



Landcare Research
Manaaki Whenua



Landcare molecular diagnostics - our services and some quick updates

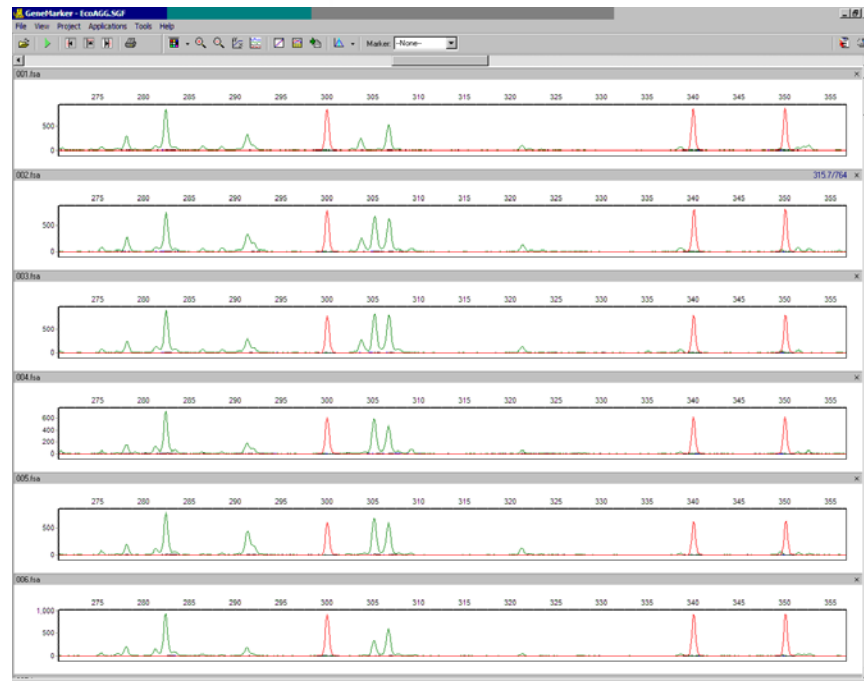
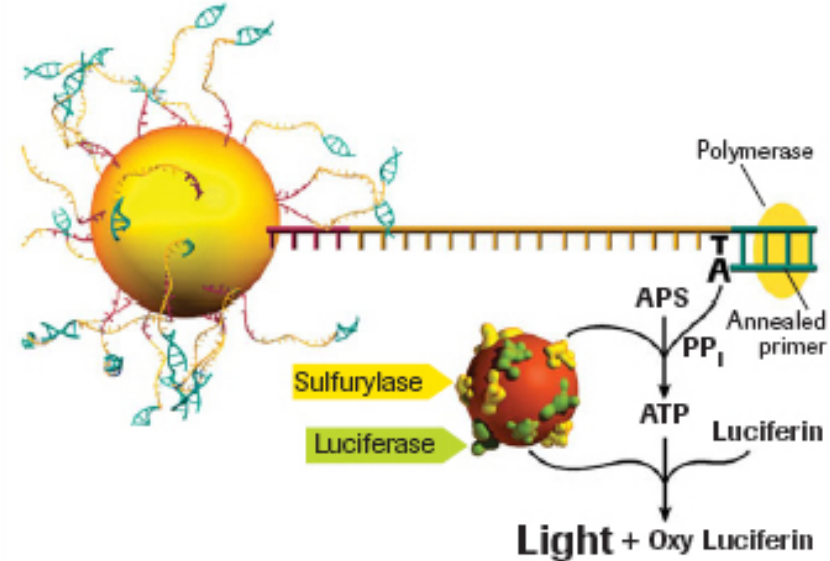
Gary Houlston

