Shrimp welfare in the spotlight

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Welfare concept

5 FREEDOMS IN ANIMAL WELFARE	MANAGEMENT PRACTICES
1. Freedom from hunger or thirst	Nutrition
2. Freedom from discomfort	Water quality
3. Freedom from pain, injury or disease	Health management and Therapeutants
4. Freedom to express normal behaviour	Infrastructure, stocking densities
5. Freedom from fear and distress	Handling, Mutilations, Humane slaughter

Webster et al., 1994

Pics by Bögner, 2024

What is the actual welfare legislation for decapods?

- Only a few requirements at slaughter or transport (Austria, Norway, Switzerland, Italy, and New Zealand).

- In EU, no legislation, despite EFSA recognizing them as sentient.

Why so few regulations?

- Pain-related mediators (receptors) not identified so far.

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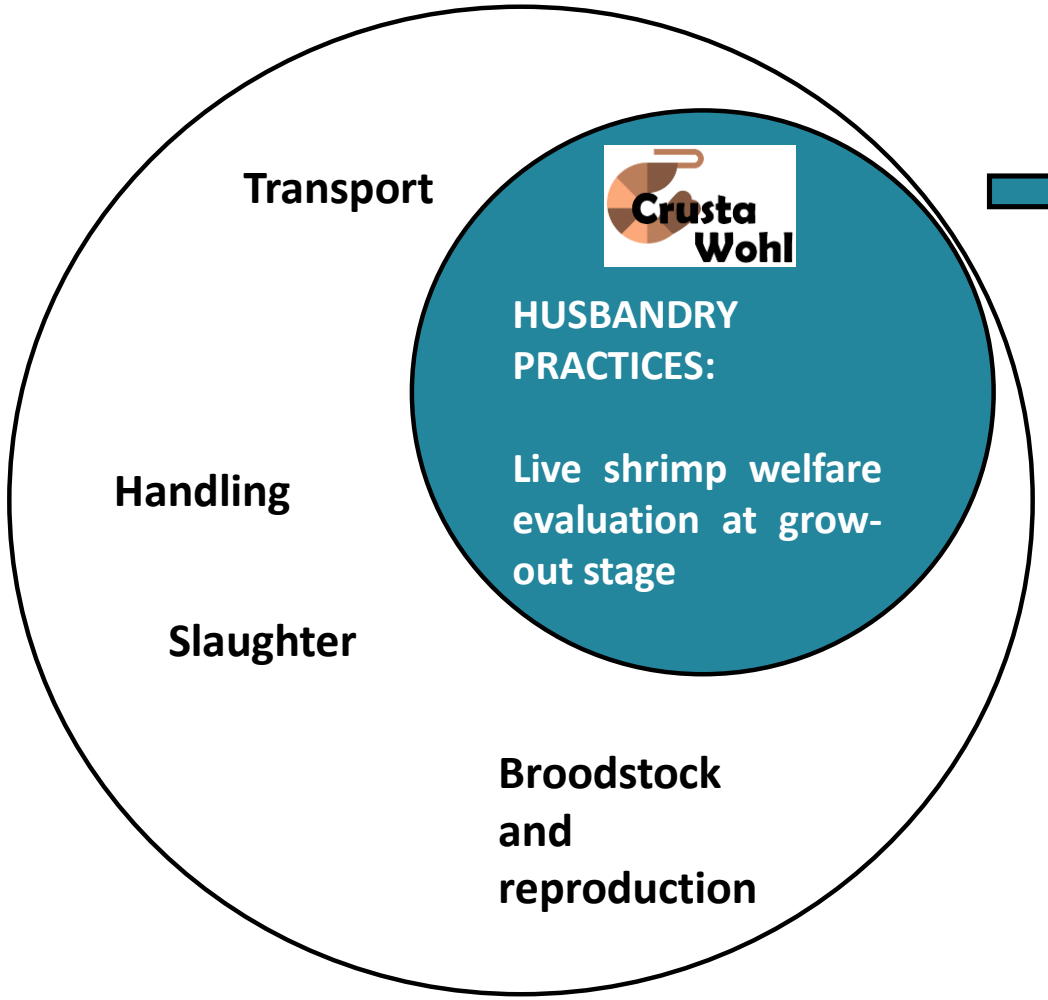
Shrimp welfare



Operational welfare indicators (OWIs)

- Measures that reflect welfare on site

Direct

Invasive

- Physiological parameters
- Histopathology

Non-invasive

- Physical health
- Behaviour
- Growth
- Survival rate

Indirect

- Water chemistry
- Nutrition
- Management
- Rearing system

What has been done?

