NCRAC Priorities from 2000 White Papers

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Baitfish

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Not in rank order)

CULTURE TECHNIQUES FOR GOLDEN SHINER PRODUCTION IN THE NCR

- Develop early season fry production to extend growing season
- Examine combined pond and indoor culture system to get golden shiners to market sooner and during peak shortages
- Reduce the slow, continuous mortality of golden shiners in recirculation systems.
- Conduct genetic selection program to improve growth and hardiness

CULTURE POTENTIAL AND SPECIFIC CULTURE TECHNIQUES FOR HIGH VALUE BAITFISH SPECIES

- Hornyhead chubs
- Develop cost-effective fry production techniques
- Examine use of methyl testosterone for creating all male populations
- Creek chubs
- Finescale dace
- Central mudminnows
- Tadpole madtoms
- Spotfin shiners
- Examine egg transfer production technology
- Examine use of hybrids for baitfish production
- Examine the aquaculture advantages offered by the clonal reproductive strategy of the finescale dace × northern redbelly dace hybrid
- Develop sterile baitfish to reduce environmental concerns of introducing baitfish to new
- locations

POND CULTURE TECHNIQUES

- Vegetation control
- Feeds and feeding strategies for baitfish
- Fertilization techniques
- Control bird depredation
- Restricting over-reproduction of baitfish in ponds
- Maximizing pond production of baitfish
- Provide non-spawning fathead minnows during times when they spawn in the wild

EXTENSION

- Provide existing information to baitfish wholesalers and retailers regarding proper handling, transportation, and holding techniques to reduce baitfish mortality
- Temperature acclimation
- Use of salt
- Proper water quality (ammonia, nitrite, pH, dissolved oxygen, etc.)
- Parasites and disease treatments
- Reducing stress
- Teach marketing and business management skills to baitfish producers, wholesalers, and retailers
- Teach bait harvesters how not to spread exotic species with baitfish and how to certify their baitfish as "exotics free"
- Facilitate forum or workshop to bring baitfish producers together to solve business management and marketing problems

BUSINESS MANAGEMENT

- Examine production costs and profitability for increased golden shiner aquaculture options in the NCR
- Examine broader NCR market potential for high value baitfish that are currently only
- available in limited geographic areas
- Examine production costs and profitability for new aquaculture opportunities with the high value species listed above
- Determine if brand-name baitfish command a higher price and increase market area

REGULATIONS

- Encourage development of more uniform state regulations across the NCR
- Conduct a forum to discuss baitfish and aquaculture regulations across the NCR
- Work with INAD/NADA coordinator to register drugs and hormones for use on baitfish

ENVIRONMENTAL ASSESSMENT

- Examine the tiling and draining of natural lakes and ponds to assess the impacts to aquaculture production and to assess environmental impacts to these unique ecosystems
- Examine the environmental impacts of increased baitfish aquaculture in the NCR
- Examine impacts of the spread of any cultured baitfish not currently widely marketed
- Assess environmental implication of any changes in the genetic makeup of baitfish

Effluence

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Not in rank order)

NUTRITION

- Develop low-polluting diets requiring little fish meal and producing stable fecal pellets for non-traditional species.
- Develop predictive models of nutrient retention by the fish and excretion of solids and dissolved wastes for these diets (Cho et al. 1991; Nijhof 1992; Westers 1995).

TECHNOLOGY

- Test the performance of partial (semi) recirculation systems by evaluating critical water quality parameters, especially ammonia, under different production and water use intensities (Summerfelt 1998; Westers 1999).
- Evaluate commercial scale recirculation aquaculture systems: rearing water quality parameters, production capabilities, water demand, waste management, and economics.
- Evaluate appropriately scaled management strategies and technologies for recovery of nutrients and solids concentrated from partial and full recirculating aquaculture systems.

EXTENSION

- Keep abreast of the technological developments in aquaculture in the U.S. and Europe.
- Conduct workshops on best management practices for environmental management and effluent control.

Largemouth Bass

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Prioritized)

A number of issues that limit the production of largemouth bass in the NCR have been identified.

Clearly, determining an appropriate prepared diet and feeding regime is the most important issue.

Priorities number 2 and 3 are of equal importance, but priorities 4 and 5 are not ranked.

RESEARCH

1. Develop appropriate feeds and feeding regimes
2. Determine and demonstrate realistic production densities
3. Improve the percentage of trained bass that stay on the prepared diet

LARGEMOUTH BASS WHITE PAPER (MARCH 29, 2000) PAGE 9

4. Develop the frozen and iced food fish market for largemouth bass
5. Enhance better disease control including more approved drugs

Outreach

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Prioritized)

As indicated in other NCRAC white papers, prioritizations are largely subjective and it is unlikely that any ordering would reach consensus among either aquaculture producers or extension specialists. The ordering of the list is likely affected by our personal biases but with input from outside reviewers of this document. The list should, therefore, only be viewed as a guide. The highest priority issues are numbers 1 and 2, both equally weighted.

