

# AVAvision

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## Eat Well For Less, Choose Frozen Meat

**F**ood prices around the world are on the rise due to a myriad of reasons such as rising fuel prices and poor crop production due to adverse climates. With most of our food coming from overseas, Singapore is not immune from this global rise in prices. Just last year, Singapore's food price inflation increased by 2.9%.

To address this problem, the Agri-Food and Veterinary Authority (AVA) is working together with the industry to further diversify Singapore's supply sources to keep food prices competitive. At the same time, consumers, too, can play their part in keeping

their grocery bills down by choosing cheaper food options. One such option is frozen meat. Frozen meat is generally around 20% cheaper than chilled meat. Some cuts, like chicken wings and drumsticks can even be up to 50% cheaper. Not only is frozen meat better value for money, it also tastes just as good as chilled meat when cooked.

AVA, together with industry partners, has rolled out a public education programme to increase consumer awareness of frozen meat as a cheaper alternative to chilled meat and educate consumers on the handling and use of frozen meat.

*Continuation on page 6...*



## Corporate Cuts

# AVA Passes with Flying Colours in "Exercise Gallus V"

### The scenario

5.30am, 10 January 2008. Agri-Food and Veterinary Authority (AVA) officers conducting a routine inspection of live poultry import consignments at Tuas checkpoint found a lorry with 6% of its chicken dead. This was higher than the 3% mortality limit set by AVA. The truckload of 1,500 chicken was suspected to be infected with bird flu and was escorted by the police to the nearby Tuas Training Village (TTV) where AVA cullers were dispatched to at 9.00am. By noon, all the chickens were culled.

This was the scenario played out in AVA's bird flu operational readiness exercise on 10 January 2008. Codenamed "Exercise Gallus V", the exercise aimed to test AVA's readiness to deal with an incursion of bird flu at Tuas checkpoint. Some 200 officers from various agencies,



*Screening of cullers prior to the exercise to ensure that they are medically fit*



*Culling of chickens in progress*

including the Ministry of Health, Singapore Police Force and Immigration and Checkpoints Authority were involved in the exercise. It was the 5th bird flu operational readiness test exercise AVA had conducted since 2002 and the first time that the exercise was conducted at TTV.

### The process

Cullers who were despatched were medically screened, issued Tamiflu and suited up in personal protective equipment (PPEs). Upon entering the hot zone, they quickly went into their designated positions and started the culling operations. Chicken crates were unloaded from the lorry by a forklift and the chickens removed from their crates and placed into garbage bags to be gassed with carbon dioxide and humanely euthanised. Their carcasses were then securely handled for transport to and disposal at the Tuas incineration plant.

### New emergency management system

The entire process moved with clockwork precision thanks to the All-Hazards Incident Management System (AIMS), a new emergency management system that AVA had adopted in October 2007. Based on the American Incident Command System, AIMS allows the integration of a combination of facilities, equipment, personnel, procedures and communications operating within a common organisational structure. All officers involved in an emergency response undergo specific standardised training and have functional specialisation in their respective roles during an emergency. For example, cullers are trained to handle and cull birds humanely while decontamination personnel are trained to decontaminate everything from personnel to equipment to vehicles, effectively and efficiently.

### Superb teamwork

The commitment of all the people involved ensured the success of Exercise Gallus V. Although the personnel working in the hot zone were hot and sweaty from wearing the PPE suits of non-breathing fabric, they gritted their teeth and continued to work with determination under the sweltering heat. They showed outstanding endurance, with signs of exhaustion showing on their faces only at the end of the exercise.

Various other groups also worked tirelessly behind the scenes: the controllers oversaw the organisation of Exercise Gallus V; the logistics group ensured all requests for equipment were promptly met; the staging group staged personnel at a speedy rate of 100 personnel per hour and the evaluators who picked up points for improvement.

AVA's spirit of camaraderie, cooperation and teamwork shone throughout the exercise and was especially apparent towards the end. Despite exhaustion, everyone chipped in to clear up the place: carrying buckets of water, scrubbing the floor, packing up equipment and clearing out rubbish.

With the successful completion of Exercise Gallus V, AVA had once again proved its operational readiness to combat bird flu incursion into Singapore.



