Research for productivity increase: examples from aquaculture

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Plan

- Global challenge to produce enough fish
- Food insecurity for fisheries in Australia
- Research to increase production & productivity
  - Breeding
  - Nutrition
  - Genetics

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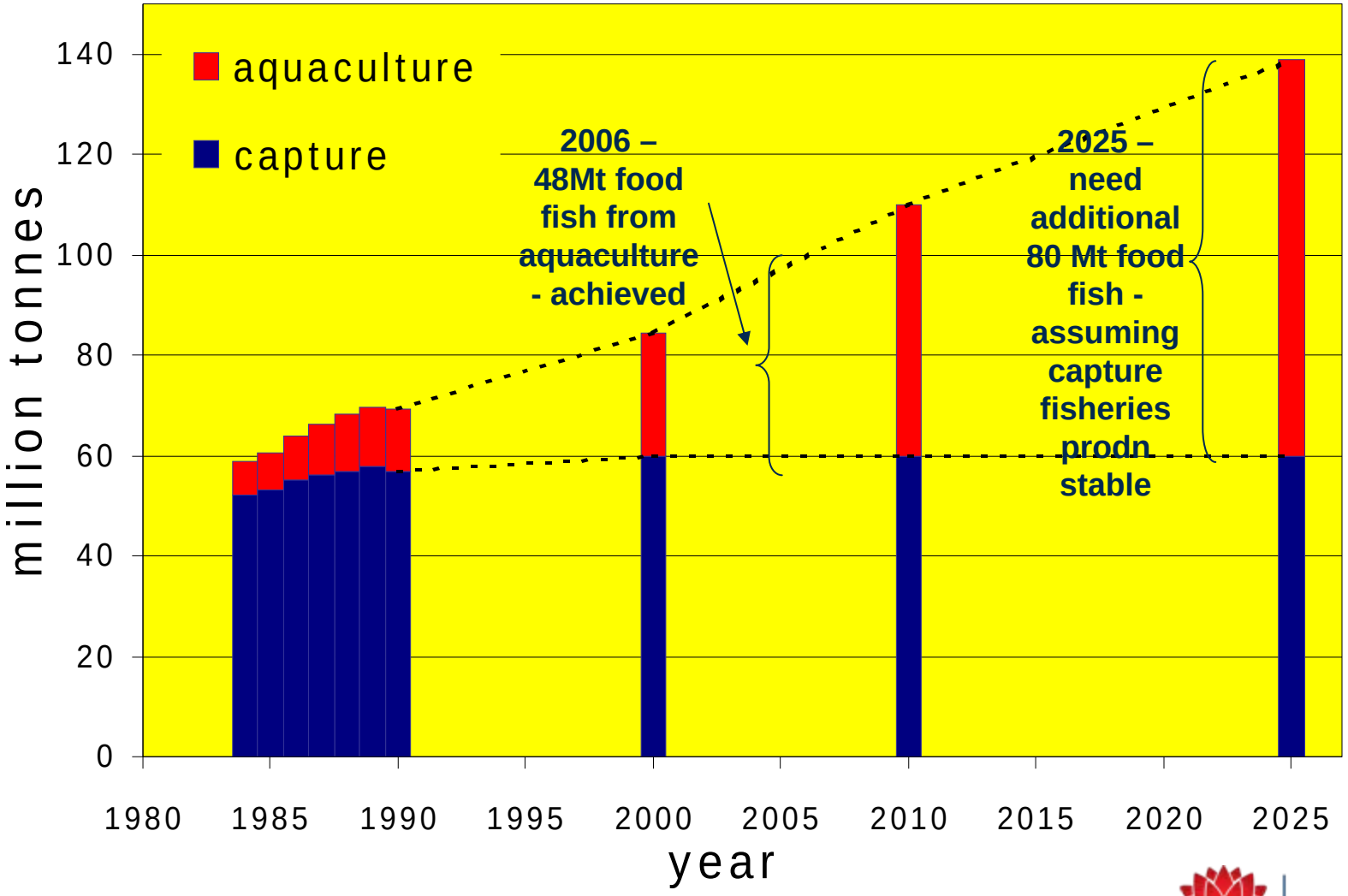
Global requirements for food fish



