dead	Non regulated - not in BORIC **
920056625	520	WVWZZZ1KZ5U012577	Unknown	Unknown	Arthropod	Diptera: Tipulidae	Identification not possible	Dead	Some species regulated in BORIC
920056625	520	WVWZZZ1KZ5U012577	Unknown	Unknown	Arthropod	Lepidoptera: Noctuidae	*Graphania lignana*	Dead	Non regulated - not in BORIC **
920056780	603	WF04XXGBB4IRI4842	Unknown	Unknown	Fungus	Unknown	Identification not possible	Unsure	Unable to be determined
920056780	603	WF04XXGBB4IRI4842	Unknown	Unknown	Fungus	Unknown	Identification not possible	Unsure	Unable to be determined
920056780	603	WF04XXGBB4IRI4842	Unknown	Unknown	Fungus	Hyphomycetales: Dematiaceae	*Cladosporium cladosporioides*	Unsure	Some sub-species regulated in BORIC
920056979	1415	1FTBX17L22N95229	U.S.A	Unknown	Nematode	Rhabditida: Cephalobidae	Identification not possible	Unrecorded	Non regulated - not in BORIC **
920056455	500	GV8W416420	Japan	Unknown	Arthropod	Lepidoptera: Zygaeinidae	Identification not possible	Unsure	Non regulated - not in BORIC **
920056455	500	GV8W416420	Japan	Unknown	Unknown	Lepidoptera: Nymphalidae	*Nymphalidae* indet.	Unsure	Some species regulated in BORIC
920056458	1307	SXA100051771	Japan	IDC	Arthropod	Coleoptera: Scarabaeidae	*Maladera* sp.	Dead	Some species regulated in BORIC
920056452	1291	ST2104035732	Unknown	IDC	Arthropod	Coleoptera: Chrysomelidae	Identification not possible	Dead	Some species regulated in BORIC
920056452	1291	ST2104035732	Unknown	IDC	Arthropod	Coleoptera: Staphylinidae	Identification not possible	Dead	Some species regulated in BORIC
920056452	1291	ST2104035732	Unknown	IDC	Arthropod	Coleoptera: Endomychidae	Identification not possible	Dead	Some species regulated in BORIC
920056985	836	BK12023496	Unknown	IDC	Arthropod	Lepidoptera: Noctuidae	Identification not possible	Dead	Some species regulated in BORIC
920056984	1407	3J66C187957	U.S.A	IDC	Arthropod	Araneae:	Identification not possible	Dead	Unable to be determined
920056779	958	BJFW107457	Japan	IDC	Arthropod	Araneae:	Identification not possible	Live	Unable to be determined
920056986	740	EU14041761	Japan	IDC	Arthropod	Odonata: Aeshnidae	*Aeshna* sp.	Dead	Non regulated - not in BORIC **
920056445	1302	Z25A0043374	Unknown	IDC	Arthropod	Lepidoptera: Pyralidae	Identification not possible	Dead	Some species regulated in

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
									BORIC
920056462	491	EP910443761	Japan	IDC	Arthropod	Diptera: Chironomidae	Identification not possible	Dead	Some species regulated in BORIC
920056462	491	EP910443761	Japan	IDC	Arthropod	Diptera: Tipulidae	Identification not possible	Dead	Some species regulated in BORIC
920056462	491	EP910443761	Japan	IDC	Arthropod	Mycotophilidae	Identification not possible	Dead	Non regulated - not in BORIC **
920056462	491	EP910443761	Japan	IDC	Arthropod	Hymenoptera: Formicidae	Identification not possible	Dead	Some species regulated in BORIC
920056462	491	EP910443761	Japan	IDC	Arthropod	Diptera: Drosophilidae	Identification not possible	Dead	Some species regulated in BORIC
920056462	491	EP910443761	Japan	IDC	Arthropod	Unknown	Identification not possible	Dead	Unable to be determined
920056460	474	JCG110005210	Unknown	IDC	Arthropod	Coleoptera: Carabidae	Identification not possible	Dead	Some species regulated in BORIC
920056460	474	JCG110005210	Unknown	IDC	Arthropod	Hemiptera: Lygaeidae	Identification not possible	Unrecorded	Some species regulated in BORIC
920056460	474	JCG110005210	Unknown	IDC	Arthropod	Hymenoptera: Formicidae	*Pheidole* sp.	Dead	Some species regulated in BORIC
920056460	474	JCG110005210	Unknown	IDC	Arthropod	Lepidoptera:	Identification not possible	Unrecorded	Some species regulated in BORIC
920056461	126	CE11647374	Japan	IDC	Arthropod	Lepidoptera: Crambidae	*Orocrambus flexuosellus*	Live	Present in NZ
9056777	1059	RD15113858	Japan	IDC	Arthropod	Hemiptera: Plataspididae	*Coptosoma punctissimum*	Unrecorded	Non regulated - not in BORIC
9056974	1252	z23w0206588	Unknown	IDC	Arthropod	Unknown	Identification not possible	Unrecorded	Unable to be determined
9056974	1252	z23w0206588	Unknown	IDC	Arthropod	Diptera:	Identification not possible	Unrecorded	Some species regulated in BORIC
9056974	1252	z23w0206588	Unknown	IDC	Arthropod	Lepidoptera:	Identification not possible	Unrecorded	Some species regulated in BORIC
9056974	1252	z23w0206588	Unknown	IDC	Arthropod	Homoptera: Tingidae	*Stephanitis* sp.	Unrecorded	Some species regulated in BORIC
9056974	1252	z23w0206588	Unknown	IDC	Arthropod	Hymenoptera: Ichneumonidae	*Mesochorus* sp.	Unrecorded	Non regulated - not in BORIC **
9056971	1350	KZJ950012788	Unknown	IDC	Arthropod	Hemiptera: Achilidae	Identification not possible	Unrecorded	Non regulated - not in BORIC **
9056778	959	GG2053751	Japan	Unknown	Arthropod	Araneae: Phalangiidae	*Phalangium opilio*	Unrecorded	Present in NZ
9056976	1236	Z23W0206420	Unknown	IDC	Arthropod	Lepidoptera: Pieridae	Identification not possible	Unrecorded	Some species regulated in BORIC
9056976	1236	Z23W0206420	Unknown	IDC	Arthropod	Diptera: Syrphidae	*Syrphus* sp.	Unrecorded	Some species regulated in BORIC