*Dr Mohamad Maliki Osman, Parliamentary Secretary for National Development, observing the culling procedures*



# MND Senior Management Builds Esprit De Corps at Singapore Turf Club

The Agri-Food and Veterinary Authority (AVA) hosted the senior management of the MND Family (comprising the Agri-Food & Veterinary Authority, Building and Construction Authority, Housing & Development Board, National Parks Board and Urban Redevelopment Authority) to a Get Together at the Singapore Turf Club on 21 February 2008 as part of the initiative to build up camaraderie among the MND Family.

Themed “The Amazing Race @ Singapore Turf Club”, AVA shared with the MND Family its roles in facilitating the import and export of animals, in particular horses, as well as safeguarding animal health in Singapore through rigorous quarantine and disease surveillance programmes. The Singapore Turf Club also shared its equine health programme and took the participants for a tour of its Equine Hospital where demonstrations were conducted at both the Endoscopy and Ultrasound Rooms.

The event ended with an MND Family “Lo Hei” as the event coincided with the last day of the Lunar New Year or “Chap Goh Mei”.



*A photo memento for the event*

# AVA Shifts into Charity Gear with MND

Twelve officers from various statutory boards under the Ministry of National Development (MND), including 5 officers from the Agri-Food and Veterinary Authority (AVA), cycled through 42 New Zealand towns and cities in 25 days, all in the name of charity.

Organised by the MND Recreation Committee, the sporting challenge, aptly named “Pedal for Hope”, stretched from 14 December 2007 to 8 January 2008. In total, more than \$170,000 was raised for two beneficiary organisations - namely the Association of Persons with Special Needs (APSN) Chao Yang School and the Singapore Association of Mental Health (SAMH) Oasis Day Centre.

To drum up support for the event, a pledge card donation drive amongst MND staff was launched and thousands of letters were sent to prospective donors. AVA staff donated about \$12,000 in the pledge card donation drive, the second highest amount collected within the MND Family.

The gruelling expedition, covering the North and South Islands of New Zealand tested the cycling team on their physical and mental limits. Besides cycling, the members also doubled up as their own support team, juggling various roles such as cooks, bike mechanics, photographers and luggage porters, when they were not on their saddles. They also took turns motivating each other: hugging one

another during difficult moments, carolling in the rain on Christmas Eve and cheering and dancing on the road on the last cycling day.

After 25 days of sweat, toil and tears, the 12-member team arrived back in Singapore, exhausted but extremely thrilled from the once-in-a-lifetime experience.



*The triumphant team, posing for a group photo upon their return to Singapore*



## Corporate Cuts

# New Chairman to helm AVA's Board of Directors

On 31 March 2008, the Agri-Food and Veterinary Authority (AVA) bade farewell to its founding Chairman, Mr Koh Poh Tiong, and two other Board Members, Dr Ling Ai Ee and Mr Lee Ark Boon. Mr Koh Soo Keong, AVA's current Deputy Chairman, took over the reins as AVA's new Chairman on 1 April 2008.

At the same time, AVA welcomed three new Board Members - Assoc Prof Zhou Weibiao, Dr Lee Tung Jean and Mr Huang Hong Peng. The new members brought with them a wealth of knowledge and expertise, based on years of experience in industries as varied as food science, logistics and environmental policies.

Dr Ngiam Tong Tau, Mr Frankie Chia, Mr Tan Kian Chew, Mr Cavinder Bull, Mr Alan Lee and COL (Dr) Benjamin Seet were re-appointed as members of the AVA Board for another two-year term.

AVA has benefited tremendously from Mr Koh Poh Tiong's leadership in overcoming the many challenges that it faces in ensuring the safety of Singapore's food supply and safeguarding the health of animals and plants. Mr Mah Bow Tan, Minister for National Development, acknowledged Mr Koh's significant contributions as the first Chairman of AVA "in guiding the development of AVA into a recognised and credible authority on food safety and veterinary services".