- Albalat et al., 2022: List of potential operational welfare indicators

Requires for best management practices considering regions/farming systems

- Pedrazzani et al., 2023: Score index of all indicators in different production stages for *P. vannamei*

Lack of direct application of integrated welfare assessments

- Würtz et al., (2023) requires to assess physiological biomarkers and behavioral studies to monitor welfare

Approaches for *Paeneus vannamei*

- **Questionnaire to shrimp experts:**

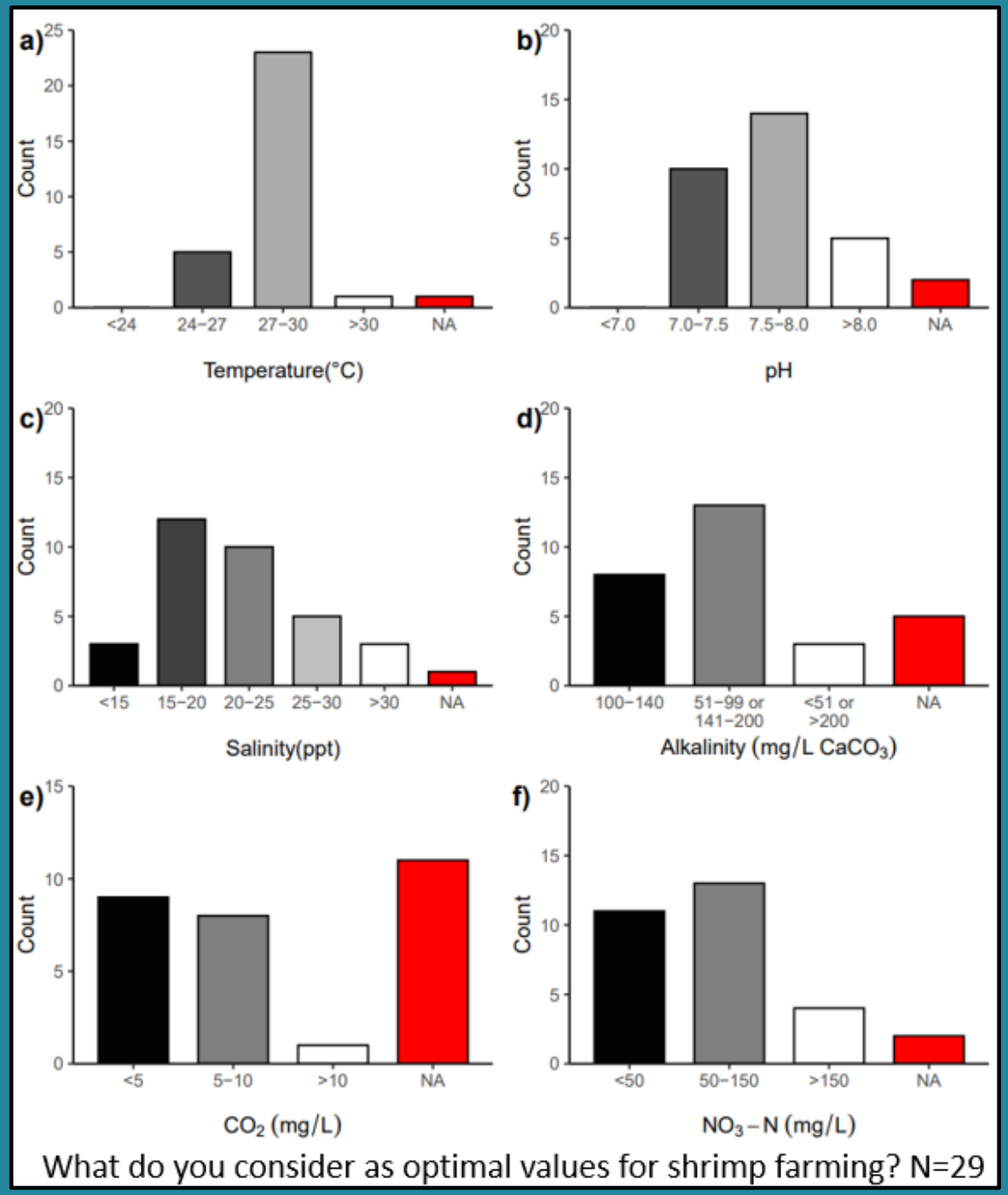
29 replies obtained
Questions on different topics
Some results presented here

