



Aquaculture Association of  
Southern Africa

## NEWSLETTER

OF

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



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## A Word from the AASA Chairman and the CEO of AISA

### Etienne Hinrichsen

It's that time of year again – the time when the days scream by as we race towards the end of 2008. I am not sure if it's got to do with one's own age or if it's just the age in which we live, but months and years fly by like days and weeks. It's probably a combination of these factors... What's this got to do with aquaculture you ask? Well, very little. Nevertheless, I find myself reflecting on just one decade ago when aquaculture was a very foreign concept in South and Southern Africa. Albeit with some frustrations, aquaculture has come a long way and clear acceleration is evident.

In South Africa, I am aware of a number of aquaculture developments and public facilitation initiatives that are taking place at the moment. Among these are the initiatives by the Provincial Development Corporation (PDC) in the Western Cape to develop a growth centred Policy for the province, the ongoing developmental work by the Department of Science and Technology (DST), various activities by the Eastern Cape Development Corporation (ECDC), a best management practice guideline by the Department of Water Affairs and Forestry (DWAF) and a multitude of projects by the Marine and Coastal Management (MCM) Branch of the Department of Environmental Affairs and Tourism (DEAT). These MCM projects include work-shopping and finalisation of the Abalone Ranching Guidelines, the selection of land based and offshore marine aquaculture sites, development of pilot projects, the backing of new EIA guidelines for aquaculture and the establishment of an implementation plan to cover the main objectives of their policy – these being the creation of an enabling environment, research, environmental matters and transformation.

Some of you may recall my previous reporting on the Alien Invasive Species (AIS) regulations. Short of getting into more detail, I can say that a number of aquaculture stakeholders met with the South African National Biodiversity Institute (SANBI) on 13 August. They have been tasked to rework the categorisation of alien species and will be finalising their work shortly. (see below under Regulatory matters – Ed.) Stakeholders were told to expect a next draft of the regulations in October with further public consultation.

The eight International Symposium on Tilapia in Aquaculture (ISTA) is due to take place in Egypt from 12 to 14 October 2008. I am reporting on this specifically due to the fact that a group of people will be gathering at this event to discuss the strategies around the formation of an African Chapter of the World Aquaculture Society (WAS) – a discussion that has been ongoing for some time now. Although doubtful that I will be attending myself, we will have a representative of AASA in these discussions. I hope to provide more information on this important milestone in the near future. I trust that the rush towards the end of the year will be fruitful, productive and exciting.

### Dr. Lizeth Botes

From Lizeth Botes [lbotes@ai-sa.org.za](mailto:lbotes@ai-sa.org.za)

It is again almost the end of the year and indeed also time for the 2nd and last SAWG meeting of the year. I realise that there has been many workshops and a lot of action over the last few months but would appreciate your support for the last SAWG meeting of the year (Wednesday 30 Oct 2008, 10am – 12pm) since it is also time to elect the next SAWG Chairperson, Vice-Chairperson and secretariat. The agenda and final arrangements plus details of the venue will be circulated to all closer to the time of the meeting.

As the current Chairperson of SAWG, I would do my utmost to arrange, along with above mentioned elections, an interesting meeting with a speaker on a topic of your interest. I therefore

would like to invite all interested parties to send any suggestions as to the speaker you would like me arrange for the day.

Looking forward to hearing from you!

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- ◆ Agro-industry companies
- ◆ Conservation organisations
- ◆ Fisheries and food traders, retailers, processors, etc.....



## **THE FUTURE IS FISH FARMING**

## The Editor's choice

Adrian Piers [newsletter@asa-aqua.co.za](mailto:newsletter@asa-aqua.co.za)

## Editorial

There have been several news reports that Tilapia is not a healthy choice as far as the medical benefits of eating fish is concerned. A well respected nutritionist published the article below to put the facts right.

## Tilapia should not be removed from diet

By Thomas Repas, DO, FACP, FACE, CDE

A colleague of mine asked me whether we should warn our patients about the dangers of consuming Tilapia. My reply was: "No! Absolutely not!"

Recently, an article was published in the *Journal of the American Dietetic Association*

[http://www.adajournal.org/article/S0002-8223\(08\)00515-4/abstract](http://www.adajournal.org/article/S0002-8223(08)00515-4/abstract)

**suggesting that consumption of tilapia may be less beneficial** compared with other types of fish because of lower levels of omega-3 and an increased omega-6 to omega-3 ratio. The media, public and some health professionals have misinterpreted this to mean that tilapia is unhealthy. Nothing is further from the truth.

Increasing the consumption of omega-3 fatty acids (particularly docosahexaenoic acid or DHA and eicosapentaenoic acid or EPA) for cardiovascular prevention has been advocated by the American Heart Association and other groups. Because omega-3s are produced by marine phytoplankton and move up the food chain, the best natural source is fatty cold-water ocean fish including sardines, herring, mackerel and salmon. Thus, it has been recommended for us to consume fatty cold-water fish at least twice a week.

It is correct that all freshwater fish, including tilapia, have lower amounts of omega-3 compared with fatty cold-water ocean fish. Some freshwater species such as trout may have high amounts of omega-3 when raised on fish farms and provided feed containing ocean-source omega-3 containing fish meal. As much as I enjoy fly-fishing, I realize that the farmed trout sold in the fish market contains more omega-3 than the wild trout I so avidly pursue.

Tilapia consists of a group of warm-water species including *Oreochromis*, *Sarotherodon* and *Tilapia*. Under the proper conditions, they grow rapidly and do not require input of expensive feeds unlike some other species. Because of this, they are among the most popular species to grow in aquaculture.

Tilapia is a high-quality protein, low in both total and saturated fat. One 100 g serving of tilapia contains less than 1 g of saturated fat. Compare that to 2 g per serving of roast chicken breast and 6 g or more in a broiled hamburger patty. However, even though tilapia is low fat, a serving still contains up to 100 mg of omega-3. The average daily consumption of EPA and DHA in the United States is only 100 mg to 200 mg.

