

AVAvision

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AVA Kicks Off Food Safety Month with Host of Exciting Activities

July is the Agri-Food and Veterinary Authority's (AVA's) Food Safety month. Packed with many activities, the Food Safety month reminds consumers to practise food safety, and honours the food industry players that have augmented our food safety programme. AVA recognises that the integrated food safety system we have in place would not be as effective without the collaboration of the industry and consumers in Singapore given that food safety is a shared responsibility.

Food Safety Awards Night

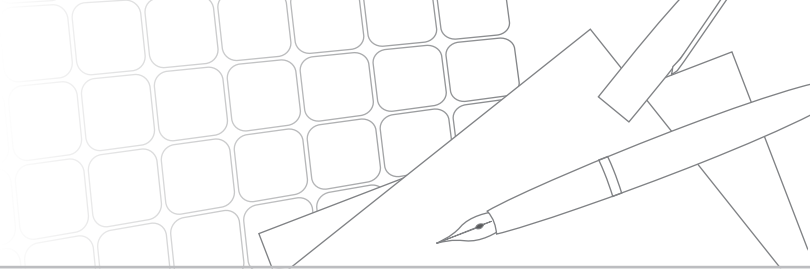
AVA held its annual Food Safety Awards Night on 18 July 2008 at the Grand Copthorne Waterfront Hotel. Guest of Honour, Minister for National Development, Mr Mah Bow Tan, presented four Silver Awards, 14 Bronze Awards and 83 Certificates of Commendation to recipients that night.

Introduced to recognise food factories for consistently maintaining high standards...

Continuation on page 6...



Corporate Cuts



AVA Organises Orientation Programme for New Board Members



Board Members touring AVA facilities with accompanying AVA officers

A familiarisation-cum-welcome programme was organised in July 2008 to help the new Board Members of the Agri-Food and Veterinary Authority (AVA) be better acquainted with the organisation's business roles and functions. Comprising site visits to the Animal and Plant Health Centre, Veterinary Public Health Centre and Marine Aquaculture Centre at St. John's Island, this Orientation Programme was insightful for the Board Members as they learnt first-hand, of the instrumental role AVA plays in ensuring a resilient safe food supply for our people and safeguarding Singapore from major animal and plant diseases.

AVA Develops World's First Intelligent IT Food Safety Approval and Tracking System (iFAST)

The Agri-Food and Veterinary Authority (AVA) has developed the Intelligent Fast Approval and Safety Tracking System (iFAST) to support its food safety, as well as animal and plant health programmes. iFAST will facilitate AVA to carry out its statutory responsibilities of ensuring a resilient supply of safe and wholesome food, and to safeguard animal and plant health for the well-being of the nation.

Monitoring Singapore's Food Safety and Supply Level

With iFAST, AVA is able to better monitor the safety level of food, and health status of animals and plants and their products, imported from other countries. Apart from capturing critical information on import, inspection and laboratory findings of all food, animals, plants and their products, iFAST's advanced data analysis capability issues alerts when anomalies are detected in our food supply. This will help prevent unwholesome foods and foodborne hazards from entering our supply chain and set consumers' minds at ease.

With its ability to monitor the food supply levels, iFAST will issue warnings on declining levels in food supply. It also cautions on over dependence in any particular food source. Furthermore, iFAST is capable of generating foolproof sampling plans for consignments of products undergoing mandatory testing before release for sale,

or for products under the routine monitoring and surveillance programmes.

Seamless Transaction

As iFAST is web-based, customers and members of the public are able to directly transact with AVA electronically. Customers can send in their requests for inspection, or for laboratory services from the convenience of their own homes or offices. In the same manner, they are able to receive their laboratory reports or inspection findings through the Internet or via SMS.

iFAST's mobile computing feature enables AVA's inspectors to access critical data online and enter data during inspection of consignments at clients' premises. iFAST's advanced business intelligent reporting tools are capable of generating reports for effective decision making on the food supply and animal and plant health status in Singapore. This is particularly useful during food emergencies where critical information is needed for swift and effective strategic planning.

iFAST is believed to be the first of its kind of intelligent IT system serving the authority, public and corporate clients.



