

North Central Regional Aquaculture Center



Listening Session Assessment



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Taxa Discussions

Percids (Smith)

1. Yellow Perch

- Development of economical feeds that fish need for all stages of growth, especially 2nd year
- Pond intensification studies
- Year around availability of stocks
- Yield verification
- Nutritional programming in aquaponic systems
- Economics of system productions
- Disease research in *Columnaris* and vaccines
- Reduction of gut inflammation of fish fed soybean diets
- Indoor larval production
- Nutritional values for humans of culture vs wild sources
- Need for long-term nutritional studies
- Demand for feed-trained fish year around
- Out-of-season spawning
- Processing information
- Business plans
- Processing needs
- On-farm intensification studies
- Economics of using all female stocks on farms

2. Walleye

- Role of cryopreservation
- Validation of research
- Perceptions of hybrid walleye to the consumer
- Feed trained fingerling production
- Economics of production efficiency
- Standardization of production methods related to indoor and pond to feed training
- Use of cryopreserved sperm
- Initial fry feeding studies
- Market studies
- Use of genetics to decrease aggressive cannibalism
- Out of spawning information
- Commercial broodstock
- Domestication
- Information research to production
- Fingerling production
 - Costs and availability
 - Feed trained production
 - Role of recreation fishing

Centrarchids (Morris)

- Largemouth Bass
 - Food Fish
 - Individuals hit $\frac{3}{4}$ lb then stop growing in RAS Can research regarding feed formulation and genetics of these animals assist?
 - Market seems strong, but do we really know what the market is like?
 - Can a market analysis give an increased understanding of LMB food fish economics?
 - Fingerlings
 - Improve growth and survival from egg to fingerling
 - Can research regarding feed formulation and genetics of these animals assist?
 - Need information on culturing fry indoors without need for outside ponds
 - Size variations
 - Strategies for producing larger fish in first year
- Bluegills
 - Limited genetic diversity
 - Need for commercialization of genetic improved fish to support the industry
 - Strategies for producing larger fish in first year
- Hybrid bluegills
 - Genetic research
- Crappies
 - Feed training methods
- Extension assistance with new and established farmers
 - A stronger extension presence will assist new farmers as well as facilitate the dialogue between farmers and researchers
 - Difficult to accomplish because of NCRAC spending requirements (no soft money)

Salmonids (Jescovitch)

- Fish health and disease management
- Predation
- Public perception
- Equipment and cost
- Information distribution
- Commercial field trials
- Marketing research
- Funding opportunities
- Social license to operate and regulations
- Transportation costs in delivery
- Imports of cheaper fish
- Need for communication
- Feeds in RAS
- Economic evaluation of fish species in RAS and aquaponics
- New methods of extension communications
- Food safety

Tilapia, Shrimp and Other (Quagraine)

1. Tilapia

- Industry is segmented (many species)
- Market sharing
- Regulations
- Cost of doing business is high and margins are low
 - approach to increasing profit- reduce production cost
 - approach to increasing profit- finding more profitable markets (boutique markets) and or value-added produces
- Competition
 - imports
- Feed
- Processing for niche food fish markets
- Location
 - Growing season vary by geographic area, species, and water

2. Baitfish

- Problem- climate change, high winter kills, very short growing season and regulations
- Solution need- need the technology and BMP to transition production indoor
- Off season spawning (ask Minnesota baitfish growers what their species of interest are for research)
- Feed formulation (note- Paul Brown mentioned that feed research is not the type of research that will push the industry forward right now. Feed manufacture need volume to make products. This is research that would more impactful once the industry has grown.
- Transitioning from outdoors to indoors
- Industry is interesting in exploring the potential of baitfish in aquaponics
- Ask Minnesota baitfish growers what their species of interest are for research.
- Small capacity (need cooperatives)

3. Tilapia (RAS facilities)

- Transfer of oxygen
- Filtration & biofiltration (RAS)
- Faster growth
- Equipment evaluation
- Education for new farmers (e.g. Ohio State Aquaculture Bootcamp)
- Evaluation of alternative energy sources (efficiency and cost)
- Farmers would like technical support in the form of a specialist or extension who can help with equipment and systems related support.

