



**Lincoln
University**
Te Whare Wānaka o Aoraki
CHRISTCHURCH • NEW ZEALAND

Individual ID of possums using DNA

AHB Project: DNA collection system for Mark-Recapture estimation of possum density, and TB surveillance sensitivity.

James Ross

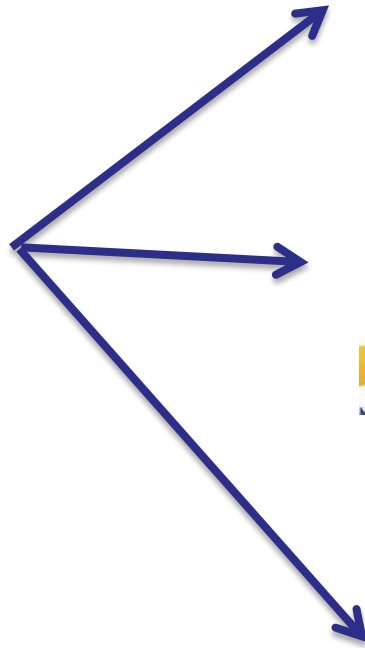
Rob Cruickshank

Graham Nugent

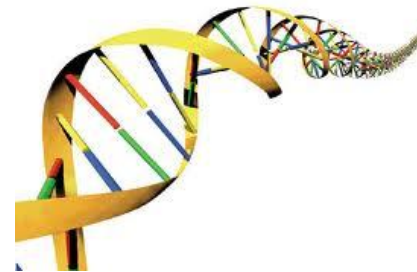
Background - Non-invasive monitoring



The Holy Grail - Individual Identification



Bite Marks



DNA



Footprints

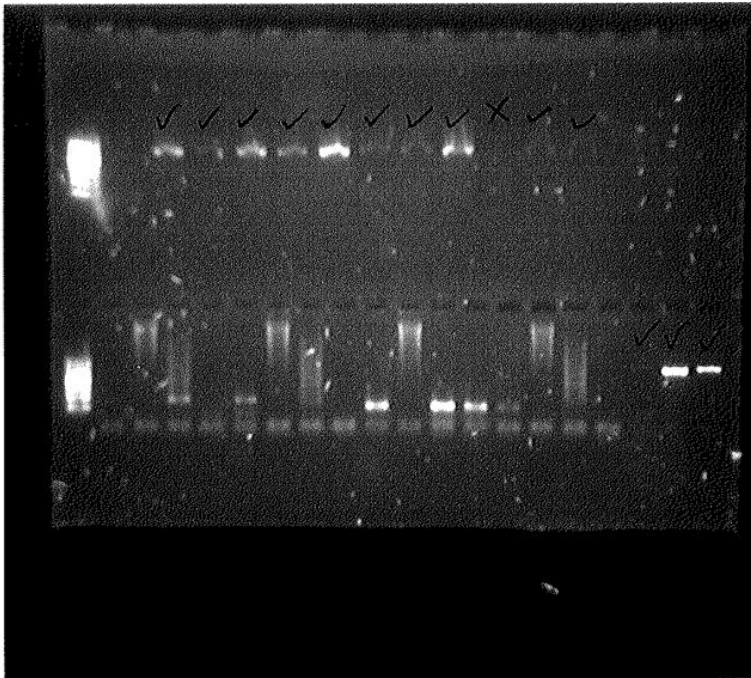
DNA Sources

- Previous work had investigated both hair traps and faeces.
- Saliva has been collected from sedated possums and has confirmed that they do harbour streptococci in their mouths!



Vargas, M. L., Cruickshank, R. H., Ross, J. G., Holyoake, A. J., Ogilvie, S. C. & Paterson, A. M. (2009). Non-invasive recovery and detection of possum (*Trichosurus vulpecula*) DNA from bitten bait interference devices (WaxTags). *Molecular Ecology Resources*, 9(2), 505-515.

Previous Research - MS



MS can be amplified for identification by the PCR process. 13 out of 14 bands with DNA (93%).

MS – fast evolving sections of DNA – hyper variable!