- **Chronic stress experiments at lab/farm scale**

- **Welfare index realization and testing**

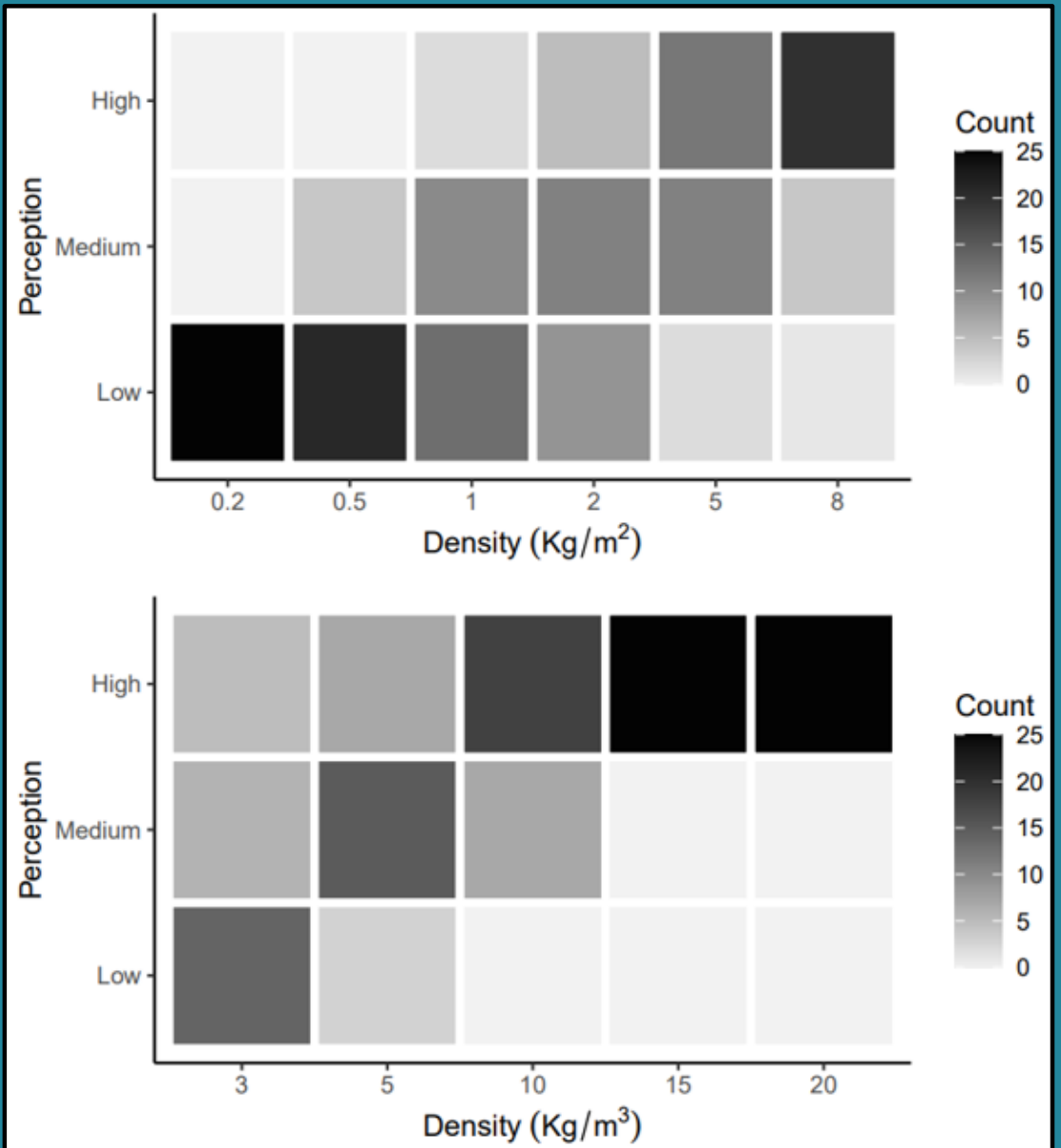
Indirect welfare indicators: Water parameters

