

Floundering in a changing lake

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Seafood Production



Why is the research important?

- Fish are products of their environment
- The environment is changing (not just the weather)
- We need baseline information to understand the resilience (or lack of) for our important fish species
- Can we recommend some species as being more suitable fisheries candidates to thrive in a changing world?
- Temperature is one of the most important environmental variables

Overview

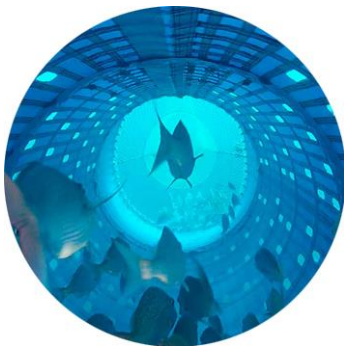
- » Seafood Production Group at Plant & Food Research
- » Fish and temperature
- » This project – ‘Floundering in a Changing Lake’
- » Aerobic scope
- » Next steps for the research

Seafood Production
at PFR



Plant & Food Research

- » NZ based research institute
- » 14 sites in NZ
- » Broad range of research interests
 - » Seafood
 - » Crops
 - » Horticulture
 - » Food and beverage
 - » Wine

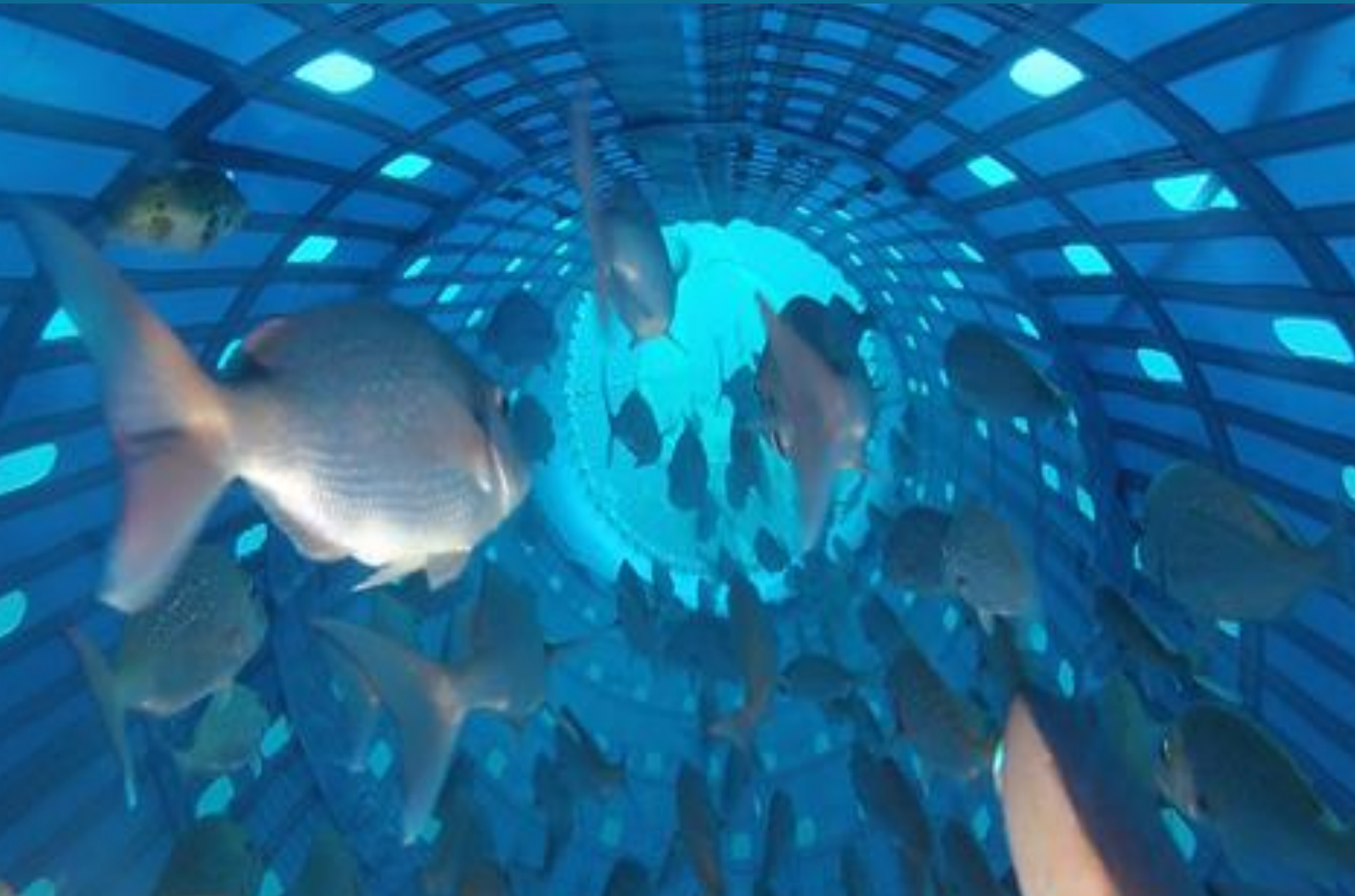


Seafood Production Science

- » We learn how to breed fish – snapper, flounder, blue cod
- » We breed fish to study them
- » Live behaviour and physiology, genetics
- » We design technologies based on what we know



Modular Harvest System



Pātiki breeding programme

- » Aim to culture yellow belly flounder in captivity
- » Using broodstock from Pelorus Sound
- » For future use in either restocking or aquaculture or both
- » Sharknett (Pelorus); Ngai Tai (Hauraki Gulf)



Nelson Research Facility



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Fish and temperature



Humans regulate body temperature

- » Humans maintain a constant internal body temperature regardless of the external environment
- » We do this using both behavioural and biological strategies
- » We can't tolerate changes in our internal body temperature



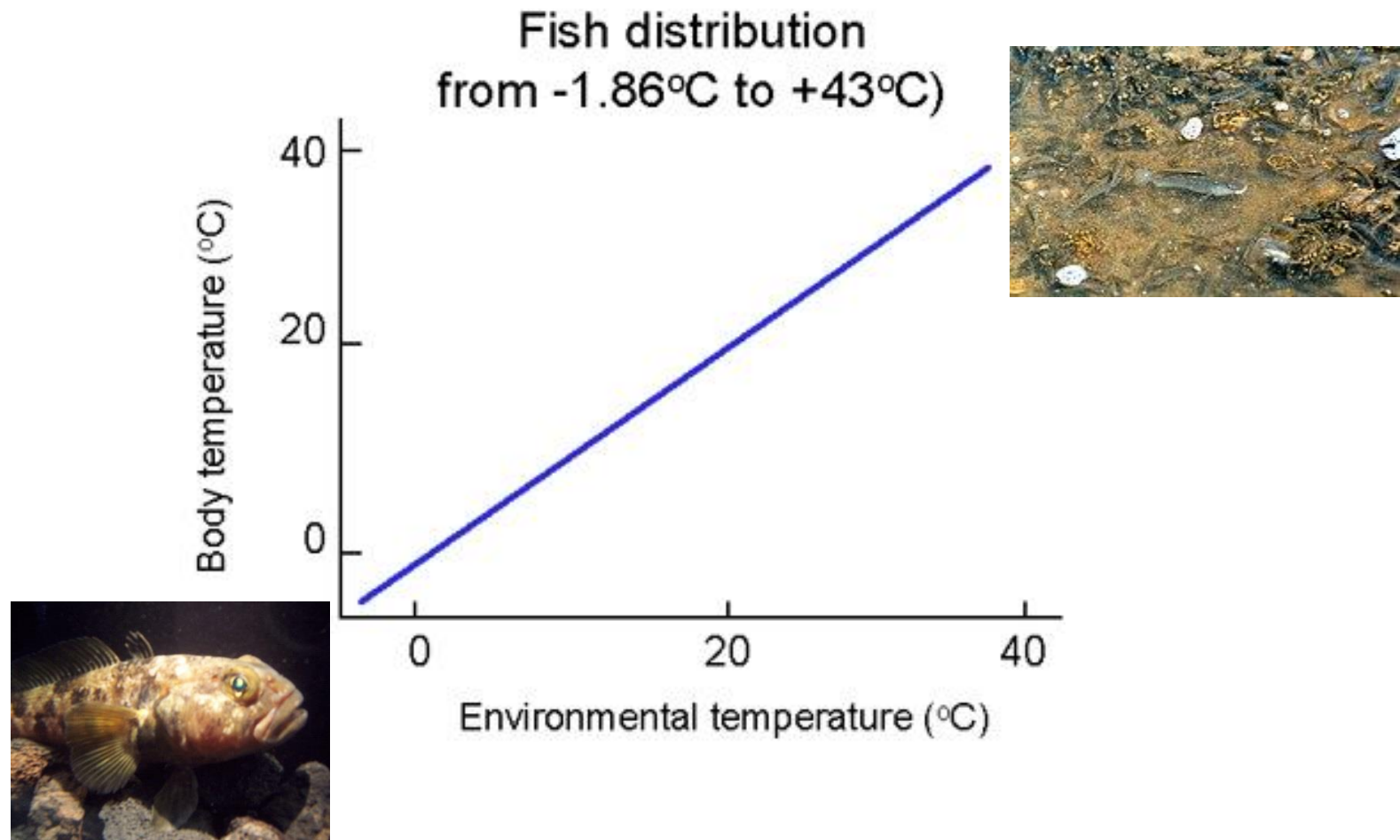
Fish can't control body temperature physiologically