Ecological Genetics

Landcare Research, Lincoln, New Zealand

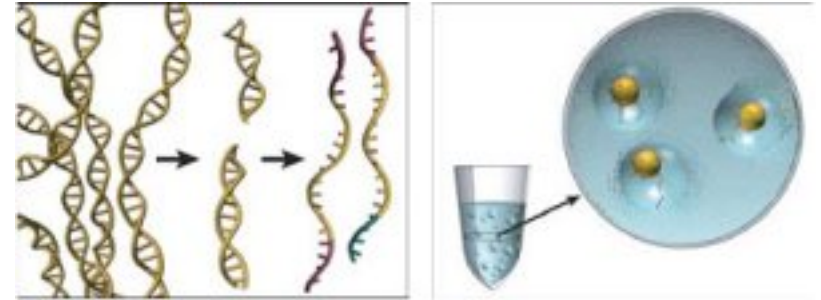


- Specific test development
 - Genetic markers
 - Species multiplex
- Flow cytometry
- Whole genome sequencing!

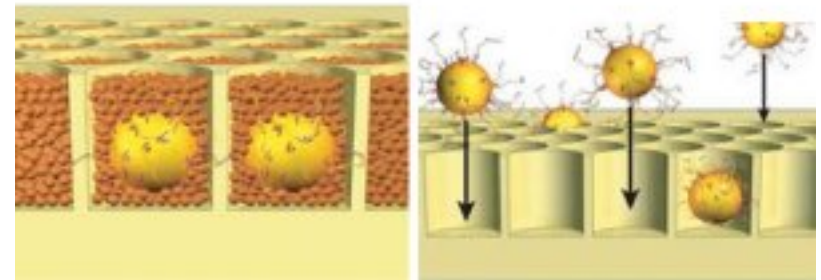