- Homogeneous results for temperature
- Wide range of salinities and pH as known for this species
- Alkalinity variation due to system type and water source hardness
- > 150 mg/L NO_3-N might impact growth performance negatively
- CO_2 not measured in several facilities



Indirect welfare indicators: Stocking densities

- It depends on system type, enrichments, tank design, stage of growth
- It can be measured in different ways (individuals/L, Kg/m^2, Kg/m^3)
- In kg/m^2, standard is indicated between 2 and 5 kg/m^2
- In kg/m^3, standard is indicated between 3 and 10 kg/m^3

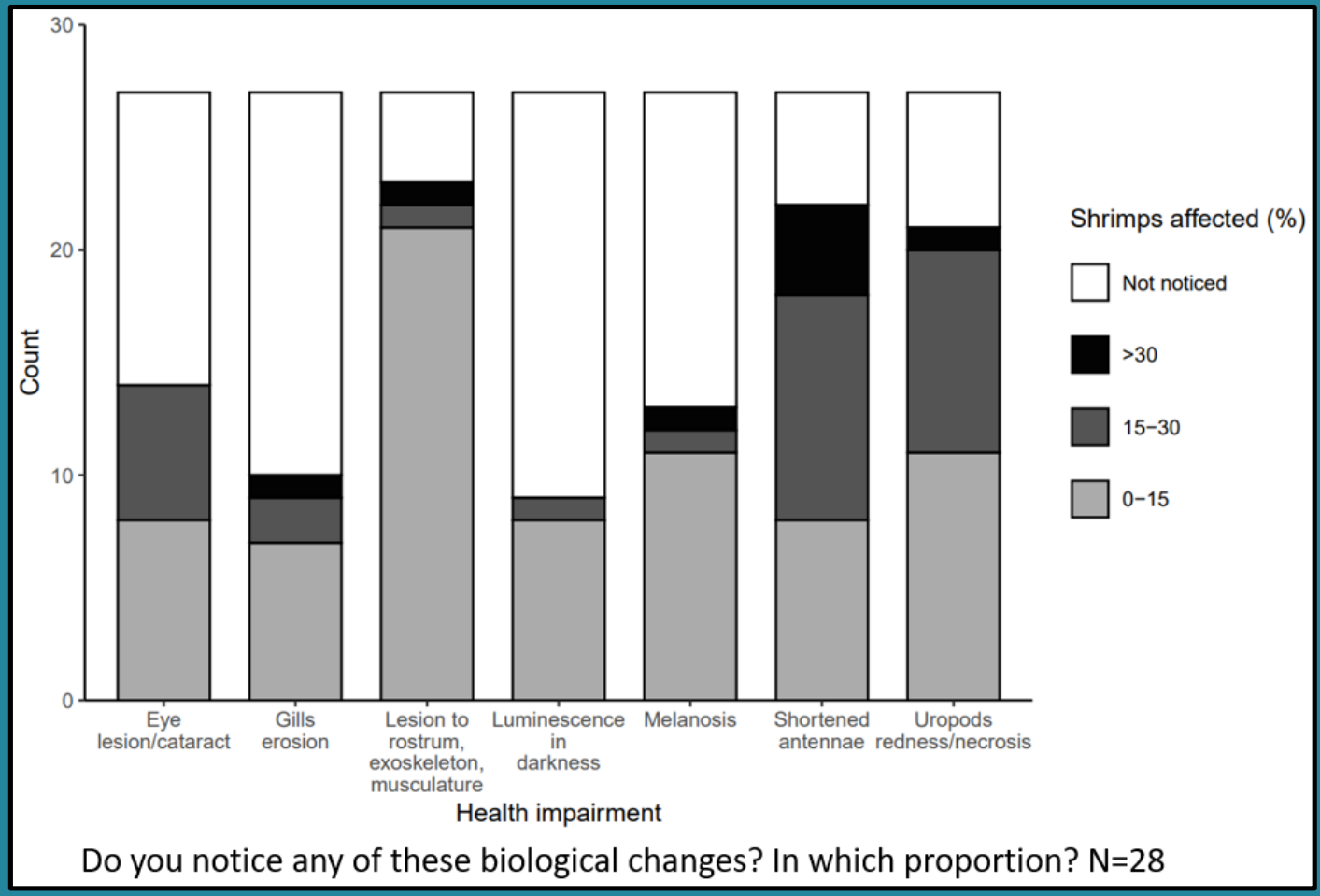


