

Aquaculture

North America

Fish Farming in the United States, Canada & Mexico

FUTURE AQUACULTURE CELEBRITIES

Wolfeel and rockfish “tick all the boxes” for aquaculture

BY MATT JONES

Shannon Balfry, Director of the Aquatic Animal Breeding program at the Vancouver Aquarium Marine Science Center (VAMSC), says her research with the native Pacific wolfeel and rockfish is starting to see encouraging results but more research is needed.

Balfry's work, which expands on previous efforts in this field at the VAMSC, is funded through a number of Aquaculture Collaborative Research and Development Program (ACRDP) grants from the Department of Fisheries and Oceans. “We've done nutritional diets, we've done growth performance diets, temperature and salinity tolerance experiments,” says Balfry. “Quite a lot of research has been done over the years.”

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Jenna Radloff, Aquatic Animal Breeding program technician at the Vancouver Aquarium Marine Science Center, handles a friendly wolfeel broodfish.

Photo provided by the Vancouver Aquarium

SHELLFISH TOURISM

Maine Oyster Trail showcases industry

Restaurants, growers, retailers pull in the public

BY MURIEL L. HENDRIX

The Maine Oyster Trail, which originated in an informal blog by Catherine Schmitt, Communications Director of Maine Sea Grant, will formally open this summer with over 40 restaurants pinpointed as purveyors of Maine-grown oysters, shellfish retailers, and two opportunities for tours of oyster farms. More tours are expected to be added during the summer.

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Maine “Oyster Lady” Abigail Carroll demonstrates how she grows oysters at Nonesuch Oysters in Scarborough, and tells Maine Oyster trail participants the story of how she became an oyster farmer.

Photo courtesy of the Maine Aquaculture Association

RESEARCH

Eugenol based sedative tested for tilapia and yellow perch

Reducing fish transport costs

Research at the University of Wisconsin-Stevens Point, building on industry knowledge of eugenol-based sedatives for fish, suggests higher than standard densities can be achieved during transport using AQUI-S®20E, which could be a cost saving for the industry.

One significant operational expense in the aquaculture industry is fish transport costs, especially as fuel prices continue to rise. Not only is fuel an expense during transport but also labor, oxygen, vehicle maintenance, and fish mortality during and post-transport. Increasing fish loading density above the industry standard during transport would definitely increase farmer profit, enabling more fish per gallon of fuel and decrease transport trips. However, high densities can further decrease oxygen levels and cause ammonia levels to spike, resulting in higher fish stress and

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University of Wisconsin-Stevens Point graduate student, Aaron Cupp, adding Eugenol sedative to a simulation transport tank to determine the effect on yellow perch.

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COVER

Eugenol based sedative tested for tilapia and yellow perch

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aggression. This can lead to great mortalities.

To lessen physiological imbalance, aggression, and other stressors experienced at high loading densities during transport, the effects of various additives, including sedatives, need to be explored to reduce fish mortality under these conditions. Although MS-222 is the only FDA-approved sedative in the United States, a eugenol based sedative AQUI-S®20E (10% eugenol, Lower Hutt, New Zealand) has received attention in aquaculture due to the potential for decreased withdrawal time. AQUI-S®20E is a product being evaluated by the US Food and Drug Administration, Center for Veterinary Medicine as an immediate release finfish sedative. Because AQUI-S®20E is a relatively new sedative to reach the market, data are needed to assess its effectiveness for animal welfare.

In cooperation with the US Geological Survey, Upper Midwest Environmental Sciences Center, University of Wisconsin-



Yellow perch fingerlings were used in observing Eugenol effects during and post simulated transport at the University of Wisconsin-Stevens Point.

had high mean survival (>90%) following a 10 h simulated transport at a loading density of 480 g L⁻¹ (two times the industry standard). Tilapia recovered rapidly following exposure to AQUI-S®20E at all loading densities. While rapid recovery time is desired following sedation, the duration of reduced behavior was less than what was observed for yellow

The effectiveness of sedation ... (is) impacted by fish species, fish size, temperature, loading density and duration.

Stevens Point graduate student Aaron Cupp, conducted a research study with the hypothesis that with the addition of AQUI-S®20E, increased loading densities could be achieved without increasing mortality. The study included both yellow perch *Perca flavescens* and Nile tilapia *Oreochromis niloticus* fingerlings as model species to examine behavior, recovery from sedation, ammonia accumulation, eugenol uptake from water, survival and metabolic rates when exposed to AQUI-S®20E through a simulated transport. The fish were exposed to 0 to 300 mg L⁻¹ AQUI-S®20E at loading densities up to three times the current industry standard during simulated transport and static respirometry.

In yellow perch, higher concentrations of AQUI-S®20E resulted in only light sedation but >95% mean survival 7-day post-transport, and decreased metabolic rates at loading densities up to 360 g L⁻¹ in 17°C water. The light sedation observed suggests a decrease in physiological stress and lower behavioral activity with low physical injury from aggression or in contact with tank walls. The yellow perch showed to be a good example in demonstrating how greater densities can be achieved by lowering fish stress, which can have a large impact in increasing survival rates.

In contrast, tilapia held at 22°C showed minimal changes in metabolic rate and sedation when exposed to higher concentrations of AQUI-S®20E, but

perch. This suggests that sedation of Nile tilapia with AQUI-S®20E may benefit fish haulers primarily during initial loading and transport.

When using AQUI-S®20E to sedate fish during transport, it is important to consider how species and loading density will impact sedation. This study suggests that loading density appears to have a negative effect on the level of sedation reached. Additionally, individual species appear to respond differently to sedation. Overall, the study has indicated that AQUI-S®20E sedation during fish transport has the potential to allow fish haulers to transport at increased loading densities. The effectiveness of sedation and fish transport are impacted by fish species, fish size, temperature, loading density and duration. To more closely match the numerous biotic and abiotic situations for hauling live fish, it will be important to assess each of these variables and provide additional data to fish haulers. Particularly, fish life stage and temperature are potentially important given the diverse conditions under which fish are transported (i.e. biotic and abiotic factors that are beyond the control of the fish hauler).

To access the complete publication of this research, see: [aquaculture.uwsp.edu/Current Projects/Effects of Eugenol Sedation](http://aquaculture.uwsp.edu/Current%20Projects/Effects%20of%20Eugenol%20Sedation).

Written by Emma Wiermaa from the thesis and research by Aaron Cupp.

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