By and for the Big Island aquaculture community

Big Island Aquaculture News

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Announcements

Workshop: *Getting Started in Aquaculture* On Saturday, January 27, Jim Szyper will present this free workshop in Hilo at Hale Aloha building on the Hawaii Community College Campus. This session is for people who are looking for information about aquaculture for the first time, as well as those who have gathered some information and would now like to learn what can be grown in Hawaii and how to get started. The major products of Hawaii will be discussed, as well as the major considerations for starting to grow products for home use or commercial purposes. The session will begin at 9:00 A.M., and finish near noon. Sign in and refreshments will be available beginning at 8:30. Enter the campus from Kawili St. across from Mehana Brewery. Contact Jim at 981-5199 or email *jszyper@hawaii.edu* for further information.

Information Sources

Atlas of Tilapia Histology This new book, available from the World Aquaculture Society (*www.was.org*, 96 p., 197 color plates, $80 or $45 to members) "provides a key reference work on normal anatomy and histology of *Oreochromis niloticus"* (Nile tilapia). This should be valuable for traditional disease diagnosis, as well as for producers and breeders who need comparisons with fish of newly developed strains or under "unusual environmental conditions."

Updates

Other States Hawaii's annual sales value of aquaculture products is approaching $30 million, which appears to be pretty good among the states for our size and population. Other states' figures have been mentioned here from time to time. In the December 2006 issue of *World Aquaculture* magazine, Granville Treece, an aquaculture specialist with Texas Sea Grant, reports a 2005 product value of $51.7 million. He points out that the industry contributes three times that much to the state economy, counting directly and closely related jobs, demand for feed and its components and restaurant sales. Hawaii's industry generates similar spin-off values. The biggest product in Texas aquaculture is channel catfish, having an annual production of 4700 tons and a sales value of $6.9 million. In

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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Hawaii, algae, mostly *Spirulina*, is the product of largest sales value, at a similar figure. The second largest production crop in Texas by weight is the Pacific white shrimp *Litopenaeus vannamei*, with over 3000 tons weight sold for over $14 million. These sales figures reflect the large difference in price per pound between catfish and shrimp. Texas also produces significant crops of ornamental fish and water garden plants, about $7 million value in the latter.

A newsletter article about a research project pointed out that in Florida (with product value a little larger than Hawaii's as noted here last year), the ornamental fish industry accounts for nearly half of all sales revenues. The research project is trying to figure out what percentage of the fishes' nutrition comes from the added feed, and how much from other organisms and materials in the pond. This has been done for some shrimps and food fishes. The answers are interesting (shrimps get a lot from the pond, fish often get at least something), but the farmer still has to learn how to feed his own crop for best production and cost management.

Indoor Production Current "news" seems to be conscious of both offshore aquaculture (the article mentioned above says a few words about Texans' interest in the Gulf of Mexico), and the contrasting strategy of confining the water and animals indoors, an old idea and practice whose prospects change as technology and economies evolve. Blue fin tuna (*Thunnus thynnus*) are cultured worldwide in floating net pen facilities, starting with wild-caught juveniles. This widespread practice has been stimulated by the large demand in Japan for this priority species for sushi and sashimi. According to a recent on line BBC News article (thanks to Taira Yoshimura for passing this on), "the Japanese eat 80% of the world's blue-fin tuna," whose "..stocks .. are declining." Because indoor culture technology has advanced, and the demand is sufficient to foster investment, a businessman in Shizoka (Japan) "..is trying to recreate the oceans that the tuna are used to." The team knows that "..blue-fin tuna have been farmed before, but not indoors." They pump very clean deep (depth not specified) water of nearly constant 21^{o}C temperature into modest sized 5 meter diameter tanks, each starting with 15 fish, in a dimly lit facility. "Curtains" of streaming air bubbles keep the fish away from tank walls. The crop will require at least 3 years' growth. The chef at a nearby sushi restaurant said, "The quality of farmed tuna is improving, .." (due to better feed) ".. but still most Japanese people believe a wild tuna tastes better than a farmed one." This echoes a familiar issue about salmon in the U.S.

