Summer 2009

The Lobster Bulletin, Summer 2009

Lobster Institute, University of Maine

the Lobster Bulletin

Summer 2009

"News, research updates, and information on lobsters and the lobster industry."

Published by the Lobster Institute

"Protecting and conserving the lobster resource, and enhancing lobstering as an industry…and a way of life."

Development of Best Management Practices to Reduce or Eliminate Stress on Lobsters

As the result of a study entitled, **Tools and techniques to recognize lobster stressors throughout the supply chain and the development of best management practices to reduce or eliminate stress on lobsters**, a preliminary series of "best management practices" for handling lobsters to reduce stress from hauling and handling has been developed. (See page 2)

This project was funded by a grant from the State of Maine's Lobster Research, Education and Development grant (license plate funds), and carried out by the Lobster Institute and The University of Maine's Maine Aquatic Animal Health Lab (MAAHL) (D. Bouchard & D. Basti) and the School of Marine Sciences (I. Bricknell).

The study used a repeated measures design to compare the physiological changes that occur in lobsters over time as the result of differences in hauling depth, hauling rate and storage methodology. An abbreviated "stress" panel was developed based upon research with "healthy" resting state adult lobsters held at ambient Maine coastal water conditions. The panel was used to quantify changes in immune status, hemolymph biochemistry, stress hormone levels and bacteriology. This information helped in the identification of points of vulnerability in the movement of lobsters from the seabed to the consumer. For more results of the study, please see the "Research Report" section of this *Bulletin* on page 3. ⌘

Lobster holding tanks at MAAHL.

Mariner Beverages, USA Wine West Unveil New Wine to Benefit the Lobster Institute

The Lobster Institute, USA Wine West, and Mariner Beverages introduced Big Claw – a new wine specifically designed to pair with lobster – at a "first pour" event on July 13 at DiMillo's Floating Restaurant in Portland, Maine.

It was announced at the event that a portion of the proceeds from sales of Big Claw would be donated to the Lobster Institute to further their research and outreach work for and with the lobster industry.

Big Claw is a crisp, balanced blend of Chardonnay, Sauvignon Blanc, Colombard, and Chenin Blanc from the North Coast, and was the unanimous choice as "the perfect wine to go with lobster" by members of a panel of wine and food professionals that guided the design of Big Claw. Steve Melchiskey of USA Wine West (with offices in California and Maine) and Tim Wisseman of Mariner Beverages (Portland, Maine) are the designers of the wine, and offered the first pour to Steve DiMillo, host of the event and owner of DiMillo's Floating Restaurant, and Dr. Bob Bayer, Executive Director of the Lobster Institute.

– **cont. on page 4**

The Lobster Bulletin
published by the

LOBSTER INSTITUTE

5763 Rogers Hall, Room #210
The University of Maine, Orono, ME 04469-5763
Phone: 207-581-2751 Fax: 207-581-2744
www.lobsterinstitute.org

A unit of the Maine Agricultural & Forest Experiment Station
THE UNIVERSITY OF MAINE
A member of the University of Maine System
Cathy Billings, Editor cathy.billings@umit.maine.edu

Made possible through an endowed gift by Helene & Frank Crohn.

Dan Zawaki of Lobster Gram receiving the Lobster Institute's Rising Star Award.

Lobster Institute Presents First Rising Star Award to Lobster Gram, Inc.

The Lobster Institute created its Rising Star Award *for "Best New Industry Partner – Fundraising and Environmental Initiatives",* to recognize a first-time volunteer from the lobster industry business that worked together with the Institute to raise awareness and the necessary funds for the Lobster Institute to continue its mission to "conduct and provide for research and educational outreach focused on protecting, conserving, and enhancing the lobster resource and lobstering as an industry…and as a way of life."

Lobster Gram, Inc. Founder and Chairman Dan Zawacki received the Institute's first Rising Star Award

(cont. on page 4)

Best Management Practices to Reduce or Eliminate Stress from Hauling & Handling of Lobsters

Although a reduction in fishing depth and hauling rate is not economically feasible, other handling practices and strategies are possible. Here is a preliminary list of "best management practices" resulting from the study entitled, **Tools and techniques to recognize lobster stressors throughout the supply chain and the development of best management practices to reduce or eliminate stress on lobsters (**referred to in the article on page 1 and the Research Report on page 3):

