New Zealand shellfish aquaculture and the potential for integration of deposit-feeding sea cucumbers as extractive species

Leo Zamora (PhD)

20th May 2022

2nd HOLOSUSTAIN workshop. Sea cucumbers: a potential novel seafood in Europe?

CAWTHRON

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Cawthron Aquaculture Park

Nelson, New Zealand

Shellfish Aquaculture Research Platform NZ

Grow

- Greenshell™ mussel
- Pacific oysters
- Selective breeding
- Hatchery supply
- Farming efficiency
- Post harvest

Diversify

- Geoduck clam
- Abalone
- Flat oysters
- NZ scallop
- Surf clams
- Ribbed mussels

Secure

- Biofouling management
- Tools for health management
- Mitigate disease risk
- Climate change risks
- Environmental risks

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

https://www.researchgate.net/project/Shellfish-Aquaculture-Research-Programme

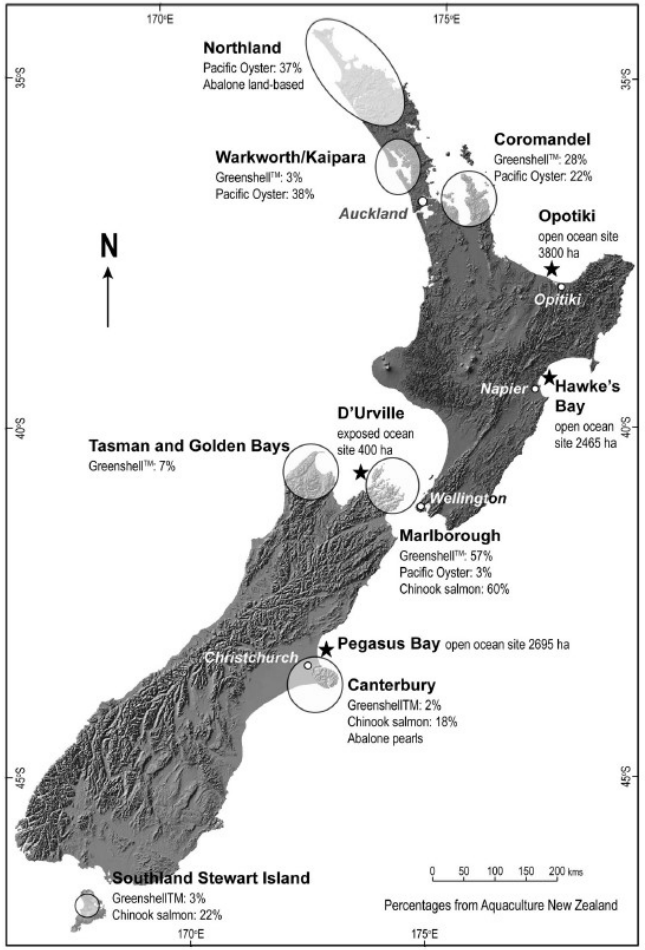
Greenshell™ mussel
Perna canaliculus
2021 export volume: 33,120 tonnes*
2021 export value:NZ$299.2 million *

Pacific oyster
Crassostrea gigas
2021 export volume: 1,303 dozens*
2021 export value:NZ$17.4 million*

Abalone (Pāua)
Haliotis iris
Single land-based farm
~120 tonnes (~NZ$6.6 million)

Chinook/King salmon
Oncorhynchus tschawytscha
2021 export volume: 7,662 tonnes*
2021 export value:NZ$139.3 million*

