Kingfish

Australia’s new potential white fleshe salmon?

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Yellowtail Kingfish

Often abbreviated to ‘YTK’
Scientific name *Seriola lalandi*

One of a number of *Seriola* species

Also known as...
- Hiramasa
- Gold-striped Amberjack
- Yellowtail Amberjack

Frequents coastal & oceanic semi-tropical and warm temperate waters

Circum-global distribution occurring in the Indo-Pacific & Atlantic oceans

Farmed on a small scale in Japan for many years (about 4,600 tonnes in 2014)

More recently farmed in Australia, Ecuador and New Zealand

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Why the Interest in Yellowtail Kingfish in Australia?

Increasing product available on the domestic market at seafood retailers & in supermarkets; about 45% is exported to high-end European suppliers.

Increasingly served at medium/high-end restaurants.

Good culture characteristics:
- Reliable year round spawning of broodstock
- Hatchery culture established providing high quality fingerlings
- Fast growth rate to market size
- Multiple and quality products
- Good price
Atlantic Salmon Farming

Atlantic Salmon farming is a major aquaculture finfish industry in many countries; in 2017-18\(^1\) global production was 2.5 million tonnes, valued at US$15.4 billion

Atlantic Salmon farming is Australia’s largest aquaculture industry (~1.5% of global salmon production)\(^2\) with a track record of overcoming challenges

Atlantic Salmon is a popular product with consumers, with about 90% sold domestically\(^3\)

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1. International Salmon Farmers Association 2018. Salmon farming sustaining communities and feeding the world.
The Australian Yellowtail Kingfish Aquaculture Industry

**Locations**
- NSW, SA & WA

**Companies & start date**
- Clean Seas Seafood, SA, 1998
- Indian Ocean Fresh Australia P/L, WA, 2008
- Huon Aquaculture Group, NSW & WA, 2015

**Present Production**
- **Yellowtail Kingfish**
  - 3,000 tonnes
  - $38 million
  - 70-80 direct FTE jobs¹

- **Atlantic Salmon**
  - 63,000 tonnes
  - $740 million²
  - 2,292 direct FTE jobs³

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1. Pers. comm. Steven Clarke, SARDI (various information on the web about each company).
Initial Rate of Industry Growth

**Tasmanian Salmon aquaculture industry**

- 1984: Fertilised eggs imported from interstate & ongrown in tanks
- 1986: The first sea cage harvest occurred: 53 tonnes
- 1987: The Saltas hatchery was initiated (government-industry venture)
- 1990: 36,000 fish were transferred from onshore tanks to sea cages
- 1997: First broodstock collected

**Yellowtail Kingfish industry**

- 1998: First hatchery & production trials
- 1999: Production reached 1,000 tonnes (i.e. after 7 yr)
- 2000: Production reached 11,000 tonnes (i.e. after 16 yr)
- 2004: Production reached 1,000 tonnes
- 2005: Production reached 2,000 tonnes (i.e. after 14 yr)

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1. TSGA (2019). History. 2. Pers. comm. Steven Clarke, SARDI (various information on the web about The Stehr Group/Cleans Seas)
Farming Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Yellowtail Kingfish</th>
<th>Atlantic Salmon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range (°C)</td>
<td>Subtropical - warm temperate: 11-28</td>
<td>Cold – cool temperate: 6-18</td>
</tr>
<tr>
<td>Growth Rate (months)</td>
<td>Hatchery &amp; nursery to 30 g: ~3</td>
<td>Hatchery &amp; nursery to 200/500 g: ~15/18</td>
</tr>
<tr>
<td></td>
<td>Seacage growout to 3-5 kg: ~12-24</td>
<td>Seacage growout to 4-6 kg: ~12-18</td>
</tr>
<tr>
<td>FCR</td>
<td>Carnivorous but with capacity for substantial fish meal and oil replacement ~1.8-2.2:1</td>
<td>Carnivorous but with capacity for substantial fish meal and oil replacement ~1.3:1</td>
</tr>
<tr>
<td>Stocking Density (kg m⁻³)</td>
<td>~10-15 (20)</td>
<td>~10 (20-30)</td>
</tr>
</tbody>
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1. Pers. comm. Steven Clarke, SARDI (information from a range of sources).
## Product Attributes¹