- Genotyping
 - Fine-scale identification
 - Several applications



- Pampas
- Rat work for Island conservation
- Giant buttercup
- Persicaria

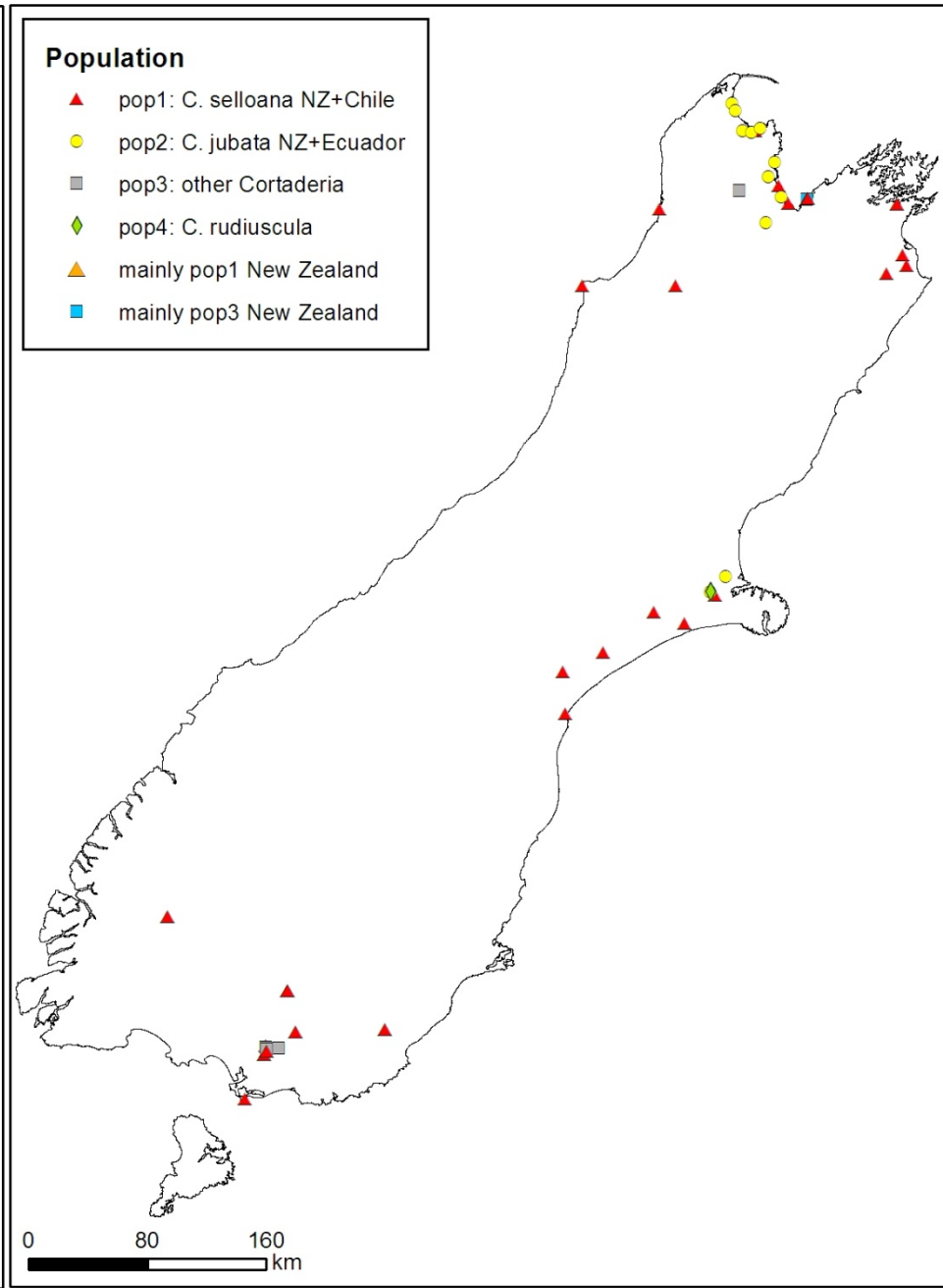
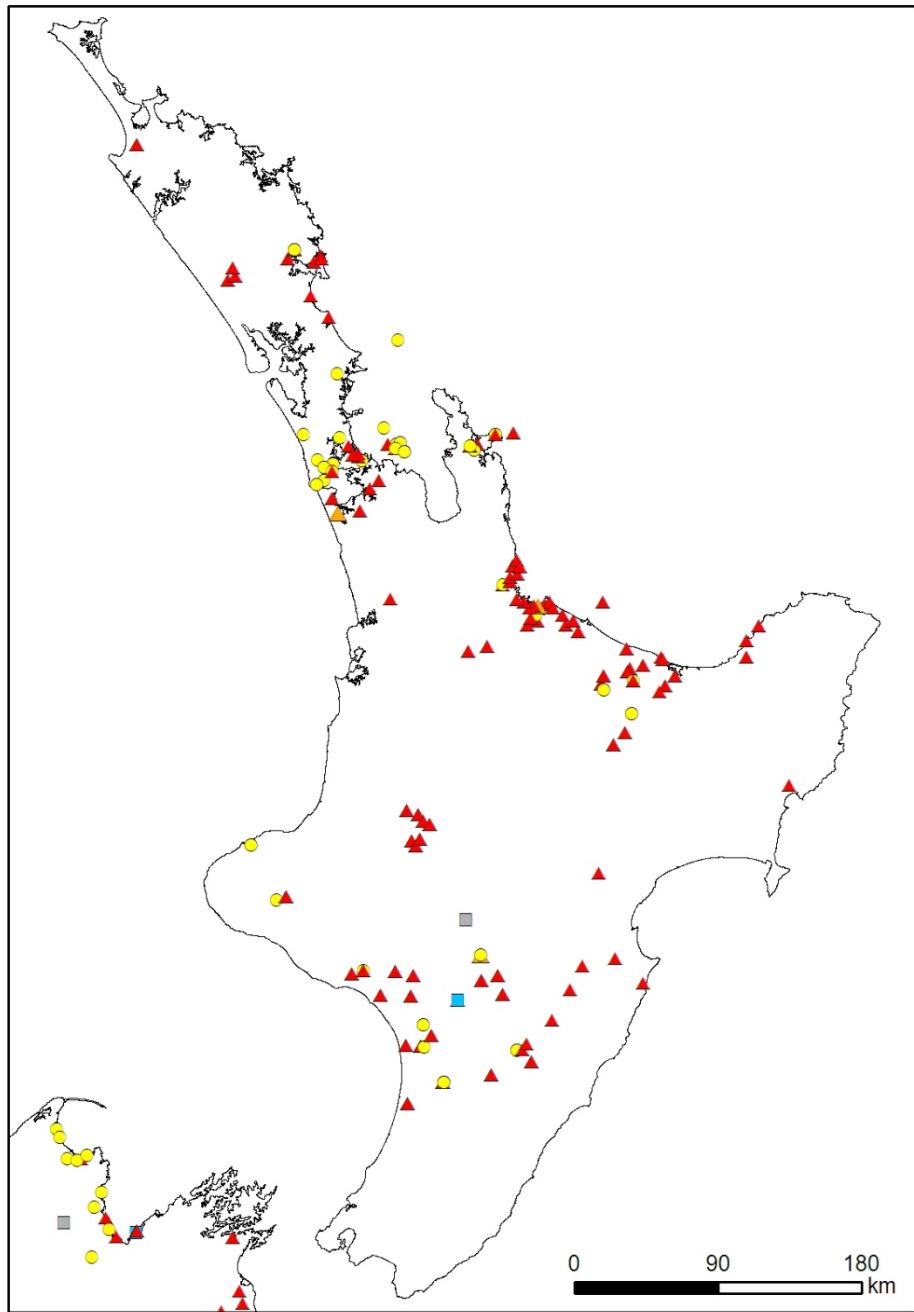




