



NEWSLETTER

OF

**AQUACULTURE ASSOCIATION OF SOUTHERN AFRICA &
AQUACULTURE INSTITUTE OF SOUTH AFRICA**



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A Word from the Chairman and the CEO of AISA

Etienne Hinrichsen chairman@aasa-aqua.co.za

Although it is customary and, by now somewhat cliché to keep wishing people a prosperous New Year, please accept my well wishes in this regard. We have a great aquaculture year ahead of us. Sitting in a meeting with a colleague a few days ago we made a list of the potential new projects that we are aware of for 2007 – WOW! We came up with at least a dozen potential and large scale ventures that may kick off during 2007.

Natasha Marshall now mans (or “womans”) the AASA office. This is proving to be a great bonus and she is going full steam ahead with organising a more comprehensive database, setting up contacts, fielding calls and queries, organising the 2007 conference and more. With the setting up of the AASA office the contact details have also changed. Please note the new contact details as:

PO Box 71894, The Willows, 0041, South Africa

Tel: +27 (0) 12 807 6720

Email: info@aasa-aqua.co.za

Website: www.aasa-aqua.co.za



Although Natasha still needs all of our support to ensure that she finds her feet, please contact her at any time for assistance. With Natasha’s appointment and setting up of the AASA office, we are also restructuring memberships and much of the administrative system. I have written a comprehensive notice on this, which will be circulated as a separate document to newsletter recipients. Of greatest importance are the new membership fees. Please read over the notice “*Taking the Aquaculture Association into 2007 and Beyond*” for this information. I urge all of you to finalise your 2007 membership as soon as possible as these funds will keep AASA running. In addition to this, there are significant costs that need to be settled towards the 2007 conference.

Conference! I am proud to announce that the dates and venue for the 2007 conference have been finalised. The conference will be held at the Cape Town Convention Centre from 23 - 26 October 2007, with the following theme:

AQUACULTURE AFRICA
Linking Resources to Markets Through Technology

More conference information is given in the notice that will be circulated with the newsletter. Calls for papers and registration details will follow. I trust that we can count on all of your collective support to ensure that AASA becomes a real player in local and international aquaculture.

Dr. Lizeth Botes lbotes@ai-sa.org.za

Since it’s the beginning of a new year, I feel that AISA should kick start the year by wishing you all the very best for 2007. Before we get serious and stuck into our work, I’d like to bring some very South African humour to the table by sharing a message with you that I received recently.

“Spring op, gooi jou hare terug, klap jousef oppie bas en skree: jys man ek is gorgeous! Live on the edge ou mater, otherwise you take up too much space, life is a journey so ry hom in sy chops. Wys jou mys, hang jou slang, geniet jou babbelas, braai ‘n tjop en drink ‘n dop. Lewe asof daar nie ‘n more gaan wees nie. Die lewe is ‘n lied, sing uit volle bors al klink jy soos ‘n vals vink. Happy New Year and a phenomenal 2007 to all!”

Lastly I’d like to invite everyone, especially the AASA EXCO to submit articles to the Newsletter. If you are a student, remember there will be student prizes for the best student articles submitted.

The Editor's chance

Adrian Piers new_sletter@aasa-aqua.co.za

The next AASA conference

We have dates for the next Aquaculture Association of Southern Africa biannual conference!

Please see below under "Announcements" for details. A formal call for papers will be in the next New sletter, but I would like to encourage all of you to start putting together your presentations if you have not begun already. Looking forward to seeing you at the conference!

A blue revolution to beat poverty

Fish consumption in Africa, per capita, is actually *decreasing* despite increasing production. What is happening here? The global fish capture situation is common knowledge, and Africa is an important source for many of the world's developed markets. Surely the expertise acquired there can profitably be put to use with farmed fish. As mentioned in the articles below there are some very real advantages that African aquaculture is well positioned to exploit. Pristine environments, closeness to the European market and a supply gap rapidly opening in domestic markets will favour economic prospects. All that really remains are to finalise the legislative aspects and get the means of production up and running. Egypt has shown us how.

This article from the BBC looks at fish production with a focus on Africa.

<http://news.bbc.co.uk/2/hi/science/nature/6255137.stm>

New School of Thought On Fish

From United Nations Africa Renewal. www.un.org/AR reported by Ernest Harsch

At the base of the Zomba plateau in southern Malawi, more and more villagers are digging ponds to raise fish. James Chitonya previously grew maize, with meagre returns. But since he began fish farming (aquaculture) several years ago, he has earned enough from fish sales to replace his grass hut with a house that has electricity and an iron-sheet roof, pay school fees for his children and buy some other livestock. A few thousand kilometres away, in Nianing, on Senegal's coast, hundreds of women clean the 50 tons of fish caught annually by kinsfolk who venture into the Atlantic in canoes. The fish is sold to residents or to companies for export to Asia. Concerned that overfishing was beginning to deplete the stocks of offshore fish, Nianing's fishers and fish processors welcomed support from the government and a Japanese aid agency to improve management of fishing, the village's economic mainstay. Since the project began, the value of Nianing's total fish output has increased by almost half. Initiatives such as these must be replicated across Africa if the continent is to harness the promise of its fish production to strengthen economies, reduce poverty and improve food security and nutrition, argue promoters of the New Partnership for Africa's Development (Nepad). Although fishing in much of rural Africa tends to be overshadowed by agriculture and stock raising, it is not a marginal sector. Fishing provides direct incomes for about 10-million people, half of whom are women, and contributes to the food supply of 200-million more.

The WorldFish Centre, a research institute headquartered in Malaysia, reports that Africans rely on fish for an average of 22% of their consumption of animal protein. *In some countries, the rate is as high as 70%*. The poor rely on fish more than others, because it is often the most affordable source of protein. African fish exports increased notably during the 1980s and 1990s. By 2001 they

reached \$2,7bn, about 5% of the total global trade of \$56bn. According to the United Nations Food and Agriculture Organisation (FAO), fish products constitute more than 10% of the value of exports in 11 African countries, but under current fishing practices, Africa's marine and inland fisheries are reaching their limits. Too many fish are being caught, so stocks are dwindling. Daniel Pauly, a researcher at the University of British Columbia in Canada, estimates that with the tripling of fishing activity in north west Africa since the 1970s, the amount of fish in deep waters has fallen by a quarter. Off West Africa, deep-water fish stocks have declined by half.

A Nepad action plan for the development of African fisheries and aquaculture observes that during the 1980s and 1990s, fish caught in marine and inland waters increased steadily, rising to a yearly average of 7,3-million tons. But output has stagnated since then, reaching only 6,8-million tons in 2002. Increasingly governments are implementing policies that limit catches and allow fish stocks to replenish themselves. Other options include investing in fish-processing enterprises, cold storage units and marketing facilities that will increase incomes and minimise losses, thereby easing the economic pressure to catch so many fish. Improving the efficiency and sustainability of Africa's marine and inland fisheries will help boost overall production to some extent. But they alone will not be able to meet the continent's growing domestic demand for fish nor increase exports on a significant scale. The Nepad plan therefore singles out aquaculture as the sector with the greatest potential for expansion.