EXTENSION

1. Lack of State Aquaculture Extension personnel.
2. Lack of Sustained Educational Programs for Prospective and Practicing Aquaculturists.

Salmonids

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Not in rank order)

ENVIRONMENTAL STRATEGIES

- Characterize the water quality of aquaculture discharges based on diet composition and feed utilization especially as it relates to recirculating systems and other new system designs.
- Develop methods for improving water quality discharges through improved system design. Such design might include removal of solids by technologies like side streaming waste out of double drain systems.
- Develop diets and feeding strategies that result in less nutrients being introduced into the environment without jeopardizing fish performance.
- Evaluate current environmental regulations for their appropriateness. Determine if aquaculture is treated similarly to other water users.
- Develop/improve predator control techniques.

GENETICS

- Identify or develop salmonid strains that are better suited for the different temperatures and production systems in the NCR.

SALMONID WHITE PAPER (MARCH 29, 2000) PAGE 16

- Develop new strains with advanced growth characteristics similar to what has happened in other agriculture meat producing segments.

ECONOMICS AND MARKETING

- Develop and extend the best marketing strategies.
- Improve trout markets to family style and white table cloth restaurants.
- Develop and improve value added products such as smoked fish.
- Improve strategies to deal with market price suppression by Idaho trout.
- Improve technical expertise for raising salmonids.
- Feeds made with regional ingredients and produced locally to hold the costs down.
- Better access to lower cost feeds.
- Better access to lower cost fingerlings.
- Better access to investment capital.
- Increase regional processing/marketing capabilities.
- Develop aquaculture programs within land grant universities which focus on developing skilled

personnel who are employable in the private sector.

PRODUCTION FACILITIES

- Enhanced facility design and water management.
- Utilize GIS to document potential regional availability of water resources.
- Develop manuals on high density production under low flow conditions.
- Land grant universities should contribute more research on various types of aquaculture
- production facilities.

TRANSPORTATION METHODS

- Improve delivery methods for live salmonids which maintain water quality, reduce stress, and are economical to operate.

RISK ASSESSMENT

- Sound risk assessment and management of diseases and aquatic nuisance species introductions.

FISH DISEASES

- Development of approved therapeutants.
- Access to official fish health inspections.
- Develop sound cost effective industry driven disease management strategies.
- Better access to qualified aquaculture veterinary services.
- Develop uniform import regulations for salmonids among states.

Sunfish

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Not in rank order)

BROOD STOCK MANAGEMENT AND FRY PROPAGATION

- Gain Food and Drug Administration approval for using more therapeutics.
- Develop complete diets for the fry stage of sunfish to eliminate or reduce the need for brine shrimp.
- Continue to test alternative strategies, e.g., polyploidy.
- Need for "pure" stocks of brood fish.

FINGERLING PRODUCTION AND GROW OUT

- Evaluate pond and tank production.
- Evaluate and document growth performance differences between monosex and mixed-sex populations.
- Develop least-cost diets and evaluate dietary growth enhancers.
- Test various pond management strategies.
- Improve recirculation system technologies.
- Investigate further the role of compensatory growth, feeding frequencies, and size variation on production.

ECONOMICS

- Document production costs and feasibility of out-of-season spawning.
- Document production costs of fingerlings raised using different methods.
- Document production costs of grow out.

EXTENSION

- Conduct conferences targeting specific topics.
- Increase emphasis on pond fingerling and grow out.
- Extension fact sheet on parasite management.

Tilapia

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Prioritized)

A number of issues concerning tilapia production in the NCR have been identified and described in the present document. Prioritizing such a list is not only difficult, but could be counter-productive. Prioritizations are largely subjective and it is unlikely that any ordering would reach consensus among tilapia producers. However, most producers would probably agree that expanding the live market beyond the few cities now being targeted is essential if tilapia producers are to survive economically. The issue of quality control, specifically that related to off-flavor problems, is another high priority area. The remaining areas of concern could just as well be listed in a random order. I have placed them in an order that I believe is reasonable based on the input I have received, but the ordering of the list is likely affected by my biases. The list should therefore only be viewed as a guide.

1. Expand Live Market
2. Quality Control
3. Identify Niche Markets
4. Cost Reduction in RASs Technology
5. Disease Control
6. Reproductive Control
7. Feeds and Nutrition
8. Genetic Improvement
9. Business Plans and Loan Packaging
10. Enter Fillet Market
11. Cooperatives
12. Promotion

Walleye

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Not in rank order)

MARKETING

- Fingerling Walleyes for Stocking
- Develop lists of angler groups, sportsman's clubs, lake associations, and government agencies (city, county, and state) that purchase or potentially purchase walleye for stocking.
- Develop marketing information on preferred sizes, numbers, prices, and seasonal demand of walleye sold for stocking.
- Summarize regulations regarding interstate transfer of walleye and other fish used for stocking, and determine whether regulatory agencies (i.e., state fish and game agencies) will
- permit use of sterile walleye and hybrid walleye for stocking.
- Food-Size Walleye

WALLEYE WHITE PAPER (MARCH 29, 2000) PAGE 20

- Do no further market studies for food-size walleye at this time. Riepe's (1998) report and the current marketing study provide sufficient marketing information for food-size walleye at this time.