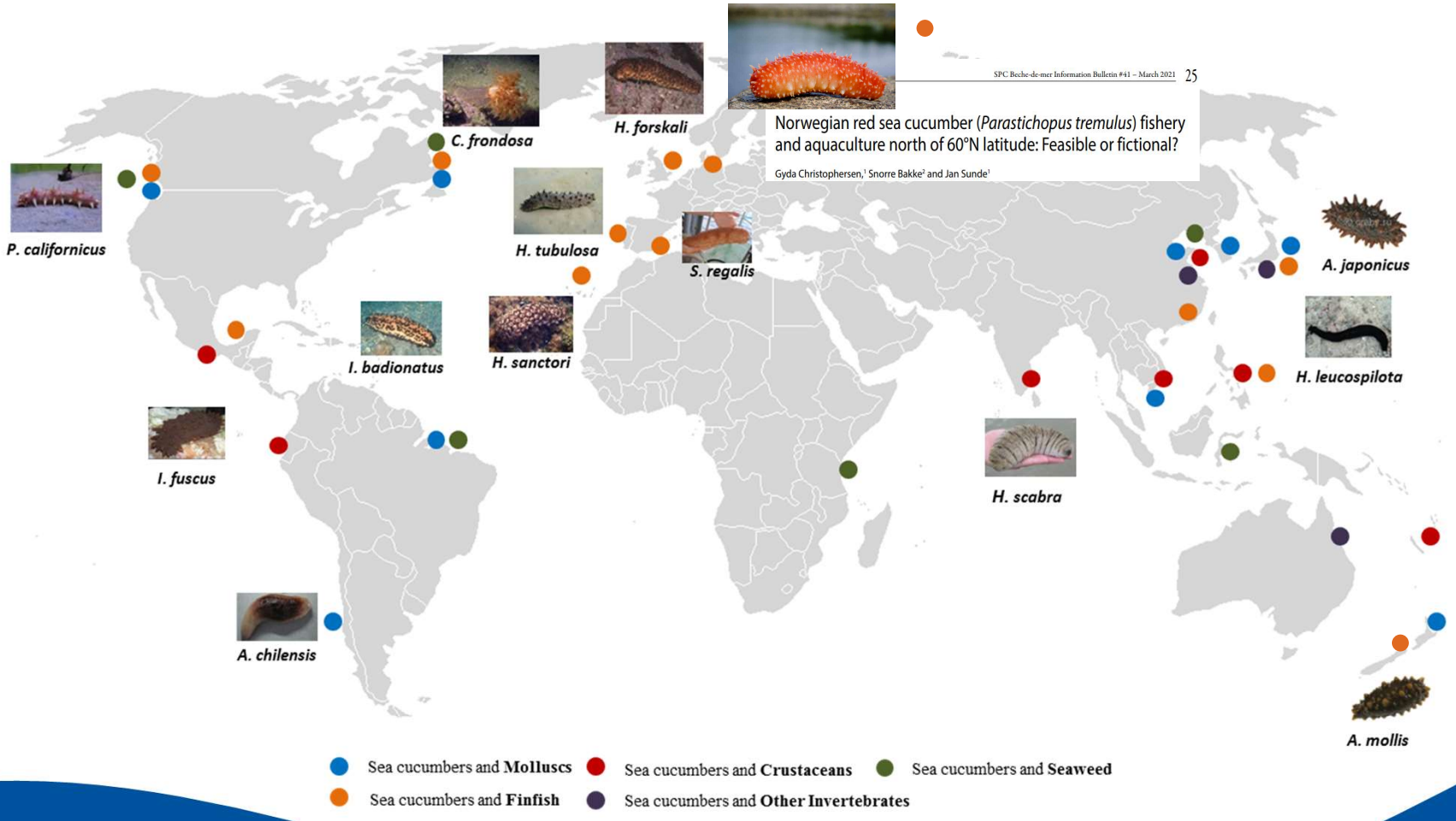
*Source: Aquaculture New Zealand



NEW ZEALAND JOURNAL OF MARINE AND FRESHWATER RESEARCH
https://doi.org/10.1080/00288330.2020.1752266
Taylor & Francis
Taylor & Francis Group
REVIEW ARTICLE
Check for updates

New Zealand aquaculture industry: research, opportunities and constraints for integrative multitrophic farming

Jeanette M. E. Stenton-Dozey [a], Philip Heath [b], Jeffrey S. Ren [a] and Leo N. Zamora [c]



SPC Beche-de-mer Information Bulletin #41 – March 2021 25

Norwegian red sea cucumber (*Parastichopus tremulus*) fishery and aquaculture north of 60°N latitude: Feasible or fictional?

