

CRYOPLANKTON – A NEW ERA IN MARINE LARVAL PRODUCTION

LARVI22

NILS TOKLE, PHD

CTO, PLANKTONIC AS



OUR LIVE FEEDS

Cryo-S

Balanus crenatus nauplii
length 200µm/width 100µm.

Cryo-L

Semibalanus balanoides nauplii
length 320µm/width 150µm



BARNACLES ARE THE SOURCE OF CRYO-S AND CRYO-L

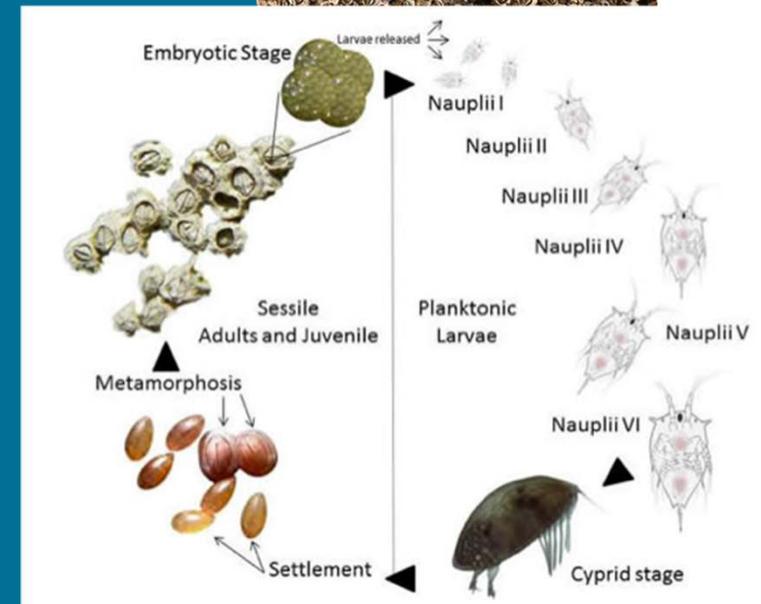
Each barnacle contain up to 20.000 eggs

Eggs release when conditions are optimal, first quarter every year.

The eggs hatch to naupli stage 1 immediately. Go through six planktonic stages before they attach to a surface and start molting into a sessile barnacle.

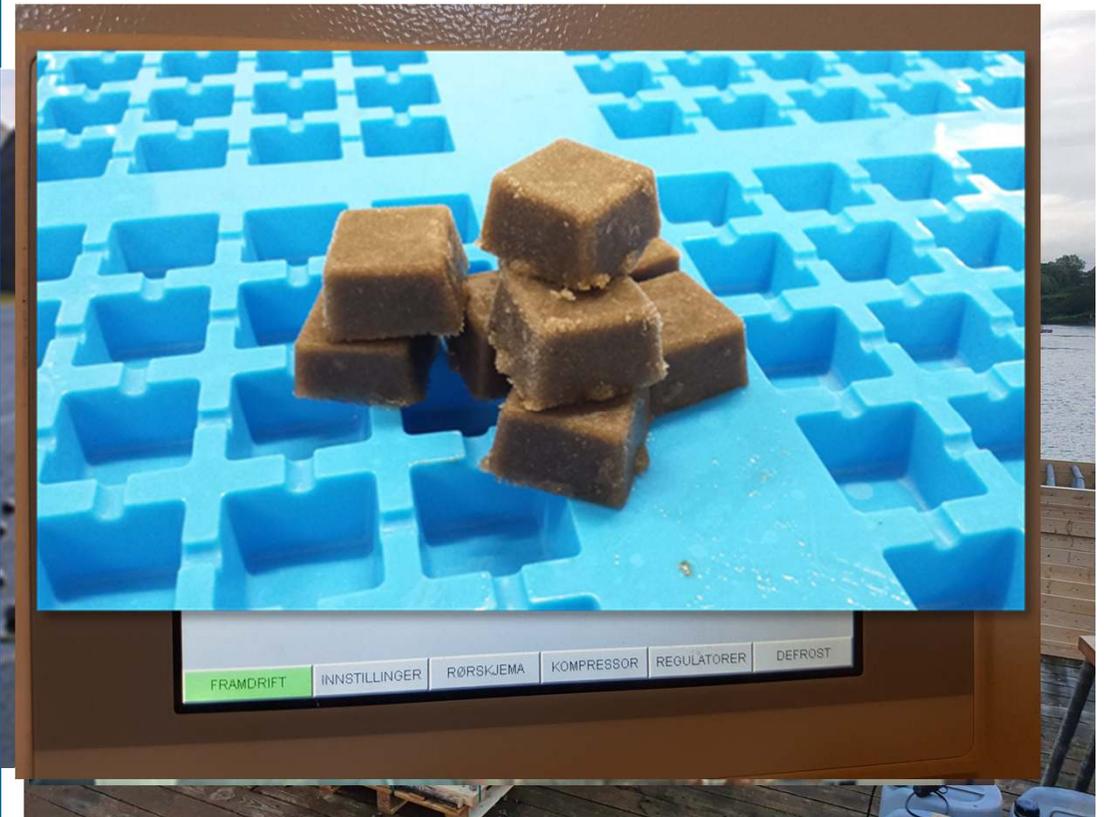
A year after, the cycle repeats

Vast biomass – they are «everywhere» – it's all about competition for space.



