Evaluation of the Introduction History and Genetic Diversity of Serially Introduced Fish Populations in New Zealand

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Consequences of Invasion

- Founding events or introductions:
 - Reduced N
 - Increased F_{IS}
 - Genetic drift
 - Overall loss of genetic variation
 - higher extinction rates

“Paradox” of Invasion

- Founding populations tend to have:
 - Low genetic diversity
 - Low evolutionary potential
 - Low reproductive fitness
- BUT,
 - Introduced populations often evolve
(Reznick & Ghalambor 2001; Stockwell et al. 2003)

“Paradox” of Invasion

Admixture

- Cuban Lizard Example
 - Kolbe et al. 2004; 2008

Success with disadvantage

- Roman & Darling 2007
- Brooks & Endler 2001
- Stockwell & Weeks 1999

Western mosquitofish

Gambusia affinis

Hawaiian “Beach Head”

Texas to Hawaii Translocation

- Scribner et al. 1992
 - Increased *heterozygosity*
 - Little or no loss of *allelic richness*.

Questions

- Concordance of genetic data and published record?
- Genetic impacts of serial introductions on this invasive fish species?

Methods

- Microsatellite assay – 9 loci
- Five sample locations
- 30 Individuals / sample

Map

Auckland Domain (AD)

Lake Ngatu (LN)

Genetic Diversity

Allelic Richness

Heterozygosity

Divergence estimates

- Overall $F_{ST} = 0.096$

	BR, TX	CL, TX	LH, TX	LN, TX	AD, TX
BR, TX	-	0.009	0.009	0.091	0.209
CL, TX	1/2	-	0.002	0.078	0.203
LH, TX	0/1	1/2	-	0.084	0.214
LN, NZ	9/9	8/8	8/8	-	0.088
AD, NZ	9/9	9/9	9/9	8/9	-

Genetic Distance

Genetic Structure

Approximate Bayesian Computation

Approximate Bayesian Computation

Conclusions

- Support for the documented introduction history
- Strong evidence of founder effects
- Large, persistent populations
- Reduced genetic diversity has not impacted long term population persistence.

Next Step?

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