Lab accession	Vehicle ID	VIN Number	Country	Laboratory	Specimen type	Taxonomy	Identification	Viability	Biosecurity regulation
9056976	1236	Z23W0206420	Unknown	IDC	Arthropod	Diptera: Xylophagidae	*Xylophagus* sp.	Unrecorded	Non regulated - not in BORIC **
Unrecorded	846	VFIDA1102268477178	Unknown	IDC	Arthropod	Dictyoptera: Blattellidae	*Supella longipalpa*	Live	Regulated in BORIC
9056981	1327	SAJAC23EOYLF00706	Singapore	IDC	Arthropod	Diptera: Tipulidae	*Leptotarsus huttoni*	Unrecorded	Non regulated - not in BORIC
9056969	1230	Z23W0206604	Unknown	IDC	Arthropod	Diptera: Calliphoridae	*Lucilia* sp.	Dead	Only non regulated species in BORIC
9056969	1230	Z23W0206604	Unknown	IDC	Arthropod	Odonata: Libellulidae	*Sympetrum* sp.	Dead	Non regulated - not in BORIC **
9056969	1230	Z23W0206604	Unknown	IDC	Arthropod	Lepidoptera: Pieridae	*Pieris* sp	Dead	Some species regulated in BORIC
9056969	1230	Z23W0206604	Unknown	IDC	Arthropod	Lepidoptera: Nymphalidae	Identification not possible	Dead	Some species regulated in BORIC
9056969	1230	Z23W0206604	Unknown	IDC	Arthropod	Hymenoptera: Ichneumonidae	Identification not possible	Dead	Some species regulated in BORIC
9056619	657	AK12011048	Japan	IDC	Arthropod	Lepidoptera:	Identification not possible	Dead	Some species regulated in BORIC
9056784	1316	AE1115002561	Japan	IDC	Arthropod	Araneae: Theridiidae	Identification not possible	Unrecorded	Some species regulated in BORIC
9056978	836	BK12023496	Japan	IDC	Arthropod	Diptera: Stratiomyidae	*Hermetia illucens*	Unrecorded	Non regulated in BORIC
9056980	1413	2GCEC1445F1106797	U.S.A	IDC	Arthropod	Coleoptera: Dermestidae	*Trogoderma sinistrum*	Unrecorded	Regulated - not in BORIC
9056621	627	S14147875	Japan	IDC	Arthropod	Araneae: Sparassidae	*Heteropoda* sp.	Unrecorded	Only non regulated species in BORIC
9056618	651	MCR300022169	Japan	IDC	Arthropod	Araneae: Theridiidae	*Theridion* sp.	Unrecorded	Regulated in BORIC
9056782	1313	P11533195	Japan	IDC	Arthropod	Hymenoptera: Formicidae	Identification not possible	Unrecorded	Some species regulated in BORIC
9056977	1241	CS2A0800372	Japan	IDC	Arthropod	Lepidoptera: Pyralidae	Identification not possible	Unrecorded	Some species regulated in BORIC
9056983	1328	WFOFXXWPDFYK6624 1	Singapore	IDC	Arthropod	Dictyoptera: Blattidae	Identification not possible	Unrecorded	Some species regulated in BORIC
9056982	1324	WVWZZZ9CZYM64825 0	Singapore	IDC	Arthropod	Dictyoptera: Blattellidae	*Supella* sp.	Unrecorded	Some species regulated in BORIC
9056781	1064	TG10102034A	Japan	IDC	Arthropod	Dictyoptera: Blattidae	*Periplaneta* sp.	Unrecorded	Some species regulated in BORIC

