Mycoplasma bovis

The story so far and what can we learn?

2 August 2018

Mycoplasma bovis: Overview

Aim to provide some understanding of disease incursion process and lessons to learn for kiwifruit

- The organism
- The disease in cattle
- The incursion – pathway and progression over NZ
- Impact
- Traceability and NAIT
- The eradication decision
  - Diagnostics
  - Surveillance
- Critical factors that we can learn from

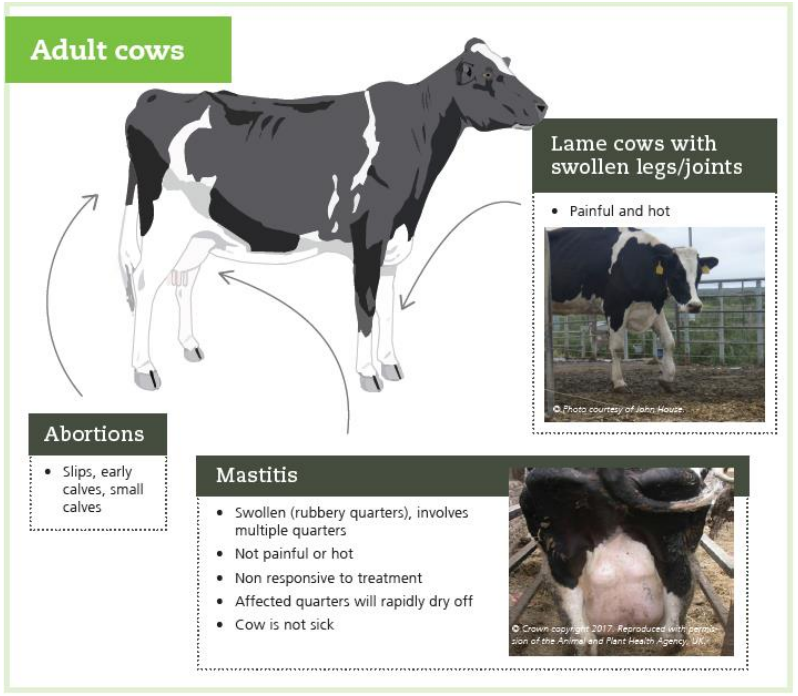
Mycoplasma bovis: the organism

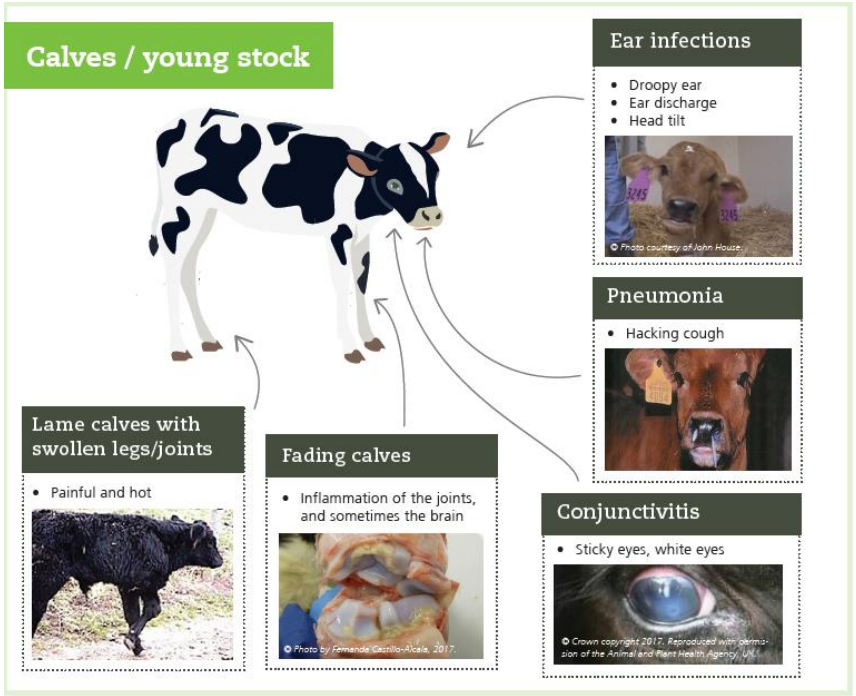
- Very small bacteria – no cell wall
- Anaerobic (lives without oxygen)
- Difficult to treat with antibiotics
- Not easily "recognised" by animal's immune system, so difficult to diagnose
- 125 different Mycoplasmas – unique to each animal
- Present in most countries of world – was on unwanted orgs list under Biosecurity Act 1993

