AGRI-FOOD & VETERINARY AUTHORITY OF SINGAPORE

ORNAMENTAL FISH NEWSLETTER

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SPECIAL POINTS OF INTEREST:

TRADE NEWS

- New Export Quality Assurance Scheme.
- Further Transitional period for EUS in EU.

AQUATIC ANIMAL HEALTH

- New emerging disease of concern for the industry.

MANGEMENT TIPS

- Management of Digenean Trematode Infection.

INSIDE THIS ISSUE:

A new quality assurance scheme to facilitate export of ornamental fish from Singapore- AVA Quality Assurance Scheme (AQUAS)

AVA is targeting to introduce another export scheme which would replace the existing Accredited Ornamental Fish Exporter Scheme (AOFES) which had been implemented since 1983.

As you may be aware, Singapore was audited by the EU and Australian competent authorities several months ago on the export of ornamental fish. At the audits, the AOFES was not deemed to meet their requirements (such as pre-export inspection). As such, AVA has decided to revamp the AOFES to ensure our export scheme stays relevant and is accepted by overseas authorities as assuring quality fish and good health. In turn, this would further facilitate export of ornamental fish from Singapore.

On 25 November 2010, the AVA gave a presentation during the AVA -SAFEA dialogue as a prelude for the upcoming new quality assurance scheme for export of ornamental fish. The new scheme known as AVA Quality Assurance Scheme (AQUAS) to be introduced in 2011 focuses on establishing an ordered and coordinated quality control process for export of ornamental fish that would consistently meet AVA's export certification requirements as well as to comply with the import requirements of specific importing countries.

Export facilities for ornamental fish in Singapore

Unlike AOFES, AQUAS offers a consultative approach for the industry towards quality management for export of ornamental fish. On the contrary, AOFES is a prescriptive, top-down system administered by the AVA for the industry.

The advantage doesn't stop here. ***AQUAS also allows co-regulation of activities between AVA and industry in achieving quality enhanced fish for export.*** Exporters under the scheme would undertake a greater role in implementing and documenting an AVA approved and documented quality system, to ensure ornamental fish to be exported are healthy and of high quality.

AVA will ensure that the implemented quality system complies with documented standards through regular audits. Other benefits of the new scheme include financial savings, lifetime membership, enhanced competitiveness of exports etc.

We hope the new scheme excites you. The AVA will be holding consultative sessions with the industry in early 2011 on the details of the new scheme. Till then, stay tuned for further updates from the AVA.

Requirement for health certificates for exports of susceptible species to certify freedom from White Spot Disease (WSD) to Germany and Spring Viraemia of Carp (SVC) to Hungary

Bee shrimps– a susceptible species of WSD.
Source: Qian Hu Fish Farm

Germany has declared itself to the European Commission as free of WSD in October 2010 for a compartment Garnelenhof Schäfer. Separately, Hungary has submitted to the European Commission applications for the approval of national measures on SVC. Hungary has also conducted targeted surveillance on SVC for the last two years which has demonstrated that its entire territory is free of SVC.

Given these, the European Commission has published a regulation (Commission Decision (2010/761/EU) of 7 December 2010 to declare Hungary as being disease free from SVC.

With the freedom declaration, Germany (compartment Garnelenhof Schäfer) and Hungary are thus free to apply market restrictions on the import of susceptible species from infected areas. Correspondingly, if you have exports of susceptible species from Singapore into those countries, the shipments would need to be accompanied by health certificates to certify disease freedom from either WSD or SVC. The susceptible species of WSD are all crustaceans (e.g., shrimps, crabs, crayfish etc.) and for SVC, namely goldfish and koi/carps.

Norway's WTO Notification on Draft Regulations Relating to the Import and Release of Alien Organisms

"Species found in the trade mainly include crayfish from the Cambaridae family, including the red swamp crayfish (Procambarus clarkii) and the Mexican orange dwarf crayfish (Cambarellus patzcuarensis)."

Source: http://farm1.static.flickr.com/29/52594830_2d49ff9852_m.jpg

On 7 July 2010, the Norwegian Ministry of Environment issued a WTO notification (reference G/SPS/N/NOR/30) to inform member countries on the draft regulations relating to the import and release of alien organisms in Norway. An alien organism is defined as an organism that does not belong to a species or population that occurs naturally in an area. Organisms have been classified by the Norwegian authorities into 4 lists described below:

- List I – Organisms for which no permit is required for import of specified purposes

- List II – Organisms prohibited for import

- List III – Organisms prohibited for release

- List IV – Organisms for which no permit is required for release.

