Culture of Hybrid Striped Bass

Phase II and Phase III Production

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Phase II Production

Production Cycle

- From Phase-I harvest to 1 year old
- Growing season: June to October
  - Can survive winters well
- Grow from 1-2 to 10 inches (25-50 to 250 mm)

Most rapid weight gain occurs during Phase II

- Highest growth rates
- Aggressive feeding

Taking full advantage of rapid growth stage requires careful monitoring of water quality, nutrition, and feed management

Feeds

To support rapid muscle gain and high activity level, typical feeds contain

- 36-50% protein
- 10-16% fat

Formulations currently in use

- Salmon/trout diets
- Striped bass diets

Floating pellets preferred

- Observe fish status
  - Easy opportunity to generally assess survival, size, and condition
- Reduce or increase amount of feed according to demand

Pond Culture

Phase II are stocked at lower densities

- 4,000 – 100,000 fish/acre
- Emergency aeration is essential

For uniform size and increased survival

- 10,000 to 24,000 fish/acre
- Above 24,000 fish/acre need constant aeration

Pond Culture

- No need for additional fertilizer
  - Feed and fish waste provide nutrients to support phytoplankton
  - Plankton may shade out submerged vegetation
  - Fertilizer increases phytoplankton and negatively effect O_2 and pH

Harvest

Seine harvest similar to Phase I

- Typically harvest when temperatures are below 54°F (12°C)
- Expect 0.25-0.5 lb fish (8 – 10 in)
- 85% survival is common
- Concludes 1st year in production cycle

Restock for Phase III

- Size grade fish by hand
- Stock similar sized fish together for phase III growout

Phase III Production

Fish are grown out to market size

- Second year of production cycle
- 1 ½ to 2 lbs (0.7 to 1 kg)
- Overwinter following Phase II harvest
- Growing season June - October

Production intensity increases

- Large production load
- Careful monitoring of water quality, feed, and predators

Several production strategies employed

- Ponds
- Cages
- Vertical raceways
- Indoor recirculation systems

Pond Culture

Larger ponds, lower stocking rates

- 1-10 acres (0.5 to 4 ha), usually 5-6 acres (2-2.5 ha)
- 3440 fish/acre (8600 fish/ha)

Susceptible to predation

- Birds, raccoons
- Deterrent devices (noise makers, decoys, etc.) often used

Transition to slightly lower nutrient density feeds

- 36-38% protein, 10% lipid typical

Feed by blower

- Twice daily
- 2-3% of the combined weight of the fish
- Never above 280 kg/ha

Harvest

Harvest before third growing season

- Seines
- Boom truck and loading net
- 90% survival is common

Live cars are often used to hold fish in ponds while slaughter or other preparation occurs bank-side

Recirculating Aquaculture System (RAS) Culture

Most intensive form of aquaculture

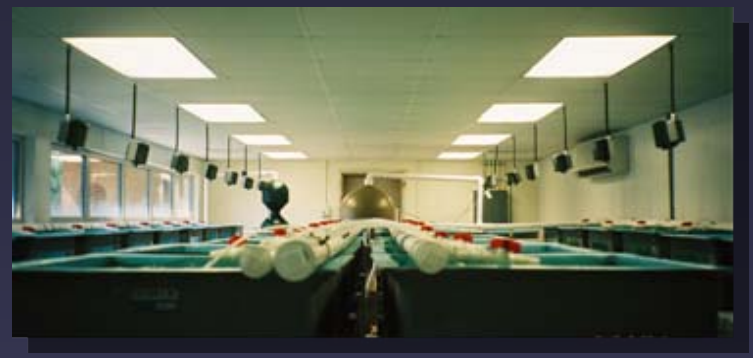
Increased control over production environment

- Little influence of natural limitations
  - Predation
  - Weather
  - Access

With increased control comes increased complexity

- Culturists must provide and maintain complete suite of environmental criteria

Components of RAS



Culture Tanks

- Round tanks, raceways, etc.

Aeration or Oxygenation

- Diffusers, liquid O_2 injection, etc.

Solid Waste Removal

- Sedimentation basins, screen filters, bead filters

Biological Filtration

- Fluidized bed filters, trickle filters, rotating biological contactors, etc.

Optional components

- Foam fractionation, carbon dioxide stripping, ozone or UV disinfection

Rapid Production, High Yields

Produce 0.33 to 0.5 lbs/gallon of water

Stocked at 0.25 lb will take approximately 5-7 months to reach market size (1.25 to 2.0 lbs.)

General RAS Characteristics

Advantanges

Reduced water requirements

Year-round production

Use existing buildings

High yields per gallon

Improved feed conversions

Greater security

Disadvantages

High initial investment

Complex systems

Expensive equipment

Increased power usage and dependency

Water quality management

Inefficiencies in filtration

Other Considerations for RAS

High density livestock production can resulted in increased occurrence and quicker spread of disease

- Similar to traditional feedlots

Greater capital needed for construction and maintenance

Increased training necessary for staff

Cages and Vertical Raceways

Utilize existing surface water bodies to culture fish

Constructed of durable and non-toxic mesh material mounted on a frame

- Simplifies feeding
- Reduces predation
- Allows circulation of water through cage
  - High stocking densities may require mechanical circulation and/or aeration
- Floats and is anchored to a dock or weight
  - Easy access

HSB Cage Culture

Can grow from one gram to 1.5 to 2 pounds in 18 months

Stocking densities range from 2.5 to 5 fish per cubic foot

- One 4’x4’x8’ cage per surface acre of water at a high stocking density with water circulation and aeration

HSB Vertical Raceway Culture

Similar to cages, but air lifts are used to move water through raceway (up to 450 gallons/min)

Advantages over traditional cages

- Higher stocking densities
  - 10-15 fish/cubic foot
- Yields as high as 5000 pounds/acre/year
- Improved water quality
- Reduced manpower
- Less off flavor

Need emergency backup generators

Marketing

Some markets prefer live fish or fillets, but whole-on-ice marketing is typical

Slaughtered using ice bath or electrocution

- Rapid death and careful handling is important
- Cuts, tears and bruising make fish unappealing

Whole-on-ice

- Very small = 0.75 to 1.0 lbs.
- Small = 1.0 to 1.5 lbs.
- Medium = 1.5 to 2.0 lbs.
- Large = 2.0 to 2.5 lbs.
- Jumbo = 2.5 lbs. and up

Live

- 1.25 to 1.75 lbs.
- >2 lbs. too large

3-Phase vs. 2-Phase Production Cycle

Advantages

No size grading and re-stocking between phase II and phase III

Reduced stress from Handling

Reduced costs

Stock larger fingerlings (10 g) to reduce size variation

Disadvantages

Less control of population density

Survival is hard to estimate

Increased cost of fingerlings