INDUSTRIAL FARMING AND PRODUCTION OF BARNACLES

- Extensive production
- Governmental licenses
- Extracting eggs from adult barnacles
- Cryopreservation
- Patent 1: use of barnacle offspring
- Patent 2: cryopreservation
- Easily scaleable



PLANKTONIC'S
PRODUCTS AND OUR
VALUE
PROPOSITION TO
OUR CUSTOMERS

Replace	Replace live feed cultures with NATURAL PLANKTON - live off-the-shelf product of better nutritional quality
Simplify	Simplify production process in hatcheries, reducing risk and lowering bacterial levels in feed
Improve	Improve fry quality to that of wild population
Achieve	Achieve highly improved FCR and SGR in growth cages - increased profitability

ACCUMULATED EXPERIENCE USING CRYOPLANKTON AT
HATCHERIES

USED AS THE STANDARD FEEDING PROTOCOL

MARKET LEADER NORTHERN EUROPE

NEW SPECIES IN AQUACULTURE = DEPENDENT OF A HIGH
QUALITY PREY

USP#1: OPTIMAL NUTRITIONAL VALUE

No enrichment needed - natural nutritional value, optimal for larval development.

Marine HUFA's are stored in the phospholipids and not in the triglycerids - makes a world of difference.

Taurine is important for larval growth/development.

Beneficial carotenoids for effective conversion to vitamin A in fish and

NUTRITIONAL CONTENT	
Average content in g/100 g dry weight	
Protein	67
Lipid	11
Ash	12.5
Typical fatty acid content (% of total fatty acids)	
DHA	22
EPA	25
Total saturated fatty acids	18
Total monounsaturated fatty acids	19
Total polyunsaturated fatty acids	62
Total omega-3 fatty acids	50

USP#2: EASY TO USE – LIVE FEED «OFF-THE-SHELF»

Always live feed available,
with consistent quality and
replicability.

Standardized live feed
preparation – limits
uncertainty.

Less dependant on «user
capabilities».



USP#3: UNPARALLELED BIOSECURITY

All batches screened - no pathogens found

Barnacle eggs, non cultivated, disinfected

No enrichment that can leak into the tank

Thoroughly washed before supplied to fish tanks

↳ Insignificant release of

PHARMAQ Analytiq Real time RT-PCR analyserapport Rapport nr.: 20-4281-Pe

Informasjon fra kunde

Firma	PLANKTONIC AS	Lokalitet	TROLLA
Fiskeart	Semibalanus balanoides (skjell/rur)	Lokalitetnr.	
Stamme		Vev	Rur nauplier
Uttaksdato	24.07.2020	Generasjon	
Rapportmottaker	Nils Tokle	Antall prøver	19
		E-post	nils.tokle@planktonic.no

Informasjon fra PHARMAQ Analytiq

Prøve mottatt	18.08.2020	Analyseperiode	18.08.2020 - 25.08.2020, Lab: Bergen
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Oppsummering av analyseresultater

Agens	Vev	Antall analyser	Antall positive	Godkjente
CLUCV-PA	Rur nauplier	19	0	19
CLUTV-PA	Rur nauplier	19	0	19
LPV-PA	Rur nauplier	19	0	19
ParaPer-PA	Rur nauplier	19	0	19
VHSV-PA	Rur nauplier	19	0	19
Noda-PA	Rur nauplier	19	0	19

For detaljert informasjon om analyse, se neste side.

Kunden står fri til å kopiere denne analyserapporten, men ufullstendig gjengivelse må ha skriftlig godkjenning fra laboratoriet.

PHARMAQ Analytiq
Bergen, 25.08.2020

Kjetil Thorstensen (sign.)
Laboratorieingeniør / Laboratory technician

USP#3: MICROBIAL ACTIVITY; CUSTOMER STATEMENTS

Low microbial activity with beneficial profile result in:

- More reproducible results between fish tanks and production cycles
- More reliable larval production
- Change of the larva's microbiome – evidence from activity in the gut

Picture Left: TSA CryoPlankton after 48 hours after revitalization

Picture Right: TSA in rotifer culture

Lower petri dishes, diluted



USP#3: UNPARALLELED BIOSECURITY

Studies show that cryopreserved barnacle nauplii do not have the capacity to develop further into a sessile barnacle and become a fouling problem within or outside the hatchery.