Quantum Leap Improvement Fuelled by AVA's Innovative Spirit

The recent Agri-Food and Veterinary (AVA) Innovation Day held on 19 March 2008 recognised various workplace innovations put in place by AVA officers from multiple disciplines. Officers from the Animal and Plant Health Laboratories Division, in particular, did themselves proud with as many as six accolades.

Novel Medium for Mass Screening of *Streptococcus equi* subspecies *equi*

One award was for the development of a novel medium for economic mass screening of *Streptococcus equi* subspecies *equi*, the causative agent of strangles, a disease that can devastate the horseracing industry. Strangles is a highly contagious and serious infection of horses and other equids. An outbreak of this disease in the local Turf Club would lead to high morbidity of race horses, and disrupt movement of these animals in and out of Singapore, thus resulting in turmoil and massive financial loss in the racing industry.

This new medium significantly reduces screening test time by 85%. It also brings about manpower and material costs savings of nearly \$2 per test and allows up to 7 times more animals to be tested at one go. Such rapid laboratory diagnosis enables AVA to make more timely interventions during disease outbreaks.

Alternative Method to Determine Pathogenicity of Newcastle Disease Virus

Another significant 'breakthrough' was an alternative method to determine the pathogenicity of Newcastle Disease Virus (NDV). Newcastle Disease is a contagious

and fatal viral disease that affects domestic chickens and all species of birds. The pathogenic form of NDV is a notifiable disease in Singapore as it can cause high economical losses arising from its high mortality in farmed poultry. Since the clinical signs of pathogenic NDV are very similar to bird flu, it is critical to quickly differentiate these two diseases for prompt and accurate action to be taken in times of crisis.

By optimizing different molecular techniques (real-time polymerase chain reaction, sequencing and computer analysis), sourcing for the quickest steps for each part of the process, and combining them into one integrated process, this new method shortens the time taken for the identification of pathogenic NDV from a lengthy two months to just three days. Along with the fast turnaround time is an anticipated annual savings of over \$57,000.

This strong innovative organisational culture will help AVA in achieving quantum-leap improvements in work processes and fulfill its mission of safeguarding animal and plant health in Singapore.



Winning smiles from the team that developed the alternative method to determine the pathogenicity of NDV

AVA Receives Renewal of ISO/IEC 17025 Accreditation Status

The Agri-Food and Veterinary Authority (AVA) continued to receive accreditation under the Singapore Accreditation Council-Singapore Laboratory Accreditation Scheme (SAC-SINGLAS) for its Chemistry Laboratory at the Post-Harvest Division (PHD) on 10 April 2008.

Assessed by the management and technical panel from SAC-SINGLAS and Republic Polytechnic, AVA received accreditation for seven tests, namely, Moisture, Total

Arsenic, Total Cadmium, Total Lead, Total Mercury, Determination of Surimi Gel Strength using Punch Test and Determination of Surimi Whiteness.

The continued accreditation of PHD's laboratory is a testament of AVA's technical expertise in the tests and services provided to its customers. AVA will strive to improve and update its laboratory management and quality systems to maintain the ISO/IEC 17025 accreditation status.



Scrub Down, Clean Up and Back in Business

Hit by a spate of food poisoning incidents, Prima Food, along with its bakery chain Prima Deli, made headlines for nearly two months in November 2007. Consumption of the implicated confectionery items resulted in 204 food poisoning cases. 15 cases were hospitalised and subsequently discharged, while majority of the victims experienced diarrhoea, vomiting and abdominal pain.

Nailing Down the “Culprit”

Findings from the investigations conducted by the Agri-Food and Veterinary Authority (AVA) and the Ministry of Health (MOH) confirmed that the outbreak was caused by *Salmonella enteritidis* contaminated cakes produced at the Prima Food factory.

It was deduced that the factory could be the source of problem since more than one Prima Deli retail outlets were involved. At that time, faced with the rising number of food poisoning cases and the source of contamination not fully established, AVA instructed the factory to immediately stop its food production and recall all the products produced so as to prevent further outbreaks. The high incidence of food poisoning cases ceased with the closure of the factory.

To determine the source of contamination, large numbers of food and environmental samples were taken for laboratory analysis. Screening of food handlers was also carried out simultaneously. A massive cleaning and disinfection exercise took place during the period when the factory stopped operation.

