

Disease surveillance in New Zealand: the role of sanctuaries



Key points

- Why is disease important?
- How can we look for disease in wild populations?
- Keeping an open mind – disease is complex – disease as a sentinel
- What role can sanctuaries play in disease surveillance



Does disease matter?

- Disease is an impairment of normal function
 - Think toxins, viruses, bacteria, fungi
- Is disease normal?
- Disease works at many levels to impact wildlife populations
 - may lose normal predator avoidance behaviours
 - may be forced to take greater risks in order to access food and other resources
 - is less likely to breed, or raise young successfully
 - is less able to withstand severe weather events
 - is more likely to succumb to parasites and other secondary infections



Disease is a result of interactions

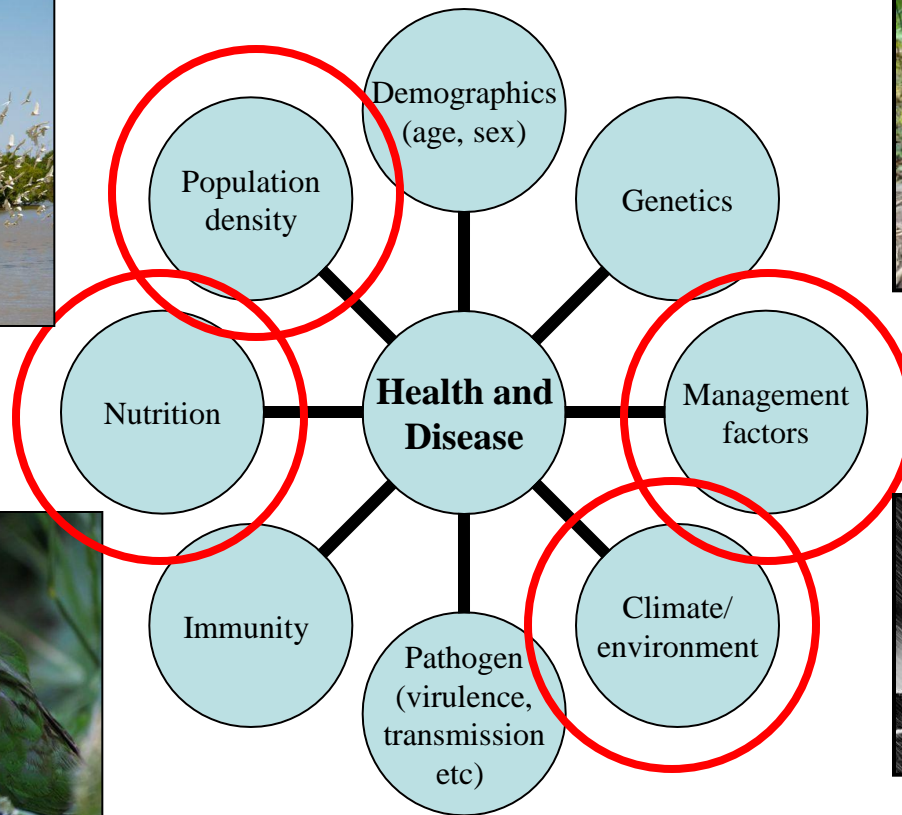


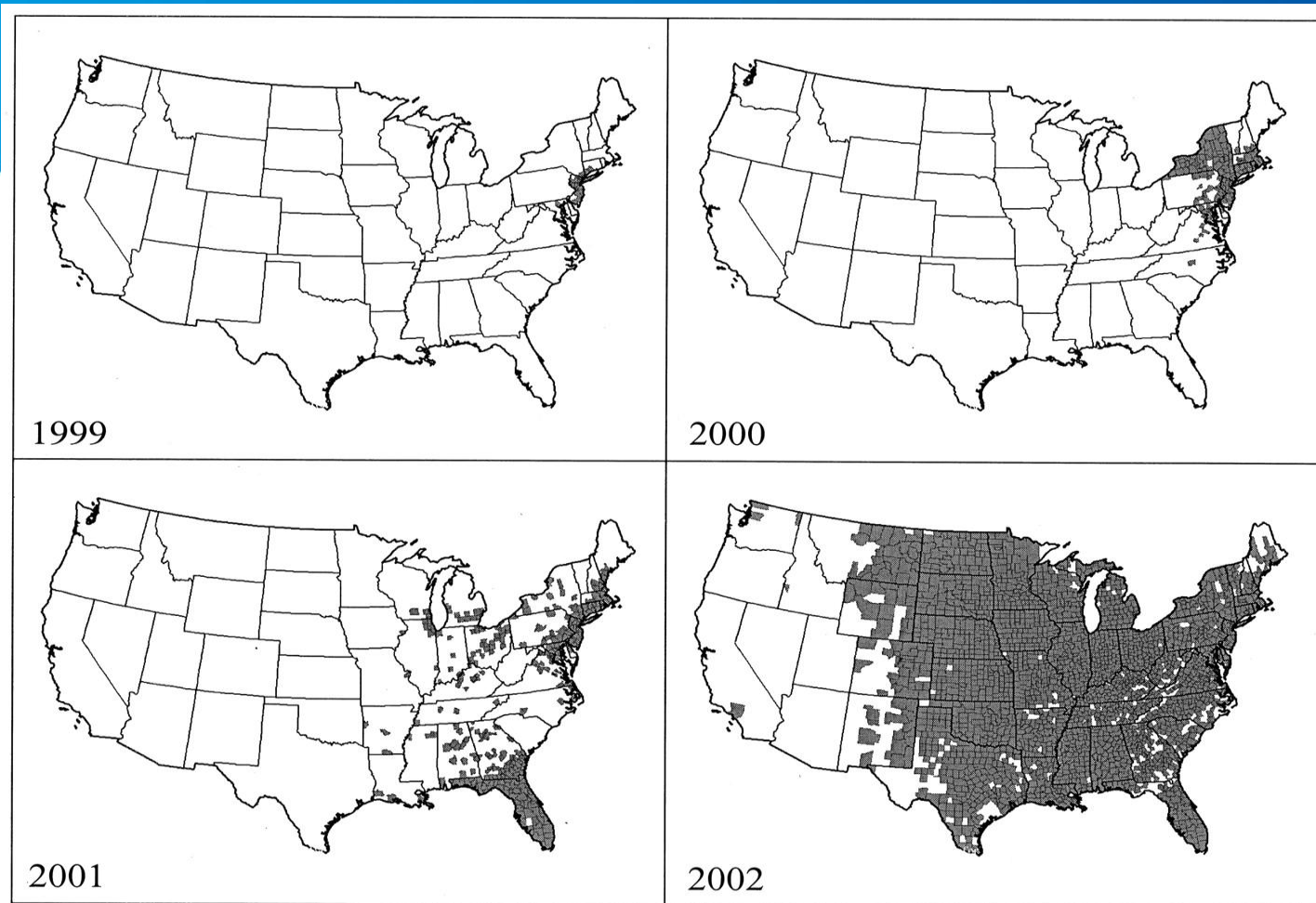
Image: motleynews.net



A case in point

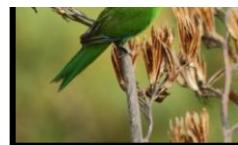
- West Nile Virus in America – crows falling out of the sky and humans dying across the USA