- Diagnostics by sequencing
 - Improving all the time

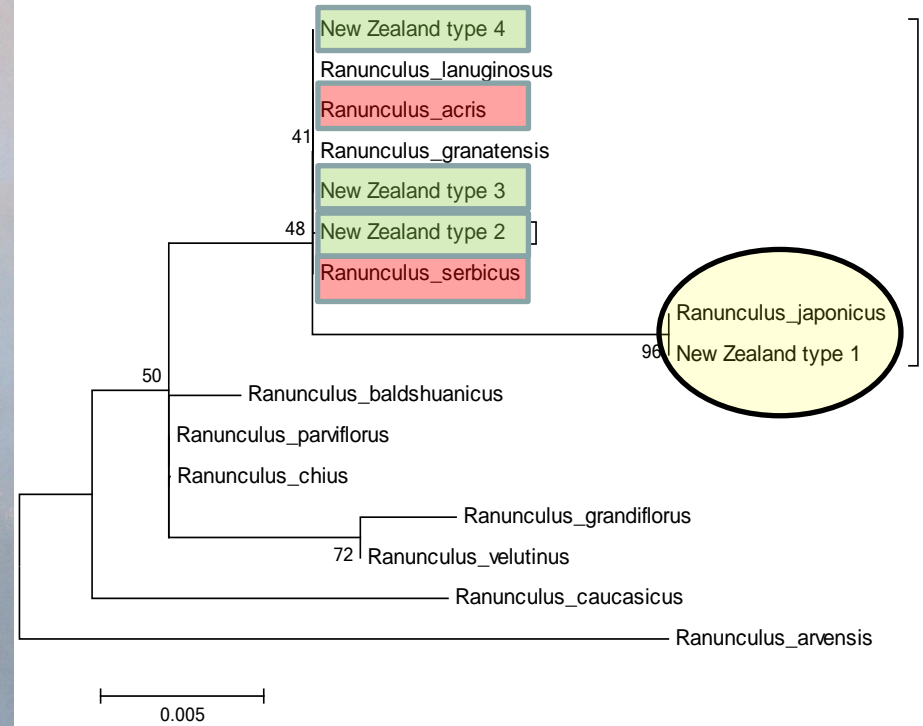
- Seed identification from containers
 - Compared molecular identifications in 2010 and 2014
 - 11 samples from 9 genera
 - 5 of the genera had more data in 2014

James TK, Champion PD, Dowsett CA, McNeil MR, Houlston GJ. Submitted. Identification of weed seeds in soil samples intercepted at the border. New Zealand Plant Protection Society.



