YEAR-ROUND PRODUCTION OF NATIVE WHITE SHRIMP (*Litopenaeus setiferus*) FOR THE LIVE BAIT MARKET

Deliah Arrington*, Jeffrey Brunson, Robert Shumate, Al Stokes, and John Leffler

Waddell Mariculture Center
South Carolina Department of Natural Resources

DNR

Market studies show that there is a demand in the recreational fishing community for year-round production of native shrimp for use as live bait.

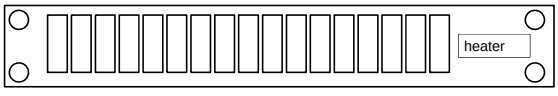
OPPORTUNITY

- Over 14 million recreational saltwater fishermen, who contribute over $34 billion to the nation's economy.
- The demand is high - between 65-75% use live bait shrimp.
- Sold wholesale for $80 - $125 per thousand; Retail for $3.50 - $4.25 per dozen.
- Bait shrimp are sold at a small size, approx. 6 grams - Short Growout Time!
- Operational costs and potential risks could be less compared to producing food shrimp.

Can indoor, year-round production of bait shrimp be a feasible business?

Two studies designed to determine optimal methods for growout production of Atlantic white shrimp

DENSITY STUDY



- Seventeen 60-L aquaria
- Circulating water bath – heater & 4 pumps
- Stocking densities = 400m^{-3} to 2800m^{-3} in 150/m^{-3} increments

RESULTS

Figure 2. Survival (%) as a Function of Post Larvae Stocking Density

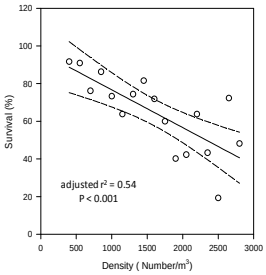
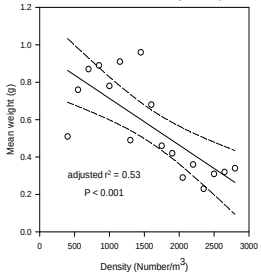
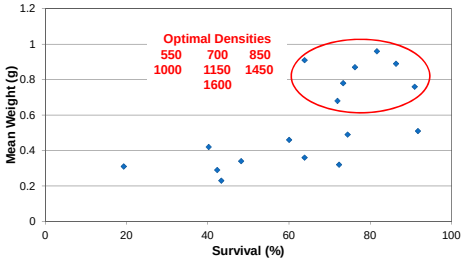


Figure 3. Mean Harvest Weight as a Function of Post Larvae Stocking Density



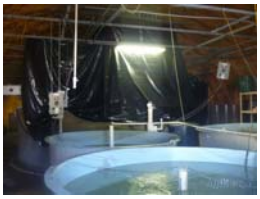
RESULTS

Relationship between Survival and Mean Weight in a *Litopenaeus setiferus* Nursery



Clear-Water-Flow-Through vs. Biofloc System

Biofloc



Flow-through

BIOFLOC vs. CLEAR-WATER

Biofloc Treatment

- 3 replicates
- 2 m^{-3} tanks
- Seeded with "seasoned" water from existing raceway
- No water exchange
- Immersion heaters – 25ºC

Clear-water Treatment

- 3 replicates
- 2 m^{-3} tanks
- Filtered seawater preheated in a 30m^{-3} reservoir tank
- 4.0 – 4.3 $Lmin^{-1}$ flow-through rate
- Immersion heaters in reservoir – 25ºC

Harvest Data

Stocked at 0.35 g
Stocking rate: 330 shrimp m^{-3}

Tank	Treatment	Mean weight (g)	Survival %
1	Clear-water	3.6	65.6
2	Clear-water	3.1	69.4
3	Clear-water	3.2	70.7
4	Biofloc	4.7	45.5
5	Biofloc	3.9	65.6
6	Biofloc	4.4	42.8

Total Growout: 70 days

RESULTS

Survival tended to be better in Clear-water, but not significantly different (P = 0.079).

Mean growth rate was significantly greater in the biofloc treatment (P = 0.021).

Size variability among individual shrimp (P = 0.033) and among replicate tanks (SD = 0.404 vs 0.265) was much greater for biofloc than clear-water.

(an inherent disadvantage?)

CONCLUSIONS

- Biofloc treatment produces faster growth, but growth rate is still only 0.395 g wk^{-1}.
- Economic model requires higher stocking rates and faster growth rates for indoor, year-round bait shrimp production to be a profitable enterprise.

Funding provided by the
South Carolina Sea Grant Consortium