Agri-Food and Veterinary Authority Board Members	
<b>CHAIRMAN</b>	
Mr Koh Soo Keong Managing Director EcoSave Pte Ltd	
<b>MEMBERS</b>	
Dr Ngiam Tong Tau Executive Vice President United Engineers Ltd	Mr Alan Lee Managing Partner August Consulting Pte Ltd
Mr Frankie Chia Managing Partner BDO Raffles	Mr Cavinder Bull Director Drew & Napier LLC
Mr Tan Kian Chew Group Chief Executive Officer NTUC Fairprice Co-operative Ltd	COL (Dr) Benjamin Seet Chief Army Medical Officer Ministry of Defence
Dr Chua Sin Bin Chief Executive Officer Agri-Food & Veterinary Authority	Dr Lee Tung Jean Director, Water Studies & Dy Executive Director of Environment and Water Industry Development Council Ministry of the Environment and Water Resources
Mr Huang Hong Peng Regional Director (China) Asia Pacific Breweries Ltd	
Assoc Prof Zhou Weibiao Director, Food Science & Technology Programme Department of Chemistry, National University of Singapore	

## Spirit of Giving at AVA

The spirit of giving continues at the Agri-Food and Veterinary Authority (AVA) with the AVA Charity Bazaar 2008 held on 31 January 2008.

AVA officers set up a total of 13 stalls selling a wide array of food items from Chinese New Year cookies to ice cream. Besides food, a tantalizing range of costume jewellery, porcelain, Chinese New Year plants, DVD games and golf equipment accessories were also put up for sale. AVA's Environment Outreach Group also took the opportunity to promote environmental awareness for reduce, re-use and recycling through a Car Boot Jumble Sale.

Prior to the Charity Bazaar, AVA ran the AVA Idol Competition during which contestants were judged on their performance as well as their ability to raise funds for charity. AVA staff were encouraged to add to the contestants' scores by making donations to the Straits Times School Pocket Money

Fund. The amount of donations collected by contestants made up 30% of their total score for the competition.

In total, more than \$15,000 was raised for the Straits Times School Pocket Money Fund for needy children from low-income families.



Dr Chua Sin Bin, CEO of AVA, presenting the cheque to Mr Gerard Wong of SPH



## Lacquer Coatings in Metal Cans Pose No Health Risk

Consumers who are concerned about the adverse effects of exposure to bisphenolic compounds, which can be found in metal can lacquers and migrate to the canned food, can set their minds at ease. A recent survey conducted by the Agri-Food and Veterinary Authority (AVA) has determined that the bisphenolic compounds detected in canned food products sold locally are well within safety limits.

### Metal can lacquers

The internal surfaces of tin cans are coated with lacquer to prevent metal corrosion and to allow the cans to withstand high temperatures during the food sterilisation process.

Bisphenol-A (BPA) is a starting substance of Bisphenol-A-diglycidyl-ether (BADGE), a chemical used in the production of metal can lacquers. BPA, BADGE and other bisphenolic compounds that are formed from BADGE can migrate into canned food.

To protect the health of consumers from adverse effects of exposure to bisphenolic compounds, the European Union (EU) has established migration limits and Tolerable Daily Intakes (TDI) for BPA, BADGE and its bisphenolic components. The migration limit of a substance refers to the amount of substance allowed to migrate from a food-contact material into food while TDI is an estimate of the

quantity of substance which can be ingested daily over a lifetime without posing a significant risk to health.

### Determining migration levels and health risks of bisphenolic compounds

AVA conducted a survey in August 2007 to determine whether the levels of bisphenolic compounds in canned food pose any health concerns. Since BADGE has a high tendency to migrate into fats and is rapidly converted to other more water soluble bisphenolic compounds in liquid food, the survey was targeted at canned fatty foods (such as canned fishes and meats) and canned beverages. Analyses conducted by the Health Sciences Authority (HSA) showed that the migration levels of the bisphenolic compounds detected in the canned food samples were well within the EU's migration limits.

The daily intakes of these bisphenolic compounds were then assessed based on the migration levels of bisphenolic compounds detected. The study showed that the daily intakes of the bisphenolic compounds were below their TDIs. This suggests that there are no health concerns associated with the intake of these compounds from canned fishes, meats and beverages at levels detected in this survey.

Local consumers can thus continue to enjoy their canned products with peace of mind.

### Facts about food canning

The process of food canning was discovered in the 18th century when a French confectioner observed that cooking food in sealed glass jars prevented the food from deteriorating. Food canning has since then been established as a method for preserving food by first sealing the food in air-tight jars, cans or pouches, and then sterilising it to destroy food-spoilage and food-poisoning microorganisms.