- Report from University of Stirling

STUDY REPORT

STUDY NO. AWERB 2022 7388 5896

Comparison of cryopreserved barnacle larvae survival vs non-cryopreserved barnacle larvae.

Prepared for: Nils Egil Tokle, Planktonic

Prepared by:

INSTITUTE OF AQUACULTURE, UNIVERSITY OF STIRLING

MARINE ENVIRONMENTAL RESEARCH LABORATORY

USP#4 : SMALL FOOTPRINT – EASY SET UP.

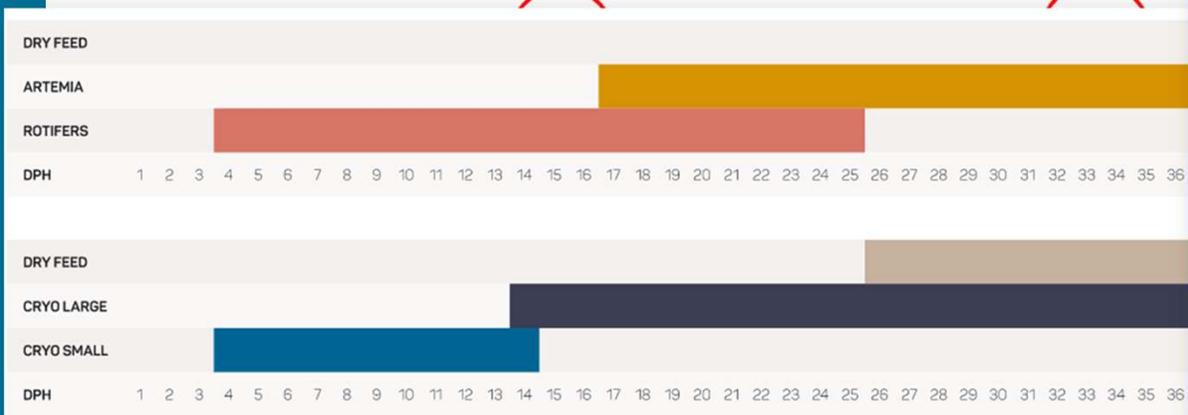


USP#5: EVIDENCE OF EFFICACY

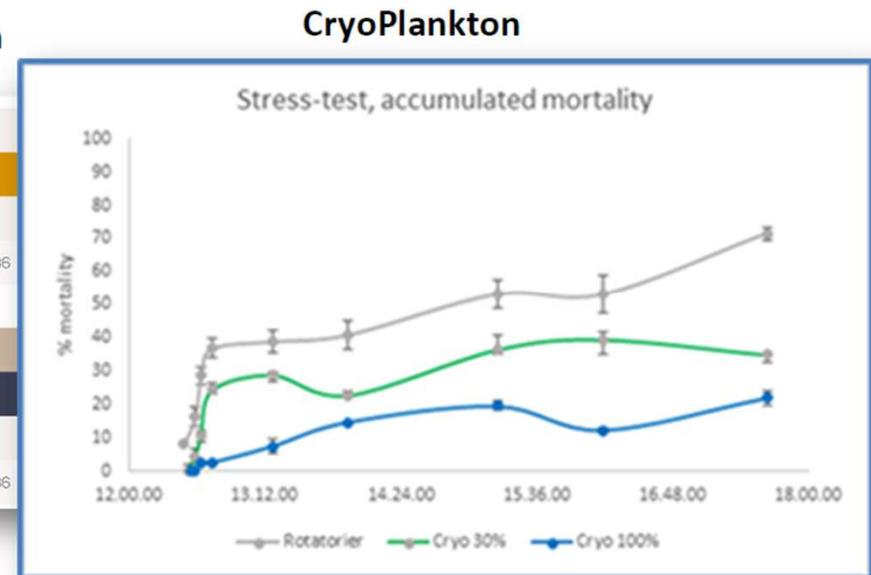
Improved gut health (Source: Sintef/NTNU)

CryoPlankton

CryoPlankton



Promising results on shrimp



USP#5 : EVIDENCE OF EFFICACY; JUVENILE

Fish raised on CryoPlankton display reduced deformities

- Recent trial on sea bass resulted in dramatic reduction of deformed individuals. Eliminates the need of manual sorting for discarding deformed fish
- Flatfish gives better pigmentation when fed Cryoplankton

EXPERT OPINION:

Deformities is the last visible expression in a fish that suffer. Before that happen, the fish struggle with poor gut health, liver etc etc.



REQUEST FROM INDUSTRY

Bio-security which assure a consistent production and predictability.

Robust and less deformed juveniles with improved growth and survival

Improved long term effects on growth which will have major impact on the profit

No or minor preparation of live food

A live food that meets the nutritional requirements of challenging species as Atlantic Cod and Kingfish (*Seriola* spp.).

THANKS FOR YOUR ATTENTION

 eureka



The Research Council
of Norway



Innovation
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