Prima Food was only allowed to resume their factory operation after it had thoroughly cleaned up the factory and complied with the hygiene requirements set by AVA. This included reviewing its food safety system and revising its standard operating procedures (SOPs). All the workers and food handlers also had to be screened and cleared for *Salmonella* infection by MOH.

Outcome of Investigation

Samples of hazelnut paste and chocolate cream, ingredients used in the manufacturing of cakes, were found positive for *Salmonella enteritidis*. Six food handlers from the factory were also found to be positive for *Salmonella enteritidis*. The outcome of the tests showed a common *Salmonella* phage type in the food samples taken from the factory and retail outlets, the clinical cases and the food handlers. These results supported an epidemiological link between food, food handlers and cases.

Conclusive investigations carried out by AVA and MOH showed that the likely place where the contamination

occurred was the cake and decoration area which had poor hygiene practices. Creamed cakes and semi-processed cream left in a holding area at ambient temperature over a prolonged period could also cause contamination and bacterial growth.

Taking No Chance

To verify that the cleaning and disinfection process had been effectively carried out by Prima Food, environmental swabs at various areas of the factory were taken for testing.

Following the submission of proper food safety plan and SOPs and satisfactory test results, AVA granted Prima Food the approval to resume its operation in two phases. The initial approval was only granted for the production of food products that were subjected to high heat treatment, for example, baked products and frozen dough to be baked at the outlets. Higher risk products that contain ingredients not subjected to heat treatment, such as cakes with toppings had to undergo a trial production before approval could be given to resume commercial production.

This arrangement was necessary for Prima Food to demonstrate its ability to adhere to all aspects of good manufacturing and food hygiene practices and to establish that its food safety system is working well.



Back in Business

Prima Food was finally allowed to resume full production operation by AVA on 29 December 2007. This was after the microbiological test results, on the cakes produced and ingredients used during the trial production were found to be satisfactory.



iGATES Strengthens Food Safety Net for TCM

To address consumers' concerns over the safety of Traditional Chinese Medicine (TCM) herbs, the Agri-Food and Veterinary Authority (AVA), has partnered iGATES BioInnovation Pte Ltd (jointly formed by Eu Yan Sang International and KOOPrime) to implement the Integrated Good Agronomic Practice for Traditional Chinese Medicine

Electronic System (iGATES). Expected to strengthen the food safety net for TCM herbs, iGATES was officially launched on 16 April 2008 by Ms Grace Fu, Senior Minister of State for National Development and Education.

iGATES is an on-line web-based software system that streamlines, automates and integrates various quality and safety assurance processes throughout the TCM supply chain. This encompasses Good Agronomic Practices, Good Laboratory Practices, Good Manufacturing Processes, Good Distribution Practices and Genomic Profiling.

iGATES is also the world's first web portal to combine the duo components of Good Agronomic Practices and Genomic Profiling in a single IT system. Leveraging on IT to seamlessly integrate these processes, iGATES is capable of efficiently and accurately tracking a wide variety and large volume of herbs through real-time reporting. Should any TCM product be found unsatisfactory, iGATES is able to swiftly and precisely detect the source of the problem and halt its sale.

Anticipated to enhance AVA's existing food safety regulatory systems, AVA will be working closely with iGATES BioInnovation Pte Ltd to explore the integration of iGATES to its existing IT regulatory systems for the use of other food.



Award Ceremony of The Enterprise Challenge Grant for the development of iGATES officiated by the Senior Minister of State for National Development and Education, Ms Grace Fu

AVA Conducts Vegetable Cultivation Training Course for North Sumatra Officers

To help diversify supply sources and ensure that the vegetables supplied to Singapore are of good quality and safe, the Agri-Food and Veterinary Authority (AVA) conducted a course on vegetable cultivation for the Singapore market for nine officials from the Agriculture Department in Simalungun, Karo and Dairi Regencies of North Sumatra Province from 22 to 29 April 2008.

The topics covered during the course included: vegetable production in Singapore, introduction to Good Agriculture Practice for Vegetable Farming (GAP-VF) scheme, setting up a soil cultivation vegetable farm, protected cultivation technology, factors affecting shelf life and postharvest of fruits and vegetable, and cold chain management of vegetables. The programme also included practical sessions on packaging and pre-cooling of vegetables, a two-day attachment to a local vegetable farm for hands-on practice on vegetable cultivation, and a visit to AVA's Animal and Plant Health Centre and Veterinary Public Health Centre.