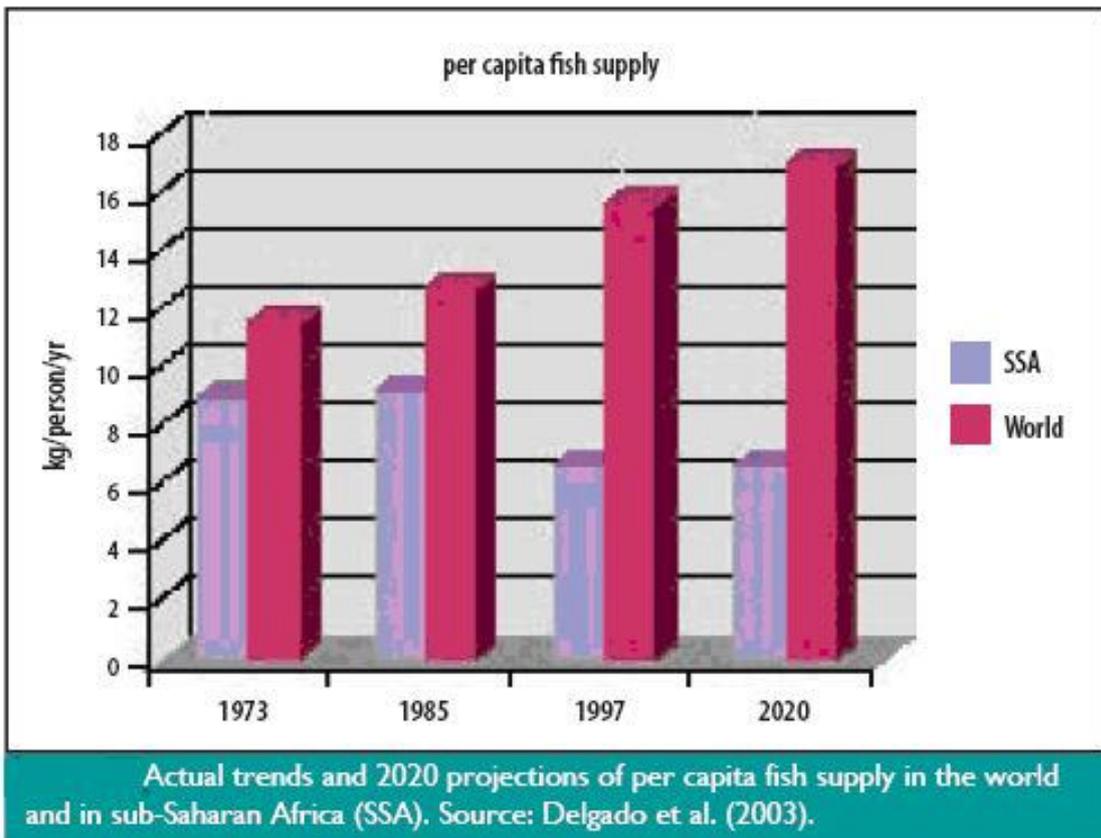
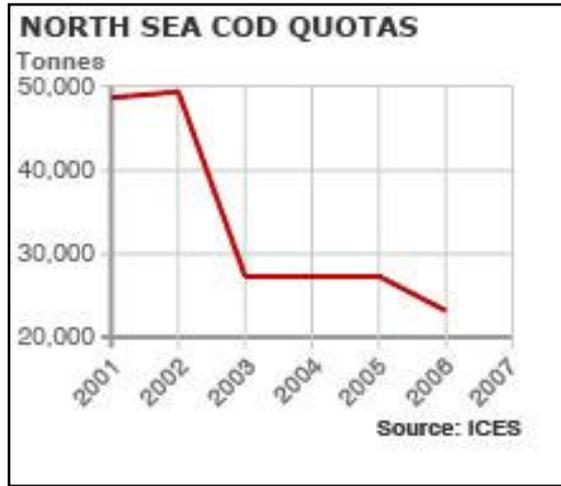
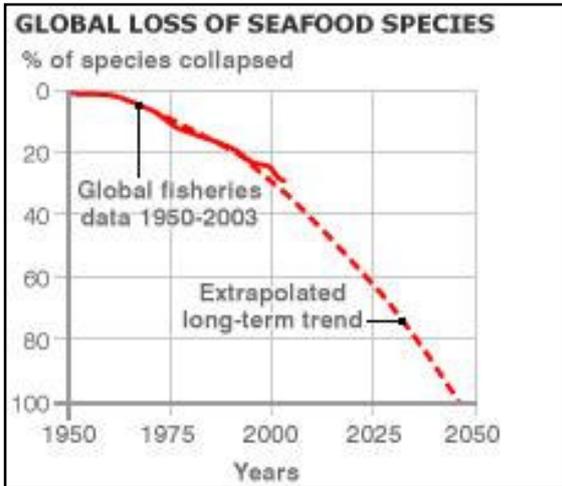
Fish farming was introduced into Africa more than a century ago with modest impact. Only in the past decade has aquaculture begun to take hold, with overall production rising from 80,000 tons in 1990 to more than 530,000 tons in 2003, but this is still only a small fraction of Africa's total fish output.

Even in countries where production is still low, as in Mozambique, the sector is winning greater attention. Fish farming, says Isabel Omar, an aquaculture expert in Mozambique's fisheries ministry, "plays an important role in the socioeconomic development of the country" by improving people's diets through the provision of low-cost protein, creating jobs and enhancing rural incomes. According to studies by the FAO, about 9,2-million km, 31% of the land area, of sub-Saharan Africa is suitable for smallholder fish farming. If the yields achieved in recent projects can be maintained on a wide scale, devoting only 0,5% of this area to aquaculture would be sufficient to meet a third of Africa's additional demand for fish by 2010.

If aquaculture output can grow by an average of 10% a year, argues a technical paper distributed at the August 2005 Fish for All summit, then Africa will be able to reach about 3-million tons over the next 15 years. Such growth could create at least 5-million additional jobs, help feed millions more and yield another \$50m to \$100m in export revenues.

A PDF file of the NEPAD plan mentioned above is available for download at: -

<http://www.iss.co.za/Af/RegOrg/nepad/fishplan.pdf>

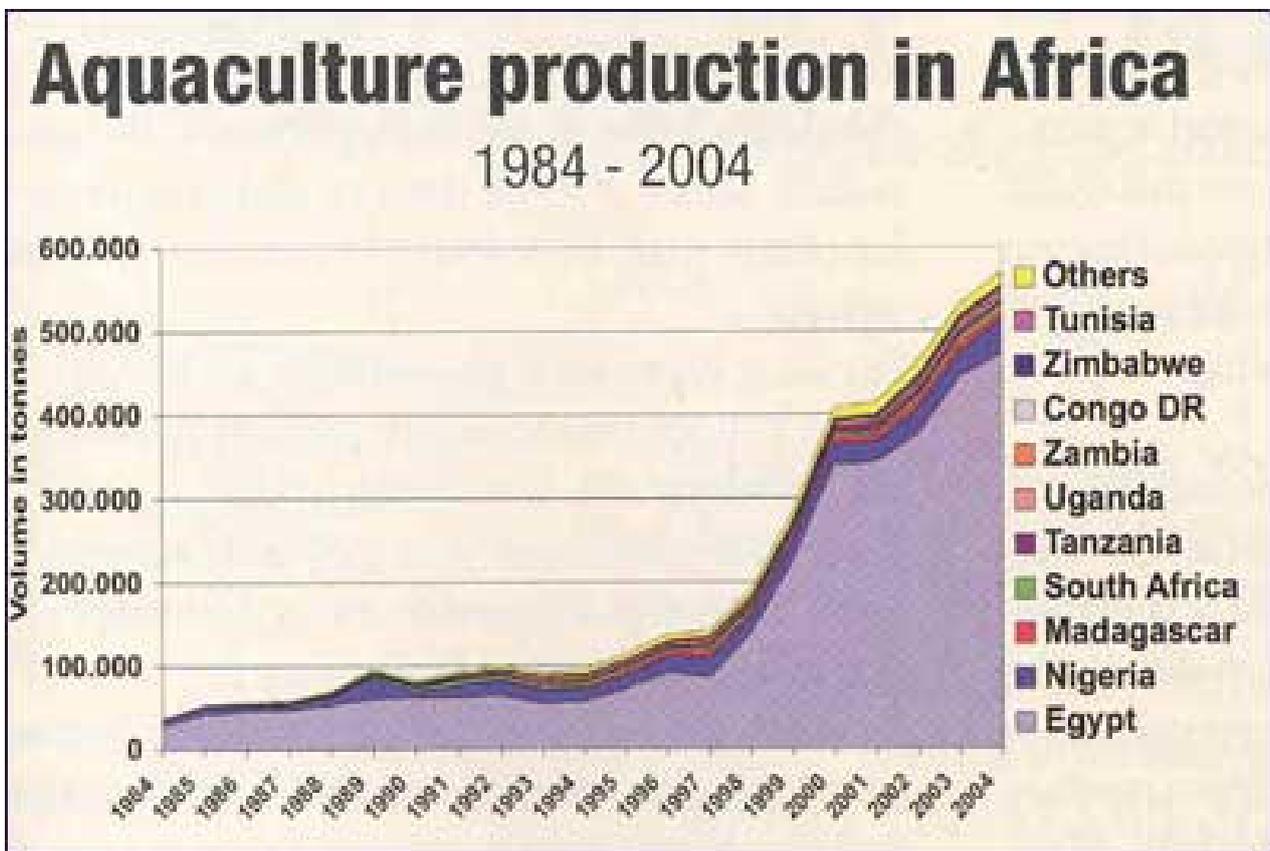


From Erik Hempel, INFOSA

Over the past few years, interest in aquaculture in Africa has increased. While there has been local interest in aquaculture for a long time, foreign investors are now showing their interest in several countries. The potential for developing aquaculture is there, but the continent still faces a number of challenges.

