



Centre for
Sustainable
Tropical Fisheries
& Aquaculture



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Barramundi – the next big global marine finfish

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Australia

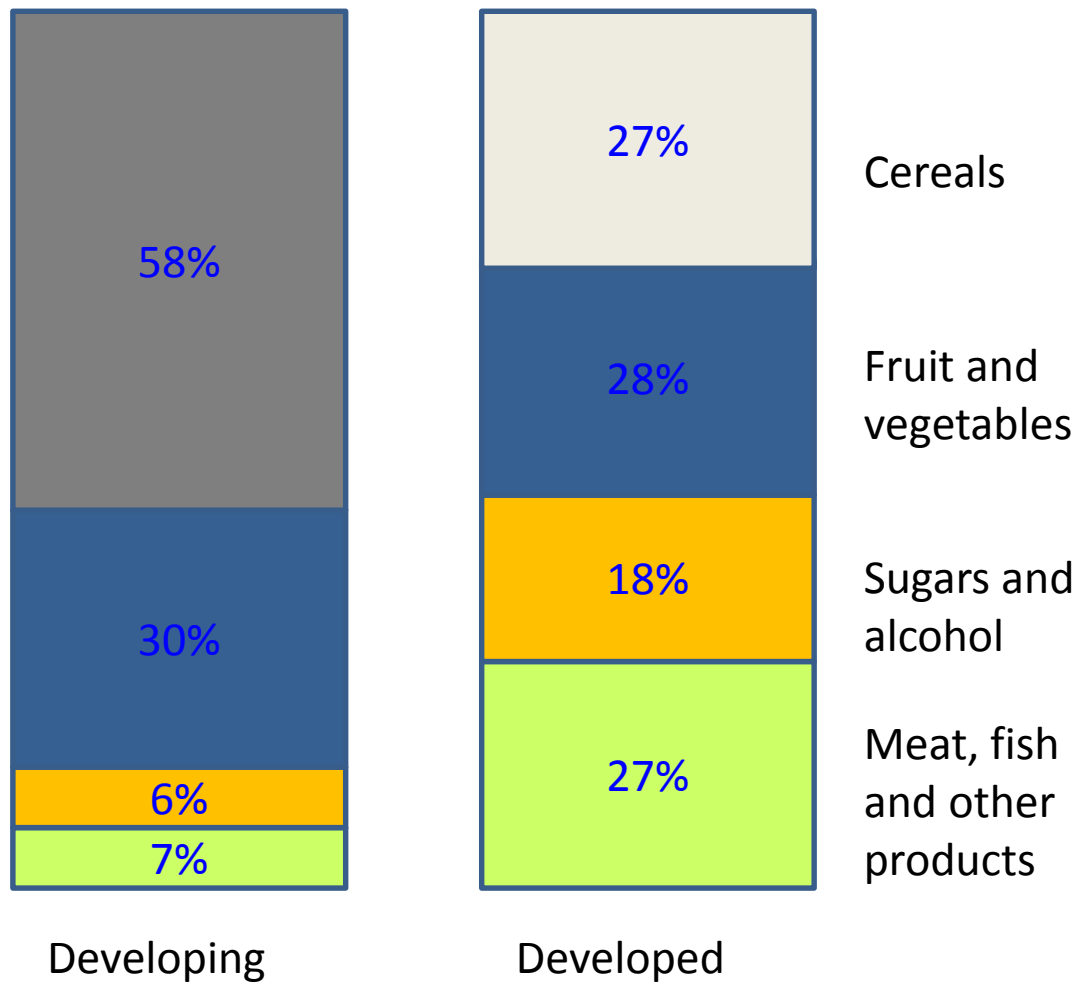


Presentation outline

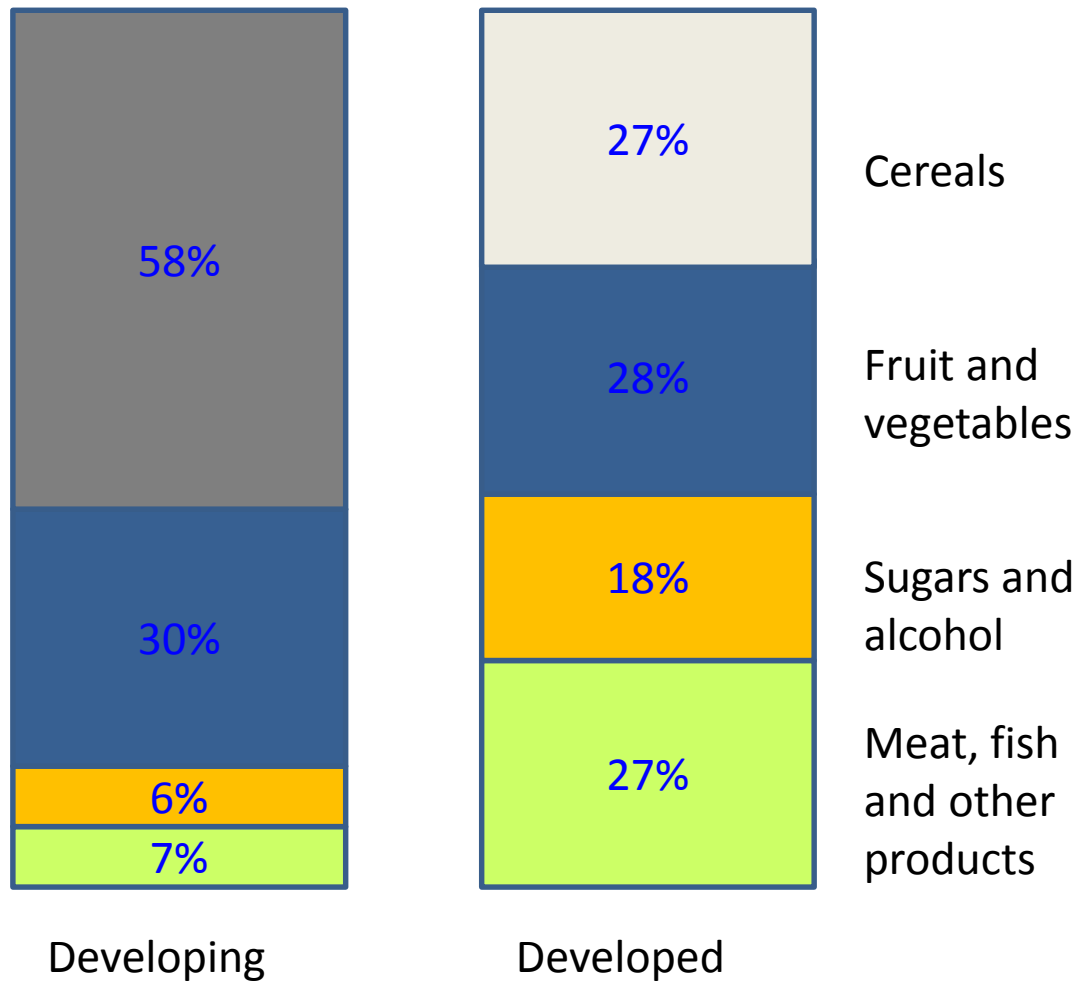
- Global changes in food commodity consumption
- Barramundi as the gap filler
- Biological attributes of barramundi
- Broodstock management
- Hatchery production
- Challenges to farming
- Potential in Brazil



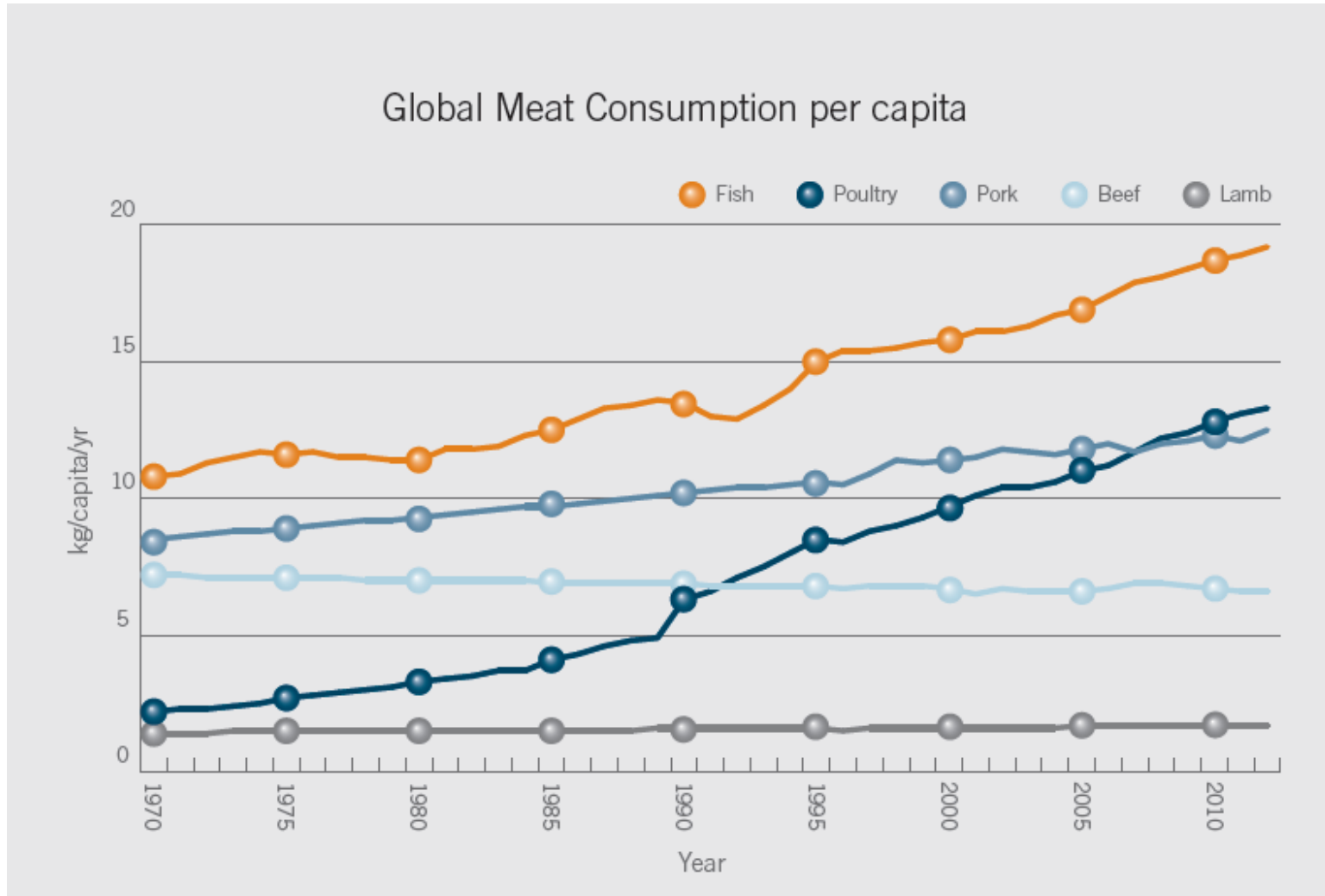
Changing populations with changing diets