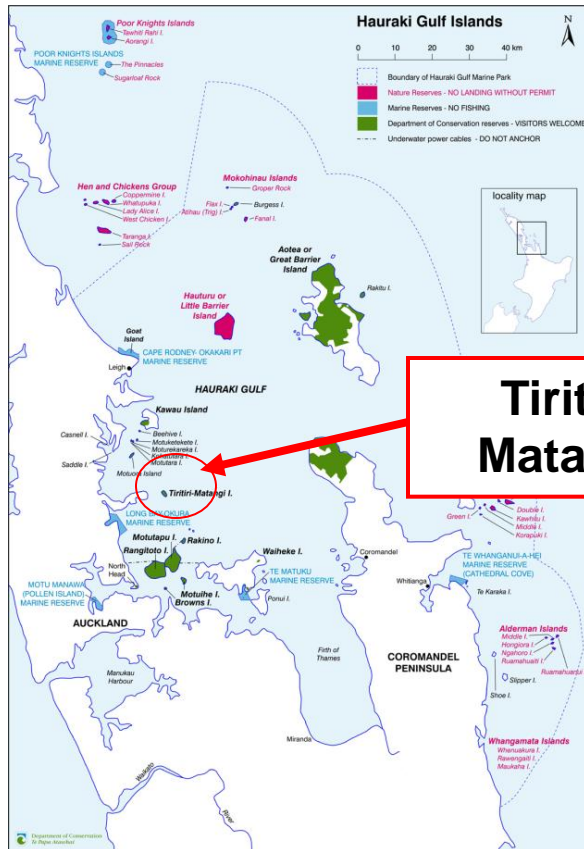


Counties reporting the presence of WNV: United States, 1999–2002.

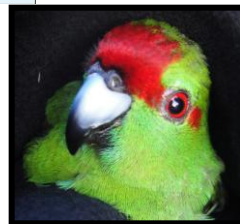
Hayes and O'Leary. 2004. West Nile Virus infection; a paediatric perspective. *NeoReviews* 113(5)



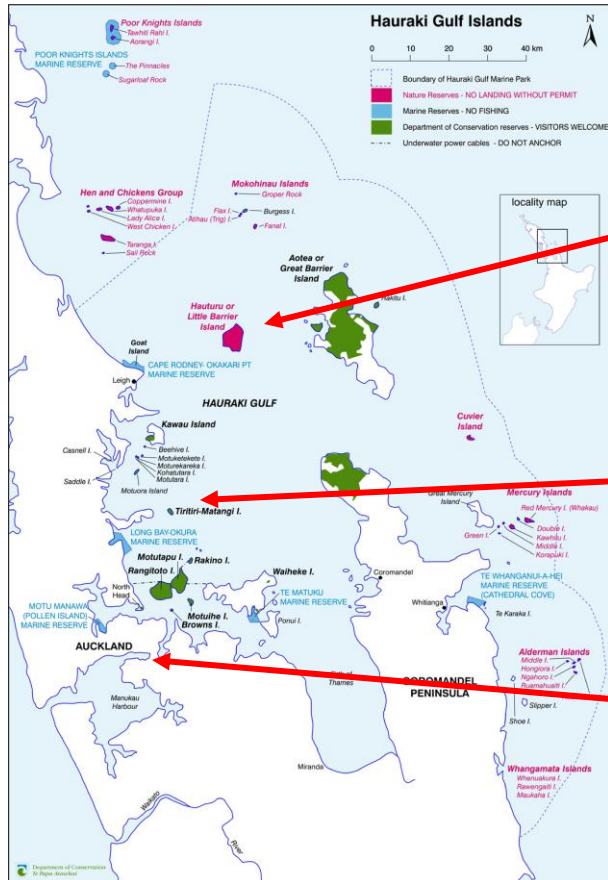
Case study – Tiritiri Matangi and feather loss in kakariki



Maori for	Buffeted by the winds
Established as reserve	1980
Size	220ha
Habitat	Modified/recovered
Predator free	Since 1993
Tourism	30,000/year
Iwi	Kawerau/Ngati Paoa/Ngati Manuhiri



Background to research project



Virus (BFDV) found in wild kakariki in 2008 by Luis Ortiz-Catedral

Possible feathering problems

Eastern rosellas and sulphur crested cockatoos carrying virus (BFDV)

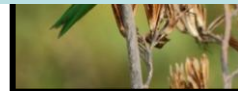


Research opportunity



Research opportunity

- Step back – avoid tunnel vision
- What else could be there?
- Who else can help us?
 - Researchers
 - Community groups and sanctuaries
 - Special interest groups (carers, OSNZ)
- Where can we contribute the most?
 - Health and disease



What do we do?

