Chemical Ecology of Marine Interactions

The chemical language that shapes future marine health

Dr Michael Steinke
University of Essex, UK

Blue Science for Blue Growth
8 February 2017
Metabolites facilitate communication in microbial networks
Marine Chemical Ecology spans across various scales

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Example 1: Prey detection (kairomones)

- 2 mm long crustacean copepod
- Feeds by ‘filtering’ small plankton out of suspension
- One species alone (*Calanus finmarchicus*) has same biomass as entire human population
- Ecologically and economically important!
- Cannot see well:
Example 1: Prey detection (kairomones)

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Their success is entirely governed by sensing chemicals in the environment
Example 1: Prey detection (kairomones)

Watch the videos at:

Blue Science for Blue Growth
Example 1: Prey detection (kairomones)

Feeding current: velocity

Tail-flapping: velocity
Example 1: Prey detection (kairomones)

- Plankton prey
- Boundary layer
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Example 2: Predator detection (kairomones)

Slide credits: Dr Uwe John, AWI
Example 2: Predator detection (kairomones)

Up-regulated genes
Down-regulated genes

SxtA, SxtG gene up-regulated

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Example 2: Predator detection (kairomones)

Nutrients
Temperature
Light
...

Adaptation

Grazing

Competition

Infection (parasite & virus)

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Beginning to understand ‘signals’, ‘words’...
...imagine if we were to understand chemical ‘sentences’, ‘languages’...
...and use this to direct, manage...
EuroMarine Foresight Workshop

- Provided with 10 k€
- 21 participants
- 6 countries, 11 institutes
Outcomes from EuroMarine Workshop

Identification of key milestones in terrestrial chemical ecology that could provide a blue-print for new cross-disciplinary activities to unravel chemical signalling processes in marine ecosystems.

‘Pull’
Volatile chemicals produced by border plants attract stemborer natural enemies

‘Push’
Volatile chemicals produced by intercropped plants repel stemborers and attract their natural enemies

http://www.push-pull.net/
Outcomes from EuroMarine Workshop

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Apply ‘push-and-pull’ strategies in mariculture?
Follow-up Funds

‘QUESTSEM’ – Preparation for Horizon2020 Application in the area of ‘Food Security’

Innovative Training Network (ITN)

DFG Fellowship – Dr Mahasweta Saha at University of Essex
Follow-up Funds

‘Message in a Bottle’ – CIFAR-GBMF Workshop in Eilat Israel: 13-17 March 2017

Sea lice trap development

Tracks

Velocities
Sea lice trap development

Tracks

Velocities

Bait distribution

Selander, Heuschele & Larsson, *submitted*
• EuroMarine activities provide a vision of future marine chemical ecology research

• Increase ecological knowledge to generate economical and societal impact

• Happy to take questions and respond to comments during the panel discussion

www.euromarinenetwork.eu