By and for the Big Island aquaculture community

Big Island Aquaculture News

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Announcements

Summer Course in Saltwater Aquaculture Hawaii Pacific University is offering a 3-credit course titled "Principles of Saltwater Aquaculture" at the Oceanic Institute on Oahu on Tuesdays and Thursdays from 4:30 to 6:10 P.M during June 4 through August 22. It will be taught by Dr. Shaun Moss and colleagues. For application and reservation assistance, contact Carlos Medina or Ann Yamashiro at HPU, 235-5209 or 236-3570, email *cmedina@hpu.edu* or *ayamashiro@hpu.edu*. For information on the course content, contact Gary Karr or Shaun Moss at OI, 259-7951, email *gkarr@ oceanicinstitute.org* or *smoss @oceanicinstitute.org*.

Video-based Online Course: Principles of Aquaculture Kentucky State University is offering this 3 credit course in the summer and fall 2007 terms, taught by Dr. Jim Tidwell. "Each class will include video lectures, combined with Power Point presentations, in short subject-specific modules ... and other tools for interaction between instructor and students ... ." The course is available at both undergraduate and graduate levels; the summer class runs from June 1 to July 27. For further information, see *www.ksuaquaculture.org/POA.htm*.

Employment / Partnership Opportunity Eden Farms Hawaii, a 37-acre tropical flower farm in Kurtistown on the Big Island of Hawaii is currently seeking employees and or strategic partners with an interest in organic aquaculture. We are in the initial stages of transitioning to organics with an emphasis on sustainable farming and permaculture, i.e.: stewardship of the planet with the goal of zero carbon footprint. Our long-term goal is to evolve into a demonstration sustainable farm school integrating humane animal husbandry and sustainable farming practices. Interested parties should have at least some knowledge of aquaculture and a passion for organic farming. Experience with birds is a plus. Compensation is commensurate with experience. Housing is potentially available. Please contact *gary@edenfarmshawaii.com*.

Information Sources

The Internet as a Resource for News and Information about Science The Pew Internet and American Life Project issued this

Readers' contributions are invited with aloha, and much appreciated, though not all can be used. They may be mailed, faxed or emailed to the editor at this address. Contributors understand that materials may be edited for space and other considerations. This newsletter is part of a cooperative project funded by the University of Hawaii Sea Grant College Program, the UH Cooperative Extension Service, and the State of Hawaii Aquaculture Development Program.

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42-page report in November 2006 (*www.pewinternet.org/pdfs/PIP_Exploratorium _Science.pdf*). It is subtitled, "The convenience of getting scientific material on the web opens doors to better attitudes and understanding of science," and is based on a telephone survey of 2000 adults aged 18 and over. The opening Summary of Findings is 6 pages long. Most "online users" (87%, ± 3%, at 95% statistical confidence level) use the internet as a research tool. This percentage of the American adult population numbers 128 million. By similar reasoning and a presumption that the sample was representative, 40 million "rely on the internet as their primary source for news and information about science." Among broadband users, about equal numbers get most of their science news from the internet or from television, with the internet proportion being somewhat higher for those under age 30. When faced with questions on specific topics, many people would turn first to the internet for information: 67% for stem cell research, 59% for climate change, and 42% for the origins of life on earth. The library was the second source in all cases. Most users (80%) check further into the accuracy or reliability of information they obtain. In a somewhat subtle analysis, the authors say that those who obtain scientific information online report that they have better understanding and more favorable attitudes toward science than internet users who don't seek scientific information, regardless of social status or education.