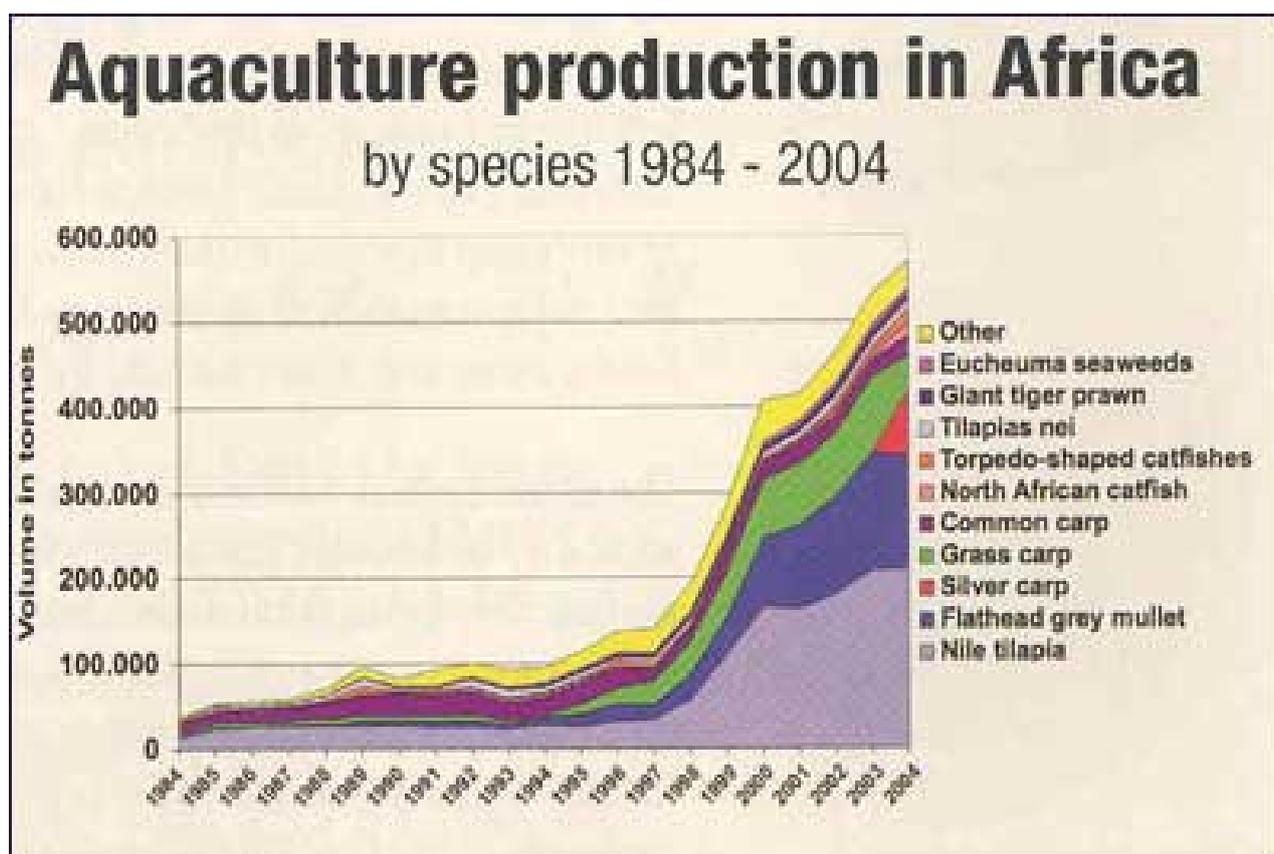
The total aquaculture production of Africa only amounts to 570,000 tonnes annually (2004), or a little less than 1.0 per cent of the global production. Until the mid-1990s production was relatively stable at around 50,000 to 100,000 tonnes, but developments since then have shown that there is both room and possibilities for growth. Growth in particularly Egypt's production has contributed to a five-fold increase in less than 10 years. Egypt has been the largest producer in African aquaculture since as far back as 1950. In 2004, Egypt accounted for almost 83 per cent of the total African production. Nile tilapia is the dominating species in Egypt. In 2004 Egyptian farmed tilapia production amounted to some 200,000 tonnes, accounting for over 42 per cent of the total aquaculture production of the country. But in recent years aquaculture has been developed in other countries like Congo DR, Nigeria, Madagascar, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. In Nigeria it is particularly catfish farming that has contributed to this development. In 2004, production of catfishes accounted for about 63 per cent of the total Nigerian aquaculture production.

By far the major part of African aquaculture is done in inland waters, - lakes, water reservoirs and rivers. In 2004, this accounted for 89 per cent of all African aquaculture. There is some marine aquaculture, mainly in the Mediterranean and the Indian Ocean, while activities on the Atlantic coast have been very limited until now. The largest species in African aquaculture in terms of volume include tilapias, gray mullet, carps and catfishes. There is also some production of shrimp, mainly black tiger shrimp, *Penaeus monodon*, and in 2004 African farmed production of this species amounted to 7,600 tonnes.



Interest and investments in African aquaculture can broadly be divided into two: community based aquaculture which is promoted by international organizations, aid agencies and governments as part of their efforts to alleviate poverty and create livelihoods and improve the food supply situation; and commercial aquaculture, which is mainly privately financed and export oriented. A number of community based aquaculture projects have been started in countries such as Cote d'Ivoire, Ghana, Malawi, Namibia, Nigeria and Zambia. These projects are of a small scale nature and have been financed by aid agencies and national governments. Commercial investments in aquaculture have been registered in countries such as Egypt, Ghana, Kenya, Malawi, Namibia, Nigeria, South Africa and Zimbabwe. Generally, these projects are developed on a larger scale and their production is mainly export oriented. Often, there is foreign capital involved, in some cases in joint venture with local investors.

Most of the commercial aquaculture operations in Africa are targeting the international export markets. That often puts the continent at a disadvantage because of inadequate transport options. However, even so, some projects have been successful in exporting to world markets, such as tilapia farming in Zimbabwe, shrimp farming in Mozambique and Madagascar, and oyster farming in Namibia. The local markets, which until now have been mainly served by small scale, community based fish farming, are probably grossly under-estimated. There is a growing demand in the region for fish and seafood, and many markets are able and willing to pay good prices. In fact, for many operations the local, African markets represent a better option in terms of profitability. What is needed, though, is the development of distribution systems, and to some extent cold chains.



African aquaculture is still facing a number of challenges that must be dealt with. Corruption and lack of infrastructure in some areas are major obstacles, but there are also other challenges, such as the lack of seed, lack of feed, lack of knowledge, and above all lack of financing. The lack of access to financing is caused mainly by the lack of knowledge and experience on the part of financial institutions in the region with regard to aquaculture. Both development banks and commercial banks in the region are reluctant to finance aquaculture projects because they do not know the sector, they do not understand it, and they do not see sufficient collateral available. Consequently, they tend to turn down applications for loans. However, the investors must also take

part of the blame for this, as many do not know how to present their projects to financial institutions. Furthermore, many investors/initiators lack equity and ask for too large external financing shares for their projects. Foreign, non-African banks with understanding of and experience in aquaculture financing could find new business opportunities in Africa, particularly if they are willing to work with local commercial banks.

What needs to be done - a recent assessment of the situation for African aquaculture by the FAO points to a number of initiatives that are important in order to further the development of the sector:

- Increasing the involvement of the private sector. The private sector should be responsible for all production inputs such as seed, feed, technology etc., and it should focus on market-driven, profitable operations. Furthermore, the private sector should be active in the management of the aquaculture sector in each country and contribute to functions such as research, extension, information etc.
- Focusing effort on high potential areas. Such areas are those that have the greatest possibilities for providing the best results both in terms of successful production and profitable operations. Authorities should provide an environment conducive to development of these areas.
- Redefining the role of the governments. In many countries, the government has been managing and even investing in the sector. This is not considered the best way to achieve results. Governments should instead focus on their role as a facilitator and monitor of activities. They should support research, provide information and provide proper quality control.
- Divesting public infrastructure. Public sector involvement in providing such infrastructure as seed production, demonstration projects etc should be discontinued and left to the private sector. Government installations in such activities should be sold to the private sector or converted to other uses.
- Increasing the responsibilities and organization of producers. The private sector needs to be more involved in the management of the sector through producer associations and increased participating in supplying reliable and correct information.
- Developing methods for monitoring and evaluation. These functions are the responsibility of all the stakeholders in the sector. Correct, reliable record-keeping provides a basis for future planning, but also requires responsive institutions. Getting the correct information about the sector is a necessity for successful planning in harmony with national development strategies.
- Elaborating flexible national aquaculture strategies. Such strategies have been neglected in some countries, but must be developed and in harmony with the overall national development plans. There may be a need in some countries for a focused, national aquaculture task force in order to secure sustain development.

There is little doubt that the African continent offers ample opportunities for aquaculture development. With the general movement towards democratic societies and the continuous fight against corruption in many African countries today, development prospects for the sector appear brighter than in many decades. Africa may still have a long way to go, but the process has started.

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Ebb & Flow - Letters to the Editor

Sale of Aquaculture Assets

The Editor,

We are giving notice of a sale of aquaculture assets in Belize. We would be very grateful if you will resend this notice out to the members of your organization. The International Finance Corporation is the private sector arm of the World Bank Group.

If you have any question, please feel free to contact me.