1. Fisherman should provide their lobsters with a "rest" period in re-circulating ambient temperature seawater below deck to allow for partial recovery from the effects of depth, high speed hauling and rapid decompression. Lobsters subjectively judged as "weak" or "fair" in vigor could be temporarily exhausted from vigorous escape activity during hauling, but may recover if kept below deck in re-circulating water.
2. Care should be taken during handling to avoid injury and overexertion from repeated "tail flipping." Lobsters should be packed within totes in sufficient density to minimize aggressive behavior and shifting. If lobsters are stored above deck in totes, they should be placed parallel to each other in the same direction with the tails curled under to protect the vulnerable ventral abdomen from punctures, and packed in sufficient density to minimize shifting. This should also apply to transport on land ("Cappy" Sargent personal communication).
3. For lobsters destined for pound or captivity for holding, research conducted by the MAAHL and underwater video surveillance may reveal that the infrequent feeding of large amounts of fish byproducts and other sources of protein at random locations within the pound may cause frenzied feeding activity resulting in mortality. A better alternative may be to develop a probiotic feed supplement in the form of a nutrient dense pellet that could be broadcast fed to satiety at more frequent intervals, thus reducing lobster aggregation and possibly aggression. Currently The University of Maine has obtained research dollars for a pilot study to produce a probiotic feed supplement that could possibly provide a source of nutrition to aid in feed conversion, nutrient assimilation and exoskeletal calcification, and may increase the survivability of lobsters during cold weather impoundment and long distance transport. An additional benefit may be the upregulation of the lobster immune system (Verschuere et al 2000).
4. During land-based storage, workers should maintain high quality water conditions, good circulation and temperatures at 10˚ C or below, which may be outside the thermal preference of *P. indicum.*
5. Ongoing research at the MAAHL indicates that appropriately timed antibiotic therapy can be efficacious in reducing post-capture mortality in lobsters that are susceptible to secondary bacterial infection caused by *P. indicum.* It may therefore become necessary to employ judicious preemptive antibiotic therapy to reduce post-capture "shrinkage" in lobsters during impoundment or land based storage systems. Currently, work is in progress with Intervet Schering-Plough Animal Health for obtaining and investigational new animal drug (INAD) for application of Aquaflor (florfenical antibiotic) in lobster feed. ⌘

Check out the Lobster Institute website at www.lobsterinstitute.org, providing the definitive site for lobster information …… with nearly 200 links.

the Lobster Bulletin

Research Report

Readers may contact the Lobster Institute for more detailed information on any of these projects.

- **Tools and techniques to recognize lobster stressors throughout the supply chain and the development of best management practices to reduce or eliminate stress on lobsters (cont. from page 1)** – Lobsters undergo "stress: as part of the capture process. This is a "normal" response, but it varies in severity. The physiological effects of depth of capture, hauling rate and storage methodology can be measured in the laboratory and can be compared to "resting state" control animals. The measured changes may be the result of hypoxia (low tissue oxygen levels), over-exertion, rapid decompression, sub-patent infection (non-detectable), or a combination of these factors. Our experiment determined that these changes are significant over time for total hemocyte counts, crustacean hyperglycemic hormone (stress hormone) L-lactate, ammonia and glucose. However, these changes may be temporary in effect and reversible in most cases if lobsters are allowed to recover to pre-stress levels in ambient temperature seawater. Current research suggests that recovery time varies from 24 hours for L-lactate to 96 hours for most other analytes. Work at the MAAHL indicates that a return to a physiological "resting state" may take up to 3 weeks. However, with all of the parameters that this experiment measured, there does not appear to be a single factor or measured analyte that will predict post-capture mortality. However, hemolymph glucose levels in survivors are significantly more likely to return to pre-stress levels in lobsters taken from shallow water and held temporarily in re-circulating seawater. The magnitude of change in glucose levels may distinguish capture related stress from other forms of stress such as bacterial septicemia and requires further research. There are also trends in higher levels of L-lactate and ammonia in non-survivors originating in deep water and hauled to the surface at the commercial rate, suggesting that an increase in depth, hauling speed, or air transport are risk factors for post-capture mortality. Compounding these factors, a gram-negative bacterium, *Photobacterium indicum* was identified in pure culture from hemolymph samples of all weak lobsters tested during re-acclimation. Histopathology of weak lobsters revealed gram-negative bacteria throughout most tissues with evidence of ante mortem edema and necrosis suggestive of septicemia. There is evidence that concomitant infection with *P. indicum* may initiate a fatal systemic inflammatory response in lobsters experiencing higher levels of the stress hormone (CHH) and ammonia, and lower total hemocyte counts. This may occur secondary to immuno-suppression, intestinal mucosal injury or through the release of virulence factors. The ecological role or full impact of *P. indicum* is unknown at this time; however it appears likely to be an emerging opportunistic pathogen of severely stressed lobsters. A full manuscript of all research performed is being prepared for submission to the journal "Diseases of Aquatic Organisms", entitled:

Factors affecting the post-capture survivability of the lobster *Homarus americanus*

David Basti, Ian Bricknell, Ken Hoyt, E.S. Chang, William Halteman, & Deborah Bouchard

- **Possible Impacts on Crustaceans from Construction of Wind Farms in the Marine Environment** – The Lobster Institute has compiled a review of literature dealing with potential effects on lobsters and other crustaceans from the construction of wind farms. A summary and bibliography are on the Lobster Institute's Web site at www.lobsterinstitute.org/index.php?page=87. Key topics covered are electromagnetic emissions from power cables, habitat disturbance due to cable installation, heat radiating from power cables, and noise.

  The COWRIE 1.5 Electromagnetic Fields Review – Final Report (Gill 2005) contains an extensive compilation of available references and literature review on the topics of electric and magnetic fields as they relate to marine organisms in general, and specifically in the context of offshore wind farms. In addition, the Lobster Institute has compiled a reference list of 100 scientific articles dealing with the possible environmental impacts of offshore wind farms on marine animals and habitat. This bibliography was drawn from a search of the "Aquatic Sciences and Fisheries Abstracts" and the "Oceanic Abstracts", as well as a general Internet search using the following key words: **el**ectromagnetic, lobster, magnetic fields, wind turbines, wind farms. ⌘

Lobster Institute

210 Rogers Hall
The University of Maine
Orono, ME 04469

LOBSTER INSTITUTE
***Lobster Bulletin*, Summer 2009**

Big Claw Wine Sales to Benefit Lobster Institute

(cont. from page 1)

""Big Claw has a very refreshing taste, and is a terrific compliment to lobster," said Bayer. "Not only have they done a great job with the wine, their willingness to support the lobster industry is also very commendable. The Lobster Institute is very appreciative of being chosen as the beneficiary of their support."

Wisseman noted that "giving back" was a decision he and Melchiskey made early on. "Since we are capitalizing on Maine's lobster fishery we wanted to support the industry," he said. "We are doing that by giving back financially to the Lobster Institute as well as trying to increase the awareness of the Institute. We chose the Lobster Institute because of their history of working closely with lobstermen to maintain the vitality of both the resource and the fishery."

Big Claw Wine

Melchiskey's motivation for developing Big Claw came from several friends, in Portland and on Little Cranberry Island, who are commercial lobstermen. ""I've always admired the hard work they do with good spirit, and wanted to develop a wine that would match both that spirit and Maine's best known resource."

The wine is available at restaurants and retailers throughout southern and coastal Maine. To learn more and to find out where you can purchase Big Claw, call Mariner Beverages at (207) 699-2939, or visit the Lobster Institute's Web site, www.lobsterinstitute.org. ⌘

Lobster Gram

(cont. from page 2)

in recognition of Lobster Gram's innovative "Lobster Bailout-Blowout Sale". The tough economic downturn in Fall 2008 made it difficult for lobster fishermen in the North Atlantic to move their healthy supply of lobsters – during what is typically their most lucrative season. Lobster Gram, Inc. conceived the "Lobster Bailout-Blowout Sale" as a way to help these lobstermen protect their livelihoods. Zawacki explained, "Lobster Gram just wanted to do what it could to help an industry that has been instrumental in our success." As an additional motivator for customers, the sale also served as a fundraising mechanism for the Lobster Institute. For each purchase through the "Lobster Bailout-Blowout Sale", Lobster Gram contributed $1 to the Lobster Institute. Nearly $2,000 was raised. In August of this year, Lobster Gram ran a similar fundraiser by offering a "Lobster Stimulus Package." Again, a dollar was contributed to the Lobster Institute for each sale.

"We are very proud to count Lobster Gram as one of our newest industry partners," said Dr. Bob Bayer, Executive Director of the Lobster Institute. "Dan has admirable foresight when it comes to the sustainability of the lobster resource and the fishery. He completely understands the mission of the Lobster Institute and our C.O.R.E. focus: Conservation, Outreach, Research, and Education…for the future of the lobster industry." Dan "The Lobster Man" Zawacki started Lobster Gram in 1987 and it remains one of the top direct-mail retailers of lobster and gourmet foods. They ship all their live Maine lobster packages directly from their warehouse in Biddeford, Maine; and their National Customer Service Headquarters are in Chicago. You can learn more about them and their products at www.livelob.com or at 1-800-LIVELOB. ⌘