Population

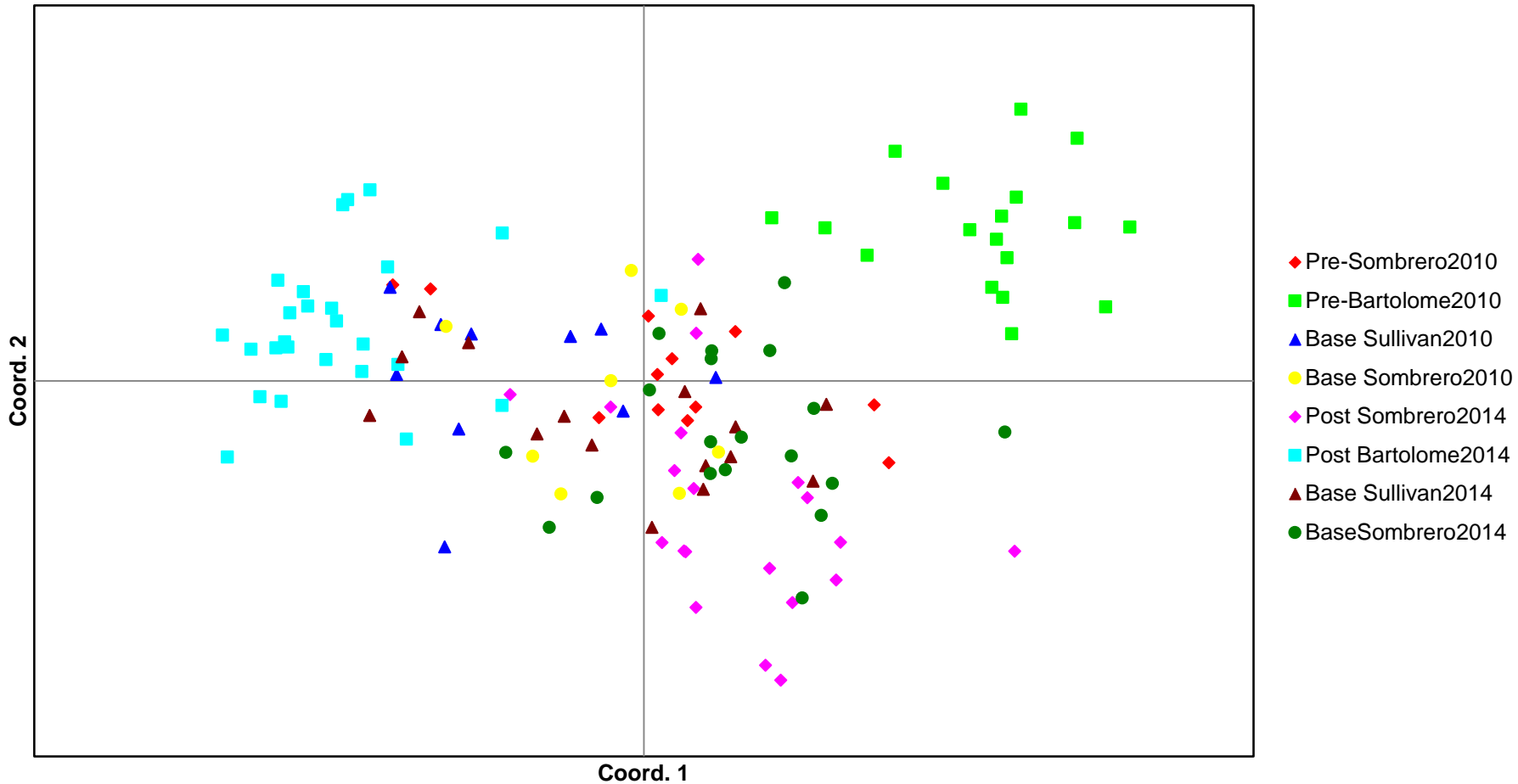
- ▲ pop1: *C. selloana* NZ+Chile
- pop2: *C. jubata* NZ+Ecuador
- pop3: other *Cortaderia*
- ◆ pop4: *C. rudiuscula*
- ▲ mainly pop1 New Zealand
- mainly pop3 New Zealand