Field survey (cross sectional study) on Tiritiri Matangi Island, April and September each year for 2 years, capturing up to 65 individuals at each session

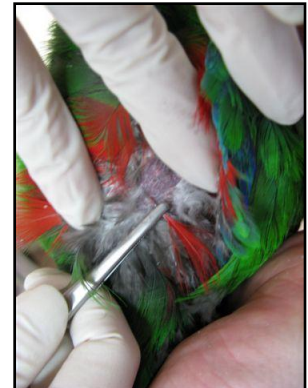


What do we do?

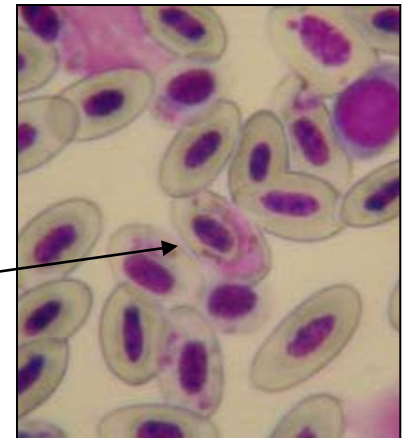


How do we measure health and disease?

- Good sample sizes, different seasons, multiple years
- LOTS OF SAMPLES
 - Blood
 - Feather
 - Faeces
 - Skin biopsy
- Physical exam
- Photos
- Measurements



What do we find?



Malaria



Psittacine beak and feather disease (PBFD)



PBFD



MITES



What is PBFD?

- The disease PBFD is caused by the virus Beak and feather disease virus (BFDV)
- Broad range of effects in a range of parrot species
- Described in Australia in 1975
 - ?? Spread to rest of the world via trade in parrots??



