COMMERCIAL SCALE LARVICULTURE OF PENAEID SHRIMP IN INDIA
STATUS & CHALLENGES

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Culture of Penaeid shrimps in India

1. *P.monodon*
2. *P.indicus*
3. *P.semisulcatus*
4. *P.merguensis*
5. *P.japonicus*
6. *L.vannamei*
Species under commercial hatchery operation

1. **L.vannameii**
2. **P.monodon**
3. **P.indicus**
Wild source of brood stock
Limited maturation techniques
Maturation 1-2 spawning/female
Off late entirely based on wild gravid females
Risk of diseases
Limited stocking in Larval tanks – up to 100/lit
Low survival rate
MBV, WSSV issues
L.Vannameii Era

- Successful trial production up to 2008
- SPF brood stock from USA, Mexico
- Multiplication of Hatcheries & farms in large scale
- Production in farming sector jumped from - 70000 MT of *P.monodon* in 2010 to 7.0 lac MT of *L.vannamei* in 2018
<table>
<thead>
<tr>
<th>Year</th>
<th>Monodon</th>
<th>Vannamei</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6.0</td>
<td>2.2</td>
<td>8.2</td>
</tr>
<tr>
<td>2011</td>
<td>6.7</td>
<td>4.5</td>
<td>11.2</td>
</tr>
<tr>
<td>2012</td>
<td>5.0</td>
<td>9.0</td>
<td>14.0</td>
</tr>
<tr>
<td>2013</td>
<td>3.2</td>
<td>18.0</td>
<td>21.2</td>
</tr>
<tr>
<td>2014</td>
<td>3.0</td>
<td>26.5</td>
<td>29.5</td>
</tr>
<tr>
<td>2015</td>
<td>1.9</td>
<td>31.7</td>
<td>33.6</td>
</tr>
<tr>
<td>2016</td>
<td>1.3</td>
<td>41.5</td>
<td>42.8</td>
</tr>
<tr>
<td>2017</td>
<td>1.0</td>
<td>53</td>
<td>54.0</td>
</tr>
<tr>
<td>2018</td>
<td>1.0</td>
<td>65.0</td>
<td>66.0</td>
</tr>
</tbody>
</table>
## Market share of *P. monodon* & *L. vannamei*

<table>
<thead>
<tr>
<th>Year</th>
<th><em>P. Monodon</em></th>
<th><em>L. vannamei</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>73%</td>
<td>27%</td>
</tr>
<tr>
<td>2018</td>
<td>3%</td>
<td>97%</td>
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</table>
Status of hatchery operation in the year 2018

- 70 billion seed were produced
- 65 billion seed were sold
- Overall efficiencies in the hatchery improved
- Farm efficiencies have been declined
## Production & Productivity (L. vannamei)

<table>
<thead>
<tr>
<th>Year</th>
<th>PL Billion</th>
<th>Production tons</th>
<th>Productivity (Per billion) tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2.2</td>
<td>47,000</td>
<td>21,363</td>
</tr>
<tr>
<td>2011</td>
<td>4.5</td>
<td>83,000</td>
<td>18,444</td>
</tr>
<tr>
<td>2012</td>
<td>9.0</td>
<td>1,45,000</td>
<td>16,111</td>
</tr>
<tr>
<td>2013</td>
<td>18.0</td>
<td>2,47,000</td>
<td>13,722</td>
</tr>
<tr>
<td>2014</td>
<td>28.5</td>
<td>3,20,000</td>
<td>11,228</td>
</tr>
<tr>
<td>2015</td>
<td>33.6</td>
<td>363450</td>
<td>10816</td>
</tr>
<tr>
<td>2016</td>
<td>42.8</td>
<td>424000</td>
<td>9906</td>
</tr>
<tr>
<td>2017</td>
<td>54</td>
<td>601000</td>
<td>11129</td>
</tr>
<tr>
<td>2018</td>
<td>65</td>
<td>669000</td>
<td>9557</td>
</tr>
</tbody>
</table>
Current Capacities & Trends

- Total no of hatcheries increased to 600 from level of 200 in the year 2008.
- Total production capacities of hatcheries in India could be around 120 billion.
- In the year 2019 seed demand could be at the same level of 2018 or slightly lower by 10%.
## Case Study in Kakinada Coast

<table>
<thead>
<tr>
<th>YEAR</th>
<th>No of Hatcheries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>72</td>
</tr>
<tr>
<td>2006</td>
<td>45</td>
</tr>
<tr>
<td>2018</td>
<td>225</td>
</tr>
</tbody>
</table>
Low demand of seed in 2019 – WHY...