A list of the species found in these lists had also been issued to all member countries.

Species found in the trade mainly include crayfish from the *Cambaridae* family, including the red swamp crayfish (*Procambarus clarkii*) and the Mexican orange dwarf crayfish (*Cambarellus patzcuarensis*). These items are listed as prohibited species, appearing in both Lists II and III. As such, please be reminded not to send these species to your Norwegian consignees as this regulation has come into effect on 1 January 2011. Please note that shipments containing these items may cause the entire shipment to be detained, returned or destroyed upon arrival at the border.

For more information on this regulation as well as the list of all affected species, please visit the following websites:

-http://members.wto.org/crnattachments/2010/sps/NOR/10_2659_00_e.pdf

-http://members.wto.org/crnattachments/2010/sps/NOR/10_2659_01_e.pdf

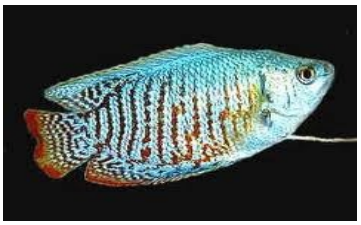
-http://members.wto.org/crnattachments/2010/sps/NOR/10_2659_02_e.pdf

Exporters are advised to check their consignment item list against the above species list before sending their shipments to Norway.

*The list applies only to the import of organisms that are not to be released to the environment and that present a minimum risk of escape.

Source: http://aboutzoo.net/aquarium/lt/wp-content/uploads/2009/12/cambarellus_patzcuarensis_orange3.jpg

Advisory on emerging new diseases - Iridovirus



Dwarf gourami (Colisa lalia)
Source: source:www.petfishtalk.com

Iridoviruses have been found in a wide variety of freshwater and marine fishes,.

As of Jul 2010, Australia has drafted an import risk analysis report for ornamental finfish with respect to iridoviruses, including the recommendation that fishes are to be sourced (imported) from populations demonstrated to be free of gourami iridoviruses and related viruses. The iridoviruses of concern for Australia is a category of viruses called megatocytiviruses. All various strains and isolates of infectious spleen and kidney necrosis-like viruses (ISKNV) fall under the megatocytiviruses genus. ISKNV-like viruses can affect cichlids, gouramis and poeciliids.

AVA has conducted surveillance on ISKNV in 2009/2010 and there have been several positive cases detected in gourami (*Trichogaster & Colisa*), including one case in platys.

Clinical signs of ISKNV infection in gouramis are usually non-specific and include:

- Darkened or pale body
- Frayed fins/ tail rot
- Reddening
- Distended abdomen (due to enlarged spleen and kidney)
- Lethargy

Iridoviruses are contagious and there is currently no known cure for infected fish. Fishes that survive the infection might serve as carriers of the virus even though they look normal and healthy, and can affect other newly introduced fish. The key point is to prevent introduction and spread of iridovirus into Singapore farms. This would involve good farming practice like sourcing from reliable sources and implementing good biosecurity measures.

Exporters should also inform AVA if there is a suspected disease problem or cases of high mortality. This not only helps in early detection of diseases but also allows AVA to work with the industry promptly to find out the causative agent and resolve the issue.

Some helpful sites on iridovirus:

- An article on iridovirus in gouramis from University of Florida IFAS extension: http://edis.ifas.ufl.edu/fa035

- Biosecurity Australia's Provisional final import risk analysis report on gourami iridovirus and related viruses: http://www.ofish.org/files/files/iridovirusses-australia.pdf

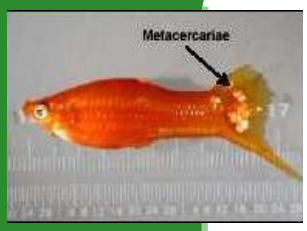
"Iridoviruses are contagious and there is currently no known cure for infected fish."

Three-spot Gourami (Trichogaster trichopterus)
Source: Qian Hu Fish Farm

Diagnosis, Control and Management of Digenean Trematode Infection

Botulus microporus, a giant digenean parasite from the intestine of a lancetfish.
Source: http://www.websters-online-dictionary.org/definitions/

One of the commonly observed parasites in fish in Singapore is the digenean trematode, also known as fluke infection, metacercarial infection, black spot, white grub, yellow grub. Different species of the digenean trematode affect a wide range of hosts including fish, snail and land vertebrate such as birds, human and livestock. The fish may be the final host for the adult trematode or it may be an intermediate host, which the parasite undergoes a developmental stage such as the larval stage and awaits the final host for completion of the life cycle.