Frank Kobayashi
Principal Special Operations Officer
Special Operations Department
International Finance Corporation
Washington, DC 20433
Phone: 1-202-458-8856

Abalone

South Africa bids to sate Asia's abalone cravings

From Reuters, By Wendell Roelf

Shipped halfway across the world to Asia as a seafood delicacy, abalone has become a prized commodity for South African entrepreneurs as well as criminals who have poached the mollusc almost to extinction. Known colloquially in South Africa as "perlemoen", abalone is so endangered the government has drastically reduced the total allowable catch in the wild and attempted to encourage saltwater farming of the curlicue-shaped shellfish. Once sucked from its hard shell, abalone has a soft but chewy flesh that is consumed in a variety of ways, but mostly steamed, grilled or, for the more adventurous, as a sushi dish. Resembling a giant limpet and a distant relative of garden snails, it thrives only in oceans or special land-based farms that use seawater to cultivate the creatures.

Abalone's growing popularity in Asia, where it is a status symbol and reputed aphrodisiac, has spurred sophisticated smuggling rings, some linked to China's notorious Triad gangs, according to South Africa's Institute of Security Studies. The amount of illegal abalone confiscated in South Africa has skyrocketed to more than 1 million shellfish from a mere 21,000 in 1994 when the country held its first democratic elections. It is now common for police to pull over trucks, sometimes refrigerated, carrying illegal abalone on the roads of the Western Cape and Eastern Cape provinces, where most of the delicacy is harvested. "We've had good successes, especially towards the end of last year, where we seized huge quantities of abalone ... this is just the tip of the iceberg," said Captain Billy Jones, a spokesman for the Western Cape provincial police. But legitimate businesses also see a future in abalone farming in South Africa.

Production accounts for 60 percent of the country's aquaculture revenues. In 2006 it was worth more than 141 million rand (\$19.7 million) and employed about 800 people. "Abalone farming has the highest economic value as compared to all other farmed products and is the highest employer within the marine aquaculture sector," said Blessing Manale, spokesman for South Africa's

department of environmental affairs. He said the department hoped job losses in shrinking abalone fishery could be offset in the burgeoning farm-raised sector, which last year produced more than 900 tonnes of abalone and is projected to hit the 1,000 tonne mark this year. Ten years ago production was a mere 10 tonnes. South Africa exports live and canned abalone, with its endemic *Haliotis midae* species fetching between \$22 and \$38 per kg on world markets. China and Japan are among the main markets. Nick Loubser, general manager of aquaculture at I&J fishing company, said the firm was exporting up to 150 tonnes of specialty abalone a year from its facility at Danger Point Bay, about 220 km southeast of Cape Town. The firm's abalone is fed a special diet at a land-based marine saltwater farm until ready for export. Instead of waiting 12 to 15 years for the molluscs to reach full size, the roughly 10 South African firms in the sector typically sell cocktail-sized versions that take only three to four years to grow.

Loubser said the industry faced a number of challenges, including concerns about availability of land, conflicting legislation and problems with South African bureaucracy. "One of the major stumbling blocks at the moment is the fact that the government hasn't declared areas for mariculture. So if you want to start a farm you have to go through a huge amount of red tape," he said. Pierre Hugo, chairman of the Abalone Farmers Association of South Africa and managing director of Abagold, the country's largest exporter of abalone products, warned the government may be overestimating the potential of abalone farming. "They think it's easier than it is. One of the models we have been promoting is using the existing abalone farms as a backbone for secondary aquaculture activities - such as seaweed cultivation -- around the farms," he said. Hugo said satellite farms could also be used to accommodate emerging black farmers, who might lack the finances, technology and management expertise to start a hi-tech abalone farm. The government is working to develop a policy and development plan for the sector, Manale said. Poached abalone could be reduced or even wiped out, according to Manale, noting there were plans to list wild and cultured abalone as an endangered species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). "This could curb poaching," he said.

Catfish

No submissions

Crayfish

Good Crayfish season expected in the US

By Wesley Steckler in the Natchez Democrat

Crawfish, Crayfish or Crawdads, no matter what you call them, the season for catching and eating them is near. Former Natchez resident Clifford Tillman is the owner of Cajun Crawdads, a crawfish farming operation in Monterey and a crawfish sales operation in Horn Lake, just south of Memphis. Though the season for Central and North Louisiana and Mississippi doesn't start until February, Tillman said he expects this year's crop to be better than last year. "It's not going to be a bumper crop season but it's not going to be a bad season either," Tillman said. Sunday, Cajun Crawdads farmer James Aaron checked test traps at the crawfish farm in Monterey. Tillman said Aaron reported having about two pounds of crawfish in each of the eight traps he set out, "Which is really good for this time of year". Tillman said the 2007 season is looking better because of the recent rainfall received in the fall of 2006. In the fall of 2004 because of the heavy rainfall the 133 farmable ponds produced about 2,000-2,500 pounds per week in spring 2005 during the harvest. In the 2005-2006 season his ponds only produced 500 pounds per week.

Louisiana State University professor of Aquaculture Rob Romaine said during the 2004-2005 season crawfish farmers in Louisiana harvested approximately 75 million pounds. In the 2005-2006

season, farmers harvested about half of that because of the loss of farmable acreage due to hurricane Rita and a period of drought prior to the hurricane. "In speaking with farmers, they're seeing more crawfish this year," Romaine said Sunday. He said test-trap results like Tillman's this early in the season are a very good sign for this year's harvest.

And from Reuters

Louisiana's famed crayfish harvest is bouncing back two years after Hurricanes Katrina and Rita devastated the \$40-million industry, state and industry officials said. A mild winter and heavy rainfall in southern Louisiana, where most crayfish are raised, could lead to a bumper crop of the tiny crustaceans, which look like miniature lobsters and are a staple of Cajun cooking across the country. Crayfish are harvested on farms or trapped in the state's swamps and wetlands. About 40 percent of Louisiana's crayfish production comes from the Atchafalaya basin, a 566,600 hectare stretch of forest and swamp west of New Orleans. Wetlands and crayfish farms were feared devastated by the saltwater carried ashore by Katrina and Rita in 2005. "We had some acreage that got impacted, especially by Hurricane Rita, and there was some question about how that would linger into crawfish season," said Greg Lutz, a Louisiana State University aquaculture specialist. "It looks like it's going to be a good crop," said Darrel Rivere, a food manufacturer from Paincourtville, Louisiana, and a Louisiana Seafood Marketing Board member. "We already have early water in the Atchafalaya River basin, so it looks like the basin is going to be vibrant this year," Rivere said. Mature crayfish usually start showing up in seafood stores by late January and are available well into late spring or early summer. Producers still worry that the scattering of residents from the largest crayfish market, New Orleans, may cut demand. Less than half of the city's pre-Katrina population of 460,000 has returned and there are far fewer tourists and conventioners chowing down on crayfish po-boys and platters of etouffee. However, many of those who relocated due to Hurricane Katrina are introducing crayfish to new markets in other parts of the country, Lutz said. "We're hoping we can get a little momentum there and build on that," he said. "Crawfish is one of those products that tends to open the door to other Louisiana products, like seasoning."

Eels

No submissions

Ornamentals

No submissions

Oysters & Mussels

Biological Gems

By P. Ainima in the Hindu

His pearls speak for themselves. According to experts from the United States, his 22 mm nuclei produce the largest pearls and perhaps the most expensive ones too. Ajai Kumar Sonkar, an independent researcher and Chairman of the Pearl Aquaculture Research Foundation, has been delving deep into the marine wealth of the Andamans for over three years now in an endeavour to produce superior quality pearls. He has been experimenting on various species of these biological gems that fetch fat amounts in the international market. But to get those perfectly round, uniform and lustrous pearls is quite a task, says the pearl-maker. "Every oyster will not produce a pearl," he

explains. Pearl aquaculture is a long and tedious process. Beginning with choosing oysters from the sea and preparing the ones that are one or two-year-old for surgery, it is followed by the procedure itself. The operated oysters are then delicately put back into the sea for six months to two years for pearl formation. After the stipulated period, the oysters return to the laboratories for the pearls to come out.

Pearl aquaculture is still a nascent concept in India, says Dr. Sonkar. "It was difficult for me to get clearance to begin work in the Andaman waters," recounts Dr. Sonkar, who began his experiments with fresh water projects. After the green signal from authorities, he began work in 2003. He believes that the Indian climate, especially the Andamans, is conducive for pearl culture. But the devastating tsunami played havoc with the project. "The tsunami disturbed the breeding grounds and caused variations in depth. But things are getting back on track," says Dr. Sonkar.

The researcher is currently working on two species of oysters *Pinctada margaritifera* and *Pinctada maxima*. What is considered to be Dr. Sonkar's greatest achievement is the breakthrough he achieved in developing the technique to produce the nuclei that are vital to pearl culture. Pearls, he says, are distinguished on the basis of quality. A factor that is significant when it comes to quality is the aragonite composition. "Pearls are calcium carbonate that crystallises in two ways -- calcite crystallisation and aragonite crystallisation," he explains. "The aragonite crystallisation is the pearl component which is less in fresh water, that's why saline water pearls are of superior quality," he adds. The environment in which culturing takes place has an impact on the pearl quality. "The oysters in Tahiti are huge and so are the pearls, while those produced here are smaller and it has to do with the climatic conditions," says Dr. Sonkar. He believes that India has a great future when it comes to pearl culture. "We have a long coast and nature has been generous," he says. "Pearl culturing can fetch foreign exchange as well as create employment opportunities as the work is manual," Dr. Sonkar adds. But the key, the researcher whose experiments have resulted in almost zero mortality of oysters says, is to "take your laboratory to nature and not to bring nature to the laboratory".

