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Final Pack and Getting it to the Customer

SRI LANKA
EXPORT DEVELOPMENT
BOARD

National Aquaculture Development Authority of Sri Lanka
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THE SHIPPING PROCESS

Shipping Process

- We have reviewed a number of key factors involved in successful transport of fish
- These need to be incorporated in a protocol to be successful
- The key steps are:
  1. Sourcing quality fish
  2. Conditioning fish
  3. Pre-packing
  4. Final packing

Conditioning Fish for Transport

- This has been covered in Quarantine Section but will be revised here again
- Conditioning of fish for transport is very important in reducing losses.
- In most cases harvested ornamental fish are brought in from ponds and placed into a holding facility, where they are often held for several days prior to shipping
- Conditioning consist of the following 3 steps:
  - Prophylactic Treatment
  - Starvation / purging
  - Pre-packing

Packing Water

- Having good packing water is vital to successful shipping of fish
- Should be a known and stable environment that reduces harmful toxic metabolic products
  - Carbon dioxide
  - Ammonia
  - Faeces, mucous etc

- Many operators also have “secret formulas" of various salts that are added to the transport water. In general, the addition of salts assist fish in maintaining their osmotic balance and may aid in preventing infection from injuries incurred during transit.
- Careful preparation and quality control will help in reducing problems
- formulas for packing

Packing Water – Salt and Chemicals

- Salt (Sodium chloride) has long been used for packing fish
- It acts as a disinfecting agent
- Also helps fish to cope with stress and osmoregulation (maintain water/salt balance)
- Generally used at 0.1 to 3 ppt or grams per litre
- Various other 'salts added

Packing Water - Antibioitcs

- Should avoid using Antibiotics in transport water
- Our industry is being heavily criticised over this
- Lead to antibiotic resistance – zoonosis and could spread to humans
- If you have to use an antibiotic there is a problem with the fish
- If you do use Antibiotics what bacteria are you trying to prevent/kill?
  - They don't kill all bacteria so it doesn't guarantee you will not get bacterial problems
- Common used:
  - Tetracycline 7 – 12ppm
  - Doxycycline ½ teaspoon in 200 litres

Packing Water - Ammonia Remover

- Zeolite has traditionally been used at the rate of 20 grams per litre of packing water (around 1 tablespoon)
- Activated carbon also added at same rate but does not remove ammonia – is good for absorbing cloudiness
- Amquel or similar ammonia binding products used 1 to 3 grams per litre of packing water

Packing Water - PVP

- PVP (Poly Vinyl Propanol) is basically man-made Aloe Vera
- PVP can be added to water to help prevent / reduce damage to skin and gills
- Acts as a bandaid and covers any injuries to skin and prevents infection as well as reducing inflammation
- Use at xx per litre of packing water
- Alternative is Indian Almond leaf

Packing Water - Anaesthetics

- Always use with caution… if not used properly can kill fish

- Remember dissolved CO2 from fish with have a narcotic affect on fish as well
  - MS222 – 20 – 50mg/L
  - Benzocaine 20 mg/L
  - Phenoxyethanol 2 ml per litre
  - Clove oil / Euegenol – narrow safety margin and difficult to get a set dose
    - Can use Aqui-S which is better
  - Phenoxyethanol 2mls into 900 ml of water into fish bag

- Large fish may be better anesthetised prior to catching and bagging

Packing Water - Anaesthetics

- Not as popular as used to be:
  - Costs
  - Action of anaesthetics vary depending on water quality, species and size of fish - this means it is complicated to use
  - Incorrect dose or use can easily result in an overdose and increased shipment mortality

