High risk site surveillance programme annual report 2014–2015

The High Risk Site Surveillance (HRSS) programme is a post-border risk-pathway-focused surveillance programme operated by the Ministry for Primary Industries (MPI), targeting vegetation (mainly trees and shrubs) and wooden materials. The primary objective of the HRSS programme is to detect new plant pests that pose a biosecurity risk or may impact on trees and shrubs (e.g., plantation forests, native forests and urban trees).

Methods

The HRSS programme identifies high-risk sites (where the risk of introduced organisms is high owing to movement of tourists or cargo) and groups them into Risk Site Areas (RSAs) that include ports, Transitional Facilities, camping grounds, tourist venues and golf courses, based upon identified clusters of sites. Risk and required detection probability are calculated to improve allocation of surveillance resources. Surveillance transects are assigned within RSAs to cover areas of potential host vegetation and provide discrete, repeatable "packets" of intensive surveillance. Field surveyors thoroughly inspect trees, shrubs and woody material within these transects. Suspect samples that may (in the opinion of the field surveyor) be a biosecurity risk are collected and forwarded to the appropriate laboratory for identification. New records are recorded in MPI's Plant Pest Information Network (PPIN) database and reported for further appropriate action.

HRSS is administered by AsureQuality on behalf of MPI. SPS Biosecurity is responsible for most of the field work throughout New Zealand, and AsureQuality carries out surveillance in the Wanganui-Manawatu region. Methods used in the HRSS programme are further detailed in Stevens (2011).

Data collection for the programme is completely electronic, including the sample forms for submissions to FHRL. Everything is running smoothly and Scion's diagnosticians can access data on each sample while actually inspecting it.

Changes made to the risk model in previous years to enable a risk factor to be allocated to each individual RSA throughout New Zealand were maintained this season. All risk sites and calculated risks are mapped in GIS. This enables better allocation of limited surveillance resources and makes the programme more effective.

Probability of detection in the HRSS programme is based on Carter (1989). Using this model, it is clear that repeated surveys within RSAs increase the probability of detection . Additionally, as the risk of incursion is ongoing, repeated inspections mean incursions in a smaller population are increasingly likely to be found. For these reasons, the RSAs with the highest calculated risk were inspected up to four times during the survey season.

Results

Field surveillance

During the 2014–2015 season 503 RSAs and 7 006 transects were surveyed. Most surveillance was carried out around Transitional Facilities or their associated vegetation-rich areas (VRAs) (90 percent of all transects).

Table 1 shows an example of calculated biosecurity risk compared to the actual transect inspections completed by region, for the 10 regions most at risk. It shows that Auckland has the highest biosecurity risk in the country; this is directly related to the volume of goods and passengers entering the country and/or being unloaded there.

Table 2 is a summary of the detection probabilities for the major risk ports. Detection probabilities have been maintained at previous levels and aligned with the calculated risk.

As part of surveillance the HRSS programme inspects more than a thousand species of tree. While production trees are specifically targeted, there are many pests which can also be found on multiple hosts, and many areas where there are no production species planted. To overcome this, a good cross-section of native and urban exotic tree species are also inspected. On average about 240 trees and shrubs of each species are inspected, including about 35 trees, per transect.

Diagnostics

Most diagnostic support for the HRSS programme is provided by Scion's Forest Health Reference Laboratory (FHRL). MPI's Investigation and Diagnostic Centre, Plant Health and Environment Laboratory (IDC-PHEL) identified samples not associated with trees and shrubs, or suspected of containing viruses, bacteria or nematodes.