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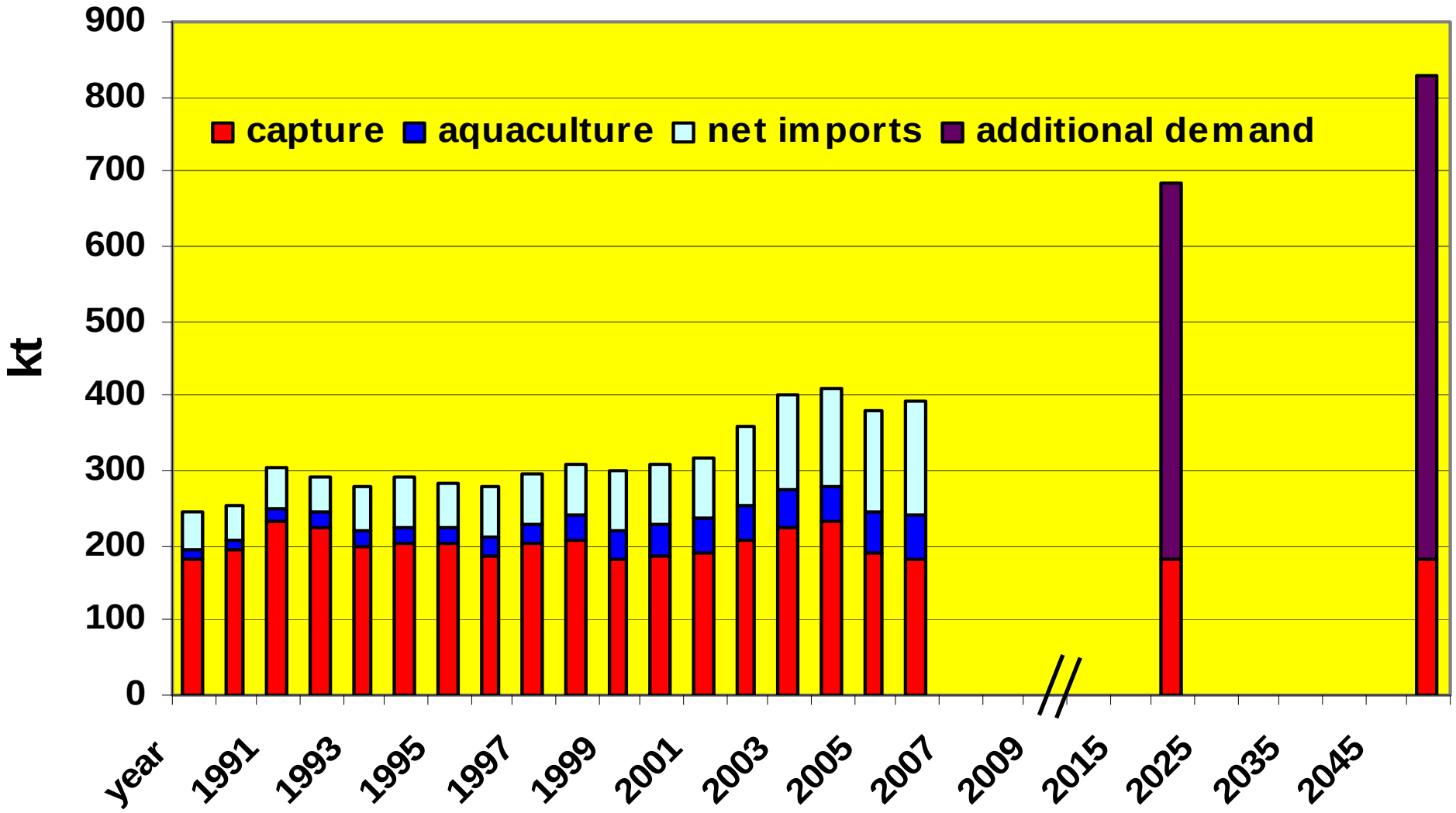
Australian fisheries supply and projected requirements



Summary

- 190,000 t (net production: capture + aquaculture – exports)
- 200,000 t imports
- 390,000 t domestic consumption
- 18 kg/yr consumption
- Projected population 35 million by 2056 (mid point estimate)
- Need 630,000 t fish by 2056
- Need 440,000 t imports + aquaculture (assuming capture production stable and 0 exports)
- NSW produced 20,662 t (2006/07)
- ~ 108,000 t = 75% imported
- **Food insecurity for fisheries in Aust**

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How can research help?

