Sampling Interceptions for Risk Identification.

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Biosecurity is Expensive

Australian Federal Department of Agriculture and Water Resources 2014–15 Annual Report.

17 900 000	Air passengers
146 100 000	Mail Articles
18 000	Vessel First-Port Arrivals
611 000	Air Freight Consignments ($< \$1000$)
450 000	Cargo units referred from Customs (in 2014)

DAWR Operation

DAWR entomologists and plant pathologists identifiy pests detected on incoming goods.

Identification is carried out for two main reasons:

1. tactical: so that appropriate phytosanitary and/or sanitary measures can be applied, and
2. strategic: to become better informed about the nature of the risks of various import activities.

2012 Inspection Activity

The database comprises 26549 entries for 2012, from 8070 unique AIMS quarantine entries.

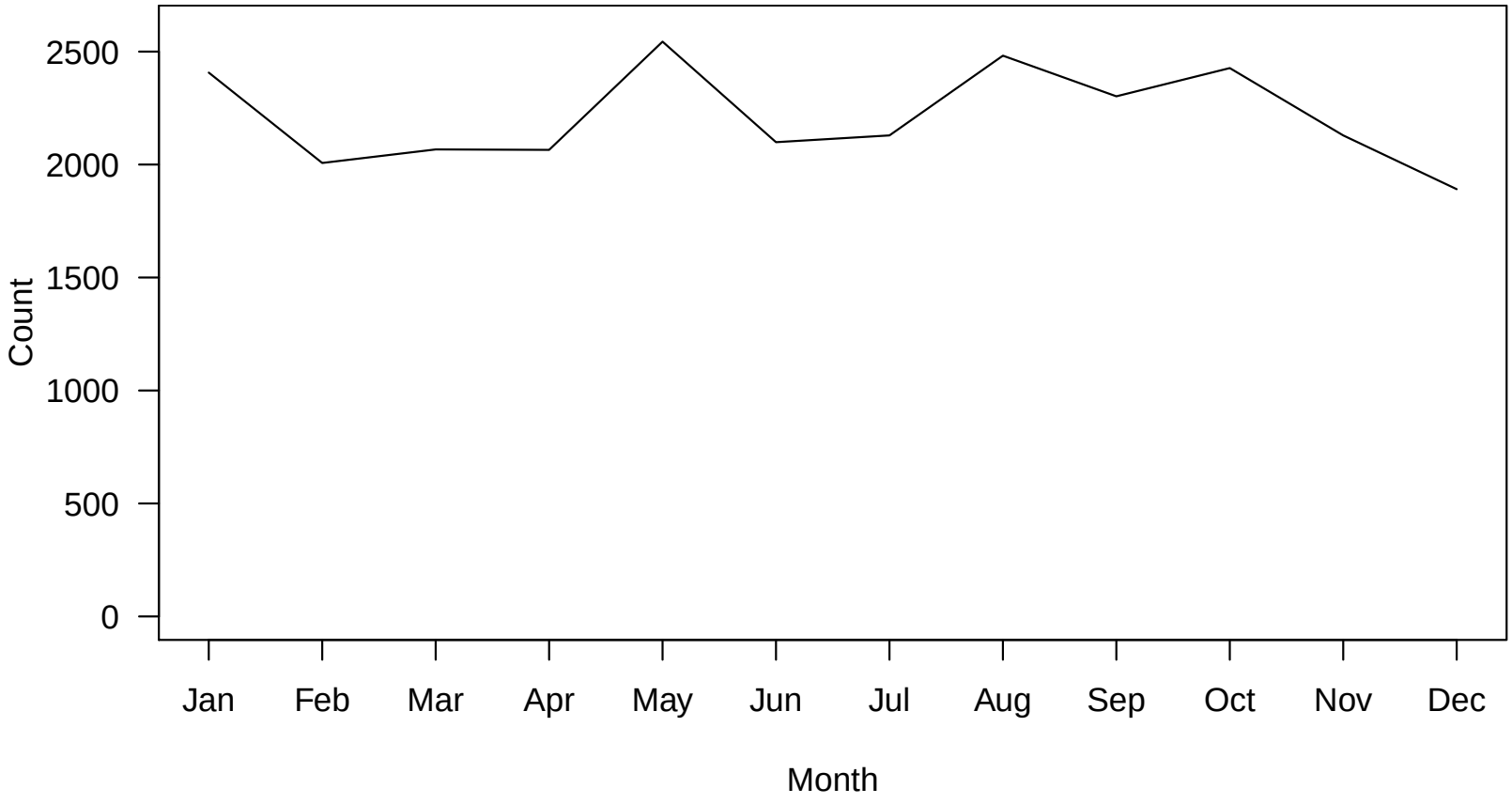

Figure: Monthly entry count for 2012 Incidents database.

