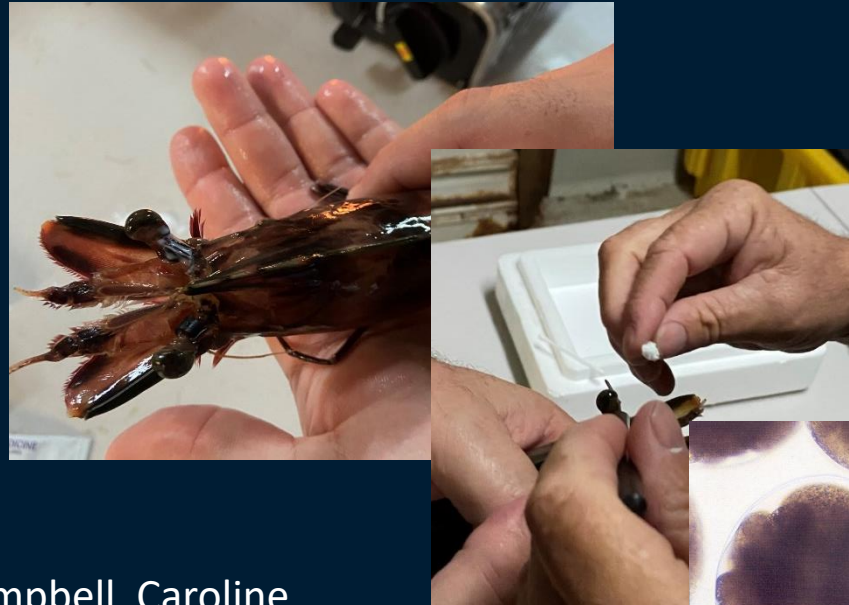




# Defining behaviour metrics for farmed prawns and developing methods to enhance spawning and welfare of *Penaeus monodon* broodstock



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# Project Overview

## Objectives

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Identify research gaps in animal welfare best practice for Australian prawn farming, focusing on broodstock management

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Assess novel solutions for stimulating ovarian maturation in *Penaeus monodon*



## Proposed approaches



**Literature review** – identify knowledge/science gaps in welfare space

A large black checkmark icon is located to the right of the "Literature review" description.

**Behavioural metrics** – define science-based metrics of normal behaviour of subadult and adult aged prawns



**Non-ablation, anaesthetics and nutrition** – investigate alternative methodologies and management approaches to enhance ovarian maturation



# Recent activities



## Proposed approaches



Literature review – Status of prawn welfare knowledge as relevant to the Australian prawn aquaculture industry



Behavioural metrics



Non-ablation alternative



- Scope, format and approach
- General concepts, topics and frameworks
- Farming events
- Scientific knowledge relating to welfare subject matters
- Summary of knowledge gaps



# Recent activities



## Proposed approaches



Literature review



**Behavioural metrics** – system setup and first recordings



**Non-ablation alternative** – injection dsRNA (VIH – Laphayi et al., 2021) - ongoing trial

## Background

- Behavioural research on penaeids has typically focused on behaviours related to feeding, mating and specific production practices, and not on specific aspects of welfare
- Frameworks of sentience from Birch et al., (2021) include 8 criteria, 5 of which are behaviour based: “The amount of evidence of sentience for a given biological taxon is limited by how much scientific attention the question of sentience in that taxon has received..... penaeid shrimps have barely been studied”
- Clear need for more research into behavioural aspects of penaeids to determine potential suitable metrics that can be used as Operational Welfare Indices (OWI)