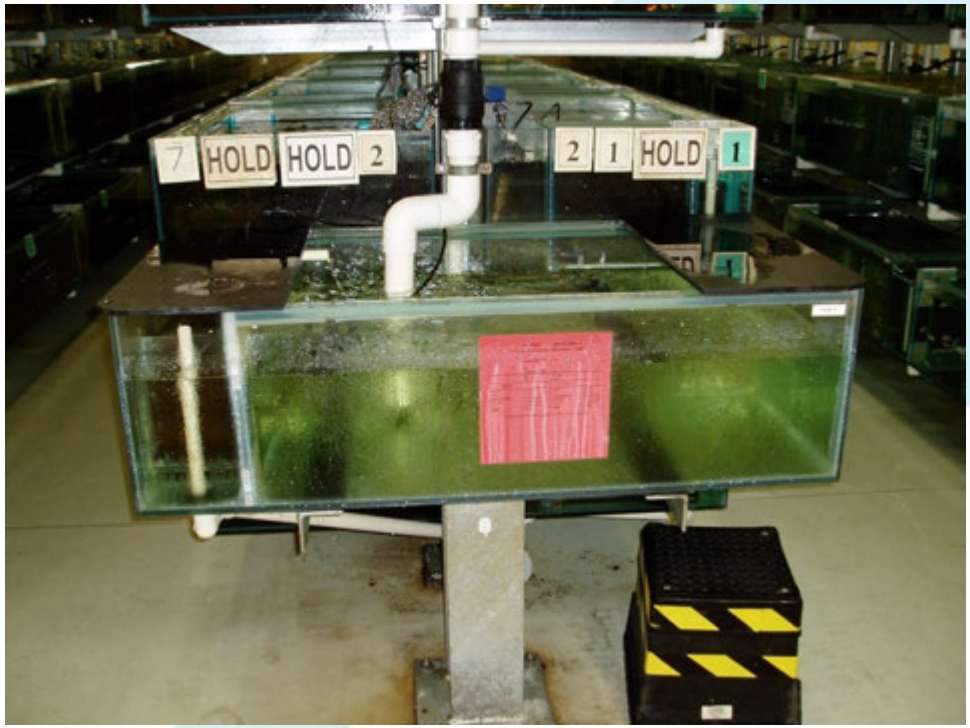
Water Quality for Packing Fish

Fish Type	pH	GH in ppm	KH	TDS / conductivity	Temp
Goldfish and Coldwater species	7.0 – 7.5	150	60	1000 - 1400 μs	15-18^{O}C (59 – 65 ^{O}F)
Miscellaneous species	6.9 – 7.2	80	60	1000 - 1400 μs	22 – 23^{O}C (71 – 73 ^{O}F)
Tetras and Discus	6.5 – 7.0	50 - 100	40	800 – 1,000	24 -26^{O}C (75 – 79^{O}F)
Livebearers, Brackish and Rift Lake Cichlids	7.0 – 7.5	250 - 300	120	Approximately 2400 µs	22 – 23^{O}C (71 – 73 ^{O}F)

Packing Water - Bacteristatics

- Not an antibiotic but will slow/prevent bacterial growth
- Acrflavine 5 to 10 ppm
- Methylene Blue 1 to 3 ppm

- Both also have advantage that they darken the water which helps reduce stress



Packing Water - Buffers

- Due to dissolved Carbon Dioxide from fish pH of bag water will drop
- pH can go as low as 5.0
- Massive stress on fish, particularly when unbagging on receiving side
- Maintaining alkalinity of water can help but buffers will hold pH more stable
- However, need to allow for some drop in pH to reduce toxicity of ammonia
- Several commercial buffers have been used e.g. ‘Tris Buffer’

Packing Water Recipes

- The following slides are packing water recipes I have worked with
- Based on Potable water source with a pH of around 7.0, GH 100, KH 80ppm
- The recipes may need to be modified depending on the source water – you need to experiment and develop your own formula

Buffer Recipes

- Buffer for pH 6.6
  - 500grams Disodium phosphate anhydrous
  - 800grams Mono sodium phosphate
- Buffer for pH 7.0
  - 500 grams Disodium phosphate anhydrous
  - 300 grams Mono Sodium phosphate
  - ½ teaspoon Methylene blue
- Buffer for 7.2
  - 500 grams Disodium phosphate anhydrous
  - 280 grams Mono Sodium phosphate
- Buffer for 7.5
  - 500gm Disodium phosphate anhydrous
  - 250 grams Mono sodium phosphate

Packing Water – Livebearer / Brackish Water

- Suitable for Livebearers, most brackishwater species, African Rift lank Cichlids
- Target Parameters:
- pH 7.2-7.5
- Conductivity 2200-2800µs
- GH 300ppm
- KH 120ppm
- For 200 litres:
  - ½ cup coarse salt
  - 1 cup Epsom salts
  - Bicarb soda 3 tablespoons
  - Chlormon ½ cup or 200 gram Amquel (1 gram powder per litre)
  - 2 Tablespoons pH 7.5 Buffer

Packing Water – Neutral

- Suitable for most Barbs, Gourmais, Catfish, Rasboras – species that do most under neutral conditions
- Target Parameters:
- pH 6.9-7.2
- Conductivity 1000-1400µs
- GH 150ppm
- KH 60ppm
- For 200 litres:
  - ¼ cup coarse salt
  - 4 tablespoons Epsom salts
  - Bicarb soda 3 teaspoons
  - Chlormon ½ cup or 200 gram Amquel (1 gram powder per litre)
  - 2 Tablespoons pH 7.0 Buffer

Packing Water – Soft Acid

- Suitable for Discus, Tetras
- Target Parameters:
- pH 6.5-6.7
- Conductivity 1000-1400µs
- GH 80ppm
- KH 30ppm
- For 200 litres:
  - 3 tablespoons coarse salt
  - 2 tablespoons Epsom salts
  - Bicarb soda 1 teaspoons
  - Chlormon ½ cup or 200 gram Amquel (1 gram powder per litre)
  - Peat Extract 1/8 cup
  - 2 Tablespoons pH 6.6 buffer