How would you define these stocking densities at grow-out stage? N=29

Direct welfare indicators: Physical health

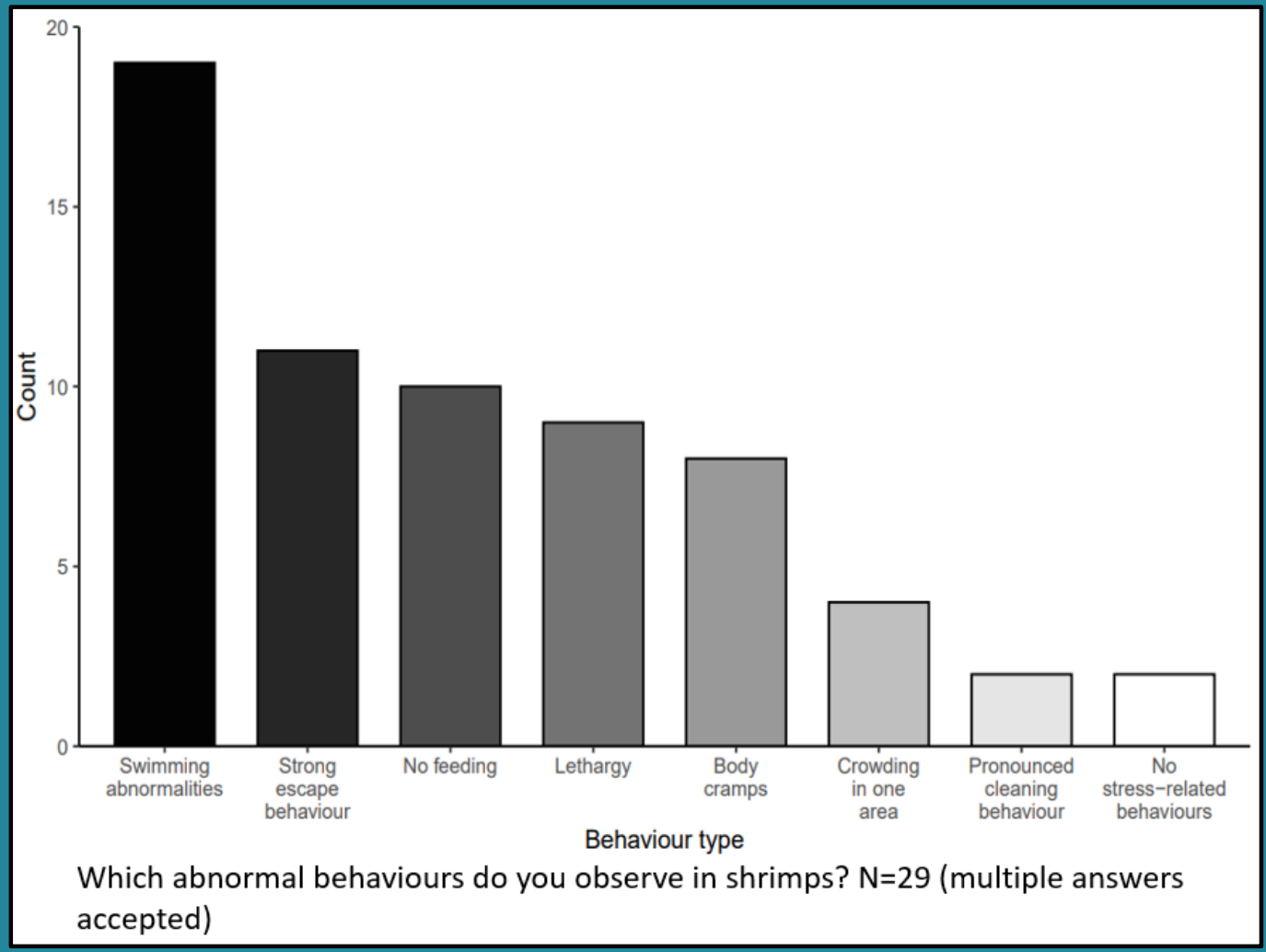
- Antennae, uropods, rostrum, exoskeleton, musculature lesions frequently observed

- Antennae and uropods impairments affect at a larger rate shrimp facilities



Direct welfare indicators: Behaviour

- Swimming abnormalities are frequently observed
- Escape behaviour, no feeding, cramps and lethargy follow



Which abnormal behaviours do you observe in shrimps? N=29 (multiple answers accepted)

THANK YOU

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