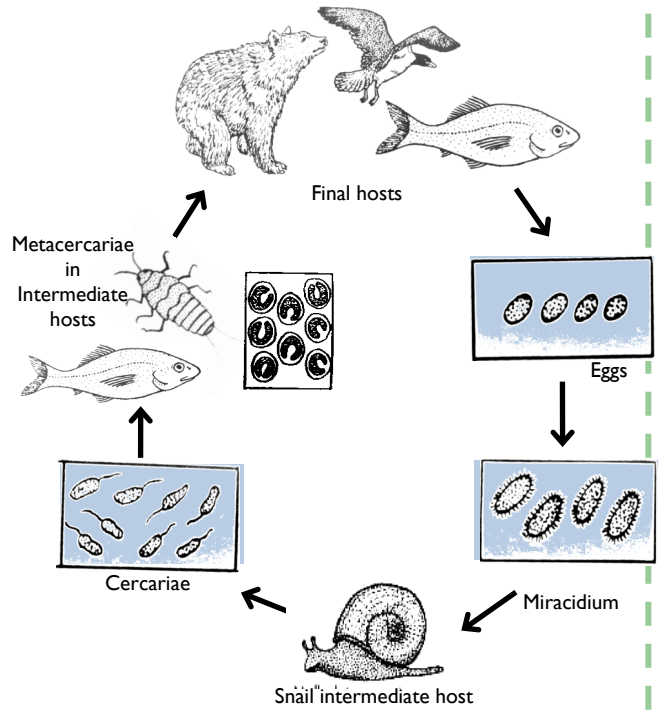
Digenean metacercariaeen cysted on swordtail fin and skin.

Source: Common Freshwater Fish Parasites Pictorial Guide: Digenean Trematodes (FA112), by Deborah B. Pouder, Eric W. Curtis, and Roy P.E. Yanong, published July 2005. (pdf, html). (http://thegab.org/Illness-and-Treatment/common-freshwater-fish-

"The life cycle of the digenean trematode is complex and involves more than one host for the completion of the life cycle."

Life Cycle

The life cycle of the digenean trematode is complex and involves more than one host for the completion of the life cycle. The adult digenean trematode produces eggs which would be shed by the host in the feces or saliva. The eggs then hatch in the water into a miracidium. The miracidium is a free swimming stage which would penetrate a mollusc intermediate host, usually a snail. The parasite will then undergo various developmental stages within the snail and emerge as cercaria. The cercaria would penetrate another intermediate host, which can be a fish or an invertebrate, and encyst in host's target organ as a metacercariae. When the intermediate host is eaten by the final host e.g. fish, birds etc, the metacercariae will differentiate into an adult.



Life cycle of digenean trematode (modified from Noga, E.J)

Clinical disease and zoonosis

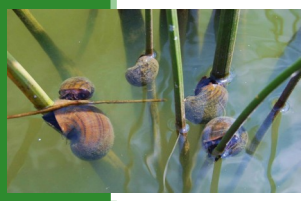
Adult digenean trematode mostly inhabits the gastrointestinal tract but can affect other organs as well. Most does not cause much problem except for those that live in the blood or circulatory system. The migrating cercariae stage may cause inflammation, hemorrhage and necrosis along the migration path.

Metacercariae infection is much more common, where they can be found in almost any tissue including the gills, eye, muscle, skin. It usually does not cause severe health problems or high mortality except in situations of very high burden and depending on the organs affected. For example, high levels of metacercariae encysting the brain would cause neurological signs affecting their swimming; respiratory distress if it were in the gills; or blindness resulting in starvation if it were the eyes. In a less imminent situation, heavy burden of metacercariae can cause low grade mortality, decrease growth rate and decrease value due to aesthetic reasons.

Some species of digenean trematode may also affect humans via consumption of metacercariae in fish that are not well cooked.

Apple snails– a possible intermediate host

Source=http://www.forestryimages.org/browse/detail.cfm?imgnum=5389860



Diagnosis

The parasites may be identified via wet mounts of gills, organ squash preparation or parasite gently removed from the skin with a scalpel blade. For internal organs, the parasites may be observed via tissue sections on histopathology examination. Identifying the species of metacercariae is often not possible; nevertheless, the management of all metacercariae is the same.

Treatment and control

The best strategy for controlling digenean trematode infection in the farm is to break the life cycle by controlling the intermediate host - snails. Do note that molluscicides may be toxic to fish. Cop-

per sulphate is tolerated by most fish but its toxic levels may be affected by acidic and soft water. Hence these chemicals have to be used with care. Other method of control includes control of weeds, grass and aquatic plants. Other strategies to break the life cycle include keeping the bird hosts out of the production system.

