



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention



IPPC Global Workshop on Systems Approaches

Santiago, Chile
1 – 4 December 2025

In partnership with:



Canada



Australian Government
Department of Agriculture,
Fisheries and Forestry

Quantitative tools developed in Australia to support Pest Risk Analysis

Dr Rieks van Klinken (CSIRO, Australia)



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Challenges for developing and assessing phytosanitary systems approaches where quantitative methods can help

- Determining how much risk needs to be reduced by
- Quantifying the combined benefit of multiple measures
- Knowing how many measures are enough



PRReSTo: Pest Risk Reduction Scenario Tool

- Designed to guide risk assessment and management
- Freely available on-line
- 1,500 users, 9 countries
- Being overhauled in 2026

puts:

Expected pest abundance
Expected area-wide:
ligible (0 - 0.01 PTW)

low (0.01 - 0.1 PTW)

(0.1 - 1 PTW)

severe (1 - 10 PTW)

very severe (10 - 100 PTW)

Method for specifying expected pest abundance:
Specify custom likelihood distribution (use sliders above)
Normal distribution (specify mean and SD below)

Mean (PTW)

Standard deviation (PTW)

Apply

Measures to minimise pest exposure at the registered site:

Exclusion
not applied

Treatment #1
not applied

Treatment #2
not applied

Vitro observation (area-wide)
monitoring

Vitro observation (site)

Expected host vulnerability
(for host items compliant with trade specifications):

non-host

very low vulnerability

low vulnerability

moderate vulnerability

high vulnerability

very high vulnerability

Measures to minimise host vulnerability:
Optional: adjust for host items in the consignment that are compromised by (choose one option first)

Low quality (e.g. damaged, bruised)

Expected host vulnerability (for low quality host items)

no change to trade specifications

Host status in the consignment

100% trade specifications

Host grading (quality)

not applied

Expected host infestation rate
(given pest exposure and host vulnerability):

negligible
(0 - 100,000 of 100,000)

very low
(100,000 - 1,000,000 of 100,000)

low
(1,000,000 - 10,000,000 of 100,000)

moderate
(10,000,000 - 100,000,000 of 100,000)

high
(100,000,000 - 1,000,000,000 of 100,000)

very high
(1,000,000,000 - 10,000,000,000 of 100,000)

Measures to reduce host infestation rates in the consignment:

Symptom grading
not applied

Kill treatment #1
not applied

Kill treatment #2
not applied

Inspection sampling method
relative risk = 1 (random sampling)

Inspection sample size
n = 500

Inspection sensitivity
20% sensitive

Outputs:
Host infestation rates in the consignment:

Show infestation rates given a negative inspection outcome (no pest detected and consignment shipped)

Risk threshold
0.01% (> very low infestation rates)

Probability of a positive inspection outcome (≥ 1 pests detected)

Probability of exceeding risk threshold in the consignment



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Crop Protection

journal homepage: www.elsevier.com/locate/cropro

The Pest Risk Reduction Scenario Tool (PRReSTo) for quantifying trade-related plant pest risks and benefits of risk-reducing measures