During closing discussions, AVA urged the attending officers to hold similar training sessions for their colleagues and farmers in their respective regencies, and to disseminate information on the delivery safe and good quality vegetables to Singapore.



Participants learning about post-harvest handling



AVA Kicks Off Food Safety Month with Host of Exciting Activities

...Con't [Cover Story]

...of food safety, the Food Safety Excellence Awards are given out according to the number of consecutive years the factories achieve Grade 'A' status, namely: Gold Award - 15 years, Silver Award - 10 years, Bronze Award - 5 years and Certificate of Commendation - 2 years.

The Food Safety Partner Scheme was introduced in 2003 to encourage the food industry to not only maintain high food safety standards but also educate the public on food safety. This year, Singapore Food Industries Pte Ltd joined eight other companies as AVA's Food Safety Partners. These companies include: Cold Storage, NTUC FairPrice, Thong Siek Food Industries, Chop Hup Chong Food Industries, KSB Distributions, Tai Hua Food Industries, Golden Glory Food Industries and Seo Eng Joo Frozen Food.



Entertaining performance by the Sri Cemara Gamelan Ensemble from Evergreen Secondary School

Here are some food safety tips that you can start adopting when shopping for food.



Guest of Honour, Minister for National Development, Mr Mah Bow Tan delivering his speech at the Food Safety Awards Night

Food Safety Public Education

Themed "Select Food Carefully", this year's public education programme encourages consumers to start with food safety practices when shopping for food. Micro-organisms can contaminate food in damaged packaging; toxins found in mouldy food can cause health problems; and expired food may compromise food safety and quality. Thus when care is exercised during the food selection process, the risk of food poisoning is reduced.

AVA has embarked on an intensive radio and print media campaign to help spread the food safety message. Point-of-sale materials will also be put up in supermarkets to educate consumers on key food safety tips. Other key events happening during the month include: school talks and exhibitions, supermarket tours with Oscar, AVA's food safety mascot, cooking demonstrations and exhibitions at the libraries.

TIPS:

- Buy your food from established and reliable retail establishments.
- Select food that has not passed its expiry date, as shown on the packaging.
- Do not buy chilled or frozen food that is displayed at room temperature.
- Select frozen food stored below the load line of the freezing unit to avoid temperature abuse.
- Do not choose canned food that is badly dented or bloated.
- Avoid food packaging that is torn, leaking or infested with insects.
- Do not buy food that has turned mouldy or rancid. It may be contaminated with harmful mycotoxins.
- Check that bottled milk or drinks are tightly sealed.
- Buy eggs that are clean. Avoid cracked eggs as bacteria can enter eggs through the cracks.

Buying canned and packaged food

- Examine canned food carefully. Do not buy if the cans are rusty, dented or swollen. They might have quality defects and could also cause food poisoning.



- Examine packaged food carefully. Do not buy if the packaging is damaged or opened as they may contain harmful microorganisms that could cause food poisoning.
- Do not buy mouldy dried food. They may contain harmful mycotoxins.
- Ensure that the seals of bottled goods are not broken. The contents may have been exposed to food poisoning bacteria.

Buying meat and poultry

- When buying meat, make sure it does not appear stale or have off odours.
- Buy only meat or poultry that has been stored at the right refrigerated conditions. Do not buy chilled or frozen meat or poultry that is displayed for sale at room temperature.
- Do not buy meat or poultry in leaking or torn packaging.
- Ensure that there is no excessive moisture on the surface of meat or poultry. It shows that the food items have not been handled properly.
- Head for home once you have purchased meat as they cannot be left un-refrigerated for long.

Buying seafood

When buying seafood, make sure that it is properly refrigerated or iced.

Choose fish that has:

- A bright, shiny appearance with scales that are intact.
- Bright, clear and full eyes. When the fish has lost its freshness, its eyes would have turned red and cloudy.
- Bright red to liver red gills that are free from slime.

Avoid fish which shows signs that it is not fresh. These include:

- A strong ammonia-like smell.
- Darkening around the edges with brown or yellowish discoloration, especially if these areas appear dry or mushy.