It does not make sense to avoid tilapia because it does not contain as high an amount of omega-3 compared to other species. If your goal is to increase omega-3 intake, it is correct, you should increase consumption of fatty cold-water ocean fish. However, by replacing other less healthy, higher fat sources of protein, tilapia and other freshwater fish still have a place in our diet. It is absurd to frighten people about tilapia while at the same time they do not think twice about consuming fast food.

Come to think of it, there is a recipe for baked tilapia I would like to try out for dinner tonight.

## Letters to the Editor

No submissions



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## Abalone

### Shellfish producers for Exporters Awards

By Bronwynne Jooste in the Cape Argus

The town of Hermanus can now officially lay claim to two of the Western Cape's fastest-growing and most innovative export businesses. Hermanus-based Elezane Industries and Abagold are finalists in the Cape Town Chamber of Commerce's 2008 Exporter of the Year awards.

Elezane Industries exports tons of live snails to Europe each year, while Abagold breeds, harvests and exports Abalone, known locally as perlemoen to the East. Both companies employ hundreds of people in a community where joblessness is a problem. They worked hard to identify their markets and then made sure they met their growing demands. Abagold was established in 1995, although the idea was born more than 22 years ago. Managing director Christo du Plessis said the business was the brainchild of veterinarian Pierre Hugo, who had done experiments to measure how perlemoen could breed in captivity. He also speculated how long wild perlemoen populations could be sustained. And what started as a side-project in a small fish tank has grown into a multi-million-rand business. Abagold has its own hatchery in Hermanus's harbour. From the hatchery the perlemoen spend four years in the farm and is then moved to land tanks. Six million litres of fresh sea water is pumped into the tanks each hour. The perlemoen are then taken to a processing plant from where they are shipped to countries like Hong Kong, Singapore and Malaysia. Abagold

exported 220 tons last year, seeing a R57 million turnover. Du Plessis said they were aiming to export over 300 tons a year in the next two years.

Marine and Coastal Management is conducting studies to identify sites for a new method of breeding perlemoen, called ranching. Du Plessis said ranching would mean parts of the coast would be allocated for growing and harvesting baby perlemoen. "We also want to get into integrated aquaculture. Instead of pumping the sea water back into the sea, we want to use it to grow seaweed which will be used to feed abalone. This will open the door for growing other species like mussels."

But for now, the company feels "honoured" by its nomination.

"We have created a name for ourselves with consistent supply and quality. We are 100% exports, but we don't import any of our materials and we are totally eco-friendly. We feel privileged we can contribute in Hermanus by creating jobs."

Like Abagold, Elezane Industries, which trades as the SA Snail Company, is feeding a healthy international demand. The company partners saw amazing business possibilities for snail exports by harvesting the molluscs from local farms. Hundreds of workers, who can earn around R350 a week, including in off-season, collect the snails. They are then taken to the factory where they are chilled and go into hibernation, sealing their shells. From there they are exported to Europe, where the brown garden snail is a major delicacy. Elezane partner Shelldon Breda said the company was proud to be a pioneer in the industry. It's one of the first commercial snail harvesting and exporting companies in the country. It is clearly not afraid to venture into uncharted territory. It is one of the first businesses in South Africa to export live snails by sea.

Elezane is the first wholly black-owned and managed company to be nominated for the Chamber's award.

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## Catfish

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No submissions

## Crayfish and Lobsters

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### Crayfish in the Nile River

By D, Bardslev [dbardsley@thenational.ae](mailto:dbardsley@thenational.ae)

If there is one thing Magdy Khalil loves to see on his dinner plate, it is a tasty crayfish that has been plucked from the River Nile. In fact, Professor Khalil, an aquatic ecologist at Ain Shams University in Cairo, would like these creatures to become the favourite food of everyone in his country, and not only because they are delicious. The reason is that crayfish, which have the scientific name *Procambarus clarkii*, can destroy the livelihoods of fishermen along the length of the Nile. Native to the United States and introduced to Egypt in the mid 1980s, the crustaceans have been free to multiply thanks to the absence of any major threat from predators. It is a scenario all too familiar to ecologists, who around the globe have seen populations of countless introduced species, from snails to mammals, grow out of control when natural checks and balances do not exist. The crustaceans, which are smaller versions of lobsters and breathe through gills, cause a headache to fishermen because they cut their nets and eat the catch. They also eat the eggs of the Nile tilapia, a fish native to Egypt that is commonly caught for food.

And as if disrupting the Nile's harvest of fish were not enough, crayfish can damage the irrigation canals of the Nile delta through their habit of building burrows that can stretch up to one-and-a-half metres in length. Native to Louisiana, they are believed to have arrived in Egypt courtesy of a fish farmer who thought he was buying shrimp eggs. The eggs hatched into crayfish, which went on to attack small fish being farmed in captivity nearby. "He had his fish farm in the middle of the Nile near Cairo. When he found they destroyed the nets he threw them into the Nile," Prof Khalil says.

The only predator the crayfish need fear in Egypt is the catfish, but *P. clarkii* is only vulnerable when very small or when its body is still soft soon after it has moulted its shell to allow growth, something it does about seven times during its lifetime. The catfish's best efforts are nowhere near adequate to keep crayfish numbers down to levels that do not cause significant harm to fishermen. *P. clarkii* is such a hardy creature that it can even thrive in polluted water. "As long as no catching is taking place from the River Nile, their numbers are probably still increasing," says Prof Khalil.

In many instances in the past, humans have deliberately introduced species to control pests, a tactic known as biological control. Prof Khalil is adamant this tactic could cause as many problems as it solves were it to be tried with the crayfish. But while the crayfish may not have any natural predators, and no predators are likely to be introduced to control them, Prof Khalil believes man could take the place of the birds, bass fish and salamanders that in America love nothing more than filling their stomachs with a tasty crayfish. On paper, turning crayfish into a regular on Egyptian dinner plates should not be too difficult a task, since the creatures are a popular food across the world in areas including Australia, Canada, the United States, Africa and Europe. However, despite the popularity of crayfish in other countries, Prof Khalil faces an uphill battle in his quest make them a popular dish in Egypt.