Changing populations with changing diets



Changing populations with changing diets



The portfolio gap

The Portfolio Gap for a Premium White Fish

premium category		<i>Salmon</i> INDUSTRY VOLUME 4,201,000 tonne INDUSTRY VALUE \$US 18,487 million VALUE PER KG \$US 4.40 SOURCE 23% capture 77% aquaculture
value category	<i>Carp & Tilapia</i> INDUSTRY VOLUME 32,151,000 tonne INDUSTRY VALUE \$US 46,664 million VALUE PER KG \$US 1.45 SOURCE 7% capture 93% aquaculture	<i>Tuna</i> INDUSTRY VOLUME 7,199,000 tonne INDUSTRY VALUE \$US 17,367 million VALUE PER KG \$US 2.41 SOURCE 100% capture 0% aquaculture
	white fish	pink fish

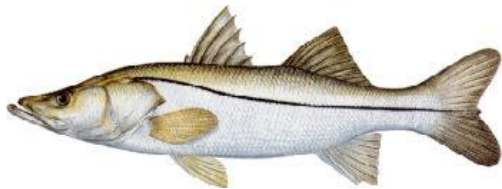
The portfolio gap

The Portfolio Gap for a Premium White Fish

	<i><u>Barramundi</u></i>	<i><u>Salmon</u></i>
premium category	INDUSTRY VOLUME 100,000 tonne	INDUSTRY VOLUME 4,201,000 tonne
	INDUSTRY VALUE \$US 400 million	INDUSTRY VALUE \$US 18,487 million
	VALUE PER KG \$US 4.00	VALUE PER KG \$US 4.40
	SOURCE 25% capture 75% aquaculture	SOURCE 23% capture 77% aquaculture
value category	<i><u>Carp & Tilapia</u></i>	<i><u>Tuna</u></i>
	INDUSTRY VOLUME 32,151,000 tonne	INDUSTRY VOLUME 7,199,000 tonne
	INDUSTRY VALUE \$US 46,664 million	INDUSTRY VALUE \$US 17,367 million
	VALUE PER KG \$US 1.45	VALUE PER KG \$US 2.41
	SOURCE 7% capture 93% aquaculture	SOURCE 100% capture 0% aquaculture
	white fish	pink fish

What is barramundi?

Species: *Lates calcarifer*



Snooks (Americas)
Centropomus sp.

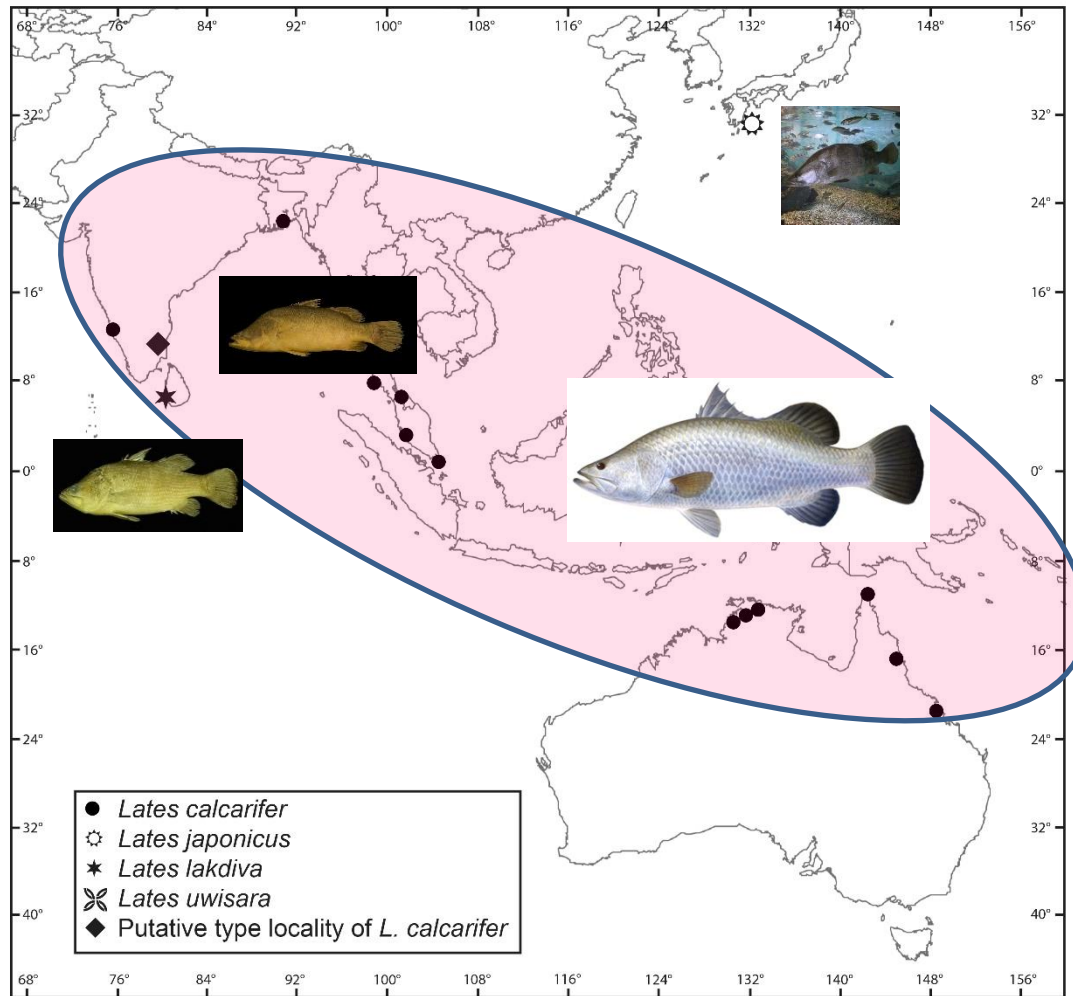


Nile perch (Africa)
Lates niloticus

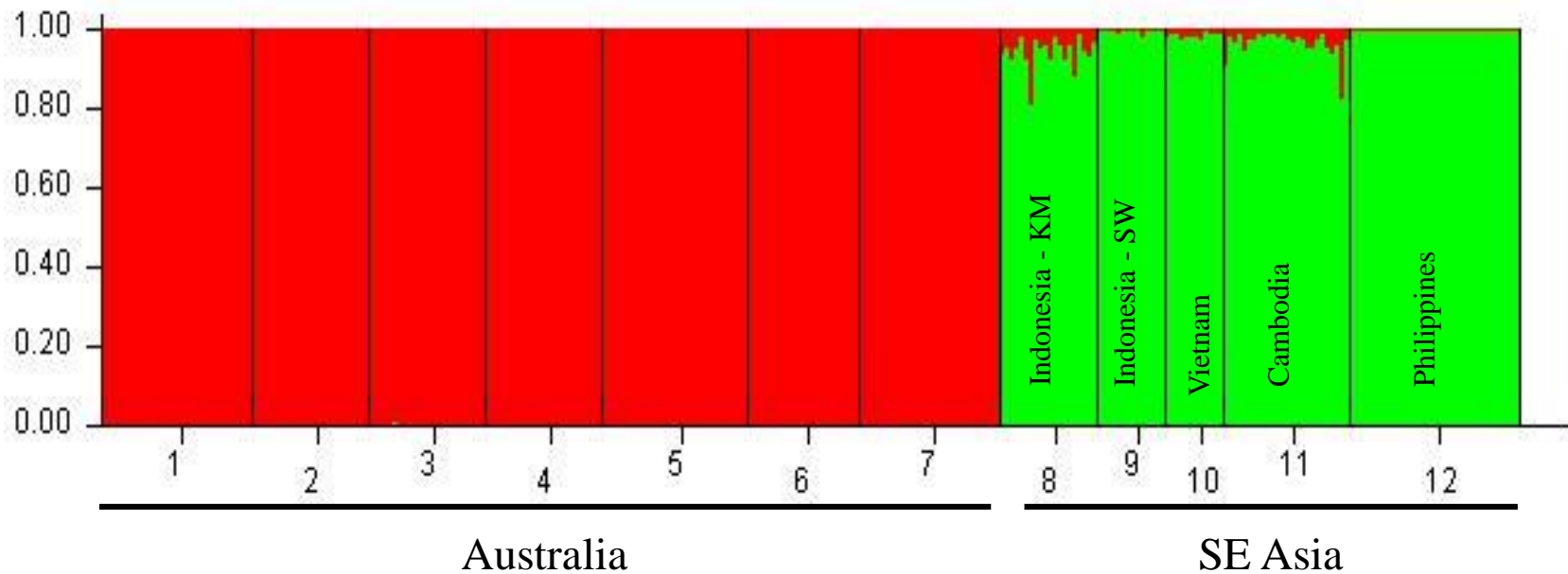
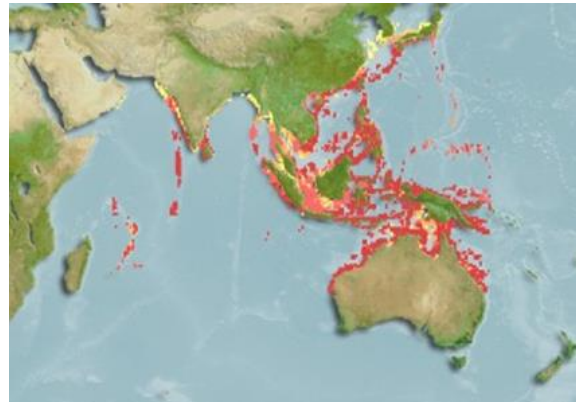




