

AQUA CULTURE

A s i a P a c i f i c

BMP in shrimp culture in India

New heights for a feed business in Thailand

Pangasius catfish: India expands production

RSA in Vietnam

Q&A on sustainability for Asian aquaculture

Verification and prevention for safe seafood

Grow with Gold Coin



Since 1984,
GOLD COIN is committed to
research, sustainability and
good customer service.

visit our website
www.goldcoin-group.com

At **GOLD COIN**, we are committed to provide superior shrimp feeds to ensure your business success. Using only the highest quality raw materials and manufactured under strict quality controls, we offer a range of feeds* to consistently meet the various levels of production systems. Our strict policy of opposing the use of antibiotics in our feed is congruent with the growing demand by consumers for traceability.

- **GOLD SUPREME** for superior growth and feed efficiency. Health enhancement with proprietary ENCAP® Immune enhancer
- **GOLD FORTE/GOLD VERTEX** are specially formulated for the intensive culture of white shrimp *Penaeus vannamei* in Asian conditions
- **GOLD CLASSIC/GOLD ELITE** are our flagship products that meet all nutrient requirements of *Penaeus monodon* shrimp under normal conditions
- **GOLD ROYALE** is used in highly intensive conditions by the most discerning farmer
- **ENCAP®** Hatchery Feeds have prime quality ingredients micro-encapsulated within a digestible yet water stable membrane

*Some products may not be available in your country. For details on Gold Coin range of shrimp feed and other Gold Coin Aquaculture products, please contact our regional offices.

HEADQUARTERS - Gold Coin Holding Limited Sdn Bhd. Suite 9-6, Level 9, Wisma UOA Damansara II No.6 Jalan Changkat Semantan Damansara Heights 50490, Kuala Lumpur, Malaysia Tel: +603 2092 1999 Fax: +603 2092 1919 email: general@goldcoin-group.com

MALAYSIA (JOHOR) - Gold Coin Specialities Sdn Bhd/Gold Coin Biotechnologies Sdn Bhd, Tel: +607 237 0695 Fax: +607 236 1143 email: sp.koh@goldcoin-my.com

INDONESIA (NORTH SUMATRA) - P.T. Gold Coin Specialities Medan, Tel: +62 61 685 5127 Fax: +62 61 685 3452, email: p.zulkarnain@goldcoin-id.com

INDONESIA (WEST JAVA) - P.T. Gold Coin Indonesia, Specialities Division, Tel: +62 21 885 3668 Fax: 62 21 884 1947 email: p.zulkarnain@goldcoin-id.com

THAILAND (SONGKHLA) - Gold Coin Specialities (Thailand) Co Ltd, Tel: +66 74 483 600/5 Fax: +66 74 483 493 email: w.prapipat@goldcoin-th.com

INDIA (CHENNAI) - India- Gold Coin Biotechnologies Sdn. Bhd. India Liaison Office, No.1, B.V.R. Nagar, Alwar Thiru Nagar, Chennai 600087, India. Tel: +91 44 2486 8433 Fax: +91 44 2486 2091 email: v.ravi@goldcoin-id.com



2 From the editor

4 News

Issues and controversy in pangasius industry/better year for shrimp in Indonesia

6 News in Brief

Shrimp Culture

8 Seeing returns in a North

Malaysian shrimp farm

Science and experience merge to produce healthy shrimp. By Zuridah Merican

12 BMP in shrimp farming: The success story in Surat

Manoj M. Sharma demonstrates that key to steady success is best management practices.

Feed Technology

18 New heights for Betagro's aqua feeds by 2012

An interview with Dr Nopporn Vayuchote and Worrawut Vanitkulbodee in Bangkok.

22 The use of microarray technology in fish

Keith Filer says this is to study gene expression during adaptations and nutritional responses to diet changes.

24 Making strides in aquaculture with natural trace minerals

Growth effects of a certified organic trace mineral booster in juvenile tilapia. By Damon Fodge, Sarapong Rattanagulvaranon and Nguyen Thi Minh Huong

Pangasius Catfish

26 Pangasius catfish in India

Two industry leaders are moving ahead with feeds and fillet processing, respectively.

30 Vietnam: Pangasius production and exports in 2010

In 2010, the country produced 1.14 million tonnes, reports Le Thi Ngoc Diep.

Responsible and Sustainable Aquaculture

31 Pangasius: a fight between actual and perceived sustainability.

A commentary by Flavio Corsin

34 Q&A on sustainability

Ocialis' Stéphane Ralite says there is no choice for aquaculture.

36 Responsible sourcing of farmed products

Valeska Weymann and Mario Velasco explain GlobalGap's new cycle of aquaculture certification

Marketing

38 Prevention, verification and cooperation in food safety

A proactive way to prevent food safety problems with aquaculture products, says the team from U.S. FDA's Centre of Food Safety and Applied Nutrition.

40 Transforming aquaculture production

Experts give their views at the conference on 'Culture Quality Seafood' in Bangkok.

Company/Product News

42 Larger dryer production facility/ New shrimp post larvae feeds.

43 Creating a superbrand - the KFC story.

44 New growth promoting products in Surat Thani/Auto feeder.

Reviews

46 Aquatic Asia & VIV Asia 2011, March 9-11, Bangkok

Moving from feed to fish in this first edition.

50 The 2011 Hinter symposiums in March

The progress of the Chinese feed industry.

52 Aquaculture America 2011, 28 February- 3 March

Aquaculture on parade in New Orleans, reports Eric Roderick.

Previews

53 Aquaculture Europe 2011

Setting the future for Mediterranean aquaculture in Greece in October.

54 The Aquaculture Roundtable Series (TARS)

TARS2011 presents aquaculture feeds and nutrition in August in Singapore.

Events

56 Forthcoming events

Editor/Publisher

Zuridah Merican, PhD

Tel: +603 2096 2275 Fax: +603 2096 2276

Email: zuridah@aquaaasiapac.com

Editorial Coordination

Corporate Media Services P L

Tel: +65 6327 8825/6327 8824

Fax: +65 6223 7314

Email: irene@corpmediapl.com

Web: www.corpmediapl.com

Design and Layout

Words Worth Media Management Pte Ltd

Email: sales@wordsworth.com.sg

Web: www.wworthmedia.com

AQUA Culture AsiaPacific is published bimonthly by **Aqua Research Pte Ltd**

3 Pickering Street, #02-36 Nankin Row, China Square Central, Singapore 048660

Web: www.aquaasiapac.com

Tel: +65 9151 2420 Fax: +65 6223 7314

Editorial and advertising enquiries
Request for reprints and articles

Email: zuridah@aquaaasiapac.com

Tel: +603 2096 2275 Fax: +603 2096 2276

Subscriptions

Subscribe via the website at www.aquaasiapac.com or complete the enclosed form and mail with payment. Subscriptions can start at any time.

Subscriptions rate/year (6 issues): Asia SGD 70, Other zones: SGD 100

Email: subscribe@aquaaasiapac.com

Tel: +65 9151 2420 Fax: +65 6223 7314

Aqua Culture Asia Pacific Online
View E-magazine
Download past issues

Copyright © 2011 Aqua Research Pte Ltd. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owners.



From the editor

Desperately seeking sustainability – more questions than answers

Walking through the halls during ESE 2011 held in Brussels in May, one cannot escape from how widely sustainability, be it fisheries or aquaculture products, is represented at several stands. It was already a focus in 2010, but is seemingly more prominent this year. Aquaculture has always been termed as a 'sustainable way of meeting global supplies for fish' and so should the attestation of sustainability arise or is sustainability a market tool? Nevertheless, the promotion and perception of seafood sustainability gains consumer confidence.

As aquaculture in Asia moves from production to market driven, there will always be a strong business case for sustainability. The Marine Harvest sustainability report 2009 says that 'the seafood industry must be socially and environmentally sustainable to be profitable over the long term. The world needs more seafood, and aquaculture must grow to meet demand. This growth must however be sustainable from all perspectives: environmental, social and economic.' Personally, I feel economic sustainability is a given as no commercial entity will carry-on losing money which leaves us with the environmental and social aspects.

Seafood sustainability is consumer driven. Consumer perception, which may not always be correct is heavily influenced by NGOs and the media. The consumer passes the responsibility on to the buyer who makes demands on the producers to influence their production methods and plans. How important is it to be sustainable or perceived as sustainable? Vietnam's pangasius catfish producers and exporters bore the brunt of this learning process. In the latest tirade against pangasius products, the WWF 'Pangasius Lie' documentary has apparently brought down markets. As DG SANCO and others said at the recent panel discussion on Vietnam's pangasius 'from production boom to sustainability' - it will take a long time to restore consumer confidence in pangasius in Europe, a key market (see page 4).

The Vietnam pangasius example stresses the importance to quickly demonstrate a sustainable aquaculture production. However, is this to be done at the farm level, company or at the country level? Standards vary greatly as certifications are done per producer basis but all it takes is just one 'bad apple' and the 'non sustainable' image is en bloc labelled for the whole country. This is the dilemma faced by a Vietnam producer, who at ESE 2011 said that although with his processing factory and farms certified, he too, is suffering as buyers pulled out.

This leads to the next question - how is sustainability assessed? Environmental sustainability is intangible, difficult to quantify and is certifiable through third party programs. The cost of implementing changes and of certification is placed squarely on the producer. In Madagascar, Unima, a major black tiger shrimp producer has been assessed as environmentally sustainable by WWF with its low stocking density, reduction in the use of wild broodstock, reduction of fishmeal usage, sites which avoids the use of mangroves and a replanting program, emission of carbon from aquaculture and impacts of effluents. In Europe, major companies involved in feeds and aquaculture have demonstrated their commitment to sustainable production since the late 1990s. At the producer level, sustainable production is determined also by his upstream feed and seed supplier. They have demonstrated a sustainability program but are not certified by a third party. The above examples show extremes of the same by-word - 'sustainable'.

From the viewpoint of the Asian aquaculture industry, there seems to be no universal certification, rule or guideline. To avoid this sustainability issue deteriorating into a perceived non-tariff barrier, the industry is looking for guidance. Today, it seems that there are more questions than answers.

Zuridah Merican



TARS 2011

AAP is pleased to announce the first of The Aquaculture Roundtable Series (TARS 2011). The inaugural meeting will be held in Singapore, 17-18 August, 2011. The focus will be Aquaculture Feeds and Nutrition.

OUR MISSION

- We strive to be the beacon for the regional aquaculture industry.
- We will be the window to the world for Asia-Pacific aquaculture producers and a door to the market for international suppliers.
- We strive to be the forum for the development of self-regulation in the Industry



NANOLIS

HIGH QUALITY FINGERLING FEED

made in Vietnam

Has been presented in

AQUATIC ASIA 2011

Bitec, Bangkok. Thailand

Ask for a sample and discover our new micro feed under the NANOLIS range !



Ocialis

Feeding a sustainable future

Reconciling production boom with sustainability at ESE 2011

Europe is a major market for Vietnam's pangasius catfish with a 36% market share and since 2008, the market has been stable. Each year, producers and exporters show a strong presence at the European Seafood Exposition. This year was no exception with 50 stands within the Vietnam pavilion at ESE 2011 held from May 3-5 in Brussels.

However, in recent months, the industry has been challenged by a lack of confidence in its pangasius catfish products following several adverse representations, either on the internet or by organisations and individuals on its production methods. This has convinced consumers that the fish is unsafe to eat and raising doubts on its environmental sustainability.

In November 2010, World Wildlife Fund (WWF) added the pangasius to its red list in its influential seafood guide which was later withdrawn. Working with WWF, some 10% of farms have planned to join the Aquaculture Stewardship Council (ASC) within 5 years. In March 2011, the industry lost markets after a WWF produced documentary, the 'Pangasius Lie' was shown in Germany. Seafood Source said consumer demand for pangasius in northern Europe nosedived, particularly in Germany and sales by wholesalers, retailers and foodservice operators are suffering badly.

As purchasing decisions by seafood importers are increasingly influenced by the environmental sustainability of the production process, Vietnam Association of Seafood Exporters and Processors (VASEP), Ministry of Industry and Trade of Vietnam (MOIT) and Embassy of Vietnam took the opportunity to organise a panel discussion on May 5. Comprising NGOs, importers, researchers and food health authorities from Europe and Vietnam, the aim was to address issues and controversy surrounding the environmental sustainability of the industry.

"The need is not only to explain its position vis-à-vis the sustainability of the industry but also to work towards 'the long term interest of enterprises and farmers alike' said, Pham Anh Tuan, Deputy Director, Fishery Department, Ministry of Agriculture and Rural Development (MARD), in his opening address.

"This is a chance to present information on the industry in Vietnam and also on research conducted by both Vietnamese and European researchers. However, it is clear that the EU is a large and stable market for the fish but is also the most difficult market," remarked H.E Pham Sanh Chau, Vietnam's Ambassador for EU, Belgium and Luxembourg. He added that in the interest of farmers, it is imperative consumers and importers see the correct picture of the industry.

Nguyen Huu Dzong, Permanent Vice President, VASEP said that production has stabilised. The industry recognises consumer requirements on sustainability be it social or environmental and at the same time ask for assurance on food safety and traceability. Since 2005, there have been steps towards a more sustainable industry. The achievements are that 45% of processing plants are GlobalGap



Melanie Siggs (right) with some of the panel members, from left Pham Anh Tuan, H.E. Pham Sanh Chau and Eric Poudelet.

certified, 103 farms have been or are certified by various certification bodies and 5 farms are implementing PAD (Pangasius Aquaculture Dialogues) standards. An MOU was signed between GlobalGap and the Ministry of Agriculture and Rural Development for equivalence of VietGap to GlobalGap standards.

Nevertheless, among the issues related to a sustainable production, Dzong emphasised the need on quality assurance and fighting with bad practices, sharp increases in input costs and low ex farm prices, wastewater management and improvement in social responsibility.

Melanie Siggs, Sustainable Fisheries Partnership and Patrick Sorgeloos, Ghent University led the panel comprising Eric Poudelet, European Commission's Directorate General for Health and Consumer Policy (DG SANCO), Mike Urch, Seafood Source Editor, Prof Johan Verreth, Wageningen University, Netherlands, Jérôme Lazard, CIRAD, France, Mark Powell, WWF and Nguyen Huu Dzong.

"With EU funding there are efforts to help Vietnam develop this industry. There will be more interaction between Vietnamese and European counterparts through projects on sustainability issues such as the SEAT project, which will cover Vietnam. The ASEM aquaculture platform brings different stakeholders and facilitates interactions between Europe and Asia and to document issues on nutrient and energy flows. It will also help industry to address issues which we all have to be conscious of," said Sorgeloos.

In the case of food safety, Eric Poudelet said that although he saw the high level of food safety by many companies, there have been consignments, which do not comply. Since 2008, there are 65 consignments not complying with notifications on Listeria, residues of veterinary drugs, nitrofurans and malachite green.

"The EU has achieved a high level of food safety. Although EU consumers need the pangasius products, as they are cheap, they have to be of quality. Unlike the US, EU does not accept decontamination with hyperchlorinated water and processors must respect this," said Poudelet.

The pangasius industry is similar to the livestock industry. Any bad publicity, even a short bad movie can destroy an industry for ten years.



It is important to initiate more communication and proactive meetings to be transparent on the production methods. Managing a brand reputation is a challenge and Siggs suggested that retailers should be part of the process to develop the brand integrity of the product. Poudelet said that some water retention products are permissible but some fillets exported to the EU show too high levels, sometimes as high as 40%. This constitutes a fraud issue and not that of food safety.

There is concern on intensive farming and to treat diseases, drugs are often used which evokes a problem of sustainability. This is an economic balance, which the industry must adopt. However, Dr Johan Verreth said that this step is not necessary as in Europe, the trout and eel are farmed at equally high densities. The issue is not the density but the system the fish is being farmed. A lot can be done in improving the water quality in which the fish is being reared and in the treatment of organic matter. Improving feeds stability will be one way to settle this discharge problem.

SIPA - Seafood Importers and Processors Alliance is a grouping of seafood companies from several countries. Guus Pastoor said that when imports into the EU were growing fast, rising to two thirds of

requirements, members realised that there was insufficient information on the production and marketing process for the pangasius, a potential white fish for consumers in Europe. Initially SIPA looked at quality control and certification, followed by sustainability. In comparison, it was easier to understand the more familiar salmonid industry. SIPA then took the role to show to producers in Vietnam what was required and included research into environmental aspects. Thirdly, it needed to address the image issue. Consumers will always require more information and seek more professional research to derive the right answers.

Although the pangasius is not high in terms of omega-3 fatty acids content, nevertheless it is affordable for the mass population. A positive outcome of its availability is that younger consumers are now more amenable to consume the fish, which has little taste. Ultimately, as they grow older, these consumers form the future group eating tastier higher end fish as they value the benefits of fish as a healthy protein source.

In the near future, fish farmers and processors will be required to apply strict standards to make all their operations less environmentally harmful.

A better year for Indonesia in 2011

During the last two years, farmed shrimp production in Indonesia has been on the decline. Farms in Sumatra to East Java were affected by IMNV-infectious myonecrosis virus and other diseases. The prolonged situation has been a major concern for the Indonesian Fishery Product Processing and Marketing Association. Members faced a shortage of material for processing.

At ESE 2011, Johan Suryadarma, the vice president of the Association was with members at the Indonesian pavilion. They have discussed with the Director General of Aquaculture (Ministry of Marine Affairs and Fisheries) on the question why this disease has affected only Indonesia. Learning from the practices in China, Thailand and Vietnam, Suryadarma is clearly convinced the problems lie with the culture methods.

"I also asked experts from China and Thailand to explain our predicament. The main issue is the way we culture. Farmers in these countries stock at 100-120PL/m² and never more. Secondly, pond-drying period should ideally be at least 4-6 weeks. In contrast, our intensive farmers will stock from 200-300PL/m². Then they dry their ponds for less than a week. As they continue to do this, they will continue to face a big problem. We need to change this mind set.

"We have the best conditions for shrimp culture in Indonesia. We do not have any typhoons and a small range of fluctuations in temperature. All that we need to do is improve on the culture method. There are no problems with shrimp feed."

Suryadarma added that the production could be expected to stabilise at 250,000 tonnes countrywide comprising both vannamei and black tiger shrimp. However, it will be necessary for the processors to network with producers to encourage them to lower stocking density and use only quality post larvae. The only contention is with stocking density and the shorter drying periods as farmers do adhere to proper management with regard to using aeration etc.

"We have seen some advantages with these changes. In East Java, when the stocking density was reduced to 70PL/m², within 100 days, larger sized shrimp with better survival rate could be harvested.

"We still face resistance from farmers. In a 3,300m² pond and they can get 25 tonnes in 120 days. We need to show sustainability and contrarily learn from China, which already produces 1.4 million tonnes.

However, at the same time, the long-term measures must continue to be prevention of diseases. This is the role of our researchers.

In the EU market of nearly 400,000 tonnes, Indonesian shrimp imports declined 12.3% to 12,291 tonnes in 2010 as compared to 14,013 tonnes in 2009. In the US market of 552,146 tonnes, Indonesia was the third largest supplier at 61,100 tonnes as compared to 69,300 tonnes in 2009 and 84,000 tonnes in 2008. Thailand was the leading exporter at 203,200 tonnes, followed by Ecuador. In the 205,346 tonnes Japanese market, Indonesia is now the third largest supplier after Vietnam and Thailand at 32,000 tonnes as compared to 34,800 tonnes in 2009 (Globefish, 2011).



At the AP51 booth during ESE 2011, Johan Suryadarma (left) is also director of Seafood Service Centre in Surabaya. Also in the picture is Artati Widiarti (middle), deputy director for Promotion and Cooperation and Trias Alamsari, Section of Foreign Market Collaboration. Both are from the DG of Fisheries Products Processing and Marketing, Ministry of Marine Affairs and Fisheries, Indonesia.

News in Brief

Shrimp AD orders to continue

The U.S. International Trade Commission (USITC) has determined that revoking the existing anti-dumping duty (AD) orders on frozen warm water shrimp from Brazil, China, India, Thailand, and Vietnam would likely lead to a continuation or recurrence of material injury in future. As such, the existing orders on imports from these countries will remain in place. This action came after a five-year (sunset) review process as required under the Uruguay Round Agreements Act. The Department of Commerce has to revoke an antidumping or countervailing duty order or terminate a suspension agreement, after five years, unless it has been determined that revoking the order or terminating the suspension agreement would likely lead to a continuation or recurrence of dumping or subsidies (Commerce) and of material injury (USITC) within a reasonably foreseeable time. The U.S. began to impose countrywide antidumping duties ranging from 25.76% (Vietnam), 5.34% (Thailand), 10.17% (India) and 7.05% (Brazil) and 112.81% (China).

Singapore ups fish supply from coastal farms

The Agri-Food and Veterinary Authority of Singapore will work closely with farmers to help them improve productivity in line with the target to provide 15% of fish consumption from domestic supplies. Specifically AVA will help farms identify gaps that hinder production and develop improvement plans. Farmers will also be encouraged to leverage on AVA's Food Fund to improve farming technology and upgrade production capability. As part of AVA's licensing conditions for coastal fish farms, the farms are required to meet a minimum production target of 17 tonnes of fish per 0.5ha of space annually. Of the 95 coastal farms, 23 are currently producing more than the minimum production level of 17 tonnes. Ten are producing between 8.5 and 17 tonnes, while another 36 are producing at below 8.5 tonnes. The remaining 26 farms are new farms or farms which have undergone a recent change of ownership. These farms meet 4% of Singapore's total fish consumption.

Surviving higher feed and PL prices

In Vietnam's Cuulong district in the Mekong Delta, the cost of farming black tiger shrimp has increased to around VND 105,000/kg or USD 5.1/kg due to higher feed and post larvae prices. Feed manufacturers including CP, Viet Thang, Cargill, Uni President have increased prices by as much as VND 300/kg or US 1.5 cents. PL prices have increased by VND 10 to 30 each, compared to the same period in 2010, said a farmer in Tien Giang Province. However, the high ex-farm price at VND205,000 or USD 9.95/kg is helping to increase profits to VND100,000/kg (USD 4.8/kg). The report in Vietnam News said that one ha yields profits of at least VND500 million/crop (USD 24,277) while for white shrimp it is VND300 million (USD 14,566). In the first quarter of 2011, both black tiger and white shrimp were farmed in more than 300 ha of ponds, 54% more than in 2010 for the black tiger shrimp and 99% more for the white shrimp, according to Department of Agriculture and Rural Development reports. The Viet Nam Association of Seafood Exporters and Producers reported that in 2010, shrimp exports totalled 240,000 tonnes and the value rose 20% to more than USD 2 billion.

Rising seafood demand in China

A 15% growth in demand over the next five years is predicted and could hold big investment opportunities. Zhu Changliang, vice-chairman of the seafood branch at the All-China Federation of Industry and

Commerce said that seafood purchases currently account for 40% of the restaurant industry's variable cost and will grow to 60% by the end of 2015. This means that the industry will see more than 15% growth every year. China is the world's biggest seafood producer, contributing 70% to global supplies worth USD 100 billion and it exports USD20 billion. There are now more than 10,000 companies in the seafood production industry, but most of them are small players. The next step for the industry must be consolidation. It has only one listed seafood company, Zhanjiang GuoLian Aquatic Products Co Ltd. China consumes 40 kg per capita of seafood, double the world's average.

Canola varieties with long chain omega-3 oils by 2016

Oilseed company Nuseed, CSIRO and the Grains Research and Development Corporation will embark on a commercial production of long-chain omega-3 oils (eicosapentaenoic and docosahexaenoic acids), for the human food market and aquaculture industry. CSIRO Food Future Flagship director Bruce Lee said that working on the project since the early 1990s, researchers have shown that they can produce the nutritionally important omega-3 oils in canola using genetic modification techniques. Now the work is on optimising the ratio and amounts of the desired long chain omega-3 fatty acids in canola and developing commercial varieties by 2016. The GRDC is providing funding for the project and Nuseed the oilseed breeding expertise and has the option to license the intellectual property overseas. Lee said that this would create a new industry in Australia where farmers would be paid premiums for growing the canola.