Partly because of the bad press crayfish have had, perhaps justifiably, in the country, many people simply do not want to eat them. "They don't like the morphology, the shape of the animal. The

media in Egypt named the animal the cockroach of the River Nile or the scorpion,” Prof Khalil says in a slightly exasperated tone. “It’s not natural in the River Nile, so they are afraid to eat it.” Prof Khalil is trying to use the Egyptian media to change the image of the crayfish and encourage his countrymen to discard their culinary prejudices. “They have them in Louisiana, where they are eaten, and it’s a big industry as well as in France and China.”

In Egypt, crayfish meat is relatively inexpensive, selling for about three Egyptian pounds (Dh2) a kilogramme, making it affordable for most families.

While it causes fishermen problems, the presence of the crayfish in the Nile also brings benefits, thanks to the animals’ fondness for munching on a certain kind of snail. These snails carry the larval stage of a flatworm that causes *bilharzia* or *schistosomiasis*, a chronic illness that damages internal organs, impairs growth in children and can cause death in extreme cases. Thousands of larvae escape from the snails into the water and their heads can penetrate the skin of people unlucky enough to be in their vicinity. Ultimately, the parasites infect the lungs, liver and other organs of infected individuals, causing severe damage if the condition is not treated.

“That is the most positive thing about these crayfish, it likes to eat the freshwater snails, especially the bilharzia snails,” Prof Khalil says.

In fact, more than 20 years after the introduction of the crayfish into the Nile, Prof Khalil believes snail numbers have dropped 90 per cent. “Every village water channel we surveyed from 20 years ago or 15 years ago, when we came back we didn’t find any snails. It’s very useful to Egypt,” he says. If the crayfish give such benefits, it begs the question of whether they should be fished at all. If they were eliminated, could the bilharzia snail population grow once again and cause more people to become infected? Prof Khalil insists crayfish stocks are large enough to allow many of the creatures to be caught and eaten without the snail population increasing significantly. “We have a lot of these crayfish to take,” he said.

## Ornamentals

### Passing of a Legend - Hiroji Sakai

From Servaas de Kock [aquanetmail@iafrica.com](mailto:aquanetmail@iafrica.com)

In the early hours of this morning of August 26 2008, the Koi world lost it's most dynamic and pioneering Koi breeder with the passing of Hiroji Sakai, President of Sakai Fish Farms of Hiroshima. Together with his younger brother Yoshimichi and son Kentaro, Hiroji revolutionized Koi breeding in Japan and brought Koi breeding and rearing standards to an unprecedented level, resulting in Sakai bred Koi taking Grand Champion 5 times out of the last 8 All Japan Koi Shows. Hiroji Sakai brought the love of Koi to thousands throughout Japan and around the world, and will be dearly missed by those of us who had the honour of knowing him as we did, a loving grandfather, father, husband, and an unparalleled Koi breeder with a true love of Nishikigoi. Hiroji Sakai's legacy lives on in the Nishikigoi bloodlines that he created and cherished, and in the thousands of lives that he touched with his smile. Hiroji was 62 or so. His son, Kentaro is taking over the business. Also, his younger brother, Kentaro's uncle, has been managing the farm together for some time.



A sad lost to the Koi industry. Rest in peace.



## Oysters & Mussels

No submissions

## Prawns

No submissions

## Tilapia

### Aquaculture growing in Kenya

By Cosmas Butunyi in the Kenya Daily Nation

After years of relying on the benevolence of Mother Nature, fishermen in Lake Victoria are awakening to the reality that they now have to raise their own fish. They now have an added responsibility. Before they can think of casting their nets, they have to source for young fish and feed them to maturity.

From digging their own fish ponds to rearing fish in cages immersed in the lake and other water bodies, fish farming remains their only hope of survival. This has been necessitated by a rapidly growing population in the Lake Victoria basin, coupled with high unemployment. "This has intensified competition for resources," says Fisheries Development minister Paul Otuoma. An estimated 42,300 fishermen derive their livelihoods from the Kenyan side of Lake Victoria.

A recent study carried out by Dr Jembe Tsuma of the Kenya Marine and Fisheries Research Institute (KMFRI) found that there has been a 225 per cent increase in the number of fishing vessels in Lake Victoria since 1990. "The highest increase was from 42,493 vessels in 2000 to 69,160 in 2006," says Dr Tsuma. Despite increased restocking efforts, catches in the lake have gone down. Latest statistics indicate that 117,232 tonnes of fish were landed from the lake last year, down from 200,159 tonnes eight years ago. "Aquaculture is the only way we can ease pressure on Lake Victoria, which contributes 80 per cent of the fish landed in the country," Dr Otuoma says, adding that the basin has a huge potential for fish farming.

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He says that the country is lagging behind in adopting fish farming technologies. "Aquaculture is in its infancy here," he adds. The minister notes that while the global ratio of capture fisheries to aquaculture was 50-50, aquaculture contributed less than one per cent in Kenya. However, all this is set to change with the newly created ministry focusing its energies on promoting of aquaculture.

So serious is the Government's commitment that there are proposals to create a directorate of aquaculture to co-ordinate its growth. The directorate will be one of four to be created by the new fisheries policy to be launched this month. The ministry has started breeding fish fingerlings in anticipation of the huge demand. The assistant director of fisheries in charge of the western Kenya, Ms Susan Imende, however says this is only in the short term. "We do not want to compete with the farmers," she says, adding that the role of the ministry would be to act as a fallback for genetic improvement of fish species. Fish feed production in the region, she notes, is low because no company is involved in mass production. Ms Imende says that her office's emphasis was on promoting fish farming as a business. "We are encouraging individuals to take up fish farming as a source of employment and income generation," she says. Fish farmers are undergoing training in business enterprise, she says. Already, Ms Imende states, her office is working out estimates of expected returns per unit investment in fish farming. "The only challenge that we have is estimating the yields according to different areas where the fish is raised," she says. She says that the region is being demarcated into different ecological zones to guide the estimation of yields.