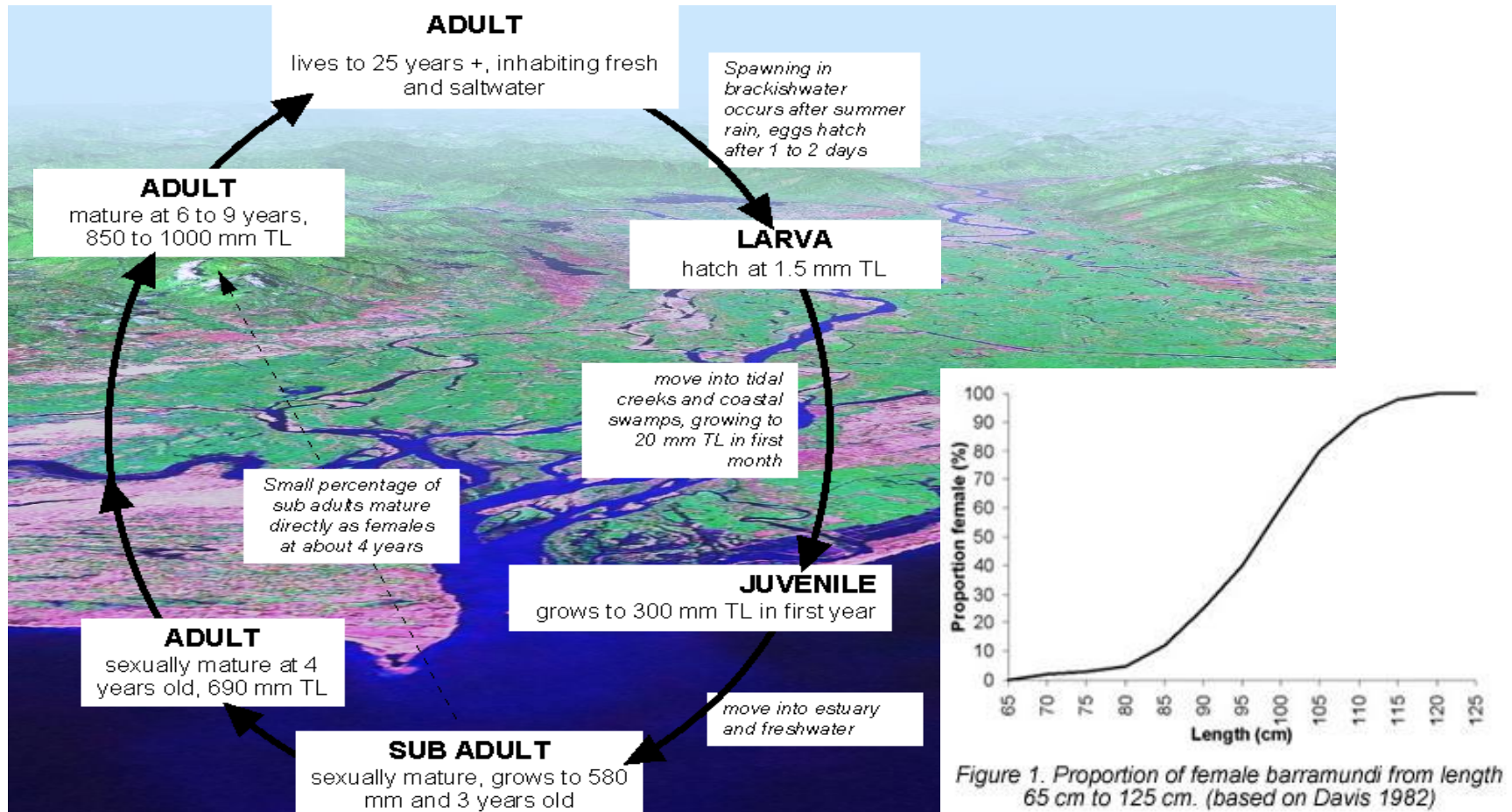
Distribution of barramundi/seabass



Australia vs SE Asia Barramundi



Catadromous and protandrous life-history



Catadromous - live in fresh water but migrate to marine waters to breed

Protandrous Hermaphrodite – born males and change sex into females later in life

Attractiveness for farming

Euryhaline (wide salinity tolerance):

Cultured in fresh, brackish or seawater

Fast growth: 1 kg in 1 year

Accept well artificial food: wean onto pellets early, specialised diets available

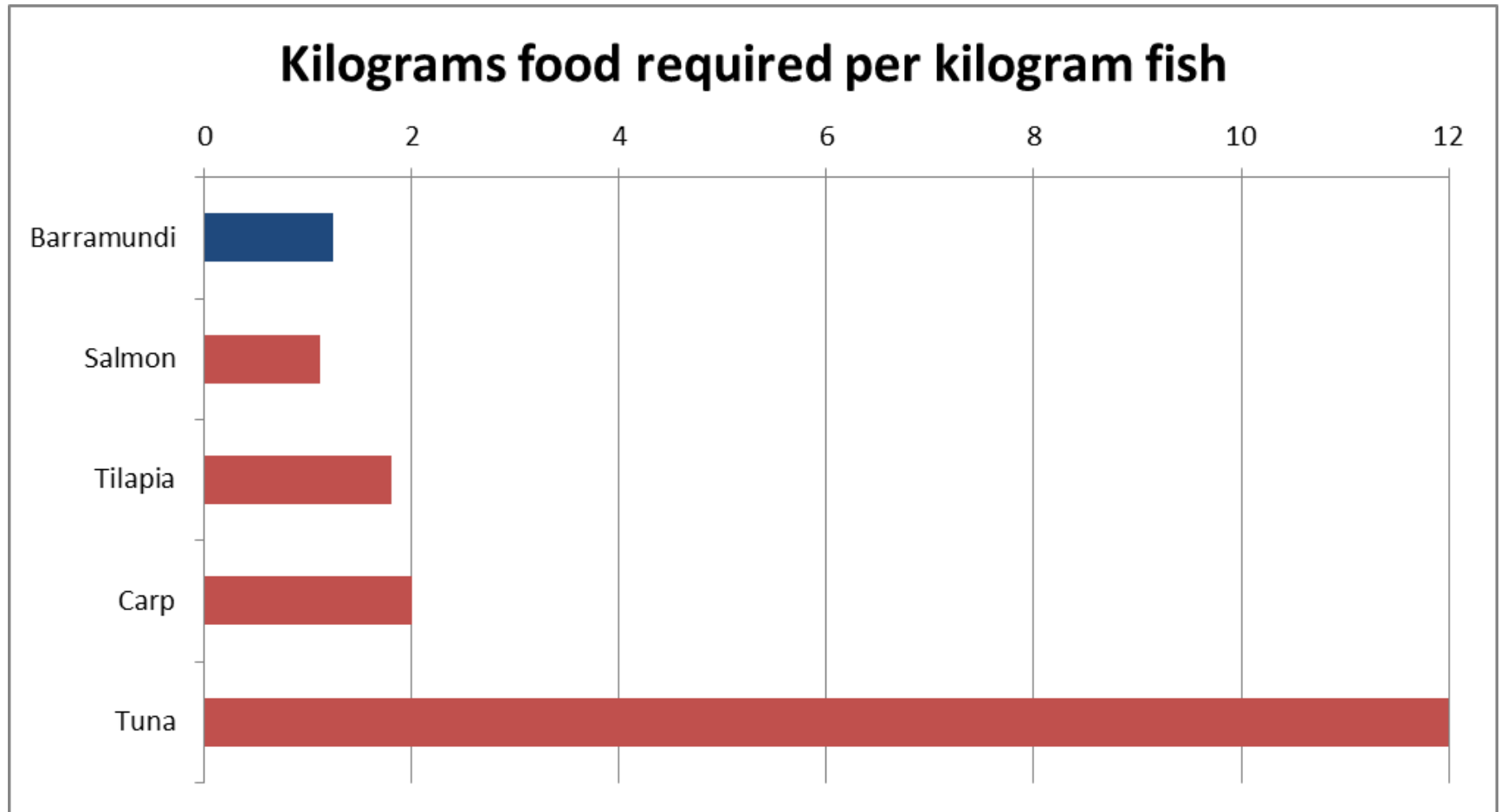
Good Feed Conversion Ratio

FCR = < 1.5 :1 (Kg feed : Kg fish)

Hardy: up to 100 kg / m³, 50t/ha



Food conversion efficiency



Strong consumer preference



Consumers consider Barramundi to be the number one Australian fish for taste, texture and quality.