China's CPP announced annual profit growth

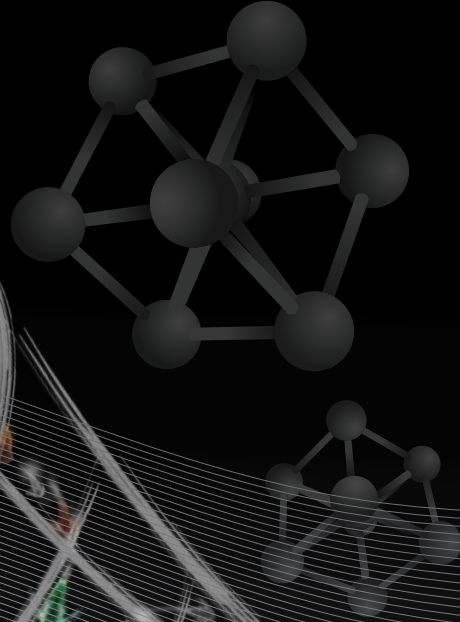
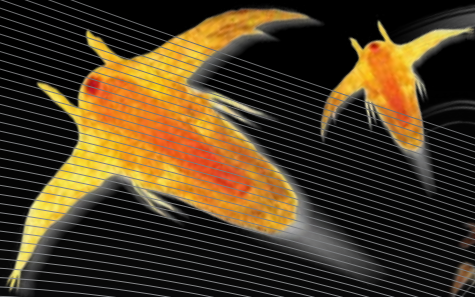
C.P. Pokphand Co. Ltd, the leading animal and aqua feed producer in China has reported a group profit for 2010 of USD132.8 million, a 1,450% rise from the USD 8.6 million in 2001. CPP acquired a feed business in China from the parent company in late February 2010 and feed revenue for the 10 months to December 31, 2010 rose to approximately USD1.84 billion on sales of 3.76 million tonnes of animal feed products. Complete and concentrate feed accounted for 91.7% of total turnover, comprising swine, poultry, aqua and other animal species at 38.7%, 38.2%, 10.9% and 3.9% respectively. Premix feed accounted for 5.6%. Anticipating a growing demand in China, CPP has signed an agreement to lease four feed plants from its parent. It will also focus on investment opportunities overseas and in January 2011, CPP was granted an option to acquire from the parent a majority stake in an integrated livestock and aquaculture company in Vietnam.

Seafood chain restaurants in India

Among the new restaurants in India, is a niche sea food chain across the country, Tiger Bay. This is being launched by Waterbase, a pioneer in shrimp feed and black tiger shrimp production in India. The first 464 m² will open in Bangalore in the first week of June and a second one is planned in Delhi. Eighty other Tiger Bay outlets are being planned across the country. Waterbase said that the margins in seafood exports hover around 3% while in the food chain business they vary between 30 and 50%. Waterbase owns shrimp farms, hatcheries and a processing plant complete with a back-end cold chain. Tiger Bay is likely to offer sea food lovers squids, prawns and lobsters.

A NEW GENERATION OF ARTEMIA CYSTS

SEP Art
TECHNOLOGY



- Complete separation
- Clean biomass
- Undamaged nauplii
- Increased biomass output



INVE

Advanced Solutions
for animal rearing

www.inve.com



INVE
AQUACULTURE

Seeing returns in a North Malaysian shrimp farm



Harvesting 65-60pcs/kg shrimp after 90 days culture. A crane is used to haul the baskets containing 60kg of shrimp from the pond onto the lorry.



Lim Tio Huat with farm documentation required for approval to export to the EU and US markets

Shrimp farming requires skills in using science and the art from experience to produce healthy shrimp and to combat diseases. It is also tied to economies of scale and compliance to food safety norms imposed by importing countries all along the production chain.

After more than 10 years in the shrimp farming business in the northern state of Kedah and seeing the results of his investments in two farms, Malaysian Lim Tio Huat, managing director, Hoi Huat Aquaculture Sdn Bhd is a happy man. He has now passed farm operations of the larger 140 acres or 56.7 ha farm, Usaha Fadzilat to the second generation, his sons Lim Shen Yong and Lim Yong Keng. The other 60 acre or 28.2 ha farm, Hoi Huat Aquaculture with 12 ponds is managed by farm manager, Ng Chu Hai. Together both farms employ 40-50 farm workers. Assisting in technical management at both farms is Ching Kok Ying, director of Inteqc Feed (M) Sdn Bhd and of course Lim TH himself.

Since 2005, both farms culture the vannamei shrimp. Prior to this, it was the black tiger shrimp. For the past year, the average production has been 36 tonnes/ha/year from two crops/year and the annual production is 1,200-1,500 tonnes/year.

"I have designed the farm to circumvent several challenges in an area close to other farms and to urban Sungai Petani, some 15 km away. In this farm in Batu Lintang (Usaha Fadzilat), all of our ponds are enclosed by 2 long reservoir ponds of 3m depth which follow the loop of the river. We have fenced these in with the ponds to prevent intrusions from humans and land animals. The latter are potential carriers of diseases. We draw in the water upstream from the river at one end and release water downstream into the same river at another end. Incoming water, ranging from 10 to 30ppt, is filtered with an 80 mesh size filter. Water is usually kept in these ponds for at least three days, prior to use in the culture ponds. We do not have any problem with birds and thus have not installed overhead lines in ponds," said Lim TH.



Ching Kok Ying (left) and Ng Chu Hai, manager of Hoi Huat Aquaculture farm.



WHO CARES?

Who cares that one extra fish, one extra shrimp, or improved survivability, will make the difference between profit and loss in the aquaculture world this year?

Alltech does!

In fact, so do the 2,300 people worldwide, committed to producing and managing the Alltech range of patented, high quality, safe and natural ingredients that improve feed quality, animal health, food safety and industry profitability.

Supported by 30 years of research, 150 PhD theses, 70 masters' theses and over 300 reviewed papers, Alltech ingredients are proven to promote animal health and performance through better nutrition ...*naturally*

So the next time you ask the question, who cares? Remember at Alltech...

WE DO!

Alltech[®]

Nutrition, health, performance ...*naturally*

For more information on Alltech Aqua Solutions, email: aquasolutions@alltech.com
or contact your local Alltech representative.

www.alltech.com



The farm uses a fibreglass tank to acclimate post larvae prior to stocking. Post larvae flow out of the tank into ponds via the disposable blue plastic chute.



This is the innovative tiller for the ponds which Lim built in Malaysia using engine parts imported from China. With this, the soil preparation time is reduced and the ponds are cleaned well.

“When we harvest, we would keep the water in the outlet canals for a few days. Fish will be the indicator to show whether we can or cannot release the water into the river,” said Lim TH.

The use of chemicals is limited. Chlorine is used only in ponds when there are reports of diseases in neighbouring farms and to clean up nets and other utensils in the farm. We use authorised crustacides and bactericides when necessary, says Ching.

Usaha Fadzilat farm has 28 ponds, ranging from 1 ha to 2 ha in size and the pond depth averages 1.5m. The deepest ponds are 2.5m deep. The ponds are arranged in blocks comprising 7 ponds in each block. The ponds have either clay or sandy soil pond bottom. Lim TH pointed out that with their technology and experience, shrimp have a darker colouration which is preferred by buyers. Therefore, when the farm decides on lining ponds with HDPE liners, it will be on the sides only.

Disease control

The farm regularly sends samples for disease diagnosis to the nearest government laboratory. Since last year, it has not faced any outbreaks. Ching said that the risk of diseases is lowest at low salinity and 22 ppt is the best salinity to stock shrimp. When the salinity increases, disease risks increase. Temperature also is a parameter to monitor; at range of 25 -28°C, chances of disease breakouts are higher. To improve

shrimp immunity to diseases, the farm top dress feeds with vitamin C and uses feed probiotics.

“Elsewhere, there are reports of slow death of shrimp occurring when the salinity goes down. Shrimp die after losing appetite. This occurs when shrimp reach 130-100pcs/kg after 50-60 days of culture. We do not know the causative agents and have not identified the virus. Apparently in Indonesia, this and IMNV was the reported cause of high shrimp mortality,” said Ching.

Frequent harvesting

At the farm, the general practice is to stock 4-6 ponds on a monthly basis and also to harvest the same number monthly. The stocking density ranges from 80 to 120 post larvae/m² depending on the season. The lower stocking density is used in September until December. Post larvae cost from RM 10-12 or USD 3.2 to 3.8 per 1000. The farm buys post larvae from 3 hatcheries about 1.5 hours away by road. Ponds have a mixture of long arm paddle wheels procured from Thailand and aerators from Taiwan. Currently, Lim TH has arranged to import a blower type aerator to use in the pond to increase dissolved oxygen.

“Harvest is partial and starts with 100 to 90pcs/kg, usually after 60 days. The next harvest is when shrimp reach 70-60 pcs/kg and subsequently at 35-40 pcs/kg. The company has a 7-man harvesting team.



"The harvest is transferred into baskets and a crane lifts each basket weighing around 60 kg from the pond to the pond dyke. In this way, our workers do not need to run in and out of ponds carrying the harvest to the pond dykes. It is a faster way to complete the harvesting and more importantly, we safeguard the welfare of our workers."

Usually shrimp are sold to either a broker for the local market or processing plants for export. Immediately after harvesting, shrimp are transported in ice in an insulated truck to the processing plant, located approximately an hour away by road. On April 1, the price quoted for 70 pcs/kg was MYR 14.50/kg or USD 4.51/kg.

Innovating

Aside from running the farm, Lim TH and his suppliers have been innovating to improve farm operations. In Asian shrimp farming, it is common to see workers entering ponds to release post larvae when restocking ponds. This is a biosecurity risk. However, at this farm, they use a fibreglass tank straddling the dyke between two ponds. Post larvae are acclimatised with pond water in the tanks and then gradually flow out into a pond through a simple plastic chute. The opposite pond is also restocked in the same way.

"My latest trial is using a modified soil tiller for pond preparation of both the sandy and clay ponds. We will dry the ponds for 3 days, add hydrated lime, till the soil to expose and oxygenate the lower layers and dry again for 1-2 days. Water will be added and the pond will be ready to restock. This saves time," said Lim TH.

"Next we will be looking at auto feeders which can be placed on the pond dykes as opposed to those from Thailand which are placed over the pond. In this way, we can cut the cost of building a walkway which is rather expensive in Malaysia at more than MYR 2,000 (USD 645) each."



Lim Yong Keng, the youngest son of Lim TH holds a recent harvest of shrimp.



Rising feed cost

Escalating fish meal price

Opportunistic diseases

Environmental impact

Low Shrimp & fish prices

Tired of hearing only bad news?

Feed is the main cost in most aquaculture operations ...

and the most difficult one to reduce when ingredient prices are rising ...

AQUAGEST® *maximizes digestibility and feed utilization efficiency*

AQUABITE® *enhances palatability and appetite*

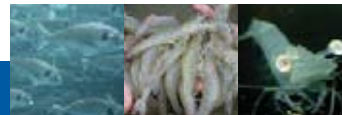
SANACORE® GM *improves growth and productivity by promoting a healthy gut microflora*



Visit us at World Aquaculture Conference & Exhibition
Natal, Brazil • June 6-10, 2011

Booth # 208

applying nature for a healthy and sustainable future



info.aqua@nutriad.net
www.nutriad.net

BMP in shrimp farming: The success story in Surat

By Manoj M. Sharma

The key to a consistent 95% success rate in farming marine shrimp in Surat is following closely best management practices.

In India, Gujarat state has the second largest brackish water potential area for aquaculture at 376,000ha, next to West Bengal's 405,500ha. However, only 3,116 ha (0.83%) of the potential area are utilised for shrimp farming. The total pond area is 2,248 ha and in 2010, production reached 6,800 tonnes with an average productivity of 3.02 tonnes/ha/year, valued at more than INR 200 crores or USD 45.3 million.

Surat district in Gujarat has a potential of 24,300 ha of brackish water for aquaculture. Shrimp farming started with 6 ponds in the village of Dandi (Olpad Taluka) under the technical guidance of the author in 1995-96. From 2000, with his efforts and the participation of local fisheries communities and entrepreneurs, this expanded to 1,200 culture ponds covering 1,500 ha producing 3,500 tonnes by 2010. This is only 5% of the national farmed production but the average count of 26/30pcs/kg exceeds the national average of 35pcs/kg.

The introduction of a standard culture technology and biosecure culture protocols doubled the average production/area in this state from 1,200 kg/ha/year to 3,020kg/ha/year. In addition, it has gained international reputation by adhering to better management practices



A well constructed farm in Surat showing settlement, reservoir and culture ponds with 5:20:75 ratio



A constructed pond indicating depth at outlet



A farm showing pumping efficiency

(BMP) with various food safety protocols. Recently, the author also proved that the black tiger is still commercially lucrative compared to other commercial shrimp species. In recent studies carried out in his farm in Surat (Info fish International-March 2011) he has successfully produced 16/20 counts of black tiger shrimp by following the BMP protocol detailed in this article. This is a model for world shrimp farming which can restore faith in black tiger shrimp farming especially in India.

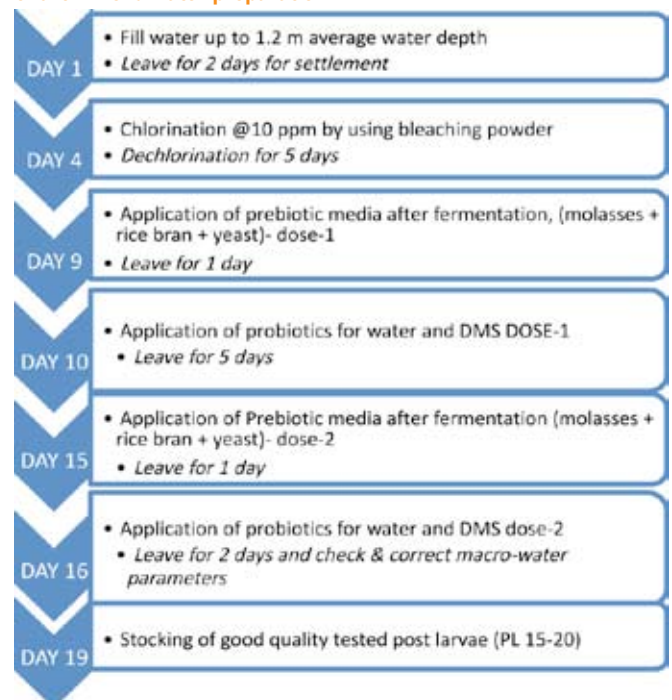
BMP protocols

These are simple, practical, cost-effective, system/time specific and applicable to all, even to small scale farmers. These protocols are practised in Surat farms to achieve successful and sustainable shrimp farming practices.

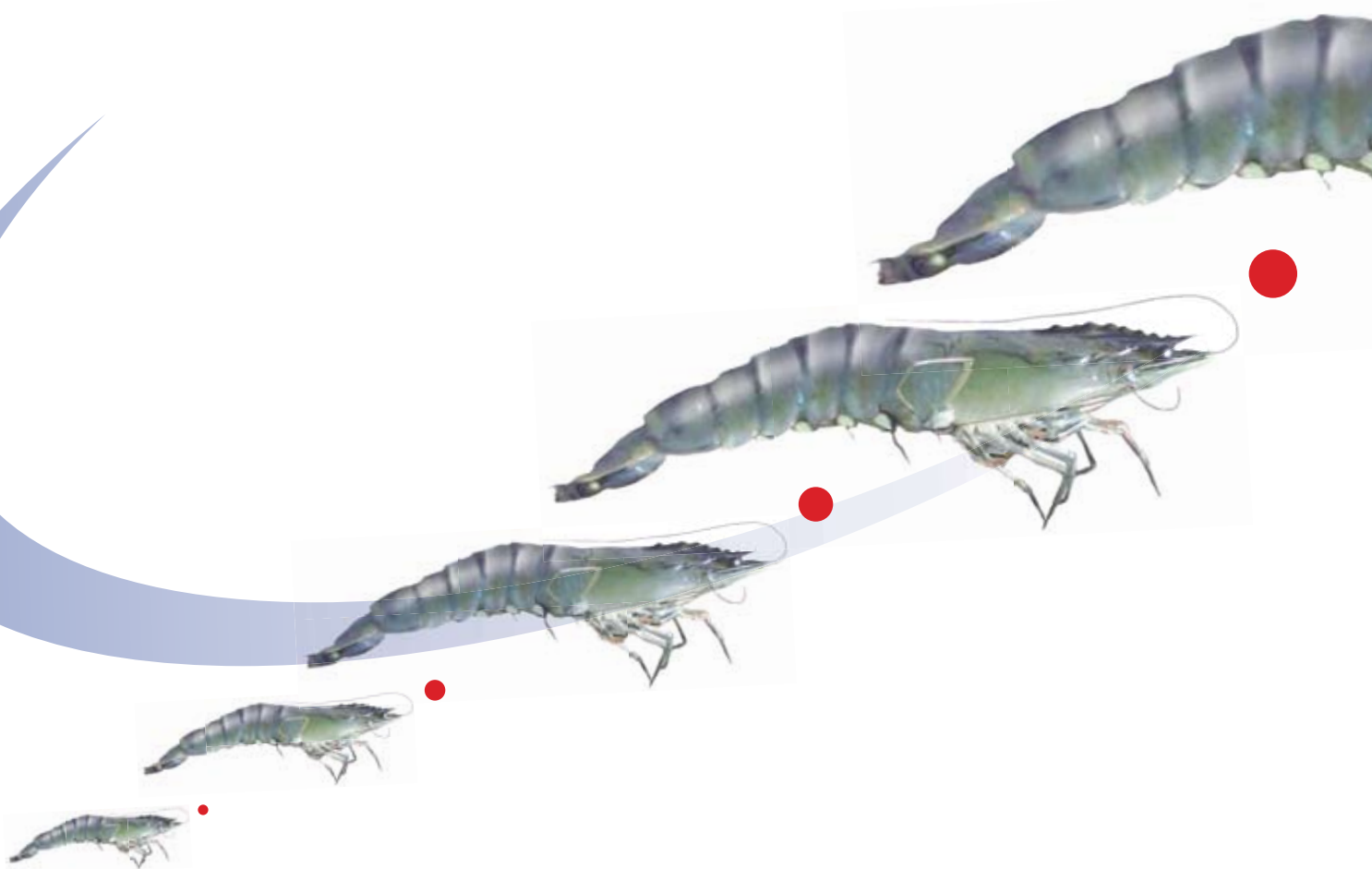
Site selection, design and construction of ponds

These are of paramount importance. In Surat, entire sites were selected according to topography, climatic conditions, water quality, susceptibility or vulnerability to pollution, accessibility and logistics. A developed site in Surat as seen in the photo shows that all of the farms were properly designed and constructed with the ratio of settlement, reservoir and culture ponds at 5:20:75. The culture ponds of all farms were constructed with the ideal size of 0.8-1.0 ha of water area. In each pond, water depth was maintained at an average of 1.8m for maximum carrying capacity and with the optimum bed slope of 10-12 inches (25-30cm) per 100m for good bottom flushing. Good pumping capacity at 10hp/ha was practised in all farms.

Chart 1. Pond water preparation



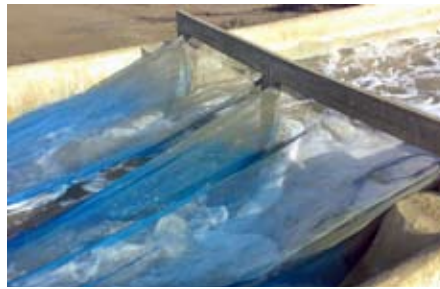
GROWING IS BEAUTIFUL



Our hydrolysates have a unique concentration of Natural Active Nutrients™.
Thanks to their biological action on fish and shrimp growth mechanisms,
they boost your feed performance and help you substitute fish meal.



Scraping during pond preparation



Multiple filtration chambers



Pond preparation

Good pond preparation includes drying, ploughing, compacting/scraping, culturing pond water with pre and probiotics. This results in the desired natural food production, which serves as primary food for the growing shrimp with high survival.

A multiple filtration system is used in all farms in Surat as a BMP standard. Water passes through multiple filter chambers consisting of mesh sizes of 20, 40, 60 and 80 prior to filling the culture ponds. The protocol for pond water preparation prior to stocking of post larvae is detailed in chart 1.

Post larvae quality and stocking

Post larvae (PL) used were selected only from reputable hatcheries, with a strong technical background. The PL must be produced from a good source of brood stock, traceable with at least a 3-year record of performance. PL were selected from hatcheries not using antibiotics. probiotic reared PL were preferred for good performance in ponds. Testing of the post larvae was conducted at three stages: PL 5-6, 10-12 and prior to packing. Results from two different PCR laboratories were obtained before confirming an order.

The transport time and the number of PL in each bag was strictly monitored to minimise stress. At the farm, PL were acclimatised in a well aerated tank system prior to stocking inside the ponds for optimum survival rate. Weak and dead PL were discarded.

Water quality management

This is required for a healthy shrimp harvest. The key factors are the maintenance of healthy natural food along with optimum physico-chemical parameters in the culture pond. In Surat, the following steps are practised under their BMP.

Water depth is maintained to give sufficient space to culture shrimp: In the first month, the water depth is 1.2 m, in the second month, this is increased to 1.4m and in the third month, the depth is 1.6m. In the fourth month and until harvest, the depth should be 1.8 to 2m.

The use of water and water exchange is minimised such that water exchange is carried out only at 80, 95, 110 and 125 DOC (days of culture). This reduces bottom sludge and toxic gases from culture ponds. Effective water exchange as well as soil probiotics from reputable companies are utilised after field test along with the use of

indigenous pre-biotics at regular intervals. Usage of the optimum dose of probiotic is dependent on the feed input/week.

The recommended aeration is one horsepower for every 300-500 kg of harvested biomass in each pond. The operation of aerators is as suggested in Table 1.

Table 1. Operation of aerators.

Biomass	Aeration timing	Hours/day
up to 1,000 kg	11.00 p.m. – 7 a.m.	18
1,000-1,500 kg	11.00 p.m. – 7 a.m. + 2.00 p.m. – 6 p.m.	12
1,500 – 2,000 kg	11.00 p.m. – 7 a.m. + 10.00 a.m. – 12 noon +	14
2,000 – 3,000 kg	2.00 p.m. – 6 p.m.	≥ 18
	Without for one hour of feeding	

However, this only applies when climatic conditions are normal. Suitable adjustments should be made, such as when the weather is humid, or if there are low winds, days are cloudy and nights foggy. Adjustments are also required when water transparency is high and there is a plankton crash in ponds and if water additives are used. The pond bottom should be checked periodically i.e. at least once a week.

Good bottom chaining is recommended at least twice/week and during the non-feeding hour of 10.30am and 4.30pm. This is to clean the feeding area and release toxic gases from the pond bottom for effective pond bottom management.

Feeding

Feeds and feeding practices are vital components of any shrimp farming operation. Feeds constitute approximately 65% of the production cost. Some important practices followed by shrimp farmers for best feed and competent management include good and consistent feed quality from a reputable feed mill. Feeding should be with the right size of feed pellets according to the development stage of the shrimp. Feed is dispersed, initially from the dykes and later from a boat. Proper check tray management is required for optimum feed management and FCR.

Feeding lines are changed once or twice in a crop. This means the broadcasting area is changed every month from the pond dyke line. For example, if during the first month the feed line is 5 metres away from



Farm acclimatisation of post larvae



Good aeration in culture pond



Bottom chaining in culture pond in Surat area

Balance the Immune System for Health and Performance.

IMMUNITY

GUT
MORPHOLOGY

DVAQUA
METABOLITE ADVANTAGE

GUT
MICROBIOTA

The benefits of a balanced immune system and improved intestinal function include:

HEALTH AND DISEASE RESISTANCE

YIELD AND SURVIVABILITY

FEED DIGESTIBILITY AND EFFICIENCY

That's why you need DVAQUA®. The unique nutritional fermentation metabolites in DVAQUA support robust digestive health by balancing gut microbiota, the immune system and optimizing gut morphology. In fact, performance results of our aqua research trials* consistently prove that feeding all-natural, science-based DVAQUA is the smart, healthy decision.

DVAQUA

 **Diamond V**
Research Tested. Performance Proven.™

*Data available at diamondv.com, dvasia@diamondv.com or +66 2730 3251.
©2011 Diamond V Mills, Inc. All rights reserved. Diamond V® and DVAQUA® are registered trademarks of Diamond V Mills, Inc.



Get the real facts, benefits and proof that Diamond V delivers at diamondv.com.



Central feeding in a culture pond



A check tray showing good faecal strands

the dyke, then in the second month it is shifted to 8 to 10 metres from the dyke. Rotating the position of the feeding lines provides effective cleaning of pond bottom.

Good binders of high density, non-oil base and with maximum stability should be used with feed additives. Good quality gut probiotics at the correct dose and from reputable sources are used with feed in regular intervals to reduce the risk of diseases and also to increase immune-modulation in shrimp. Feeds are soaked with feed additives/freshwater to avoid contaminating the gut .

Health management and biosecurity

In all farms in Surat, shrimp health were properly monitored by regular daily check tray observations and weekly sampling. Strict biosecurity practices are the major steps for a successful crop. Biosecurity measures have been religiously used. These are bird netting, crab fencing, tyre and foot bath, and hand wash at the entry points.

