

Green sea urchin farming in eastern Canada: creating opportunity with advanced feed technology

PEIAA - 2017 Alternative and Emerging Species Workshop



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Green sea urchin fishery in NL: historical context

- Slow to develop: - 1969... early 1990s... **2003** (1.9M pounds)



2014

- 55 license holders
- 13 harvesters
- 3 processors
- 2 outside buyers

• Challenges

- Environmental conditions
- Non-traditional harvesting methods
- Logistics



Market expectations

$$GI (\%) = \left(\frac{\text{gonad wet weight (g)}}{\text{whole body wet weight (g)}} \right) \times 100$$



- GI: 10-15%
- Texture: 2 distinct halves (firm)
- Taste: sweet
- Color: yellow to orange



➔ Formulated feeds or natural diets?

	Formulated	Natural
GI	↑ > 10%	↓ but > 10 %
Colour	Bright	Acceptable
Taste	Bitter	Sweet

(e.g. Azad *et al.* 2011; Helfin 2012; Foster *et al.* 2015)

Nofima

Background



Unique sea urchin feed

A unique sea urchin feed developed and produced in Bergen may bring new life to the Japanese sea urchin industry.



- No hormones and no antibiotics



“... a business that depends on transforming ocean health. We convert unhealthy, worthless urchins into a high-quality delicacy.”

- Feed in production and used for 15+ years;
- Tested in Norway, New Zealand, Australia, USA, Japan;
- Commercially used in Japan.

Who?



???



“... developing new products, seeking new markets and new processing techniques to better serve customers”



How?

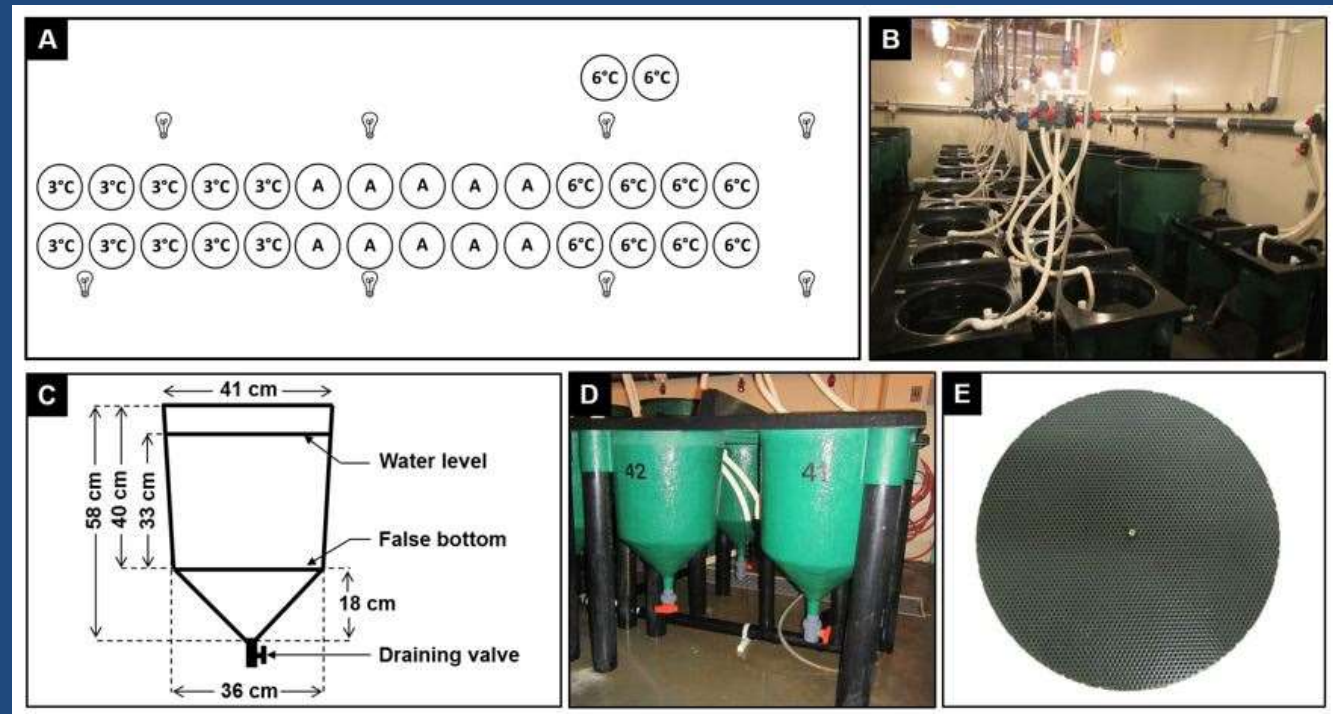


Engage Grants

“... intended to foster the development of new research partnerships by supporting short-term research and development projects aimed at addressing a company-specific problem”

To assess the performance of the formulated feed at **contrasting stages of gonad production** and its relationship with the **thermal environment** for land-based production of green sea urchin roe at Green Seafoods Ltd.

- 4- and 8-week trials
- Pre- and post-spawn
- 3 temperatures
- 20 urchins per tank
- 45-55 mm t.d.
- Fed *ad libitum*
- Urchins from barrens



- Dependent variables: Feed consumption, fecal production, roe yield and quality

Taste

- End of Experiment 2 (8 weeks)
- 24 participants (volunteers)
- Preference: 9-point hedonic scale (Lawless & Heymann, 2010)
- Flavour: 6-point scale (Pearce *et al.*, 2004)



Rank	Preference scale	Flavour scale
1	Dislike extremely	Very poor (very bitter)
2	Dislike very much	Poor (bitter)
3	Dislike moderately	Satisfactory (bland: not sweet, not bitter)
4	Dislike slightly	Good (sweet)
5	Neither like nor dislike	Very good (very sweet, but < 6)
6	Like slightly	Excellent (very sweet)
7	Like moderately	
8	Like very much	
9	Like extremely	

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