Dr Otuoma warns that if fishermen do not embrace aquaculture, the lake region, famous for its fish production, will soon have to depend on other areas for supplies. "Other areas are adopting the technology fast and soon fish will be brought into Nyanza Province because fishermen have taken too long to adopt," he says. Dr Richard Abila, the deputy director of KMFRI, says that a pilot project to promote the practice has been launched in Harambee in Nyakach, Bomet District, Kisii and Machakos, among other places. "This was after research was done in a dam in Nyando District," adds Dr Abila. The researcher says the first batch of fish is set to be harvested next month. "The farmers started rearing the fish, which have now attained a weight of 300 to 400 grams, in November last year," says Dr Abila. He says that the fish are reared in cages of varying sizes with each holding between 1,000 and 10,000 fish.

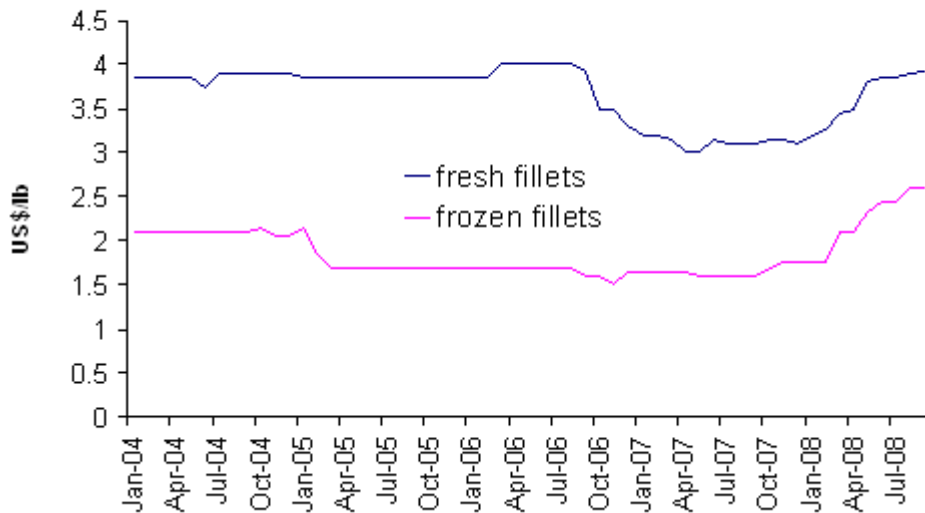
At the Obenge beach in Rarieda constituency, a community-based project to rear tilapia in cages is in progress. KMFRI has set up two fish cages with 200 fish each at the beach to showcase aquaculture to local fishermen. The local beach management union's secretary, Mr Victor Mbugu, says raising tilapia is intended to close the supply gap created by declining catches. Rarieda MP Nicholas Gumbo says that plans are underway for the Lake Basin Development Authority to embark on a pilot project in the constituency. The authority runs a fish farm on the outskirts of Kisumu that raises tilapia and catfish fingerlings. Dr Otuoma says that aquaculture offers a reprieve to fishermen when the omena ban is in effect between April and July. However, Dr Abila calls for caution in the rearing of fish in natural water bodies. He says different types of feeds in the water could lead to degradation.

## **Tilapia prices in the US**

From Globefish Tilapia Report

The discussion of tilapia providing not enough omega-3, as reported in the last issue of the GLOBEFISH Seafood Highlights, seems to have had no impact on US tilapia consumption. While tilapia buyers are dealing with supply problems and price increases, the good news is that consumers are still buying tilapia. Consumption will be down in 2008, but this is mainly due to less tilapia arriving on the market from China due to the cold weather losses. Ecuador is expected to return to tilapia farming, now that feed costs are normalising while tilapia sales' prices are reported very attractive.

## US tilapia prices



Full article at:-

[http://www.globefish.org/index.php?id=4590&utm\\_source=Aquafeed+English+Newsletter&utm\\_campaign=58c579caf7-Aquafeed+Newsletter+-+09+-+25+-+2008&utm\\_medium=email](http://www.globefish.org/index.php?id=4590&utm_source=Aquafeed+English+Newsletter&utm_campaign=58c579caf7-Aquafeed+Newsletter+-+09+-+25+-+2008&utm_medium=email)

## Trout and Salmon

### Workers suffer the effects of Infectious Salmon Anaemia in Chile

By Daniela Estrada in IPS

While non-governmental organisations appreciate the Chilean government's efforts to improve hygiene and environmental conditions in the salmon industry, they are calling for an end to the expansion of salmon farming and solutions for thousands of workers who lost their jobs because of a crisis in the sector. "We cannot continue to clean up the country's image at the expense of the workers. In the view of the outside world we are protecting the environment, but what are we doing within our country? Who will take responsibility for the families of the people who have been sacked?" asked Cecilia Millán, the head of the Chilean branch of Oxfam, an international relief agency. Oxfam and the non-governmental Terram Foundation launched the second part of their "Not Afraid to Go against the Current" campaign on Monday. The goal is to draw public attention to poor sanitary, environmental and labour practices in the salmon farming industry. At a press conference, the two organisations called on the authorities not to allow further expansion of salmon farming from the Los Lagos region, located more than 1,000 kilometres south of Santiago, to the even more southerly Aysén and Magallanes regions.

According to statistics from the government of Michelle Bachelet, 474 salmon and trout farming concessions have been granted to date in Los Lagos, covering an area of 6,172 hectares. In addition, there are 391 pending applications. In Aysén, 526 concessions covering 4,224 hectares are in operation, and the authorities are considering 1,141 new applications, which would spread over 10,806 hectares. In Magallanes, 41 concessions occupy 181 hectares, and there are 1,083 pending applications, which would take up an additional 13,323 hectares. According to the authorities, there are only two areas still available for fish farming in Los Lagos, and 68 in Aysén.

Chile is the world's second largest producer of farmed salmon and trout, after Norway. The industry enjoyed phenomenal growth following the introduction of both non-native fish species in

the 1980s. In 2007, exports were worth over 2.2 billion dollars, and the sector had created an estimated 55,000 direct and indirect jobs.