Harvest and post-harvest practices

Harvesting is the last and most important aspect of shrimp farming. This determines the profitability of farms. It is vital to study proper market trends before harvesting. For all farms in Surat, harvesting is conducted with minimum handling to maintain good quality shrimp. Some tips are given below:

SAFA – The most successful BMP model in India

In 2005, all Surat based aqua farmers were united and formed a group called the Surat Aquaculture Farmers Association (SAFA). Their primary goal is to carry out sustainable shrimp farming with an eco-friendly approach using BMP protocols. Presently, there are 200 members. This is one of the most practical and successful cluster farming groups in India with more than 95% success with each crop.

This collaborative effort in Surat provides all members with best available seed, feed and other inputs and information on all the necessary guidelines for successful shrimp farming. It carries out group marketing for better farm gate shrimp price. To date, it has developed more than 1,500 ha of shrimp farms and is producing 3,500 tonnes/year of high quality shrimp since the last decade. It has also provided direct employment to 500 families and indirect employment to thousands of others in the support services.

You asked for a **DO METER**
that's **SIMPLE** and **RUGGED**.
Here it is.

YSI AQUACULTURE
PROVEN. TRUSTED.

WE KNOW
YSI **D.O.**
YSI.com/pro20

The **NEW YSI Pro20** is an easy-to-use handheld dissolved oxygen instrument with the fastest response times available. Lower your total cost of ownership with user-replaceable sensors and cables.

Get what you ask for with YSI. **800 897 4151 US +1 937 767 7241**



Good quality harvested white shrimp *Litopenaeus vannamei*

- Check on molting cycle. Harvest is planned when there is no molting
- Arrange all equipment to be used, the day before
- The ratio of ice:shrimp should be 1:1
- Harvested shrimp to be cleaned and chilled well.
- Harvesting should be completed before noon.
- Harvested shrimp to reach processing plant in the shortest time possible.

Conclusion

Some of the prerequisites of a successful BMP in shrimp farming such as with the SAFA group in Surat are: best pond preparation, best seeds, best feeds and better water quality. In addition, it advocates a single crop/year with crop rotation and encourages group farming and the planning of the harvest according to markets trends. The purpose of the business should be 'food and profit' with total biosecurity and the slogan must be –'minimise greed and think sustainability'.



Manoj M. Sharma with a good quality harvested black tiger *Penaeus monodon*

Dr. Manoj M. Sharma is director, Mayank Aquaculture Pvt. Ltd., Surat, Gujarat State, India. He has 16 years experience in shrimp farming and has developed satellite shrimp farming concept for SAFA, producing 3,500 tonnes/year. He is also general secretary and founder member of SAFA. He graduated with a MSc in Fisheries Management from the Central Institute of Fisheries Education, Mumbai and a PhD in Fisheries Science (shrimp farming) from Swami Ramanand Teerth University, Nanded, Maharashtra, India. He is also a founder member of Society of Aquaculture Professionals (SAP). E-mail: mapl.shrimp@gmail.com

Selection. Service. Solutions.



No matter the size or scope of your project, Aquatic Eco-Systems can help bring it to life.

Aquatic Eco-Systems has supplied the industry with equipment, supplies and complete system packages for over 30 years with our comprehensive inventory of 13,000+ products. And free expert advice is always in stock.



2011 Master Catalog now available. Free print copy with any order, or visit AquaticEco.com for digital and downloadable versions.

AQUATIC

ECO-SYSTEMS, INC.

Since 1978

Web: www.AquaticEco.com • Tel: +1 407 886 3939

Email: InternationalSales@AquaticEco.com

2395 Apopka Blvd. Suite 100, Apopka, Florida 32703, USA



New heights for Betagro's aqua feeds by 2012

By Zuridah Merican

The medium size player in Thailand's aqua feed business is planning for a larger presence in aquaculture by 2012. Driving this will be the emphasis on quality and food safety.

The foray into the production and marketing of shrimp and fish feeds started 15 years ago for Betagro Co., Ltd part of Thailand's second largest agro-industry conglomerate, the Betagro Group. Since then, it has maintained itself as a medium size player in the country's large aqua feed market of 1.28 million tonnes per year competing with the likes of large integrators such as Chaoreon Pokphand and Thai Union and feed producers such as Thai Luxe. As shrimp farming in Thailand went through its ups and downs, the company was there with feeds for its select group of farmers. The current production is from two aqua feed mills in Nakhon Pathom and Lop Buri, and production is now focused on shrimp feeds at 1,600 tonnes per month (tpm).

The Betagro Group founded in 1967, engages in animal feed production, integrated swine and poultry production and animal health products. Since then, it has grown into a USD 5.5 billion agro-industry conglomerate. Along its supply chain, the company emphasises on its corporate culture of high quality and safe food production. Since 1991, the focus of its activities is in Lop Buri province, designated as the group's quality safe food development and manufacturing base. Ten specialised companies of the Betagro Group are involved in feed

production, husbandry and genetic development in swine, broilers and layers, breeder farms and manufacture, distribution of veterinary medicines and aqua feed production.

Aqua feed production comprises 20% of the group's feed business which in turn contributes 20% to the group's sales of THB 1,800 billion (USD 60 million) in 2009 and in the next few years, the group expects the aqua business to grow at 15 % annually. It produces and markets 6 brands of sinking feeds for the vannamei shrimp and floating and sinking feeds for the tilapia (red and nile), local catfish and herbivorous freshwater fish. After an extended quiet period, this aqua feed business is now poised for a larger presence and will be expanding its aqua feed and pet food production. The focus will be at its feed mill in Lop Buri which was set up in 2006.

"We have a steady market and we make sure that the product is safe and we push the industry to improve as consumers will want to buy from a safe source. Now we are poised for expansion in our aqua feed business in 2011 and have exciting products for the open feed market," says **Dr Nopporn Vayuchote**, executive vice president, group business development in an interview in Bangkok in March. Also

present was **Worrawut Vanitkulbodee**, foreign business director who is responsible for the group's production of aqua feeds at the two feed mills in Thailand. Both men have spent most of their working life with Betagro. Vayuchote joined Betagro in 1975 and since then, has held several positions in companies within the group. Vanitkulbodee, joined Betagro in 1989 as feed salesman and now has 22 years experience in feed marketing.

AAP: Why would such a large group be interested in the aqua business and then keep this business small?

Nopporn Vayuchote: As we have always been in the feed business, it was a natural step to go into the aqua feed business. We also wanted to fulfil a demand from our poultry and livestock customers who were looking for a single supplier of not just feeds, but feeds with consistent quality and from a trusted supplier.

Our entry into this business was just prior to the Asian economic crisis in 1997. We concentrated on shrimp feed production and now produce 1,600 tpm of shrimp feeds and 700 tpm of extruded fish feeds. We were also unfortunate to come in just before shrimp farming in Thailand faced its major crisis with diseases. However, together with our farmers, we overcame the hurdles; disease, contamination with nitrofurans and slow growth of markets.

As we are a rather small player in the industry, we have remained unscathed and managed to maintain our production capacity. Perhaps in the next year, we may need to worry for factors beyond our control.

Worrawut Vanitkulbodee: We started this aqua feed business by buying an old feed mill, renovated it and at that time produced 700 tpm of shrimp feed and 2,000 tpm of fish feed. Initially, marketing was



Dr Nopporn Vayuchote (left) has dedicated almost 20 years to the Thai livestock industry and was credited with the development of the Thai animal medical industry to reach global standards. He also started the Saitarn foundation to help in the education of rural children. Since 2011, **Worrawut Vanitkulbodee** (right) is foreign business director and is responsible for Betagro's business in Asean which includes its emerging business in Laos and Cambodia.

Assuredly... innovation is our enduring legacy.



Since 1935, we've been helping customers solve problems and capitalize on opportunities faced by their businesses.

Seventy-five years ago, a key answer was a molasses mixer. Today, the solutions tend to be more technologically complex – but our founding pledge remains unchanged.

At Wenger, we innovate to solve customer challenges.

And then we do it again.



Inventing the new original since 1935.

SABETHA, KANSAS USA 785-284-2133 INFO@WENGER.COM WWW.WENGER.COM
 USA BELGIUM TAIWAN BRASIL CHINA TURKEY



through our livestock dealers. However, now we have progressed with a dedicated set of dealers for shrimp feed whilst continuing to use the dealers for our livestock and poultry feed sales to market fish feed. With vannamei shrimp, farming has extended into the central areas such as Supaburi where most of our customers are. We believe that we fill a niche where farmers want to deal with a sole supplier for all feeds.

AAP: Where were you in 2010 and where will you be in 2011 onwards vis-a-vis the developments in Thailand?

VV: The shrimp feed market in Thailand is estimated at 60,000 tpm. In the shrimp feed business we wish to grow to 4% in 2011 and then 10% in 2012 (6,000 tpm) of the vannamei shrimp feed market. Currently, the fish feed market is estimated at 50,000 tpm and we will have a 15% share of this market in 2011 and we plan for 20-25% by 2012. These will be for catfish and tilapia feeds and general feeds for other species.

NV: We also intend to introduce extruded shrimp feeds for the premium markets. We have been experimenting with this for a year and will be ready to launch this soon. We realise that this is a more expensive process relative to pelleting feeds. It will be sold at a higher price but in the long run, we believe that the farmer will be able to reap the benefits with higher digestibility which will also take care of the environment. This will put us ahead of the other aqua feed producers in Thailand. You can see this in Taiwan where some companies have

already marketed extruded shrimp pellets. This will be an entirely new product and the farmer will have the choice of premium and economical feeds. The extruder capacity will expand to 4,500 tpm in 2011 versus our present production of 1,000 tpm.

AAP: The shrimp feed market is already saturated with several top producers. What will be your role in aquaculture in Thailand and what are your expectations in the future?

NV: We do realise that we are a latecomer into this market and we are still learning about the direction of the future. We do considerable R&D on our products. Farmers have accepted our pelleted shrimp feed and extruded fish feed products although our prices are relatively higher than our competitors. We know that it will be difficult to corner a larger percentage of the market which we think will require integration and which we will not venture into in the near future. However, we remain open and it will help if there is a company that can work with us on the farming aspect while we process the feed and use our marketing channels.

Shrimp production in Thailand is estimated to rise to 600,000 tonnes per year and I do not expect production to go beyond this level. The government is very clear that expansion into the rice growing areas will be restricted to avoid social conflicts. Furthermore, if we continue to market Thai shrimp as quality shrimp, it will be risky to increase production irresponsibly. In shrimp culture, we will need to look more at the environmental effects of production and this gives us the reason to introduce extruded feeds.

Fish farming will continue to grow and Thailand has export opportunities with tilapia although expansion of farming area may be limited. We cannot see export market opportunities with our *Clarias* catfish.

VV: At the moment we can see that shrimp production will be limited as farmers continue to face the white faeces syndrome. We are confident to increase market share by focussing on quality. Also some farmers want to have the choice of products, rather than be limited by bundling together supplies of post larvae, services and feeds.

AAP: What do you think is your forte in the shrimp feed market?

NV: For the company, quality has been our strength and this is applied to all our products, including aqua feed. In pork, in terms of quality we are ahead in the market in Thailand. With chicken meat, we are one of



Betagro at VIV Asia 2011

The Betagro Science Centre, founded in 2005 and located in Amphur Klong Luang, Pathum Thani province, is a collaboration between the Betagro Group and Thailand's NSTDA (National Science and Technology Development Agency). It is a think tank for R&D to seek improvements in production protocols and food safety in food products. Vayuchote says that this SGS accredited laboratory is the best and biggest in Thailand. It provides monitoring of animal health and food products and analyses for the feed, livestock and food industries. For food safety, it does testing for drug residues in food products such as nitrofurans metabolites, chloramphenicol, malachite, leucomalachite, crystal violet and leucocrystal violet and pathogenic bacteria such as *Salmonella*, *Listeria*, *Escherichia coli*, *Vibrio cholerae* and *V. parahaemolyticus*. Feed quality tests include those for protein, fat, ash, moisture, fiber, calcium, phosphorous, pepsin, sodium chloride, total viable count for bacteria, yeast, mould and pathogenic bacteria. Email: bsc@betagro.com Web: www.bsc-lab.com

the top three in the supply chain. This makes us confident to expand more into the aqua feed market. At least on our part, we sell fish feed with the assurance that we have sourced the raw materials from a safe source. Of course we realise that aquaculture is different from chicken and pork production, because it is in the water and environmental concerns are more significant. With shrimp and fish, we know that it is too late to enter farming and if we do so, it has to be upstream integration. But we do not have plans to do so at this time. We will continue to be a strong supplier in the open market. Some farmers welcome us as the 'balance' in the shrimp/fish farming business.

WV: We also believe that with extruded shrimp feeds, we will be ahead of our competitors, now comprising small aqua feed producers. We know that our farmers have accepted our feeds and that most farmers want to buy from a recognised feed supplier. Farmers also welcome our feed as 'a reliable product' in contrast to that of small companies where quality fluctuates.

AAP: What will be your driver for the aqua feed business?

NV: In its livestock business, our emphasis is on food safety. This applies to every product from livestock and poultry feeds, to pet foods and aqua feeds. We can claim to have the best or biggest laboratory facility for testing in the Science Park, Phatum Thani province. The laboratory also conducts testing for other companies. Betagro has also invested in a R&D laboratory in the Science Park outside Bangkok, where our scientists conduct research in food science together with others in the Science Park.

Traceability is a strong selling point in Betagro's pork and chicken meat business. Our e-traceability system based on the FXA program runs the livestock farming business and has been applied to contract and our farms. At the moment, we do not apply any tracking system to feeds sold and similarly, for aqua feeds. However, in the future if some integrator wants to collaborate with us, we will be ready to help them in supply chain management with e-traceability.

AAP: In 2004, Betagro entered into the shrimp feed business in Vietnam. What is your take on this venture and industry in Vietnam?

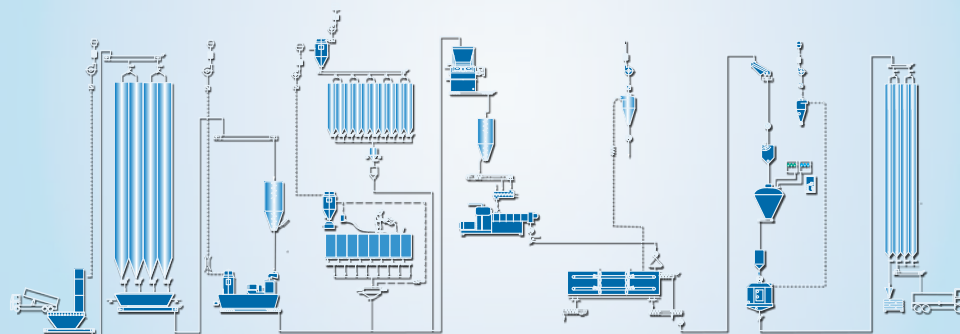
WV: This was a joint venture with Thai Luxe, a major shrimp/fish feed producer in Thailand. When we began to plan our investment into the shrimp market in Vietnam, there were only 8 major players but when we started production in 2004, there were almost 30 feed producers. We can produce 30,000 tonnes of shrimp feed annually but we have never reached that capacity. Although it is expanding, the shrimp feed market in Vietnam has a large participation of large integrators and producers. In the Vietnamese market, credit is provided until the end of the production cycle. We have found that it would be difficult to infiltrate this market to expand but nevertheless will continue to have a presence.

NV: In my opinion, Thailand is still a more attractive market. In the case of marine fish feeds, we cannot see the potential in Thailand as farmers use trash fish and furthermore, we do not have the expertise with marine fish feeds. As far as I know feeds for snappers and cobia are well researched into but we know little about feeding of groupers.



Process technology, machinery, and complete plants for the aqua feed industry

- New process lines and plants ■ Process equipment upgrades and replacements
 - Spare and wear parts ■ Service and maintenance programs ■ Optimization and support
 - Leading technologies ■ Global presence ■ Local service
- Together, we make it work!



ANDRITZ FEED & BIOFUEL supplied in 2008, a complete system to Emsland-Aller Aqua. With Europe's most modern fish feed factory, in Golßen, Germany, Emsland-Aller Aqua has an excellent facility for testing product innovations. Using the most modern machines available, for example the latest in extruder technology, product developments can also be put into practice quickly.

ANDRITZ FEED & BIOFUEL
Rep. office Vietnam
Phone: +84 8 6253 9434
andritz-fb.vi@andritz.com

ANDRITZ FEED & BIOFUEL
Division of ANDRITZ Technologies Ltd. P.R. China
Phone: +86 21 64670285
andritz-fb.cn@andritz.com

www.andritz.com

The use of microarray technology in fish

By Keith Filer

This is a tool to help us study gene expression during adaptations, physiological changes and nutritional responses to diet changes. However, this is dependent on the availability of a complete genome sequence of the species.

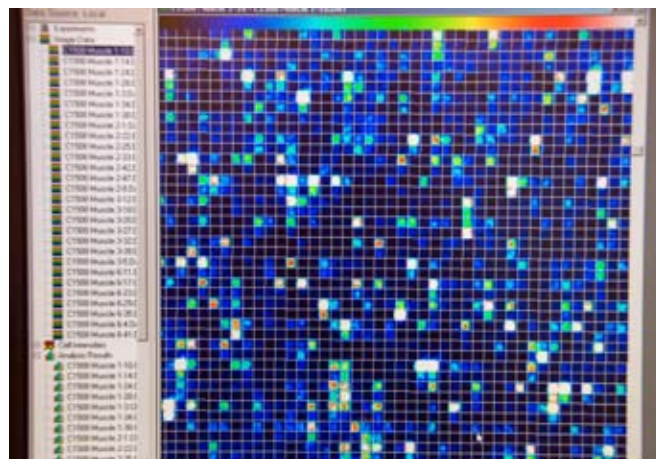
An organism's hereditary information is encoded either in DNA or, for some viruses, in RNA. All the DNA in an organism is called the genome. The first genome to be sequenced was a virus in 1976. In what is now recognized as one of the largest scientific accomplishments in the history of mankind, the sequencing of the human genome was completed in 2003. In total, the genomes of more than 180 organisms have been sequenced and more are continuously being processed. The ability to sequence the entire or partial genome has evolved through the development of powerful techniques that study the functions and interactions of all the genes in the genome. These tools have also formed the basis of the -omics era which includes genomics, transcriptomics, proteomics and metabolomics.

The -omics era

Within the field of genomics a number of different areas have evolved. Genomics includes the study of the function and interaction of all the genes in the genome. Within this broad concept, areas of comparative genomics, functional genomics, environmental genomics and nutritional genomics have developed. Comparative genomics examines whole genomes, gene content, order, structure, evolution and taxonomy whereas functional genomics determines the biochemical and physiological role of proteins. Environmental genomics includes studies of molecular variation in populations and the response to environmental conditions. Nutritional genomics, or nutrigenomics, examines the response that certain nutrients have on gene expression.

Changes in gene expression levels could lead to modifications in animal performance, either good or bad. Understanding this relationship is much easier when the tools of genomics are utilised. With the field of genomics, it is possible to evaluate thousands of genes simultaneously in a single experiment in relation to other biological components in the sample. The majority of this research has utilised techniques from transcriptomics. Transcriptomics is the monitoring of the complete set of RNA transcripts produced by the genome at any time. This will usually be followed up with proteomics work to understand how the changes in gene expression impact the function of the protein. The action of proteins generates metabolites which forms the science of metabolomics.

In order to utilize the complete power of genomic techniques in a given study, it is important that the entire genome of an animal is sequenced and the functions of its proteins have been identified or annotated. Of the animals raised for agricultural purposes on a large scale, the chicken genome and the bovine genome have been sequenced and a first draft of the swine genome has been published. The only aquaculture genome sequences that are complete and available are for the zebrafish, puffer fish, fugu and medaka. Atlantic salmon *Salmo salar* L. and rainbow trout *Oncorhynchus mykiss* (Walbaum) genome projects are underway with intentions of completion this year (Oleksiak, 2010). A tilapia genome project, supported by the National Institutes of Health in the U.S., is currently being sequenced (Liu, 2011). Collaborative studies are ongoing to obtain full or partial genome sequences of cod, sea bass as well as the Pacific oyster (Wenne et al., 2007). Although no genome of a commercially important fish species has been completed, a large amount of sequence data has been generated, where much of it is in the form of expressed sequence



A typical representation of a scan from a gene chip. Picture is a GeneChip® produced by Affymetrix®

tags. These sequence tags are partial sequences of longer expressed RNA sequences. This is important because it provides information about the gene's function.

What are microarrays?

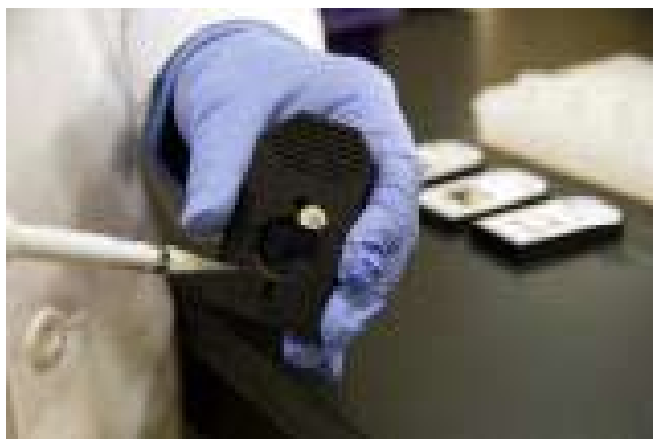
The use of -omics technologies has developed from the fact that the genomes of organisms can be completely or partially sequenced, and from the sequence, microarrays can be generated. A DNA microarray consists of a specific DNA sequence commonly termed a 'probe'. The probes are complete or partial gene sequences that are used to indicate the expression of genes. A commercially produced set of microarrays can include the entire genome of an organism bound to a solid surface. This is referred to as a gene chip. The amount of mRNA bound to each site on the gene chip indicates the expression level of the various genes in the genome, and it is possible to evaluate the expression of up to 30,000 genes in one study. Smaller microarrays can contain 5 to 10,000 gene sequences.

Microarray technology has been used to understand gene expression in a variety of species. Due to the commercial availability of microarrays, a number of these have been done with zebrafish. These are important studies because the gene expression profile generated can be used to help establish biomarkers which in turn can be used for research in commercially important species. A biomarker is a gene or set of genes that can be used to indicate the physiological state of fish. Biomarkers that have been identified in zebrafish studies include those for disease states such as mycobacteriosis (Meijer et al., 2005), sex determination and reproduction (Wen et al., 2005), larval development (Linney et al., 2004), hypoxia (Ton et al., 2003) and temperature stress (Malek et al., 2004).

Nutrigenomics in fish has resulted in limited published studies (Douglas, 2006). A microarray from Atlantic salmon was used to study the substitution of dietary fish oil with 75% rapeseed on lipid metabolism (Jordal et al., 2005). In the fish fed 75% rapeseed, genes involved in lipid metabolism were upregulated and the fatty-acid composition in the liver of the two treatments was different. Studies in



The gene chip is ready to be read.



Addition of RNA to a gene chip.

rainbow trout compared gene expression of fish fed fish-oil-containing and fish-oil-free diets. Decreased transcription levels of energy, fatty-acid and protein metabolism genes occurred in fish fed vegetable oils (Panserat, et al., 2008). As opposed to nutritional studies, microarrays have been used extensively to study physiological processes as a result of environmental conditions such as hypoxia, temperature and stress.

The variable exposure to oxygen in the environment has led to adaptation processes that have also been studied using microarray technology in a number of species. In the long-jaw mudsucker, specific changes in gene expression were observed such as the rapid expression of protein synthesis and locomotion in muscle. This was followed by induction of glucogenesis in the liver and a reduction of cell growth and proliferation (Douglass, 2006). The zebrafish has also been used as a model system to understand the importance of hypoxia in such conditions as stroke, chronic ischemia and cancer (van der Meer et al., 2005).

Exposure to temperature change is common among fish and leads to changes in gene expression. These changes occur if the variations of temperature occur on a daily basis or over a longer seasonal time frame. Studies have been conducted in at least five different species to understand the impact on gene expression. General trends are seen related to the expression of genes involved in metabolism and transcription/translation (Douglas, 2006). Species that have been studied include channel catfish (Altschul et al., 1990), carp (Gracey et al., 2004), zebrafish (Malek et al., 2004), killifish (Podrabsky and Somero, 2004) and rainbow trout (Vornanen, 2005).