Genes involved in animal growth discovered in studies of Oysters

By Carl Marziali marziali@usc.edu

How many genes influence a complex trait, like weight, height or body type and why does the answer matter?

Among other reasons, because the "Green Revolution" that multiplied crop yields has to be followed by a "Blue Revolution" in ocean farming, according to marine biologists at the University of Southern California. "We're going to have to make future decisions as a society how to provide enough food for a growing population," said Donal Manahan, co-author of a study on oyster growth appearing online in Proceedings of the National Academy of Sciences Early Edition. Currently a delicacy, oysters fed the masses in the past and could again become "the soy bean of the sea" as traditional fisheries collapse, Manahan predicted. He and senior author Dennis Hedgecock linked growth rate in oysters to approximately 350 genes, or 1.5 percent of the more than 20,000 genes in the oyster genome. To the authors' knowledge, this is the first estimate of the number of genes that determine growth rate in any animal. Specifically, the authors discovered the genes responsible for "hybrid vigor," or the ability of some progeny of crossbreeding to outgrow both parents. Hybrid vigor is of evolutionary as well as agricultural interest because it appears to favor biodiversity.

Many plants have hybrid vigor. Seed companies exploited this property to increase corn yields seven-fold from the 1920s to the present. Most animals do not express hybrid vigor to such an extent, the authors said. That makes oysters particularly strong candidates for aquaculture. "Their hybrids grow much faster than either of the parents, and this is exactly like corn," Manahan said. The PNAS study may lead to improved breeding both on land and sea. The green revolution worked by trial and error, with companies trying every possible cross of corn strains to find the best hybrids. "A century after its discovery in corn, we still don't know why plants have hybrid vigor, despite the economic and evolutionary importance of this phenomenon," Hedgecock explained.

Knowing the genes for hybrid vigor may enable companies to develop the best cross of corn strains, or oyster types, without guesswork. The lines would not be genetically modified, only screened and matched as in a dating service. The goal is efficient and sustainable domestication of oysters and other promising ocean species, mostly shellfish. Oysters already are by weight the number one farmed aquatic species worldwide.

Another problem is the apparent lack of hybrid vigor in most fish. Even in oysters, the researchers found the rules of hybrid vigor to be more complicated than predicted by classical ideas in genetics and physiology. For example, some genes were expressed much less in the offspring than in either parent, a pattern the authors call "underdominance." Very few genes were expressed as the average of the expression in their parents. Hedgecock called the underdominance patterns "one of the more surprising findings" of the study.

Prawns

Organic shrimp farming receives a boost in India

Organic aquaculture in India has taken a step forward by tying up with a Swiss government agency for aid in certification and marketing of organic shrimp farming produce. India should be able to establish its presence in the global organic aquaculture market by the year-end, said Union Minister of State for Commerce and Industry Jairam Ramesh, as the Marine Products Export Development Authority signed a memorandum of understanding with the Swiss Import Promotion Programme at Indaqua 2007. "There's a growing trend in Switzerland and the European Union for more sustainable, environment friendly and healthy products," said Markus Stern, the director of the Swiss Import Promotion Programme.

The demand for organic products is growing at the rate of 18 per cent every year, according to the Marine Products Export Development Authority.

Full article at <http://www.hindu.com/2007/01/12/stories/2007011205260400.htm>

See below under "other" two articles on organic Aquaculture.

Tilapia

New book on Tilapia published - TILAPIA - Biology, Culture and Nutrition

See below under the Research matters, Reviews & Training section

Desert fish farming in Israel

From an article by Rina Castelnovo in The New York Times

Fish farming in the desert may at first sound like an anomaly, but in Israel over the last decade a scientific hunch has turned into a bustling business. Scientists here say they realized they were on to something when they found that brackish water drilled from underground desert aquifers hundreds of feet deep could be used to raise warm-water fish. The geothermal water, less than one-tenth as saline as sea water, free of pollutants and a toasty 98 F degrees on average, proved an ideal match.

On a fish farm at the Kibbutz Mashabbe Sade that raises about 15,000 fish at a time the last light reflects off the backs of sea bass swimming in fish ponds lined in neat rows on this desert farm..

The organic waste water produced in the farming process is being used to grow plants in hothouses. "It was not simple to convince people that growing fish in the desert makes sense," said Samuel Appelbaum, a professor and fish biologist at the Jacob Blaustein Institutes for Desert Research at the Sede Boqer campus of Ben-Gurion University of the Negev. "It is important to correct the impression that arid land is nonfertile, useless land," said Professor Appelbaum, who pioneered the concept of desert aquaculture in Israel in the late 1980s. "We should consider arid land where subsurface water exists as land that has great opportunities, especially in food production because of the low level of competition on the land itself and because it gives opportunities to its inhabitants." The next step in this country, where water is scarce and expensive, was to show farmers that they could later use the water in which the fish are raised to irrigate their crops in a system called double usage. The organic waste produced by the cultured fish makes the water especially useful, because it acts as fertilizer for the crops. The recycled water from the fish ponds is used to irrigate acres of olive and jojoba groves. Elsewhere it is also used for irrigating date palms and alfalfa.

The chain of multiple users for the water is potentially a model that can be copied, especially in arid third world countries where farmers struggle to produce crops, and Israeli scientists have been selling their ideas abroad. Dry lands cover about 40 percent of the planet, and the people who live on them are often among the poorest in the world. Scientists are working to share the desert aquaculture technology they fine-tuned here with Tanzania, India, Australia and China, among others. "Each farm could run itself, which is important in the developing world," said Alon Tal, a leading Israeli environmental activist who recently organized a conference on desertification, with the United Nations Convention to Combat Desertification and Ben-Gurion University, that brought policy makers and scientists from 30 countries to Israel. At the conference, Gregoire de Kalbermatten, deputy secretary general of the anti-desertification group at the United Nations, said, "We need to learn from the resilience of Israel in developing dry lands." Israel, long heralded for its agricultural success in the desert through innovative technologies like drip irrigation, has found ways to use low-quality water and what is considered terrible soil to grow produce like sweet cherry tomatoes, peppers, asparagus and melon, marketing much of it abroad to Europe, especially during winter.

The history of fish-farming in nondesert areas here, mostly in the Galilee region near the sea, dates back to the late 1920s. At the time, the country was extremely poor and meat was considered a luxury. But fish was a cheap food source, so fish farms growing carp were set up on several kibbutzim in the Galilee. Eventually they expanded to other varieties of fish including tilapia, striped bass and mullet.

Fish farming, meanwhile, has become more lucrative worldwide as people seek more fish in their diet for better health, and ocean fisheries increasingly are being depleted. The practice is not without critics, who say it can harm the environment and the fish. In Israel there was a decision by the government to stop fish farming in the Red Sea near the southern city of Eilat by 2008 because it was deemed damaging to nearby coral reefs. Some also argue that the industry is not sustainable in the long term because most of the fish that are farmed are carnivorous and must be fed a protein-rich diet of other fish, usually caught in the wild. Another criticism is that large numbers of fish are kept in relatively small areas, leading to a higher risk of disease. Professor Appelbaum said the controversy surrounding fish farming in ocean areas does not apply to desert aquaculture, which is in an isolated, controlled area, with much less competition for resources.

On Kibbutz Mashabbe Sade, Amit Ziv runs a fish farm, raising about 15,000 fish at a time. Up to 500,000 cubic meters of water from the fish ponds is recycled for irrigation every year. "It's a matter of better efficiency," said Mr. Ziv, who pays about 24 cents a cubic meter for water, a government-subsidized rate. "In an area where there is lack of water, being able to use it twice over is a huge advantage." He said there are benefits to farming in the desert: the dryness translates to fewer insects and less mold and disease. He also said the warm air makes it easier to keep the pools temperate. He remembers the stories his parents, who, along with other founders of the kibbutz in 1948, would tell of having to travel long days to get to the fields of the communal farm. They then tilled closer to central Israel, because at the time the local arid ground was thought to be impossible to farm.