Table 1: Calculated regional risk compared with percentage of transect inspections completed in 2014–2015

Region	Calculated biosecurity risk (percent)	Completed transect inspections (percent)
Auckland	61.1	50.6
Mid-Canterbury	11.1	8.4
Bay of Plenty	8.5	8.4
Wellington	5.6	5.5
Waikato	3.3	3.9
Hawke's Bay	3.1	3.6
Dunedin	1.4	3.0
Nelson	1.2	1.8
Southland	1.1	1.9
Wanganui	1.0	1.6

Source: Fraser *et al.*, 2015

Table 2: Summary of detection probabilities for the major risk ports, 2011–2015

Risk site	Mean detection probability 2011–2012 (percent)	Mean detection probability 2012–2013 (percent)	Mean detection probability 2013–2014 (percent)	Mean detection probability 2014–2015 (percent)
Port of Auckland	87	91	85	80
Auckland Airport/ Auckland Metro	76	89	88	82
Port of Tauranga	89	93	90	90
Port of Wellington seaport & Wellington Airport	63	55	60	66
Christchurch Airport	69	55	63	63
Port of Lyttelton	62	57	55	55

Source: Fraser *et al.*, 2015

IDC-PHEL was also responsible for validating all new to New Zealand identifications.

From 1 July 2014 to 30 June 2015 the diagnostic labs were sent 651 submissions (**Table 3**). These were divided into potential risk organisms and identifications made from these specimens. Insect specimens and plant samples showing insect damage were the most common (61 percent of all samples received). Fungi were identified in 18 percent of samples, but many of these yielded inconclusive results so they were further processed by the pathology sectuons of the laboratory to rule out fungi as a cause of damage. In 21 percent of samples, no insect or pathogen could be found or identified. A total of 896 identifications were made during the season, of which about 63 percent were made to species level.

From the identifications a total of 124 PPIN reports were forwarded to MPI from FHRL. All species identifications made by FHRL were completed or fully evaluated within 15 days for their potential to be a biosecurity threat, and 92 percent of insect identifications were completed within 15 days.

The HRSS programme generated 55 sample submissions directly to the IDC-PHEL. In addition, four samples came via FHRL. Eleven PPIN reports were generated out of the submissions directly reported to IDC-PHEL.

FHRL and PHEL both reported that submission quality from the field was of the same high standard as last year.

Table 3: Identification types made by FHRL and PHEL, 2012–2015

Sample type	2012–2013 (percent)	2013–2014 (percent)	2014–2015 (percent)
Entomology	47	61	61
Mycology	33	16	18
Inconclusive or other	20	23	21
Total	100	100	100

Source: Fraser *et al.*, 2015

DIscussion

Numbers of significant samples identified provide one measure of the effectiveness of any surveillance programme. **Table 4** shows the number of samples received and significant identifications made (either new to New Zealand, new to science, new host associations or new distributions) in 2014–2015. The number of significant identifications is down on 2012–2013 and closer to the level found in the two previous reporting periods.

Conclusion

As demonstrated by the number of significant detections reported to MPI, the HRSS programme continues to provide effective detections of plant pests potentially posing a biosecurity risk. While the total number of significant detections has decreased slightly, the proportion of submissions that produced significant detections has been maintained at the level achieved over the previous three years. The number of new to New Zealand records reported via this programme has dropped since last year. There could be many factors contributing to this, including increased border biosecurity.

The efficiency of the programme continues to be demonstrated by the ability to allocate surveillance resources to areas of known risk magnitude and with calculated detection probabilities for the highest-risk sites.

References

Carter PCS (1989). Risk Assessment and Pest Detection Surveys for Exotic Pests and Diseases which threaten Commercial Forestry in New Zealand. *New Zealand Journal of Forestry Science* 19(2/3): 353–374.

Fraser A, Kane W, Sopow S, Bulman L, Rogan B, Bennett S, Flynn A (2015). High Risk Site Surveillance: Annual Report 2014–2015. Programme report to Ministry for Primary Industries.

Stevens P (2011). High Risk Site Surveillance Annual Report 2010–2011. *Surveillance* 38(3), 72–74.

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Table 4: Diagnostic trends from 2011 to 2015 (FHRL and PHEL)

Type	2011–2012	2012–2013	2013–2014	2014–2015
Submissions	740	1 106	860	651
Identifications	966	1 627	1 154	896
New to NZ	5	6	2	0
Significant detections	147 (20 percent)	228 (21 percent)	153 (18 percent)	135 (21 percent)

Source: Fraser *et al.*, 2015