- The disease is a feather disease
- Broad range
- Described in
 - ?? Spread to



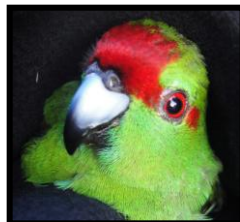
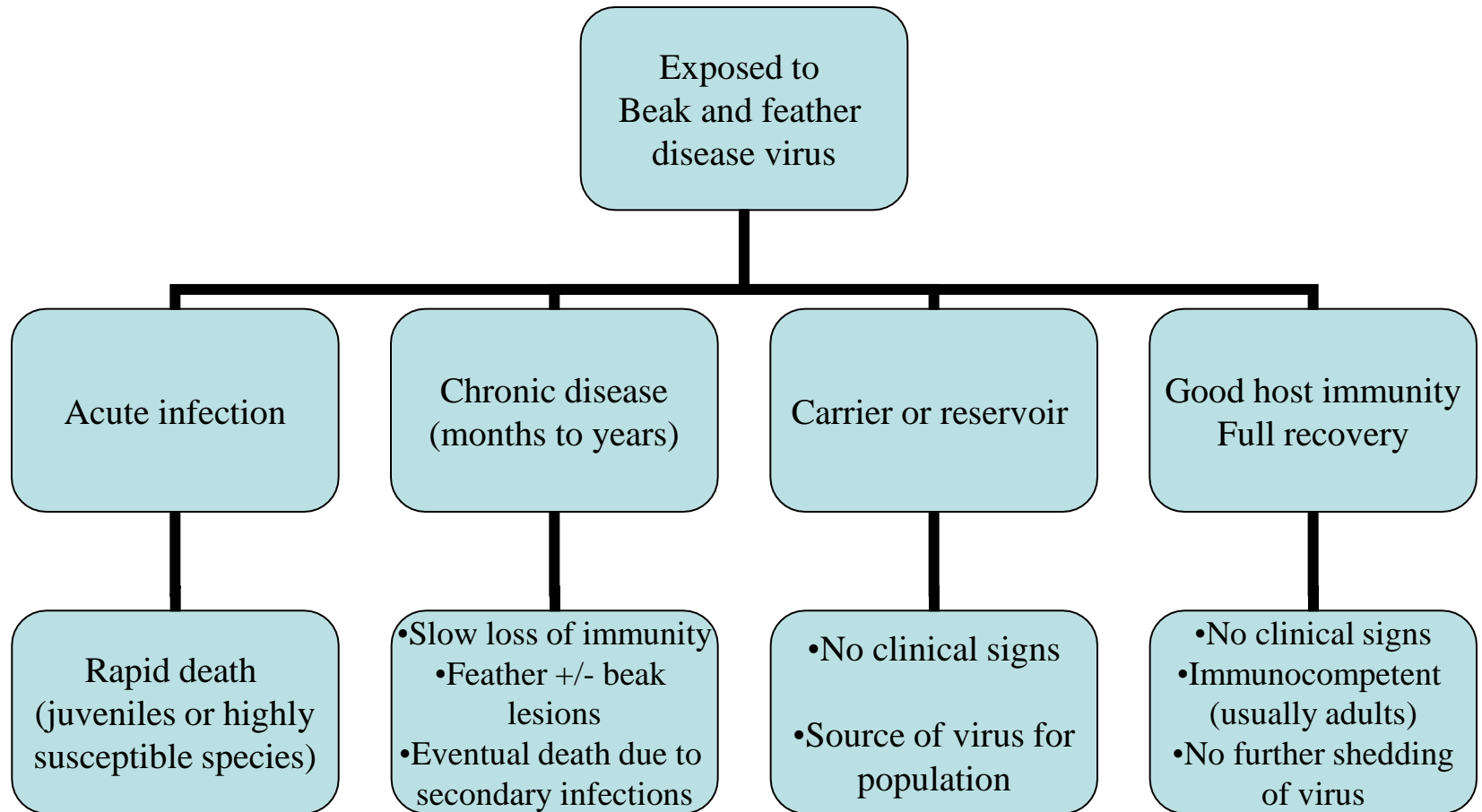
Beak and

ot species

arrots??

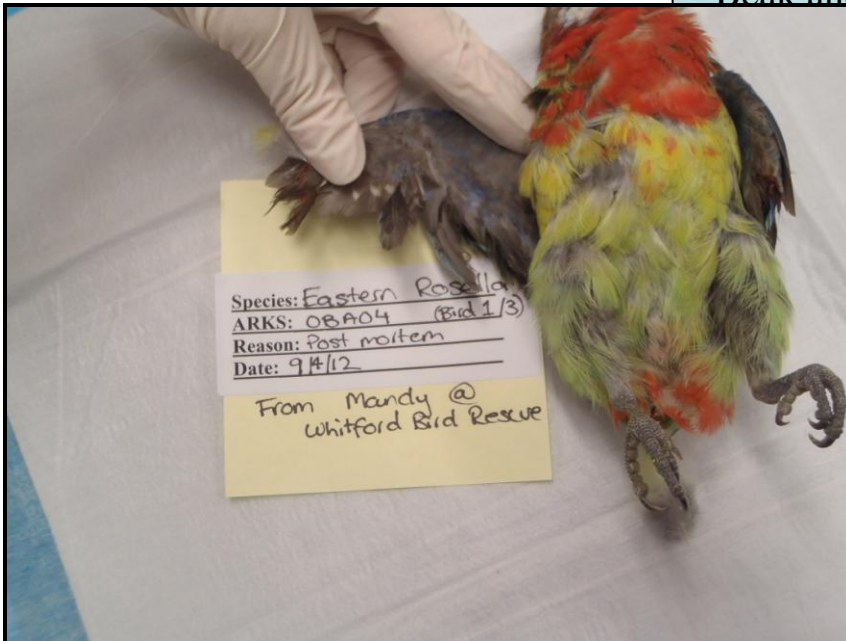


What happens?