<table>
<thead>
<tr>
<th>Product Forms</th>
<th>Yellowtail Kingfish</th>
<th>Atlantic Salmon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole fish, cutlets, steaks, fillets &amp; ‘pieces/slices’</td>
<td>Whole fish, cutlets, steaks, fillets (skin on or off) &amp; ‘pieces/slices’</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Flesh Colour</th>
<th>White to pale pink</th>
<th>Medium orange</th>
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<table>
<thead>
<tr>
<th>Boniness</th>
<th>Few easily removed large bones</th>
<th>Moderate number of easily removed fine pin bones</th>
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<table>
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<tr>
<th>Texture</th>
<th>Medium - fine</th>
<th>Medium</th>
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<table>
<thead>
<tr>
<th>Recovery Rate (fillets from GG fish)</th>
<th>55%</th>
<th>78%</th>
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<table>
<thead>
<tr>
<th>Protein (g/100g)</th>
<th>22.9</th>
<th>20.5</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th>Omega 3 (g/100g)</th>
<th>High: 2.58</th>
<th>High: 2.62</th>
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<table>
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<tr>
<th>Carbohydrate (g/100g)</th>
<th>0.33</th>
<th>0.12</th>
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| ‘Cooking Styles’ | Raw – sashimi & sushi, baking, frying, grilling, smoking & ‘steaming’ | Raw – sushi, baking, grilling, smoking & ‘steaming’ |

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Key Challenges to the development of the Yellowtail Kingfish Industry

1. Market development to balance increases in production

2. Effective management of fish health, diseases and pests

3. Supporting infrastructure (e.g. transport & wharf facilities)

4. Cost effective, nutritionally complete and sustainable feeds

5. An ongoing ‘social licence to operate’ to access farming leases

6. Proactive, clear, scientifically-based government legislation & regulations

7. Skilled staff

8. Greater market competition from other Seriola producers internationally
Benefits of Targeted R&D

e.g. “Growing a profitable, innovative and collaborative Australian Yellowtail Kingfish aquaculture industry: bringing ‘white’ fish to the market”, Rural R&D for Profit Programme, Department of Agriculture & Water Resources, Australian Government.

Enhanced productivity through:

- Improved food utilisation, growth rates and survival
  *i.e. enhanced feed composition, feeding strategies & management of fish health.*

- Reduced input costs along the supply chain
  *i.e. aquafeeds made from alternative protein sources*

- Improved social licence to operate
  *i.e. more sustainable feeds & reduced nutrient discharge*

Note: 17:1 return on R&D dollar invested¹

¹ Agtrans Research (2019). An impact assessment of investment in Australian Yellowtail Kingfish aquaculture R&D.
Estimated potential annual production in 2030:

61,400 tonnes
$781.6 million

Based on currently owned lease area & growth projections for existing farms & maintaining a price of $12.73/kg (with 20% probability of achievement)\(^1\)

[c.f. Atlantic Salmon in 2022-23: 71,600 tonnes, $910 million]\(^2\)

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Future Opportunities: Production

- Improvements in growth rates & feed utilisation (nutrition & genetics)
- ‘Contained’ rises in feed costs (nutrition & genetics)
- Increased productivity through improved parasite disease management (fish health, diseases & pest, & genetics)
- Full utilisation of existing lease areas held by present companies
- New industry entrants
Future Opportunities: Products & Markets

With increased supply expect:

- Increased capture of global high-end markets with ‘branded’ premium, sustainably farmed products from pristine waters
- Increased effort to differentiate product from competitors
- Development of new larger volume, lower-end products marketed both domestically and internationally
Conclusion: Are Yellowtail Kingfish Australia’s new potential white fleshed Salmon?

Yes, but not yet

Yellowtail Kingfish farming practices have been developed for temperate Australia

Domestic and international markets exist and consumer interest is high and growing, driven by higher end-products

Production is expected to grow substantially over the next decade

As production volume increases and production costs reduce, markets for lower-end products will be developed
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