# Eat Well For Less, Choose Frozen Meat



*At the launch:*

*Panel discussion with, from left, Mr Ting Puong Huat, Managing Director of Ong Joo Joo Food Industries Pte Ltd, Dr Paul Chiew, Deputy Director, Veterinary Public Health (AVA), Dr Chua Sin Bin, CEO of AVA, Ms Grace Fu, Minister of State for National Development, Mr Roger Yeo, CEO and President of Singapore Food Industries and Mr Tng Ah Yiam, Director of Integrated Purchasing of NTUC Fairprice Co-operative Ltd*

*...Con't [Cover Story]*



*At the launch:*

*A cooking demonstration by celebrity chef Ms Violet Oon*

Themed "Eat Well For Less, Choose Frozen Meat", the public education programme was launched on 23 February 2008 by Ms Grace Fu, Minister of State for National Development, at Yuhua Community Club. The event included a panel discussion where many of the invited guests had their queries on frozen meat answered and concerns addressed. Guests were also treated to a live cooking demonstration and food tasting by celebrity chef Ms Violet Oon.

Following the launch, a public education event was held at HDB Hub between 22 to 23 March 2008 to show consumers how they could enjoy quality meat at cheaper prices. Interactive exhibition panels, brochures and recipe booklets helped explain the benefits of frozen meat as well as impart tips on how to buy, handle, store and cook frozen meat. Cooking demonstrations by 10 chefs from the Society of Chinese Cuisine Chefs and the Society of Professional Chefs also demonstrated how easy it was to whip up tasty dishes using frozen meat. For shoppers, cooler bags for carrying frozen meat were distributed at the exhibitors' booths.

To further reach out to the community, community groups from the various constituencies in Singapore were invited to the event. A total of about 630 people took part in guided tours of the exhibition panels and participated in various stage activities. They also took away souvenirs of cooler bags complete with brochures and recipe booklets.

As part of the 2-day programme, celebrity chefs Asmah Laili and Violet Oon conducted mouth-watering cooking demonstrations on stage and MediaCorp artists Bryan Wong, Cavin Soh, Kym Ng and Chen Liping also made special appearances to promote the use of frozen meat and to dispel the common myths associated with it.

The event proved to be an excellent platform for consumers to learn how easy it is for them, despite rising food prices, to Eat Well For Less.



At the consumer roadshow:

A chef at the cooking demonstration kitchen drawing a crowd with his mouth-watering dish



At the consumer roadshow:

Members of the public learning about our sources of frozen meat at an interactive panel



At the consumer roadshow:

"HDB Tai Tais" Kym Ng and Chen Liping showcasing their culinary skills using frozen meat



At the consumer roadshow:

Members of community groups learning about frozen meat through stage games

## Facts and Myths on Frozen Meat

MYTH	FACT
The freezing process affects the quality of the meat. Hence, frozen meat is not as fresh as chilled meat.	Freezing and frozen storage is the best method of extending the useful shelf life of meat, preserving its freshness, taste, nutritional value and quality. The freshness of frozen meat can be maintained for up to 6 months under appropriate storage conditions while unrefrigerated meat can go stale and spoil within a day.
Frozen meat is leftover chilled meat that has been frozen or derived from inferior quality animals.	Frozen meat is derived from freshly slaughtered animals. All the different grades of meat are available in both chilled and frozen forms.
The colour of frozen meat (such as pork, beef and mutton) is usually darker than fresh meat. This is an indication that the meat is not fresh or of an inferior quality.	The colour of meat (such as pork, beef and mutton), frozen or non frozen, is affected by the presence or absence of oxygen. Frozen meat in vacuum sealed packaging is darker in colour because of the absence of oxygen. When the frozen meat is exposed to oxygen in the air, it will return to its original colour. Vacuum packing prevents the meat from becoming rancid and prolongs its shelf-life if the meat is kept under proper refrigerated conditions.



# Strengthening Our Food Supply Resilience through Food Diversification

Ensuring Singaporeans a resilient supply of fresh, safe and wholesome food is a top priority of the Agri-Food and Veterinary Authority (AVA). In order to ensure resilience in our food supply, offer more choices to consumers and maintain stability in food prices, AVA proactively seeks to identify and accredit new primary food sources from overseas to supplement our existing sources.