Mycoplasma bovis: the disease

- It does not infect humans and presents no food safety risk. There is no concern about eating meat, milk and milk products
- It does lead to serious conditions in cattle and therefore constitutes an animal welfare and productivity issue

How it presents in cattle



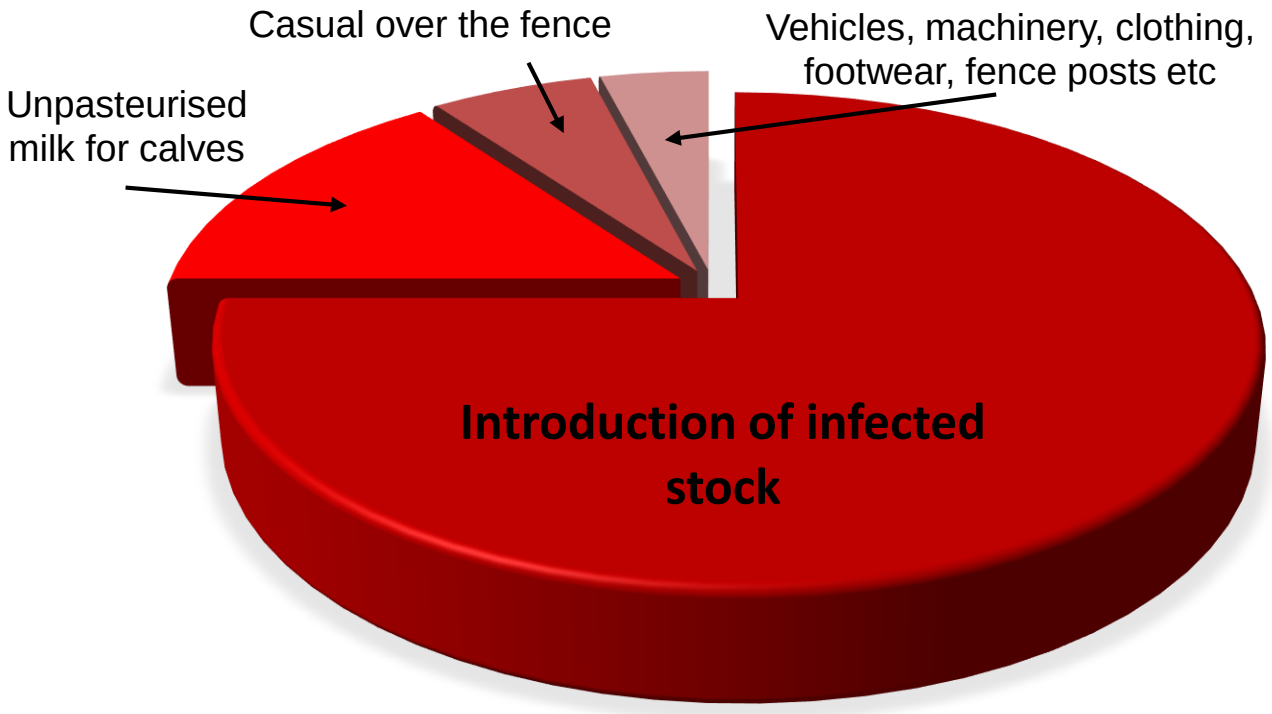


https://www.dairynz.co.nz/animal/cow-health/mycoplasma-bovis/

Mycoplasma bovis: spread

- Between animals through close contact
- Between farms through the movement of animals that are infected but may not be showing symptoms
- It is also potentially spread on contaminated equipment
- Feeding of untreated milk to calves
- It is not windborne.
- Some of the conditions can be treated, but affected cattle will always be carriers of the disease

How it spreads between farms



- Not windborne
- Some of conditions treatable, but affected cattle always carriers
- Carriers not always show symptoms

Mycoplasma bovis Update

Biosecurity New Zealand
Tiakitanga Pūtaiao Aotearoa

Currently, there are...

Nth. Island	Sth. Island	
6	33	**Infected Properties (IPs)** — 17 Dairy farms, 19 Beef farms, 3 Other farms
8	59	Properties under **Restricted Place Notice** (note: includes **Infected Properties**)
53	113	Properties under **Notice of Direction**
23	94	Properties under **assessment**

What has changed over time?

32,561	**Animals** have been culled
30	**Infected farms** have had their cattle culled
166	**Properties** that were under legal movement controls that have tested **negative** and been **released from controls**
167,031	Tests **completed**

Compensation

234	Claims **received by MPI**
81	Claims **completed** or with **part payments**
$21 million	Value of claims **assessed**
$14.1 million	Value of claims **paid**
3	Claims **pending payment**

Glossary

RESTRICTED PLACE NOTICE - A legal notice that restricts the movement of animals and other risk goods on/off an infected farm or a farm where there is a very high suspicion of disease and we're awaiting confirmation through testing.