Versatility of farming systems

Freshwater/brackish ponds



Sea Cages

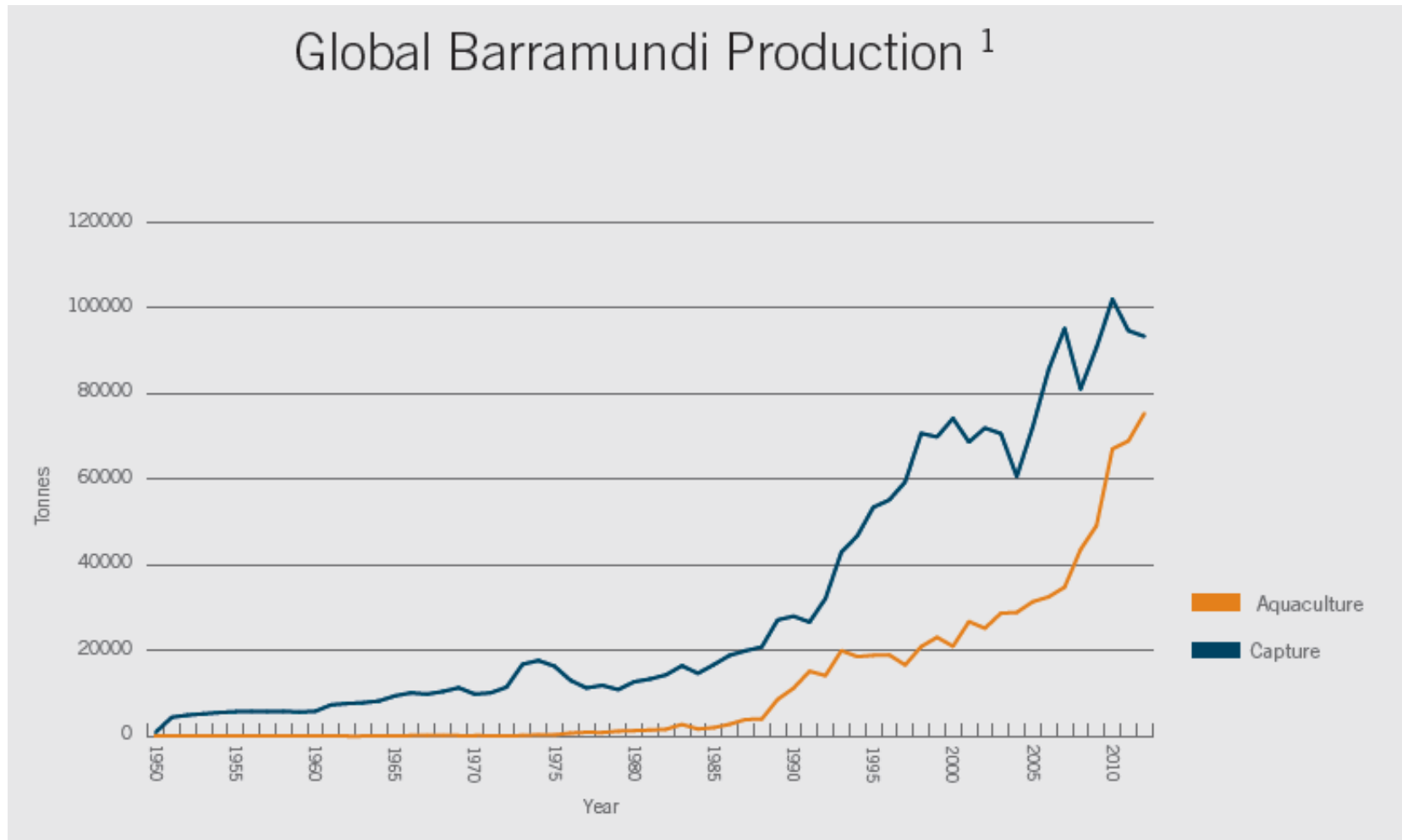


Intensive raceways

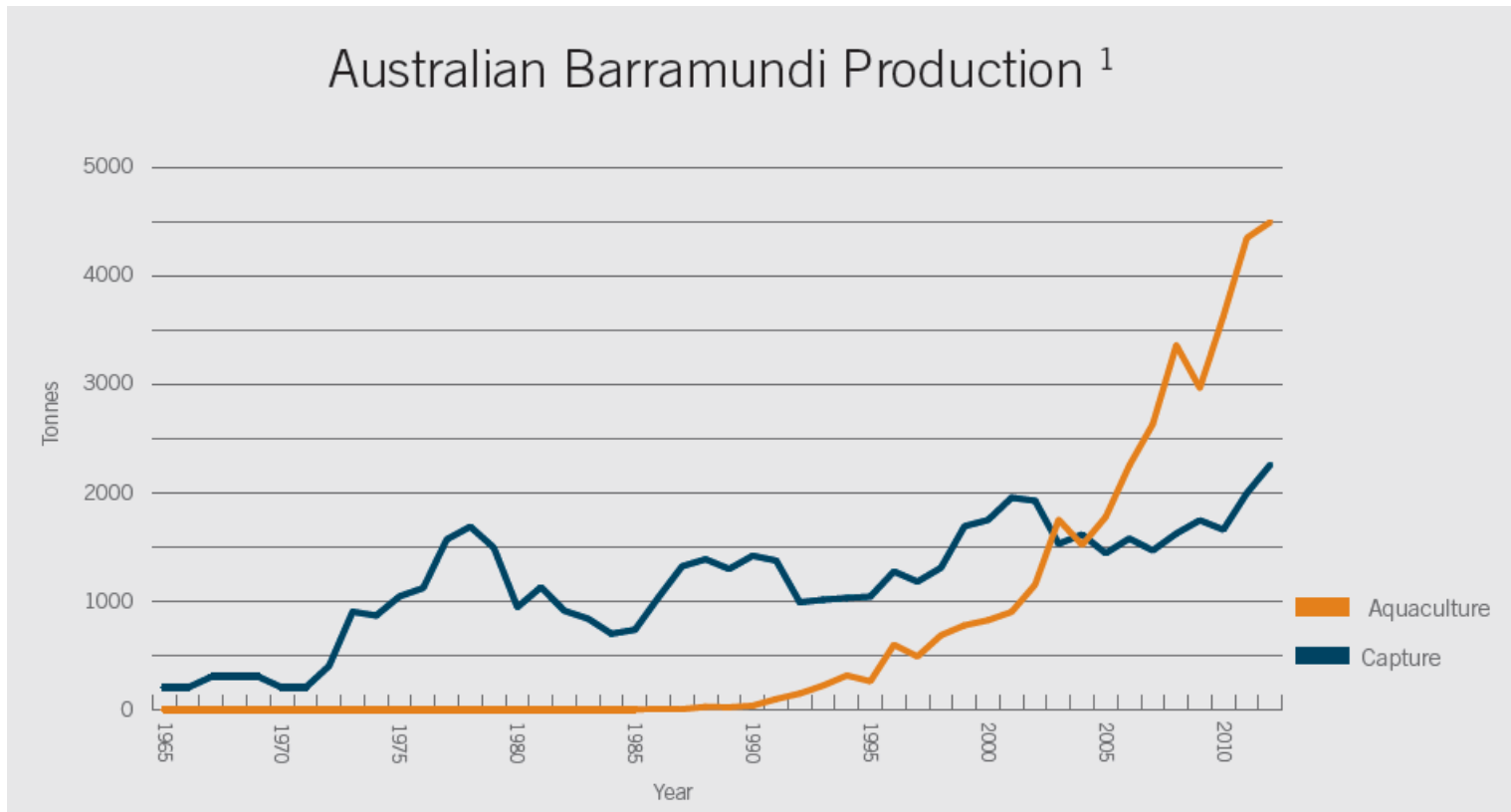


RAS

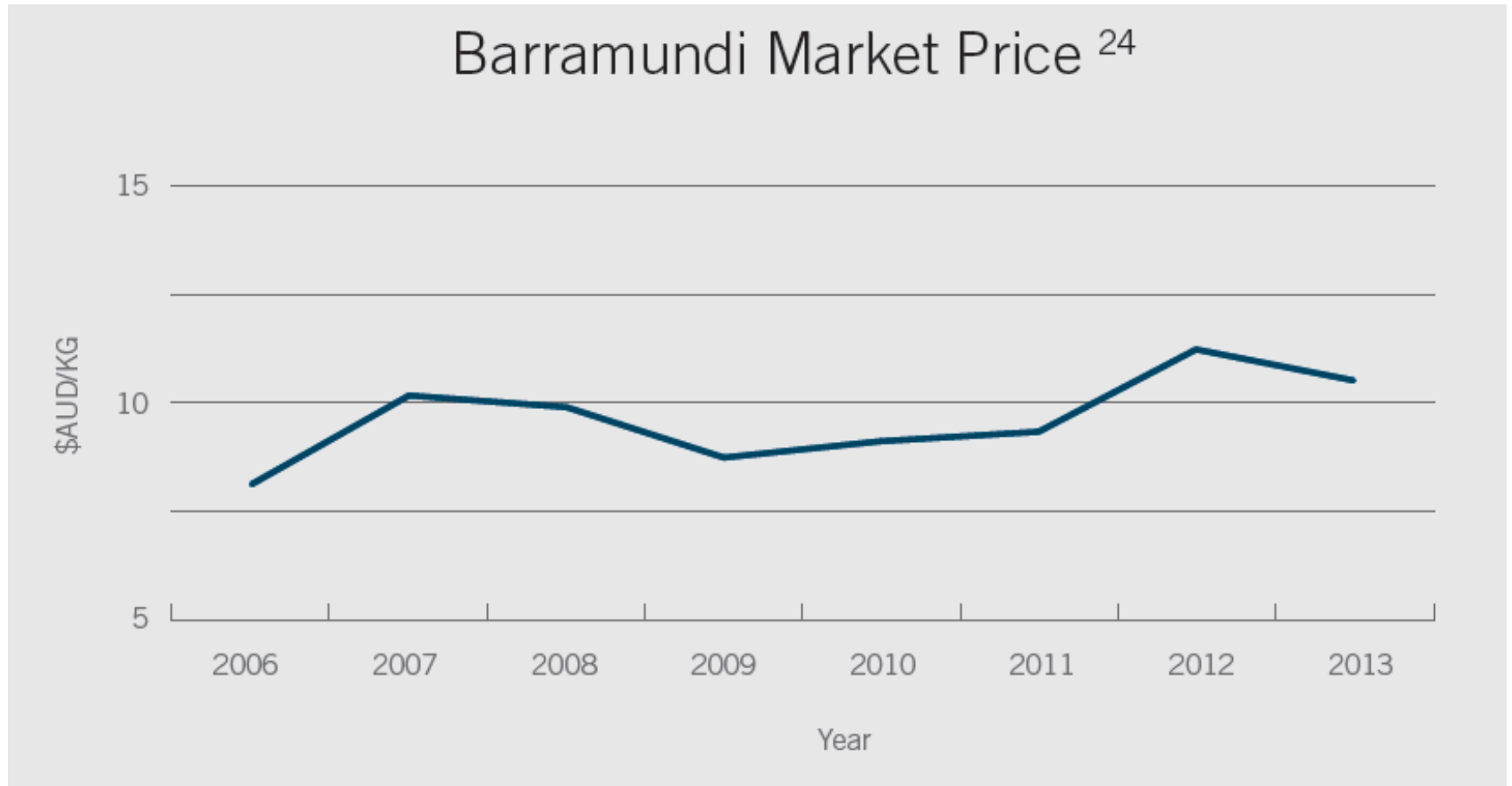
Production Statistics - Global



Production Statistics - Australia

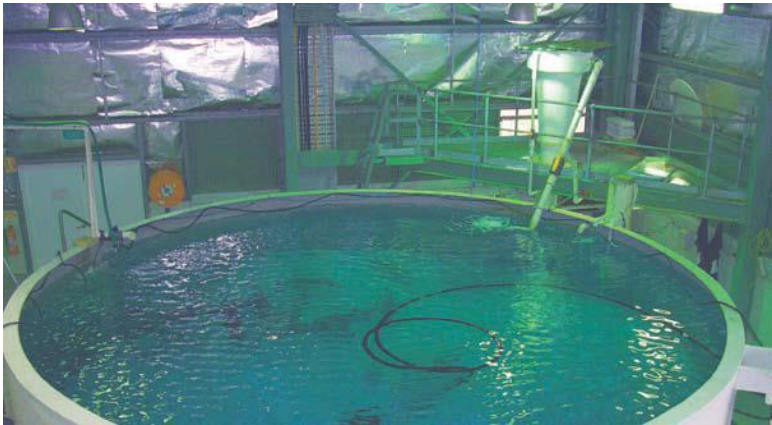


Production Statistics - Australia



Broodstock management

- Require saltwater (28-35ppt) for final gonadal maturation
 - Tanks – 10 000 – 50 000L
 - Ponds – ½ ha
 - Net cages



- Feeding (3x/wk): fish, squid, commercial broodstock feed, Vitamin E

Broodstock management

H
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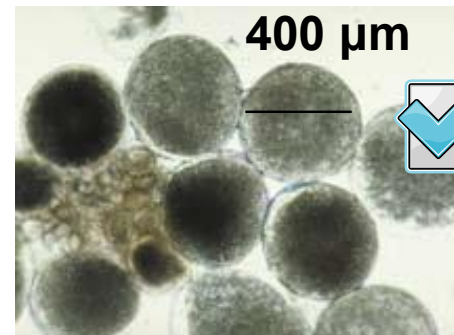
M
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Anesthetised fish



I.D. checks: weight, sex, history...