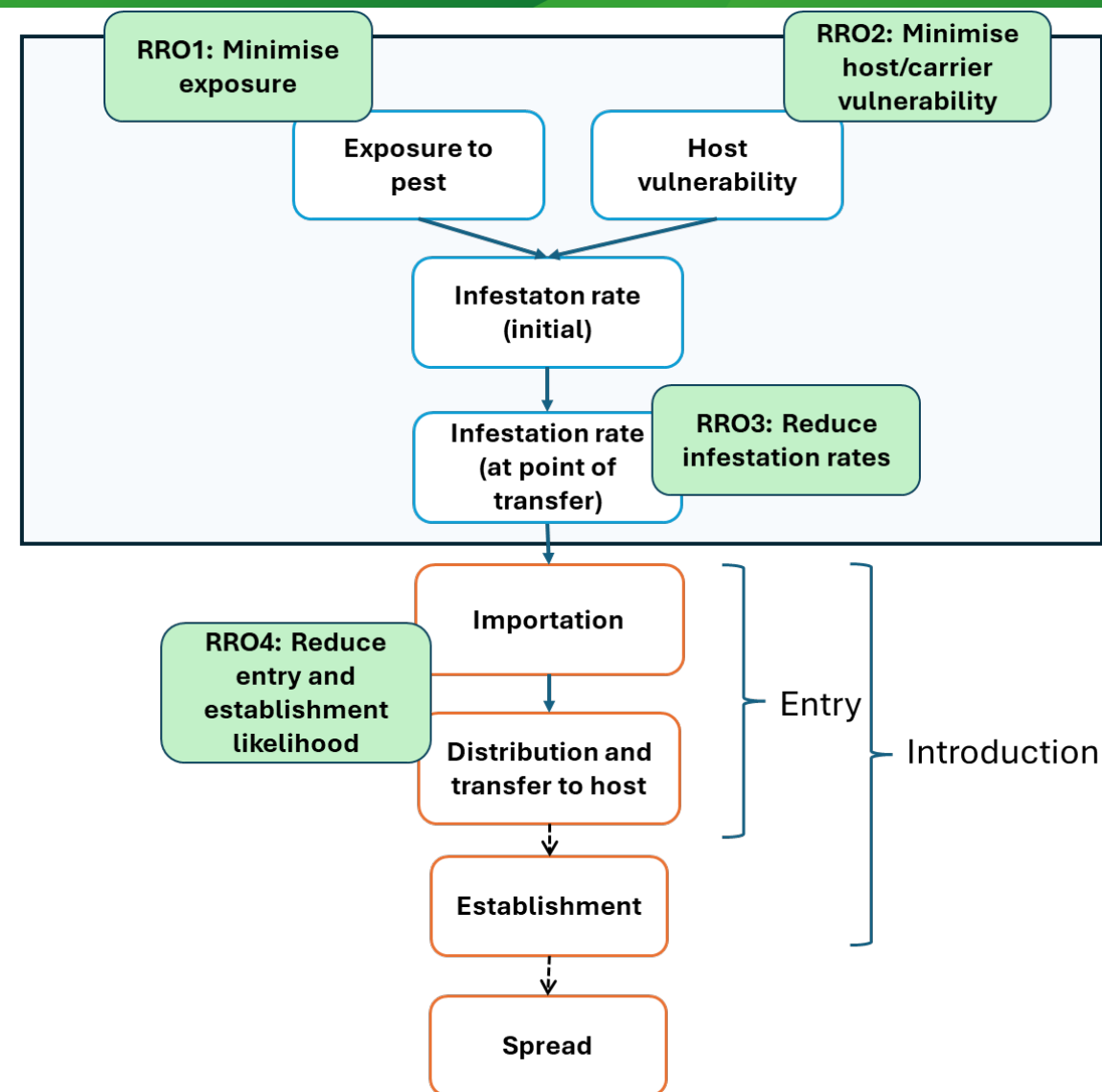
Jens G. Froese^{a,*}, Justine V. Murray^a, Nicholas J. Beeton^b, Riëks D. van Klinken^a

[PRReSTo \(Pest Risk Reduction Scenario Tool\) \(csiro.au\)](https://www.csiro.au)