Packing Water – Coldwater

- Suitable for Goldfish and Koi
- Target Parameters:
- pH 7.0 – 7.5
- Conductivity 1000-1400µs
- GH 150ppm
- KH 60ppm
- For 200 litres:
  - ¼ cup coarse salt
  - ¼ cup Epsom salts
  - Bicarb soda 3 teaspoons
  - Chlormon ½ cup or 200 gram Amquel (1 gram powder per litre)
  - 2 Tablespoons of pH 7.2 Buffer

Pre-Packing

- Once fish are sufficiently purged they can be caught and pre-packed into bags
- Important stage that Acclimates fish to packing conditions
- Allows ‘weak’ or stressed fish to be identified and removed from consignments
- Allows a final quality check before packing
- Count into bag lots and prepare shipment
  - Good time to check numbers of fish etc
  - Is everything ordered available to go?
  - Prepare packing documents etc with correct numbers of fish

- **Packed with prepared packing water**

Pre-Packing

- Pre-packed bags of fish must be kept in a cool dark area to acclimate
- Ideally cool down in an air-conditioned room to desired temperature
- Bags of fish normally put into coolroom and chilled to 22-23^{O}C (72 – 74^{O}F) for Tropicals and 15-18^{O}C (59 – 65^{O}F) for coldwater species to acclimate them to packing conditions – minimum of 4 to 6 hours (many do this overnight)

Pre-Packing

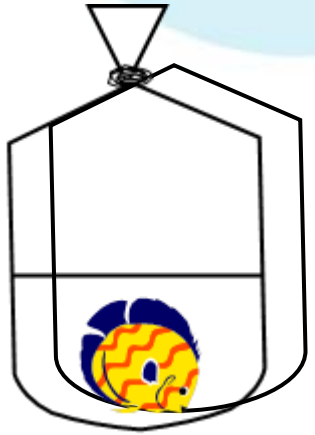
Final Pack

- Once the fish have finished the pre-packing process they are ready for final packing
- Fish that show signs of sickness or stress should not be shipped
- Remember if it looks suspect at your facility – it will only get worse during transport

Final Pack

- Ensure you pack with the correct amount of water
  - Not enough = problems
  - Too much = higher landed cost

- Pack the fish in boxes
  - Ensure they are properly marked – many exporters list the contents of box on outside for easy reference
  - Don't squash the boxes in too tight – bags expand during the flight and if too tightly packed may burst or leak
  - Ensure the box is full



- Bags can be put in standing up or laying down
  - Laying down gives better surface area for gas exchange

Final Pack

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GETTING IT TO THE CUSTOMER

Transporting and Transferring

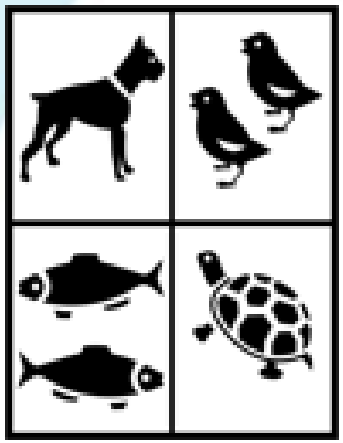
- The air transport of ornamental fish is governed worldwide by the International Air Transport Association (IATA).
- Fish to be transported by air must be packed to IATA standards, and meet packaging requirements of the airline to be used
- Generally requires compliance with the standards associated with acceptable type and total weight of the expanded polystyrene (EPS) box, types of plastic bags and method of tying.

Labelling Requirements

- Labelling must also meet IATA and airline requirements, and the following must be included on each box:
  - Consignment note must be filled out legibly
  - ‘This end up’ stickers
  - Boxes must be marked as ‘Live Fish’
  - ‘Handle with Care’ stickers
  - Customer contact details
  - Number of boxes in consignment
- Similar labelling is required for road transport.

Paperwork and Documents

- Always consult with the receiver as to what paperwork they require – if you are not sure ask for examples to be sent
  - **A shipment can be destroyed or sent back if the paperwork is not correct**
- Airway bill
- HEALTH CERTIFICATE- you may need to be registered by your veterinary authority to organise this
  - If these are required contact your veterinarian authority in plenty of time to organise this
- Fish may also have to be inspected prior to packing to get this



