

CALANUS

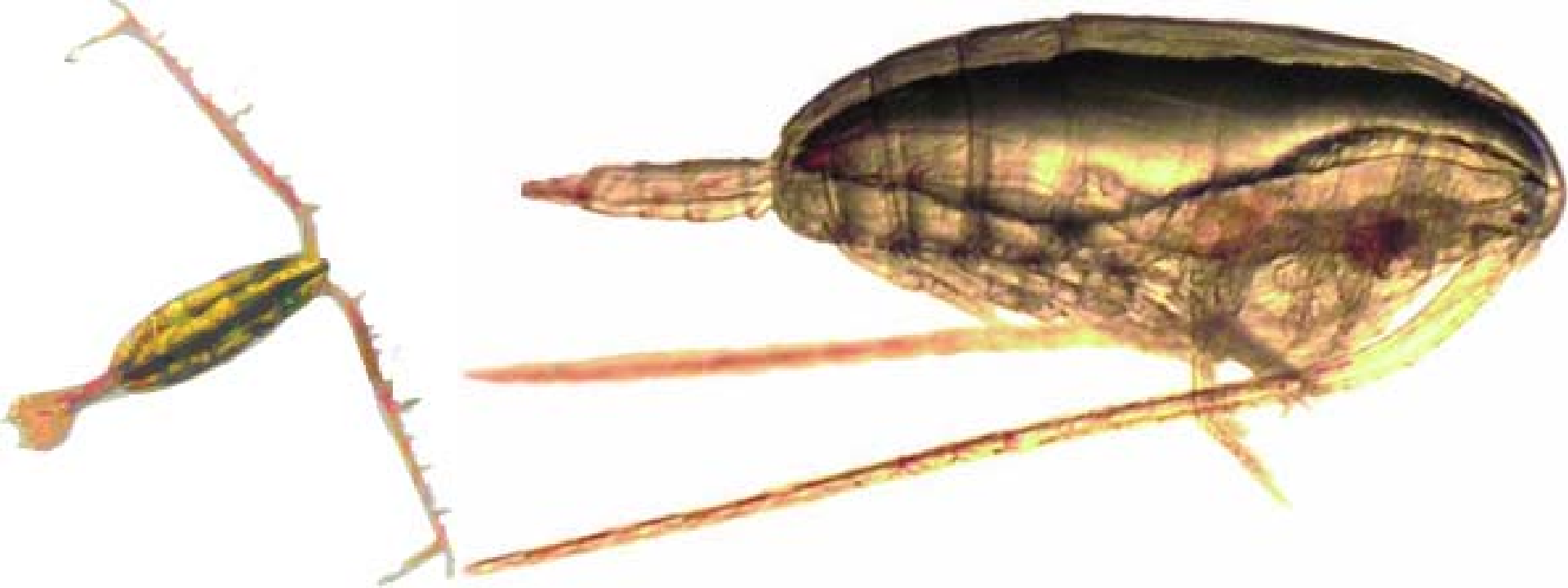


# Bioindustry based on the marine copepod *Calanus finmarchicus*

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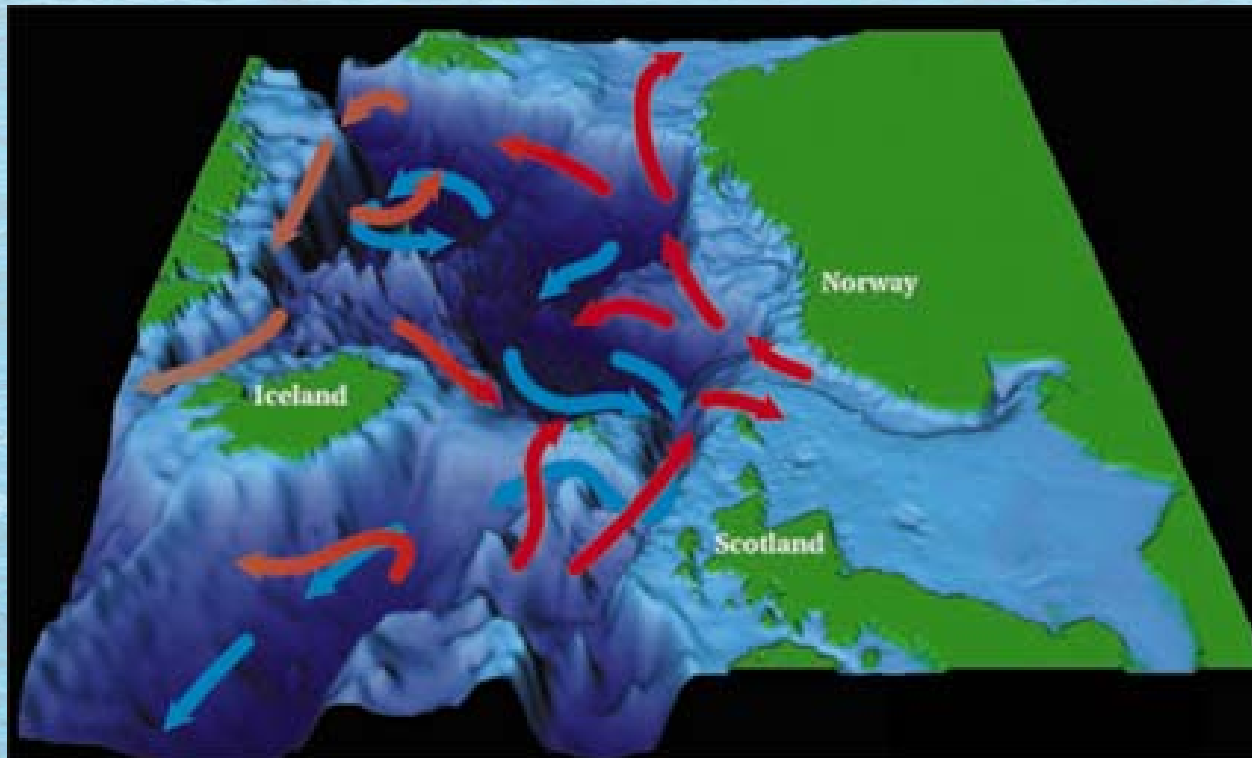