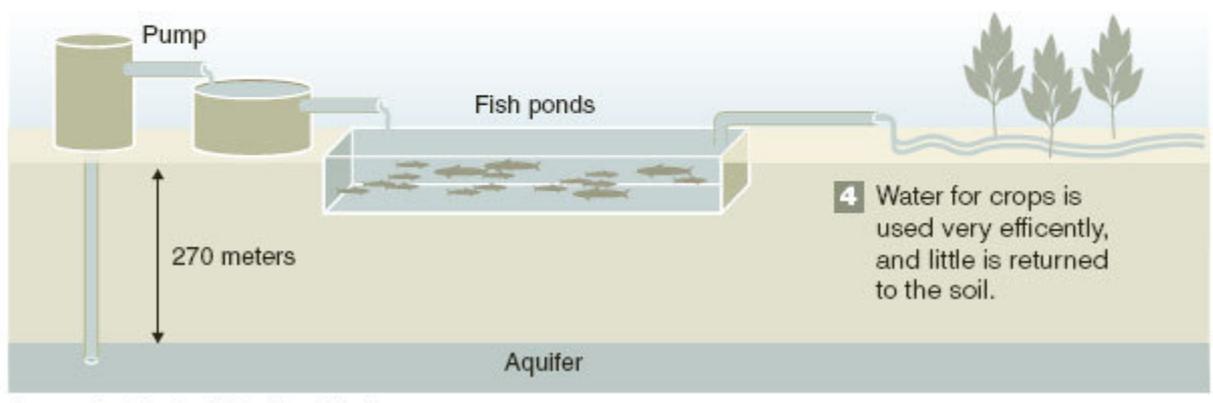
“Now,” he said, pointing toward the desert-grown crops, “the fields are all here.”

Tapping A Desert Aquifer

At Kibbutz Mashabbe Sade, water from ancient aquifers is restoring life to arid lands. Researchers in the Negev and Arava Deserts have found a way to farm fish and crops by drawing on naturally warm, brackish water from deep underground.



- 1** Desert aquifers lie as deep as 900 meters below ground. Once found, water naturally rises to sea level and is pumped from about 270 meters below the surface.
- 2** The water is piped to ponds, where fish including tilapia, barramundi, sea bass and striped bass are grown.
- 3** Water from fish ponds irrigates olive and date trees. Vegetables and fruits are watered directly from the aquifer.



- 4** Water for crops is used very efficiently, and little is returned to the soil.

Source: Ben-Gurion University of the Negev The New York Times

Trout and Salmon

Parasites in farmed Chilean salmon cause disease outbreak

By Dr. Felipe C. Cabello, New York Medical College.

Aquaculture of salmon constitutes a rapidly growing worldwide industry with an expanding globalized market. Although this industry has several economic benefits, according to recent reports it is also accompanied by effects that are detrimental to human and animal health and the environment. Aquaculture has been implicated in the transmission of infectious diseases. For example, in caged fish aquaculture, bacterial and parasitic diseases can be transmitted to wild fish.

Furthermore, aquaculture-raised fish may be susceptible to the microorganisms and parasites of wild fish. However, in spite of the accepted fact that parasitic worms can be transmitted to humans by free-ranging fish, until recently, few examples have been reported of pathogens that could be transmitted to humans directly by the products and byproducts of salmon aquaculture. New information indicating that salmon aquaculture may be involved in expanding the range of fish tapeworm infections to humans.

Several recent publications report outbreaks of human cases of infection by the fish tapeworm *Diphyllobothrium latum* in Brazil. These infections have been epidemiologically linked to consumption of raw salmon produced by the aquaculture industry in southern Chile, thousands of miles away. These cases of diphyllobothriasis are noteworthy because this parasite was totally unknown to clinicians and parasitologists in Brazil, where it does not appear to have an endemic life cycle. *D. latum* is transmitted to humans by plerocercoid larvae present in fish meat and visceral organs. *D. latum* and the closely related sea gull tapeworm, *D. dendriticum*, have well-established endemic life cycles in a series of glacial lakes in northern Chilean Patagonia. Infections with these parasites have been detected in this geographic area since the 1950s in persons who ingested uncooked fish from these lakes. The link that closes the epidemiologic chain between the Brazilian outbreak of fish tapeworm infections and the aquaculture of salmon in southern Chile is that some of the freshwater lakes where *D. latum* and *D. dendriticum* are endemic are used to grow the freshwater stages of juvenile salmon, or smolt, in cages. Smolt are temporarily grown in these lakes to accelerate their growth before they are transported to cages in the sea where the salmon will reach adult stages. The practice of growing smolt in freshwater lakes appears to be unique to Chilean salmon aquaculture, as in other salmon aquaculture settings smolt are grown in tanks containing filtered water.

Chilean parasitologists have demonstrated that native species and introduced salmonid fish are infested with *Diphyllobothrium* plerocercoids in these lakes where the other intermediary hosts of the fish tapeworm, the calanoid copepods *Diaptomus diabolicus* and *Boeckela gracilipes* are abundant. Native and introduced fish ingest copepods containing proceroid larvae that develop into plerocercoids and the fish tapeworm life cycle is subsequently closed in these lakes when humans and animals, the definitive hosts of these fish tapeworms, ingest infested fish. The persistence of the cycle of *D. latum* in these lakes is facilitated by the release of untreated sewage, which deposits stools of infected humans containing high concentrations of fish tapeworm eggs in the water. The Brazilian studies did not detect *Diphyllobothrium* plerocercoids in several samples of Chilean salmon tested after the first human cases of diphyllobothriasis appeared. However, this failure may have resulted from limited sampling and recent work in Chile has demonstrated the presence of *Diphyllobothrium* plerocercoids in rainbow trout raised in aquaculture, demonstrating that aquacultured fish can become infected with these parasites. In Chile, infestation with *Diphyllobothrium* plerocercoids has also been detected in coho salmon living in the wild, a nonindigenous species raised originally in aquaculture that escaped from pens. Larvae of another fish tapeworm, *D. pacificum*, whose definitive hosts are large marine mammals such as sea lions and fur seals, have been detected in marine fish in Chile. Salmon aquaculture sea cages attract these large mammals, creating the possibility for the parasite life cycle to occur in the environment around the salmon cages. However, this is an unlikely scenario for the spread to human populations, because the fish tapeworms identified in the patients in Brazil had the morphologic characteristics of *D. latum*, which as discussed above is one of the *diphyllobothrium* endemic in the lakes of southern Chile. These findings suggest that the aquaculture of salmon in southern Chile has expanded the species range of infestation by *diphyllobothrium* to nonindigenous salmonid fish species introduced by the aquaculture industry and that the escape of infected fish from aquaculture sea cages has probably resulted in the expansion of the geographic range of the disease in Chile. In turn, the marketing of Chilean aquacultured salmon in Brazil has expanded the range of this human disease to a geographic region where this pathology was until now absent. In the Brazilian outbreak all the cases had previously eaten salmon sushi. If this explains the appearance of the fish tapeworm outbreak in Brazil the solution is for the Chilean aquaculture industry to stop growing salmon smolt in the lakes in the areas where diphyllobothriasis is endemic.

This epidemiologic event may also be understood as a cautionary tale and an additional example of the dangers entailed by the globalization of food supply and of the rapidly changing global eating habits that facilitate the distribution of human and animal pathogens worldwide. The expansion of diphyllbothriasis-endemic areas in Chile may, in turn, facilitate the appearance of future outbreaks of this disease as the aquaculture industry expands to these new infested areas and the market for Chilean salmon enlarges worldwide. The increased popularity of eating uncooked fish in sushi will also be a factor in the emergence of future outbreaks of this disease. As has been the case with other human infectious diseases disseminated by the industrialization of animal husbandry, this outbreak of diphyllbothriasis could have been prevented by use of existing information, including that concerning the endemic nature of diphyllbothriasis in the lakes of southern Chile and its transmission by raw fish.

Salmon Farmers Challenge Activists

By Suzi Fraser of Aquafeed.com

British Columbia's salmon farmers are challenging anti-aquaculture organizations to demonstrate accountability, and to apologize for defamatory and malicious statements designed to frighten people away from eating farmed salmon.

The call comes following a Supreme Court decision just that found anti salmon farming campaigner Don Staniford intentionally used inflammatory words and withheld facts in an effort to damage the reputation of salmon farmers in British Columbia. In today's regulatory environment the actions of salmon farmers are measured, publicly reported and closely scrutinized. "We applaud the Supreme Court decision and recognize that the ruling signals a move towards applying a similar set of accountability measures to critics" states Mary Ellen Walling executive director, BC Salmon Farmers Association. "The Court has ruled that it is unlawful to deliberately mislead the public in the guise of public education," notes Walling, "If activist groups are to retain any semblance of public trust they should, at a minimum, meet the same standards of scrutiny applied to others." The Supreme Court decision and the Salmon Farmers call for activist accountability comes at the same time as the anti-aquaculture group CAAR is promoting a new brochure: discounting the health benefits of eating farmed salmon and salmon farmers' commitment to environmental sustainability. "The notion that those of us who live and work in coastal communities would endorse an activity harmful to our environment is ridiculous," says Gerry Furney, Mayor of Port McNeill. "The facts are, as coastal residents, we are actively involved on a daily basis as guardians of our environment. The court ruling should be seen as a vindication of an industry which practices environmental sustainability, supports economic diversification and creates opportunities in coastal communities. I strongly believe that we can have both a healthy environment for all fish populations and an economically viable aquaculture industry."