What happens?

Exposed to
Beak and feather



(juveniles or highly
susceptible species)

lesions
•Eventual death due to
secondary infections



•Source of virus for
population

(usually adults)
•No further shedding
of virus



Where is it in the wild?

References

Massaro et al
“Molecular characterisation
of beak and feather disease
virus
(BFDV) in New Zealand
and its implications for
managing
an infectious disease”
2012 *Archives of Virology*

Red
crowned
parakeets
since 2008

Eastern
rosellas
since 1985

Yellow
crowned
parakeets in
2012

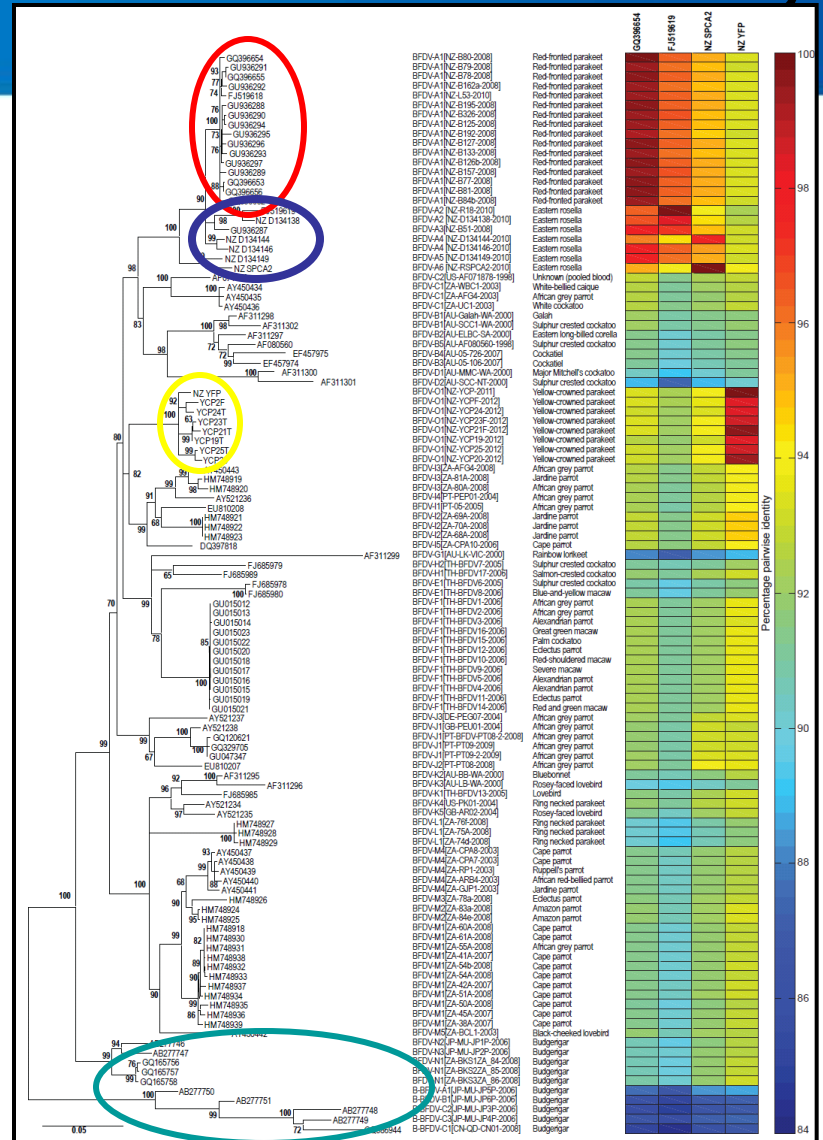


DNA sequencing adds to the story

Reference

Massaro et al, 2012

“Molecular characterisation of beak and feather disease virus (BFDV) in New Zealand and its implications for managing an infectious disease”
Archives of Virology