However, in July 2007 fish farming was brought to an abrupt halt by the appearance of a lethal virus which causes infectious salmon anaemia (ISA), forcing companies to close a large number of processing plants and to slaughter all the fish in infected farms. By Aug. 29, 2007, ISA outbreaks were confirmed on 25 Chilean fish farms. A further 16 farms were suspected to have ISA, 35 were fish-free and temporarily closed for disinfection, and another 81 were in quarantine, that is, no virus had been detected but these salmon farms were sealed off because they were near infected facilities. The government went into action to defend the industry's international image, and created the Salmon Working Group, made up of authorities and experts and chaired by Economy Minister Hugo Lavados. Lavados said that changes in aquaculture sanitary regulations, environmental rules and import regulations for aquatic species, including salmon eggs, would be completed by December 2008. The National Fisheries Service will be strengthened in order to improve oversight of the fish farming industry, and an independent research study is to be contracted to define the carrying capacity of aquatic ecosystems affected by salmon farming.

"One of the current problems in salmon farming is the intensive use of antibiotics. Although they are permitted, we believe their use should be rationalised," the Working Group says in its report. As a result, a plan for using and managing antibiotics will be drawn up.

Oxfam and the Terram Foundation welcomed the measures proposed by the Salmon Working Group, they criticised the fact that no mention was made of the problems faced by thousands of workers dismissed because of the ISA virus crisis. "They have only solved half the problem. The other half is the workers," said Millán.

According to Lavados, more than 1,000 people were dismissed when fish farms and processing plants were closed, but the non-governmental organisations put the number closer to 3,000. A large part of the wages received by salmon industry workers is calculated according to companies' production volume, even when factors other than the workers' own productivity, like the ISA virus, come into play. "If there is an epidemic, those who lose out most are the workers, not the company," she complained.

In spite of the crisis, in 2007 the export volume of Chilean salmon and trout grew by three percent, and the value of the exports increased by 2.6 percent, compared to 2006.

## Other

### Crocodile farming booms in Zambia

By Danstan Kaunda

Crocodile farming is booming in Zambia. The Zambia Crocodile Farmers Association hopes to export more than 50,000 crocodile skins to high fashion markets in France and Singapore by next year. Closer to home, the animal's meat is used for food. There are 80,000 Nile crocodiles in 12 reptile farms in Zambia. Not a single piece will be thrown away. Crocodile skin earned the country US four million dollars in exports last year. The meat is served in restaurants and is considered a delicacy, appreciated for its taste and because it's low in cholesterol. The fat is used for making beauty cream. And the oil is said to help relieve the symptoms of ringworm and respiratory ailments, but those claims have not yet been tested.

Bill Thomas is the chairperson of the Zambia Crocodile Farmers Association. He says there are a lot of international pharmaceutical companies that have shown interest in crocodile oil. "So this is an opportunity for crocodile farmers," he says. "There is a lot of demand for crocodile oil even here



in Zambia. More and more people are asking for it." But this booming industry may slow down because of the high cost of fuel and food. That's because they need more food to have better quality skin. It's becoming more and more expensive to raise the reptiles. For one thing, he says,



taxes are going up. "The charges [taxes] that we are paying to government are increasing all the time," he says. " We have seen a great effect on the business in the last six months, a lot of our crocodile farmer members are not able to expand. I think government is not bothered with our concerns because the country is currently riding on high metal prices and when the metal price comes down they will turn to us and other non-traditional exports only to find they have pushed us out of business."

Kalimba Reptile farm 10 km from Lusaka

In Zambia, the crocodile skins are sold twice a year at trade fairs through the Crocodile Farmers Association. Last year, 40,000 skins were sold, earning the country over US \$ four million dollars. The industry employs about 450 people. According to the World Wildlife Fund trade in wildlife report, close to 50 million products made from reptiles are being traded each year, with a declared value of up to US\$ 500 million.

### Israel research on Caviar production



Even if you don't often buy real caviar because of its high price, you know that the worldwide production of this gourmet treat has been drastically reduced in recent years because of sturgeon populations decline in the Caspian Sea. Now, Israeli researchers might help caviar lovers. They started by importing fertilized sturgeon eggs eight years ago. According to the scientists, it takes eight to fifteen years for the female sturgeon to reach puberty and start producing eggs, while male sturgeon reach puberty after four or five years. And fisheries need to wait for the first four years because it's impossible to tell the gender of the fish

before this age. After the gender has been determined by endoscopy male sturgeons are sold on the fish market while females are fed until they can deliver up to \$3,000 in caviar.

<http://www.alphagalileo.org/index.cfm?fuseaction=readrelease&releaseid=531691>

### Call to promote Nile Perch cage farms

Editorial in the Uganda New Vision

The agriculture ministry has warned that within a few months Uganda might run out of Nile perch given the rate at which the stocks are dwindling. This would be disastrous as fish has been one of Uganda's leading exports, fetching over \$100m annually.

While the Fisheries State Minister blames this on fishermen who catch immature fish, and officials who fail to regulate them, this illicit practice is largely driven by the demand in Europe, Asia and other countries of the Great Lakes region. Since fish is expensive most consumers in these export destinations can afford only smaller pieces.

Additionally, many say the younger Nile Perch tastes better. The challenge for the fisheries sector is to ensure consistent and high production.

Whereas it is important to police the lake better and check illicit fishing practices, the current stocks have to be increased. Since fisheries researchers have not yet succeeded in making Nile Perch farming feasible on land, cage fish farming on lakes remains the most viable option for increasing Nile perch production.

Government should therefore put in place the necessary regulations and guidelines for cage fish farming. They should initiate a campaign to attract investors to do cage farming on Ugandan lakes and provide incentives such as tax exemption on inputs.

The aquaculture department in the ministry should also create a one-stop information centre for investors.

<http://www.newvision.co.ug/D/8/14/646989>

## Feeds

### Distribution of enzyme-producing bacteria in digestive tracts of freshwater fish

Mondal S., Roy T., Sen S.K., Ray A.K. 2008.. Acta Ichthyol. Piscat. 38 (1): 1-8.

