Commercial fishing + science = good business

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Seafood Research Exchange
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» Seafood Production Group
  » Longevity in NZ Seafood Research
  » Strong link with NZ Seafood Industry
The holy grail:

Control and consistency
Research question:

» How can we efficiently harvest, handle and store aquatic animals with minimal damage, distress and loss of value?
R & D approach

- Establish control
- Identify key variables affecting performance during processing
- Objective measures of performance
- Measure current industrial practice
- ‘scope-for-improvement’
- Provide industry with the tools
PFR’s postharvest R&D projects

Each project:

» was derived from physiological and behavioural studies

» was built on surprising properties discovered during these studies

» illustrates that we have only just begun to explore the properties and opportunities offered by our marine bio-resources
High density live snapper transport
High density live snapper transport

» DSIR project on the physiology of “tuna burning”
» Great project but...
» Used kahawai as a physiological model and tripped across something weird…
» “Animal hypnotism”
Fish hypnotist at work

Watch animals being hypnotised! Supernatural, BBC Earth
If they didn’t have it they built it
High density live snapper transport

» Targeted the best *ike jime* long line snapper

» 8kg of snapper to 10L water

» No drugs

» 50 hours transit

» Compatible with conventional airfreight
Export of live snapper to Japan
Rested harvesting of cultured fish
Genesis in industrial hoki fishing

» Delicate fish caught
  ~600m depth
  » Large tonnages and bulk stored

» Very hard to access undamaged fish

» Cultured King salmon as a model for harvesting studies
Rested harvesting technology

» Investigated the effects of eliminating pre-harvest exercise on post-harvest tissue physiology

» Harvesting using our novel food-grade anaesthetics gave us the best results
Rested tissue revealed a surprise

7 hours

24 hours
Benefits of rested harvesting

» Eliminates unnecessary external and internal damage

» Selective, efficient, consistent

» Extends “sashimi” grade shelf life – living tissue

» Unmasks surprising tissue properties and qualities video
Benefits of rested harvesting

Post-mortem white muscle pH of Snapper (Pagrus auratus)

Storage time (hours)

White muscle pH

Rested snapper data from:
Rested harvesting

» Rested harvesting is now embedded in international best aquaculture practice

» Rested harvesting unmasks attributes and properties of our fish species obscured by exhaustion and damage
We were left with the glaring question:

*How do we apply the concepts learned from aquaculture to our wild fisheries?*
Is it possible? How good can we be?

» In 2003 CFR and industry set out to see if the lessons learnt on cultured fish could be applied to wild fisheries

» Could we significantly improve hoki quality?

» Our largest fishery, characterised by high tonnages, delicate fish and harsh harvesting conditions
Is it possible? How good can we be?

» Focus was initially on improving postharvest quality
» Little control or consistency
» Where was the damage and fatigue occurring?
  » Capture method
Custom instrumentation

» If you can’t buy it – make it!
Eyes in the trawl

The ‘a-ha’ moment

Why do we have to **strain** the fish out?

Why do we have to **exhaust** them?

Why are we **damaging** them during harvest?
Re-designing industrial trawling
Commercialisation of the technology

» The answers led to **Precision Seafood Harvesting**
  commercialisation phase of nearly
  ten years of research

» The biggest step forward for commercial fishing in
  **150 years**
Precision Seafood Harvesting

» 6 year PGP programme sponsored by MPI
» $26M from industry partners
» $26M from MPI
» Into the 3rd year of the programme
What are we trying to achieve?

» Extract the maximum value out of each animal captured with the minimum of waste

» Develop cost-effective, highly selective, “stepping stone” technologies that could be deployed in our fishing operations

» Develop animal handling, storage and transportation technologies that do justice to our catch
So where are we?

» Right in the thick of it....

» We are currently commercialising new capture and handling technologies
Right smack in the thick....
Snapper vision – spectral sensitivity

Physiology experiments – Dr Esme Robinson (based at UoC)

Data from:
New facility, bigger team, custom gear
Key messages

» A virtuous circle - be nice to your fish and they will be nice to you

» Fit the process to the animal

» Talk is cheap - prototype

» Solutions not problems
Commercial fishing + science = great business
Thank you!
http://precisionseafoodharvesting.co.nz/