4. Freshwater prawn

- Address indoor production & cannibalism
- Density
- Product shelf life

5. Marine Shrimp

- Salt water Discharge
- Solids removal & water quality
 - Outreach pub- solids & water management guide (BMP)
- Aquaponics- Identify plants that would be a good fit
- Sludge- What do you do with it?
- Nutrition retention/digestability
- Challenges with zero exchange
 - Solids management
 - Molt (vectors for disease)
 - Outreach pub that address the benefits and importance of removing molts from culture system
 - Water quality
- Market challenges (farmers going out of business because they are not able to sell product)
- Post larval (PL) availability is a bottleneck
 - Research- Reproduction in a controlled environment (industry needs regional pl supply)
Outreach product- BMP for raising shrimp in a controlled environment
- How to ship live shrimp?
 - Potential market is the live market but shrimp do not transport well.
 - Problem- thin exoskeletons make transporting difficult
- How can shrimp farmers reduce production cost?

6. Ornamental

- Problem- Increasing transportation cost are hurting farmers financially.
 - Question- Packaging rates (increase density per box)?
 - Drugs/tranquilizers/other options
 - Note- limiting factor is ammonia
- Issue/Question- How can farmers improve hatchery efficiency?
 - Problem- gold fish and koi eggs have adhesive matrix
 - Question- Can the adhesive matrix be dissolved/broken down so that farmers can increase eggs per batch using technology like MacDonald jars.
 - Note- If farmers can hatch more eggs per batch they would be able to increase production number and decrease production cost. (Impact- improve profit margin)
- Feed efficiency

7. Economics/Marketing

- Processing salmonids versus other species
- Consumer Education- aquaculture produces, benefits of farm raised fish, health benefits, preparation
- Classification of Markets/Economics of segments/demographics
- Education for Seafood Preparation
- Access to Capitol
- Labeling and nutrition
 - Research- Evaluate aquaculture produces
 - Nutritional values
 - Contaminates (absent or present)

8. Opportunity (How can we advance aquaculture?)

- Consumer education
- Problem- How to we become more competitive (comments focused on import market)
 - Labor force/youth development
 - Processor/Processing
 - Entrepreneurship training
 - Alternative feed/nutrition
 - Cooperatives
 - Bootcamps/skill sharing/education for new farmers
 - Communicating success stories
 - Contracting

Systems Discussion

Ponds (Smith)

- Overwinter conditions
- Effect of warmer winter temperatures
- Prevention of winter fungus
- Effects of latitude on walleye
- Split pond applications
- Aquatic plant management
- Need to address limited regional growing season
- Tadpole production as 2nd product
- Goldfish culture
- Breakup of egg masses for McDonald Production

Flow through and Semi Recirculation (Kinnunen)

1. Flow-through Research
 - a. Needs
 - i. Quarry aquaculture/floating raceways
 - ii. Biofilm reduction (literature search)
 - iii. Economics
 - iv. Social license to operate
 - v. Open water net pens
 - vi. Investigate past failures
 - vii. Create blueprint of a successful system
 - viii. Improve waste water effluents with development of N & P standards
2. Semi-recirculating systems
 - a. Needs
 - i. Proof of concept
 - ii. Microbial loading and disease management

RAS and Aquaponics (Primus)

- Feeds in RAS
- Economic evaluation of species in RAS and aquaponics
- Best methods to disperse information
- Microbes research in RAS and aquaponics
- Food safety
- Energy costs
- Feeds effect on systems

1.

Themes Developed During the Recap Sessions (Jacovitch)

1. Social license to operate
2. Discharge issues
3. Proof of Concepts
 - a. Species
 - b. Systems
 - i. Efficiency
 - c. Practical fish health applications
 - d. Economics
 - e. Water quality
 - i. Effluents, off-flavor, microbes
 - f. Feeds/nutrition
 - g. Practical fish health applications
4. Extension
 - a. Information flow between research and industry
 - b. Inventory of producers and researchers
5. Systems
 - a. Semi to RAS
6. Processing issues and constant supply of eggs through food size
7. Education
 - a. Industry stories
 - b. Workforce development
 - c. Consumers