Scottish Shellfish Innovation, SAIC project updates

Association of Scottish Shellfish Growers

Annual Conference, 26-27 October 2017

Robin Shields

Scottish Aquaculture Innovation Centre

Scientific support to pilot mussel hatchery

SAICHatch Project

- "To research and develop new technologies and processes required for a successful Scottish commercial mussel hatchery"
- May 2016 – Oct 2018 (30 months)
- Total project value £366,000

Genetic Tools Project

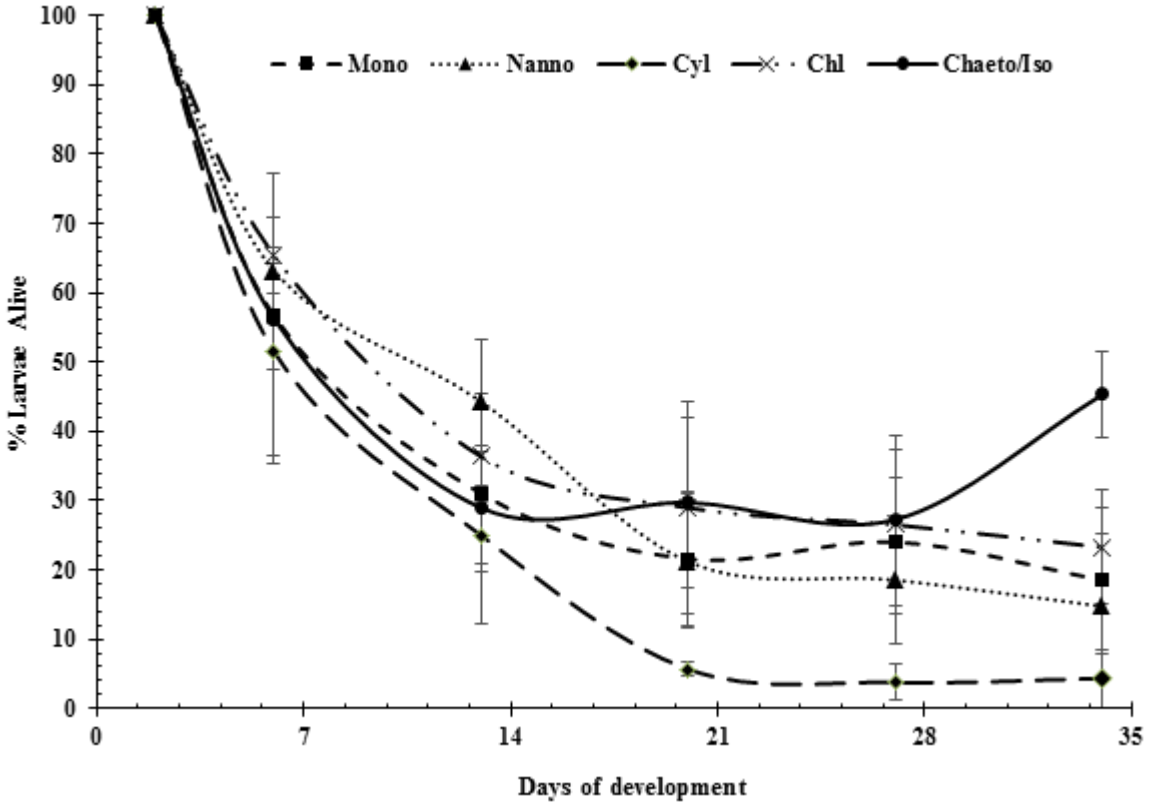
- "To develop and validate standardized genetic tools for stock management of mussels"
- Jan 2016 – Dec 2017 (24 months)
- Total project value £150,000

SAICHatch work streams

- **Innovations in algal feeds**
  - Strain selection, comparing photautotrophic, heterotrophic & mixotrophic culture conditions
  - Lab scale evaluation of shortlisted strains: mussel larval survival, growth, microbiology
- **Microbial communities in pilot hatchery**
  - Characterisation for key hatchery components and mussel life history stages; “seasonality” effects
- **Metamorphosis & role of biofilms in spat settlement**
  - Molecular characterisation of maturing biofilms
- **Methodologies for transferring spat to sea**
  - Optimal size/age of spat
  - Socked vs unsocked growing ropes
  - Post-transfer performance

SAICHatch, Algal feeds

- Eg, larval survival in response to different algal diets (source A. Hughes et al., SAMS)



SCOTTISH ASSOCIATION for MARINE SCIENCE

European Union
European Social Fund

Survival percentge during the larval development for the different diets evaluated. Mono: M.subterranean; Nanno: N. oceanica; Cyl: C. fusiformis; Chl: Chlorella vulgaris; Chaeto/Iso: mixed diet 30:70 C. calcitrans: I. galbana.