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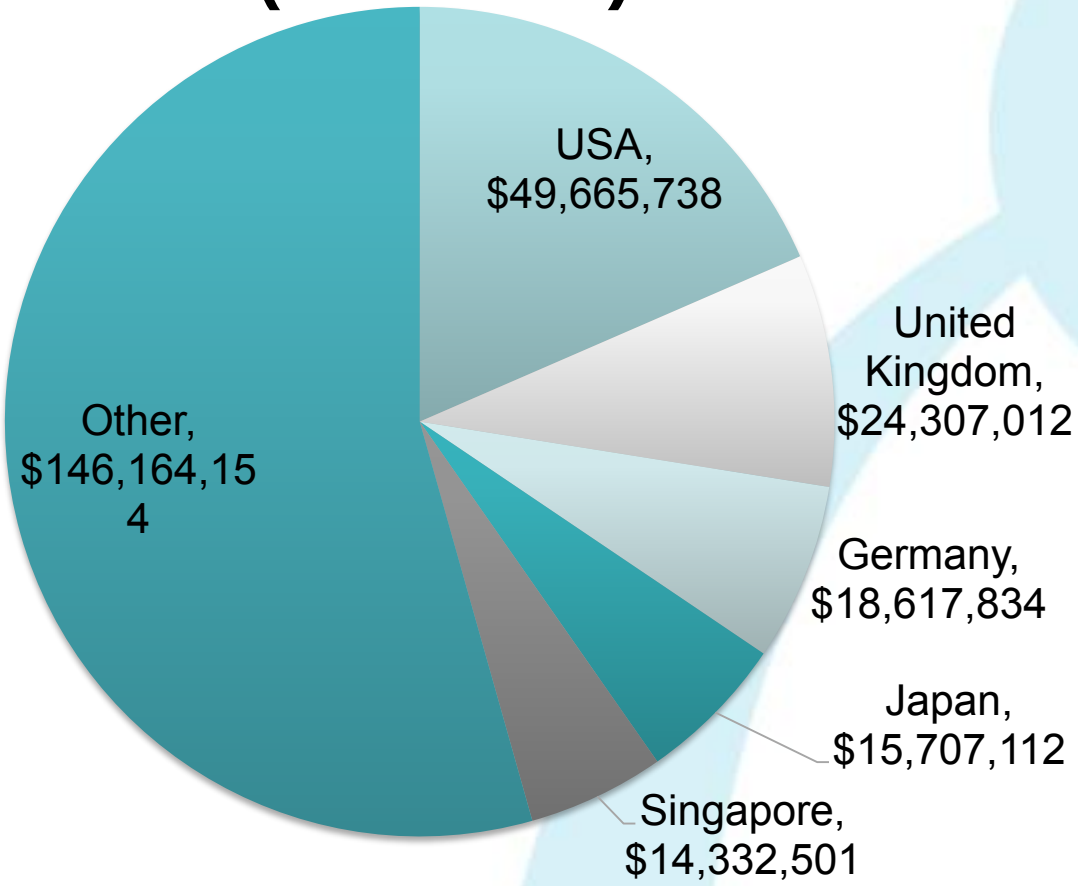
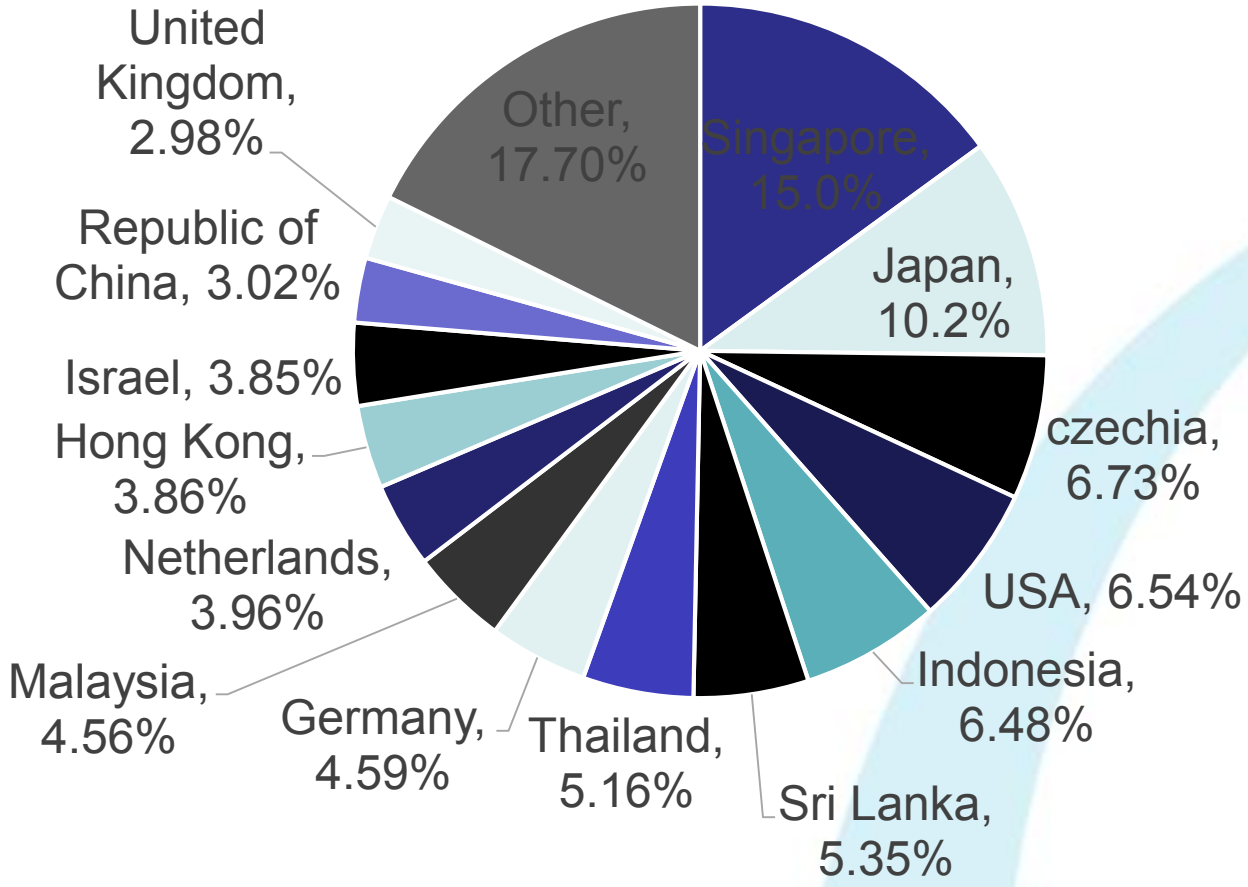
MARKET