The information on gut microflora in fish is scanty and there is a paucity of knowledge regarding microbial enzyme activity in fish gastrointestinal tracts. Although some information is available on the enzyme-producing bacteria in fish digestive tracts, almost nothing is known about their distribution in different regions of the gut. In the present study, an attempt has been made to investigate the distribution of enzyme-producing microflora in the foregut and hindgut regions of seven culturable freshwater teleosts.

Isolation and enumeration of aerobic bacterial flora in the foregut and hindgut regions of the gastrointestinal tracts of seven freshwater teleosts of different feeding habits, namely rohu, *Labeo rohita*; catla, *Catla catla*; mrigal, *Cirrhinus mrigala*; bata, *Labeo bata*; orange-fin labeo, *Labeo calbasu*; Nile tilapia, *Oreochromis niloticus*; and climbing perch, *Anabas testudineus*, have been carried out. Microbial culture of the gut mucosa on selected nutrient media, following the enrichment culture technique, was done for bacterial isolation. Bacterial isolates were qualitatively screened on the basis of their extracellular enzyme-producing ability. The selected strains were further quantitatively assayed for amylase, cellulase and protease activities.

In general, bacterial population was lower in the foregut region of all the seven species of fish examined. Amylolytic strains were present in higher densities in the foregut region of orange-fin labeo and bata in comparison to the hindgut region. The cellulolytic population exhibited maximum densities in the hindgut region of bata followed by the foregut region of the same fish. Amylolytic and cellulolytic bacterial flora was not detected in both the fore and hindgut regions of climbing perch. Proteolytic bacterial flora was found in all the species of fish studied and the maximum count was observed in the hindgut region of bata, orange-fin labeo, Nile tilapia and climbing perch. Minimum count of proteolytic bacterial flora was observed in the foregut region of all the fishes studied. Peak amylase and cellulase activities were exhibited by bacterial strains isolated from the foregut of orange-fin labeo and the hindgut of bata respectively. Maximum protease activity was exhibited by a strain isolated from the hindgut region of orange-fin labeo, followed by the strains isolated from the hindgut regions of climbing perch, bata, and Nile tilapia.

The results of the present study indicate that there is a distinct microbial source of digestive enzymes apart from the endogenous sources in fish digestive tracts. The enzyme-producing bacteria isolated from the digestive tracts can be beneficially used as a probiotic while formulating

aquafeeds, especially in the larval stages. However, further investigations are required to determine if the addition of such isolates to fish feeds do, in fact, provide some kind of benefit to the fish involved before advocating their use.

Full PDF paper at:-

[http://www.aiep.pl/volumes/2000/8\\_1/pdf/01\\_817\\_FULLTEXT\\_Mondal\\_et\\_al\\_P\\_4.pdf](http://www.aiep.pl/volumes/2000/8_1/pdf/01_817_FULLTEXT_Mondal_et_al_P_4.pdf)

## Environment, Health and Disease issues

### A new breed of Fish Farming

By Fiona Morrow in the Globe and Mail

Aquaculture has long been a target of environmentalists, but the fish at this operation in British Columbia in Canada tick all the right eco-boxes. Bruce Swift is remembering his first attempts to generate interest in his B.C.-farmed Coho Salmon. It was four years ago, and the trip from his property in Agassiz, B.C., to Vancouver was a disaster.

"There wasn't one person who would take it," he recalls. "I came back and had to cull 1,500 to 2,000 fish. We shipped them all to the mink farm."

How times have changed. Mr. Swift's farmed coho are now an exclusive delicacy, available only at three high-end restaurants in Vancouver. This operation meets all the right standards with the local, sustainable and organic movement. This may come as a surprise to conscientious consumers, but Mr. Swift's product is a far cry from the farmed variety found at the supermarket. The time has come to look for sustainable alternatives and Mr. Swift's project may be the answer. His farm is land-based, the coho kept in a series of enormous tanks, removing any possible contamination effect on wild salmon. It's a system that has environmental groups excited.

"As part of the Coastal Alliance for Aquaculture Reform, we are advocating strongly at the provincial and federal level for investment in closed-containment pilot programs," said Catherine Stewart, Salmon Farm Campaigner at Living Oceans. "The system addresses a lot of the problems of open pens and we need a thorough analysis of what is a potential solution to a vital issue." And the difference between the farmed salmon Mr. Swift rears and regular farmed salmon isn't only a matter of breeding grounds. More than simply salmon reared in gigantic fish bowls, Mr. Swift's farm is part of a Canadian research concept known as integrated multi-trophic aquaculture being tested on both coasts by the Universities of New Brunswick and Victoria. The idea is to grow one species in conjunction with others in a multi-level system that balances out biological and chemical processes. It involves one fed species, in this case, the salmon eat pellets made from wild marine material developed by animal nutritionist Dr. MaryLou Swift. Then other plants and animals that extract their nutrients from either the solid or water waste are introduced. At Swift Aquaculture, waste solids are filtered and become fertilizer for field crops such as garlic and beans, while waste water is used to grow wasabi, watercress and algae. The algae, in turn, become a feed supplement for the crayfish bred in Mr. Swift's freshwater pond.

No additional nutrients are brought onto the farm. It's a meal in one backyard.

"We only have four acres," says Mr. Swift. "Yet I could grow hundreds of thousands of fish - that's the beauty of aquaculture. One tank can hold 2,000 fish, and that's not high-density at all. The key thing when you're looking at a land-based system is that you can go up, you just make your tanks taller and deeper." Nevertheless, Mr. Swift says he prefers to operate a smaller system, supplying to a niche market. "I like to avoid the middlemen," he explains. "I sell direct, meet the chef - these coho are not a commodity to me." His approach is to grow small salmon, only 1 to 1.2 kilograms,

that produce two fillets each. The brood stock are kept in tanks inside, under strict biosecurity conditions. From this stock, eggs and milt are removed for fertilization and then transferred to the tanks where they will grow until harvest. Keeping the fish small and, as a result, not grading the fish for size, is important to reduce handling. If handled too much, grown Pacific salmon become stressed, triggering proliferative kidney disease, Mr. Swift explains.