** No genus or species from this family was found in BORIC.

Appendix VII. Explanation of risk units

19.1 Definition of risk units

Risk goods that do not conform to an import health standard on arrival pose an unacceptable level of risk, and so are seized when detected. Although seizures represent an unacceptable risk, not all seizures are equal in terms of the risk they pose: a piece of backyard fresh fruit poses a risk of fruit fly outbreak, and is intuitively higher risk than a soiled tennis shoe, but lower risk than a live dog without proper certification, which may pose a risk of rabies. A live dog without appropriate documentation from Australia, where rabies is absent, is likely to be a lower risk than one from the United States, where rabies is present. A piece of raw meat from south-east Asia may pose a risk of foot and mouth disease, while a piece of fully-cooked meat from the same origin would not. A kilogram of wheat intended for sowing would be higher risk than a kilogram of wheat from the same origin that was destined for processing. Thus, seizures can be given a risk rating, in terms of risk units per kilogram or per unit, based on the type of product, the country or region of origin, the level of treatment and the end use.

Seizures, once seized and properly treated or disposed of, no longer constitute a risk to New Zealand: they represent risk averted. However, slippage (undetected entry of non-conforming risk goods into New Zealand) does represent a risk to New Zealand. Quantifying slippage seizures in terms of risk units, rather than so many kilograms of fruit fly host material and so many units of nursery stock, and so on, means that a single value of risk exposure can be expressed for a pathway. This value, although meaningless by itself, can be tracked over time, compared with values obtained for other pathways, and used as an indicator of changes in biosecurity risk. Differences in the risk exposure of a pathway under different risk management regimes can also be used to give a value to the biosecurity benefit of those regimes, relative to their cost.

19.2 Risk exposure and seizure detection rate

The risk unit system exists as a series of tables in the Quantum database, enabling a risk unit value to be applied consistently to seizures whether recorded in Quanmail, Quanpax or Quancargo, whether made by MAF Quarantine Service as part of normal operations or found by the Biosecurity Monitoring Group during pathway monitoring surveys. The ratio of risk units found by MAF Quarantine Service to total risk units estimated to have arrived in a period of time (based on monitoring slippage) is a measure of the operational efficacy of the clearance process (which is based on a BNZ standard) in averting risk: this is referred to as the seizure detection rate. However, the seizure detection rate is not a measure of risk in itself: the value of risk exposure, expressed in risk units, for a pathway indicates the level of risk posed by the pathway, regardless of what proportion it is of the total risk on the pathway. If one pathway has 20,000 risk units arriving per month and risk management processes seize 50% and another has 100,000 risk units arriving per month and 90% is seized, the risk exposure of the two pathways is the same at 10,000 risk units per month.

19.3 Development of the risk unit scale

The concept of "risk units" (formerly called "urtcils") was developed in 1995-96 as a way to assign relative weights to slippage seizures found during a survey of international mail. The originator of the concept, Neil Hyde, developed a matrix of seizure types from different parts of the world and sent the matrix to experienced staff in MAF Quarantine Service, plant scientists at MAF Lynfield, and animal scientists in MAF Regulatory Authority. The three groups were asked to rate the various types of seizures from 1-10, with 10 being an extreme risk and 0 representing a conforming risk good or no risk, based on the type of product, types of pests/diseases present in the region of origin and not present in New Zealand, and level of processing and/or end use in some instances. The group weightings were then averaged and rounded to a single weighting.

The weighting did not take quantity seized into account, so the weighting was applied to a standard quantity based on the way in which the product was commonly intercepted. For instance, all fruit fly host material was given a rating of 10 – the common quantity seized is a piece of fruit, such as an apple, with a weight of approximately 100 grams. If a piece of fruit weighing 100 grams has a rating of 10 risk units, then fruit fly host material as a class should have a weighting of 100 risk units per kilogram seized.

For two product classes, nursery stock and live animals, the weighting was increased to reflect the extreme high risk of these classes. Live animals from any country were originally given a rating of 10 – this was increased to 200 per unit (animal). Nursery stock from any country was originally given a rating of 8 – this was increased to 150 per unit (plant).

In 1998 the seizure classification system was changed by MAF Biosecurity Authority, with subclasses being added for most seizure classes. What had previously been Meat Products was divided into subclasses such as meat, offal, pate, extracts, fat/tallow, and other meat products. A processing or qualifier field was also added for many classes, so that meat products in any subclass could be recorded as having no treatment, being home processed, being commercially processed without zoosanitary assurance or being commercially processed with zoosanitary assurance. Plant products (not for food) could be recorded as manufactured or not manufactured. Live animals and nursery stock subclasses could be recorded as prohibited, new to NZ without entry approval, not present in NZ but with entry approval, and present in NZ. The addition of subclasses and qualifiers greatly expanded the original risk unit scale: with 20 world regions, over 100 subclasses and 2-4 qualifier categories for many of the subclasses, over 2000 combinations had risk unit weightings developed. The new ratings for the highest risk combinations (e.g. meat with no treatment) were based on the original values, with lower values being applied for lower risk combinations (e.g. commercially processed extracts).