Stress on fish can occur from a number of factors such as environment, crowding and exposure to toxicants. Because genes are involved in the stress response, it is important to compare how genes behave in a tissue-specific manner. Samples from the brain, kidney, muscle, blood and liver are targeted-areas to test with microarrays. Published reports of the use of microarrays to understand the impact on gene expression have been done with rainbow trout, salmon, sea bream, zebrafish and European flounder (Douglas, 2006). In salmonid fry, many genes that showed altered expression patterns as a result of exposure to stress were involved in oxidative stress (Vuori et al., 2006).

Microarray technology involving fish is expanding, and as genome sequences become available, especially regarding species that are of economic importance, this technology will continue to become even more significant. Published results have provided valuable information on phenomena such as toxicant responses, adaptation and behavior as well as nutritional responses to diet changes.

Continued research will allow a greater understanding in areas such as management, development and nutrition. The use of -omics technologies in fish has an exciting and relevant future.

References available upon request.



Keith Filer, PhD is the aquaculture research manager for Alltech. He has worked for Alltech for 14 years and has been involved in enzyme production and research as well managing the Asia-Pacific Biosciences Centre. Recent research has focused on the application of enzymes in the aquaculture industry.



Choose the Best for You

we are able to provide you with quality products at competitive prices.

Supply

- Fish Feed
- Shrimp Feed
- Wheat flour
- Vital Wheat Gluten
- Corn Gluten Meal



Fairway (Thailand) Co., Ltd.

14 th Floor Bangnathani, Building 1/28 Bangna-Trad Rd.,
Bangna, Bangkok 10260 Thailand
Tel : 02-398-5918 Auto 7 Lines Fax : 02-398-5919
Email : fwt@fairway-thailand.com www.fairway-thailand.com

Making strides in aquaculture with natural trace minerals

By Damon Fodge, Sarapong Rattanagulvaranon and Nguyen Thi Minh Huong

Trials in China show the unique effects of a certified organic trace mineral booster on growth in juvenile tilapia. The key to the mode of action is their role in protein synthesis.

Despite the need of many aquaculture farmers to use natural products in their feed and water, finding certified organic inputs has been a challenge for shrimp and fish farmers throughout Asia. However, many in aquaculture are having success by using a natural mineral product from Utah, USA which is also widely used in Asia.

This product is called AZOMITE® which is an acronym for 'A to Z of minerals including trace elements'. This is a certified organic trace mineral booster for animal feed and pond water. The product is mined from an ancient lakebed (now dry) into which volcanic ash was deposited. The deposit typically contains over 70 trace mineral elements.

In shrimp nutrition, it is well known that because of the rapid growth, the requirement for minerals is much higher than in many other species. Thus, supplementation in the feed is common. In addition, in a typical shrimp pond, often there are insufficient amounts of the minerals in the water to meet the requirements of the animal.

Trace mineral nutrition

Today, shrimp and fish nutritionists have a good understanding of the biochemical function of essential minerals such as calcium, phosphorus, potassium, sodium, iron, copper, zinc, cobalt, selenium and magnesium. However, it is recognised that 'trace' or 'micro-minerals' play an important role in fish and shrimp biochemistry, despite science's current knowledge gaps in the field of mineral nutrition.

Essential minerals are required for multiple biological functions and inorganic or organic compounds are included in trace mineral or vitamin premixes to provide essential micro-minerals such as manganese, iodine, and sometimes molybdenum to the diet or in pond water to increase algae growth.

The list of required or beneficial trace minerals continues to grow as our knowledge of the function of minerals increases. At least 11 elements were recently added to the list of minerals recognised as essential in animal nutrition, such as boron, bromine, fluorine, lithium, nickel, silicon, tin and vanadium. The dosage for these elements is usually less than one part per million, hence, these elements have been designated by some as 'ultra-trace minerals'. There is also evidence which suggests that aluminium, rubidium and germanium are also essential, and that tungsten has an important effect in some animals.

The lanthanide series of elements – the so-called 'rare earth elements' are particularly interesting because these elements are well known in the scientific literature for several beneficial effects in animal production, including that of fish and shrimp. There is evidence in the scientific literature that rare earth elements play an important role in protein synthesis. This may be a reason why trials with this trace mineral booster show improvements in weight gain as it contains these ultra-trace mineral elements. This may also explain why recent university studies in tilapia and *Penaeus vannamei* using ultra-trace mineral elements have shown positive results.

Tilapia and trace minerals

Prof. Xiang-Jun Leng, professor of Ichthyology at Shanghai Ocean University in Shanghai (SOU), China (PRC), conducted some trials with tilapia in 2010 which shed some light on a possible mode of action for

the trace minerals present in the product with improved immunity and weight gain in the tilapia. The results have been published in the peer-reviewed Chinese Journal of Animal Nutrition, May 2010 issue.

The study with the trace mineral booster in tilapia at SOU consisted of two tests using two different fish sizes. In the first, the product was added to the tilapia feed at three inclusion rates: 0.25% w/w; 0.5% w/w; and 0.75% w/w. This was compared against a control without the product. This trial was conducted over 60 days with 1.0g tilapia fingerlings. There were three replicates for each treatment. The results of the first trial are given in Figure 1.

Figure 1. Growth, FCR and survival of tilapia (initial weight 1g) in test a 1 over 60 days.

Inclusion rate %	0 (Control)	0.25	0.50	0.75
Initial body weight (g)	1.0	1.0	1.0	1.0
Final body weight (g)	13.39	15.45	16.06	15.37
Weight gain %	1239.7a	1445.0b	1506.0b	1437.9b
Improvement %	0	+16.5	+21.5	+15.9
Feed Conversion Ratio (FCR)	1.55a	1.38b	1.33b	1.35b
Survival rate	99.5	100	100	99.5

Data within rows with the same letters are not significantly different at (P<0.05)
 †AZOMITE® www.azomite.com or www.azomiteinternational.com

The highest weight gain was shown by fish in the 0.5% inclusion group but this was not significantly different from the other two treatments. FCR was significantly lower as compared to that in the control. The best performance was in the treatment with the 0.5% inclusion which showed a 16.5% improvement in FCR from 1.55 (control) to 1.33.

The second test was conducted with 20g tilapia with the same inclusion rates as the first test with three replicates per treatment and 20 fish per replicate over a 35 day period. Figure 2 shows the results of this test.

Figure 2. Growth, FCR and survival of tilapia (initial weight 20g) in test 2 over 25 days.

Inclusion rate %	0	0.25	0.50	0.75
Initial body weight (g)	20.1	20.0	20.1	20.0
Final body weight (g)	37.9	40.4	40.1	40.1
Weight gain %	88.5a	102.0b	99.2b	100.7b
Improvement %	0	+15.3	+12.1	+13.8
Feed Conversion Ratio (FCR)	1.50a	1.27b	1.33b	1.29b
Survival rate	100	100	100	100

Data within rows with the same letters are not significantly different at (P<0.05)

The results with 20g tilapia also produced statistically significant improvements over the control. However, at the lowest inclusion rate in the feed (0.25%), weight gain improved over that of the control by 15.3% and FCR was low from 1.50 (control) to 1.27 (treatment with 0.25%). It must be noted that while the addition of the trace mineral booster improved weight gain and FCR as compared to the control,

there were no significant differences for all parameters at the three inclusion rates.

A possible mode of action of AZOMITE® was clear after Prof. Leng tested the digestive enzymes in the stomach and small intestine of the tilapia. He found an increase in a few of the key enzymes needed by the fish for protein digestion. The pepsin and pancreatic protease in both tests yielded significant improvements as shown in Figure 3.

Figure 3. Data on pepsin and pancreatic protease in digestive enzymes.

Inclusion rate %	0	0.25	0.50	0.75
Pepsin	2943.9a	3764.6b	3715.6b	3135.8a
Pancreatic protease	779.8a	1119.9b	975.9b	945.5b

Data within rows with the same letters are not significantly different at (P<0.05)

It is well known that the synthesis of enzymes requires a wide range of trace minerals for optimisation. Presumably, this is the cause of the increase in the important digestive enzymes of the tested tilapia. Prof. Leng's test revealed that this increase in enzymes also resulted in an increase in dry matter utilisation and crude protein digestibility (Figure 4).

Figure 4. Dry matter utilisation and crude protein digestibility.

Inclusion rate %	0	0.25	0.50	0.75
Dry matter digestibility	52.26a	57.83c	56.27bc	56.09b
Crude protein digestibility	73.19a	74.49b	74.47b	74.29ab

Data within rows with the same letters are not significantly different at (P<0.05)

These results are some of the evidence that the trace minerals present in the product are required by the animals for optimum enzyme synthesis. The key digestive enzymes in the gut are boosted, allowing the animal to digest the feed more completely, lowering FCR and increasing weight gain.

Trace minerals and white shrimp

In addition to the tilapia test, SOU is conducting tests with *P. vannamei* shrimp. The preliminary results, as in tilapia, have shown an improvement in weight gain and livability, including a boost in the enzyme lysozyme in the shrimp. Lysozyme degrades the cell walls of pathogenic bacteria in order to kill them. An increase of this important enzyme in the presence of the natural mineral booster is an indication that the immune system is healthier than in control animals, and is an indication this may improve shrimp immunity against a wide variety of bacterial pathogens.

Natural productivity

Aside from dietary inclusion in aqua feed, the product is used widely in *P. vannamei* and *P. monodon* culture to stimulate algae growth in pond water. Typically, farmers add this into the water on a weekly basis and/or to treat the soil in the pond bottom between culture cycles. This has proven to be effective in maintaining quality phytoplankton and zooplankton population as well as keeping blooms stable during the grow-out period. This may also be important for shrimp because they can absorb minerals directly from the water. In many countries where salinity is low or even zero, shrimp farmers struggle with the problem of 'soft' or 'loose' shells in farmed shrimp. Testimonials from these farmers indicate that the use of the trace mineral booster has significantly reduced the soft shell problem, a further indication that the minerals are being absorbed by the animals.

Trace minerals required by shrimp and fish are similar to most animals. In fact, an ash analysis of a shrimp, fish, chicken or any other terrestrial and aquatic species commonly reveals the presence over 60 trace minerals. The animal's biochemistry may be using these elements in thousands of ways – both known and unknown. Supplementing aqua feed and pond water with AZOMITE® is an important way to provide these trace minerals to fish and shrimp



Damon Fodge

Sarapong Rattanagulvaranon

Nguyen Thi Minh Huong

Damon Fodge is sales manager, Azomite Mineral Products, USA for the Middle East and Asia. Email: damonfodge@gmail.com.

Sarapong Rattanagulvaranon is executive director, Animal Health and Nutrition Division, Behn Meyer Chemical (T) Co., Ltd, Bangkok, Thailand. Sarapong has a BSc in Aquatic Sciences from Burapha University, Chonburi, Thailand and has been in shrimp farming, as technician and in sales & marketing since 1989. Email: sarapong@behnmeyer.co.th.

Nguyen Thi Minh Huong is aquaculture manager of Behn Meyer Vietnam. She has 10 years of experience in aquaculture nutrition and health and is responsible for Behn Meyer's Freshwater Aquaculture R&D Centre in Binh Duong. Email: minhhuong@behnmeyer-vietnam.com

Are you sure I'm not missing a key essential nutrient?

VANNAGEN®

naturally supports...
 ... Performance
 ... Health
 ... Stress management

chemoforma

We have your performance in mind

www.chemoforma.com

Chemoforma Ltd. CH-4302 Augst Switzerland
 Tel +41 61 811 33 55 Fax +41 61 811 28 03



Catfish in cages, photo courtesy of Indian Solvent

Pangasius catfish in India

Moving forward with better management and fillet processing

Expansion and oversupply

The rapid expansion in farming of the catfish *Pangasius hypophthalmus* in 2010 has been incredible. Production reached 540,000 tonnes from 260,000 tonnes in 2009 according to a September 2010 Government of India report by Dr Gopal Rao. As the industry re-evaluates its production in 2011, information from some farmers in Andhra Pradesh estimated this to be lower at 400,000 tonnes and in future years, this should stabilise to 300,000 tonnes.



Feeding pangasius, photo courtesy of Indian Solvent

This expansion was led by increases in stocking density from the 1-2 fingerlings/m² reported in Bhat et al in 2008 to 10 fingerlings/m² and the use of ponds formerly used for black tiger shrimp and freshwater prawns to farm the pangasius fish. Rohu carp farmers also shifted to this fish which allowed them to increase stocking density and not worry about aeration. In the last few years with high ex-farm prices at INR 50/kg, it was an attractive option.

“Farmers in Andhra Pradesh have been looking for a species with high productivity and ease of culture operations. Pangasius was easily accepted because of its versatility to grow well by utilising various agricultural by products. As there is no support for farmers on market demand and the amount of fish to be produced, farmers seeing the success of others started farming the fish and as a result today, we see this over production,” said Dr M.C. Nandeesh, Dean of the Fisheries College and Research Institute, Tuticorin, Tamil Nadu.



Dr M.C. Nandeesh

Industry has reported a rising demand for seafood following increases in the disposable income of the middle class population. In 2009, Vietnam exported 215 tonnes of catfish fillet valued at USD 530,762 to India (Vietfish News, Feb 2010). In 2010, it was reported that almost 40 tonnes/month of frozen fillet from Vietnam were imported through Chennai. Many stakeholders feel that imports could be reduced with local production of the fish. Expansion in farming was already ongoing attributed to the proliferation of feed mills providing

farms with both pelleted and extruded feeds. Feeds are sold on a credit basis. Since 2008, seven feed mills equipped with extruders were established. Leading them are the Indian Broiler and Ananda groups.

This oversupply in the domestic market led to low ex-farm prices of INR 25-30/kg or USD 0.56 to 0.67/kg. This is almost below the cost of production (COP), estimated at INR 25 to 27/kg (USD 0.56 to 0.60/kg), when pelleted feeds are used. The fish is usually sold as fresh fish in the northern part of the country. Unlike Vietnam, industry cannot absorb such high volumes as they lack cold storage facilities in the East coast. In the state where the fish is mainly farmed, Andhra Pradesh, there is only one fish processing plant.

In previous years, farming pangasius was profitable with ex-farm prices of INR 50/kg (USD 1.12/kg), close to those for the rohu at INR 60/kg (USD 1.35/kg). The higher INR34/kg (USD 0.76/kg) COP, with extruded feeds was easily compensated with high selling prices and low feed conversion ratios (FCR), such as 1.2 from 32% protein, high in soybean meal feeds. The average FCR with the lower cost pelleted (18% protein) feeds is 1.5. The culture period is 6-7 months for a harvest size of one kg and two crops a year is possible. The benefit of using commercial feeds, pelleted or extruded is better fish quality. An industry source said that customers could tell the difference between fish fed with agriculture waste such as deoiled rice bran from those fed formulated feeds. With the latter, the shelf life is longer. In addition, feeds can be formulated to give white flesh in contrast with the yellowish flesh using farm made feeds.

Whilst ex farm prices decline, farmers have shifted back to not using 100% commercial feeds, substituting with farm made feeds in some cases. At the same time, feed millers are unable to reduce feed prices as they face the dilemma of rising costs for feed ingredients in India and in

some cases, a lack of availability of such ingredients. Consequently, FCR as low as 1.8 have been reported with floating feeds.

Nevertheless, the future for the fish is very promising.

“This is provided there is value addition and good marketing support. The demand is beyond imagination. With small farmers this species will be a success only if the density is kept low and used only as a scavenger owing to its feeding habit,” added Nadeesha.

Improving FCRs with floating feeds

Indian Solvent, a company under the Indian Broiler group became a major player in the fish feed market, three years ago when it began the extrusion of floating feeds for the pangasius catfish and freshwater fish. It commissioned extruders with a capacity of 350,000 tonnes per year (tpm) to produce high protein soy-based floating fish feeds based on the fish farming practices recommended by the American Soybean Association-International Marketing Program (ASA-IM). Feeds contained 24 to 36% crude protein and 3 to 6% fat.

In recent trials in their own research ponds and in commercial ponds, the company showed that the feed conversion ratio (FCR) of these feeds can be improved to a range of 1.1 to 1.2. In comparison, common FCRs reported by farmers are in the range from 1.1 to 1.3. Such good FCRs will be a turning point for pangasius catfish farming, in particular recently, as ex-farm prices have dropped because of an oversupply. The company was at the Asian Pacific Aquaculture 2011 trade show in Kochi, Kerala in January 2011. Zeeshan Bahadur, director, explains these achievements.

“The good FCR was possible because we have very good control in raw materials purchasing. We have our own plants for hypro soybean meal (50% crude protein), DORB (deoiled rice bran with 10% max

Naturally ahead

Biomin®

BIOMIN AQUA Product Line

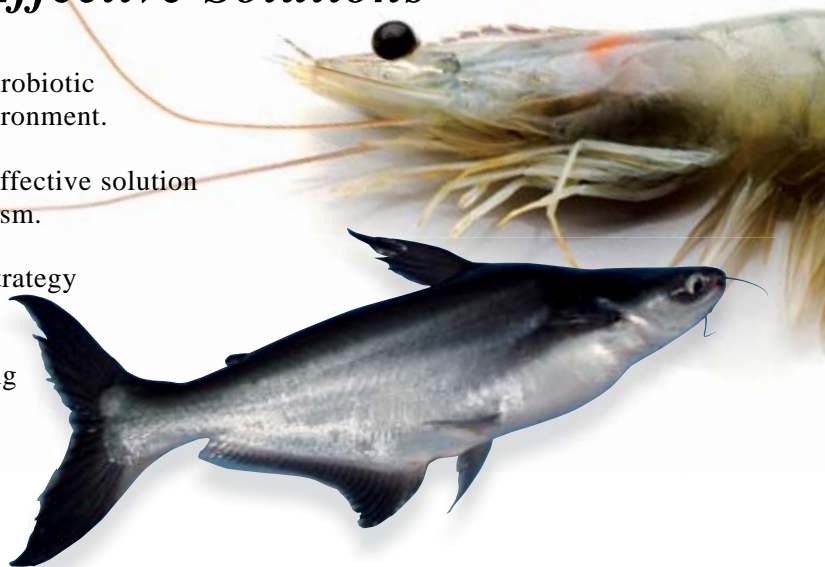
Specific Action – Effective Solutions

AquaStar, high performance probiotic strains to enhance gut and pond environment.

HepaProtect Aqua, an effective solution to support and protect liver metabolism.

Mycofix®, the most complete strategy for counteracting mycotoxins.

Biomin® P.E.P. for improving digestion and feed conversion.



For enquiry, please e-mail

aqua@biomin.net

www.aqua.biomin.net



crude fibre) and other ingredients since we have been in the poultry feed business for the past 25 years. How we did this is by taking care of the nutrient requirement of the fish and looked for the best available sources of these requirements. We balance the feed in such a way, that even after calculating all the losses, what the farmers feed and what the fish eats, we have the best cost solution.

“These feeds were developed by our in-house research team. We are able to use least cost formulation as we know certain amino acids requirements of the fish from past experiences and research. We keep adjusting the formulations to get the best growth performance. We do not use fish meal.

“We are confident of the reliability of the low FCR in the ponds as the farmers have been monitoring their farming well and our team continuously updates farmers on best management practices. We also have a laboratory where we train farmers and also ask farmers to bring their samples, even though they are not our feed clients.”

Growing with industry

Indian Solvent produces only extruded feeds for the open market. These floating feeds is a ‘modern way’ of feeding in contrast with the traditional way using farm made feeds comprising various agricultural ingredients. The benefit is the ability to observe the water stable feed floating and farmers will be able to manage feed better. This leads to maximizing economic benefit as well as better water quality with a lower threat from diseases, better survival and a healthy pond bottom.

The company intends to grow the industry with what it says is ‘the greatest advantage with the feed is the efficient nutrient delivery system made possible to fish.’ Bahadur says that the company sees the potential of aquaculture in India in the coming years and certainly will be working to help the industry grow.

“We see that there is a lot of scope for the industry to grow. In the case of the pangasius catfish, ex-farm prices may be low at this time but I see this as a phase in the industry. It will mature in time to come and we will be there providing the necessary inputs.

“My vision for the Indian farmer is that he should not blindly increase stocking density and he should take the time to learn and educate himself first before deciding on increasing productivity. As a company, I would like to see Indian Solvent grow to become the top player in the fish feed business in India. We may expand in the regional market but at this time, we are still in a learning phase.”

India’s first integration in pangasius catfish

This was started by Ananda Enterprises (India) Pvt Ltd, part of the large agro-based conglomerate, Ananda group. The completely

integrated enterprise for the pangasius catfish comprises a hatchery, feed mill, farms and processing plant. These facilities are all located around Bhimavaram, West Godavari, Andhra Pradesh. During the Asian Pacific Aquaculture 2011 conference and trade show, where the group is a major sponsor, U. Murali Ananda Varma, director, explains the production chain for its pangasius catfish.

“The Ananda Group has been involved in the aqua industry for the last 2 decades in seed production (fish/shrimp), farming (fish/shrimp), processing, exports and marketing of chilled fish in the domestic market all over India. We are in the marketing of shrimp feed and aquaculture related products. As such we felt it would give better synergy if we could successfully integrate all the activities and complete the integration cycle by setting up an extruded fish feed plant.

“Having been in the industry for a long time, we strongly felt that integration would help us lead the industry in the future. Integration will also trace the product from farm to fork. It would help us in timely delivery of assured quality and quantity. Being totally integrated the cost of production would be low which allows our products to be competitively priced as well as allowing us to have control on quality.

“However, being the first company to be integrated, we do face the regular teething problems and we are actively working to resolve them. Nevertheless, I will recommend integration to others in India.”

The integration starts with the hatchery which was set up in Kovvada in 2010. Broodstock are eight years old and hatchery production began with 7 million fry. This has increased to 50 million fry annually and supplies all the seed stock required for the company’s farms. In the near future, Varma expects that the hatchery will increase its production to 200 million fry annually and after supplying the company’s ponds, the balance will be sold in the open market.

The farm in Losari has 58 earthen ponds of 1-3 ha size and produces 13,000 tonnes of fish/year. Stocking density is 30,000 fingerlings/acre (7.4/m²) in nursery ponds. The plan is to expand the farming area by another 40 earthen ponds. In general, each pond produces 50 tonnes/ha of one kg fish. The culture cycle of 6-8 months is all year round.

The feed mill produces both extruded floating and pelleted fish feeds. The production capacity is 100,000 tonnes per year at a ratio of 1:1 of extruded and pelleted feeds. Feed composition ranges from 28% crude protein for grow out feeds to final grow-out feeds of 25%



Zeeshan Bahadur (left) with Ashif, marketing manager and Dr D.D. Dubey, nutritionist (left)



U. Murali Ananda Varma (right) at Asian Pacific Aquaculture 2011, trade show, Kochi, India.

crude protein, priced at INR 21.50/kg (USD 0.47) and INR 19.50/kg (USD 0.43) respectively in the open market. Fingerling feeds contain 32% crude protein and are sold at INR 23/kg (USD 0.51).

“Our feeds are of superior quality and in general the FCR is 1.2. Despite the high cost of soybean meal, we continue to use this in our feeds but the source is India. In the open market, we also sell our feeds

on a cash basis. Initially we faced the issue with yellow flesh but with R&D, we reformulated our feeds to overcome this,” said Varma.

Downturn with oversupply

Freshly harvested fish, whole and ungutted, in chilled form are packed in insulated boxes and transported by land, mainly to West Bengal and North Eastern states, where demand for fish is highest. Marketing is carried out by a sister company Ananda Fisheries. Fish is sold at INR 32/kg (USD 0.71) wholesale. The retail prices are INR 55/kg (USD 1.20), to cater for the INR18/kg (USD 0.40) for transport costs. For several years, production could not keep up with the demand in the domestic market. However, in the last six months, an oversupply brought the price down to its lowest ever. The challenge now is to lower production costs.

Top of line processing

This is the pride of the company. The total investment was INR 16 crores (USD 3.57 million) for a 30 tonnes/day processing plant. It has a processing capacity of 9,000 tonnes/year.

“We have the world’s first automated filleting machine from Baader. This top of the line processing line was essential as in India, we do not have the skilled labour for processing. Costs for such labour are also high at USD 4.00/day. This totally automatic line is the first of its kind in India and it carries out deheading, filleting and deskinning. The pangasius catfish has a filleting yield of 30%. Fillets are sold at INR 180-200/kg (USD 4-4.40).”

Products under the Anand brand include whole fish, headless gutted, steaks, skin on fillet and trimmed skinless fillets.

ADDCON

AQUAFORM

The sustainable growth promoter





- Better Weight Gain
- Reduced Mortality
- Improved FCR

For further information please contact:
ADDCON GROUP GmbH • Kaiserstr. 1a • 53113 Bonn • Germany
 Phone: +49 228 91910-0 • Fax: +49 228 91910-60 • eMail: info@addcon.com

www.addcon.com

Vietnam: Pangasius production and exports in 2010

In 2010, the country produced 1.14 million tonnes of pangasius catfish in a farming area of 5,400ha, reports Le Thi Ngoc Diep.