- » Body temperature changes as the water temperature changes
- » Fish in hot water are hot
- » Fish in cold water are cold

- » Influences rate of all body processes
- » Temperature has a profound influence on the survival and function of fish

- » Behavioural mechanisms are available

Fish body temperature



'Floundering in a
changing lake'



Pātiki - Flounder

- » Flatfish found around NZ
- » Live and feed on the seafloor
- » Less active and buried into sediment during daylight
- » Three main species in lake – black, yellowbelly and sand
- » Variable abundance in the lake

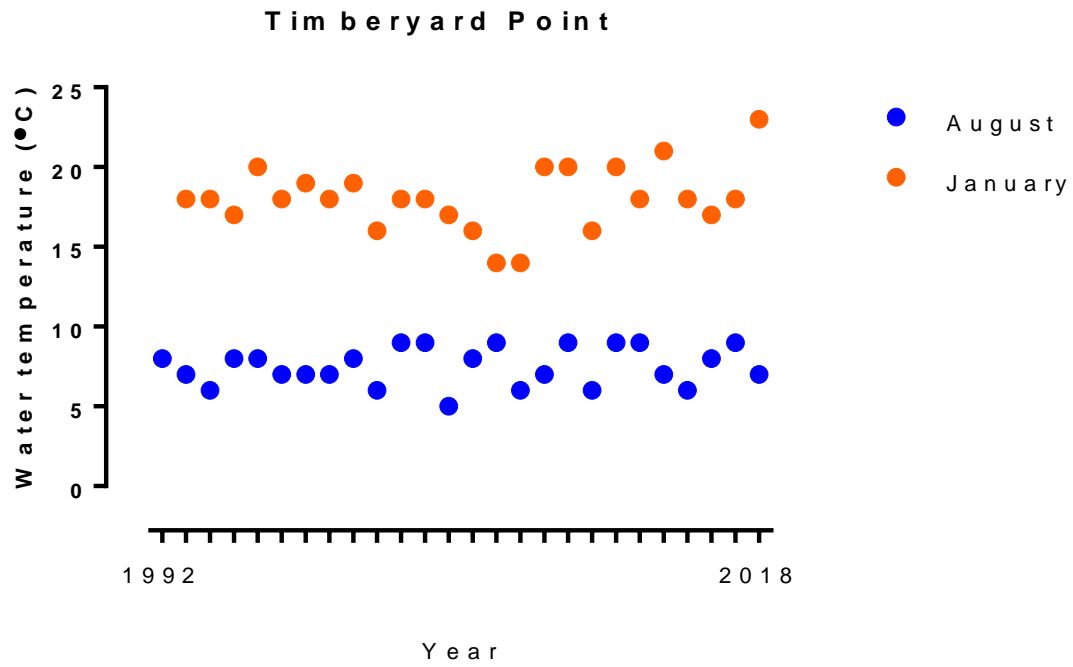


Te Waihora/Lake Ellesmere



- Te Waihora/Lake Ellesmere is sensitive to changes in temperature - shallow
- Well monitored – Ecan stations
- Good temperature data