1. Breeding

- Broodstock management
  - Phototherm control; spawning on demand (Aust bass, snapper, mulloway, yellowtail kingfish – breed fish for summer growth)
- Larval rearing – improved survival & growth (swim bladder inflation), reduced malformations
- Efficient nursery production (nutrition, system technology)

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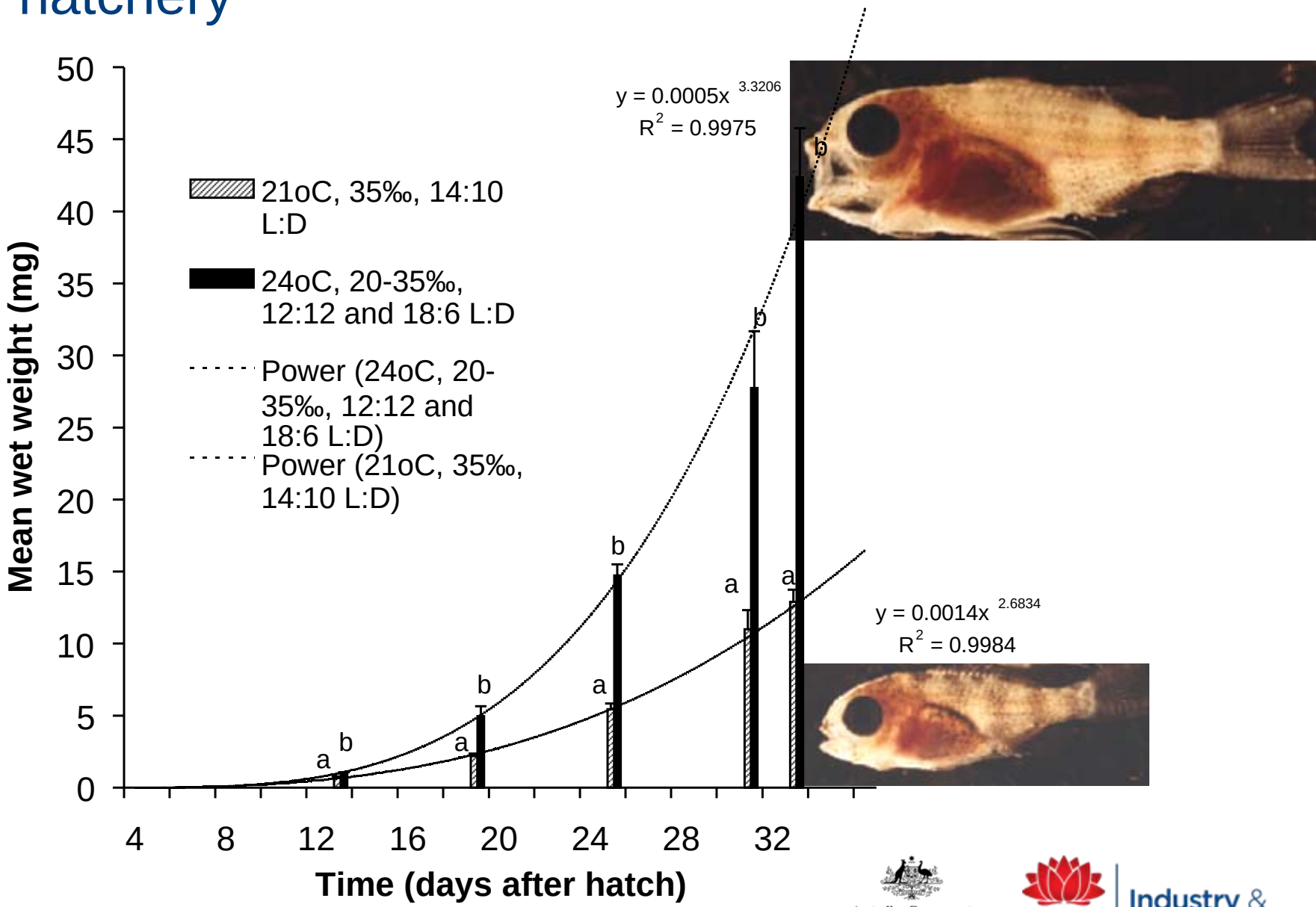
Snapper growth to 33 dah in commercial-scale hatchery



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Southern Bluefin Tuna; cages Port Lincoln, 6 dah (days after hatch) larvae, 22 dah, 85 dah.