Eggs examined
via microscopy

If broods ready:

Intramuscular
Injection of LHRHa*

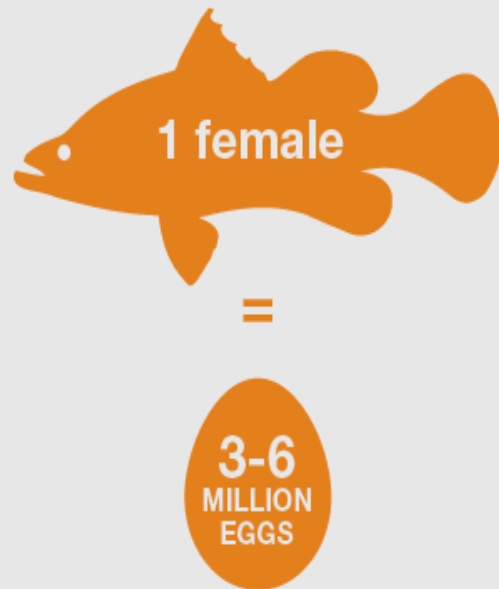
F: 50-100 µg/Kg

M: 25 µg/Kg

* LHRHa: Luteinising Hormone Releasing Hormone analogue

Highly fecund species

A single female Barramundi typically produces 3-6 million eggs at spawning. Unlike most species, this allows the production of large numbers of fish with a minimal number of brood stock. ^{20,21,22,23}



Species

No. Eggs/Kg

Barramundi

300,000

Red seabream

300,000

Striped bass

220,000

Carp

150,000

Tilapia

80,000

Rainbow Trout

2,200

Atlantic Salmon

1,800

Coho Salmon

990

Pink Salmon

900

Chinook Salmon

770

Hatchery management - Nutrition

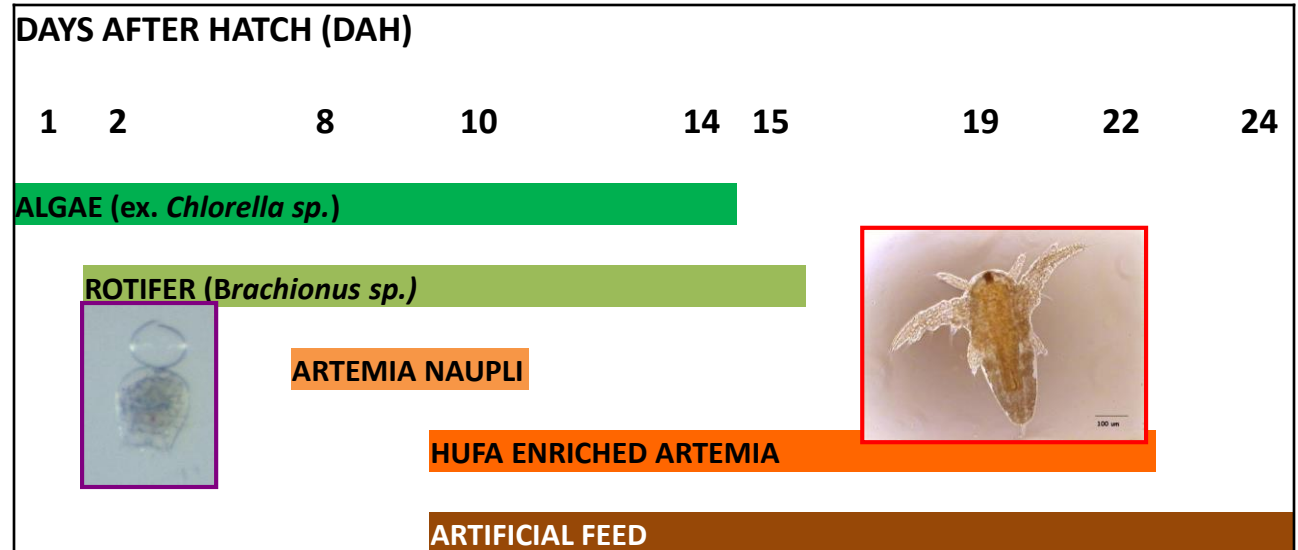
Standard marine finfish larviculture protocols