Temperature data



Introduction to the project

- » Funding from Brian Mason Scientific and Technical Trust
- » Collaboration between University of Canterbury and Plant & Food Research
- » Two year project

- » Public availability of data is key aim of project
- » Supported by Waihora Ellesmere Trust

- » Lab-based study
- » Temperature physiology
- » Relate findings to lake temperature data

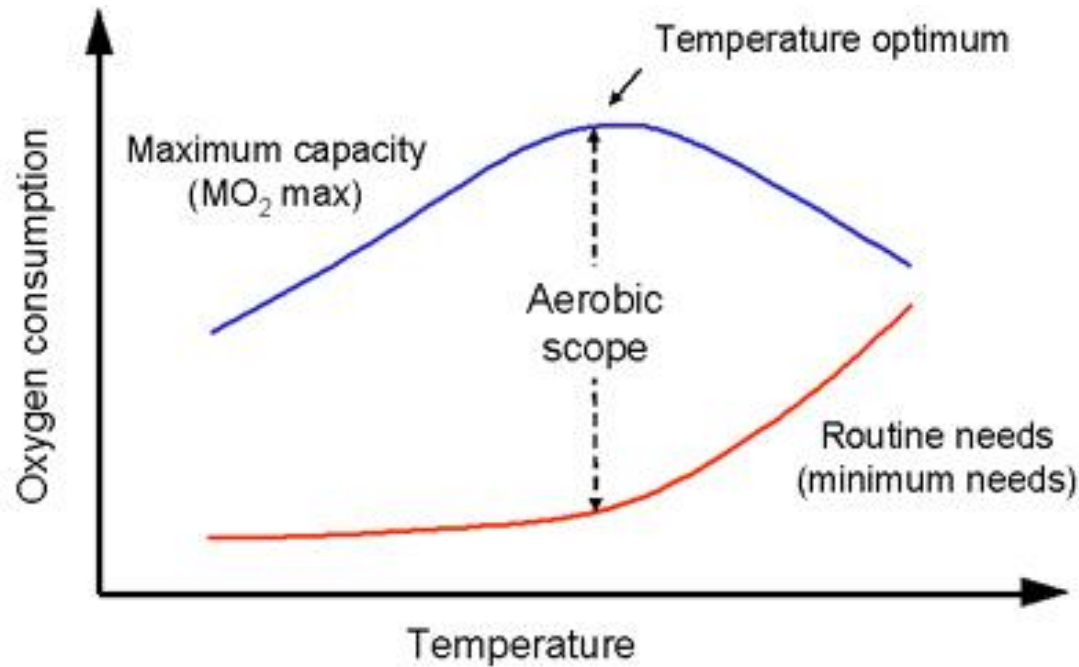
Aerobic scope



Aerobic scope

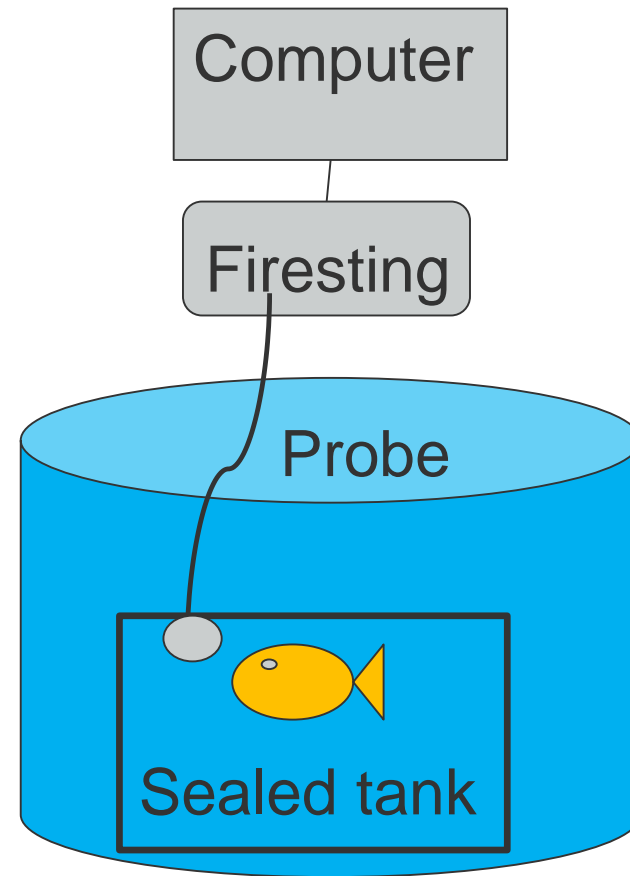
- » Capacity of fish for doing things!
- » A measure of how much energy is available to a fish for normal function (over and above the energy needed for making the body work)
- » We measure this by looking at changes in oxygen consumption – how much oxygen a fish is using