Choosing shellfish:

- Choose shellfish very carefully. Contaminated shellfish may cause viral food poisoning.
- Fresh prawns are firm, have a mild odour and their shells are not slippery. There should not be any black spots or discoloration on the shell.

- Live crabs and lobsters should exhibit leg movements. The tail of live lobsters should curl under the body when you pick them up.
- The shells of live clams, oysters, or mussels should close tightly when tapped.
- Do not buy shellfish with gaping shells as this shows that they are dead and not edible.

Buying dairy products

When buying dairy products, make sure that the packaging of the dairy product is intact, and always check for the expiry date.

- Buy only the required amount of dairy products that you can consume. Dairy products have limited shelf life and should be consumed within the suggested date.
- Only purchase dairy products that are properly displayed in the chillers. Chillers should be maintained at below 4°C.
- Do not buy dairy products that have been stored or displayed beyond the 'load line'. The 'load line' indicates the level up to which foods may be stored and kept at the correct temperature.

Buying dried and preserved food

- Choose dried and preserved food that is properly packaged. Do not buy food with packets that have been damaged or opened.
- Do not buy mouldy food as certain types of mould may produce harmful mycotoxins.
- Do not buy food with insect infestations.
- For unpacked dried and preserved food, take note of the personal hygiene of the seller, the environmental hygiene of the retail establishment and the cleanliness of the container.

Together, let's keep food safe!



Oscar making his rounds at supermarkets



Business Seminar Opens Trade Doors and Enhances Supply Resilience



Ms Nizamayah delivering the opening address on behalf of Ambassador Wardana, Embassy of Republic of Indonesia

Jointly organised by the Agri-Food & Veterinary Authority (AVA) and the Embassy of the Republic of Indonesia and supported by the Singapore Fruits and Vegetables Importers and Exporters Association (SFVIEA), the “Engaging Indonesia in Agri-Trade and Investment” Business Seminar, was successfully held on 4 June 2008.

The seminar saw an overwhelming response of more than 100 participants. Of these, more than half were local importers and traders who expressed keen interest in exploring the different sources of vegetable supply from Indonesia. Six provinces from Indonesia namely East, Central and West Java, North Sumatra, Riau and Kepulauan Riau were represented by their agricultural offices and private sector at the seminar.

During the seminar, Guest-of-Honour, Dr Delima Azahari, Minister Adviser, Ministry of Agriculture, Indonesia, expressed her support for the export of vegetables from Indonesia to Singapore. Echoing the same sentiments, the Head of Chancery, Ms Siti Nizamayah, who represented Ambassador Wardana, Embassy of the Republic of Indonesia expressed her gratitude toward AVA and SFVIEA for co-organising the seminar. She hoped that the fruitful cooperation between Indonesia and Singapore would continue to flourish through such initiatives.

The seminar covered topics on legal and contractual aspects of investment as well as the investment atmosphere in Indonesia. The audience was also informed of AVA’s involvement in technology transfer and business facilitation in Indonesia. Potential Indonesian vegetable exporters had the chance to learn about Singapore’s

import regulations and the quality standards required by the Singapore market. Participants contributed actively during the panel discussion and a greater level of understanding was generated.

Rounding off the seminar was a field visit programme conducted by AVA for some twenty Indonesian participants. Apart from a better understanding of the import procedures, requirements and types of vegetables in the local market, participants also learnt of the importance of maintaining the integrity of the cold chain for vegetables after visiting the Pasir Panjang Wholesale Centre. Impressed with the high standards imposed by AVA on food safety and the sophisticated and speedy detection of pesticide residues in fresh produce, the Indonesian delegates brought home the message that the key to export to the Singapore market is to ensure good cultivation practice and safe pesticide usage.



Sampling fresh produce from Indonesia



AVA officer explaining vegetable sampling procedure for pesticide residue test to the Indonesian delegates



AVA Keeps Close Tabs on Pet Shops with Grading System

The implementation of the Pet Shop Grading System since end 2006 by the Agri-Food and Veterinary Authority (AVA) has found the majority of pet shops in Singapore complying with licence conditions and adopting best practices.

Initiated to raise the standards of animal welfare and professionalism in pet shops, the grading system aims to give the public greater assurance that the pet shops they are patronising are of good standard. The system also hopes to promote responsible pet ownership through better

customer education and information dissemination.