According to the Vietnam Association of Seafood Exporters and Producers (VASEP), in 2010, pangasius exports to 140 markets worldwide reached 659,000 tonnes with a total value of USD 1.427 billion, up 7.4% in volume and 5.2% in value as compared to 2009. The EU, US and ASEAN were the three biggest markets, accounting for 35.8%, 12.4% and 5.5% of the total export value, respectively. Volumes were 221,939 tonnes (USD 511 million), 55,750 tonnes (USD 176.63 million) and 41,696 tonnes (USD 78.56 million), respectively. Among the 290 companies exporting pangasius in 2010, Vinh Hoan Corp, Hung Vuong Corp, Anvifish Co, Agifish, Navico, CL-Fish Corp and Bianfishco were the largest in terms of export value.

Currently, there are 175 pangasius hatcheries in the Mekong delta, with a production capacity of 2.36 billion juveniles per year. In order to improve the quality of juveniles, the Ministry of Agriculture and Rural Development (MARD) has appointed the Directorate of Fisheries and Aquaculture Research Institute to implement the project on 'Transfer Pangasius broodstock of high quality genetic characteristics and high growth rate for the Mekong Delta'. MARD's goal is that all pangasius juveniles should be of high quality by the end of 2011.

More integration

With an average output of 269 tonnes/ha/crop, the production in 2010 reached 1.14 million tonnes. This fulfilled only 95% of the yearly plan but was 5% higher than the production in 2009. It can be said that in 2010, there was no over production. Currently, there are several types of pangasius farms:

- Integrated with a combination of hatchery and processing plants or feed mills and processing plants or fully integrated with all three
- Companies dedicated only to pangasius farming in large areas
- Small scale households carrying out contract farming with processing plants and,
- Non contractual household farms.

The complete vertical integration in pangasius production, from feeds, hatchery and breeding, farming, processing to marketing is increasing. Commonly, all stakeholders in the production chain sign contracts as a way to improve cooperation. At the end of 2010, there were 98 feed mills producing pangasius feeds, of which the largest were joint ventures, mainly located in Binh Duong, Dong Nai, Dong Thap and Long An provinces. These plants produced 1.69 million tonnes of feeds in 2010, meeting 82.47% of demand.

More improvements in culture

Efforts have been ongoing to improve farming techniques and reduce adverse environmental impacts. There was no epidemic disease outbreak in pangasius farming in 2010. MARD also asserted its efforts in quality control especially for material inputs (such as feeds, probiotics and medicines at all levels of production), farming, processing and trading units, according to the Circular No.09/2010/MARD, dated Feb 26, 2010.

In addition, the Directorate of Fisheries, the National Agro Forestry and Fisheries Quality Directorate (NAFIQAD) have collaborated in coding farming areas and certification for farms, which meet food safety and hygiene requirements, in an effort to trace the origins of pangasius products.

At present, there are more than 30 processing plants with their



own pangasius farming areas certified by GlobalGap. Amongst them, Vinh Hoan has the largest certified farming area with 40 ha in Dong Thap province. With such advantages as good infrastructure, certified juveniles, high quality industrial feeds and systematic records of farming process, pangasius farmed under GlobalGap standards can be sold at a premium price as compared to those from uncertified farms. However, production costs in the GlobalGap certified farms are also 20-25% higher.

Last year, the government allocated VND133 billion (USD 6.18 million) to improve infrastructure for aquaculture production in the Mekong delta and provided VND390 billion (USD18.13 million) in soft loans to boost development of the sector.

The future

Despite the difficulties in the global economy, strict trade and technical barriers in importing markets, in 2011, MARD still plans to produce 2.5 to 2.6 billion of pangasius juveniles. Farming area for the pangasius will be expanded to 6,000 ha, of which about 1,500-1,800 ha will be used to farm pangasius in two crops in a year. The target production is from 1.2 to 1.3 million tonnes of pangasius and the export value is expected to increase to USD1.4 to 1.55 billion. Recently, the US Department of Commerce (DoC) decided to apply lower anti-dumping duty rates on Vietnamese pangasius, which will help boost exports to this important market. (Sources: MARD and VASEP).



Le Thi Ngoc Diep, Editor, Vietfish Magazine, Viet Nam Association of Seafood Exporters and Producers (VASEP), Email: ngoc.diep@hotmail.com or ngocdiep@vasep.com.vn

Commentary

Pangasius sustainability: a fight between actual and perceived issues

by Flavio Corsin

When writing about pangasius sustainability, there are two somehow different view points. The first one concerns the actual sustainability status and challenges of the sector. The second deals with the perceived sustainability of the sector and the way in which some media, NGOs and producer organisations have depicted the sector. Let us keep these separate as sometimes actual sustainability differs considerably from perceived sustainability.



A natural way to treat water from ponds

Actual pangasius sustainability

Pangasius is a good product, which is generally liked because of its cheap price and mild taste, making it palatable even to those not used to eating fish. Over the past decade pangasius exports have skyrocketed and has arguably now reached every corner of the world. In spite of its popularity, the biggest sustainability challenge of the sector remains an economical one.

Prices and margins have always been low. This can be a good thing if it allows a product to enter and expand in the market. However, sometimes margins have been so low, even going below costs, leading to financial losses by farmers. The reasons blamed for driving margins below zero have been many and included the economic downturn, cash flow problems, competition between processing plants and of course a negative perception of pangasius in some markets (but this is a different story).



Guarantee of Quality Aquafeed

“Little Prince” Monocalcium Phosphate



Main products:

DCP	Feed Grade Dicalcium Phosphate
MDCP	Feed Grade Dicalcium Phosphate III
MCP	Feed Grade Monocalcium Phosphate
TCP	Feed Grade Tricalcium Phosphate
MKP	Feed Grade Monopotassium Phosphate
MSP	Feed Grade Monosodium Phosphate
UP	Feed Grade Urea Phosphate






Sichuan Chuanheng Chemical Corporation
 Web: www.chuanheng.com
 Email: chuanheng@chuanheng.com
 Tel: +86-838-8108333 Fax: +86-838-8106337



川恒股份
 CHUAN HENG CORP.
 新一代磷酸盐专家



The reality is that, although prices are now higher than what they have been in the past, over the years several thousands of farmers have abandoned pangasius farming and the sector has shifted from being dominated by small-scale farmers to large-scale companies being responsible for the majority of pangasius production. The higher prices have also led to problems, not to farmers, but to processing plants, which have signed contracts when prices were lower and now have to buy raw material at higher prices. The current situation will most likely lead to a decrease in production for 2011 and to further restructuring of the sector, with large-scale producers playing an increasingly important role. The good news is that such a sector is somehow “easier to handle”, from a traceability and quality point of view.

What about other aspects of sustainability? Environmentally, pangasius production has gradually improved over the years. From being dominated by cage farming over a decade ago, (a system that leads to the direct discharge of nutrients in the surrounding aquatic environment and a system very popular at present e.g. in salmon farming), pangasius has shifted to being almost completely conducted in ponds. But, you may say, if the water is discharged directly in the river, what is the difference? Well, the difference is huge, uneaten feed and fish waste stay mostly in the pond and this create an accumulation of sludge. If this is not discharged into the river (as it is now increasingly the case) then a huge amount of waste has been contained.

What about the water? We now know that the nutrients discharged by pangasius farms through water discharge contribute only to a small percentage of the nutrients in the Mekong river. Nevertheless, the increase popularity of voluntary certification (e.g. GlobalGAP and the Aquaculture Stewardship Council, ASC) has led to several large scale farms to convert part of their farming operations into a water treatment system, hence reducing even further the impact of the sector.

What about feed? Pangasius is an omnivorous fish, which requires smaller amounts of protein, which it can well derive from non-animal sources. It is true that so called “trashfish” has been used either directly or indirectly (through fishmeal inclusion) in pangasius feed, but this practice is becoming increasingly less popular. Arguably, primarily because of economic reasons, feed manufacturers are moving away from using fishmeal. Some of the fish feed now available on the market actually do not contain any fishmeal and this trend is likely to continue, also because some certification schemes, e.g. ASC, do require a decrease in the use of fish by-products in feed.

What about the social aspects of sustainability? Workers are paid wages that greatly exceed legal minimum wages and working conditions in farms and factories are generally good. There are only six seafood companies certified to the Social Accountability International SA-8000 standards. Three of these companies are located in Italy, and three in Vietnam. Yes, these are hazardous jobs and more can be done to improve health and safety, but things are gradually improving.

Is pangasius safe? Of course it is. If not it will not be on the shelves of several European and American supermarkets. Yes, of course, antibiotics and chemicals are used, but these are usually approved ones. There are of course occasional non-compliances (as the EU Rapid Alert System for Food and Feed- RASFF, sometimes tell us), but this is the case in most sectors.

However, if pangasius is really as described above, so why are there numerous criticisms of it? That is a different story, as that is an issue of perceived sustainability.

Perceived pangasius sustainability

The low price of pangasius has traditionally ‘annoyed’ several producers of comparable products (e.g. catfish, cod, trout) worldwide. This is what led some of them to initiate a negative campaign against pangasius. It has been described as unsafe and as the cause of the Mekong pollution, which by the way is far less polluted than rivers like the Rhine. European parliamentarian Struan Stevenson stated that pangasius is produced by ‘slave labour’. At about the same time (i.e. in late 2010), WWF scored pangasius as ‘to avoid’, using a poor quality methodology implemented by poor quality assessors. WWF Germany also played a key role in the ‘Pangasius Lie’, a program which is so biased that it is not even worth commenting on. The reality is that these statements are the true lies!

Making the two “faces” of sustainability meet

Similar to any sector, pangasius farming has adverse impacts, but these are far more limited than what has been described and arguably far smaller than the impacts associated with the farming of other livestock and aquaculture species. The true pangasius sustainability challenge is making actual sustainability and perceived sustainability meet. The pangasius industry, including us (ICAFIS), has not been proactive enough in communicating about pangasius aquaculture. We have responded to attacks but, as it is well known, prevention is better than cure.

The sector should communicate openly and proactively on the practices and challenges and what we are all doing to address them. Only then will people, including consumers, get to know its real status, so that we can all work together in making pangasius aquaculture an increasingly sustainable sector!



Flavio Corsin, PhD is Director, International Collaborating Centre for Aquaculture and Fisheries Sustainability (ICAFIS), Vietnam. Email: flavio.corsin@icafis.org

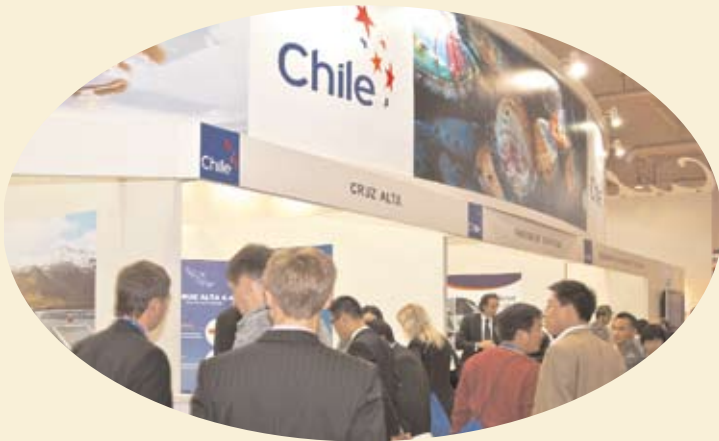


Asia's Largest Seafood Show

CHINA FISHERIES & SEAFOOD EXPO 2011

November 1-3, 2011
Qingdao, China

16th Annual Show



There's never been a better time to market your seafood to the world's largest - and fastest growing - seafood market.

Whether it's expensive seafood like abalone, lobster or crab, or lower value seafood like mackerel, squid or sardines, there's a market for your seafood in China. The best way to get your share of this lucrative market is to exhibit at China Fisheries & Seafood Expo. For the 15th straight year, China Fisheries & Seafood Expo, which was held in Dalian last November, set a record in the number of exhibitors and visitors. This year's show will feature almost 2,000 booths and 15,000 visitors from more than 80 countries.

Organized By:

Sea Fare Expositions, Inc.
2360 W. Commodore Way, Suite 210
Seattle, WA 98199
Tel: 206-789-5741 Fax: 206-789-0504
E-mail: seafoodchina@seafare.com

Sea Fare China Ltd.

16 F/A No. 58 Freetown Center
South Road Dongsanhuan
Beijing 100022 P.R. China
Tel: +86 10 58672620 Fax: +86 10 58672600
E-mail: info@seafarechina.com
www.seafarechina.com

www.chinaseafoodexpo.com

Q&A on sustainability with Stéphane Ralite, Ocialis



Ocialis is the aquaculture brand of the French animal nutrition and health group INVIVO NSA. It entered the Asian market in 1988 with a first feed factory built in Indonesia. It began producing and marketing aqua feeds in Asia in 2003, mainly for shrimp, pangasius and tilapia. It has a major presence in Vietnam, where it now has three feed mills, a R&D centre which opened in 2007 outside Ho Chi Minh City focusing on shrimp, pangasius, tilapia, cobia and barramundi nutrition. Its service centre in Long Xuyen, An Giang provides technical support to pangasius farms while that in Duc Pho, Quang Ngai provides diagnostic services for shrimp farms. Lareal Vietnam opened in 2009 and specializes in feed and food analysis. In Indonesia, research is on fish nutrition and in Myanmar, Ocialis concentrates on supplying aquaculture premix and additives.



Today, it is one of the leaders in Vietnam with feeds for the pangasius catfish and vannamei shrimp. It is fast developing a niche market for formulated feeds for marine shrimp, cobia, grouper, barramundi and tilapia for the region. Since 2010, larval and fingerling feeds for freshwater and marine fish have been added to its portfolio. **Stéphane Ralite**, heads the aquaculture department based in France.

Why do you think sustainability is important for the aquaculture industry?

This is very simple. We do not have any choice! The big question is how can we feed 9 billion people in 2050? The need for aqua products will continue to explode, especially in Asia. How can we produce so much fish? For example there is a well-known problem with fish meal: the price is already very high and the quantities available will not increase in the future. Therefore, we must find solutions to manufacture more feed with less fish meal, issued from wild fish stock.

The second example is pollution. The biggest problem with producing meat (from livestock or from fish) in the future will be space availability and pollution. We have no choice but to implement some intensive production methods (to use less area) but the issue is how can we avoid at the same time producing too much wastes?

Sustainability is not only a marketing issue for rich markets- it is already a strategic question for the major aquaculture producing countries. How can you produce fish at lower cost with high raw material prices? How can you avoid pathogens with intensive production methods? Lastly, how can you increase global production and keep a healthy environment?

As a major feed producer what role can you play to promote sustainability upstream (your suppliers) and downstream (your customers) ?

We have of course an important role to play to promote sustainability. That is what we are doing. Our group, Invivo, is strongly involved in the fish supply chains, from producer to government levels in the development of sustainable practices. For example we develop procedures for raw material evaluation, we select relevant techniques to decrease feed wastes or carbon foot print and we communicate to buyers information to explain to them how fish is produced.

However, at the same time we remain very pragmatic and focus on the needs of our clients. This is the best we can do to promote sustainability! Let us look at fishmeal replacement as an example. It has a direct impact on fish production cost and on technical results at the farm. It can also affect feed digestibility and therefore wastes in the ponds can impact the environment. This is why we invest a lot of money to build and run our own research centres in Vietnam, Brazil, Indonesia and Mexico .

Give us some examples of your experience with sustainability in European aquaculture and how can you bring this to producers in Asia?

In Europe, some sustainability issues have already led to regulatory obligations. For example, in France trout farmers have some obligations regarding phosphorus, nitrogen, suspended solids etc. in the farm water effluents. This is sometimes very difficult to manage and it places a large pressure on rearing techniques and feed. Therefore, we have developed specific models in our research centres to select the less polluting raw materials. We have also studied some specific feeding programs to minimise impact on the environment.

This experience is of course very useful to cope with problems in Asia. We work the same way in our Vietnamese research centre especially on pangasius. But to put this into practice is not easy because it involves the whole network; the producer must learn and understand the changing techniques and the seafood buyers must accept the higher cost for sustainable production.

Another very important point is that a shrimp is not a fish, a pangasius is not a salmon and a barramundi is different from the European seabass. Knowledge on European species cannot be simply applied to tropical fish. This is why we have built our research centres in the countries where we produce and not in Europe.

When you first started some years ago in Europe, what lessons did you learn? Will you face the same challenges in Asia?

We learnt that only focusing on short-term profit finally leads to business failure. This is exactly the same in Asia. Look at the pangasius network! It has exploded to finally enter a big economic crisis because of erratic technical and commercial developments. Asian industry learns much faster than their European counterpart. However, the challenges are also larger because of rapid development and because sustainability issues are much more pressing today (raw material availability, etc.).

And another problem is that this rapid development may occur with new species where little is known about its nutrition. How can you optimise digestibility and feed conversion ratios to reduce feed wastes in the water if you do not know the optimum level of protein, energy or amino acids in the feed?

Yes, we are facing the same challenges in Asia. However, the difference is that we have the tools to address these challenges and we bring them to the market. Ocialis is not an integrator. As we do not produce and sell any fish, the knowledge that we acquire in our research centres or working with big or small producers in different markets (Europe, Latin America, Asia) can be transferred to our clients. We can focus on developing new solutions for them.





www.aquafil.com

We reclaim and buy all kinds of spent Nylon 6 fish nets (gill, purse, fish farm, trawl etc)

*Think about environment!
Don't sink the nets in the ocean*

Those interested please contact us:
Ladislao Labriola (ladislao.labriola@aquafil.com)
 Tel: +39 0464 581105 / +39 348 3115102
 Fax: +39 0464 581129
 AQUAFIL S.P.A., Via Linfano 9, 38062 Arco (TN) – Italy

For Canada, North and South America:
Jim Lindsey (jim.lindsey@aquafil.com),
 Tel: +1 678 605 8149 Cell: +1 678 848 3416
 Aquafil USA, 10 Commerce Drive, Cartersville, GA 30120 U.S.A.



Responsible sourcing of farmed products

By Valeska Weymann and Mario Velasco

New is the inclusion of any hatchery-based species that can be produced under controlled aquatic systems.

A rise in health and environmental awareness has led consumers worldwide to voice their concerns, demanding products that are responsibly farmed under ecologically sound and controlled conditions. Aquaculture is the fastest growing food-producing sector in the world, making these consumer concerns a top priority, and in their efforts to respond to these demands, producers and retailers are increasingly relying on standards that provide reliability, credibility, transparency and, more importantly, promote an environment of trust in their markets.

The GLOBALGAP set of standards serves as a practical manual for Good Agricultural Practice (GAP) and is designed to assure consumers by ensuring food safety, minimizing environmental impacts of farming operations, providing guidelines for animal welfare, and maintaining a responsible approach to worker health and safety.

The Aquaculture Standard is the first Global Food Safety Initiative (GFSI) recognised pre-farm gate standard. Together with the GlobalGap platform it offers the industry a business-to-business certification system, covering the entire production chain ranging from the broodstock, seedlings and feed suppliers, to the farming, harvesting and processing stages.

A new cycle

In January 2011, GlobalGap presented a new cycle of aquaculture certification. As a result of round tables on four continents as well as three public consultations, the scope of the GlobalGap Aquaculture Standard has been expanded in the new Version 4 to include any hatchery-based species that can be produced under controlled aquatic systems, including the consideration of passive collection of seedlings in the planktonic phase.

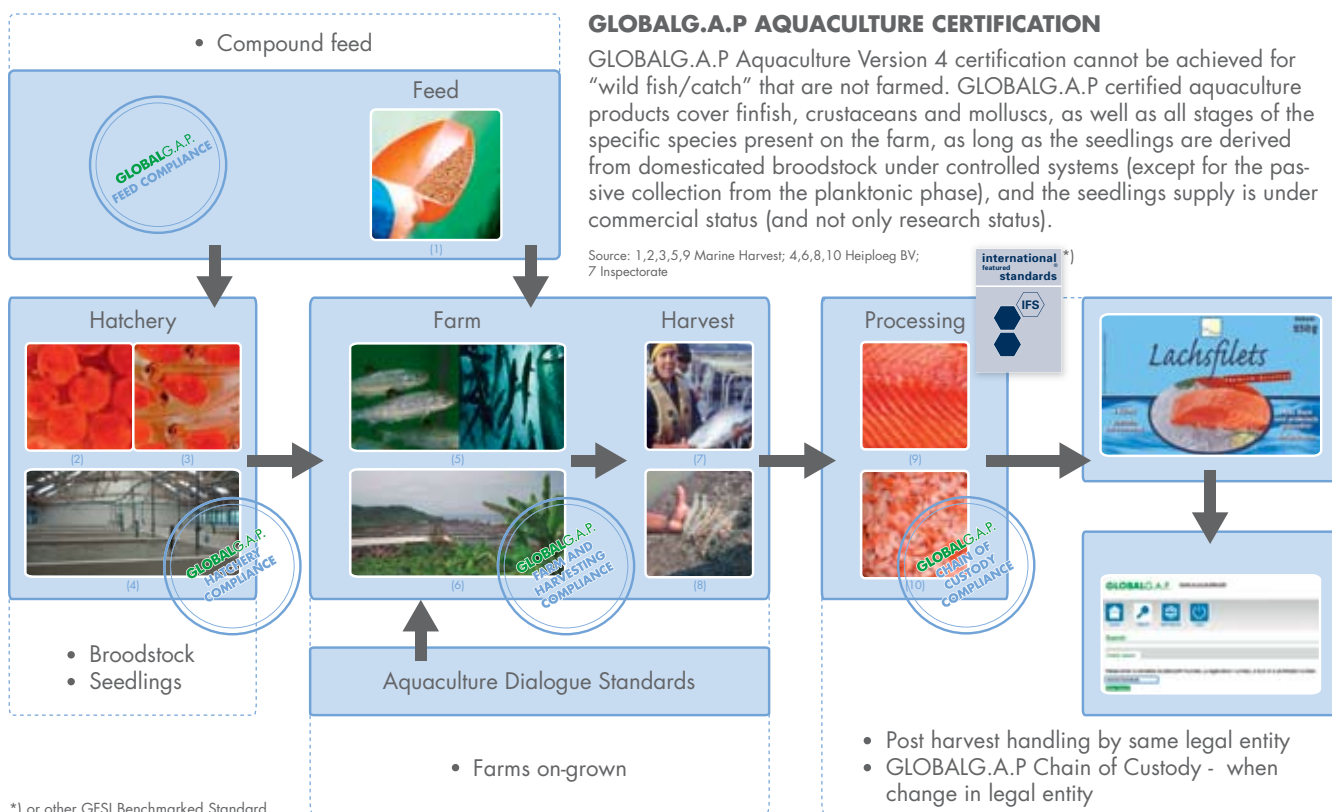
This new version reflects a compact and more comprehensive standard for users, stepping into a stricter level of compliance in key activities identified throughout the past years of farm certification experience. From the launch of the previous version in 2007, until the third quarter of 2010, 500 comments were received from stakeholders representing 116 organisations worldwide that comprise certification bodies, retailers, research centers, universities, NGOs, suppliers, farmers, GlobalGap National Technical Working Groups for Aquaculture, producer organizations, scheme owners, consultants, the food service industry, the animal health industry, and metrology institutes.

There is a firm belief in local multi-stakeholder support and adaptation: the “Think Global, Act Local” principle. To implement this principle, the National Technical Working Groups (NTWG), specific for GlobalGap’s scopes e.g. crops, livestock or aquaculture, have been established around the globe, whose role is to develop national interpretation guidelines and address identified specific local adaptation and implementation challenges.

In the new Version 4 Aquaculture Standard, the breakdown of control points are in food safety, environment (including biodiversity), animal welfare, workers welfare and traceability.

The Compound Feed Manufacturing Standard (CFM)

In March 2010, the CFM Standard Version 2.0 for certification purposes to define the guidelines for the use of compound feed at the aquatic farming and hatchery levels was launched. In the case that compound feed contains fishmeal and/or fish oil, the species of fish used and its respective country of origin must be identified. The compound feed



must also demonstrate proof that it does not contain species classified as critically endangered or endangered on the International Union for the Conservation of Nature (IUCN) Red List.

Positive impact

The credibility of the Aquaculture Standard stems from its development process, which relies on stakeholder input through transparent and inclusive standard setting procedures. The company works with accredited third-party certification bodies operating worldwide to offer the best platform of aquaculture professionals. Moreover, through its Integrity Program, GlobalGap provides a key reliability aspect by conducting surveillance spot checks to evaluate the performance of both farms and certification bodies. It also offers product buyers a database that provides an additional measure of transparency and control.