## *Calanus finmarchicus* (length 3-4 mm):

- The most numerous animal on earth?
- No previous industrial utilization, but sustainable harvesting technology has now been developed!
- Growing global demand for new sources of ingredients and bioactive compounds.

# *Calanus finmarchicus*

Annual biomass production of 200 - 400 mill. tons in the Nordic Seas (>20 x the biomass of all fish species)



# *Calanus finmarchicus*

## A potentially new marine industry in Norway?

### 1) Huge biomass production

- Management policy to be developed by authorities
- More basic research required on biochemistry etc.

### 2) Very promising harvesting technology developed

- Energy efficient and high yield of pure copepod
- No by-catch of fish juveniles

### 3) Industrial options:

- a) Raw material for aquaculture feed? *No!*
- b) Human food products? *Many possibilities!*
- c) Speciality products? *Our interest!*

# About Calanus AS

- A private Norwegian company (domiciled in Tromsø)
- Owned by the founders and seed-capital investors
- Rooted on competence in marine ecology, biotechnology and drug development
- "First mover" covering the entire value-chain, but will focus on downstream and biopharmaceutical operations
- Net profit posted both in 2007 and 2008
- Will raise equity in Q2-09 to finance investments and speed up R&D



**Calanus AS** charters fishing vessels for harvesting *Calanus finmarchicus*, using technology developed and provided by the company. Typical catch on a 3-4 weeks cruise: ~ 100.000 kg.



Harvesting of *Calanus finmarchicus* by slow speed towing using a specially designed (patented) trawl

A good haul!