Research priorities: nutrition, tank dynamics, malformations

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University of the Sunshine Coast Queensland, Australia

Australian Government Fisheries Research and Development Corporation

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

CLEAN SEAS TUNA LIMITED

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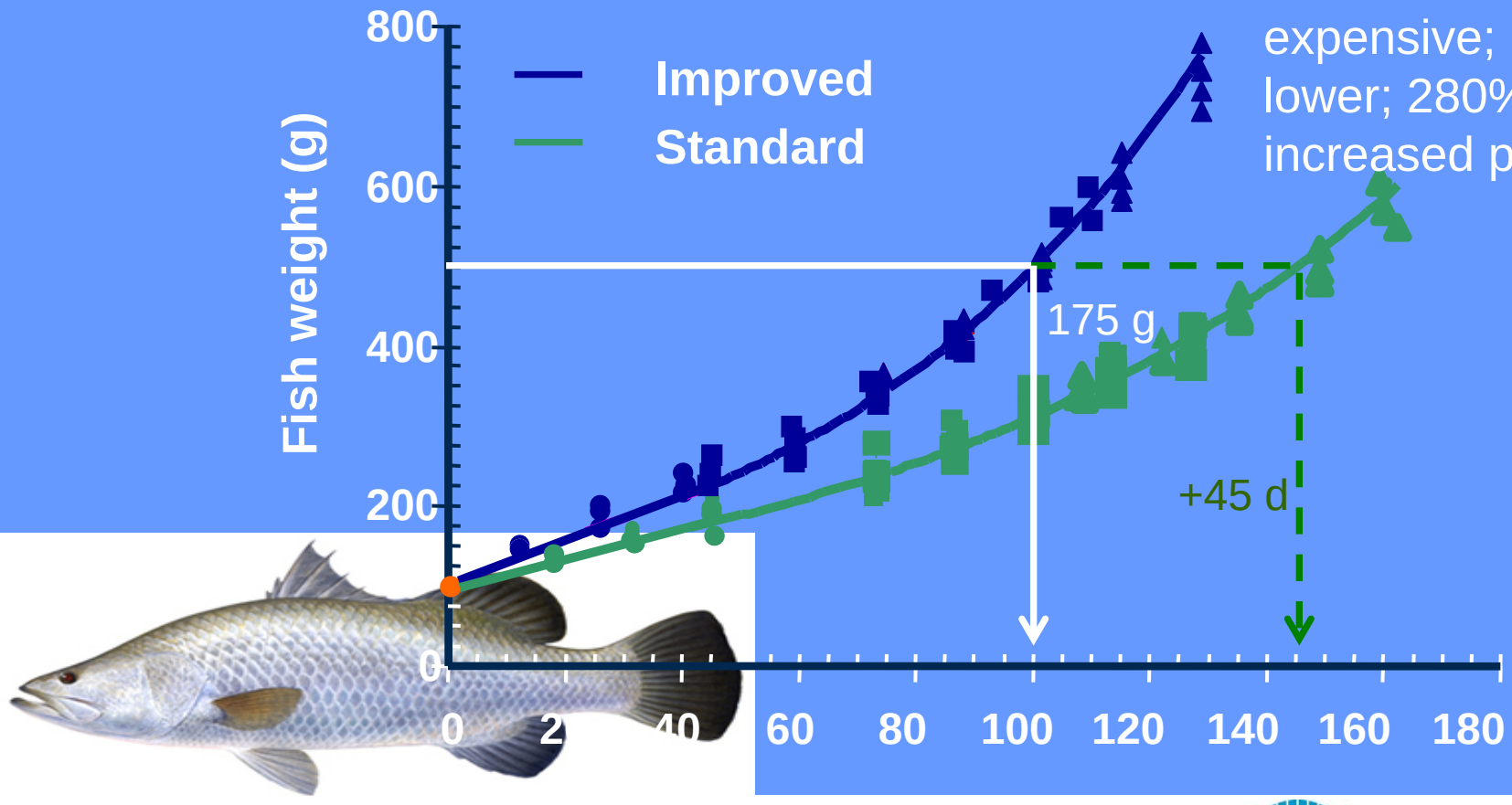
How can research help?