Aquarium setup at BIRC used for initial behaviour work



## Behavioural metrics – system setup and first recordings



Walking around tank



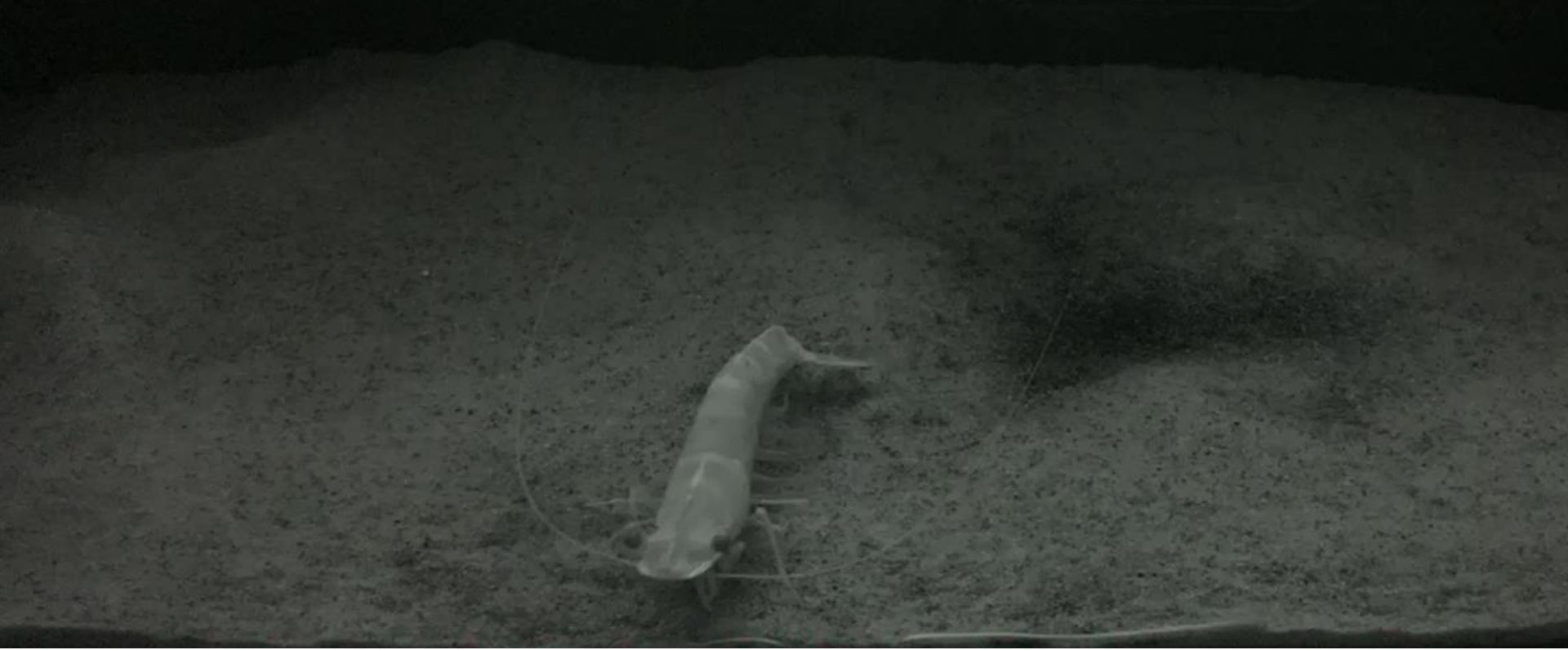
## Behavioural metrics – system setup and first recordings



Grooming



## Behavioural metrics – system setup and first recordings



Eating Polychaete



# Recent activities

- Trials to assess the impact of dsRNA against VIH on ovary maturation with single and multiple injections

Treatment	Tanks	Animals (females)	Justification
Non ablated	6	36 (6 per tank)	Negative control animals, tracked individually with no additional handling
Ablated	6	48 (8 per tank)	Positive control animals, standard industry practice to induce ovarian maturation  2 sampled day 2
Pre-bled ablated	6	36 (6 per tank)	Additional collection of 50-100ul of blood at time of ablation to see if this impacts ovarian development
Injected	6	48 (8 per tank)	Ablation alternative published in Laphyai et al 2021. Injection of dsRNA against vitellogenin inhibiting hormone (VIH)  2 sampled day 2



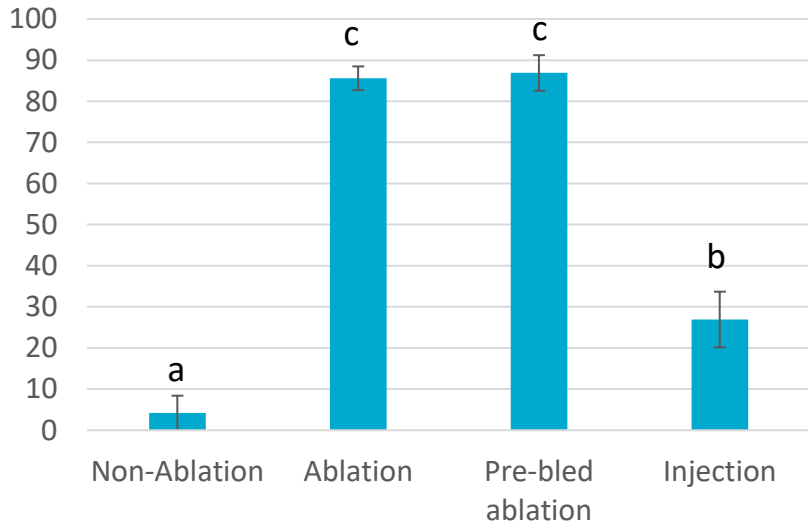
**Non-ablation alternative** – injection dsRNA (VIH – Laphyai et al., 2021) – pre-trials done