SAICHatch, Hatchery microbial communities

- Protocols optimised for DNA extraction from different sample types
- Sampling kits distributed to NAFC and SAMS
- Samples collected from key locations within pilot hatchery, multiple larval batches and different times of year
- DNA samples currently being processed from replicated lab. scale trials (SAMS) and pilot hatchery (NAFC)
- In prep. - Characterise culturable bacterial populations using standard microbiological techniques, with emphasis on *Vibrio* spp.

Institute of Aquaculture
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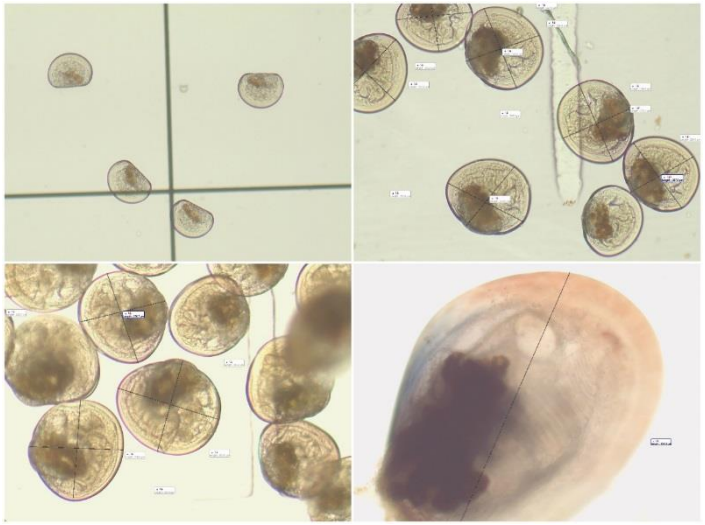
SAICHatch, Metamorphosis & spat settlement

- Different experimental rearing systems evaluated - 150L downwellers preferred
- Spat exposed to different rope types (ongoing)
- Rope & tape samples “matured” at NAFC and Marine Lab Aberdeen
- Methods developed for biofilm harvesting and DNA extraction
- qPCR tested with taxa-specific primers



Scottish Government
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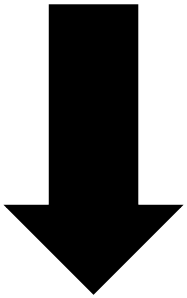
Genetic Tools work programme

- Develop a suitable SNP panel (***S****ingle* ***N****ucleotide* ***P****olymorphism* panel)
- Use spat from single parent crosses to validate SNP panel (parentage assignment)



Tools for mussel family selection programme

Genetic Tools, 2017 accomplishments

- SNP validation
  - Feasibility tested of microsatellite analysis for different-sized mussels → *2mm minimum*
  - Validation of SNP panel requires simultaneous analysis of 6x batches of single parent crosses
- Spat production
  - Painstaking process: numerous batches reared throughout 2017 season, continuous refinement of protocols.
  - Sample collection now almost completed and ready for despatch to Xelect.

XELECT
GENETIC SOLUTIONS FOR AQUACULTURE

Thank you for your attention

- **With thanks to the participants** -
  - **SSMG:** Michael Tait, Lindsay Angus, Stephen Cameron
  - **Xelect Ltd:** Tom Ashton, Andrew Richardson
  - **NAFC:** Lesley McEvoy, Blažka Smiljanič, Gregg Arthur, Danny Cowing, Raquel Quinta, Tariq Mohammed
  - **SAMS:** Adam Hughes, Michelle Stanley, Alessandro Laudicella, Joe Penhaul-Smith
  - **Institute of Aquaculture**: Stefano Carboni, Andrew Desbois, Margaret Crumlish, Stuart McMillan
  - **Marine Scotland Science**: Una McCarthy, Iveta Matejusova

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