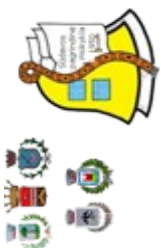




Instituto de Ensino Secundario Val Miñor



CARBON FOOTPRINT AND CLIMATE CHANGE

THE AIM

- ✓ Students would spread awareness about climate change through a role play presentation under the guidance of their teachers. The activity aims at developing advocacy skills for making their voices heard for a global cause.
- ✓ Students will think about the future of Earth if emissions of greenhouse effect gases go on without control.

THE METHOD

1. Each group choose a subject among the following:
 - i) Climate change effects
 - ii) Effect of growing population on carbon footprint and climate change
 - iii) Greenhouse gases, carbon footprint and climate change
 - iv) Steps to reduce emission of green house gases.
2. Groups prepare a presentation, discussion or role play that could be supported with a computer presentation, play or a poster.

Parasite Spillover Effects on Native Communities in New Zealand Streams and Lakes

Landscape Research
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Bridging Disciplines Program
Environmental Studies

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BRIDGING DISCIPLINES PROGRAM

What is parasite spillover?

Parasite spillover is a process that describes the feedback of native parasites from new host species to native hosts.

- First, native parasites infect introduced or invasive host species.
- With a new host, parasites flourish.
- Now, parasites return to native species with increased infection and disease rates.

Salmonids Brown trout *Salmo trutta* (originating from Europe) and rainbow trout *Oncorhynchus mykiss* (North America) were first introduced to New Zealand waters in the late 19th century. Their effects on local and native stream communities as a non-indigenous species include lesser-studied effects such as parasite spillover and dilution.

Unpublished Kirby, D.W., Paterson, R.A., Townsend, C.R., Poulin, R. & Tompkins, D.M. "Parasite spillover: a neglected concept in invasion ecology?"

Objectives

1. Test whether the presence of brown trout *Salmo trutta* and their parasite abundance is correlated to increased infection rates in four native species fish.
2. Identify for native fish and brown trout seasonal variations in infection intensity.
3. Understand the impact of parasites on host's condition, survival, and reproductive potential through captivity experimentation for all five host species. Parasite transmission to, establishment in, and mortality in different host species will also be identified.
4. Use multi-host and shared-parasite stochastic simulation models.
5. Consider global implications of this model by applying it to an Argentine system and conducting a literature survey of the abundance of shared parasites in native and exotic freshwater fish.

Unpublished Kirby, D.W., Paterson, R.A., Townsend, C.R., Poulin, R. & Tompkins, D.M. "Parasite spillover: a neglected concept in native communities?"

Could parasite spillover be a cause of native species loss and local level extinction?

Methods

- Analyze freshwater fish communities in lakes and streams
- Field surveys
- Host autopsies
- Infection trials
- Mathematical modelling

Lake Poerua, Lake Sumner, Lake Pearson, Upper Taieri Stream

My Experience

I spent five months interning with this project, conducting various lab and field tasks. In the laboratory, I counted the invertebrates from lake benthic sediment samples. I also conducted lipid analysis on galaxias, brown trout, and bully. In the field, I helped as we set nets and traps for fish. We also collected benthic sediment and zooplankton samples.

DISCUSSION

Native species loss is a critical issue throughout the world in many different environments. This map from Conservation International shows biodiversity hotspots where over at least 70 percent of native species are already lost. The most biodiverse regions, including New Zealand, are also the ones most at risk.

Competition and predation are the traditional impacts of invasive species on native species, but disease driven impacts are becoming more widely recognized and researched. Whereas parasite spillover is already an accepted form of disease driven impact, parasite spillover can potentially be more widely used as a tool for describing and understanding impacts of invasive species and native species loss.

A parallel study with similar methods is currently being conducted by the same team of researchers in Argentina. Other areas of the world where parasite spillover has been researched include a study of competing native and invasive grasshopper populations in California (Settle and Wilson 1990). With more awareness of this issue, more research and studies will hopefully begin and consider parasite spillover as a potential cause for native species loss, potentially helping reverse the trends in global hotspots.

Unpublished Kirby, D.W., Paterson, R.A., Townsend, C.R., Poulin, R. & Tompkins, D.M. "Parasite spillover: a neglected concept in native communities?"

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