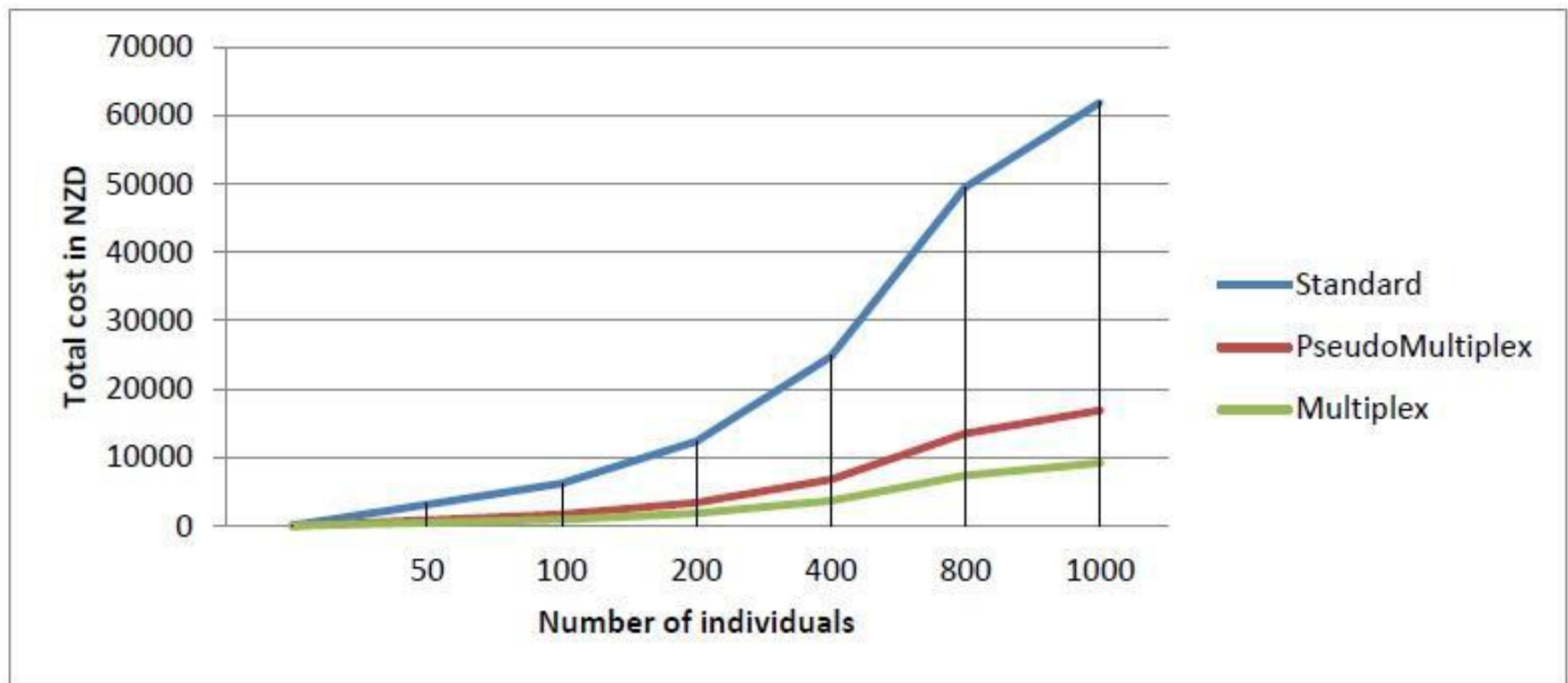


BUT – exposure to UV and rain significantly reduces DNA quantity and quality.

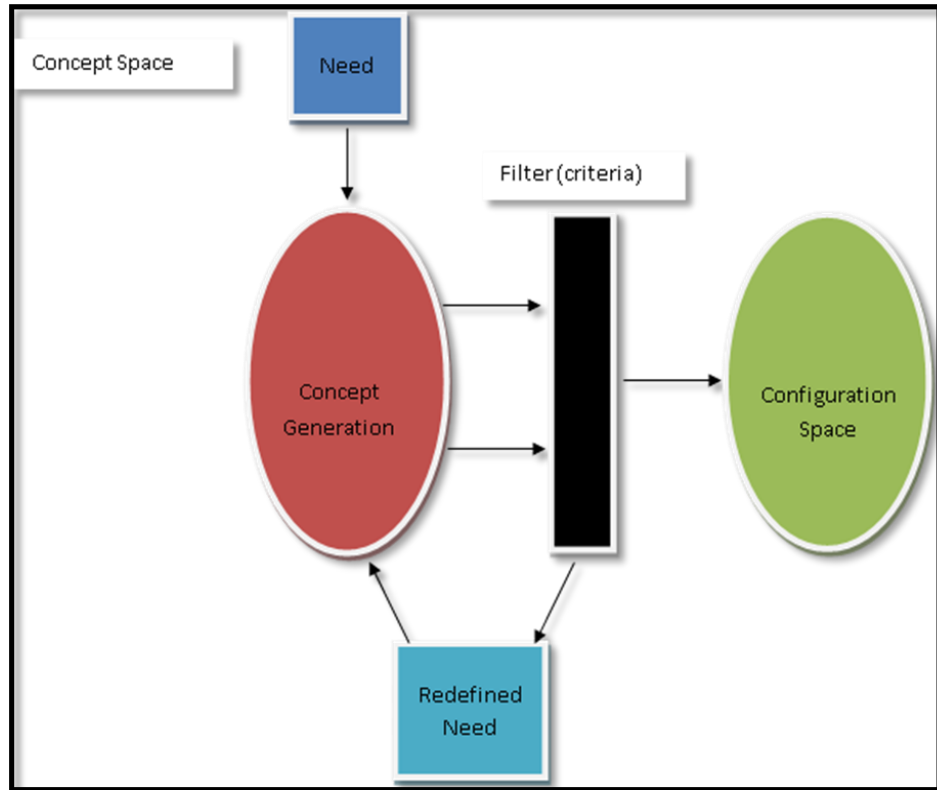
Where only 6 out of the 14 Bands (43%) showed the presence of DNA after 7 days left in the field.

Previous Research - MS

- PCR conditions for seven of the eight microsatellite primer pairs were optimised, allowing for the generation of multi-locus genetic profiles.



DNA Collection Device



Classic concept configuration model

Criteria

1. The device must be cheap (<\$10: ideally could be reused)
2. The device must be rat proof (although the presence of rat saliva is not an issue)
3. The device must be set off on first possum encounter (the presence of more than one possum DNA profile is an issue)
4. The device must protect DNA for up to 14 days in the field (needs to use either preservative gel or FTA technology)
5. The device must be easy to set and inspect (can be tree mounted)

What Next?

- Trials with captive possums are currently investigating the triggering mechanism for 3 prototype designs.
- Other trials are investigating how long the DNA lasts protected from both UV and rainfall (over 0, 3 7, 10, 14 days).

Sjoberg, T., Ross, J. & Blackie, H. (In Prep). Possum (*Trichosurus vulpecula*) responses and preferences to novel objects in their environment.