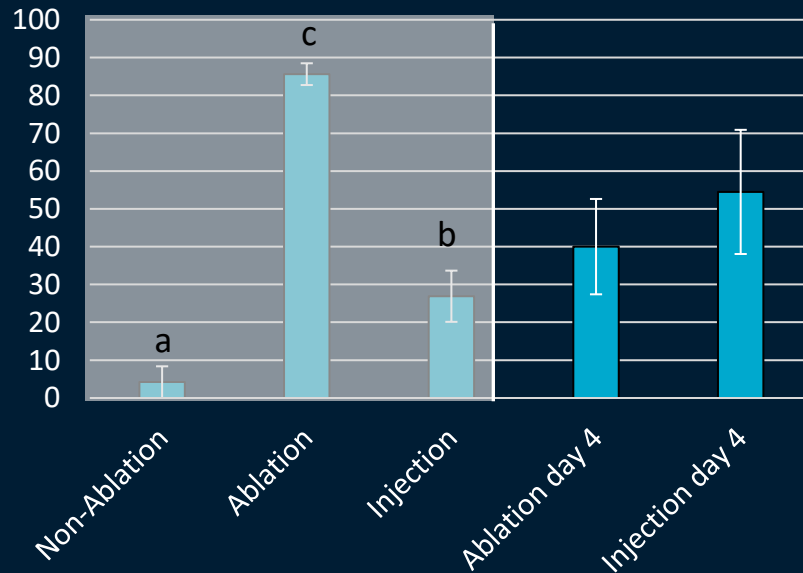
# Recent activities

% of females with ovaries



- Trials to assess the impact of dsRNA against VIH on ovary maturation with single and multiple injections

% of females with ovaries





# Ongoing and upcoming activities

## Animal ethic approved

- Behaviour assessment

- Anaesthetics
- Feed preference

- Nutrient labelling

- Heavy water – Deuterium oxide



- Next experiments

- dsRNA and anaesthetics
- Behaviour assessment (ablation, general handling, environmental Enrichment)





# APFA Prawn welfare project

## Outputs

- Literature review of welfare and husbandry in Australian prawn farming in the context of global welfare standards
- Novel behavioural metrics developed to define welfare improvements
- Reproductive and behavioural data on ovarian maturation alternatives or welfare improvement assessed and summarised in reports and publication
- Identify key nutritional drivers of ovarian maturation summarised in project reports and publication
- Industry workshop to disseminate results



# Additional slides



# Upcoming activities – next 2-4 months

- Behaviour assessment – Suggested experimental design
  - Anaesthetics

## Anaesthetic intervention treatments

Topical lignocaine

Injection of lignocaine

Immersion in MS-222

Injection of Alfaxan



	2023		2024		
Activity	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep
Trial					
Data analyses					
Report					



# Upcoming activities – next 2-4 months

- Behaviour assessment – Suggested experimental design

- Feed preference

<b>Feed preference intervention</b>
Live polychaetes
Fresh-frozen polychaetes
Fresh-frozen squid
Fresh-frozen mussel
Combination of live polychaetes, fresh-frozen squid and mussel
Combination of fresh-frozen polychaetes, squid and mussel

	2023	2024		
Activity	Q4 Oct-Dec	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep
Trials				
Data analyses				
Report				



# Upcoming activities – next 2-4 months

- Nutrient labelling - – Suggested experimental design

- Trial

Treatment	Maturation stage
Non ablated	0
Ablated	Early ovary maturation
Ablated	Advanced ovary maturation

	2023		2024			
Activity	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec
Trials						
Data analyses						
Report						