Rats in the Galapagos



Principal Coordinates (PCoA)

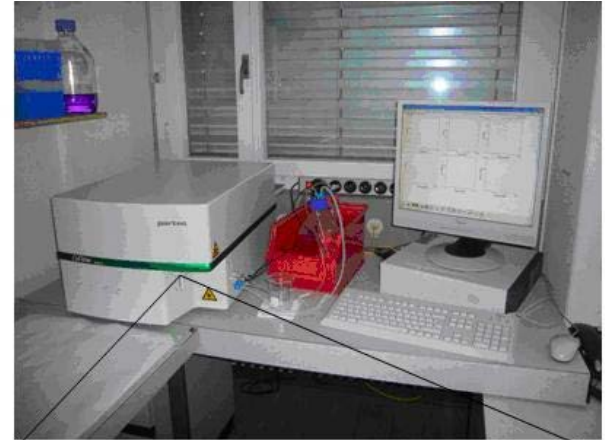


Plant ID No	Suspected ID	Chloroplast	Nuclear
CK001 (Glenfield, PchD)	Persicaria chinensis	<p>rbcL</p> <p>100 % match to</p> <p>Polygonum chinense (HQ435352.1, China)</p> <p>99 % match to</p> <p>Persicaria microcephala (FM883632.1, Italy)</p>	<p>100 % match to</p> <p>Polygonum chinense (FJ503010.1 China, GQ396672.1 Taiwan)</p> <p>98 % match to</p> <p>Persicaria microcephala (JX144671.1 South Korea)</p> <p>96 % match to</p> <p>Fallopia denticulata (HQ843126.1) identical to CK001</p>
CK002 (Hamilton, Pch2)	Persicaria chinensis	<p>97 % match to</p> <p>Fallopia multiflora (FM883616.1)</p>	<p>identical to CK001</p>
CK005 (Waitakere, Pch01)	Fallopia japonica	<p>trnL-trnF</p>	<p>identical to CK001</p>
CK008 (Glendowie, Pch5)	<p>Fallopia japonica cv. 'Compacta' /</p> <p>Reynoutria japonica Houtt. cv. 'Compacta'</p>	<p>99 % match to</p> <p>Polygonum chinense (HQ435343.1, China) and Persicaria capitata (EF653793.1)</p> <p>85 % match to</p> <p>Fallopia denticulata (HQ843149.1 and EU586187.1)</p>	<p>Varies to CK001 by two heterozygote positions</p> <p>99 % match to</p> <p>Polygonum chinense (FJ503010.1 China, GQ396672.1 Taiwan)</p> <p>98 % match to</p> <p>Persicaria microcephala (JX144671.1 South Korea)</p> <p>96 % match to</p> <p>Fallopia denticulata (HQ843126.1)</p>

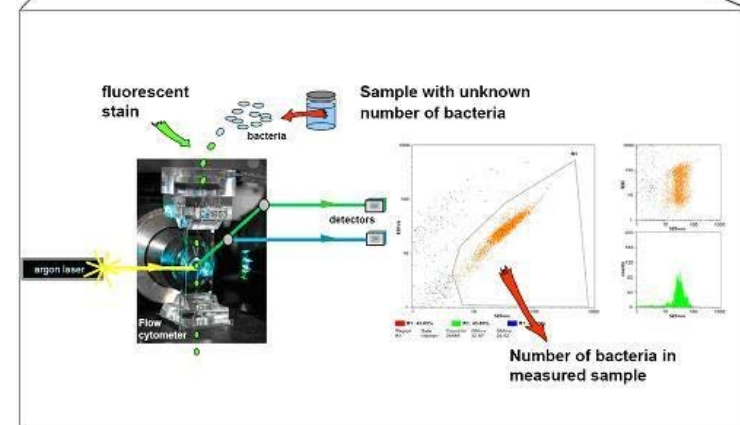
We offer a range of services:



- Specific test development
 - Genetic markers
 - Species multiplex



- Flow cytometry



- Whole genome sequencing!