BIOLOGY AND CULTURAL TECHNOLOGY

- Develop a research program for production and harvest strategies for raising walleye fingerlings in undrainable ponds.
- Inventory heated water resources (heated water effluents from steam-electric generating plants and alcohol production facilities) in the North Central Region.
- Prepare a white paper on the potentials and problems of heated water aquaculture for the
- North Central Region.

NUTRITION

- Evaluate krill hydrolysate (KH) coated feed for habituating pond-reared walleye to formulated feed.
- Evaluate commercial diets using walleye grower (WG 9206) as reference diet for juvenile walleye.

GENETIC IMPROVEMENT

- Research is needed to develop domesticated strains of walleye that have faster growth rates and that are better adapted for aquaculture. Commercial sources of genetically selected walleye are needed to shorten the culture interval between egg and market size fish.

- Research is needed on methods to cryopreserve walleye sauger semen to produce interspecific hybrids and to evaluate geographically and genetically distinct stocks of walleye.

TRIPLOID WALLEYE

- Research is needed on the methods for production and evaluation of the growth and sterility of triploid walleye and hybrid walleye.

DISEASE IDENTIFICATION AND CONTROL

- NCRAC should sponsor a white paper on "Infectious diseases of walleye, their prevention and treatment," including EPA and FDA regulations on use of chemotherapeutants.

REGULATORY CONSTRAINTS

- Sponsor a white paper on regulatory constraints that affect production, transport, and marketing of walleye.

EXTENSION

- Develop extension literature on disease diagnosis and treatment of walleye and hybrid walleye including up to date information on regulatory status of chemotherapeutants.
- Develop fact sheet from previously funded NCRAC research on procedures to habituate fingerlings to formulated feed in ponds.
- Conduct workshops on pond and intensive culture of fingerling walleye and intensive culture of food-size walleye.

Yellow Perch

SUMMARY OF RESEARCH AND EXTENSION PRIORITIES

(Prioritized)

It is difficult to rank research and extension priorities, and there is always the potential for subjective bias. The following prioritized list was presented at the 2000 NCRAC Annual Program Planning Meeting (February 25-27, 2000, Kansas City, Missouri), and I believe that a general consensus existed with regards to this list among the commercial producers, researchers, and extension personnel in attendance.

The most important research and extension needs for the development of yellow perch aquaculture are ranked numerically into categories in order of priority (categories having the same numerical ranking are equivalent). In addition, within each category specific research topics are ranked alphabetically (topics having the same alphabetical ranking are equivalent).

RESEARCH

1. Document the production parameters and costs of raising perch to market size in recirculation systems and ponds.

A. Complete the ongoing NCRAC-funded study for recirculation systems including several producers.

A. Conduct a study documenting the production parameters and costs of raising perch to market size in ponds.

B. Evaluate different geographic regions for raising perch to market size in ponds.

2. Develop methods for improving growth rates and fillet yields of yellow perch in ponds and recirculation systems.

A. Compare the growth and fillet yields of monosex female and mixed sex populations of yellow perch in pond and recirculation systems.

A. Continue efforts aimed at gaining approval for using MT (to produce monosex females) and therapeutics in yellow perch.

B. Compare the growth and fillet yields of diploid and triploid yellow perch in ponds.

C. Use traditional genetic selection between and within families (not

simply mass selection) to develop fast growing strains of yellow perch, recognizing that useful results will take a sustained effort of at least 10 years.

B. Test alternative strategies (feeding strategies, hybridization, transgenics, etc.) to improve growth in yellow perch.

3. Improve recirculation and pond systems for raising perch to market size.

A. Develop least-cost diets and evaluate dietary growth enhancers.

A. Develop improved filters for recirculation systems that remove ammonia, nitrite and solids, and develop diets that reduce fine particulates.

A. Test and improve on pond management strategies.

2. Improve fingerling production methods.

A. For pond and pond/tank culture: Develop methods to increase average fish size and total productivity of ponds, decrease variation in fish size, and improve habituation of pond-reared fish to tanks. Also, develop starter diets having increased palatability.

A. Tank culture: Develop larval feeds and methods to increase swim bladder inflation.

A. For all methods, continue to develop methods for inducing out of season spawning.

B. Document the costs of raising fingerlings using different methods.

4. Develop methods for reducing processing costs.

EXTENSION

1. Complete the yellow perch manual.

2. Develop an historical record of successes and failures of commercial producers.

2. Conduct conferences targeting specific topics.

2. Increase emphasis on pond fingerling and grow out.

2. Educate consumers regarding illegal marketing practices.