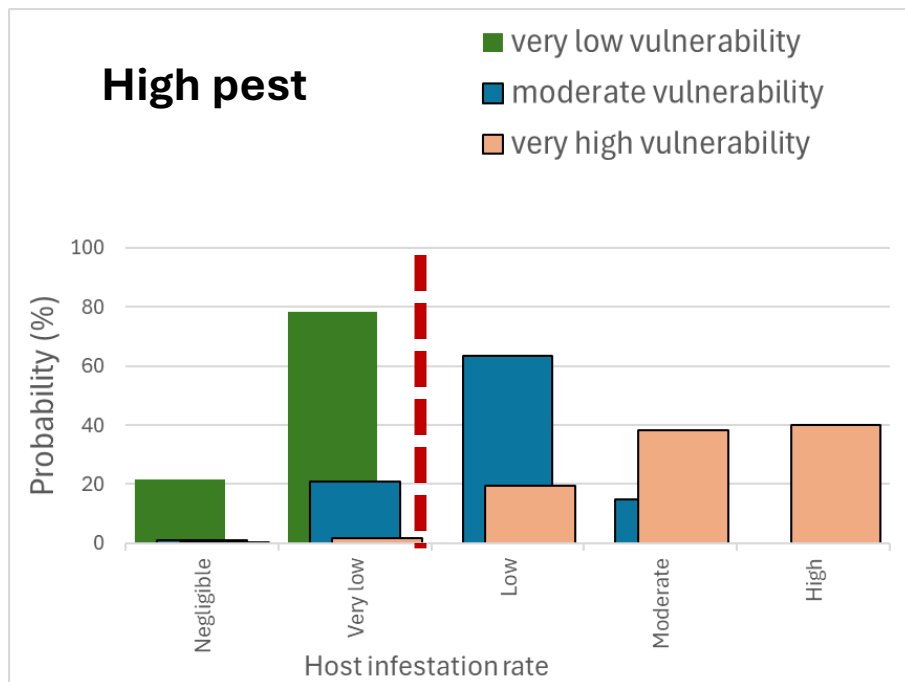
PRReSTo

- Current version estimates infestation rate at transfer
- Addresses 3 of the 4 risk reduction objectives
- 2026 version will incorporate entry and establishment likelihoods



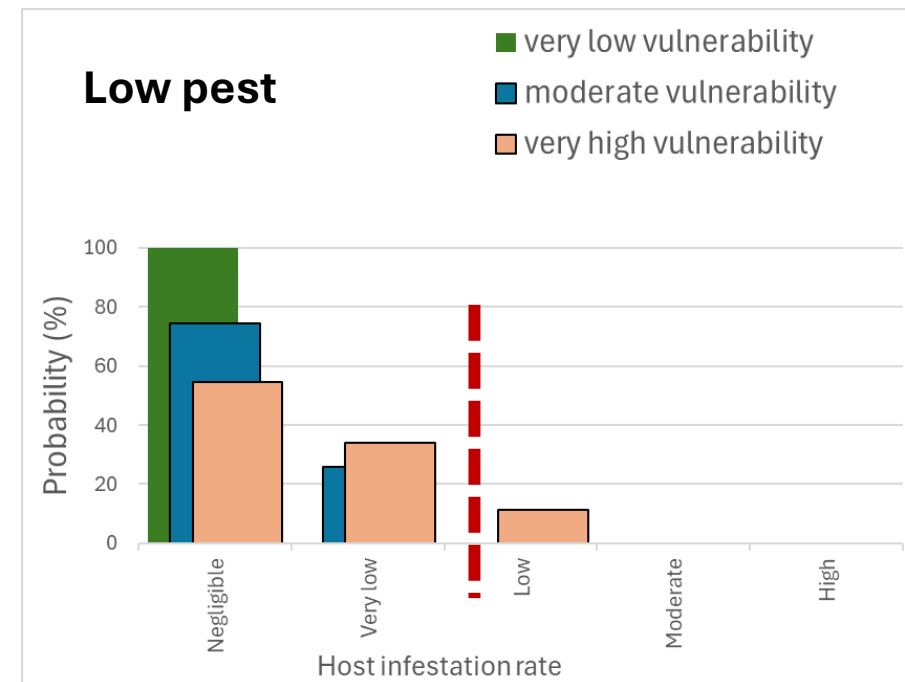


The effect of host vulnerability and pest exposure on infestation rate



High pest scenario:

- High infestation rates likely if moderate to high host vulnerability
- Much to do if host is highly vulnerable