2. Nutrition

- Relatively poor understanding of nutritional requirements
- Excessive reliance on aquatic protein & oil (fishmeal + fish oil)
- New processing technology
- Feeding strategies
- >60% operating costs for intensive aquaculture

Barramundi fed standard (45% CP; 10% lipid) or improved (55% CP; 20% lipid) pelleted feed

Diet 40% more expensive; FCR lower; 280% increased profit



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Department of Primary Industries and Fisheries

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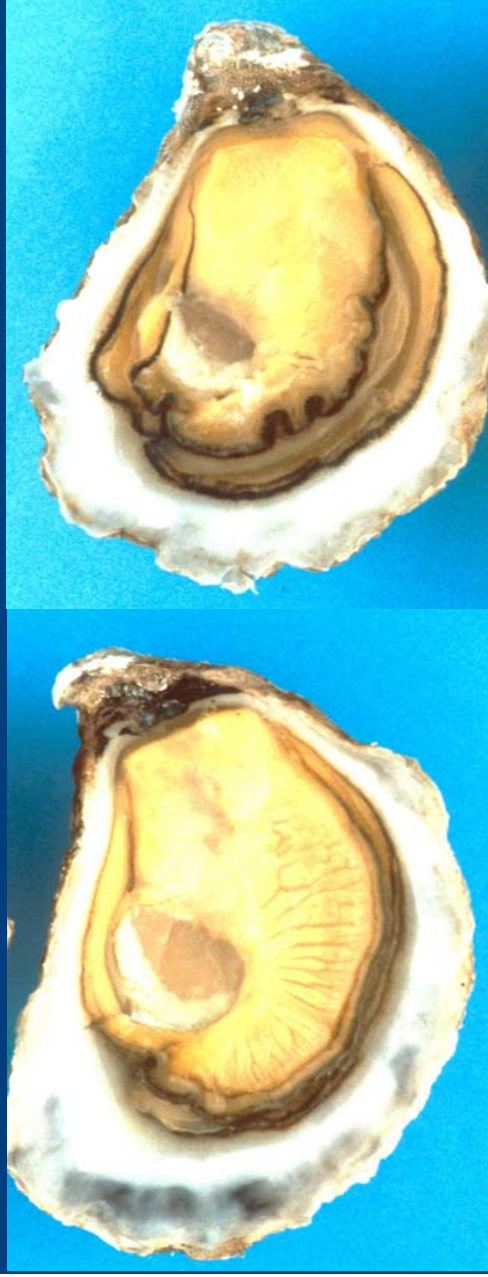
Nutrition highlights

- Silver perch
  - Initially 27% fm in diet
  - Commercial diets now 5% can have 0%
- Snapper
  - Initially 63% fm in diet
  - Successful diets now with 15% fm
- Australia has among lowest rate of fm inclusion in world
- Exports up to 50,000 t lupins for aquaculture feeds

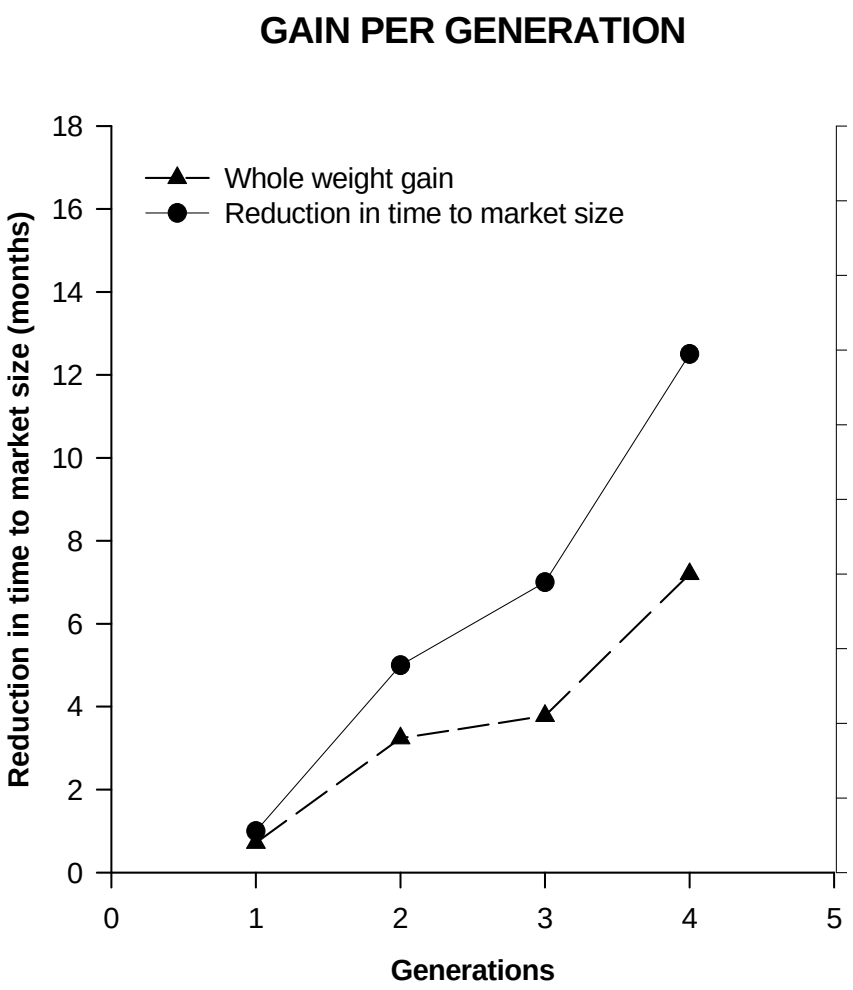
How can research help?