GlobalGap Aquaculture has been implemented in 15 countries worldwide for Version 3, covering salmonids, shrimp, tilapia and pangasius species. For Version 4, the species coverage has been expanded and the GlobalGap platform of certification bodies is ready to attend to any farm wherever its location in order to support responsible sourcing needs.

This Version 4 reflects continuous improvement built on the valuable feedback gained from producer and consumer requirements. The program will continue operating in a modular approach at farm level and its Chain of Custody certification will continue to be available to maintain product certified status throughout the production value chain.

This important certification defines the requirements for hygiene and proper segregation of certified and non-certified products for the processing operation unit and subsequent steps if needed. Through the GlobalGap Number identification (GGN), certificates can reflect the origin of the farmed product as well as the processing, packing, warehouse, or any stage of the food production chain when purchasers require proper identification of the certified source.

An effective and robust certification approach

Recognising the latter's certification approach, the World Wildlife Fund (WWF), the world's largest multinational conservation organization, is working with GlobalGap to provide training to auditors for the aquaculture standards developed by the WWF-initiated Aquaculture Dialogues (AD). Also, as part of the WWF/GlobalGap partnership, GlobalGap's accredited certification bodies will be trained by GlobalGap to audit farms that adopt the AD standards. The AD Standards will be added on in their entirety to the GlobalGap Standards.

In addition, GlobalGap certified products automatically undergo Environmental Impact Assessments (EIA) as an integral part of the certification process. This ensures that aquaculture farms not only make animal welfare considerations, but that they are also expected to assess the impact of their farming practices on their immediate environment, thereby encouraging environmental awareness.



Valeska Weymann



Mario Velasco

Valeska Weymann is with GLOBALG.A.P c/o FoodPLUS GmbH Spichernstrasse 55 50672 Cologne, Germany. Email: weymann@globalgap.org

Mario Velasco is with GLOBALG.A.P North America Inc. 4800 Hampden Lane, Suite 200 Bethesda, MD 20814, USA. Email: velasco@globalgap.org



2011 The 6th Shanghai International Fisheries & Seafood Exposition

2011 Shanghai International Aquaculture EXPO

Dec.8-10,2011
Shanghai Everbright Convention & Exhibition Center

Sponsors:
Shanghai Fisheries Trade Association
China Tong Yuan Co., Ltd.

Organizer:
Shanghai Gehua Exhibition Service Co., Ltd

Co-organizers:
Shanghai Fisheries General Corp.(Group)
Zhejiang Aquatic Products Processing & Marketing Association

Supported by:
China Aquatic Products Processing and Marketing Association
Shanghai Aquatics Office



Shanghai Gehua Exhibition Service Co., Ltd.

Add: Rm.1403,Shengli Building, No.9120, Humin Rd., Xuhui District, Shanghai, 200235, China
Tel: +86-21-3782 1152
Fax: +86-21-3782 1409
E-mail: sifse2009@163.com
Http://www.sifse.com

Prevention, verification and cooperation in food safety

The United States Food and Drug Administration's Aquaculture Assessment Program is working with producers, processors, feed mills and laboratories to prevent food safety problems with aquaculture products.

The U.S. Food and Drug Administration (FDA) is responsible for the food safety aspects of all fish and fishery products entering the U.S. It uses a wide variety of tools to identify immediate and potential health hazards, adulteration or contamination. In recent years, because of various food safety scares, U.S. consumers have become more critical of the food safety aspects of the food they consume. This is particularly true with imported foods because of the increasing proportion in the food consumed.

Annually, the U.S. consumes almost 5 billion pounds or 2.3 million tonnes of seafood, 83% of which is imported from more than 50 countries. Topping the list of imported seafood are fresh and frozen shrimp, salmon, tuna, tilapia, and crabs. Asia contributes 50% of this supply, led by China. Some 40% of the seafood comes from aquaculture.

The regulatory role of the FDA is to ensure that foreign processors are maintaining standards equivalent to what the U.S. requires for its domestic producers. Imports are under the regulatory and inspection regimes of the originating country but reports that the FDA currently turns back the highest percentage of shipments from certain Asian countries for failing to meet US standards shows that compliance is not met. In the high risk category are ready to eat products, scombroid species such as tuna and mahi-mahi, and vacuum packaged products. FDA is also required to act quickly and with the recent radiation scare with seafood from Japan, it has begun to divert seafood for testing the presence of radiation.

FDA's Seafood Safety Program

FDA uses a variety of approaches to assure the safety of seafood. One way is to conduct assessments on how a country assures the aquaculture seafood they ship to the US is safe. AAP recently met up with Brett Koonse and Barbara Montwill, from the FDA's Centre of Food Safety and Applied Nutrition during a recent assessment visit in Malaysia. They explained that the aim of these assessments is to be proactive. FDA works with the host country regulators and industry to prevent problems before they happen.

To do this, FDA meets with government officials and visits aquaculture farms, processing plants, feed mills, laboratories, and veterinary medical supply stores. At each stop, FDA looks at ensuring aquaculture products are free of unapproved or hazardous residues and pathogens such as salmonella. In this way, FDA wants to raise the food safety bar with farmed products worldwide.

"We see this approach as 'prevention and verification' and working together with producers to get compliance because we need this for seafood in the U.S. and we want it safe and wholesome."



Brett Koonse



Barbara Montwill

Koonse explained that a country wide aquaculture food safety prevention program allows for preventive measures to be in place in hatcheries, feed mills, farms and processing facilities to prevent food safety problems from occurring.

"Then you do a limited amount of selective, highly competent testing to verify that those preventive measures are working. But, this program depends on the cooperation of all parties involved including regulators and laboratories. In this way, at each step in the supply chain, the issue of food safety, public health and perceptions on how seafood is produced is addressed.

"We look at the countries' complete control programs to assess the likelihood that products will not have aquaculture residues. That is why we go to the processor to look at their HACCP plans, farms to see what records they have and access their knowledge on the drugs or chemicals they can use. Most importantly, we verify that processors and regulators are working with farms to educate and instill a sense of responsibility that if they use unapproved chemicals or antibiotics, the overall perception on the country may suffer if caught.

"For this reason, we look not only at farms and processors but also how the laboratories carry out testing and verify that the food safety prevention program is working. We also look at the distribution of farm chemicals and drugs at veterinary stores, etc. In feed mills, the focus is on the processing of medicated feed, cross contamination and controls of ingredients. We want to see some third party certificates of analysis that show the feed is properly labelled and does not contain any contaminants. This ensures a complete assessment," said Koonse.

"FDA looks at this as a more collaborative approach to compliance. We work with producers and the competent authorities (CA) so they export safe and high quality products," said Montwill.

In all cases, both agreed that to date the countries have appreciated the advice and suggestions from the FDA aquaculture experts to improve their programs.

FDA's regulatory program

Every processor, whether they are in the U.S. or export to the U.S. has to have a Hazard Analysis and Critical Control Points (HACCP) plan. If they process aquaculture products, the processor must have controls in place that ensure those products do not contain any unapproved residues such as chloramphenicol and nitrofurans.

One way is to get a written guarantee from each farm they buy from stating they only use approved drugs and chemicals and guarantee they will not use any unapproved drugs. This is a control step. The processor must also have a step in place that 'verifies' that the control is working. For unapproved drugs and chemicals, it usually involves a certain amount of testing either right before harvest, up to on arrival at the processor or finish product. FDA's requirement is different from that of the EU Food and Veterinary Office. FDA places the responsibility on the processor, not the farm or the country's regulatory authority.

Besides conducting country assessments, FDA also conducts inspections of foreign processors. It checks HACCP plans and records for compliance with the regulations. In recent years, it has increased these site inspections in producer countries.

"The selection is based on the past history of the processor, country and whether the product has posed any high risks. In 2012, the inspection program will cover around 1,500 food processors

(including seafood) inspections in several countries. There is also the surveillance program and sampling of products for unapproved residues among others. For example, the 2006 Import Alert or ban on 5 species of aquacultured products (shrimp, dace, eel, basa, and catfish) from China was the result of FDA's targeted sampling program. Consequently, FDA carried out a country wide assessment to see where the problem was and suggested changes in China's program to try and minimise the risk that its aquaculture products will be contaminated with unapproved residues," said Koonse

Prevention and verification

A better understanding leading to GAQP

The FDA has done these assessments in India, Vietnam, Indonesia, Chile, Malaysia and China. During the assessments, the FDA team emphasises the concept of 'trust but verify'.

'Trust' starts with the development and implementation of an aquaculture food safety prevention program at all steps within the supply chain and the 'verify' continues with a credible sampling and testing program at qualified laboratories to show the program is working.

"However, there is always a need for better understanding requiring training and discussion. For this reason, FDA, in conjunction with the Joint Institute of Food Safety and Applied Nutrition and the host country, has followed up the assessments with Good Aquaculture Practice (GAQP) training programs where they go into detail on what an aquaculture food safety prevention program is and how to verify that it is working. In Malaysia, a GAQP course was conducted in collaboration with the Malaysian Department of Fisheries and the farm Blue Archipelago. In the long run, a well developed and implemented GAQP food safety prevention program saves money, time, and effort for everyone—the producer, processor etc and finally, the FDA."

Montwill added, "However, we realize that we cannot standardize this in all the countries as conditions and the levels of development differ. The focus of the GAQP training is the 'trainer the trainer' program. There will be a cadre to train the small farmers in the field.

"It is essential to realise that we cannot have a good product from a bad environment and if we need to use a lot of drugs and do not respect labour laws. This is not sustainable aquaculture."

One of the main points is getting farmers involved in food safety and building up the countries image as a source of safe and high quality aquaculture products. The 'brand' belongs to the farmer, processor, distributor and government working together.

FDA and third party programs

The team explained that currently, FDA does not have a third party program. By definition, third party programs are private sector and

Important sites for regulations & guidelines

Procedures for the safe and sanitary processing and importing seafood and fishery products—www.cfsan.fda.gov/~lrd/fr951218.html

Koonse, B. and Salisbury, P.A., 2003. Ask the regulators—FDA promotes good aquaculture practices. www.foodsafetymagazine.com/article.asp?id=3215&sub=sub1

FDA Food Safety Modernization Act. www.fda.gov/Food/FoodSafety/FSMA/ucm247546.htm

www.foodsafetynews.com/2011/01/fda-food-safety-modernization-act-out-of-the-box/

The Imported Seafood Safety Program. www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/ImportsExports/ucm248706.htm

Fish and Fisheries Products Hazards and Controls Guidance, Third Edition, June 2001. www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/Seafood/FishandFisheriesProductsHazardsandControlsGuide/default.htm

government standards and from certification organisations such as GAA and CoC. Currently, FDA does not recognise any existing third party and country program and do not use these as a selection criterion. Additionally, FDA does not use a list of approved farms by the CA, contrary to the process used by the EU.

"From our stand point, third party programs are strictly market driven and maybe something buyers require. It will be good for the farm but we do not look at this. The controls by the CA are important for us," said Montwill.

The Food Safety Modernization Act (FSMA), which came into law in January 2011, will enable FDA to protect public health by strengthening the food safety system. It is the first comprehensive overhaul of the food safety program at FDA and enables it to focus more on preventing food safety problems rather than relying primarily on reacting to problems after they occur. The law also provides FDA with new enforcement authorities designed to achieve higher rates of compliance with prevention- and risk-based food safety standards and to better respond to and contain problems when they do occur.

"Under the FSMA we foresee that we will have more tools to work with the CA and options to work with third party programs. We did run a third party pilot program to get a better idea of the different schemes and what kind of resources we would need to have a third party certification program and what it demands," said Koonse.

Just released

Fish and Fishery Products Hazards and Controls Guidance - Fourth Edition, April 2011

On 27 April, U.S. FDA announced the availability of the 4th edition of the 'Fish and Fishery Products Hazards and Controls Guidance.' This updates the last version, published in 2001. This contains FDA's latest recommendations to the seafood industry for reducing or eliminating food safety hazards in the fish and fishery products they process. Key changes found in the new edition include:

- Updated post harvest treatment information for pathogenic bacteria in shellfish — including *Vibrio vulnificus* and *Vibrio parahaemolyticus* — consistent with the current recommendations of the Interstate Shellfish Sanitation Conference;
- Revised time and temperature recommendations to better control for scombrototoxin (histamine) formation and pathogenic bacteria;
- Consistency with statutes, regulations, tolerances, and action levels which have changed since the publication of the previous edition;
- The species-hazard identification table has been expanded to include additional species of seafood now found in the U.S. market;
- More comprehensive descriptions of potential illnesses and injuries which could result from a hazard.

More information and a printable version of the guide, in pdf format is available at <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/Seafood/FishandFisheriesProductsHazardsandControlsGuide/default.htm>

A video presentation providing an overview of some of the significant changes in the 4th Edition of FDA Fish and Fishery Products and Hazards ... is available at www.youtube.com/watch?v=0Vsnia2o0G0



Transforming aquaculture production

Shrimp production volumes from Asia are increasing, concurrent with improved production systems. However, with this achievement, producers in Thailand need to be prepared to face a common unfavourable outcome during the early phase of such increased production which are lower ex farm prices and often lower profit margins.



Dr Jan Koesling (right) with some speakers (from left), Tony Wall, Dr Panisuan Jamnarnwej and Tim O' Shea.

Dr Jan Koesling, regional business development manager, Aquaculture and Nutrition, Bayer HealthCare Animal Health, Thailand believes that branding of cultured seafood may play an important role in the future. Bayer Thailand sees that transforming aquaculture production comes with meeting the customers' needs and challenges and for this, knowing the customer well is crucial. Therefore, in conjunction with Aquatic Asia 2011 held together with VIV Asia 2011, the company gathered industry experts and seafood marketers to lead the program for the one-day conference on 'Culture Quality Seafood'. This was held on 9 March at BITEC, Bangkok and was attended by more than 130 participants. In Asia, Bayer Animal Health takes the lead with numerous innovative technology in pond water management, feed additive specialities and aquatic animal biocides from its own development or the development of partner companies such as Novozymes Biologicals.



Dr Surapol Pratuangtum (left) and Nick Joy

Koesling designed the program to compare relevant issues in the shrimp industry with developments in the more mature salmon industry in Europe.

Tony Wall, Fish Vet Group discussed the development in salmon farming technology in Europe, whereas **Dr Chalor Limsuwan**, Aquaculture Business Research Centre (ABRC), Faculty of Fisheries, Kasetsart University gave an overview of how Thailand's industry reached its present state of development. He also elaborated on the recent cost saving and reduction in feed wastes - the adoption of automatic feeders in shrimp ponds.

Branding, provenance and trust in seafood were covered by the salmon farmer **Nick Joy**, who is managing director, Loch Duart in Scotland. He reviewed the history of the company, which is recognised for its ethical and sustainable approach to salmon farming. It markets to top end customers in Europe, America and elsewhere. The yearly production is 5,400 tonnes. How did the company get there? Joy said the company focused on understanding what the customer wants, delivering their needs, protecting their interest and always communicating with the customer to establish a trust between producer and consumer. He focussed his message on the fact that he sees branding of sea food as associated with the taste, texture and special attributes which differentiates the product. "There is no branding if the product is not memorable."

As president of the Thai Marine shrimp farmers association (TSA), **Dr Surapol Pratuangtum** knows that the recognition given to Thailand shrimp farmers and their product is attributed to the emphasis on quality and food safety which began in 2001. Thailand was the first country to enforce farm standards. The good aquaculture practices standard (GAP) was taken up by farms in order to meet consumer

demands. Detailed data recording is required for traceability. Farmers have learnt not to overly intensify production to protect the environment and enhanced biosecurity to secure the crop against white spot syndrome and other viruses. However, there are too many certifications programs in the market and these only add costs for the farmer without adding respective value to their business at present.

Thailand is currently the world's leading seafood exporter, mainly tuna and shrimp. **Dr Panisuan Jamnarnwej**, president, Thai Frozen Foods Association (TFFA) said that aside from problems in shrimp farming; diseases, environmental issue of mangrove forest destruction and salination of inland areas, the most important issue is on trade on sea food from Thailand. There was the report on the use of slave labour which was repeated by the media and later the IUU issue in 2010. Despite being subjected to punitive anti dumping duties for export to the US in the past 6 years, Thailand is still the largest exporter to the US at 30% of the import volume. It also has the record of meeting the hygienic and quality requirement of the US Food and Drug Administration. In selling to premium markets, Panisuan gave examples of Thai shrimp as the preferred brand in Marks and Spencer outlets in the UK. Japanese buyers have expressed interest in products from a major farm in Thailand, but have certain requirements. The EU markets require head on shell on shrimp (HOSO) but processing plants established much earlier in the Mahachai area, are 100km from the farms. This affected the potential of exporting HOSO shrimp to the EU markets.

Under the Clean Fish concept, founder of Clean Fish, **Tim O'Shea** said it strives to trade seafood which can generate a premium for buyers but also producers who will have to produce according to the Clean Fish concept.

During the panel discussion, Surapol said that Thai farmers are doing more to meet the 'green concept'. At this farm, almost 80% of the water is recycled. Henry Wang, in the audience who manages a shrimp farm in south Thailand, said there are plans to adopt solar energy but this requires government assistance. Waste from ponds are used as fertilisers for oil palm plantations.



Partial harvesting in shrimp pond in Thailand. Picture by Soraphat Panakorn



Participant, Henry Wang (left) whose farm is in Phuket

This was very successful conference; enlightening primary producers in the audience on how to better market their products and for others, an insight into the sea food industry in Thailand.

Controlling shrimp export risks

Shrimp exports from India are subjected to demanding inspection and verification at EU and US ports of entry. These stringent inspections relate to presence of antibiotic residues, infections and contaminants. These may cause delays coupled with the risk of the entire consignment being rejected. To successfully negotiate these additional reviews, the exporter needs to establish credible controls across the entire shrimp production chain (hatchery, farm, processing), which demonstrates food safety and traceability to the importing countries.

AQUA safe shrimp

Recognising these challenges, Det Norske Veritas (DNV), India, a third-party certification agency, has developed a proprietary assessment scheme called 'AQUA safe shrimp' for assessing compliance with Hazard Analysis (HA) and Good Aquaculture Practices (GAP) in the farmed shrimp production chain. The scheme is a structured and documented compliance procedure against a set of controls for inspection, residue testing and GAP compliance certification. It will address residue control, water quality, disease control, chemicals and therapeutic application control and harvest/post harvest procedures.

On compliance during the audit, the producer will be issued a compliance assessment certificate (CAC), at the end of the crop. This will facilitate easier market access as it gives the producer evidence of food safety control to the exporter and the end consumer.

The farmed shrimp assessment scheme ensures every key aspect in the production chain; hatchery, farm and processing is audited and certified with the main focus on water quality, disease and residue control. The objective of the service is to provide an assurance to markets, that the Indian-farmed shrimp products are sourced from firms pursuing high quality production, environment-friendly policies and is safe from antibiotics and other contaminants.

DNV India offers training programs to shrimp producers and exporters interested in the AQUA safe shrimp certification. Training will focus on food safety issues, consumer relations and requirements in the importing countries. More information: Email: Training-dnvindia@dnv.com; www.dnv.in (India)



Expands dryer manufacturing facility

Increasing production to advance customer service

With the turn of a shovel during a recent ground-breaking ceremony, Wenger Manufacturing is poised to enlarge its dryer production facility in Sabetha, Kansas by 45,000 square feet or 4,180.6 m² and increase production capacity by nearly 50%. It may be true that 'good things come to those who wait', but Wenger is taking action to reduce dryer customer wait times as much as possible, said Robert Sunderland, Wenger's director of dryer technology.

The increased demand for Wenger dryers has created an ongoing backlog, which ultimately drove the decision to expand the Sabetha facility. "Over the past few years, we have put quite an emphasis on dryers," said Sunderland. "That has led not only to an increase in market share, but to the development of the new Wenger Enhanced Sanitary Dryer, which means we are also adding another model to the production mix."

"Dryer installations and retrofits are already brisk and we need to produce the equipment in a timely manner. Consequently, we will be adding employees once the expansion is completed," said Brad Wenger, the company's vice president of manufacturing and engineering.

All Wenger dryers go through a rigorous quality control program, which includes pre-assembly of the machine at the factory and testing the unit to the extent possible. As a result, all necessary control devices have already been wired to junction boxes prior to delivery; conveyors and pans have been pre-assembled, and burners and safety devices have been properly installed, plumbed and wired prior to shipment. "All of these steps not only ensure the reliability of the product, but reduce installation time," added Sunderland. "But faster, easier installation

does not help us reduce a bottleneck in our factory. That's why we are excited about the new dryer facility expansion." More information: RSunderland@wenger.com; web: www.wenger.com



Wenger sanitary dryer

Specialist feeds for shrimp hatcheries

Skretting is launching PL shrimp hatchery feeds to complement the shrimp grower feeds it already produces. The hatchery feeds come from the plant in Vervins, France, where specialised equipment permits the production of feeds at low temperature to retain maximum nutritional value.

The PL feed range provides larval and post larval nutrition for both black tiger shrimp *Penaeus monodon* and Pacific white shrimp *Litopenaeus vannamei*.

"We ran trials in hatcheries in Vietnam and Mexico, also in Thailand, Brunei and Colombia," says Eamonn O'Brien, Product Manager, marine hatchery feeds. "In every case our feeds were as good as or better than the established feed for the hatchery. Often that is a cocktail of manufactured feeds developed by each hatchery in attempts to meet all the requirements of the shrimp larvae (nauplii). In addition, as it provides complete nutrition, our stand-alone PL feed is much simpler to use. Another positive feature is the green colour resulting from the inclusion of algal products. These add nutritional value and appeal because of the continuity with the algae (diatoms) used for the first diet after hatching."

The development of shrimp nauplii is complex, with several stages in 25 days and daily moulting, good nutrition throughout is vital. "Skretting PL is formulated to be introduced at the zoea stage, directly after the diatoms and freshly hatched *Artemia* (brine shrimp) nauplii. This means PL in its various grades can provide all the nutrition needed from about two days after hatching through to sale. The Vervins

plant is producing five sizes of the feed, ranging from the 50–100 microns up to the 500–800 microns. The low temperature production technology retains a high level of nutrition in the feeds, which was also appreciated by the hatcheries that ran the trials along with the 62% content of highly digestible protein compared with the conventional 50% protein content."

At a trial conducted in a commercial shrimp hatchery in Mexico, the feed was compared with two established diets. At a stocking density of 350 nauplii/litre and reared until PL12, the feed matched the control diets in survival (around 70%) and final weight (ranging from 2.0 to 2.6 mg). The hatchery said that the feed was well accepted, had good stability and did not affect water quality. In an equivalent trial in Vietnam, Skretting PL outperformed the control diet with a survival rate of 60% compared with 52% and a final length of 6.45 mm compared with 6.1 mm for the control.

As part of the launch, O'Brien and his team will be conducting road shows and workshops. "These will give us an opportunity to present Skretting, as it is a new supplier for shrimp hatcheries. As a research-based company with high standards of technology, we can provide the level of data and technical information expected in the world of shrimp hatcheries. That is one reason we ran trials in Mexico. Although not a substantial producer of farmed shrimp, its hatcheries are widely recognised as technical leaders and its technicians can be found in hatcheries around the world."

Creating a Superbrand and the KFC story

In Bangkok, Asian livestock and aqua feed producers learnt on building the future with the perfect balance of vision, productivity and leadership from the founder of Kentucky Fried Chicken franchise, John Y. Brown Jr.

“Entrepreneurs don’t fail, we keep trying until we get it right” said founder of the superbrand, Governor John Y. Brown, Jr. at an inspiring seminar dinner on innovation, entrepreneurialism and the ‘8 Secret Ingredients to Success’ hosted by Alltech on March 10, 2011. Over 300 industry and business professionals gathered in Bangkok, Thailand to hear the interactive presentations given by Dr. Pearse Lyons, president and founder of Alltech and Governor John Y. Brown, Jr.

The former governor of Kentucky, USA recognised the appeal of fast fried chicken in the 1960s and he made Colonel Sanders, who developed a fried chicken recipe with 11 herbs and species, famous. During his ownership tenure from 1964 – 1970, Governor Brown was responsible for growing KFC from 600 stores to more than 3,000. He established a global reputation as a businessman and entrepreneur. Building KFC into the world’s largest food service company, in over 80 countries, he is credited as one of the key players in the launch of the dynamic growth of the fast food industry. “I’ve been an entrepreneur all my life. That’s what I really enjoy. That’s all I’ve ever done, start up companies.” In 2009, he was named as one of the top American business leaders in the twentieth century by Harvard Business School.