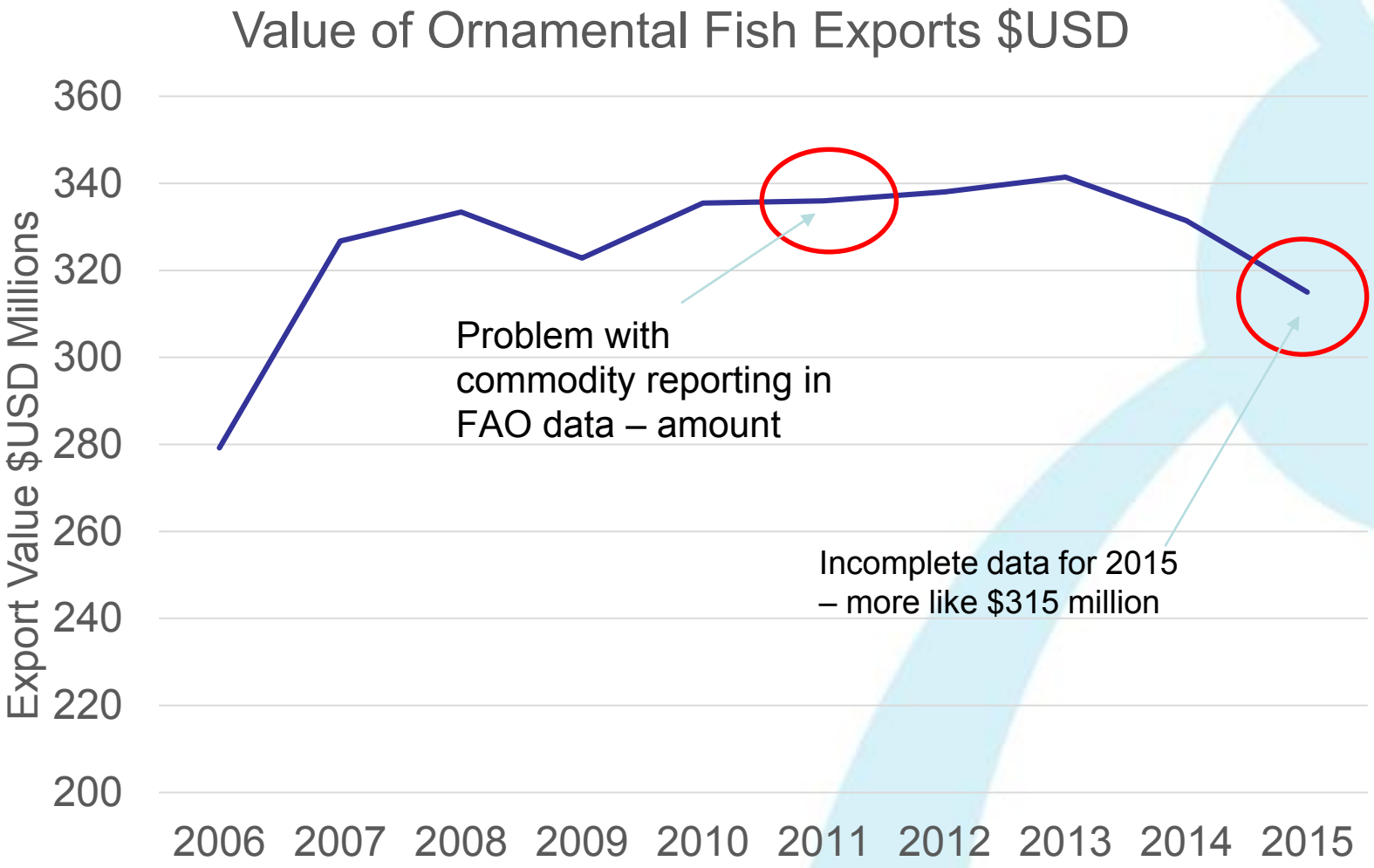
Value of Imports in USD$ for Major Importers 2015 (FAO data)