Being unable to guarantee consistency is the one drawback to this system. "Sometimes that can be frustrating to restaurateurs, because there isn't this nice, evenly sized fish," he says. But the advantages to his broader approach more than compensate. "We don't use antibiotics or vaccines and we are also one of only two salmon stocks in Canada to be health certified. This is a market ready to explode, he says, citing the fact that a land-based system in Washington is supplying Whole Foods. "You get a place like that interested, and that triggers a market. I think there's going to be a big shift, and coho is a fish that can do it."

## Research matters, Reviews & Training

### Self propelled fish cages

By Andrea Cohen, MIT Sea Grant

A self-propelling underwater cage developed and recently tested by an MIT researcher could not only cut costs for offshore ocean-based fish farms but also aid the movement of such operations into the high seas, avoiding the user conflicts and compromised water quality of coastal zones.

Fish farms account for more than half of the seafood produced globally. 40 percent of the seafood consumed in the United States is farmed in other countries and imported. However, very little of that comes from ocean-based farms. In conventional offshore fish farming, cages are routinely repositioned to control disease. Stout towboats haul the enormous cages to another site, and both the cage size and typical propulsive inefficiency of boats make such movements very energy-intensive events.

Cliff Goudey, director of MIT Sea Grant's Offshore Aquaculture Engineering Centre, is exploring a different approach to moving the cages. By placing large, slow-turning propellers directly on a cage, Goudey frees it from the normal constraints of a boat. His system uses a pair of eight-foot diameter, electrically powered propellers, with 6.2-horsepower underwater motors. The motors are powered through tethers to the surface attached to a diesel generator and a pair of motor controllers mounted on a small boat. Recently he tested the approach at Snapperfarm Inc., an offshore fish farm in Culebra, Puerto Rico, that grows cobia in submerged cages. By fixing a pair of the propellers to the mid-depth of a 62-foot diameter fish cage in a horizontal line 9 feet apart, Goudey maneuvered the cage as well as any boat-based system. "These tests demonstrate that the concept of mobile cage operations is technically feasible," Goudey says.

The project is funded by NOAA's Marine Aquaculture Program, aimed at demonstrating the technology needed to raise fish in the vast portions of the oceans that are too deep for conventional anchored fish cages. By operating while submerged and in predictable ocean currents, mobile fish farms need only a modest means of positioning to stay within planned trajectories. Besides the use of self-propulsion for routine cage movements, the propellers have additional utility. Often, the limiting factor in cage stocking density is dissolved oxygen levels due to fish metabolism during slack water. The propellers provide a ready opportunity to supplement water flow through the cage during those brief events, thereby allowing larger crops of fish. All involved in the testing were impressed with the performance of the propellers. There is also a growing demand for self-propelled harvest pens that may be a great market for this technology."



With the technical feasibility proven, Goudey is turning his attention to assessing the system's economic viability, both as a tool for routine cage movements in offshore fish farming and in a business strategy involving mobile cages associated with specific routes in concert with predictable ocean currents or tidal gyres. This future work will involve the collaboration of ocean modellers and aquaculture business people.

Full story <http://web.mit.edu/newsoffice/2008/aquaculture-0902.html>

## Regulatory matters

### Alien and Invasive species Workshop

From Leslie Ter Morshuizen [leslie@aquaafrica.co.za](mailto:leslie@aquaafrica.co.za)

A workshop between key stakeholders was held at Kirstenbosch on the 13th August 2008 to develop a draft framework for addressing aquaculture species for inclusion in the NEMBA alien and invasive species (AIS) regulations. Prof John Donaldson of SANBI has been tasked by the DEAT to make recommendations on the way forward for the practical implementation of the NEMBA regulations, and this workshop provided an opportunity for the industry's stakeholders to make comments and recommendations on the approach he was planning to propose.

Species to be used in aquaculture fall into one of three categories with the AIS category being further divided as per the Table below.

Category	Restrictions & Control
1. Prohibited alien species	Permits will not be issued
2. Permitted alien species	`White list' species, no restrictions
3. Alien invasive species	
a. Regulated by area	Only permitted in demarcated areas
b. Under surveillance	None until shown to be invasive
c. Requiring compulsory control	May not be in possession
d. Part of a management plan	May not propagate

After much discussion, the essence of the category structure above was accepted as being appropriate for regulating the aquaculture industry. The point was raised though that aquaculture species therefore fall into one of three categories: permitted, regulated by area or under surveillance.

A point of concern that was raised is the current cost of conducting a Risk Assessment (RA) on a new species of interest. Furthermore, given that the applicant wanting to bring in a new species currently has to foot the bill for the RA, but that the outcome is a public document, this creates a massive disincentive for companies to fund RAs. This situation is causing the industry to stagnate.

It was proposed that a two-tiered approach would be proposed for RAs, as follows:

1. A motivated application would be adequate for species for which there is no reason to believe that invasiveness is a significant risk, and
2. For species where it is believed that a potential risk exists a full RA will still be required.

The workshop ended on a positive note with the participants satisfied that their concerns were heard and that the industry will get fair representation by Prof Donaldson when he presents his recommendations to DEAT on 30th September 2008.

## Western Cape Policy and Strategy Workshop

From Henk Stander [hbs@sun.ac.za](mailto:hbs@sun.ac.za)

The Provincial Development Council of the Western Cape hosted the Aquaculture Policy and Strategy follow-up Workshop to the one held in Cape Town between the 17th and the 19th October 2007. The following issues were addressed:-

Policy – What do we intend to do?

Strategy – How we will go about achieving it.