NOTICE OF DIRECTION - A legal direction that restricts the movement of animals and risk goods off a farm where it is likely they have received a transfer of cattle from an infected farm, and testing is underway.

PROPERTIES UNDER ASSESSMENT - Properties that may have a risk of having *Mycoplasma bovis* and testing has begun to confirm.

OTHER FARMS - Includes lifestyle blocks and calf rearers.

TESTS COMPLETED - Completed milk, blood, swab, and tonsil tests.

Last updated **27 July 2018** *This infographic is updated weekly*

Ministry for Primary Industries
Manatū Ahu Matua

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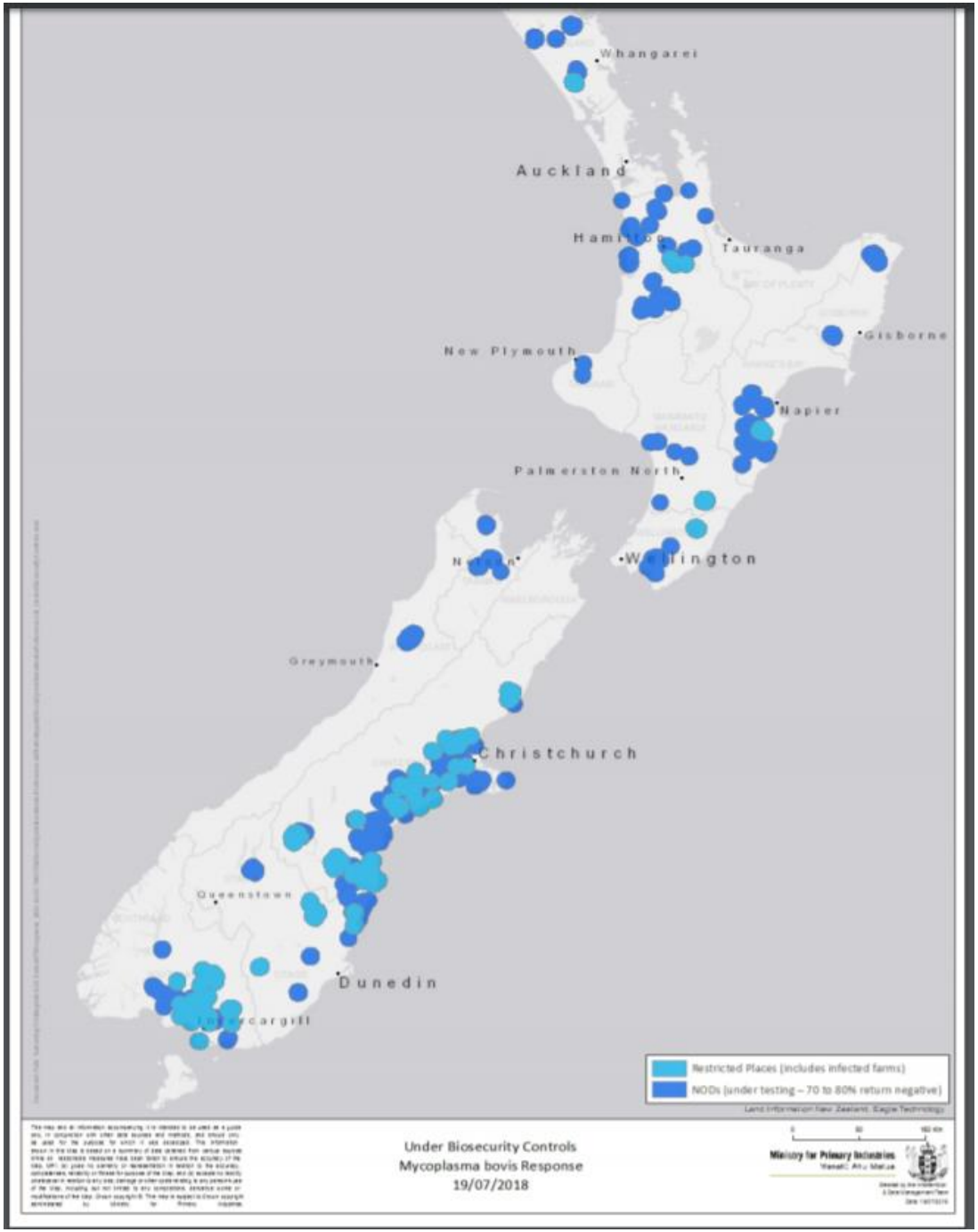