As part of Government's efforts to mitigate the impact of food inflation due to reasons such as adverse climates and rising fuel prices, AVA has stepped up its diversification efforts to further increase its pool of accredited sources.

### Meat

In the first quarter of 2008, AVA undertook three inspection visits to foreign meat processing establishments in the Philippines, China and Malaysia. AVA also inspected meat processing plants as well as commercial pig and poultry farms in Chile. The accreditation of Chile added yet another new country to the list of countries presently approved to export meat and meat products to Singapore.

### Seafood

AVA led a food sourcing mission to Namibia in October 2007. Besides having an ample supply of fish, Namibia's fish processing plants also abide by the Hazard Analysis Critical Control Point, an internationally recognised food safety system endorsed by AVA, making the country a suitable source of fish for Singapore. Following the

visit, NTUC FairPrice has started to import seafood from Namibia.

### Fruits and Vegetable

AVA collaborated with various Indonesian provincial agricultural officials in developing the provinces to supply vegetables to Singapore. This included facilitating the development of logistics network, especially cold chain management and shipping services, from source to Singapore, and showcasing leafy and fruited vegetable produce from Indonesia to local importers and buyers through fairs and trade shows.

### Continual efforts to strengthen food supply

AVA works constantly to strengthen Singapore's food supply resilience. This includes working with the International Enterprise of Singapore (IES) and the business clusters to scale up food trade with Vietnam. The inspection of new food sources in countries such as Poland and Spain are also in the pipeline. At the same time, AVA is working with key industry players to increase investment in upstream food production, such as through contract farming and setting up of food zones in viable countries.

With the engagement of regional countries, such as China and Vietnam, as well as targeted new sources, like Philippines and Namibia, this may help to temper the rate of inflation in food prices while meeting AVA's primary objective of ensuring a resilient supply of safe food with more choices for consumers at stable food prices.



*A meat processing plant in Mindanao, Philippines*



## Recent Efforts on Strengthening Food Supply Resilience

### 2nd Indonesian Fruits and Vegetables Fair

The 2nd Indonesian Fruits and Vegetables Fair was officially opened by His Excellency, Bapak Wardana, Ambassador of Embassy of the Republic of Indonesia to Singapore on 27 November 2007 at the Pasir Panjang Wholesale Centre (PPWC).

The Fair was jointly organised by AVA and the Indonesian Embassy and supported by the Singapore Fruits & Vegetables Importers' and Exporters' Association (SFVIEA).

The event saw representations by 18 commercial companies and associations from provinces such as Central Java, East Java, West Java, North Sumatra, Jambi, Riau and Kepri as well as Jakarta. Officers from the Agriculture Department of various provinces were also on hand to facilitate business discussions with Singapore importers/buyers. Local participants comprised major supermarket and hypermarket chains like NTUC FairPrice, Cold Storage Pte Ltd, Giant Hypermarket, Prime, Sheng Siong, major food suppliers such as Singapore Food Industry, and key importers of vegetables and fruits in PPWC.

Apart from showcasing vegetables and fruits from various Indonesian provinces, the Fair also presented opportunities for Singapore



*Opening of the Fair by His Excellency Bapak Wardana, Ambassador of Embassy of the Republic of Indonesia to Singapore*

wholesalers and supermarket retailers as well as institutional buyers to network with Indonesian producers and exporters. Considerable interest was generated for produce such as potato, mango and leafy vegetables.

The Fair was followed by a field visit to farms and retail outlets the following day to provide participants with an understanding of local vegetable production and marketing systems, types and quality of fresh produce and their retail prices.



*A wide array of vegetables and fruits were showcased at the Fair*



# Recent Efforts on Strengthening Food Supply Resilience

## Observing South Australia's Horticultural Systems and Practices



*Signing of MOU between Singapore Fruits and Vegetables Importers & Exporters Association and Virginia Horticulture Centre*

Together with the Singapore Fruits and Vegetables Importers & Exporters Association (SFVA), AVA organised a study visit for a 15-member delegation to South Australia from 5 to 11 January 2008. The visit was hosted by the South Australia (SA) Department of Trade and Economic Development and the Department of Primary Industries and Resources (PIRSA).