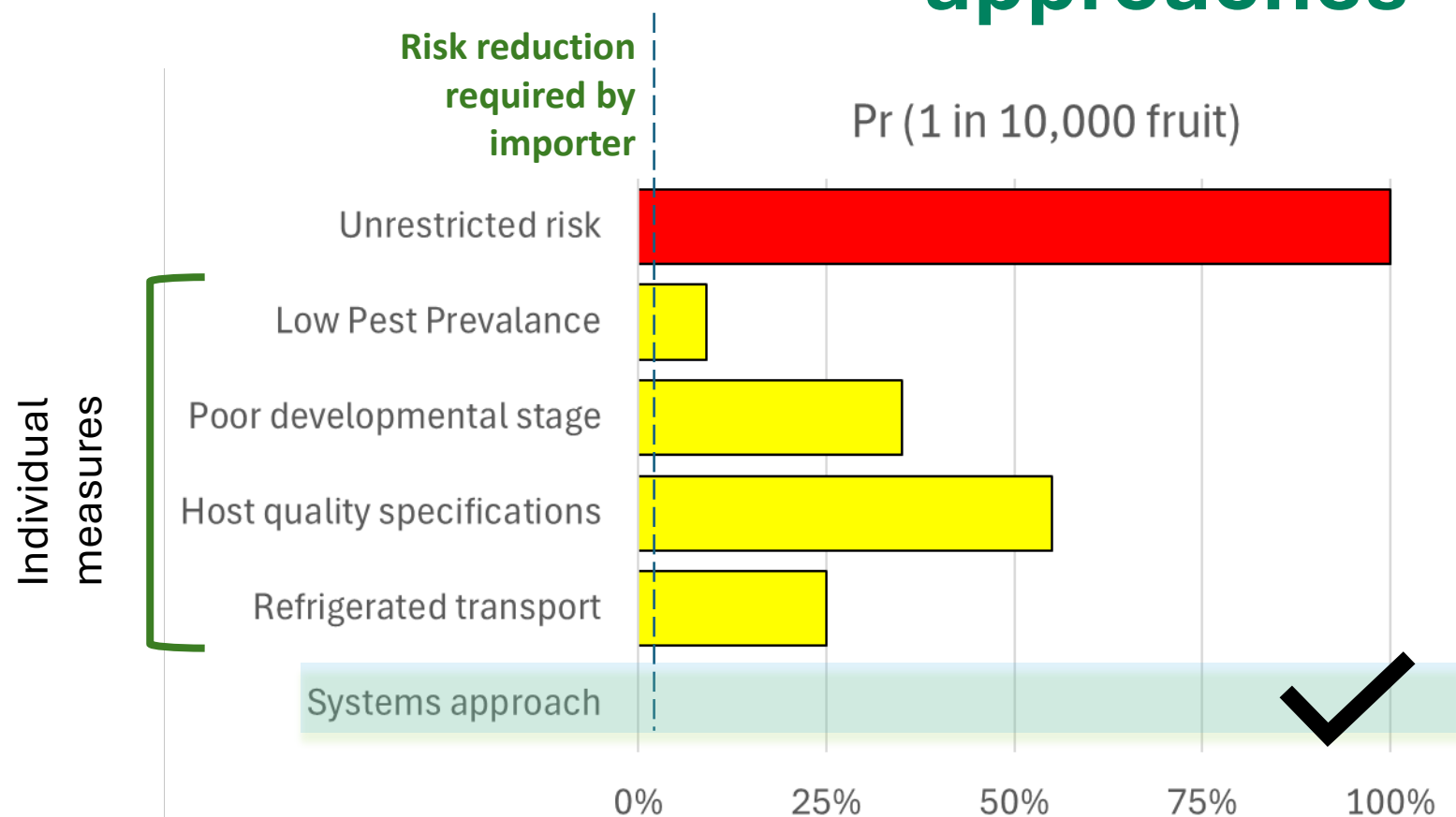


Low pest scenario:

- Mitigates most of the likelihood that infestation rates > 1:10k fruit.



PRReSTo: helping to build and evaluate systems approaches



Using PRReSTo to evaluate measures individually and in combination.