Governor Brown shared his 8 point plan for success with the audience. “The one thing about a brand is that you have to build credibility and you have to build consistency. You can’t be a little bit honest, it’s all or nothing.”

The 8 secret ingredients of success highlighted at the seminar were:

1. Nothing happens until a sale is made
2. Building a brand
3. The art of compromise and working together
4. Surround yourself with the best people
5. Making the deal
6. The value of hard work

7. Controlling your destiny
8. Giving back

He also highlighted the continued concern among consumers for healthy, traceable products. “One of the main obstacles, is educating the restaurant industry on the benefits of animal nutrition and traceability, starting with the CEOs.” New product development at Alltech, is predicated on research and development and understanding of customers’ needs and expectations. To this end Alltech is now working with John Y. Brown, Jr. to educate and provide natural, assured, traceable solutions to the restaurant industry “it not what we eat, it’s what our animals ate” added Dr Lyons.



Governor John Y. Brown, Jr. and Dr. T. Pearse Lyons (back row, right) with dinner guests from Malaysia and Thailand.

Power Brand status



Dr. Richard Chong, general manager, Alltech Malaysia (second right) and Rachel Liem, marketing manager, Alltech Malaysia receiving the award from Datuk Liew Vui Keong JP, deputy minister in the Prime Minister's Department (second left)

In Malaysia, Alltech, was recognised by the Asia Entrepreneur Alliance as the Malaysian Power Brand for animal health and nutrition, 2011. The award was presented at the 5th Malaysia Power Brand 2011 award gala dinner on 27th March 2011, Selangor, Malaysia.

This prestigious award honours small and medium enterprises which have achieved excellence within their industries. “It is truly an honour for us to receive the Malaysia Power brand award,” said Dr. Richard Chong, general manager of Alltech Malaysia. “This recognises Alltech Malaysia’s continued commitment to the local market as a trusted and valuable business partner in animal health and nutrition industry. We would like to thank our customers and our industry friends for their continued support. Without them, we would not be achieving this milestone.”

Over the last decade the Alltech brand has seen outstanding commercial success and sustainable growth, as well as high levels of innovation, ethics and corporate social responsibility within the Asia-Pacific region. Alltech’s dedicated sales team offer support across the animal nutrition industry with clear goal of expanding business and supplying natural cutting edge products to local markets. More information: www.alltech.com

New growth promoting products for the aquaculture industry

Double-salt technology on potassium diformate (KDF) triggers high interest at the shrimp farmers day in Thailand

The Thai shrimp farmers day was held in Surat Thani, south Thailand, from February 12 to 13, 2011 and it was here that ADDCON presented its double-salt-technology based growth promoting products for the aquaculture industry in a newly designed booth. The company proudly presented latest results of research, in which the white shrimp (*Litopenaneus vannamei*) grew significantly better on receiving the growth promoter (KDF) included in the feed.

“The annually held shrimp farmer’s day is the ideal fair to get in touch with the farmers and Thai feed mills for promoting Addcon’s growth promoters in collaboration with the Thai agricultural feed and aquaculture industry”, said Dr. Kai-J. Kühlmann, application marketing manager of Addcon Asia Co. Ltd. He added that more than 100 delegates from Thai feed mills, such as Asian Feeds, Lee Pattana Feed Mill, Cargill, Thai Luxe and experts from country-leading shrimp farms visited the booth during the show. “Here, we have a gem introduced to our industry, which will strongly help farmers decrease environmental related disease-outbreaks, such as the white faeces disease”, representatives from Thai feed mills said.

The results of the trials were presented by Sommart Lohmah, marketing assistant. In a 10 week scientific aquaria experiment, 2.4±0.1 g (n=540) shrimp were stocked as control and two treatment groups. Shrimp were fed with a commercial diet containing 0.2% and

0.5% KDF (treatments B and C) to satiation, while diets for the control group (treatment A) did not contain KDF.

Results show an improved growth performance, feed conversion and productivity index of shrimp when shrimp were fed diets with KDF (Table 1).

Table 1. Growth performance of shrimp fed with different KDF concentrations incorporated into the compound feed.

Parameters	Diet treatments		
	A	B	C
Initial body weight (g/ind)	2.4±0.1	2.4±0.1	2.5±0.1
Final body weight (g/ind)	11.0 ^b ±0.8	11.8 ^a ±1.3	11.8 ^a ±0.7
Weight gain, WG (g)	8.6±0.9	9.4±1.3	9.4±0.7
Specific growth rate, SGR (%)	2.2±0.1	2.3±0.2	2.3±0.1
Survival (%)	76.1±7.0	76.1±4.6	80.6±13.4
Feed Conversion Ratio, FCR	1.47±0.1	1.37±0.2	1.37±0.1
Productivity Index (PI)	45.0 ^b ± 8.5	53.8 ^{a,b} ±14.5	55.9 ^a ±14.0

*Means with different superscripts within rows are significantly different (P<0.05).
PI = WG x Survival / (FCR x 10)*

Total weight gain of 9.4g was higher for shrimp fed diets with KDF (B and C) compared to the control group (8.6g, A) leading to a 9% higher weight gain. SGR of 2.26% (B) and 2.25% (C) was higher compared to control shrimps (2.16%, A) resulting in 4.4% and 4.0% increase for KDF fed shrimp. Survival rate was 6% higher in 0.5% KDF fed shrimps (C) only compared to treatments A and B, while FCR was 7% lower for shrimp fed on KDF including diets.

The shrimp productivity index of the simulated shrimp grow-out increased significantly (P<0.05) to 3.8% (B) and 19.5% (C) due to KDF inclusion compared to shrimp fed on a control diet. Lohmah said that as laboratory trials are conducted in a rather controlled clean environment, higher effects of KDF are anticipated under natural pond conditions due to various pathogens provoking heavy mortalities and financial losses during farming operation. Thus, using dietary KDF inclusion in compound shrimp feeds pose a promising alternative in modern shrimp nutrition to improve white leg shrimp grow-out operation in ponds.



Deputy Prime Minister of Security of Thailand, Suthep Thaugsuban, at Addcon Asia's booth.

Auto feeder in shrimp farming

In shrimp farming, there is a continuous need for improving efficiency in farms and Malaysian based Star Supplies Marketing Sdn Bhd is marketing its EKO Auto Feeder, specially designed for efficient feed management in shrimp farming. The objective of an automatic feeder is to dispense a given amount of feed at certain interval during a 24-hour period without the need of excessive manual labour. The main functional advantages of this automatic feeder are heat resistant; consistent and wide feeding area (radius = 53 feet or 16.15m) and less maintenance cost on parts. The main benefits of an automatic feeder for the farm include a reduction in the number of workers required for the feeding work, preserving freshness of shrimp feed, reducing feed conversion ratio and increasing average daily growth of shrimp. The specification of the feeder is 160 cm high, 68 cm long and holds up to 175 kg of shrimp feed. More information: Email: ssmarketing_sb@yahoo.com or boeykn@gmail.com.





Illustration/Design: Capamara Design

MEDITERRANEAN AQUACULTURE 2020

OCTOBER 18-21, 2011

RODOS PALACE LUXURY CONVENTION RESORT

RHODES, GREECE

WWW.EASONLINE.ORG



AQUACULTURE EUROPE - THE ANNUAL MEETING OF THE EUROPEAN AQUACULTURE SOCIETY.





Moving from feed to fish at this first edition

Since 2007, organisers for VIV have been introducing an aquaculture pavilion into the usual livestock feeds and ingredients trade show in Asia. This has been successful and Ruwan Berculo, project manager, VIV, said that the demand for trade visitors to see more of aquaculture at VIV Asia, culminated in this dedicated event co-located with VIV Asia 2011. Aquatic Asia 2011, focused 100% on the production in Asia of fish, shrimp and other aquaculture-based products. The success also proved that this first edition of organising both an exhibition and a non-commercial conference works well.



Lee Low, Star Feedmills Malaysia (fourth from left) with his team of farmers visiting Aquatic Asia 2011 and farms in Thailand



Malaysian visitors, Khoo Eng Wah (left) and Liaw Boo Lai



The Gold Coin Malaysia team, Sam Soh (right) and Dr Alan Chew, with Norman Chwang, Shrimp Mart Thai Co, Thailand (left)



President and director, Puspita Dewi Prijadi, PT Matahari Sakti, Indonesia (second left) and her group with Mike Rimmer, project manager, ACIAR Project in Makassar (second right).

“After two editions of the Aqua VIV Asia pavilions in 2007 and 2009, we took the next step towards organising an aquaculture event in Asia. It is still not easy to set up a more dedicated event for just aquaculture in Asia. Although the market growth is huge, most farms are not yet developed and are still small scale,” said Guus van Ham, sales manager, Aquatic Asia 2011.

“Nevertheless we have seen a huge interest from visitors in Aquatic Asia 2011. We have also seen that the synergy between VIV Asia and Aquatic Asia. By branding it as a separate event, we have taken a big step forward. However, just as the aquaculture market in Asia is developing, we also see many challenges to improve this co-located event. Both visitors and exhibitors have shown a big interest in fish nutrition and animal health.”

Van Ham added, “In 2013, we would like to extend the number of exhibiting companies into different segments of the feed to fish value chain.”

At the trade show, 26 exhibitors presented their technologies to 1,355 dedicated visitors. However, there were more than 28,000 visitors to the main VIV Asia 2011 and 5,000 of them stated their interest in aquaculture. The interest was mainly in feeds, ingredients and additives, which was expected, as this has been the focus of VIV events. This was followed by animal health. Visitors were mainly from feed mills (23%), feed ingredients and additives suppliers (13.7%) fish farms (12.7%) and were mainly from Thailand followed by India and Vietnam.

The Aquatic Asia 2011 conference program was packed with three conferences during the first two days and several technical presentations by companies throughout the three-day trade show. Bayer HealthCare, Animal Health, Thailand held a one day conference on transforming aquaculture with the theme ‘Cultured Quality Seafood from Asia’ (see page 40). The Aquatic Asia 2011 team also hosted a conference with the Thai Department of Fisheries in the Thai language.

The one day Novus Aqua’s conference had a futuristic title, ‘Aquaculture to feed the world by 2050’. Invited experts looked at the role of nutrition in responsible aquaculture, plant ingredients in aqua feeds, vaccines in aquaculture and probiotics in shrimp farming in India. Lukas Manomaitis, American Soybean Association gave an overview of the use of soy in aqua feeds as well as other ingredients such as corn and its by-products, wheat by-products and other meals such as palm kernel, copra and cassava. In her presentation, Kjersti Gravningen, Pharmaq Asia said that vaccines work in aquaculture, but needs to be formulated to give the needed level and duration of protection. Dr Manoj M Sharma, India gave a farmer’s view on how probiotics work in shrimp culture. He also highlighted some best management practices in Gujarat (see pages 12-16). The highlight of the conference was a presentation by Dr Addison Lawrence, Texas A&M, USA, a pioneer in the study of the nutrition of the white shrimp. He looked at new trends in



Dr Addison Lawrence Texas A&M University, USA (second from right) with friends, from left, Joe Kearns, Wenger USA, Ronnie Tan, Blue Archipelago Malaysia and Dr Mian Riaz from the Food Protein Research and Development Centre, Texas A&M University



The Lallemand team with Dr. Mathieu Castex, product manager aquaculture & yeast derivatives (right) and visitor, Dr Thomas Wilson, Thai Luxe Feeds, Thailand (second right).

copper and zinc requirements in marine shrimp. His message was that the use of chelated trace minerals minimizes binding with antagonists such as phytic acid.

Among the majority of the exhibitors marketing feed ingredients and additives into feeds, were those focussed on fish health and culture technology. The technical team from Intervet/Schering-Plough Animal Health demonstrated fish vaccination (www.spaquaculture.com). That company Charoen Phatara Panich Co Ltd displayed its innovation for fish and shrimp ponds and tank systems. These are aeration hoses which diffuse fine bubbles and increases dissolved oxygen levels in water (www.o2bubblehose.com). New to Southeast Asian fish and shrimp farmers is a solution against external parasites and related diseases. This is Halamid® from Axcentive Sarl, France. This alternative to antibiotics was shown in pangasius catfish in Vietnam and results are comparable to those obtained with oxytetracycline. In a shrimp hatchery, the product works well as a disinfectant. (www.axcentive.com/HALAMID).

Exhibitors featuring feed additives at Aquatic Asia 2011 include China's Sunpu Biochemical Technology Limited Company, a leading company in animal husbandry and aquaculture. It was marketing vitamin C phosphate, Vitamin C coated, Allicin (garlic powder) and a test kit to monitor water quality such as pH, nitrogen, nitrate, chlorine ions etc (www.sunpubc.com). Mosaic Feed ingredients, a division of Mosaic Group Nutrition LLC, USA displayed Biofos® monocalcium phosphate with 21% phosphorus for aqua feeds (www.mosaicco.com).

Estonia based Tartu Mill is a wheat flour producer and draws upon cultivation contracts to get the exact type and growing conditions for the wheat products that it markets for the food and animal feed industry. The company has a yearly volume of 120,000 tonnes of grain to produce 74,000 tonnes of wheat and 46,000 tonnes of rye. In 2008, it bought over Latvia's biggest wheat mill and after renovations in its first

phase, the planned production is 130,000 tonnes. Tartu also belongs to the group of mills in Europe with a total production 400,000 tonnes per year. It exports to Europe, Middle East and Africa, and in Asia, exports are mainly to Thailand and Indonesia (www.tartumill.ee).

DSM introduced its new tag line at the show, 'bright science. brighter living'. Like most of the major players, DSM had a significant and larger booth in the feed additives section of VIV Asia. The products displayed at the Aquatic Asia section were aquaculture feed additives. These were Rovimix® (a vitamin-mineral concentrate), Carophyll® (carotenoids), Ronozyme® (phytase, amylase and protease), VevoVital® (benzoic acid), Vevodar® (arachidonic acid) and Rovimax® (yeast extract). www.dsmnutritionalproducts.com.

Lallemand Animal Nutrition, a primary manufacturer of probiotic yeast and bacteria has carried out trials in Asia for aquaculture. It has 5 nutritional solutions such as Bactocell® (lactic acid bacteria), the first probiotic authorised for use in the EU, Levucell® SB (live yeast) to support shrimp growth, Agrimos® (yeast fraction rich in oligosaccharides) for improving gut health, Laltide® (nucleotides) for immunity during periods of stress and Alkosel, a source of available selenium (www.lallemandanimalnutrition.com).

Lesaffre Feed Additives has more than 20 years in providing probiotics and yeast based product applications for animal feeds. These have been expanded to support aquaculture and trials are ongoing in several locations to study the effects of Pronady, and Selsaf on the major species of fish and shrimp in Asia. These products have been developed targeting major issues in aquaculture; Pronady is a fraction of yeast improving immunity against bacterial pathogens, and Selsaf (Selenium Yeast) to improve the resistance against stress. LFA is the Animal Nutrition & Health division of Lesaffre Group, world leader in yeast and yeast extract production (www.lesaffre.fr).



Addcon's booth at Aquatic Asia with Dr Kai Khulmann (right) and distributors in Thailand



Dr Philippe Tacon is market manager Aquaculture at Lesaffre Feed Additives.



At the Intervet/Schering-Plough Animal Health, Cedric Komar and Ton That Quynh Duc, Intervet Vietnam explains the vaccination procedure.



A synergistic combination for fish/shrimp health

Biomim Aqua launched a new product in the Biotronic product range, Biotronic® Top3. This product combines the synergistic effect of acidifiers, a phytochemical and a perforizer to improve growth performance on fish and shrimp. The product will be in the market soon. "The unique development is the introduction of the perforizer which weakens the cell walls of bacteria and facilitate the action of the organic acid and the phytochemicals", say Dr Pedro Encarnacao, aquaculture technical director.

"We have synergistic blends of formic, acetic and propionic acid, which are strong antimicrobials working against pathogenic bacteria in feed and the gastrointestinal tract and cinnamaldehyde, which also reduces the proliferation of potentially harmful bacteria. The perforizer makes the cell wall of bacteria more permeable to the action of the organic acids and cinnamaldehyde, their action more effective. Many different permeabilizing substances are known. However, the extent to which a permeabilizing substance can damage bacterial cell walls highly depends not only on which permeabilizing substance is used, it also depends on the inclusion level of the permeabilizing substance. The Biomim Perforizer™ was developed in collaboration with a well known Finnish research institute."

The product has been tested with the tilapia and pangasius catfish and soon will be tested in marine shrimp. With the tilapia and pangasius, data on the effects on growth and FCR have been encouraging. The next course of action will be to see the effects on marine fish and shrimp. The reason for the development of the product, explained Encarnacao is that there are research findings which indicate the positive effects of organic acids and phytochemicals in animal species. "We introduced the perforizer in this combination to enhance the effects of the organic acids and phytochemical against gram negative and gram positive bacteria. With the perforizer, we will be able to lower the amount of the combination of organic acids and phytochemicals, reducing this from the commonly used 2-3 kg per tonne of feed to less than 1 kg per tonne of feed.

In addition, Biomim Aqua is continuing to develop the market for their aquaculture probiotic products, the Aquastar range comprising a multistrain probiotic to improve production at the hatchery and grow-out stages. Encarnacao also presented "Recent updates on the effects of mycotoxins in aquatic species" in the technical seminar series presented at the Aquatic Asia 2011. (www.biomim.net).

New way to feed marine fish in Asia

This is a new series of marine fish feeds specifically designed for carnivorous fish such as cobia, barramundi and grouper in cage culture. At their booth, the technical and marketing team from Ocialis in Vietnam and France introduced the Nutrilis range of tropical sinking feeds. The smallest size feeds contain 52% crude protein and 10% lipids whilst the largest sizes of 20mm contain 42% crude protein and 28% lipid. Stephane Ralite, aquaculture department manager said, "Our global R&D team developed this using our 30 years of experience in formulation. With thorough digestibility, we have a diet, which minimises pollution with a low feed conversion ratio. The digestible amino acids levels are adapted to local targeted species and as the fish grow, the feed formulation was adjusted to provide more energy from the lipids and less from protein.

"We have been marketing marine feeds in farms in the Mediterranean region, Brazil, Mexico and now Asia. The range has been adapted to local conditions, working with private clients in Vietnam and Brazil and at our R&D centres. With this, we can now offer a complete range of feeds for these three species."

The feed sizes start at 3.0 mm to 20 mm for the feeding of 55g fish to more than 2kg fish. This is used in combination with starter feeds of 0.8mm to 2mm size from the Nanolis range. Designed for smaller 20-55g fish, Ocialis launched this range for juvenile fish in June 2010 at Vietfish International in Ho Chi Minh City, Vietnam. (www.ocialis.com).



The Ocialis team, from left, Marc Campet, Jean-Christophe Bocquet, Nguyen Van Trung, Stephane Ralite and visitor, Amir Khalil, Virbac, Thailand

Additives at VIV Asia 2011



At their booth, back row, from left, Dirk Lorenz-Meyer, Behn Meyer Aquaculture, Doug and Damon Fodge, Azomite Mineral Products, USA. Front row: Tung Lan (left) and Van Tien (right), Behn Meyer Vietnam, with Jocelyn Mariquilla (center), Behn Meyer Philippines.

Novel enzymes for fish feed

In the two-storey booth of Behn Meyer Animal Nutrition, Dr. Dirk Lorenz-Meyer, regional technical director of Behn Meyer Aquaculture explained that the company is already well known for the comprehensive enzyme work in Southeast Asia. Behn Meyer Aquaculture maintains several R&D facilities in the region and in early 2011, it also opened an office in Manila to complete the ASEAN coverage. At this major trade show, the team presented studies on a novel enzyme combination done in *Pangasius hypophthalmus*.

"In Vietnam, we have been involved in a two year research program to investigate dietary fibres in fish. Some of the trials were conducted using our novel enzymes and re-formulating commercially used fish feeds with alternative raw materials. The results indicate that we are now able to provide matrix values and detailed formulation advice to our customers."

With cost pressures already very high in pangasius feeds and raw material prices on the rise, the potential of using less expensive ingredients based on scientific results is very significant for fish feed producers. "The new enzymes have been shown to significantly improve protein efficiency of fish and thus maintain performance and feed efficiency in more economical diets rich in fibrous by-products. This new enzyme range complements our existing *Aspergillus* and *E.coli* phytases for fish feeds. In combination, our enzymes combine flexibility in diet formulation and feed cost savings with better performance and environmental protection," said Lorenz-Meyer.

The group recently organised the Asian Phytase Forum in Kuala Lumpur and Bangkok together with its partners. New findings on

phosphorus utilisation, the anti-nutritive effect of phytate and the benefits of 'phytate free nutrition' will now be made available to the industry.

While the main focus of the company is on the enzyme work, in-house R&D is also used to tailor other additives, such as pro- and prebiotics, minerals and phytobiotics to the specific needs of Southeast Asia's growing aquaculture sector. One unique feature of Behn Meyer's portfolio is that most products are certified for use in organic aquaculture. This allows the company to lead the way towards sustainable aquaculture that guarantees both, consumer safety and environmental compatibility.

"The range of products has constantly been expanded to meet the requirements of the industry. There is the new generation of probiotics from Epicore Bionetworks, which will work against luminescence bacteria to add to the second generation Epicin which works against Vibrios. We are also introducing a new heat tolerant version of Hemicell which could be used in shrimp feeds where liquid post pellet spraying is not desirable. With this in place, shrimp feed producers will have the option of using more soy protein.

"We are developing proprietary prebiotics based on Azomite, a unique trace mineral booster. This is an inexpensive additive with remarkable results in shrimp and fish feeds. With our R&D facilities in Vietnam coming on stream, we will also carry out research on monoglycerides for aqua feeds. These are water soluble lipids that deliver organic acids right into bacterial pathogens and could be used as alternatives to antibiotics in aquaculture," added Lorenz-Meyer. (www.behn-meyer.com/aquaculture).

The 2011 Hinter symposiums on nutrition and feed technology of fish and shellfish

The aim of these yearly symposiums is to communicate to the industry the progress of the Chinese feed industry.

In 2011, Guangzhou Hinter Biotechnology Co., Ltd, China company conducted three symposiums, Middle China (March 14-15 in Hunan Province), East China (March 22-23 in Suzhou Province) and North China (March 30-31 in Beijing City). At these symposiums, the Hinter team accompanied by industry experts gave recent information, analysis and practical suggestions on the stages in feed production, formulation, ingredient quality control and operations management for aquatic feed enterprise. At the three symposiums, there were 19 presentations for the more than 1,000 participants sharing ideas on Chinese aquaculture.

Several companies participated in the symposium: National Renderers Association (NRA), Evonik Degussa (China) Co., Ltd, Buhler (Changzhou) Machinery Co., Ltd, Shanghai Yi Xiang Biotechnology Co., Ltd, Guangdong VTR Bio-Tech Co., Ltd and Wu Han Mingbo Electromechanical Equipment Co., Ltd.

Jiang Xiewu, Vice-President of Guangdong Haid Group Co., Ltd, shared the group's experiences and vision on developments in the

Chinese feed industry with a report on new competition models among Chinese aquatic feed enterprises. Dr. Li Peng from NRA, Dr. Zhu Xuan from Evonik Degussa and Dr. Shi Baojun from VTR introduced the progress on research on rendered animal products, amino acid and bio-enzymes in aquaculture respectively. They also discussed new ways to improve efficiency of aqua feed with participants. With the recent focus on gut health and nutrition, Dr. Zheng Zonglin from Yi Xiang analysed the usage of gut microorganism. Han Junwei and Tian Pengfei, engineers at Buhler and Hinter, respectively, gave insights on the maintenance and smooth running of machines with less cost.

The Hinter team provided extensive current practical know-how and how-to-do information. With prices of some feed ingredients increasing daily, the pressure is on aqua feed enterprises to find new ways to keep producing at a profit. Dr. Yang Yong introduced an integrated system to design product and control quality. Dr. Zhang Song and Dr. Bian Guozhi shared their views on selecting ingredients for substitution and on the optimisation of formulations under the present situation with numerous trial data. The report on cottonseed meal quality control from an ingredient expert, He Fen gave new ideas on this ingredient. Culture experts, Zhang Taizhuo, Tang Wubin, Cai Junbin, and Wang Xin gave reports on new technology of carps, yellow catfish culture, and some fish culture with white shrimp. Good quality is the key to the success of an enterprise. Xie Xiqing, suggested a way to improve the competitive edge with end-user service systems.

The fish feed market in China continues to expand with more than 10 million tonnes in 2010. As the biggest aquatic premix supplier in China, Hinter will continue to hold these symposiums, to promote industry development through new technology, aquaculture solutions and services.