The initial rollout of this grading system was to pet shops selling dogs, cats and small mammals. Out of the 255 shops graded, 42 received Grade A, 155 Grade B and 58 Grade C. The grading was completed on 31st March 2007 and all the grades were posted on the AVA website. Pet shops were also informed to display their grades at prominent places within their premises. AVA will continue to grade the remaining shops, comprised mainly of bird shops, at the latter half of this year.

5th Run of IACUC Course Well-attended by Members of Research Community

Jointly organised by the Agrifood Technologies Pte Ltd (ATP), a subsidiary consultancy company of the Agri-Food and Veterinary Authority and the Singapore Association for Laboratory Animal Science (SALAS), the Singapore Institution Animal Care and Use Committees (IACUC) Basic Training Course and IACUC Seminar 2008 were successfully held on 8 and 9 April 2008 respectively.

IACUC Basic Training Course

Into its fifth run, the IACUC Basic Training Course continues to be well-attended by members of the research community. Participants of this course consist of existing and newly appointed IACUC members, as well as members from organisations intending to form IACUCs. To date, 219 people have been trained through this course. Based on legislation in the Animals and Birds (Care and Use of Animals for Scientific Purposes) Rules and the guidelines set out by the National Advisory Committee on Laboratory Animal Research (NACLAR) in 2003, the course provides participants with the necessary formal training on IACUC functions and duties to effectively run an IACUC.



Learning from professionals renowned in the field

IACUC Seminar 2008

This one-day seminar provided IACUC members with a forum to examine in depth, the challenges commonly

encountered by IACUCs. Issues such as IACUC administration; humane endpoints; analgesia/anesthesia; and frequent non-compliance items encountered at AVA's inspections were discussed in consultation with the panel of IACUC functions experts. The seminar also provided opportunities for fruitful discussion, interaction and hands on training in evaluating project applications.

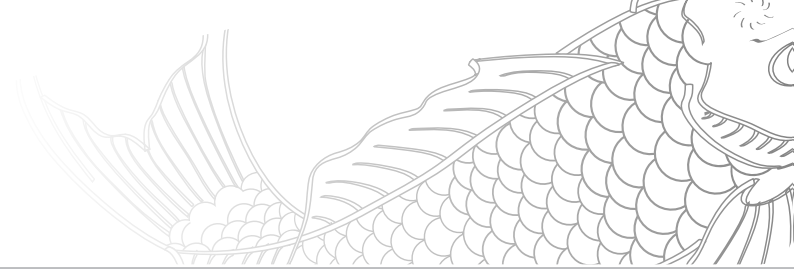
Panel of Experts

The panel of experts for the course and seminar comprised laboratory animal veterinarians, local IACUC experts, and regulators. Among them were Dr Dorcas P. O'Rourke, Dr Patrick Sharp, and Dr Bryan E. Ogden who are Diplomates of the American College of Laboratory Animal Medicine. Dr Dorcas P. O'Rourke is also a member of the Council on Accreditation of the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC). Dr Leow Su Hua, Head of Laboratory Animal Welfare Branch, shared with the participants AVA's perspective on IACUC issues as a regulatory body.

The Animals and Birds (Care and Use of Animals for Scientific Purposes) Rules were enacted under the Animal and Birds Act in November 2004. The Rules were established with the aim of ensuring that the research community adopt a responsible approach to safe and humane treatment of laboratory animals. Under the Rules, these research institutes and organisations would have to be licensed by AVA and would need to establish their respective IACUCs. The main responsibility of an IACUC is to ensure that the care and use of laboratory animals comply with the relevant legislation and the Guiding Principles set by the NACLAR in 2003. In compliance the NACLAR Guidelines, at least fifty percent of the IACUC members must undergo formal training on IACUC functions and duties.



Fishy Business



Singapore's Ornamental Fish Showcased at INTERZOO 2008

The Agri-Food and Veterinary Authority (AVA) together with members of the Singapore Aquarium Fish Exporters' Association (SAFEA) participated in the 30th INTERZOO 2008 at Nuremburg, Germany from 22 to 25 May 2008. Eight participating local ornamental fish exporters and a designer aquarium tank manufacturer took the opportunity to exhibit some of their latest products and innovations at this fair.