% of Total Exports of Ornamental Fish for Major Exporters for 2015

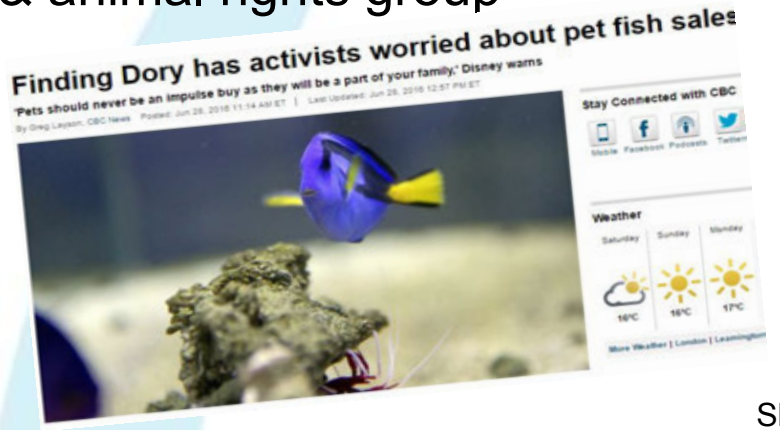


Ornamental Fish Export Trends



The Challenges

- Ornamental fish industry faces challenges from many different areas:
  - Changing retail landscape, market trends and increased competition from other hobbies and pastimes
  - Sustainability
  - Invasive species, GMO and environmental issues
  - Animal welfare
  - Biosecurity Disease, Health Status and Biosecurity
- These challenges come from government (legislation changes), also advocacy groups (environmental & animal rights group



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SUSTAINABILITY

Sustainability

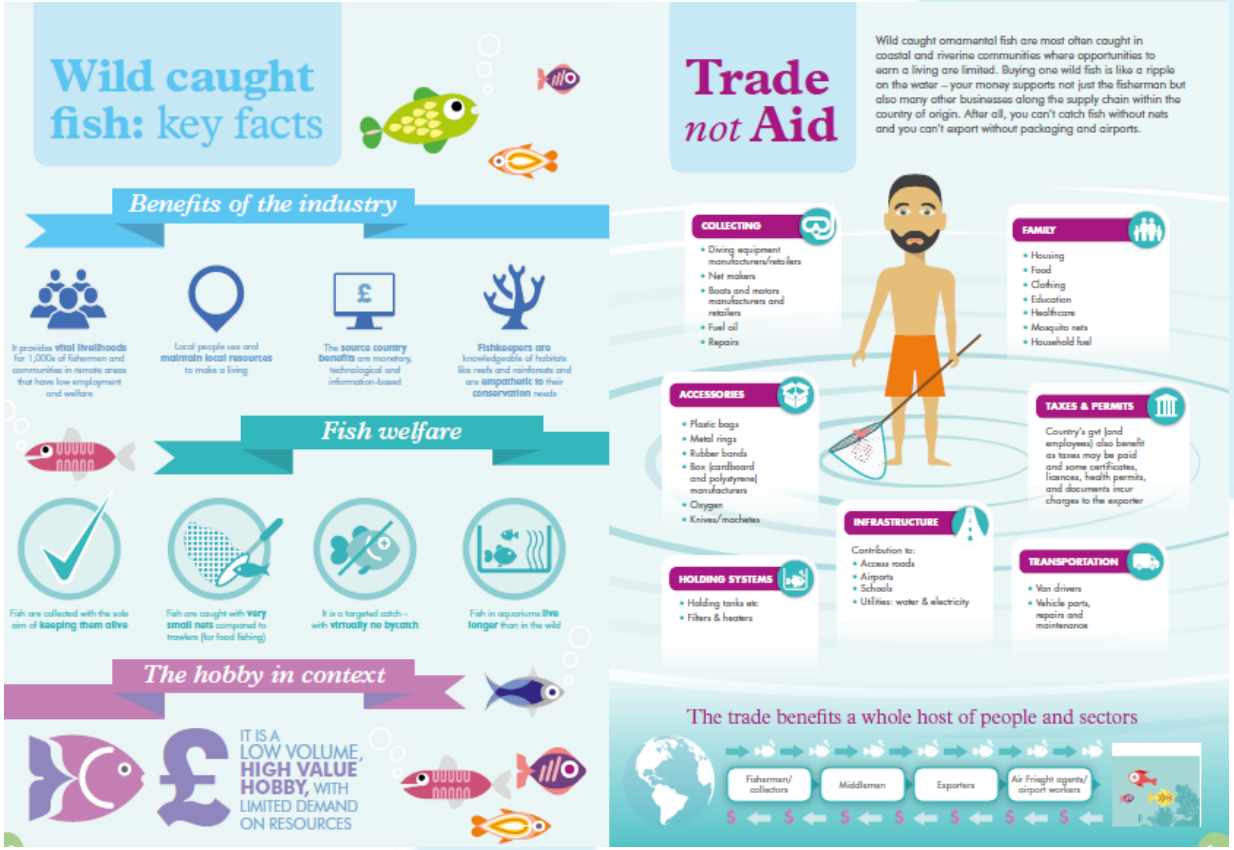
- Sustainability seems to be the buzz word in many sectors and markets around the world ……..but what does it mean and how does it apply to our industry?