BC salmon farmers recognize the importance of protecting wild salmon and see salmon farming as a natural way to meet growing global demand for salmon without putting undue pressure on wild stocks. The BCSFA endorses the stringent regulatory environment in which we operate, and the ongoing supervision from all levels of government to ensure wild salmon are protected.

Other

What makes an Organic Fish ?

By Andrew Martin

Buying a pork chop labeled "organic" is relatively straightforward: you can assume that the pig that produced it ate only organic food, roamed outdoors from time to time, and was left free of antibiotics. But what makes a fish organic?

That is a question vexing the US Agriculture Department, which decides such things. The answer could determine whether Americans will be able to add fish to the growing list of organic foods they are buying, and whether fish farmers will be able to tap into that trend and the profits that go with it. Organic foods, which many people believe to be more healthful, though others scoff, are grown on farms that shun chemicals and synthetic fertilizers and that meet certain government standards for safeguarding the environment and animals. An organic tomato must flourish without conventional pesticides; an organic chicken cannot be fed antibiotics. Food marketers can use terms like "natural" and "free range" with some wiggle room, but only the Agriculture Department can sanction the "organic" label.

To the dismay of some fishermen, including many in the Alaskan salmon industry, this means that wild fish, whose living conditions are not controlled, are not likely to make the grade. And that has led to a lot of bafflement, since wild fish tend to swim in pristine waters, show lower levels of contaminants, and be favored by fish lovers. "If you can't call a wild Alaska salmon true and organic," asked Senator Lisa Murkowski, of Alaska, "what can you call organic?" Instead, it appears that only farm-raised salmon may pass muster, as may a good number of other species, much to the delight of fish farmers. "With our control from hatch to harvest, that's going to be what people are looking for," said Neil Anthony Sims, president and co-founder of Kona Blue Water Farms in Hawaii. But a proposed guideline at the Agriculture Department for calling certain farmed fish "organic" is controversial on all sides. Environmentalists argue that many farm-raised fish live in cramped nets in conditions that can pollute the water, and that calling them organic is a perversion of the label. The issue of what is organic comes down largely to what a fish eats, and whether the fish can be fed an organic diet. There is broad agreement that the organic label is no problem for fish that are primarily vegetarians, like catfish and tilapia, because organic feed is available (though expensive). Fish that are carnivores such as salmon for instance, are a different matter because they eat other fish, which cannot now be labeled organic. Environmentalists take issue with the idea that a fish could be called organic if it ate meal made from wild, nonorganic fish.

Despite labelling fish may not be Organic Fish

By Libby Quaid from Associated Press

If you buy salmon with an organic label, do not assume it is truly organic. The round, green "USDA Organic" seal is not allowed on seafood. At least not yet. If the label says organic, the fish are not from the United States. Rather, they come from countries where chemicals and antibiotics might be used to keep fish healthy. "You're paying more for something that is not any different and not any better for you, and certainly not better for the environment," says Andrea Kavanagh, who heads the Pure Salmon Campaign for the National Environmental Trust. Those who sell organic fish say the fish have been raised as naturally as possible and certified in other countries that recognize the organic designation. In the United States, an organic label has very specific meanings, depending on the product:

- Food animals cannot be given antibiotics or growth hormones.
- No pesticides, synthetic fertilizers or genetic engineering are allowed.
- Farms must be certified by a government-approved agent.

In other countries, the rules are not always so strict. For example, Europe allows antibiotics if an animal is sick. Also, organic salmon farmers can use a pesticide to control a vermin called sea lice. Seafood raised under these rules are sold in American supermarkets and restaurants, often with an organic label. The U.S. government says that is OK, even if chemicals or antibiotics are present. "We don't have a standard for organic fish," says Barbara Robinson, head of the Agriculture Department's National Organic Program, which provides the "USDA Organic" seal. "If there were a standard, we could go after them for mislabeling." Critics say the department can pursue penalties and fines just as it can for foods that can carry the seal. "If they don't have a standard, then it shouldn't be on the market," says Joseph Mendelson of the Center for Food Safety, an environmental and public health group. "They're saying we don't have a standard, so

we're allowing the word 'organic' to mean nothing. That's just an abdication of their duty and responsibility."

In 1990, Congress told the department to set national standards for organic products to assure consumers such products meet consistent and uniform standards. Richard Martin, who sells European-certified organic salmon and cod from the Shetland Islands, says there is room for other organic labels in the marketplace. Martin is president of Boston-based Martin International, which sells fish under the Black Pearl name. "I don't see organic as a universal definition because there are different standards in different places," Martin says. "You have to identify the standards. You have to say according to whom." His company encourages retailers to display cards that explain how the fish was certified. Organic Black Pearl fish are sold at the Kings chain of supermarkets in New Jersey, ShopRite supermarkets on the East Coast and other stores in New York City and Ohio, Martin said. Seafood companies are pushing for adoption of U.S. standards for organic fish. American consumers like organic food and have shown a willingness to pay a premium for it. Growth in organic food sales has been 15 percent to 21 percent in recent years, compared with 2 percent to 4 percent in total food sales. The department has tried for several years to set standards for fish, but the issue is tricky. Start with fish caught in the wild. How do you control the food or environment of a fish that swims in the ocean? How do you give organic food to salmon, for example, when salmon eat other fish? What if fish migrate through waterways laced with toxins? These questions are easier to answer with farmed fish, according to an Agriculture Department task force. Farmed fish such as salmon live in net pens in the open water; fish such as catfish and tilapia can be farmed in closed tanks or ponds. The idea of labeling farmed fish as organic is ironic to some critics. They insist that fish farms can pollute water, deplete other fish populations and expose consumers to higher levels of toxins. "The bottom line is, the whole notion of what is organic aquaculture or organic farmed salmon is very hazy and confusing," said the Pure Salmon Campaign's Don Staniford. Fish farmers argue their operations can keep waste under control and that fish can be given a steady, sustainable diet. The task force has recommended several options for what a USDA Organic fish might eat, although the department is months, even years, away from deciding whether to set standards.

In the meantime, says Robinson, who heads the organic program, people will have to learn more about what they are paying for. "Buyers have to pay attention," Robinson says.

Research matters, Reviews & Training

Genetics in Aquaculture: Part 4 - Genetic forensic analysis

By Ruhan Slabbert rslabbri@sun.ac.za

The use of forensic genetics is becoming more prominent in police investigations and court cases world wide, so much so that a journal dedicated to this field will see the light during this year. Forensic genetics is also contributing to the fight against abalone poaching. The two most common species of abalone, *Haliotis midae* (*perlemoen*) and *Haliotis spadicea* (*siffie*) can easily be harvested, but their legal size limits differ. *Perlemoen* can't be harvested under the size of 114mm, while *siffie* can't be harvested when smaller than 32mm. One of the problems inhibiting successful convictions is the identity of the species of abalone being poached, because the meat of dried (e.g.: Figure 1) or shucked *perlemoen* and *siffie* are hard to distinguish. Poachers sometimes claim that the abalone found in their possession is *siffie*, not *perlemoen*. Physical evidence is therefore lacking, but molecular genetics can provide a resolution by employing some standard techniques.

Methodology

DNA is isolated from the samples being investigated (unknown sample) as well as *perlemoen* and *siffie* tissue (known samples). A small fragment (120 base pairs in length) of this DNA is amplified

using the polymerase chain reaction. The fragments from the unknown and known samples are sequenced and compared against each other. Species differentiation is based upon a single base pair difference between *perlemoen* and *siffie* called a single nucleotide polymorphism (SNP). *Perlemoen* will show a guanine base where *siffie* will show an adenine base (Figure 2). The unknown sample can be identified depending on the SNP contained in that sample. For more information on the theory consult Sw eijd *et al.* 1998.