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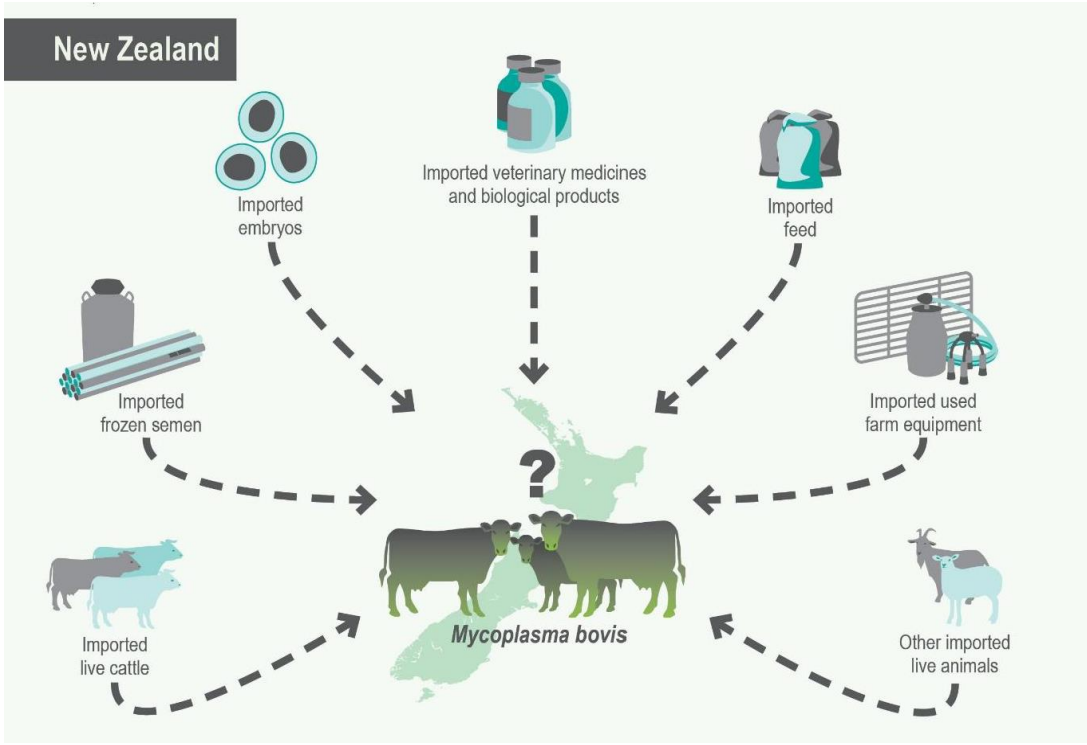
How did *Mycoplasma bovis* enter NZ?

- Seven possible entry pathways
- High risk pathway (live cattle) unlikely
- Definitive pathway not yet identified
- Initial report on MPI website
- Investigations ongoing



Timeline –when did it come here?

- First arrived late 2015 or early 2016 (based on forensic DNA testing and tracing activity)
  - Only one strain found
- **First found 17 July 2017 and confirmed 22 July 2017**
- NAIT review changes started implementation 18 May 2018
- 28 May 2018, Phased eradication announced
- Industry agreed to pay 32% of costs (total cost $870m) for phased eradication
- Eradication review programmed for early 2019

Impacts for phased eradication

- 126,000 cattle to be culled (in first 1 -2 years) in addition to 26,000 currently underway
- **Note:** 4.2 million cattle slaughtered annually
- 142 farms depopulated in year one
- 192 in total over 10 years (out of 20,000 beef and dairy farms)
- Compensation for animals directed to be culled, verifiable losses (estimated $241m over 10 years)
- Long term management estimated $1.2 billion over 10 years

FOOT & MOUTH MACRO-ECONOMIC IMPACTS

$16.2b

Large scenario
508 infected properties
191 days

$8.2b

Medium scenario
52 infected properties
50 days

$6.1b

Small scenario
1 infected property
1 day

Traceability and NAIT

- Ability to trace movements of animals forwards and back fundamental to response success
- Issues with calf movements off farm through “trades” and not recorded, bulls on and off farm for mating, grazing movements, calf rearing and sale
- Generally movements to sale yard and meat works well recorded
- Lack of movement records meant relying on memory or notebooks and manual tracing. Slowed process down significantly