Gyda Christophersen,[1] Snorre Bakke[2] and Jan Sunde[1]

REVIEWS IN Aquaculture

Reviews in Aquaculture (2018) 10, 57–74 doi: 10.1111/raq.12147

Role of deposit-feeding sea cucumbers in integrated multitrophic aquaculture: progress, problems, potential and future challenges

Leonardo Nicolas Zamora[1], Xiutang Yuan[2], Alexander Guy Carton[3] and Matthew James Slater[4]

Sea cucumber
Australostichopus mollis
TACC: 100 tonnes
Catch 2021: 44.1 tonnes
Value: ~NZ$ 350/kg

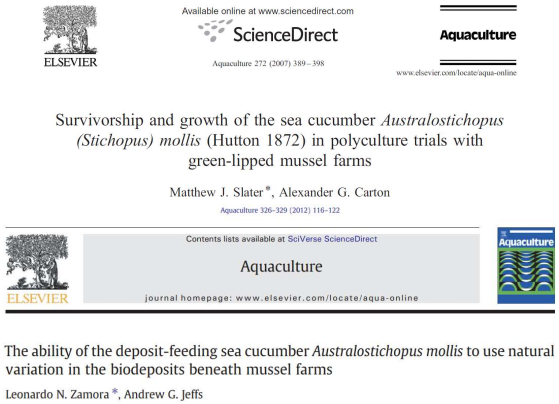
Journal of Shellfish Research, Vol. 32, No. 3, 613–627, 2013.

A REVIEW OF THE RESEARCH ON THE AUSTRALASIAN SEA CUCUMBER, *AUSTRALOSTICHOPUS MOLLIS* (ECHINODERMATA: HOLOTHUROIDEA) (HUTTON 1872), WITH EMPHASIS ON AQUACULTURE

LEONARDO N. ZAMORA* AND ANDREW G. JEFFS

Sea cucumbers and mussels

- ✓ Naturally occurring associated to coastal farms
- ✓ Filter feeder-deposit feeder integration
- ✓ Biodeposits palatability enabled large body of research
- ✓ Biorremediation
- ✓ Fast growth with biodeposits
- ✓ Ability to exploit differential biodeposition under farm could be compromised
- ✓ Mussel farm carrying capacity estimated to be 15 t/ha
- ✓ Potential value of integration NZ$25.6 million/year if using only 10% of space available



Sea cucumbers and oysters

- ✓ Naturally occurring associated to intertidal farms
- ✓ Filter feeder-deposit feeder integration
- ✓ Less space available in each farm
- ✓ Good growth but potential for reduction during summer
- ✓ Oyster farm carrying capacity estimated to be 7 t/ha
- ✓ Potential value of integration NZ$ 4.2 million/year if using only 10% of space available

New Zealand Journal of Marine and Freshwater Research, 2014
Vol. 48, No. 3, 394–404, http://dx.doi.org/10.1080/00288330.2014.901232
Taylor & Francis
Taylor & Francis Group

RESEARCH ARTICLE

Feasibility of co-culture of the Australasian sea cucumber (*Australostichopus mollis*) with the Pacific oyster (*Crassostrea gigas*) in northern New Zealand

LN Zamora[a]*, J Dollimore[b] and AG Jeffs[a]

New Zealand Journal of Marine and Freshwater Research
Vol. 44, No. 4, December 2010, 201–216
Taylor & Francis
Taylor & Francis Group

Highly localised distribution patterns of juvenile sea cucumber *Australostichopus mollis*

MJ Slater[a]*, AG Carton[b] and AG Jeffs[c]

Sea cucumbers and abalone

- ✓ Sharing habitat in rocky reefs
- ✓ Grazer-deposit feeder integration
- ✓ Land-based RAS operation and trial
- ✓ Consumption of macroalgae based diet faeces demonstrated
- ✓ Potential for juvenile growing, limitations to achieve market size
- ✓ Abalone farm carrying capacity not available
- ✓ Potential value of integration small due to scale of operation, value on waste reduction

JOURNAL OF THE
WORLD AQUACULTURE SOCIETY

Vol. 40, No. 2
April, 2009

The Effect of Diet on the Energy Budget of the Brown Sea Cucumber, *Stichopus mollis* (Hutton)

KIMBERLEY H. MAXWELL[1]

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