The draft Aquaculture Policy document was discussed and the process of drawing up an Aquaculture Strategy for the Province was initiated at this three-day workshop. All four Constituencies (Labor, Civil Society, Business, and Government) were represented at the workshop. Unfortunately only a very small percentage of the participants who attended the workshop were actively involved with the Aquaculture Industry at the present moment of time. The social principle in the Strategy draft – equitability, came through strongly during the workshop. To encourage Transformation into the aquaculture development process it is important to foster inclusivity. Aquaculture is a legitimate user of land and water for mutual benefits, and therefore aquaculture must be fully integrated within society, be socially acceptable, and carried out in an ethical manner. The Aquaculture Institute also needs to be transformed and become more representative of our society as a whole. Stakeholders decided to go back to their Constituencies for internal discussions and meetings with all stakeholders before new members for AISA would be nominated. Mr. Shelton Kaba Mandondo chaired the workshop and Prof. Krishen Rana facilitated the workshop and discussions. Good progress was made on all the relevant matters during the course of the workshop.

## Conferences, Recent and Upcoming events

### Report on Marketing Workshop 25<sup>th</sup> to 28<sup>th</sup> August

From Henk Stander [hbs@sun.ac.za](mailto:hbs@sun.ac.za)

A regional Workshop on International Marketing of Fish and fish Products: Trends and Challenges was held in Stellenbosch between 25<sup>th</sup> and the 28<sup>th</sup> of August.

It was an excellent workshop, well worth attending, with ten international experts presenting really interesting and relevant presentations on issues that are mostly neglected by the Aquaculture Industry. Coordinated by INFOSA in collaboration with the University of Stellenbosch and the Aquaculture Association of Southern Africa this four-day workshop was intensive and deliberately selective in its coverage of topics, which span the entire value chain from production to consumption. The objective was to create an improved understanding and appreciation of the key industry drivers that will help generate added value to the participant's future working activities and their dependent business communities.

This workshop contributed to the overall aim of strengthening national capacities in seafood marketing, and provided the participants with an integrated contemporary vision of the critical factor of shaping seafood marketing, with special emphasis on the emerging issues of certification schemes and sustainability, ecolabelling and market driven standards that are now becoming increasingly important, and their implications in the seafood industry.

Today's market access is hindered by a lack of understanding of international trade practices and opportunities; weak production methods (low product quality and technology), ineffective

marketing; more complicated regulations and trade procedures; certification and standardization requirements, and poor supply chain management. In order to realize the potential, industry professionals responsible for a range of functional activities must be equipped to anticipate, analyze and react to evolving trends and challenges.

African exporters of fish and fish products are not as pro-active on the international scene. They depend on traditional markets and traditional products and on a few outlets. Furthermore, many exporters are vulnerable to market fluctuations. There is a need for African producers and exporters to diversify their market so that producing nations can obtain better prices, thereby optimizing export earnings, and adopt a comprehensive marketing strategy.

## Upcoming meetings

Western Cape, South Africa - Southern Aquaculture Working Group (SAWG)  
Wednesday 30 October 2008 10am – 12pm

Contact Lizeth Botes for more details [lbotes@ai-sa.org.za](mailto:lbotes@ai-sa.org.za)

Alicante, Spain 22-24 October  
Offshore Mariculture 2008  
Details of the conference at

[www.offshoremariculture.com](http://www.offshoremariculture.com)

Istanbul, Turkey 23-25 October, 2008,  
Future Fish Eurasia 2008,

International Aquaculture Technologies & Equipment, Seafood Imports/Exports & Processing Fair  
Industrial Fishing Technologies & Equipment

[www.future-fish.com](http://www.future-fish.com)

Guadalajara, Mexico - 29th to 31st October  
4th International Aquaculture Forum 2008  
Combined conference and exhibition show, attracting visitors from all over Mexico, Central America and the US south-west.

[www.panoramaacuicola.com](http://www.panoramaacuicola.com)

Qingdao, China - 4th to 6th November 2008  
China Fisheries & Seafood Expo 2008  
The annual Chinese aquaculture, fisheries and seafood show.

[www.chinaseafoodexpo.com](http://www.chinaseafoodexpo.com)

Hanover, Germany - 11th to 14th November 2008  
Euro Tier 2008  
International agriculture show with an aquaculture forum and RAS meeting.

[www.eurotier.de/aquaculture](http://www.eurotier.de/aquaculture)

Athens, Greece - 21st to 22nd November 2008  
Aqua Medit 2008  
Fourth international congress on aquaculture, fisheries, technology and environmental management.

<http://connect.to/pasti>

Bangkok, Thailand - 25th to 27th November 2008

AsiaFish 2008

Exhibition aimed at the rapidly growing Asian aquaculture industry, along with its fisheries.

[www.baird-online.com](http://www.baird-online.com)

## Employment

From Adan Morales [whotta@hotmail.com](mailto:whotta@hotmail.com)


After completion of my degree from the University of Portsmouth, United Kingdom from which I achieved a 2:1 grade I have undertaken 2 positions both with varied specialty. Displays Development is the backbone of all 22 Merlin Sea-Life centers world wide and is staffed by 7 marine biologists under the supervision of marine biologist Robin James. My Current position is with Aqua Biotech, a leading independent aquaculture, fisheries, environmental consulting, development, testing/ research and training company operating throughout the world. My responsibilities involve working with a small team of technicians to co-ordinate and report on various aquatic trials and experiments undertaken on a range of freshwater and marine species of fish and shrimp. In addition I am responsible for general and specific maintenance of the systems, water quality testing, sample weighing, feeding, dissections and other experimental requirements.

From Alasdair Maclaurin, [alasdair.maclaurin@uk.ngrid.com](mailto:alasdair.maclaurin@uk.ngrid.com)

I have recently graduated from the University of Plymouth with a degree in Marine Biology and Coastal Ecology and I am undertaking a Masters (MSc) in Sustainable Aquaculture Systems in Plymouth beginning September 09. The course will cover many methods and individual species of aquaculture including trout and salmon, tilapia, and many molluscan species, along with some training and education on the business of aquaculture. I am looking for experience in the aquaculture industry to help me gain skills for the masters and for my possible future career in aquaculture. I would be very interested in any job opportunities. I am also interested on working on farms themselves to gain experience, would you be able to put me in contact with them?

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