HOW NAIT WORKS

Person in charge of animals (PICA) registers with NAIT

Cattle and deer tagged with NAIT approved RFID ear tags

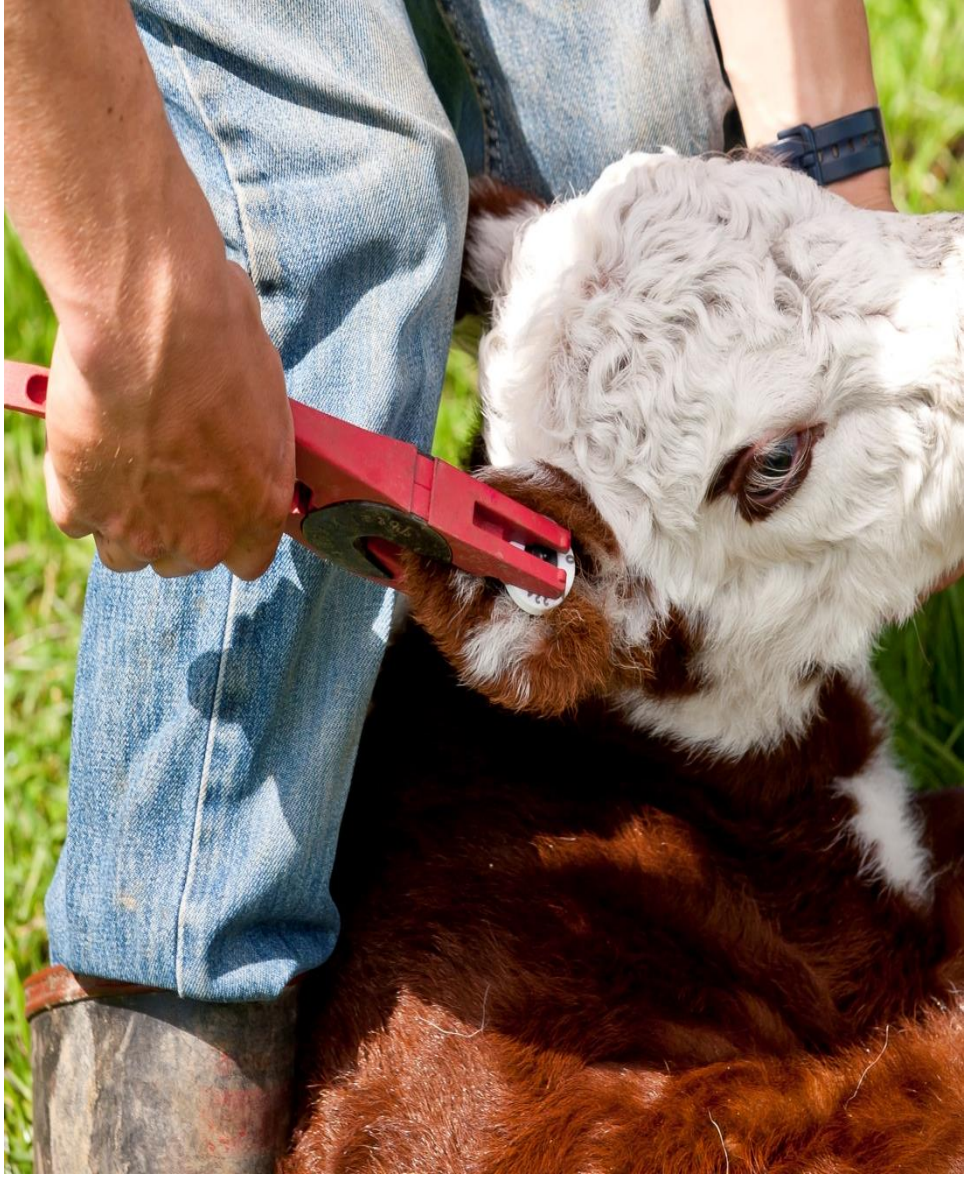
Tagged animals are registered in the NAIT system

