The importance of good food – nutritional requirements of *Parastichopus tremulus*

Dr. Ellen Schagerström and prof. Kristina Snuttan Sundell

SWEMARC, and Department of Biological and Environmental Sciences, University of Gothenburg

Project: Circular Marine IMTA

AIM

- to develop new circular production methods based on IMTA including fish, seaweed, filtrating organisms and detritivores.

Objectives for part-project Sea cucumbers

- investigate induction of breeding and develop breeding protocols for *Parastichopus tremulus*
- develop larval rearing protocols for *P. tremulus*
- characterize optimal farming conditions for *P. tremulus* regarding abiotic factors
- characterize nutritional requirements and optimal feeding protocols for different life stages of *P. tremulus*
- characterize the role of *P. tremulus* in models evaluating sustainability with respect to nutrients in IMTA with fish in semi closed systems, mussels, algae and sea cucumbers.

In the pipeline

- Develop a feed to put broodstock in optimal condition for producing high quality offspring
- Develop feed for juveniles, using waste from aquaculture (algae, bivalve and fish waste), to optimize growth rate and survival
- Determine the physiological response and tolerance limits to water parameters to establish optimal protocols for co-culture rearing (IMTA)
- Further studies on feed and feeding for all larval stages
- *In situ* observations of populations

Feed and nutrient uptake studies

Algae, bivalve faeces, fish faeces and combinations thereof

- Parameters to be analysed:
  - Ingestion rate (IR)
  - Faeces production rate (FPR)
  - Food conversion efficiency (FCE)
  - Apparent digestion rate (ADR)
  - Oxygen consumption and energy budget

These studies will be performed by Kelly Johansson, student on the Nordic masters program in sustainable production and utilization of marine bioresources University of Gothenburg and Nord University Bodø

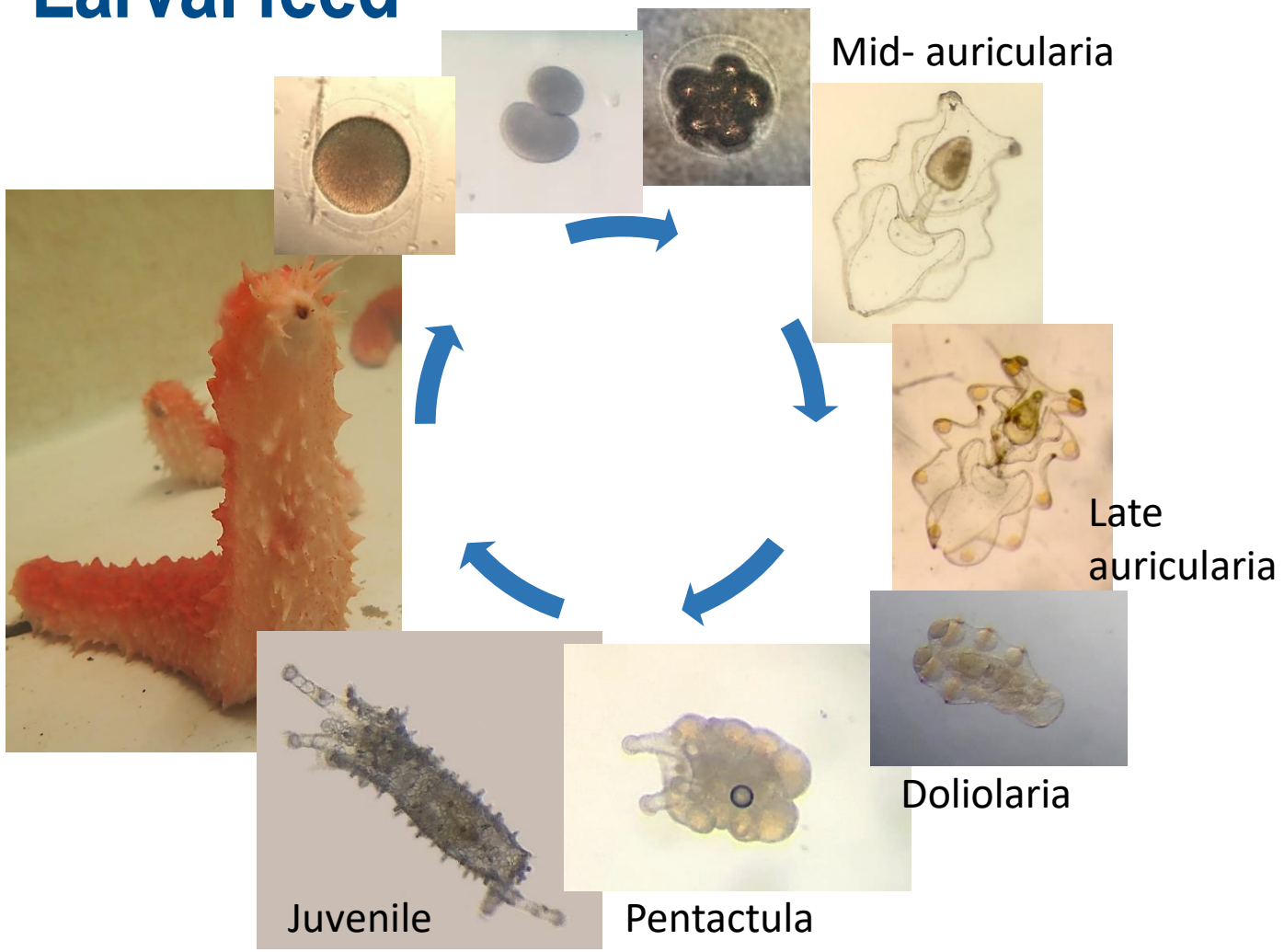
Physiological studies

- Respirometry determining oxygen consumption as a measure of stress
  - Abiotic stressor already tested: Temperature
  - Abiotic stressors to be tested fall 2022: Salinity, pH, ammonium & oxygen

- Effects of stocking density on growth

These studies will be performed by Rebecca Bussmann, student on the Nordic masters program in sustainable production and utilization of marine bioresources, University of Gothenburg and Nord University Bodø

Larval feed



The 2022 season

- Optimal feeding regime
- Initiate metamorphosis
- Increase metamorphosis step 1
- Increase metamorphosis step 2
- Settlement inducement
- Settled larvae feed
- Juvenile growth rate
- Juvenile feed
- Juvenile mortality rate

Field observations on ecology

- Population structure (size distribution)
- Natural population densities
- Behaviour during spawning season


SUPPORT YOUR LOCAL
SEA CUCUMBER RESEARCH