“What species is this?”



“Is this the same as the one we found six months ago?”

“What tree from the neighbors has damaged my drain?”

“Are these from the population we tried to eradicate, or have they reinvaded?”

“What population should we prioritise for restoration?”

“What animal killed this bird / lizard?”

“What animal did these droppings come from?”

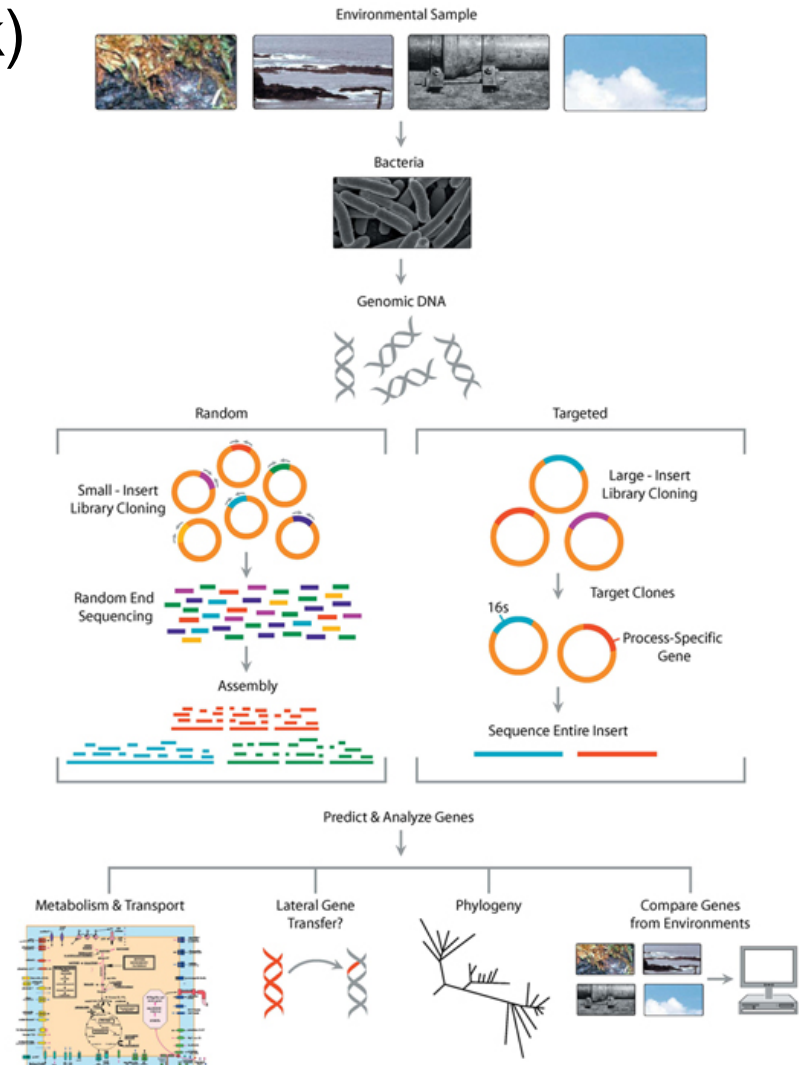
“What was this eating before it died?”

“Where in the world did it come from?”



Limitations

- Available existing data (Genbank)
- Sample quality
- Markers available?





Sample quality

- CSI is a television programme, so is Star Trek
- Tissue quality is the main limitation in what we can achieve
- Preserve / Package / Post!
 - Speed is essential

Take home messages:



- It isn't expensive, and is usually fast
- ID is only as good as existing data, but this applies to any method – improving all the time
- If in doubt, preserve something as soon as you can! **Mould = Mould!**

Who to talk to: (shameless advertisement)



- Dr Gary Houlston, Technical Advisor (Plants), EcoGene
- Dr Frank Molinia, Operations Manager, EcoGene