Animal movements are recorded in the NAIT system


TAG
REGISTER
RECORD
1
2
3

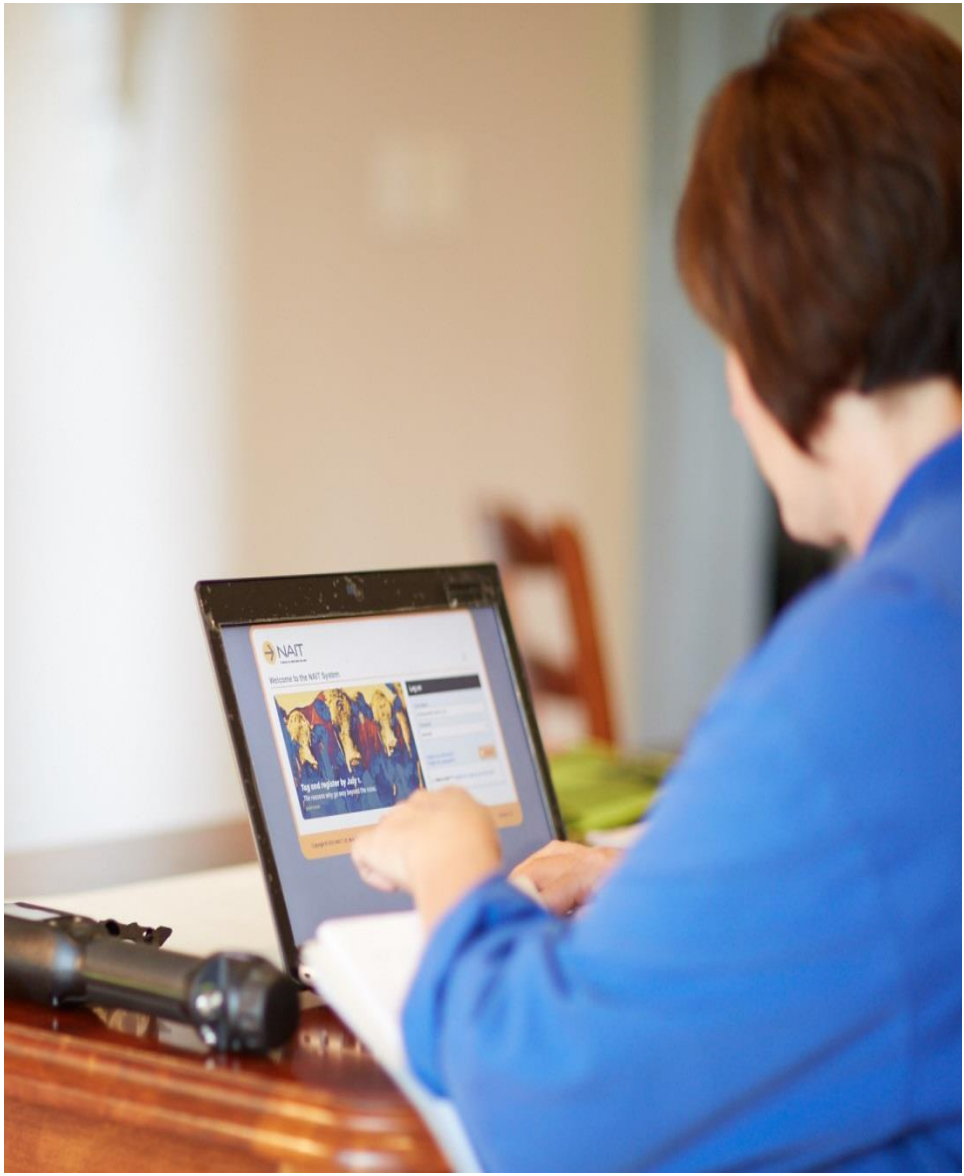
TAGGING

- NAIT approved RFID ear tag
- Before 6 months old or before they move off farm – whichever comes first