- Farm gate prices were low in second half of 2018
- Stocking was slow because of WSSV & EHP
- Many farmers switched to fishes because of diseases.
- Reports like excess inventory in the cold storages dampening the spirit of the farmers to go for stocking.
Overview of commercial scale larviculture of Shrimp

- Bio-Security.
- Water management.
- Maturation.
- Live feeds.
- Larviculture.
- Packing & Transportation.
Bio-Security

- Tyre bath & Foot dip.
- Hand spray, Wearing washed clothes.
- Allotted manpower for every section
- Likewise materials
- Bio-security is the key for successful production of hatchery.
- Bio-security helps the hatchery to run for long duration with consistency in production.
- Bio-security is important to maintain SPF status.
• Intake - Vertical bore, Horizontal bore, Open water.

• Filtration - SSF, RSF, AFM, Cartridge filters.

• Treatment - Chlorination, Ozone, UV, Settlement.
Maturation

• Brood stock stocked at 8pcs/sqm
• Live feeds - Polychaetes and blood worms
• Frozen feeds – Squid, krill.
• Pelleted feeds
• Water exchange – twice a day -200%.
• Siphoning and cleaning of tanks during water exchange
• Mating – Spawning - Hatching
Live feeds

- Algae
  i. Chaetoceros
  ii. Thalassiosira
  iii. Skeletonema

- Artemia
Larviculture

- Stocking density – 200-300/lit.
- Optimum range of water parameters.
- Algae feeding – Small quantities for more times.
- Microencapsulated – Demand feeding.
- Pro-biotic application dosages 1-5ppm.
- Atremia – 8tins – 12 tins/ 1 million pl production.
- Water exchange – topping up till mysis, 20-100% till packing.
- Shifting after pl3 or Pl4.
Packing & Transportation

- Age - pl 8 to pl 13
- Numbers - 1500 to 2500
- Transport Duration
- Salinity – Care to be take for less than 5ppt
- Age, Duration, Salinity ascertain numbers to be packed
- Water volume – 3 to 4 lit per bag
- Pro-biotics are added to reduce stress
Challenges

- **Brood stock:**
  - Availability
  - Quality.
  - Mortality during transportation.
  - Consistency in performance.
  - Issues with import documents.
  - AQF Cubicle issues.
  - Need of the hour more BMCs in India.
Challenges

- Live feeds – Polychaetes & Blood worms
  - Availability
  - Local Issues
  - Disease Threats
  - Imported frozen feeds – Polychaetes, mussels etc
  - Expensive
  - Low consumption & lower nauplii output
  - Quality & quantity of nauplii
Challanges

Z2 Syndrome:

- Major issue in larval rearing.
- Fast stocking in 2-3 days per shed.
- No identification of causative agent.
- Entire production cycle affects
- Compels hatchery operator to look for more facilities not to loose market.
Challenges

Diseases

1. WSSV - Stop using live feeds and use SPF Feeds
2. EHP – Treatment with NaOH
3. Vibrios – Suppress by Pro-biotic application
Challenges

Feeds

- Cost of Artemia & imported feeds have gone up
- Duties for importing feed increased from 6% to 32%
- Low seed price v/s cost of quality feeds
Challenges

➢ Market situation
  • Market uncertainty – Low export demand
  • Diseases out breaks.
  • Unpredictable nature of farm stocking hurt the hatchery operator.
  • Unlike P. monodon for L. vannamei, large scale import of bloodstocks’ compels the hatchery to run.
  • Delay in packing – high production cost
Other Major Issues

- Use antibiotics in production
- Quality of probiotics available in the market.
- Antibiotics residue in probiotics...!!
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THANK YOU