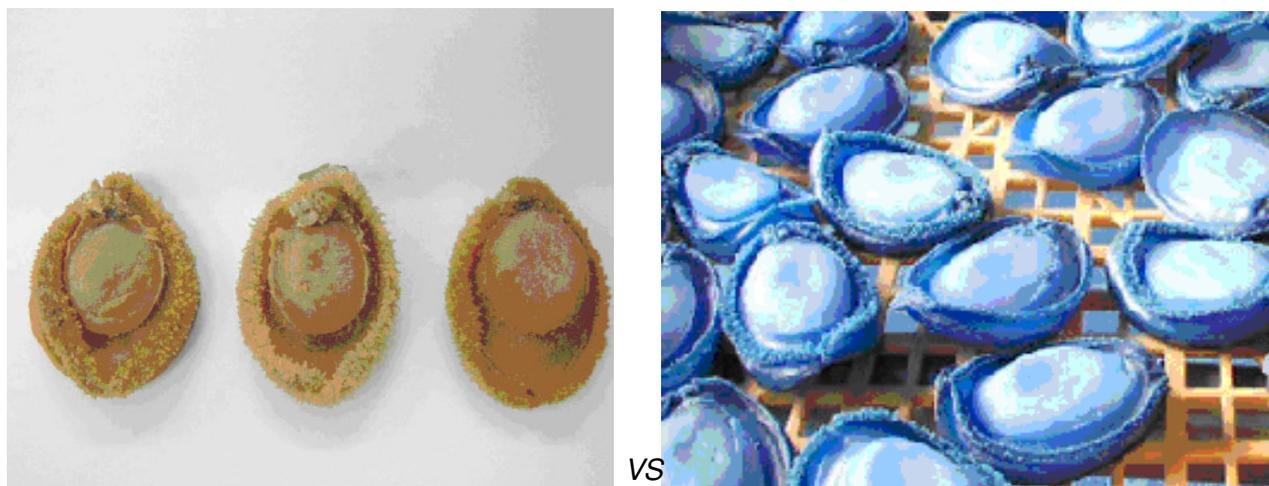


Figure 1: When dried, abalone of different species looks similar. E.G.: South African vs. Japanese abalone

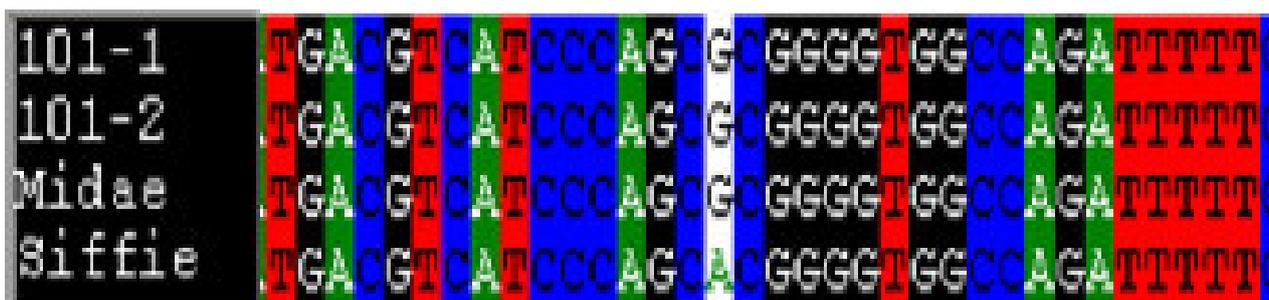


Figure 2: The SNP distinguishes between *H. midae* (*perlemoen*) and *H. spadicea* (*siffie*).

Further reading:

Roodt-Wilding, R., A. E. Bester. 2006. The forensic fight against *Perlemoen* poaching. Fisheries 31:214-215, 254.

Sw eijd, N. A., R. C. K. Bow ie, A. L.Lopata, A. M. Marinaki, E. H.Harley, P. A. Cook. 1998. A PCR technique for forensic species level identification of abalone tissue. Journal of Shellfish Research 17:889-896.

TILAPIA - Biology, Culture and Nutrition Book review

This book, edited by Chhorn E. Lim and Carl D. Webster contains a wealth of information on just about every aspect of Tilapia culture conceivable. Contributions from experts in their particular fields examine the present state of knowledge in fine detail. Industry predictions, hormonal control of growth, genetic improvement, sex determination, manipulation, and control, seed production, culture practices, earthen and lined pond production, soils, culture in flowing water, cage culture, feeds, soil, water, and effluent quality, culture in saline water, polyculture of tilapia with shrimp, parasites and diseases are covered.

Tilapia will become the most cultured species in the world very soon. This extensive reference provides the latest research and practical information and will prove a useful tool to efficiently and economically maximize production. This book quite comprehensively explores all farmed types of tilapia with a biological description of the fish and describes culture from egg through harvesting. It discusses production issues and gives a good insight on how to best encourage fast, efficient growth. Economic and marketing information are presented and projections of growth of tilapia production by country. The most up-to-date research available is included. It is extensively referenced and contains good tables, photographs, and figures.

I would say this book is essential reading for aquaculturists, nutritionists, geneticists, hatchery managers, feed formulators, extension specialists, tilapia growers, and fish farmers. Educators and students, aquaculture veterinarians and policy makers will find it a comprehensive reference resource on tilapia all in one volume.

The book is available from The Haworth Press orders@HaworthPress.com

ISBN -13:978-1-56022-318-4

Regulatory matters

From Lizeth Botes lbotes@ai-sa.org.za

Aquaculture stakeholders in South Africa should take note that the closing date for the draft aquaculture policies of National Department of Agriculture and Marine and Coastal Management have now closed. In the cover letter that accompanied the draft NDA aquaculture policy, the NDA stated that they "...will still approach MCM for possible amalgamation of the policies.." Following discussions at the SAWG meeting held on 19 Jan 2007, one National Aquaculture Policy was strongly supported by all stakeholders and it was emphasised that the vision for one National Aquaculture Policy should not be lost, no matter what the interim arrangements are. It was further said that various stakeholders at various levels should reach out to MCM in order to bring this vision into reality.

All stakeholders should also take note of the three documents released by MCM in mid-December 2007 namely: Finfish farming guidelines, Ranching guidelines, Marine Aquaculture Sector plan.

Announcements & Upcoming events

Aquaculture Association of Southern Africa biannual Conference

Dates and Venue for the 2007 conference have been finalised.

The conference will be held at the Cape Town Convention Centre from 23 - 26 October 2007, with the following theme:

*AQUACULTURE AFRICA
Linking Resources to Markets Through Technology*



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Conferences

Aquaculture Europe 2007 - October 24-27

Organised by the European Aquaculture Society. On the Aquaculture Europe 2007 page, you'll find the promotion brochure and information on this new Concept of the future Aquaculture Europe events, conference, exhibition, Industry forum, Student forum, etc.

More details on this event at: -

<http://www.easonline.org/home/en/default.asp>

Aquaculture 2007 - February 26 - March 2

The International Triennial meeting of the World Aquaculture Society, the National Shellfisheries Association and the American Fisheries Society Fish Culture Section will be organised in San Antonio, Texas.

More details: -

<http://www.was.org/Main/Default.asp>

Edinburgh Aquaculture conference - April 17-19

From the Fish Farmer

Speakers from the UK, Ireland, Europe, North America and the Middle East will participate in an Edinburgh aquaculture conference. This April, Aquaculture Today 2007 will bring together leading figures in the global seafood industry to focus on the key issues affecting aquaculture development.

High profile speakers will advise delegates on how to attract outside investment, build consumer confidence and stay on top of market developments. Other issues up for discussion include offshore aquaculture, salmon market initiatives and developments in the shellfish sector.

Following an evening of networking, the conference will open on April 18 with a keynote speech from leading expert in brain chemistry and human nutrition, Dr Michael Crawford. Karol Rzepkowski, Managing Director of Johnson Seafarms, will discuss how the company successfully pioneered organic cod as a new species for UK aquaculture, and how it has conducted a high profile media campaign promoting its products and sustainable aquaculture.

Conflicting information regarding the environmental sustainability of aquaculture operations in Canada, and the safety and health benefits of aquaculture products, has challenged public and consumer confidence. Mark Burgham, Associate Executive Director of the Aquaculture Management Directorate in the Department of Fisheries and Oceans Canada, will discuss the lessons learned from working at the centre of a very polarised debate. Other speakers due to address delegates include: Mario Santos of DG Fish, European Commission; Doug McLeod, Chairman of the Association of Scottish Shellfish Growers; Stephen Tait, Freedom Food; Karen Galloway, Seafish; and Martin Jaffa of Callander McDowell.

Now in its third year, Aquaculture Today is the UK's leading aquaculture conference and is a highlight of the industry events calendar. It will be held from April 17-19 at the Sheraton Grand Hotel & Spa, Edinburgh.

For more information and bookings go to: -

Employment

Aquaculturist required - Abalone

West Coast Abalone has an opening for an Aquaculturist which we are looking to fill. We are a small abalone farm situated in St. Helena Bay with a production of 50 tons per annum. The person that we are looking for is someone who has a good basic knowledge of aquaculture. The position is definitely a hands-on one, and as we are a smallish operation there is an element of Jack of all trades associated to the position. There is probably only a small element of very scientific work with the major responsibilities being production and staff supervision.

The job description can be forwarded on request. Anyone interested should e-mail a CV asap to:-

kwhyte@wca.co.za

Position required

I have recently completed the Certificate in Aquaculture through the University of Stellenbosch as a practical student based in Stellenbosch working at Jonkershoek trout farm, Welgevellen tilapia hatchery, and positions on various abalone farms.

Please contact Marc Touzel on 0837779811 or email: mark_touz@hotmail.com

Ph.D. and M.Sc. projects available

A Ph.D. project is available in the Aquaculture Division, Department of Genetics, Stellenbosch University with the project title "Development and optimization of a gene transfer system for the abalone *Haliotis midae*."

A MSc project is also available at Stellenbosch University with the project title "Chromosome analyses of South African abalone."

More information is available at:

http://www.sun.ac.za/news/NewsItem_Eng.asp?Lang=2&ItemID=11443

Or contact Dr. Rouvay Roodt-Wilding at roodt@sun.ac.za

Closing date: 16 February 2007