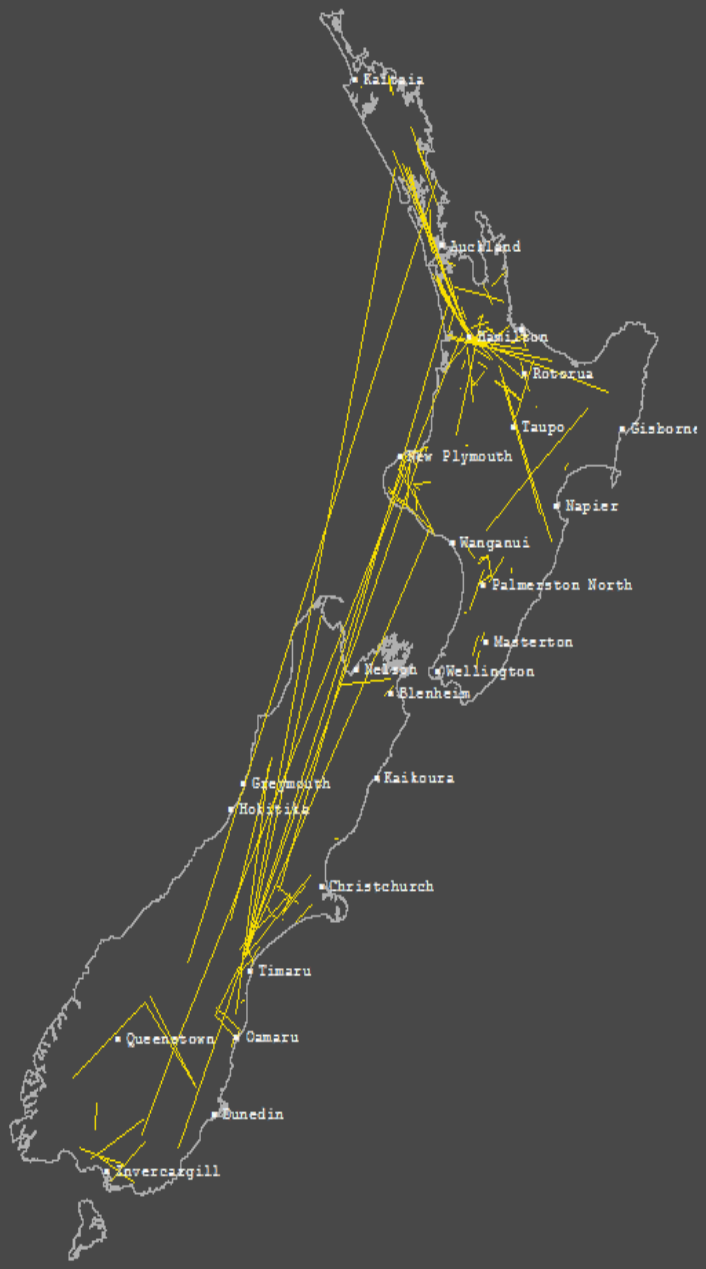
REGISTERING ANIMALS

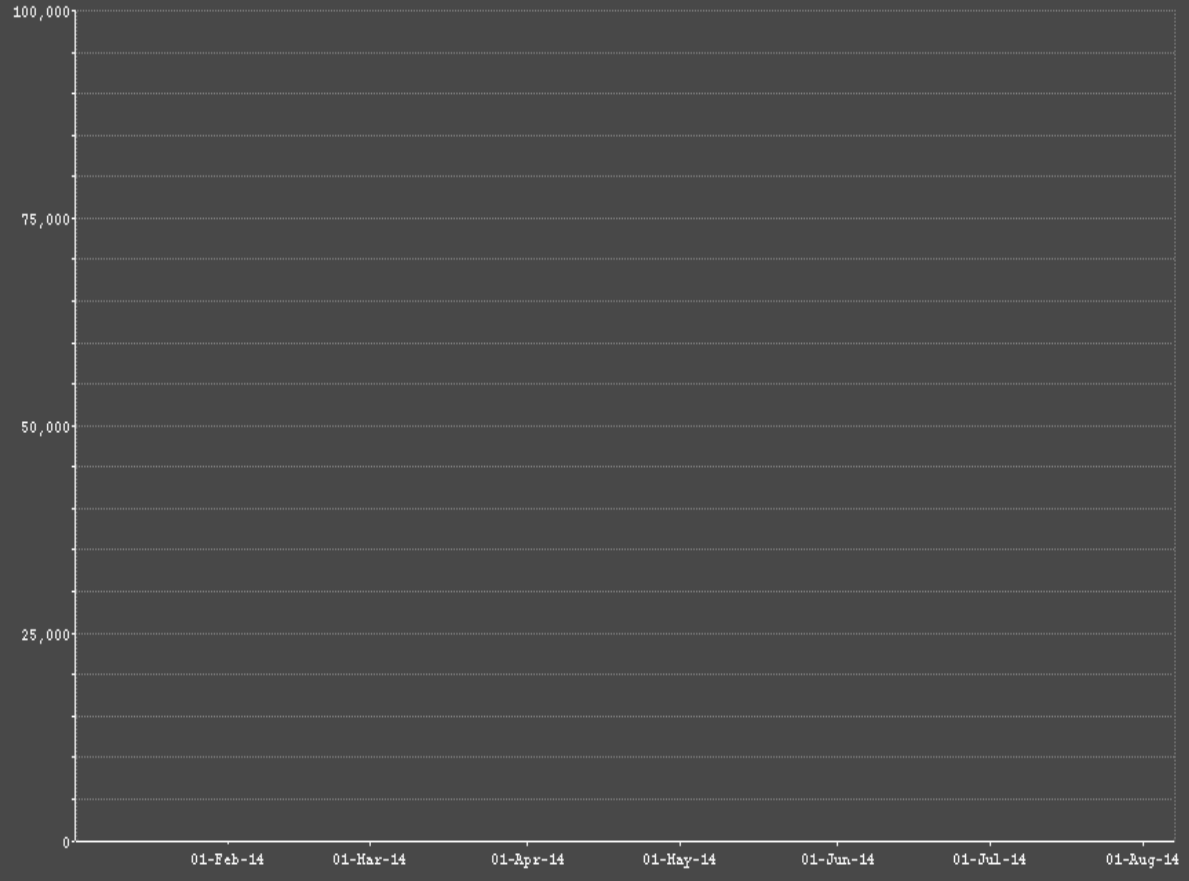
- Vital for lifetime traceability
- Must be done within 7 days of animal being tagged