Unrestricted risk = high pest exposure and a good host



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From categorical to continuous variables

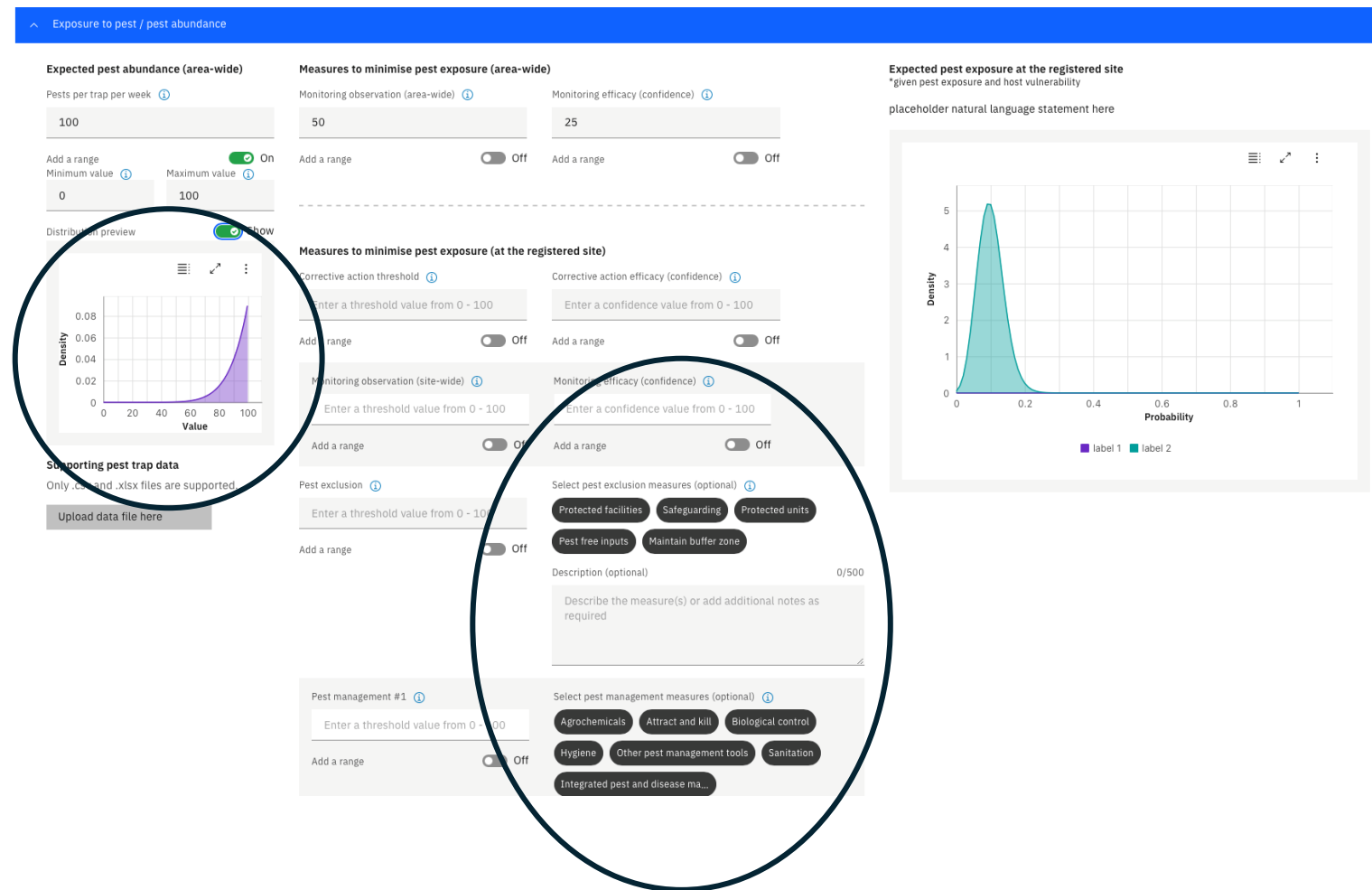
- Categorical models
 - suffer information loss
 - can inflate uncertainty and risk
- PRReSTo now enables use of continuous data



PRReSTo goals for 2026

- Major overhaul to make user interface easier to use
- Increase functionality
 - Categorical to continuous
 - Explicit link to menu of measures
 - Enable multiple scenario comparison
 - Allow you to save your models