INTERZOO 2008

Held biennially, INTERZOO is the biggest and most important market place for the worldwide trade in pet supply and aquarium fish. This year's event attracted over 1,400 exhibitors from more than 50 countries, occupying a new record gross display area of almost 89,000 square metres. Singapore exporters have over the years participated in this trade show to maintain business links and explore new business opportunities. Participating companies have expressed their optimism of increased business contacts and potential business deals through this fair.

Establishing the Singapore Brand Presence

This year, with the set up of the Singapore Pavilion, exporters had a more convenient platform to further strengthen the "Singapore brand" and reach out to new players in the global aquarium trade. AVA provided technical support to the participating companies and was instrumental in helping SAFEA secure funding from IE Singapore for the setup of the Pavilion.



The SAFEA reception booth, a hotspot for enquiries

Study Visit to Renowned Ornamental Fish Importers and Distributors

The European Union (EU) is Singapore's largest importer of ornamental fish. In 2007, EU imported some \$52.8 million of ornamental fish, which comprised 53% of our total

export in 2007. While in Germany attending INTERZOO 2008, three exporters together with an accompanying AVA officer incorporated into their itinerary, a study visit to some renowned ornamental fish importers and distributors in Brussels (Belgium) and Amsterdam (The Netherlands). This visit offered first-hand insights into the operations of these major importers of ornamental fish in Europe and allowed exporters to exchange invaluable ideas and feedback to better cater to their EU customers in future.

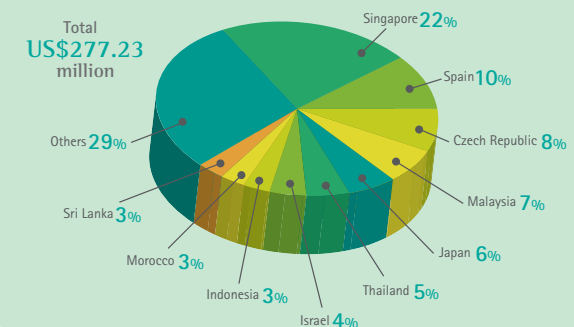


Exporters closely examining the fish-packing assembly line at Ruinemans Aquarium B.V., one of the largest importer and distributor of ornamental fish in the Netherlands

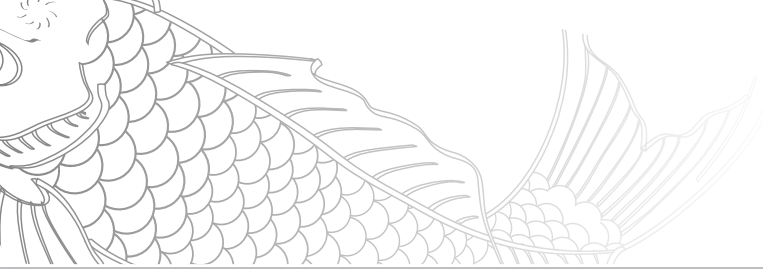
Swimming Against the Tides and Bigger Players

Despite her small size and increasing competition from lower cost countries, Singapore remains the world's top exporter of ornamental fish in 2006, accounting for 22% of the world export market share. For the first time in history, Singapore's ornamental fish exports exceeded the S\$100 million mark. AVA will continue to work closely with the ornamental fish industry to help Singapore maintain its sterling performance and acclaimed global reputation.

World's Top Ornamental Fish Exporting Countries 2006



Source: FAO Fisheries and Aquaculture Information and Statistics Service 2008. Fisheries commodities production and trade 1976-2006.



AVA Solves Farmer's Woes With Timely Advice and Assistance



Workers congregating and treating the seabass fry with freshwater

Following the successful grow-out culture of its seabass fry at an off-shore farm in Riau, Indonesia last year, the Agri-Food and Veterinary Authority (AVA) started sending smaller (2 to 2.5 inch) seabass fry to the farm since December 2007. This move helps to increase the number of fry that could be transported during each shipment. To date, more than 500,000 of the smaller seabass fry have been transported to the farm, exceeding the total number of fry transported in 2007.

Unlike the earlier batches of bigger (3 to 3.5 inch) seabass fry that adapted quickly and performed well in the local water conditions, the first batch of these smaller fish suffered heavy post-shipment mortalities. AVA officers visited the fish farm to ascertain the root cause and helped the farm resolve the problem. The officers examined the farm's post-shipment handling practices, and at the same

time followed up on a second batch of seabass fry that had just arrived at the farm.