Aerobic scope

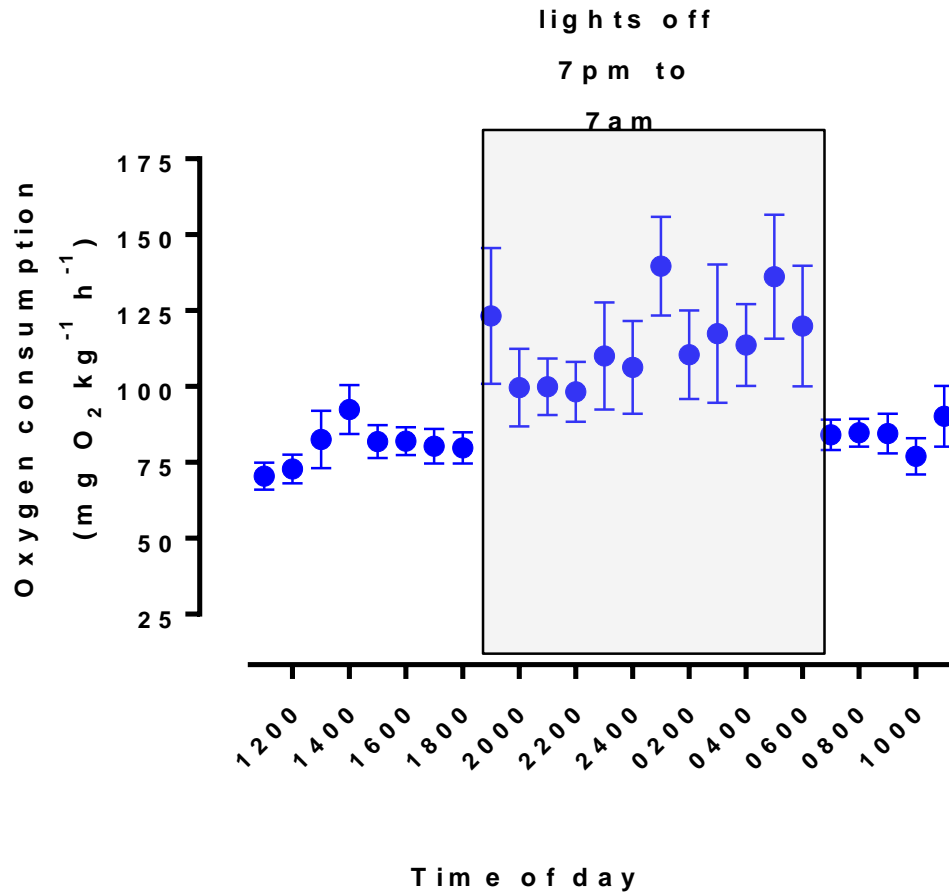


Measuring oxygen consumption

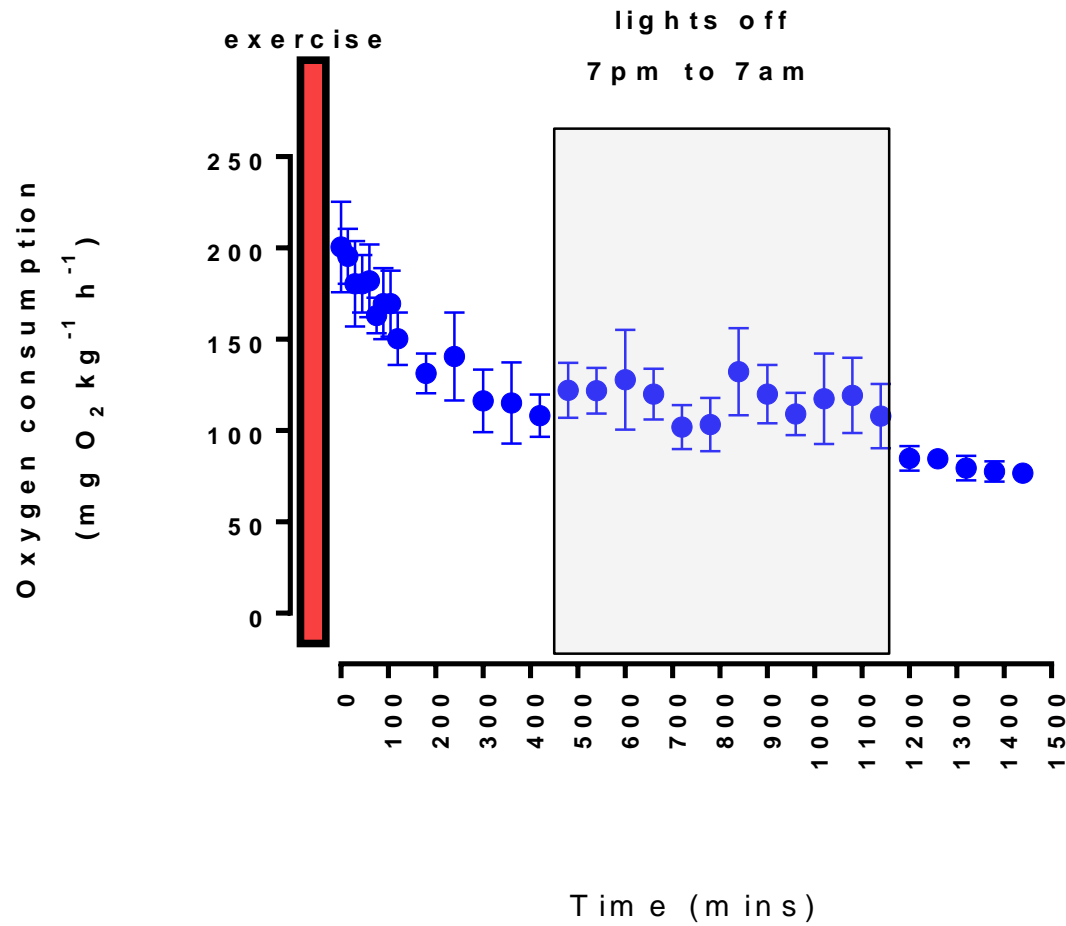
TEMPERATURE CONTROLLED ROOM



Oxygen consumption data 10°C rested