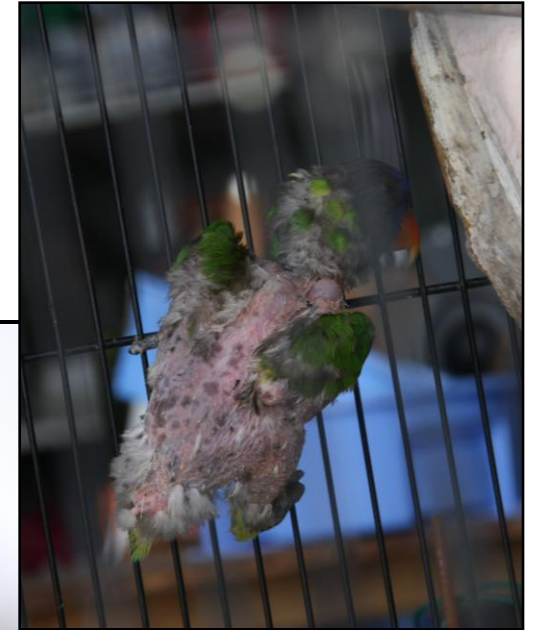


Globally?

- New Caledonia
- Australia
- South Africa
- Mauritius



Photo: Claire Raisin



And those mites?

- Predilection for head area
- Similar seen across New Zealand, although anecdotally less common historically
- Very small (approx 0.5mm), usually deep in skin
- Move around on hippoboscid flies
- Comparison between years



And those mites?

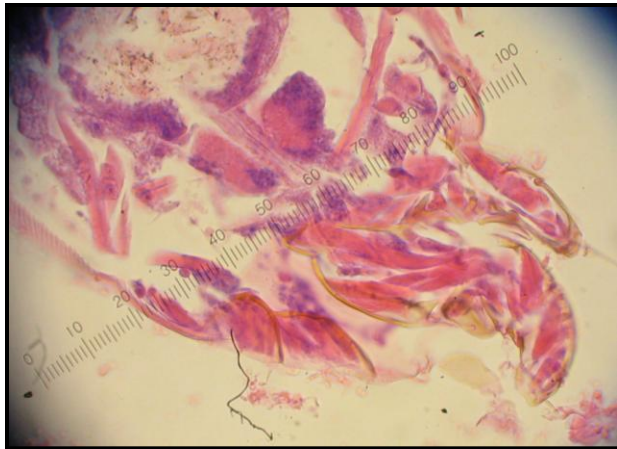


Photo:
Martin
Sanders



Practical disease surveillance

- *Which diseases should we test for, how many birds do we need to test, why should we test for these diseases, and at what cost?*
- What do these diseases mean for native parrots
 - Translocations
 - Re-introductions
 - Building resilient populations in NZ



Sanctuaries NZ

- Opportunities at the frontline
 - Observations
 - Tell someone! Take a photo!
 - Sampling opportunities
 - Research opportunities
 - Natural experiments (species interactions, multiple threats)
 - Management interactions
 - Long term monitoring potential
 - What makes populations thrive?



Zealandia

- Kaka, eastern rosellas, and now kakariki
- Collecting feather samples from adults and chicks since re-introduced
- Baseline information and annual surveillance data for retrospective study now that we know BFDV is out there



Collaborators and support



Arvind Varsani, University of Canterbury

Supervisors: Kris Warren, Carly Holyoake, Ian Robertson and Richard Jakob-Hoff

Murdoch University Research and Development Fund

Department of Conservation, Warkworth/Auckland Conservancy and National

Auckland Zoo Conservation Fund

Supporters of Tiritiri Matangi

University of Otago – Ian Jamieson and Bruce Robertson