- 30 to 150 larvae / L
- ideal 29C & 30ppt

Fertilized eggs float



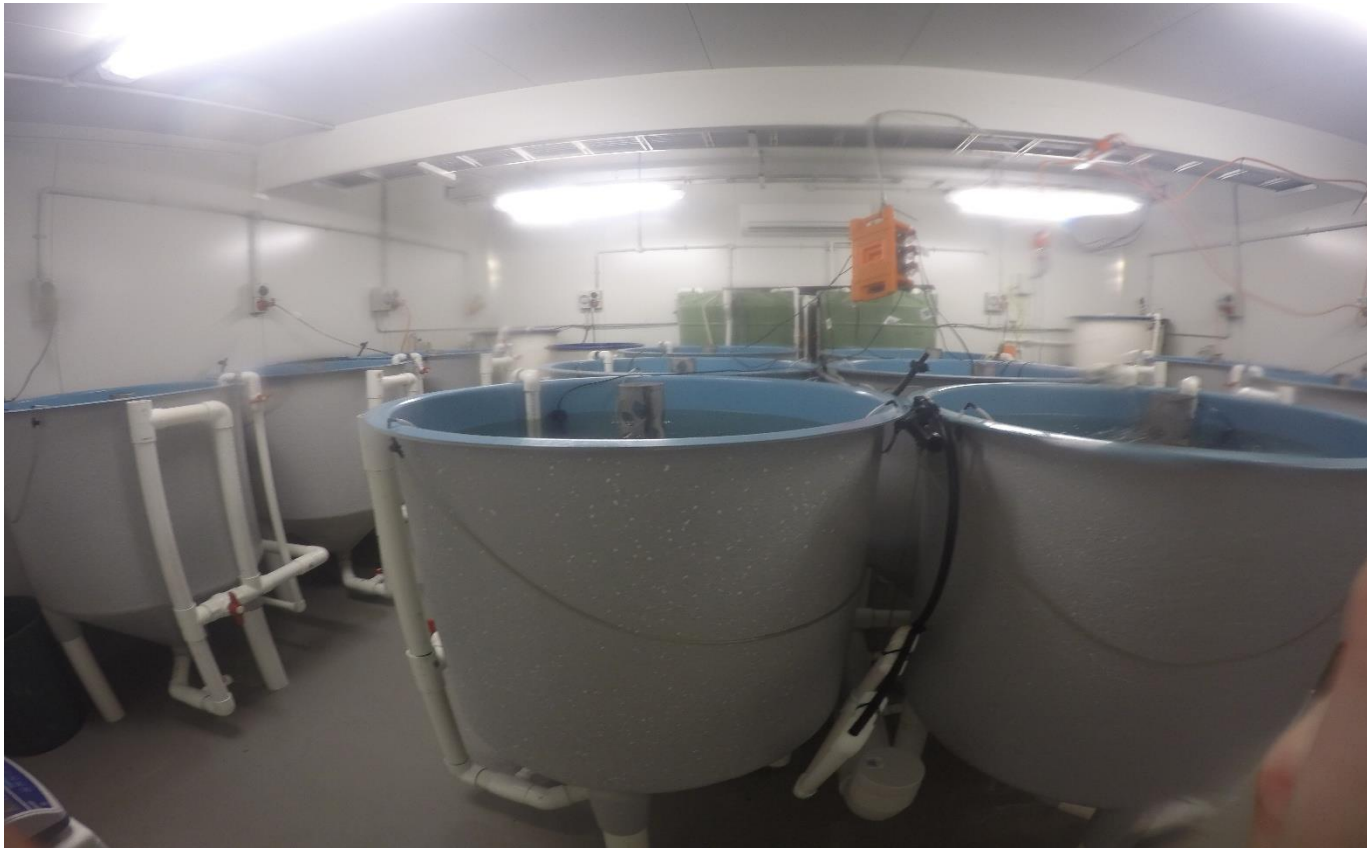
Egg collector





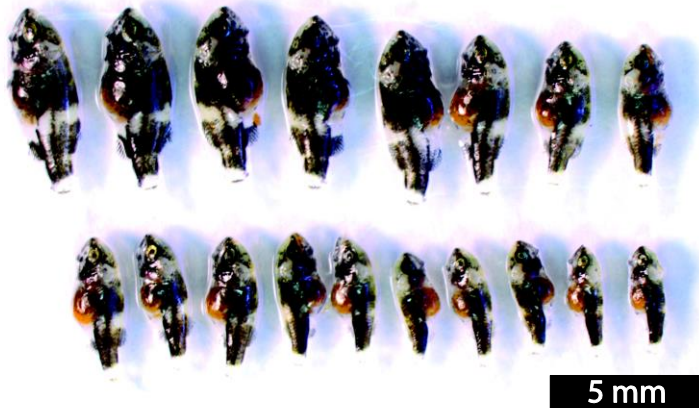
Day 40 – ready to leave the hatchery

7,253,000 fingerlings out of a room 5 x 5 m²

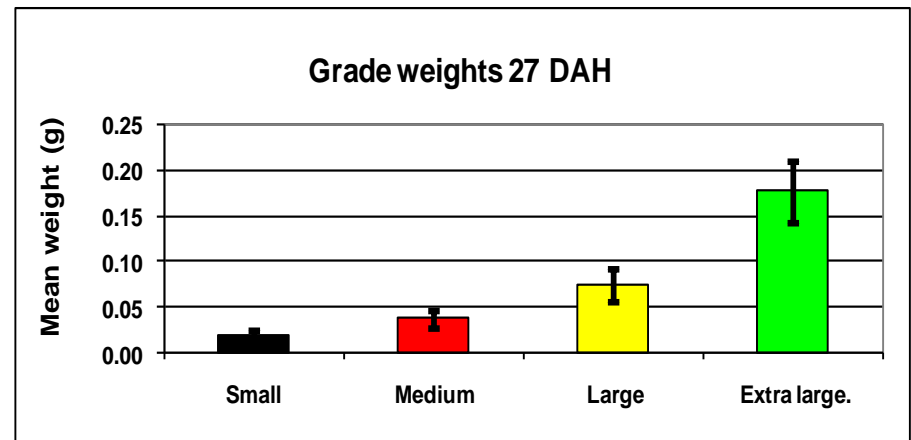


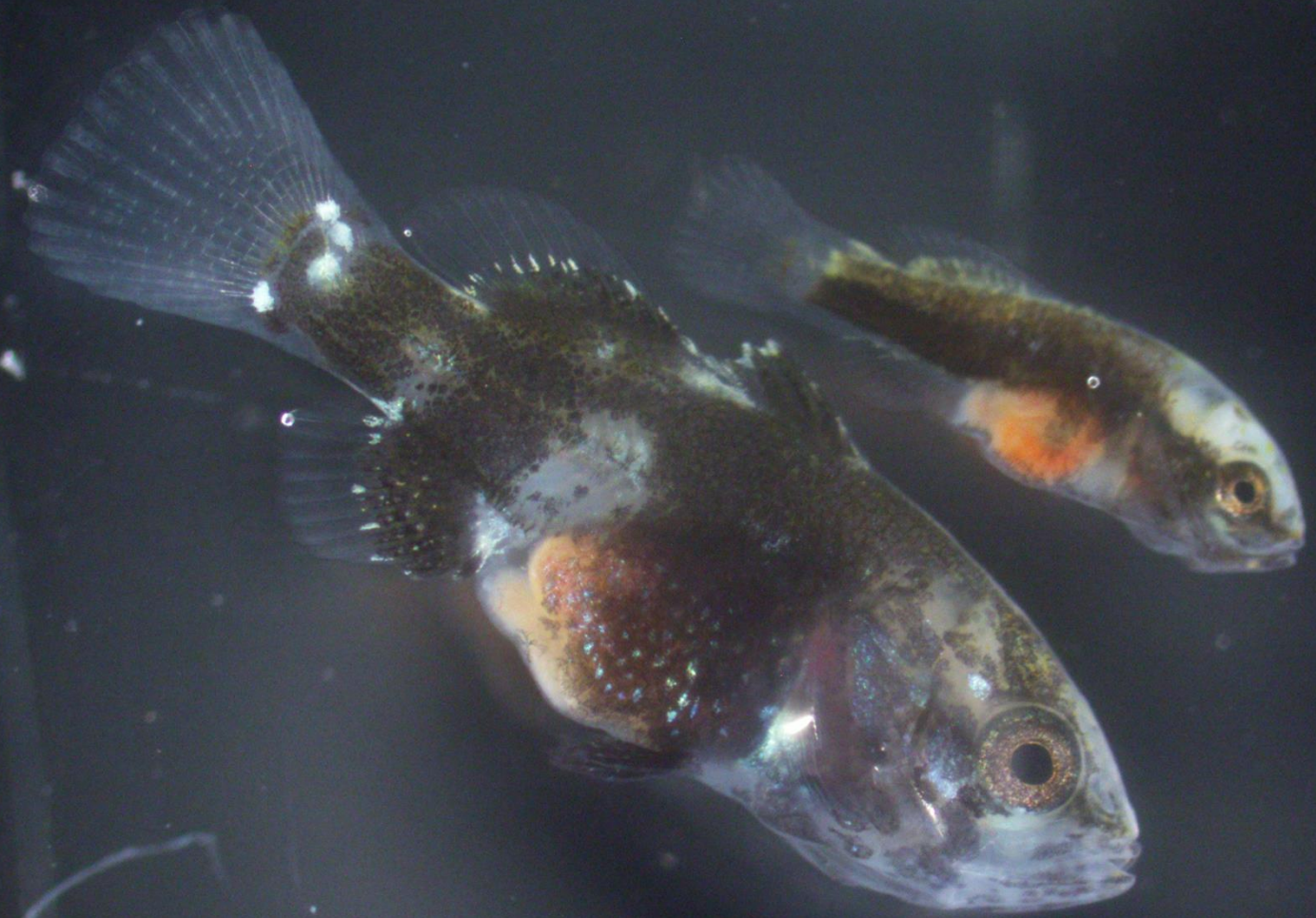
Hatchery management - grading

16 DAH



Continuous grading is required after 16-20 DAH to improve survival and avoid even greater size differences