Universities in the U.S. are proliferating self-contained indoor culture facilities for teaching, research, and demonstration. Many are in the cooler regions of the country, but can be found as far south as Harbor Branch in Florida. Their advantages, if energy costs can be managed, are much reduced consumption of water due to reconditioning it for re-use, and collection rather than discharge of solid waste, which can be converted to methane fuel or at least disposed purposefully. These advantages are part of the demonstration system to culture gilthead sea bream (*Sparus aurata*) at the U. of Maryland facility in Baltimore. They've got an economic analysis and an expansion plan available to potential entrepreneurs. But a knowledgeable local skeptic with knowledge of the international market and European net pen systems said that, if U.S. demand and production increases because of this effort, "..he has a three-year window before other people (Europeans) get into the game and bring the price down."

TECHNICAL NOTES

The Taste of Fish

Hilo is a good place to try different kinds of ocean fishes. At a recent holiday party, your editor was talking with other folks who buy them from our main local fresh fish market, which buys from fishermen several days each week. A person who has not tried much of that variety wanted to know if they taste very different. A popular impression among less experienced fish eaters is that fish might taste as different as they look. The diverse fish eaters agreed that they were different, but not extremely or intensely so. What makes the difference? Can an aquaculture producer do anything about it?

As with the meat of mammalian livestock, fats and oils are very important in taste. It is said that it would be hard to tell pork from beef if texture from cooking were similar and all fat were removed. No one seems to be saying this about subtle taste differences among fish species, but "fishy taste" is attributed to oils in fish flesh. Therefore, it's likely that oils (any fish has a handful of different ones) are involved in subtleties as well.

But oil is not the whole story. Chefs speak of mild, moderate and full flavored fish apart from oil content. It is said that Americans in particular don't like much fishy taste in fish, and apparently no one likes it in fish oil as a dietary supplement. A "nutraceutical" company web site says that they have made their EPA and DHA oil product non-fishy-tasting by removing residual proteins from natural fish oil, as well as adding lemon and rosemary. A more positive and science-based approach to fish taste apparently supports the role of dietary protein of different types. An on line ABC news article quotes a Purdue University researcher, "We can make a fish taste fishier [by giving it more fish meal], or milder [by giving it more soy beans]." The brackets are part of the quotation. On the other hand, fish meal contains fish oils and soy meal doesn't, so maybe we're still talking mainly about oil. The taste effects can be produced during only two or three weeks' feeding before harvest, and so an expensive feed ingredient, whatever it might be, need not be used for most of the growth period.

We might ask how all this relates to the issue noted in the Updates section above, in which some consumers prefer the taste of wild salmon and tuna over farmed ones. With salmon, some of the wild preference is about the firmer texture. Farmed salmon are fed diets high in oil, but it is suspected that their easier-swimming lives may be a factor in softer texture.

Cultured freshwater fishes bring another taste factor to the table. Most of the above discussion has some application to freshwater fishes (the Purdue research includes the yellow perch), but unlike most saltwater types, they are vulnerable to "off-flavor" that derives from their eating non-feed items in their pond environments. This is a much studied issue: the responsible compounds are produced by some types of algae in earthen ponds. The problem is prevented in culture systems that preclude growth of the algae, and is not found in wild fish other than those from lakes with shallow areas where the algae could live.

Finally, human individual and cultural differences must affect perception and preference. In a taste test in Samoa, cultured Nile tilapia were compared with a variety of reef fishes (which are popular there), both steamed local style in breadfruit leaves. 46% of tasters preferred the reef fishes (including surgeonfish, goatfish, parrotfish), 42% preferred the tilapia, and 12% rated them equal. This is a pretty good outcome for freshwater aquaculture vs. ocean catch.