The fish fry were found to be infected with parasites, and there were abrasions on their bodies. The method used by the farm to treat the infected fish with freshwater every two to three days was stressful to the fish fry and could be the root cause of the problem. The fry were first aggregated in a small holding area. They were subsequently scooped up from the net and placed into basins.

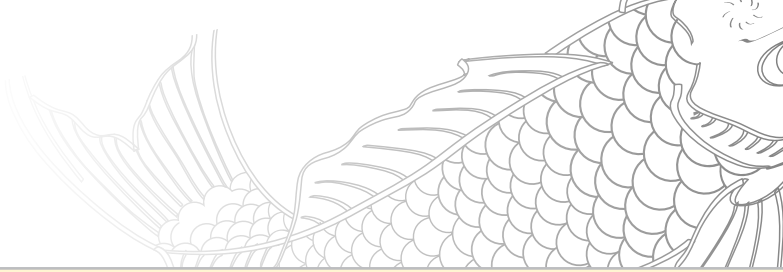
An alternative, less stressful method of treating the fry with hydrogen peroxide without removing them from the net was suggested by our officers. This was immediately adopted. Since its implementation, survival rates of the seabass fry have improved by more than 30%, significantly reducing the economic loss suffered by the farm.



Off-shore Fish Farm in Riau



Fishy Business



Delectable Fish Products with a Healthy Twist

Hosted by the Agri-Food and Veterinary Authority (AVA), the Marine Fisheries Research Department (MFRD), one of the four departments of the Southeast Asian Fisheries Development Centre (of which Singapore is a member country), has been actively developing value-added fish products from small pelagic fish species and tuna trimmings to maximise the utilisation and reduce wastage of scarce fish resources.

Owing to improper post-harvest handling, small pelagic fish species are of poor quality and have low economic value. With ASEAN being a major exporter of tuna (processed as fresh, frozen, chilled or canned), a substantial amount of tuna trimmings gets discarded. MFRD saw the potential of developing both pelagic fish and tuna trimmings into savory and healthy fish products by improving the process, preservation and quality assurance of these products.

Yummy-licious Delicacies from Small Pelagic Marine Species*

Fish Bah Kwa



Using lower-value pelagic fish such as the Indian mackerel (*Rastrelliger kanagurta*) and selar scad (*Atule mate*), the Fish Bah Kwa is a healthy choice for consumers. Taken as a snack or served with rice or bread, the tangy Fish Bah Kwa is a refreshing alternative for the Muslim community.

Fish Muffin



Weight-watchers can now enjoy this 'unconventional' muffin made with minced fish from the round scad (*Decapterus macrosoma*). Apart from the undetectable fishy taste (all thanks to the juicy fruit flavouring added), the gelling property of fish meat also helps to reduce the fat needed to make this muffin. With 30% more protein and half the fat content, consumers have every reason to tuck in to their hearts' content.

Fish Biscuit



Craving for a quick bite? Try our savoury Fish Biscuits. Concocted from a mixture of round scad (*Decapterus macrosoma*) minced meat, eggs, fish sauce, spices, salt, sugar and vegetable oil, these yummy biscuits not only ease your hunger pangs, but are very healthy too!

Gastronomical Treats from Tuna Trimmings

Tuna Ham



Produced by compressing seasoned tuna chunks and ground surimi paste, these delightfully tasty tuna ham also come in the following exciting flavours: smoked ham and honey baked ham.

Tuna Chunk Sausage



The Tuna Chunk Sausage will find a great following amongst the young. Knowing that this product is made largely from tuna and surimi (a healthy alternative) also sets concerned mothers at ease.

Breaded Tuna Burger



The breaded tuna burger consists of a mixture of tuna meat paste with onion, flour, and spices. When fried, the burger turns into an attractive golden-brown colour. This crispy and tasty product draws young and old alike.

**Small Pelagic Marine Species used here include: Round Scads (Decapterus spp., Decapterus macrosoma, Decapterus russelli and Decapterus maruadsi), Mackerels (Rastrelliger kanagurta and Rastrelliger brachysoma) and Selar scad (Atule mate)*

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