White faeces disease in cultured marine shrimp

By Assoc. Prof. Dr. Jirasak Tangtrongpiros, Veterinary Medical, Aquatic Animal Research Centre (VMARC), Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand. In Thai.

Abstract: White shrimp (*Litopenaeus vannamei*) is the most popular culture species. The original location of this species is South and Central America. This shrimp is sensitive to viral infections, particularly Taura syndrome virus and white spot syndrome virus. This species easily harbours internal protozoa mainly gregarine. This parasite provokes slow growth rates and low survivals at all stages of shrimp. Gregarine has infected shrimp in Thailand since January 2010. Pale abdominal muscle, slightly blue cuticle, loose shell, decrease in appetite, high feed conversion ratios but low mortality rates and white faeces on the surface of water are typical symptoms of the disease. The differential diagnosis of this disease comprises high water temperature, *Vibrio* infection and toxin in feed. Samples collected from diseased shrimp were investigated and it was found that the main causative agent was protozoa in the gregarine group *Paraophioidina* spp. A detail study on morphology of the parasite, effective prevention, control and treatment is ongoing. (Email: jirasak.T@chula.ac.th (Dr. Jirasak Tangtrongpiros))



Aquaculture America 2011

Aquaculture on parade

This was the theme for Aquaculture America, held in New Orleans from 28 February to 3 March. This coincided with the city's *Mardi Gras* celebrations. This is a region battered by Hurricane Katrina and devastated by the Gulf of Mexico oil spill, so these events featured strongly in the conference. Just over 1,500 participants registered from 45 countries making it an international event with 137 trade show booths. Reports Eric Roderick

This year's hosts, the Louisiana Aquaculture Association along with U.S. Aquaculture Society, the National Aquaculture Association and the U.S. Aquaculture Suppliers Association joined the American Tilapia Association (ATA), Striped Bass Growers Association (SBGA), and U.S. Trout Farmers Association in hosting their annual meetings.

The program committee, chaired by Reg Blaylock, produced a packed conference with 600 oral presentations in 10 concurrent sessions. There were also 80 poster presentations, most of excellent quality. Every significant cultured species was featured, but the main ones were shrimp, trout (and other salmonids), catfish, tilapia, flatfish, shellfish, striped bass, sturgeon and algae. (www.was.org).

Keynote speaker, **John Forster** spoke on "Turning to the sea". With aquaculture now producing over 50% of all fish and shellfish consumed globally and with pressure on wild stocks, fish farmers need to look at all options for increasing production to feed an ever increasing global population. Open sea aquaculture is one possible solution and seaweed culture could possibly double global plant food production by farming less than 1% of the ocean's surface. Farmed seaweed production of 19.4 tonnes/ha have been achieved for *Laminaria*, and at this level it would only require 0.9% of the ocean's surface to produce a dry weight of seaweed equal to the 6.1 billion tonnes wet weight of food from plants produced annually by terrestrial agriculture.

There was a Haiti Tilapia workshop held before the conference, which highlighted the plight of the Haitian people after the earthquake disaster. This event was organised by Aquaculture without Frontiers (AwF), the Global Charity started by Michael New, OBE. Speakers included **Dr Craig Browdy** (Novus International), **Dr Valentin Abe** (Caribbean Harvest Lake Azuei, Haiti) and **Bill Mebane** (MBL Sustainable Aquaculture Programme -Woods Hole USA). The main impediments to increasing aquaculture production in Haiti have been the lack of fry production and availability, poor fish feeds and the need for training and outreach projects.

Louisiana aquaculture production is currently valued at USD 0.32 billion with crawfish, catfish, minnows, fish bait, alligators, oysters and turtles as the main species. Channel catfish (*Ictalurus punctatus*) was once the most important freshwater aquaculture product in the US but production has declined dramatically, whereas crawfish (*Procambarus sp*) has increased considerably. The south is currently reviewing their open marine water farming policy and Louisiana is certainly ready to expand dramatically into this sector in order to reduce the U.S. trade deficit in seafood.

Certification as always, was a very important topic at the conference, with World Wildlife Fund (WWF) and the Global Aquaculture Alliance (GAA) with the Best Aquaculture Practices (BAP) competing directly for clients on a global basis with their similar eco-standards. The ideal scenario would be a single standard, to enable producers and consumers to have a more transparent view of the sector. There were also sessions on Sustainable Aquaculture, Best Management Practices (BMPs), and Environmental Impacts of U.S. Aquaculture with lots of lessons learnt after Gulf of Mexico oil spill. Traceability was another

keyword, highlighting the importance of being able to track the fish from farm to fork.

Nutrition featured prominently, with replacements for fishmeal discussed, along with many alternatives to live feeds (Artemia) for larval rearing. Biofloc systems featured too. Algae is the new buzzword in aquaculture nutrition, and recent research indicates that algal extracts can replace fish oils in many fish diets. Nutrition and larval rearing are seen as the major obstacles to the farming of many new species and as such attract much industry research funding. Alltech had a prominent booth at the trade show and are currently very focused on algae research having recently purchased a large algae production plant.

Shellfish was certainly very well represented with several sessions and a great many papers devoted to research, culture health benefits



AquaGreen, the big tilapia facility which is now starting marine RAS research projects on spotted sea trout and several other new species.



Alltech and trade stands



Global Aquaculture Alliance at the trade show



A new facility designed to recover the marine salt from the waste water because they are using expensive artificial salt in all their research facilities.



University of Mississippi Research Centre

and genetics highlighting the commercial importance of shellfish in global aquaculture production figures.

All World Aquaculture events feature the Employment Booth and this is often a bellwether for the health of the industry showing whose hiring and how many are looking for work. Overall, there were plenty of jobs advertised, but some very well qualified people looking for work too.

There were two farm tours conducted before the conference. The first was to Aquaculture Systems Technologies in New Orleans. Founded in 1995 by Douglas Drennan, AST is the exclusive manufacturer of bead filter technologies for biological and mechanical filtration. AST is also involved in R&D of new technologies to solve problems/issues in the continued evolution of recirculating aquaculture systems. It occupies a 7,000 sq. ft. (650.3m²) building dedicated to manufacturing, and has two 1,800 sq. ft. (167.2m²) greenhouse devoted to R&D. A tour of Louisiana State University AgCenter's Aquaculture Research Station in Baton Rouge followed. The LSU Aquaculture Station includes 145 experimental ponds totalling 100 acres (40.5ha). Research at this facility includes work on a variety of freshwater and marine fish and invertebrates as well as a number of other research disciplines within aquaculture.

The second tour was to the University of Southern Mississippi's Thad Cochran Centre for Marine Aquaculture in Ocean Springs. Founded in 2006, the Cochran Centre is a 225-acre (91.1ha) site devoted primarily to the production of marine shrimp and commercially and recreationally important finfish in closed, recirculating systems. The centre currently includes approximately 50,000 sq. ft. (4,645.2m²) of culture and research space, which includes live feed, broodstock, hatchery, and nursery/grow-out facilities for marine shrimp, spotted sea trout and red snapper. The marine shrimp research focuses on high density and low salinity culture with several research projects looking at new ways of

aeration and providing circulation in the raceways. It is a 13-week cycle to market size with three harvests per year. An additional 45,000 sq. ft. or 4,180.6m² of culture, laboratory, and research space, including a research laboratory for programs in aquaculture nutrition, genetics, disease, and reproductive physiology is nearing completion. It has received over USD40 million in grants to renovate and replace facilities destroyed by Hurricane Katrina. One of the projects produces croaker, a valuable baitfish which fishermen pay up to USD 3 per piece.

The tour then travelled to Perkinston, Mississippi to visit Aqua Green, LLC, and a private company owned by Walter Boasso, a former Louisiana State Senator, who invested USD 12 million in the facility. Established in 2008, Aqua Green produces tilapia for the east coast live fish market in its 53,000 sq. ft. or 5,300 m² facility using indoor heated recirculating aquaculture technologies. In addition to its freshwater operation, the company is exploring the production of marine fish (spotted sea trout, cobia and pompano) for market sales as well as to assist stock enhancement programs. Participants also toured the company's 23,000 sq. ft. (4923.9m²) state of the art marine research, hatchery and nursery centre. All the tilapia grown on the farm are Fishgen's GMT stocks using the YY male technology and are sold in to the live fish markets in New York and Houston. The company is currently shipping out 10,000 lbs or 4.5 tonnes per week, with production increasing to 15,000 lbs or 6.8 tonnes per week by early summer.

From talking to a broad spread of delegates from industry, academia and government institutions, there is a consensus that aquaculture is weathering the global financial situation better than other sectors and there is overall optimism amongst the stakeholders. In 2012, Aquaculture America will be held in Las Vegas from Feb 29 to March 2.

NEXT ISSUE

July/August issue will feature

- Health Management
- Tilapia
- Nutritional health, feed management

Bonus distribution:

- Tars 2011, Aquaculture Feeds and Nutrition, 17-18 August, Singapore
- Agri Indo, 29 September -2 October, Jakarta, Indonesia

Deadlines: Technical articles – June 1, 2011
Advert bookings – June 6, 2011

Contact information: Email: zuridah@aquasiapac.com ; enquiries@aquasiapac.com

Setting the future for Mediterranean aquaculture

This Aquaculture Europe event will be held for the first time in Greece. The annual conference, organised by the European Aquaculture Society (EAS) to be held Rhodes, from October 18-21 will address vital questions affecting the development of Mediterranean aquaculture over the next decade.

It will provide reviews of the importance of aquaculture in EU food production; the sustainability of aquaculture feeds and the implementation of selective breeding strategies in aquaculture. An overview of current EU-funded research programmes will highlight their relevance to current and future production practices. As usual, the conference will include an international trade show, a Farmers day and a Student workshop and provides a platform to showcase European initiatives in aquaculture.

Aquaculture Europe 2011 will be hosted by The Federation of Greek Maricultures (FGM) and the Hellenic Centre for Marine Research (HCMR).

Showcasing Greece and Turkey

Greece is the land of the twelve Olympian gods, the cradle of Western civilization, the birthplace of sciences, philosophy, history and drama - and one of the leading aquaculture producers in the Mediterranean region. With total production in the region at more than 250,000 tonnes from the more than 1 billion fry stocked in Mediterranean waters, Greece and Turkey are the main producing countries, followed by Spain and Italy.

Greece and Turkey are also the major centres for juvenile production. Three 'mega hatcheries' with over 50 million juveniles operate in Greece and Turkey and account for 20% of total production in the region. The 28 Greek and the 18 Turkish hatcheries therefore have major production themselves, but also import fry from Italy and France.

Although Greece has a lower per capita consumption of seafood products than Portugal, Spain, France or Italy, the percentage of this consumption represented by sea bass and sea bream is the highest in the region (10.4%). The reliance on these two key species has led to market challenges in recent years and the opportunity for Mediterranean aquaculture is to expand consumption (of bass and bream) in the high fish consumption countries and to diversify the products for the more demanding markets of northern Europe. With good spatial planning, increased production of other fish (marine and freshwater) and shellfish species and especially in the southern and eastern Mediterranean over the next 10 years may also be expected.

Situated between the two undisputed leaders in Mediterranean aquaculture, Rhodes is ideally situated for Aquaculture Europe 2011.

EAS Premium Sponsor is Intervet Schering Plough Animal Health, AE2011 Gold Sponsor, Biomar and AE2011 Silver Sponsor Alltech. Session sponsors are Biomin, Intervet Schering Plough Animal Health and NOVUS. Bronze sponsors are Galaxidi, INVE, Iridia, Kefalonian Fisheries, Nireus, Selonda and technical sponsors are Andromeda, Corfu Sea, Dias, Forkys and Intermas.

Plenary presentations

The thematic sessions take place each morning of AE2011 and are plenary sessions. International speakers will present these thematic sessions that "open the debate" and pave the way for the parallel, technical sessions of contributed presentations in both oral and poster format. Three plenary sessions are planned:

- Importance of aquaculture for EU food production. A vision for the 2020 status of aquaculture in the Mediterranean and its role in providing high quality safe food for European citizens. The presentation will address the development of production in terms of sites, species and technologies to better balance the current trade deficit.
- Nutrition and feeding. An overview of recent and required developments in the feeding of species cultivated in Mediterranean waters.
- Selective breeding. Lessons learned from terrestrial animals and the status of the implementation of selective breeding programmes in (Mediterranean) aquaculture.

More information on the plenary speakers will be provided on the conference web site.

Trade show

AE2011, as all Aquaculture Europe events, is a platform for exchange of ideas and communications on the development of aquaculture. The international trade event will showcase new products and services offered to the aquaculture sector.

More information at www.easonline.org
Trade show: Email Mario.Stael@Scarlet.be (Mario Stael)

What can you expect from Aqua Culture Asia Pacific in 2011

Volume 7 2011				
Number	3 - May/June	4 - July/August	5 - September/October	6 - November/December
Issue focus Recent developments and challenges for the next step	Sustainable & Responsible Aquaculture	Health Management	Hatchery	Food Safety & Traceability
Industry Review Trends and outlook	Catfish	Tilapia	Freshwater Fish/Prawn	Marine fish (Cobia/Sea bass)
Feeds & Processing Technology Technical contributions influencing the final value of aqua feeds	Feed Enzymes/Lipids Post Pellet Additions	Nutritional Health Feed Management	Feed Probiotics Drying Technology	Novel Feed Ingredients/ Nutrition
Production Technology Technical information and ideas	BMP, Standards and Certification	Recirculation Aquaculture Systems	Hygiene & Food Safety	Health Management & Biosecurity
Aqua business Feature articles	Experiences from industry, including role models, benchmarking and opinion articles in shrimp/fish culture			
Markets	Market trends, product development and promotions at ESE 2011, Vietfish 2011 and regional trade shows			
Show Issue Distribution at these and regional events (TBA) *Show preview	Vietfish 2011, Ho Chi Minh City, Vietnam 28-30 June World Aquaculture 2011, Natal, Brazil 6-10 June	TARS 2011 - Aquaculture Feeds and Nutrition, Singapore August 17-18 AGRI INDO - Jakarta Indonesia September 29-October 2	Aquaculture Europe 2011, Rhodes, Greece 18-21 October 16th China Seafood & Fisheries Exposition & Aquaculture China 2011, Qingdao, China, 1-3 November	Third International Symposium On Cage Aquaculture in Asia, Kuala Lumpur, Malaysia 16-19 November
Article submission dates		June 1	August 1	October 3
Advert bookings dates		June 10	August 10	October 1

The Aquaculture Roundtable Series (TARS)

A shared vision for aquaculture in Asia



In Asia, aquaculture is developing at a fast pace to create an alternative source of seafood amidst dwindling resources from capture fisheries. However, as editor of the Aqua Culture Asia Pacific Magazine, Dr Zuridah Merican, poses the question, “We have seen the developments in aquaculture in Asia but it still remains fragmented. We need to ask, are we moving in the right direction and is aquaculture in Asia coordinated enough to propel the industry into the next level?”

“All stakeholders need to come together, deliberate and identify a clear strategy to take the industry forward. We are proposing The Aquaculture Roundtable Series (TARS) which is a platform for the public, private sector, academia and NGOs. TARS is a stakeholder driven effort to facilitate the sharing of information, reduce redundancy and improve productivity. The benefit should come from the synergy of networking and creating efficiencies. At TARS, together we will take stock of the current situation and coordinate a concerted effort to move forward.”

Introducing a roundtable concept in aquaculture

The *modus operandi* of the two day roundtable will be a

- Series of presentations to update participants on current developments and advances. This will form the starting point for the break-out sessions.
- Break-out session (roundtable debate) on how to ‘propel industry to the next level, ie where do we want to be tomorrow? Participants will get to brainstorm and propose new direction(s). The result should be a self initiative to direct the development in a guided manner, yet allowing for the opportunity to ‘think outside the box’.
- Participants will then regroup to report on the proposals resulting from break-out sessions. Taking into consideration the current market situation, it is likely that many groups will work on similar topics, giving a wider approach to related industry challenges

TARS 2011 – Aquaculture Feeds & Nutrition, 17-18 August

Beginning with 2011, the organisers, Aqua Research, publisher of Aqua Culture Asia Pacific Magazine and Corporate Media Services, both based in Singapore, will be addressing specific sectors of the industry. In this inaugural TARS2011, it will be Aquaculture Feeds & Nutrition, and this will be held 17-18 August 2011, Holiday Inn Atrium, Singapore. TARS 2011 is supported by the Agri-Food & Veterinary Authority of Singapore and sponsored by Wenger, USA.

The aim of TARS 2011 is to provide a platform for all stakeholders to come together to share their knowledge and expertise in the different aspects pertaining to aqua nutrition, prioritise areas for R&D and formulate a new direction for the sector in light of current and emerging challenges facing the industry. TARS 2011 targets the aqua feed producers, nutritionists, feed formulators, integrators, feed equipment manufacturers, feed ingredients and feed additive suppliers.



Program Highlights

What do marine fish need and what different feed ingredients contribute? Thinking beyond “fish meal and fish oil replacement” in aquaculture nutrition.

Dominique P. Bureau, UG/OMNR Fish Nutrition Research Laboratory, Dept. of Animal and Poultry Science, University of Guelph, Canada.



“Fish meal and fish oil are no longer the main ingredients used in aquaculture feed formulations. Is it reasonable to focus so much effort on this 20% and forget about the remaining 80%? We need a more rational and systematic approach in fish nutrition research as well as fish feed formulation. More effort should be invested in the definition of the nutrient requirements of different fish species and fish at different life stages.....”

Feed requirement for shrimp at the grow-out phase

Wee Kok Leong, Research Scientist, Temasek Polytechnic, Singapore



“At the grow-out phase in shrimp culture, especially at the end of the culture cycle, the nutritional needs are higher as there will be more stress from various sources. The shrimp has to reach and respond to the stress and maintaining health requires more nutrients. But in practice the reverse is true, in that the feeds used are lower in nutritive quality with lesser protein etc....”

Recent developments in shrimp feeds and feeding, with particular reference to feed ingredient usage and the development of improved on-farm feed and water management practices

Albert G.J Tacon, Technical Director, Aquatic Farms Ltd, USA



“With shrimp feed costs usually representing over 50% of total shrimp production costs and an economic climate of steadily increasing feed ingredient and processing costs, considerable efforts have been placed by feed manufacturers and farmers alike, toward reducing feed costs per unit of shrimp production...”

Development of feed formulation technique and its potential application in aqua feeds

Matthew Clark, Regional Director, South East Asia, Feed Management Systems, USA



“In the history of feed formulation in the broiler industry, we see the change in technique from ingredient driven formulation to nutrient driven formulation. There are cost savings and technical advances in each stage. There are lessons from these developments that may be used in aqua diets to refine our understanding of the feed formulation technique needed to produce effective optimal diets.”

Program (As at press time)

Day 1 -Wednesday 17 August 2011

Back to Basics – Nutritional requirements

- What do marine fish need and what different feed ingredients contribute? Thinking beyond “fish meal and fish oil replacement” in aquaculture nutrition – Dominique Bureau, Canada
- Feed requirement for shrimp at the grow-out phase – Wee Kok Leong, Singapore
- Freshwater fish: balancing nutrient requirements to reduce feed costs-TBC

Efficient feed processing

- Current challenges in shrimp feed pelleting – Martin Guerin, Gold Coin Malaysia
- Extrusion cooking with increased capacities, higher sanitation levels and advanced computer control methods – Joseph P. Kearns, Wenger, USA

Balanced Formulations

- Recent developments in shrimp feeds and feeding, with particular reference to feed ingredient usage and the development of improved on-farm feed and water management practices – Albert G.J Tacon, Aquatic Farms Ltd, USA
- Fishmeal and fish oil in shrimp feeds: How close are we to complete replacement – A. Victor Suresh, Integrated Aquaculture International, Brunei
- Current status of fresh water aqua feeds – Pedro Encarnacao, Biomin, Singapore
- New complex enzymes can reduce fishmeal in marine fish diets – Serge Corneille, Alltech Japan
- Feed additives and supplementation in nutrition and health management – TBC

Targeted Nutrition – Learning from the poultry model

- Development of feed formulation technique and its potential application in aqua feeds - Mathew Clarke, Feed Management Systems, USA
- Fish and shrimp nutrition for genetically improved strains –TBC

Day 2 –Thursday 18 August 2011

Targeted Feeds

Shrimp feeds for specific culture and market conditions – TBC
 Certification and standards – TBC
 SWOT analysis and the future of aquaculture feeds and nutrition – Coordinator, Albert G.J Tacon, Aquatic Farms Ltd, USA

Break out session: Where will we be tomorrow? The challenges facing each species are varied. The participants will form break-out groups to identify key challenges, priority areas for improvement and recommend strategies to take the industry forward. Participants will address challenges, such as below

Shrimp: Differentiating between vannamei and monodon shrimp • Least cost formulation • Requirements for genetically improved strains

Marine fish: Moving from trash fish to compound feed • Protein sparing and high energy feeds • Feed texture and reducing wastage

Freshwater Fish: Least cost formulation • Improving meat yield • Feed texture and reducing wastage

Review Session: Representatives from each break-out group will highlight their findings and recommend strategies for future development work. Common factors will be identified, summarised and prioritised in a report that will be accessible to all participants.

Registration

The number of participants will be limited to 200. Pre registration is required. Walk-ins are not encouraged. Register online or complete the registration form to reserve space. You will be asked to specify your preferred area of interest for the breakout session.

Participation Fees: Early bird (until 25 May 2011) - SGD 650; From 26 May 2011 - SGD 800

More Information: Web: www.tarsaquaculture.com Email: conference@tarsaquaculture.com

Extrusion cooking with increased capacities, higher sanitation levels and advanced computer control methods

Joseph P. Kearns, Aquaculture Process Engineering manager, Wenger, USA



“Ever-changing formulation ideas and trends to reduce feed costs and use of indigenous ingredients require advancements in machinery design. Efficiency in production, new requirements and trends to achieve increased sanitary production methods, need for increased capacity, understanding how to meet HACCP requirements are all topics of interest to the industry...”

Fishmeal and fish oil in shrimp feeds: How close are we to complete replacement?

A. Victor Suresh, Director of Nutrition & Feeds in Integrated Aquaculture International, Brunei



“Replacement of fishmeal and fish oil in aqua feeds requires a deep understanding of the functions of the various components in both ingredients and how those functions would be provided by alternative ingredients...”

New complex enzymes can reduce fishmeal in fish diets.

Serge Corneille, General Manager, Alltech Japan



“Japanese researchers showed that at least same performance could be achieved in red seabream with a 50% fishmeal diet and a 20% fishmeal diet using a complex enzyme. Similar results were shown in amberjack, tilapia, and pangasius...”

Current status of fresh water aqua feeds: a gap analysis

Pedro Encarnacao, Aquaculture Technical Director, Biomin, Singapore



“Feed formulations, feed quality and feeding practices used for the production of fresh water species around Asia, many times reflect the use low cost ingredient, poor nutrient profiles which result in under optimal performance by the fish. The manufacture and use of feeds based on the species nutrition requirements, nutrient digestibility and utilization is highly recommended to improve cost efficiency of fresh water fish feeds...”

More information on program, presentations and speakers at
http://www.tarsaquaculture.com/program_highlights.html



The 3rd International Exhibition on
Agri Business and Technology



29 SEPT - 02 OCT 2011

Jakarta International Expo - Kemayoran

FEATURING :

- Agri Food & Dairy
- Agri Livestock & Poultry
- Agri Fishery & Aquaculture
- Agri Plantation & Forestry
- Indonesia Chocolate, Coffee and Tea

ORGANIZED & SUPPORTED BY :



Exhibition Organizer KRISTA EXHIBITIONS
 Jl. Blandongan No.28d/g . Jakarta 11220. Indonesia
 Phone +62 21 6345861, 6345862, 6334581, 6345002
 Fax +62 21 6340140, 6342113
 Email : info@kristamedia.com
 Website : www.kristamedia.com



*The Leading
Agriculture & Industry
Exhibition in Indonesia*





CREATES THE VALUE OF PRAWN



Uni-President implements traceability through all sectors along with supply chain. Biosecurity hatchery produces SPF (Special Pathogen Free) and SPR (Special Pathogen Resistant) larvae. Quality program of prawn feed plants was certified by ISO 22000 & HACCP.



• 16-18, DT 743, Song Than II Industrial Zone,
Binh Duong, Vietnam.
• Tel: +84-650-3737626 - Fax: +84-650-3790819
• Email: aquafeed@upvn.com.vn



CTY TNHH UNI-PRESIDENT VIỆT NAM
UNI-PRESIDENT VIETNAM CO., LTD.

Establishing a Healthy and Happy Tomorrow