- Our industry impacts the environment and consumes a variety of resources
  - Sustainable harvesting & collection
  - Farming practices (land use, water use)
  - Invasive species
  - Electricity and fossil fuels for operating and manufacturing accessories
  - Manufacturing frozen and artificial feeds (all using natural ingredients

- Air freight and plastic based packaging used for transport adds to carbon footprint

Sustainability

- Do we really harm the environment
- What are the benefits of our trade
- Do we need to improve Best Practices?



Invasive Alien Specie

- Invasive Alien Species could also affect trade in our industry.

- Invasive Alien Species (IAS) = non native species that can/could establish a breeding population and impacts the local waterways

- Some 400 species of ornamental fish could become invasive in different countries
  - Fish
  - Plants
  - invertebrates

Alien Invasive Species

- Many countries are addressing this through restricting species that can be imported
- Positive or white lists that can be imported/traded
- Noxious/banned or black lists that can't be imported/traded
  - Spain recently listed Koi Carp as noxious
- We need to be aware of this, respect local la avoid releasing fish to natural waterways
- Educate customers, hobbyists

IAS – Lionfish

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ANIMAL WELFARE

Aquatic Animal Welfare

- Animal welfare for all animals is gathering importance and means changes to how many agricultural sectors operate

- Increasing scrutiny on the welfare and sustainability of wild harvest and farming practices
  - Fish in tanks/ponds is cruel
  - We are destroying the environment
  - Types of fish kept

- Increasing pressure to legislate minimum standards for operators in our industry = increase operating costs and maybe changes to fish we can trade

FISH WELFARE FUND

Aquatic Animal Welfare

- Good operators already manage the welfare of fish, steps taken to ensure fish are healthy and present well for customers are all good welfare practices!
  - Welfare = good practice = healthy fish = more profit
  - We need to communicate this more!!!

- Industry needs to avoid questionable activities
  - painted / dyed / tattooed fish
  - Poor fish keeping
  - Respect local laws

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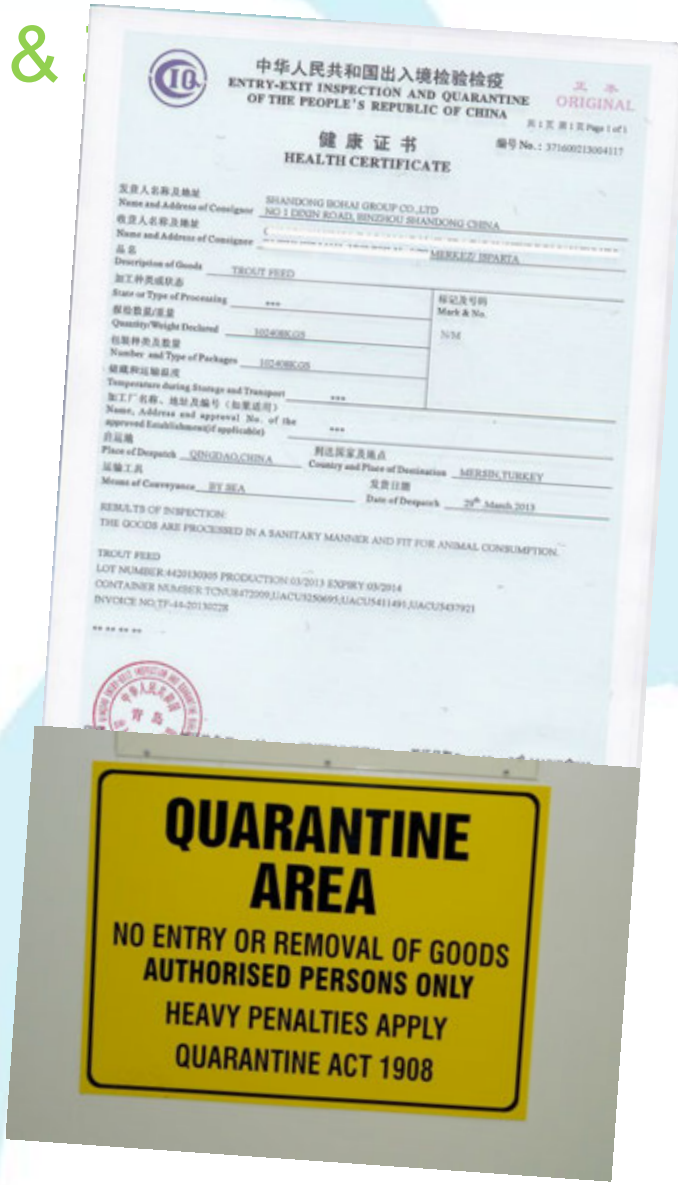
BIOSECURITY & ZOONOSES

