Attractability and palatability assessment of shrimp feed materials using video tracking technologies

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aquaculture Que

Guillermo Bardera, PhD 29th September 2022

SHRIMP FARMING

Increase in production more than x30 in the last decade (2010 - 2020).

Production of Pacific white shrimp (5.8 mt) > Atlantic salmon (2.7 mt).

Proliferation of shrimp indoor companies in Europe using RAS technology.

Hatchery plans for a near future.





FEEDING PROBLEMS







Studies mainly focused on performance assessment (i.e. SG, survival, FCR).

High variability of results.

 \downarrow information about feeding behaviour.

Focus on:

- 1. Behavioural units.
- 2. Behavioural plasticity.
- 3. Individual variation.



REVIEWS IN Aquaculture

Reviews in Aquaculture (2019) **11**, 1104–1132

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The importance of behaviour in improving the production of shrimp in aquaculture

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BEHAVIOURAL UNITS

	Behaviour	Description
Behaviours	Feeding	Time (s) spent on the feeding tray, eating food.
	Latency-to-feed	Time (s) taken by shrimp to first arrive at the feeding tray.
in relation to	Transitions	Number of times shrimp entered the feeding tray.
feeding area	Distance-to-feed	Average distance (cm) between shrimp and feeding tray during the recording.
Behaviours	Moving	Time spent moving (s) during the recording.
in relation to	Distance	Distance (cm) travelled by shrimp during the recording.
test arena	Velocity	Average velocity (cm/s) of shrimp during the recording.







Control: commercial feed (no additives)

Negative: commercial feed + Quinine-HCI (bitter taste)

Positive: commercial feed + Krill meal (3% IL)



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Assessing feed attractability in Pacific white shrimp (Litopenaeus vannamei) using an automated tracking software

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Good reliability (~98%). •

- Clear behavioural ≠ \bullet according level of attraction.
- Low individual variation. \bullet
- Heatmaps provided a quick and reliable assessment.





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The influence of density and dominance on Pacific white shrimp (*Litopenaeus vannamei*) feeding behaviour

Guillermo Bardera ^a A ⊠, Matthew A.G. Owen ^c, Felipe N. Façanha ^c, Jose M. Alcaraz-Calero ^b, Mhairi E. Alexander ^a, Katherine A. Sloman ^a

Scaling up the protocol.

Different densities were tracked at the same time using tracking software.

Low: 6.2 shrimp/m2 Medium: 12.4 shrimp/m2 High: 24.8 shrimp/m2





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- Good reliability (~95%).
- Behavioural ≠ depending on density.
- \uparrow indv. = ID swapping.
- Heatmaps provided a quick and reliable assessment.





CONCLUSIONS

- Feed often represents the highest production cost on farms, however knowledge on shrimp feeding behaviour is still scarce.
- Laboratory studies must be based on clearly defined ethograms to allow standardization and repeatability of observations.
- Proof-of-concept that tracking software can be used to assess the level of attraction and palatability in experimental feeds at individual and group levels.
- Adoption of tracking software allows to go further in results interpretation and save a considerable amount of time.
- Future research should also focus on the interpretation of behaviours in order to translate observations into feeding status indicators.

CONTRACT RESEARCH SERVICES

- Moredun Scientific is a contract research organization based near Edinburgh (Scotland).
- Mainly focus on fish health products in a range of aquaculture species.
- Experimental facilities:
 - Large Scale Biocontainment Facility
 - Commercial Scale Salmon and Trout Units
 - Small Scale GLP Compliant Facility
 - Small Scale Warm Water Facility
- Currently running studies on shrimp feed additives using tracking software.
- We are on **STAND 72** for more information.
- www.moredun-scientific.com

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Thanks for your attention!