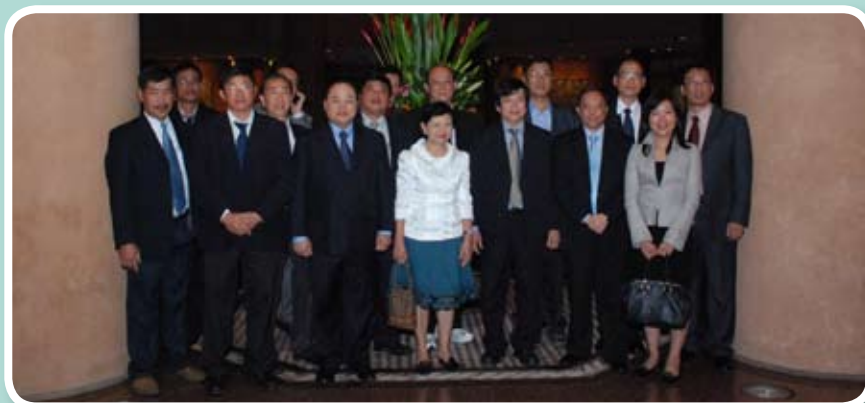
The delegation, comprising of farmers, importers, supermarket retailers and institutional buyers, learnt about South Australia's cold chain management of fruits and vegetables and explored business

opportunities to import more South Australian fruits and vegetables to Singapore. The trip included visits to vegetable and mushroom farms, a wholesale market, cold stores, the South Australia Research and Development Institute, air and sea logistics handlers at the airport and sea ports as well as fruit orchards and packers.

During the visit, participants obtained a thorough understanding of South Australia's horticultural systems and practices and delegates were impressed with South Australia's cold chain technologies and equipments and were assured of its high quality produce.

The visit culminated with the signing of a MOU between the SFVA and the Virginia Horticulture Centre (VHC). The MOU served as a platform from which future interactions and transactions could be carried out between both parties.

The study visit promises future exchanges between SFVA and VHC in training and attachment for cold chain studies and production technologies with increased opportunities in trade. Examples of such exchanges include an upcoming visit by VHC members to Singapore in April 2008 as well as proposed participation of South Australia at the Food Hotel Asia 2008 in Singapore and an Australian Fruit and Vegetable Fair at a local supermarket chain.



*Members of the delegation*



## New Food Safety Benchmark Set for TCM Herbs



*Launching of the scheme by Mr Koh Poh Tiong, former Chairman of AVA, and Mr Richard Eu, CEO of EYSI*

**E**u Yan Sang International (EYSI), with Agrifood Technologies Pte Ltd (ATP) as its external auditor, launched the Eu Yan Sang Good Agronomic Practices for Herbs (EYSGAP-Herbs) Certification Scheme on 31 March 2008.

Setting a new benchmark on food safety for Traditional Chinese Medicine (TCM) herbs in Singapore and in the region, the scheme ensures food safety controls at different

points of operations throughout the supply chain. This means that herbs and products are handled safely at every step, from farm production, to harvesting to post-harvesting handling. The scheme also ensures that any problematic batches can be easily traced back to the source.

As EYSI's external auditor, ATP, the commercial arm of the Agri-Food and Veterinary Authority (AVA), undertook an independent audit of EYSI's Lingzhi farm in Fuzhou, China in January 2008 where the supplier's production system, documentation as well as management and product quality control systems, were audited. Results of the audit were satisfactory as the farm had complied with the food safety and traceability standards under the EYSGAP-Herbs Certification Scheme.

In support of the new initiative, EYSI has also created a new EYSGAP-Herbs label for easy identification of products originating from EYSGAP-Herbs certified production sources. Mr Koh Poh Tiong, former Chairman of AVA, said that the launch of the scheme was timely as it "responds to a number of challenges – such as the global demand for safe food, changes in government policies, consumers' demand for the protection of the environment and workers, and the increase in global trade and retailing".

## ATP Runs Seafood Safety Management Course

**J**ointly sponsored by the Ministry of Foreign Affairs (MFA) and the Japan International Cooperation Agency (JICA), the Seafood Safety Management Course was held from 14 January to 1 February 2008 at the Marine Fisheries Research Department.

