COMMERCIAL SCALE LARVICULTURE OF PENAEID SHRIMP IN INDIA STATUS & CHALLENGES

K.Madhusudhan Reddy

Culture of Penaeid shrimps in India

1. *P.monodon*
2. *P.indicus*
3. *P.semisulcatus*
4. *P.merguensis*
5. *P.japonicus*
6. *L.vannameii*

Species under commercial hatchery operation

1. *L.vannameii*
2. *P.monodon*
3. *P.indicus*

P.Monodon Era

- 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

Post larvae Production (in Billion)

Year	Monodon	Vannamei	Total
2010	6.0	2.2	8.2
2011	6.7	4.5	11.2
2012	5.0	9.0	14.0
2013	3.2	18.0	21.2
2014	3.0	26.5	29.5
2015	1.9	31.7	33.6
2016	1.3	41.5	42.8
2017	1.0	53	54.0
2018	1.0	65.0	66.0

Market share of *P.monodon* & *L.vannameii*

Year	*P.Monodon*	*L.vannameii*
2010	73%	27%
2018	3%	97%

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.vannameii)

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

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

YEAR	No of Hatcheries
2002	72
2006	45
2018	225

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.

Water management

- 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

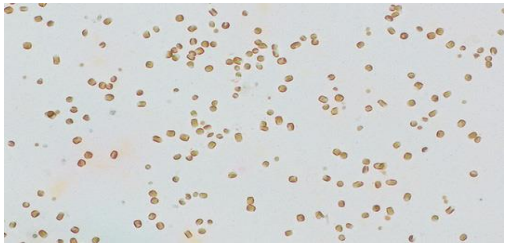
Live feeds

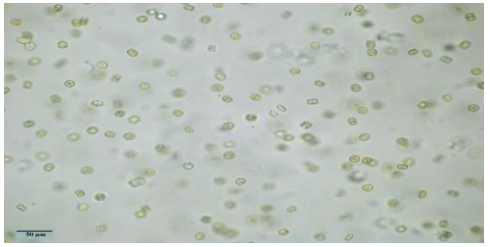
- Algae

i. *Chaetoceros*

ii. *Thallassiosira*

iii. *Skeletonima*





- 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.vannameii 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