1 mm

Hatchery management - grading



Hatchery management - grading



Nursery Culture







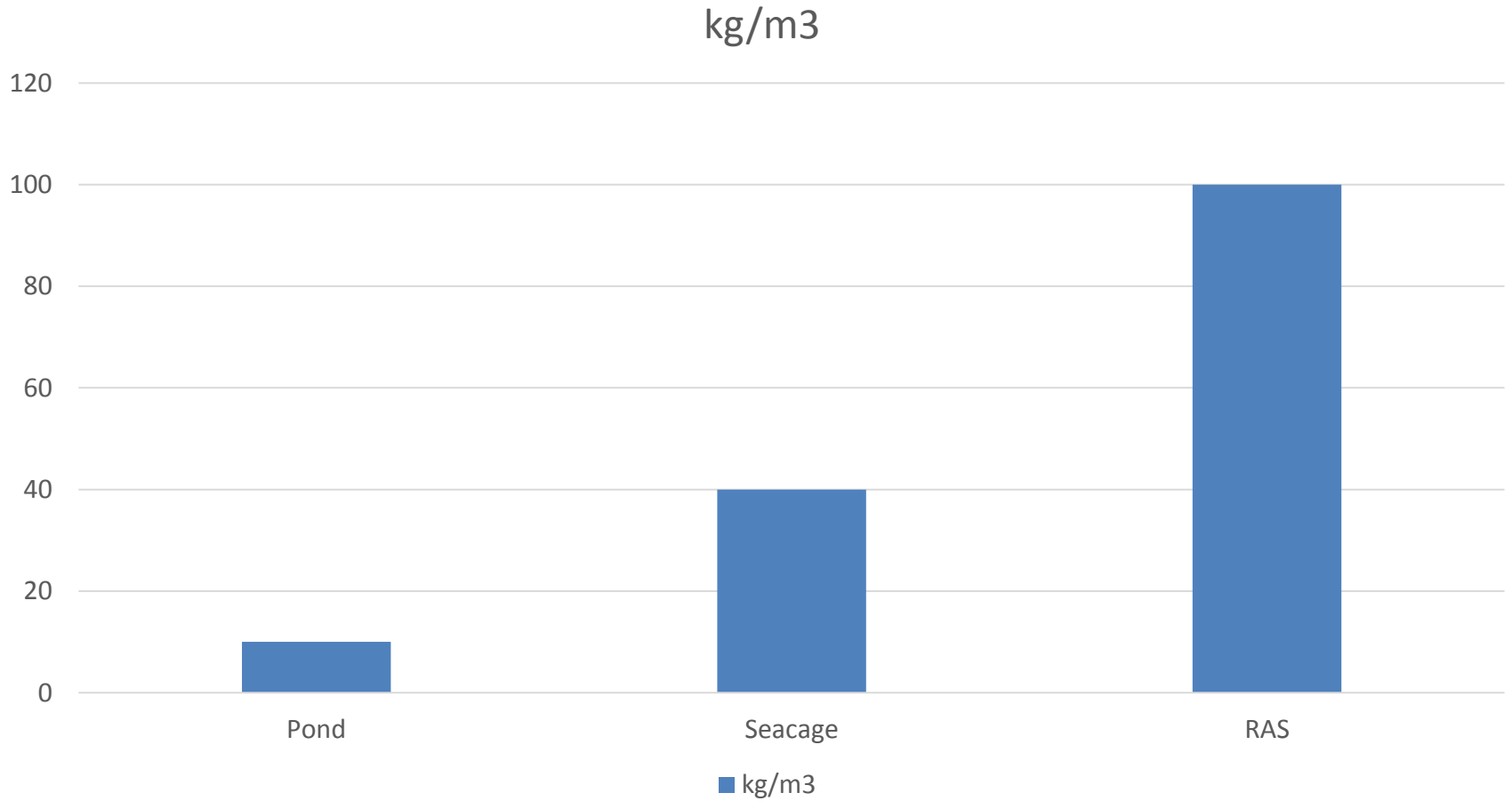


Growout

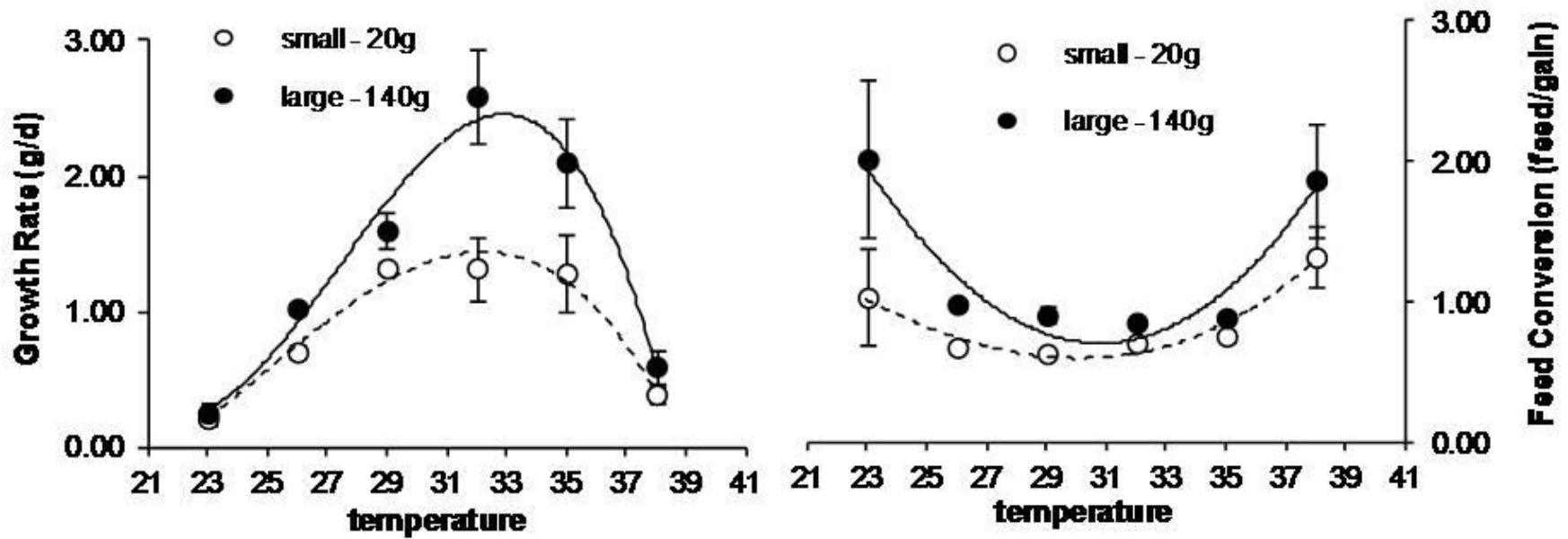
- Stock 100 mm animals (50g)
- Ponds 5,000-20,000 fish/ha
- Cages 10-15 fish/m³
- Survival >85%
- Harvest
 - Plate size (600-1000g)
 - Fillet size (2-3kg)



Growout

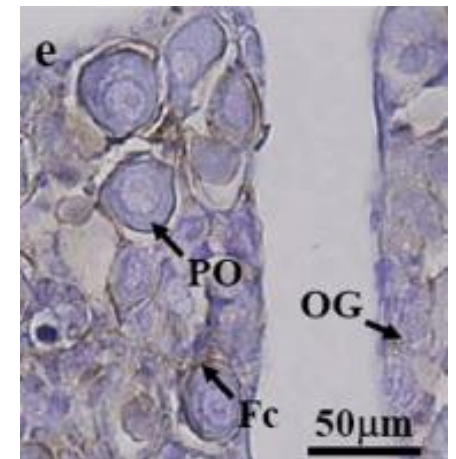
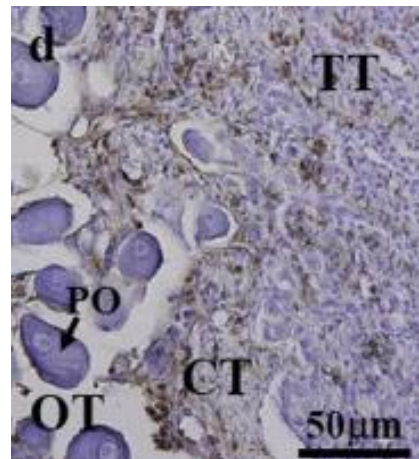
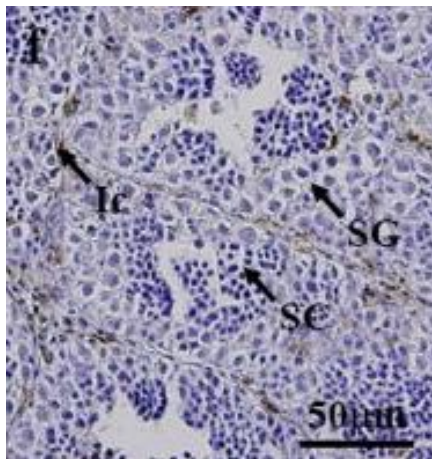
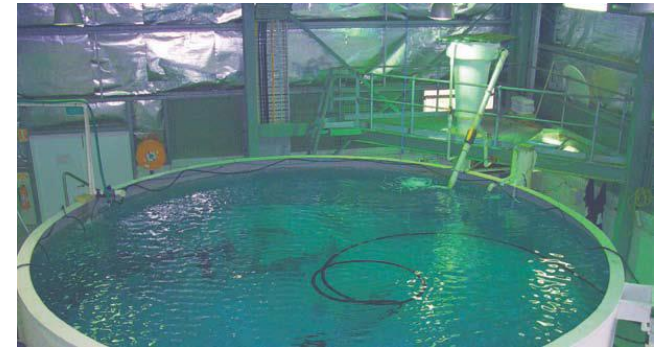