Conducted by the Agri-Food and Veterinary Authority (AVA) and the Agrifood Technologies Pte Ltd (ATP), the course served to give foreign government management and laboratory officers a better understanding of seafood safety requirements, various chemical contaminants and the Hazard Analysis Critical Control Point (HACCP) quality assurance system that was relevant to the seafood industry.

19 trainees from 11 different countries, namely, Brunei, Cambodia, Madagascar, Maldives, Myanmar, Philippines, Samoa, Sri Lanka, Timor Leste, Tongga and Vietnam, participated in the course. Trainees were given lectures on seafood safety programmes and regulatory requirements for fish and fish products inspection. There were also laboratory practical sessions on the analytical methods for various tests relating to seafood safety.

As part of their training, participants also visited the laboratories at AVA's Veterinary Public Health Centre, Jurong and Senoko Fishery Ports, mussel and milkfish coastal farms and a wet market.

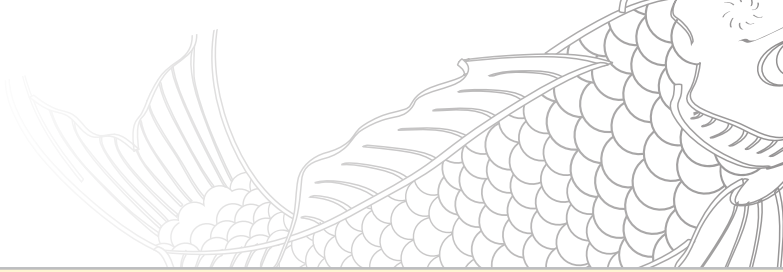


*AVA officers explaining the roles and functions of AVA's VPHC Laboratories*

The course was very well received with trainees giving the extra thumbs up for the practical sessions.



## Fishy Business



# Breakthrough in Cobia Culture

Through its intensive R&D efforts, Agri-Food and Veterinary Authority (AVA) officers at the Marine Aquaculture Centre (MAC) are now able to pinpoint the cobia's maturation period to facilitate preparation for spawning. Cobias will change in their physical appearance during puberty with the usual sign of round and bulgy stomachs.

The first cobia natural spawning in a tank system took place at MAC in September 2007 with a fertilisation rate of 78.5%. With the success of the cobia spawning, MAC commenced its first cobia larviculture. A total of 6,750 cobia fry were produced with a survival rate of 3%, which was a good start for a first trial. In the following years, MAC will continue to perfect its cobia larviculture techniques and improve the larvae survival rate through a myriad of strategies. These include better live feed management, modifying the weaning procedure and enhancing broodstock nutrition.



### Cobia

*Cobia, Rachycentron canadum, is a fast-growing marine finfish species, distributed in the tropical and subtropical waters, worldwide. Adults can achieve lengths of 2m and weights of 68kg. Having many positive culture attributes, which include capacity for natural and induced spawning in tanks, growth rate in excess of 6 kg/year, superior feed conversion ratio, high disease resistance and high survival rates for post larvae stage, Cobia has emerged as a global potential candidate for aquaculture. Many countries, including Singapore, are now focusing their research initiatives to accelerate the progress in cobia production.*

# Enhancing Foodfish Quality and Resilience through Technology



The Agri-Food and Veterinary Authority's (AVA) Marine Aquaculture Centre (MAC) and Temasek Life Sciences Laboratory (TLL) collaborated on a "Selective Breeding Programme for Marine Foodfish" to enhance the Asian Seabass fish breeding programme. This genetic improvement programme uses

molecular-marker assisted selective breeding (MAS) techniques to improve the growth rates of seabass brooders and fry.

Brooders with high genetic diversity were brought in from different geographical locations and their genetic relatedness were analysed. Superior brooders were selected using progeny tests with the help of microsatellite markers which are molecular or DNA genetic markers. Crosses were then carried out to produce quality offspring.

To date, 180 superior brooders have been selected to form the first batch of superior seabass broodstock. In the next few months, another 300 top offsprings with superior growth performance are expected to be selected for the next generation of brooders.

With this programme, AVA is now able to produce better quality fish fry in large numbers to support large-scale fish farming in Singapore and nearby waters. This will, in turn, help to sustain a resilient supply of quality and fresh foodfish for Singapore.

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