Updates

Melamine in Animal Feeds The FDA and USDA are investigating the latest developments, and have been issuing updating press releases. The recent issue began with the deaths of pets in the U.S. that consumed pet food contaminated with melamine, a relatively inexpensive industrial chemical of high nitrogen content (yes, that old-time dinnerware was made of a melamine-derived resin). The basic material was improperly added to wheat flour (and possibly other materials) in China to make the total analyzed N-content high enough to pass off the mix as high protein wheat gluten and rice protein concentrate. These materials went into pet foods in high enough percentage to harm the animals' kidney function. After the pet issue receded, some of the pet food made its way to manufacturers of feed for farmed animals: hogs and chickens, and now fish. The now-diluted melamine content of the farm feeds was small, the government folks have found, indetectable or nearly so in the food animals, and in their judgment, no threat to the human food supply. Melamine is apparently excreted in mammalian urine and not otherwise metabolized. The recent issue of our state ADP's AquaFlashes newsletter says that the Canadian fish food manufacturer Skretting has said that the feeds in question went only to hatcheries, that they have identified them, and are notifying them. The newsletter suggests that any Hawaii purchasers of Skretting feeds contact their suppliers.

Big Island Sturgeon on TV news Also mentioned in AquaFlashes (thanks Dean), the UH Hilo sturgeon work is featured in a video clip of a recent TV newscast item. View it at *www.thehawaiichannel.com/*

TECHNICAL NOTES

Fish Growth

Practical food fish production for sale involves keeping and feeding the fish according to their requirements for good growth, while giving attention to minimizing costs. This note discusses keeping and feeding and

requirements, but not costs. Your editor has been working with a mainland stock of blue tilapia, *Oreochromis aureus*, on a research and development project supported by the USDA Center for Tropical and Subtropical Aquaculture in Hawaii. The part of the project that has been assessing the growth of juveniles has found very slow growth. Water temperatures have been "too cold," and we are working to correct that. Meanwhile, basic principles and some recent literature have brought out some facts for attention.

There are some well-known basics, starting with the fact that even closely related species can have different responses and requirements. But all fish have an optimum temperature range for growth, outside of which the rate is diminished, and further outside are extremes that will kill the fish. For example blue tilapia, generally considered one of the more cool water tolerant of the (tropical) tilapias, were nonetheless kept at a reasonably warm 27 ^{o}C for experiments reported in two recent journal articles (higher levels are used for some other tilapias). It is no wonder then that growth rates have been slow in the 21-22 degree waters at the UHH farm lately. Studies of the relationship of growth to temperature usually show that feed intake is diminished at low temperatures; other measures can often be explained by this basic outcome. Slow growth may also be influenced by the genetic makeup of a strain or group of fish, but this is difficult to assess directly.

These UHH blue tilapia also grew slowly at warmer temperatures when sent off to Oahu for a cooperative experiment at Windward CC. This could be related to a common observation that fish whose growth has been restrained may require some time to go back to normal responses even when they are returned to better conditions. It will be interesting to see if they do better or not during a second month there. Some fish show faster than normal growth for a time, upon restoration of good conditions; this is called compensatory growth.

Recent journal articles discuss a substance that can be sampled and analyzed from fish blood that indicates their current growth rate and immediate potential: IGF, insulin-like growth factor. This material, made in the liver and sometimes other tissues, is in higher concentration in fast growing fish, is decreased when feeding or other factors restrain growth, and takes some time (different for different fishes and conditions) to recover. It is thought to be a hormonal response (starting with growth hormone in the pituitary gland) to the growth promoting or restraining conditions, and its dynamics may account for the lag in recovery of growth rate.

Another well established basic principle is that fish nearly always grow faster if their daily ration of feed is given in two or three parts each day, spaced some hours apart. This is a point at which the costs that we are not discussing here become a point for attention.

Finally, studies show that handling or other stresses reduce IGF, and so fish growth. We sometimes capture and weigh juvenile fish that we expect to grow rapidly, as often as once per week. This could have disturbed the growth of the UHH blue tilapia, but the batch on Oahu was handled only after a month and still grew slowly. Weekly weighing was done to juvenile mahimahi, which were kept at the temperature of their native ocean water, on Oahu many years ago and growth was very fast. Perhaps we can wonder if it was even faster in nature.

Reference:

Vera Cruz, E.M. et al., 2006. Insulin-like growth factor-I cDNA cloning, gene expression and potential use as a growth rate indicator in Nile tilapia, *Oreochromis niloticus*. *Aquaculture* 251:585-595.