2012 Inspection Activity

Table: Risk is % of identified pests that are a biosecurity threat. TTI is the average number of days taken to identify the pest.

Program	Total	Risk	TTI
Airports	2541	69.8	9.7
Fresh Produce	6860	78.3	1.2
Import Clearance	14174	68.0	5.6
Imported Foods	23	65.2	2.3
Live Animal Import	125	69.6	2.4
Mail	729	65.0	6.3
NAQS	32	56.2	12.3
Nursery Stock PEQ	874	85.8	2.8
Seaports	1132	58.0	12.0
Total	26549		

Complications: Cargo v. Pax & Mail

Diverse: tailgate, fresh produce, Unaccompanied Personal Effects (UPE), timber, machinery, break-bulk, containers, etc.

Inspection intensity varies.

Upon interception,

- store a specimen in a suitable medium;
- record relevant details;
- submit the specimen to the OSP; and
- place a hold on the cargo.

Exceptions: e.g., giant African snails.

Complications: consolidation, e.g., furniture manufacturer.

Complications: Cargo v. Pax & Mail

Submission of specimens varies from region to region, and sometimes within regions.

Once the pest has been intercepted, the identified risk is assumed to be mitigated.

How many book lice can one person take?

Identification

Commonly, identification dictates treatment. So, be quick.

Identification may be to level of risk rather than species.

Importers do not want to wait for the identification. Will treat.

Issues: Insects and Plants

Identifications to species level are often difficult or even impossible because:

1. there is not enough time,
2. the species are poorly known or new to science,
3. country of origin and/or host commodity information is unknown or incorrect,
4. appropriate taxonomic resources, reference collections, or skills are unavailable,
5. molecular techniques are primitive or non-existent,

Issues: Insects and Plants

Insect identifications to species level are often difficult or even impossible because:

1. the pest specimen is immature,
2. rearing immature specimens is difficult and often risky from a biosecurity perspective,
3. the pest specimens are the wrong sex or wrong caste, or
4. the specimen is damaged — e.g. squashed, deteriorated, lost body parts or worn body parts.

Issues: Insects and Plants

Identification of plant pathogens is difficult because:

1. the causative agents of diseases are undescribed;
2. fungal structures required for ID based on morphology alone (e.g., spores) are often not present;
3. viruses and bacteria are often not able to be diagnosed based on morphological characters, and viewing these characters is not simple given their microscopic size;
4. disease symptoms that are seen can be the result of a complex of causative agents and conditions;
5. there are difficulties in culturing causative agents and there are risks associated with containment of deliberately cultivating undetermined plant pathogens;
6. plant pathologies are often ecosystems, not a single species;
7. similar symptoms may arise from biotic and abiotic causes.

International Review

Country	Inspector	Scientist	Specialist	Try All?
Australia		✓	✓	
Canada	✓	✓	✓	
Hong Kong	✓	✓		Yes
Malaysia	✓	✓		Yes
New Zealand		✓	✓	
P.R. China		✓	✓	Yes
Peru		✓	✓	Yes
Russia	✓	✓	✓	Yes
Singapore	✓	✓	✓	Yes
Sri Lanka		✓		
UK	✓	✓	✓	Yes
USA		✓	✓	Yes

Candidate Solution Sketch

Upon interception of a pest,

1. the pest is submitted to OSP, where
2. it will be screened to determine whether the pest is a show-stopper — that is, one whose discovery presents a significant risk (e.g., khapra beetle);
3. those pests that are not identified as show-stoppers will then be divided into two groups, namely,
   - 3.1 *mandatory id*: identification required for specifying treatment, etc. — these pests will be identified as per the current standards;
   - 3.2 *optional id*: identification not required (e.g., importer requests treatment without awaiting identification results) — these pests will be randomly sampled for identification. Some will be identified as per the current standards; others will be stored. Note that all pests will still be screened as per step 2 above.

Discussion

- Precautionary principle.
- Sampling done by scientists, not inspectors.
- Alternative Implemetation:
  - Bug day
  - Snapshot surveys

Overview

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