MOVEMENTS

- All movements (incl. grazing, service bulls, private sales, events)
- Record within 2 days



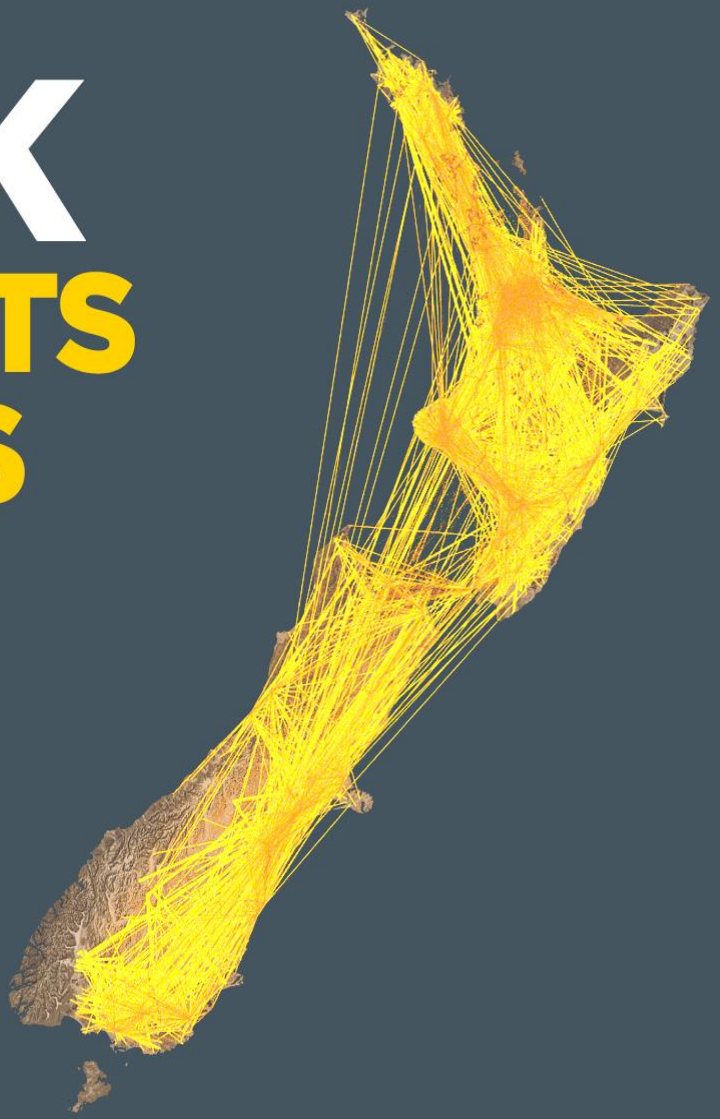


Animal movements per day - NAIT network

Date: 2014-01-02

ONE WEEK

9,513 MOVEMENTS
147,421 ANIMALS



DATA COLLECTED 22 AUGUST 2016 - 28 AUGUST 2016

Testing and surveillance

- Disease is hard to find
- Animals only shed intermittently (and cant be detected when not shedding (latent)
- No single test is 100%
- Serology (blood) produces both false positives and false negatives
- PCR (using DNA) test of choice but need to be milk producing animal or from throat/tonsil

Testing and surveillance

- Test large number of animals (100+)
- Test multiple times (at least 2)
- Time testing so animal most likely to be shedding

Lessons learned

- Early detection would have made a big difference
- Was not on the high risk list
- Movement of stock such as bulls, cattle grazing and calves were a big factor in early transfer of disease
- Many calves move “under the radar”
- Difficult diagnostics with poor sensitivity and specificity made detection hard
- Poor surveillance tests also made it difficult to assess spread especially as many cattle not clinical (next milk testing round in spring when likely to be shedding)

Lessons learned - kiwifruit

- Understand risk profile of our plant pathogens
- Develop diagnostic tests for main risks
- Understand movement of plant material and relative risks
- Establish a traceability system for movement of all plant material not just the obvious source material (rootstock)
- Traceability system needs to be simple, easy to use and have high uptake by users to be effective
- **Don’t be complacent**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