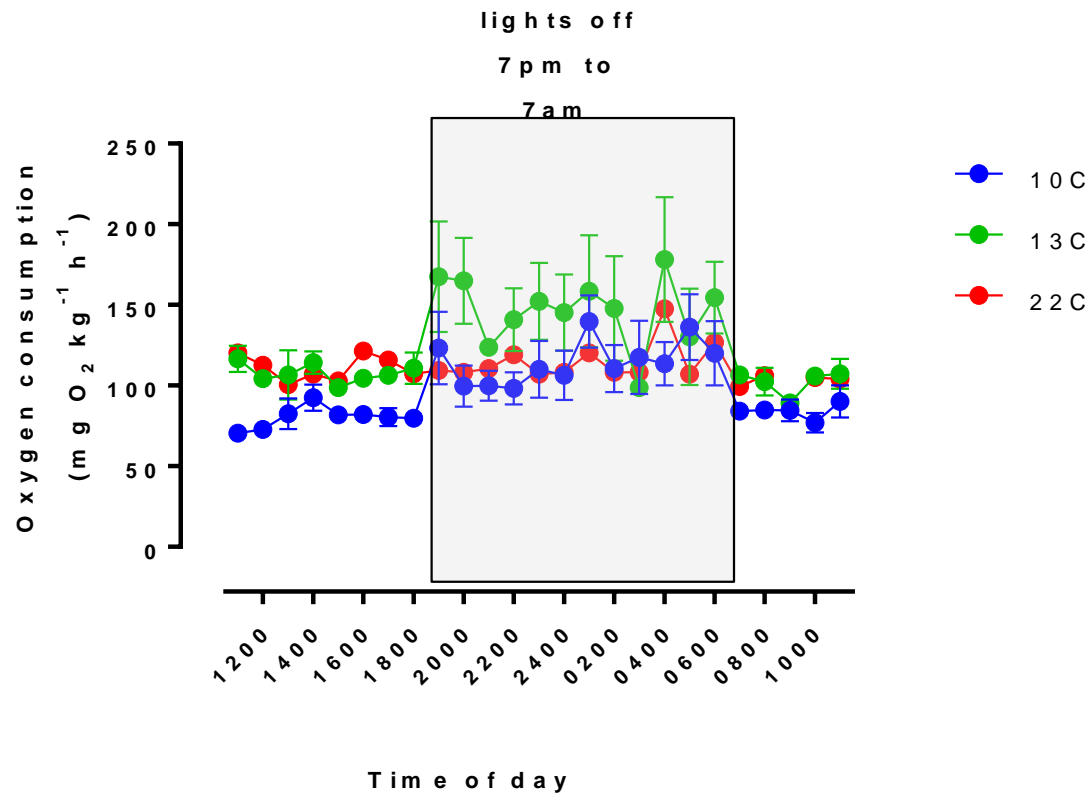


Oxygen consumption data 10°C exercised



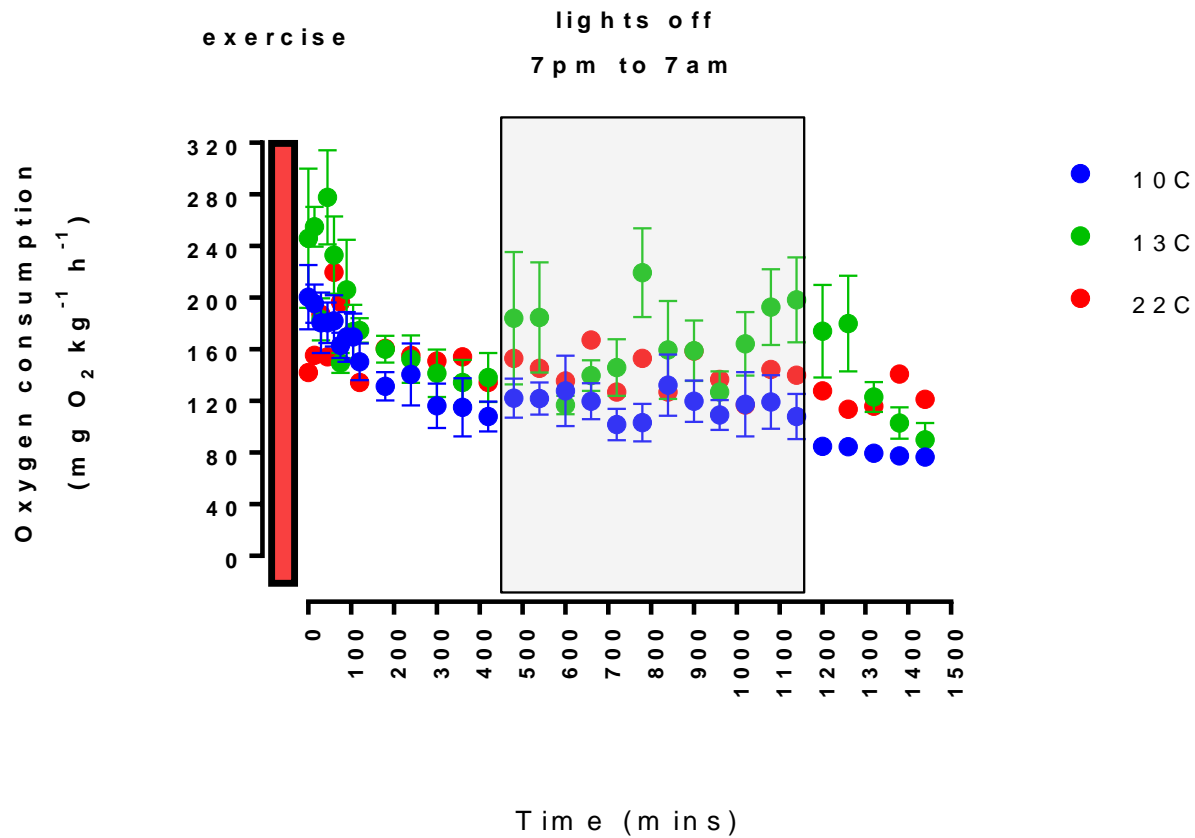
Oxygen consumption data - rest

24 hours rested

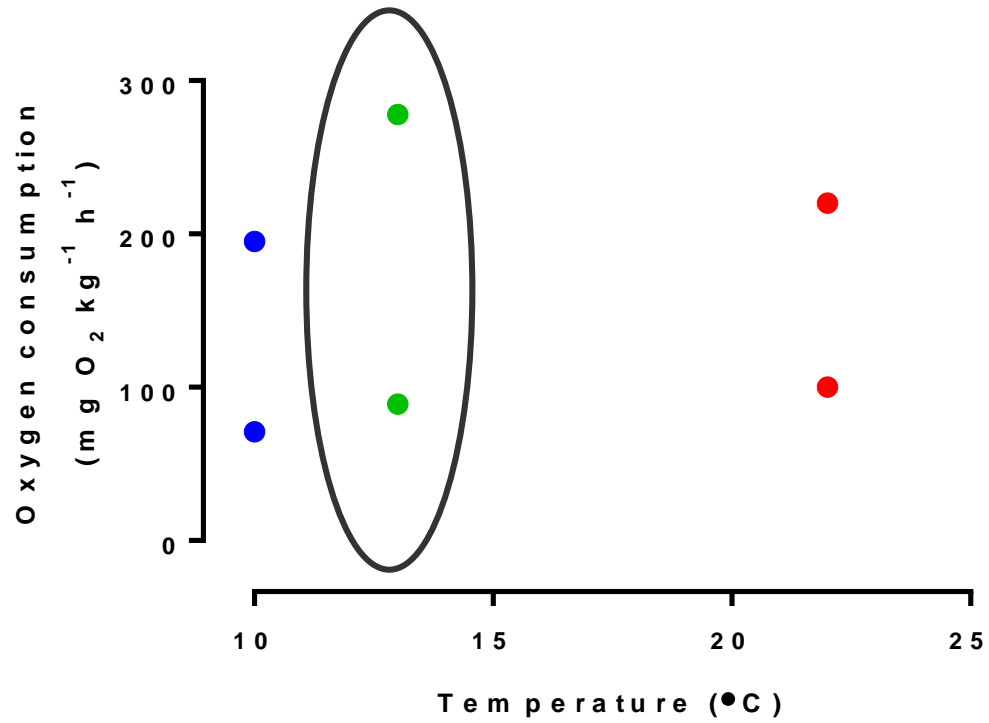


Oxygen consumption data - exercised

First 24 hours following exercise



Aerobic scope



Next steps for the
research



Next steps

- » Continue with the current research
- » Make the results available
- » Pursue some future research directions
 - behavioural thermal regulation
 - life cycle
 - food webs

Acknowledgements

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THANK YOU

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