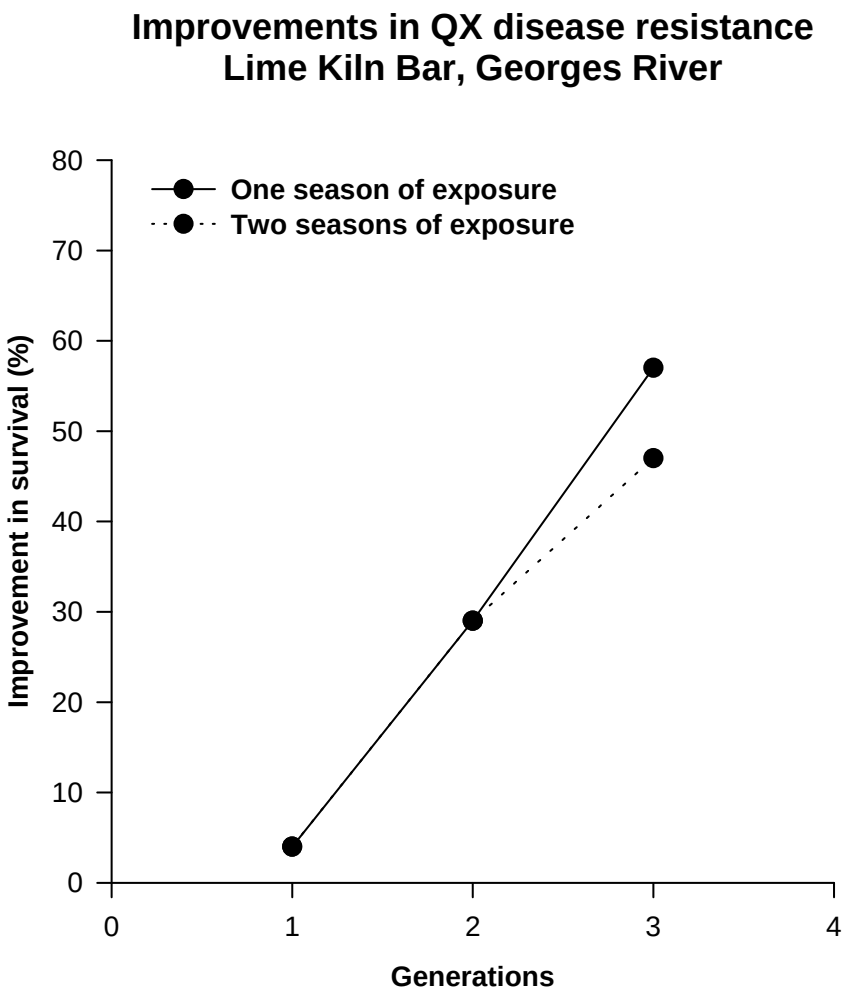
3. Genetics

- Sydney rock oysters (SRO) breeding program
  - The problem: slow growth (e.g. 4 yrs to market; vulnerable to diseases; QX, Winter Mortality)
  - The response: most successful aquaculture breeding program in the world - SRO to market >12 months earlier; fully resistant to QX; significant improvement in resistance to Winter Mortality disease
  - Re-emergence of oyster farming in estuaries devastated by QX – Georges River and Hawkesbury River



How can research help?
1. Genetics





Oysters from Georges River

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