Growout (optimal temp)

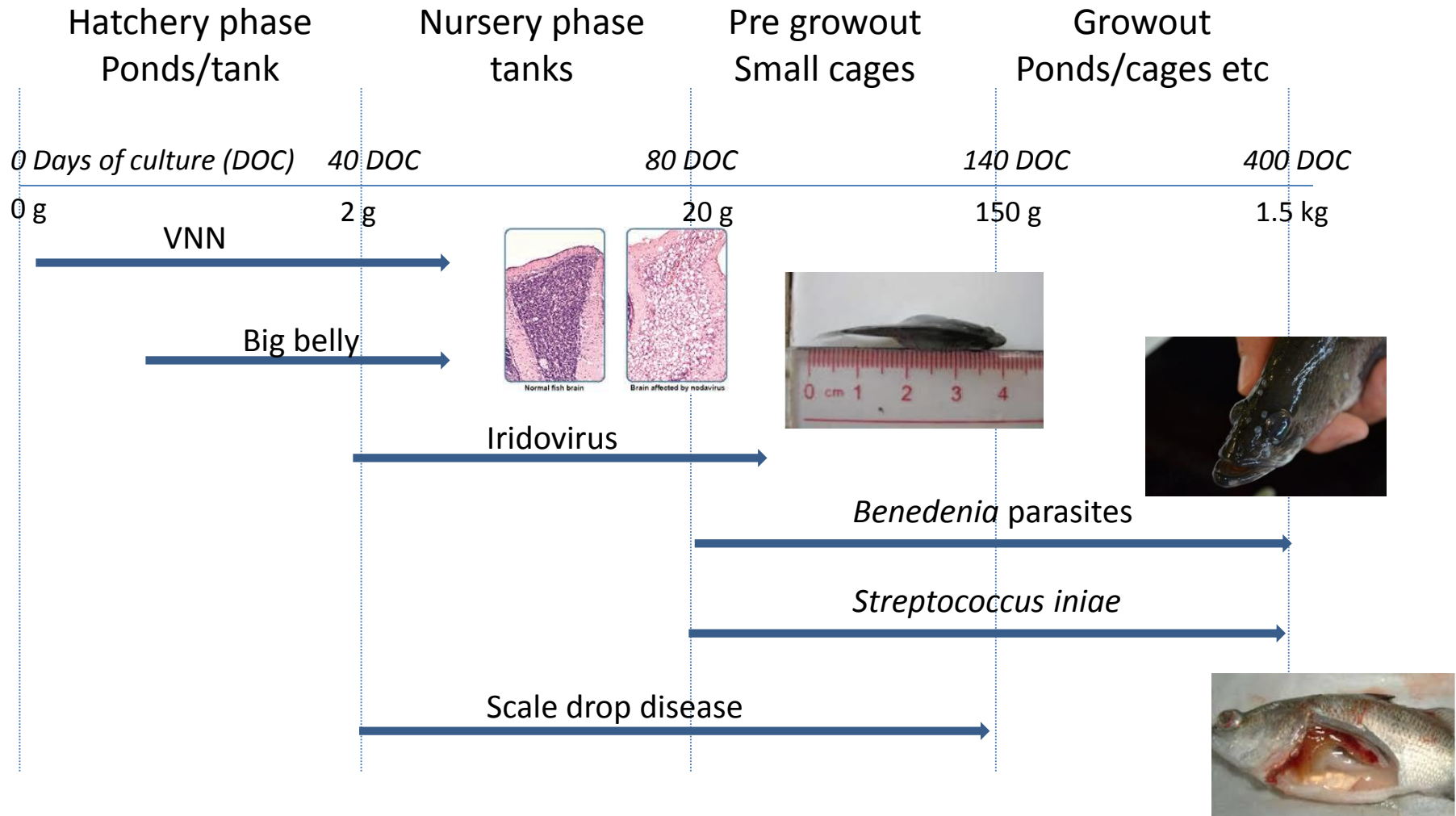


Challenges to Farming - Sex change

- Broodstock management
- Infrastructure
- Selective breeding

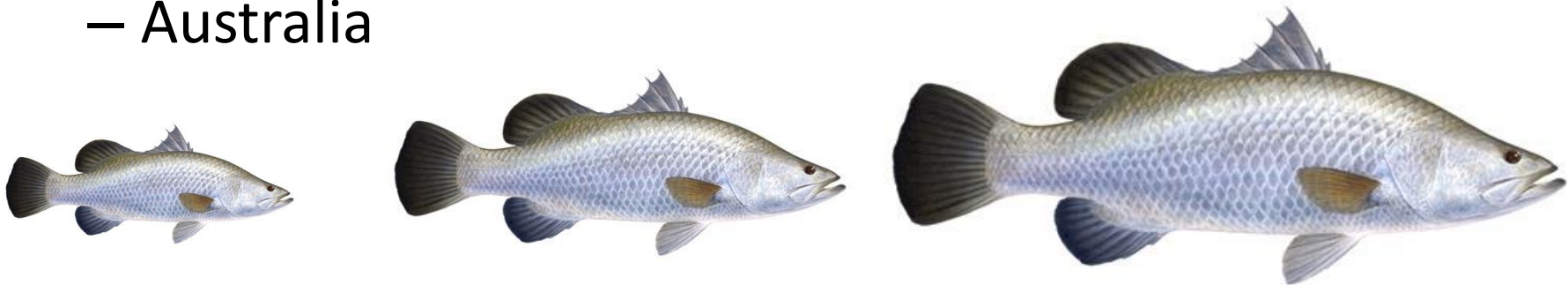


Diseases of barramundi



Challenges to Farming - Selection

- High heritability growth, low GxE
- Mass spawning, sex change, infrastructure resourcing challenges
- Selective breeding programs
 - Singapore
 - Indonesia
 - Australia



Challenges to Farming – Flavour tainting



TASTE TEST: Researcher, Ben Jones is unlocking the secrets to better-tasting barra

Funny tasting fish a thing of past

JUST one foul-tasting barramundi is all it takes to paint a pretty bad picture for the entire barra farm industry.

But a Townsville researcher believes he may be close to perfecting the ultimate recipe for better-tasting barra.

James Cook University aquaculture researcher Ben Jones is trying to solve the riddle of getting rid of "funny" tasting farm fish.

The aquacultured product is often perceived as being tainted by off flavours, or being bland and flavourless compared to wild-caught barra.

However many seafood eaters may not realise the problem, which is caused by a blue-green algae, affects both wild-caught and farmed fish.

"The trouble is, you get one piece of bad fish and it taints the entire industry," Mr Jones said. "But the fact is, early in the season, some of the

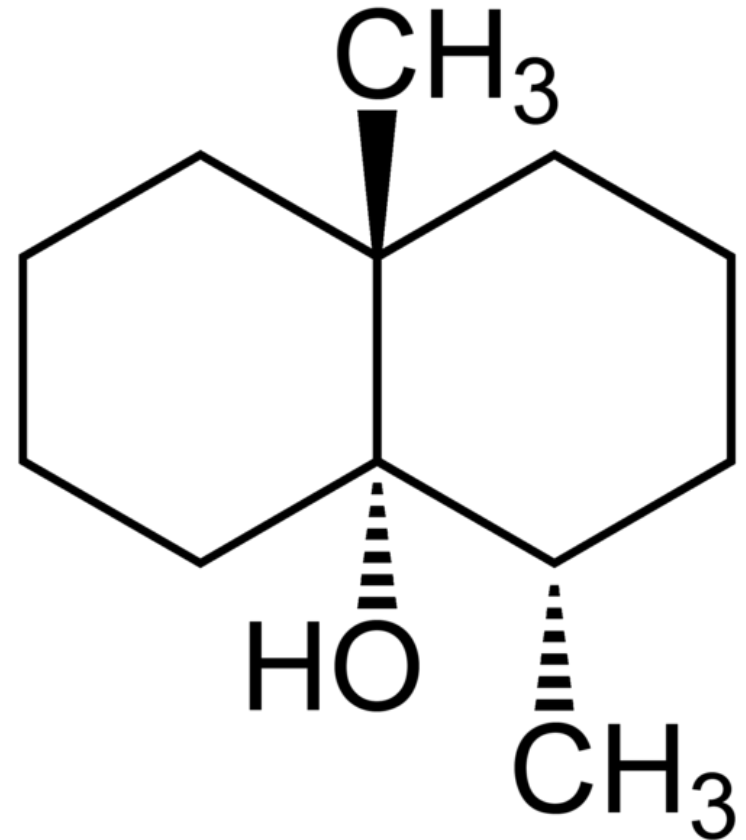
wild caught stuff can be tainted as well because of all the freshwater run-off, which causes the exact same taint."

To remove the chemicals released by the algae that create the off-flavour in barra, Mr Jones is developing a number of techniques farmers can use before the animals are harvested.

This includes holding the fish in a tank to cleanse them of taint-causing chemicals, and designing special diets to make them taste like their wild cousins.

The research project is funded by and has the full support of the Australian barramundi farming industry. The industry is preparing new quality guidelines to ensure tainted product never reaches shelves. These are expected to be rolled out within the next 12 months.

Daniel Bateman



Geosmin

Potential in Brazil

- Species with proven technology (breeding, feeds)
- Adapted to brackish systems
- Seedstock supply
- Replacement in shrimp ponds (Thailand, Australia)





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