Heavy burden of encysted metacercariae in the gills observed on wet mount microscopic examination
Source: AVA

For treatment of the digenean trematode infection in the fish, Praziquantel is effective for treatment to eliminate some metacercariae via medicated feed or bath treatment. However, the drug is rather expensive for routine use as it might take months for the reduction of parasite burden becomes evident.

"The best strategy for controlling digenean trematode infection in the farm is to break the life cycle by controlling the intermediate host - snails."

Drug	Dose	Frequency	Comments
Niclosamide (Bayluscide)	According to manufacturer's recommendation.		Recommended dose may be toxic to fish. Use with care.
Copper suphate	0.2 – 5 ppm	Prolonged immersion	Near to lethal level to fish Alkalinity must be >200ppm. Better to treat at night when snail is more active.
	Aqueous solution (unchelated copper) of 589g per 10m length, 2m width around pond		Not recommended for small ponds <3ha
Praziquantel HCl (by prescription only)	50 – 330 mg/kg body weight	Once a day for 7 days	In feed medication
	1ppm	Prolonged immersion	Bath treatment
	2-10ppm	24h immer-sion	
	10 ppm	1h	

References:
1. Noga, E. J., (2010). Fish Disease: Diagnosis and Treatment . 2nd Edition. Iowa: Wiley-Blackwell.
2. Paperna, I. (1995). Digenea (Phylum Platyhelminthes). In: P. T. K. Woo, ed. Fish Diseases and Disorders Volume 1 Protozoan and Metazoan Infections. Cambridge: Cab International, pp. 329-389.

Further Two-Year Transitional Period For European EUS Legislation

-John Dawes

Friday, 31 December, 2010, should have been a key date for exporters and importers of certain freshwater ornamental fishes. It was the day on which a process which began with the publication of European Commission Directive 2006/88/EC on 24 October, 2006, should have finally been wrapped up. Had this happened, then a host of ornamental fish species would have been subjected – as from 1 January, 2011 – to a new two-year disease-free pre-export requirement, as is currently in force for koi herpesvirus disease (KHVD) and spring viraemia of carp

All barbs, including favourites such as the longfin rosy barb (Puntius conchonius), would have had to meet a two-year EUS-free requirement as from 1 January, 2011, but this has now been delayed, at least, until 1 January, 2013.

Photo: John Dawes

The whole Trichogaster genus (this is the golden form of T. trichopterus) featured in the original EC list.

Photo: John Dawes

"The disease in question, epizootic ulcerative syndrome (EUS) – also referred to as red-spot disease – is a serious fish infection which can cause mortalities above 50% ."

(SVC).

The disease in question, epizootic ulcerative syndrome (EUS) – also referred to as red-spot disease – is a serious fish infection which can cause mortalities above 50% (OIE Manual 2010). There are currently no effective courses of treatment or vaccination against the disease, although immuno-stimulation procedures via intraperitoneal injections may offer some hope in the future – but not, of course, in the case of small specimens or species which cannot effectively be subjected to such intervention.

However, despite the gravity of the disease, and despite ongoing discussions involving all interested parties, 31 December, 2010 and 1 January, 2011 will come and go without the proposed controls being implemented. The reasons for this are embodied within a draft regulation of the European Commission (approved in November, 2010) which puts the 2006 requirement on hold until 31 December, 2012/1 January, 2013.

The fact is that, even before Council Directive 2006/88/EC was published a little over four years ago, doubts had been raised regarding the proposed list of EUS-susceptible fish to be included in the legislation, since it consisted of complete genera, rather than known EUS-susceptible species, i.e. *Catla, Channa, Labeo, Mastacembelus, Mugil, Puntius* and *Trichogaster*.

Questions were raised as to why, for example, *Puntius* should be listed en bloc when, according to the World Organisation for Animal Health (OIE), only *P. gonionotus* (silver barb) and *P. sophore* (pool barb) have been shown to be susceptible to EUS. The same goes for *Trichogaster*, where only *T. pectoralis* (snakeskin gourami) and *T. trichopterus* (three-spot gourami) feature on the OIE list… or *Labeo*, with only *L. cylindricus* (red-eye labeo), *L. lunatus* (upper Zambezi labeo) and *L. rohita* (rohu) being listed… or *Channa* where only *C. striatus* (striped snakehead) appears on the list… or *Mastacembelus*, where no species of this genus are included by the OIE. Interestingly, the OIE lists *Colisa lalia* (dwarf gourami), but neither this species, nor its genus, is included in the Directive.