**The harvest is pumped directly from the trawl into drainage tanks on board the vessel**

# The raw material is frozen on board and processed on land



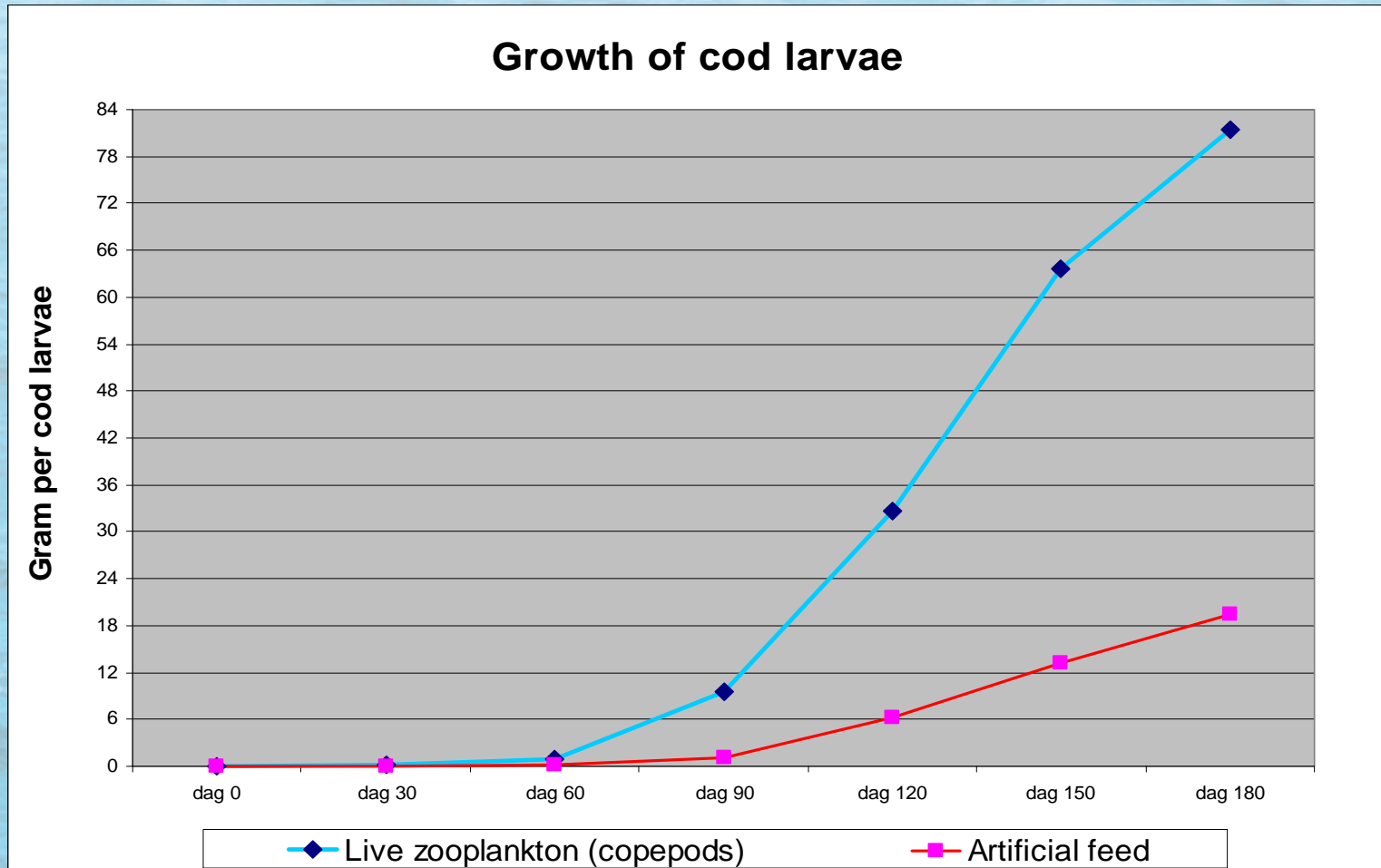
# *Calanus finmarchicus*

## Attractive raw material for biomarine industry

- High content of marine n-3 fatty acids EPA and DHA
- The richest source of stearidonic acid (C18:4n-3)?
- High proportion of n-3 fatty acids esterified with fatty alcohols (= marine wax esters)
- Very rich in phytosterols (of phytoplankton origin)
- Pigments (>1500 ppm astaxanthin) and antioxidants
- Attractive flavor properties (intensive lobster taste)
- Protein, peptides and chitin/chitosan derivatives
- Very low levels of environmental pollutants (no need for costly purification!)

# *Starter feeds for marine fish\**

## *(Nature's own recipe)*



\*Source: Lofitorsk AS, 2008

# *Immune prophylactic principle against sea-lice (patent pending)*

*Calanus finmarchicus* and sea-lice are closely related. Can innate and adaptive immunity to sea-lice be induced by components from non-parasitic copepods?



# ***Calanus-powder***





# Dietary supplements (patent pending)

**Arctic Ruby<sup>™</sup> Oil**

Arctic Ruby Oil, this singular gift from the pristine Arctic sea, is perhaps the world's most precious nutritional complex. Not only is it a rich source of potent free omega-3 polyunsaturated fatty acids, but it also contains the naturally occurring combination of nutrients and the strongest known antioxidant (squalenolol).\*

Suggested Use: As a dietary supplement take two soft gels daily, preferably with a meal. (Store at room temperature. Avoid excessive heat.)

**Warning:** If you are allergic to shellfish, have a blood coagulation disorder or are taking anticoagulants, diuretics,

\* This claim has not been independently verified. © 2000 Arctic Ruby Oil. All rights reserved. [www.arcticrubyoil.com](http://www.arcticrubyoil.com)

**Supplement Facts**  
Serving Size: 2 Soft Gels  
Servings Per Container: 30

	Amount Per Serving	%DV*
Calories	0	0.00%
Total Fat from Fish Oil	1g	20%
Cholesterol	40mg	10%
Total Omega-3 Fatty Acids	1000mg	20%
EPA	600mg	30%
DHA	400mg	20%
Other Ingredients	100mg	20%
Total Weight	1000mg	20%

\*Percent Daily Values are based on a diet of other people's secrets.

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## Arctic Ruby<sup>™</sup> Oil

500mg Virgin Calanus<sup>®</sup> Oil\*\*  
Dietary Supplement



60 Soft Gels



# ***Pharmaceutical product candidates (patent pending)***

**Animal "proof of concept" (various universities):**



→ **Model A**  
→ **Model B**  
→ **Model C**

- **Unique chemistry = novel candidates**
- **Remarkable bioactivities**
- ***E.g.* strong effect on risk-factors and end-points for CVD**

## ***Strategy - going forward***

- Continue to improve harvesting technology
- Build (prototype) GMP-processing plant
- Recruit commercial staff (manufacture, QA, marketing and sales, project management)
- Speed up product development and marketing
- Increase R&D through collaboration with universities (including Univ. of Tromsø), NOFIMA and SINTEF
- Plan and initiate preclinical pharmaceutical development (outsourced to CRO's)

**We believe that the prospects are very good for a new bioindustry based on *Calanus finmarchicus*!**