**Contact me if you'd like to
be a "beta tester"**





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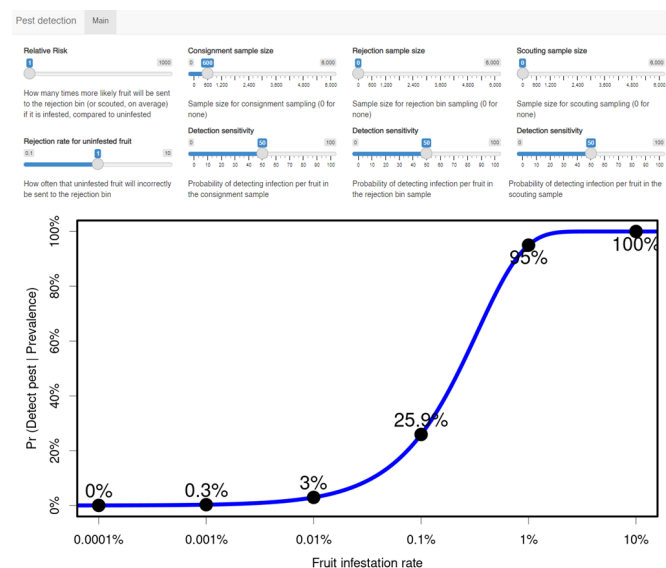


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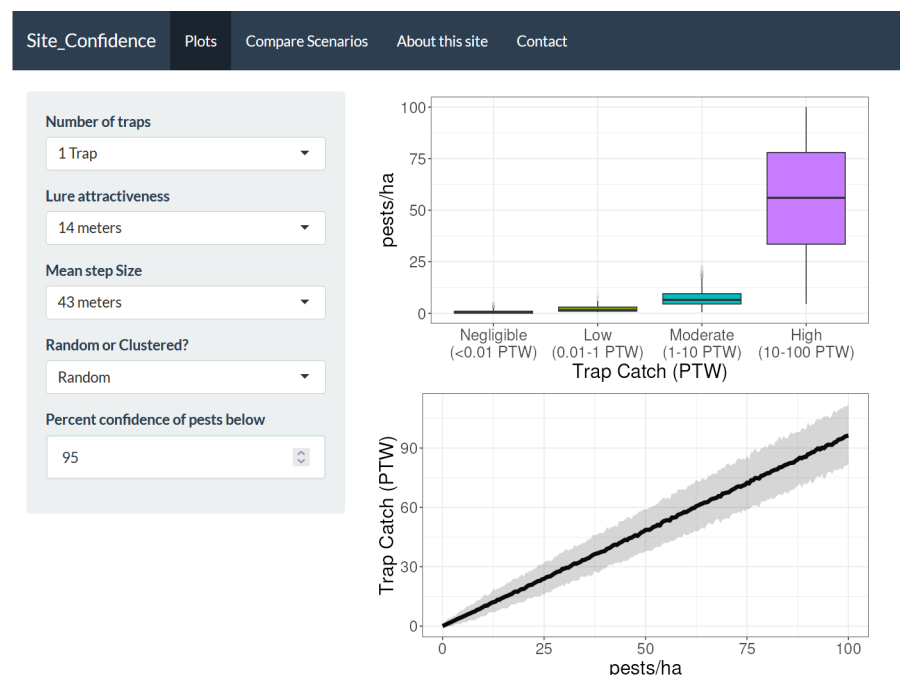


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Supporting quantitative tools



Inspection sampling
calculator



Site_Detect



Pest fly mortality
calculator

<https://research.csiro.au/prs/>



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<https://research.csiro.au/prs/>
Rieks.vanKlinken@csiro.au

The screenshot shows the Phytosanitary Risk Science website. The header includes the CSIRO logo and navigation links for 'About', 'Phytosanitary Risk Tools', and 'Market access'. The main content area features a banner image of fruit in crates. Below the banner, the title 'PRReSTo – the pest risk reduction scenario tool' is displayed. A brief description states: 'PRReSTo models pest infestation risk scenarios in commodities for trade and guides the selection of effective biosecurity measures'. A blue button labeled 'Access PRReSTo here' is present. At the bottom, there is a section for 'CSIRO PRReSTo Animation' with a corresponding image.

Quantitatively supporting Pest Risk Analyses