Should the original list have been enforced, the difficulties it would have caused for exporting countries would have been extremely serious (see also Notes at the end of this article). It would, for example, have resulted in the effective banning of exports to Europe of all 110 or so species of *Puntius* barbs, including the huge-selling all-time favourite tiger barb (*P. tetrazona*) in all its varieties, as well as all four *Triochogaster gouramis*… also excellent sellers on the world market, the 66 species of *Mastacembelus* spiny eels, and the approximately 105 species of *Labeo*, for at least two years. Not all species of barb, spiny eel or labeo are in trade, of course, but many are, so at the very least, the negative consequences for trade would have been very considerable.

These fundamental differences between the OIE and the EC lists have been at the centre of the debate that has persistently dogged discussions from the very outset. Encouragingly for all parties concerned, the EC enacted a two-year moratorium in 2008, which has allowed trade to continue on a temporary basis. This moratorium, extension, or transitional period was due to expire (as mentioned earlier) on 31 December, 2010.

Despite the repeated delays, the EC still felt, as late as September/ October, that it would still be possible to meet this deadline. However, although some progress had been made regarding the species list, new complications arose several months ago with the introduction of koi and goldfish to the proposed EC EUS-susceptible list. This was seen as a major challenge, since, had the proposal gone ahead, exports of both koi and goldfish to Europe would have to be subjected to an EUS two-year disease-free requirement, effectively stopping all exports as from 1 January, 2011, and until, at least, 1 January, 2013.

Following further discussions, the EC decided to postpone the implementation of the Directive yet again with the publication of a Draft Commission Regulation which now extends the transitional period

The late introduction of goldfish and koi into the EC list created a potentially difficult situation which the latest two-year extension has eased… at least for the moment.

Photo: John Dawes

Kois

Source: AVA

(moratorium) for two further years, i.e. until 31 December, 2012. Consequently, "Member States may authorise the import (*into Europe*) of ornamental aquatic animals of species susceptible to epizootic ulcerative syndrome (EUS) intended solely for closed ornamental facilities from third countries or territories that are Members of the World Organisation for Animal Health (*OIE*)."

This move is seen as sensible by the ornamental aquatic sector, not just because of the existing discrepancies between the EC and OIE lists, but also because mistakes have been made (more than once) in the past where the introduction of not-fully-prepared legislation has resulted in unreasonable and un-implementable measures.

In addition, paragraph (5) of the Draft Regulation relating to *EC Regulation 1251/2008*, i.e. the Regulation that implemented *EC Directive 2006/88/EC*, highlighted the need for further research "to assess more precisely the risks associated with the import into the Union of such ornamental aquatic animals." This same paragraph goes on to stress that, in order not to disrupt current trade, "it is appropriate to prolong until 31 December, 2012 the period of application of the transitional measures currently laid down in Article 20 (5) and (6) of Regulation (EC) No. 1252/2008."

So…for the moment…and for a two further years, the two-year EUS-free requirement will not be applicable and trade can continue as up to this moment. However, it is relevant to stress that EUS is a notifiable disease. Therefore, outbreaks are required, by law, to be reported to the relevant authorities who are then bound (again, by law) to destroy all affected stocks, with no agreements currently in place, either on a pan-European or international basis, for compensation to the affected facilities.

Notes:

• **Singapore has had an EUS surveillance programme in place since November 2007. This, added to the certificate conditions implemented in July 2010 requiring EUS-susceptible imported fish to originate from a compartment (country, zone, area or aquaculture establishment) that has been subjected to an official fish health surveillance system equivalent to the relevant OIE standard and recognised by the Competent Authority of the country as being free from EUS, means that Singapore is already well placed to begin certifying fish with regard to this disease, should the EU so require it.**

• All the documents mentioned in this article are openly available on the web**:**

-Council Directive 2006/88/EC of 24 October, 2006 on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals.

-Commission Regulation (EC) No. 1251/2008 of 12 December 2008 implementing Council Directive 2006/88/EC as regards conditions and certification requirements for the placing on the market and the import into the Community of aquaculture animals and products thereof and laying down a list of vector species.

-(SANCO/7102/2010/(P00L/D1/2010/7102-EN.doc) Draft Commission Regulation amending Regulation (EC) No. 1251/2008

"Singapore has had an EUS surveillance programme in place since November 2007."

as regards the period of application of the transitional provisions for certain ornamental aquatic animals intended for closed ornamental facilities.

-Manual of Diagnostic Tests for Animals 2010 (www.oie.int/eng/normes/fmanual/A_summry.htm?e1d11).

AVA inspector at ornamental fish export premises during surveillance inspection

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