Biosecurity, Disease Status &

- So what is biosecurity?
  - measures to prevent or control disease spread
- Animal health, restrictions to imports based on animal health risks.
- The Health Status of fish is important for export and essential for Health Certificates for export
- Regulations are becoming stricter in many countries
- International trade is likely to become more regulated / restricted due to disease transfer risks



Biosecurity – what is it?

- Biosecurity not just about fish disease
  - Increased antibiotic resistance in bacteria within our industry which can impact treatment of other animals and people
  - Also increased zoonotics particularly TB – there is anecdotal data to suggest increased incidence in many fish rooms in the industry and that some of these infection as are proving harder to treat
- Having a biosecurity plan is becoming more important for industry
  - ➢ Confidence in your product and market access!
  - ➢ Less disease and more profit

Emerging Global Risks

- Emerging global risks include:
  - Climate Change impacting climates and particularly rainfall patterns
  - Habitat Loss/land use changes impacting wild collection and farms
  - Increasing water scarcity
  - Pollution
  - Human migration
- Brexit = changes to import/export between UK and EU Affect imports of

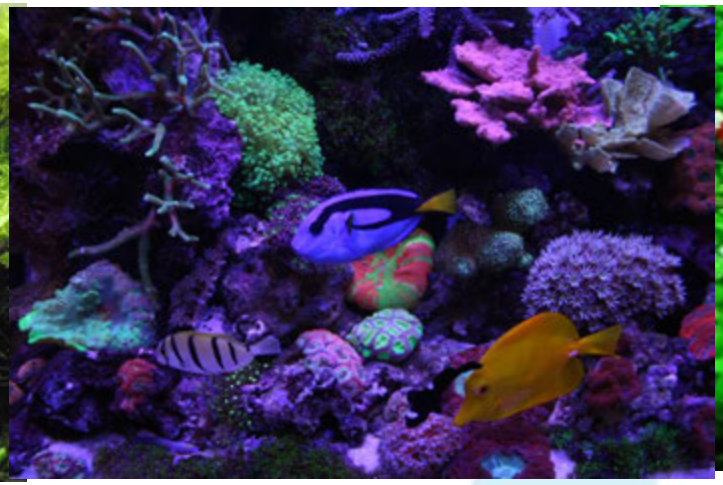
Market Trends

- Increasing importance of corporate chains in most major markets
  - Smaller more basic range of fish
  - Often lack knowledge, unable to mentor new hobbyists

- These corporate entities are very price/margin sensitive and put considerable downward pressure on pricing from suppliers which they must meet
  - Consequently this pricing flows down the supply chain
  - Everyone needs to look for more efficiencies
  - Decrease in smaller specialty stores… reduction in speciality or high end fish?

Market Trends

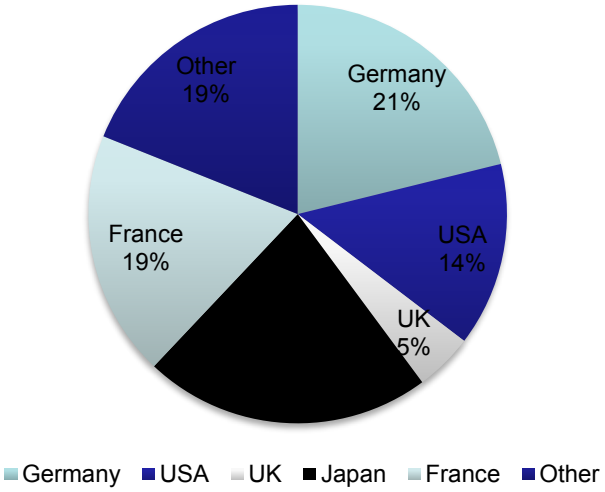
- Smaller aquarium and Nano tanks
- Smaller, less expensive species
- Aquascaping and planted tanks
- Invertebrates – shrimps
- Marines – growing importance due to cheaper, better aquarium equipment
- Less people entering the hobby?

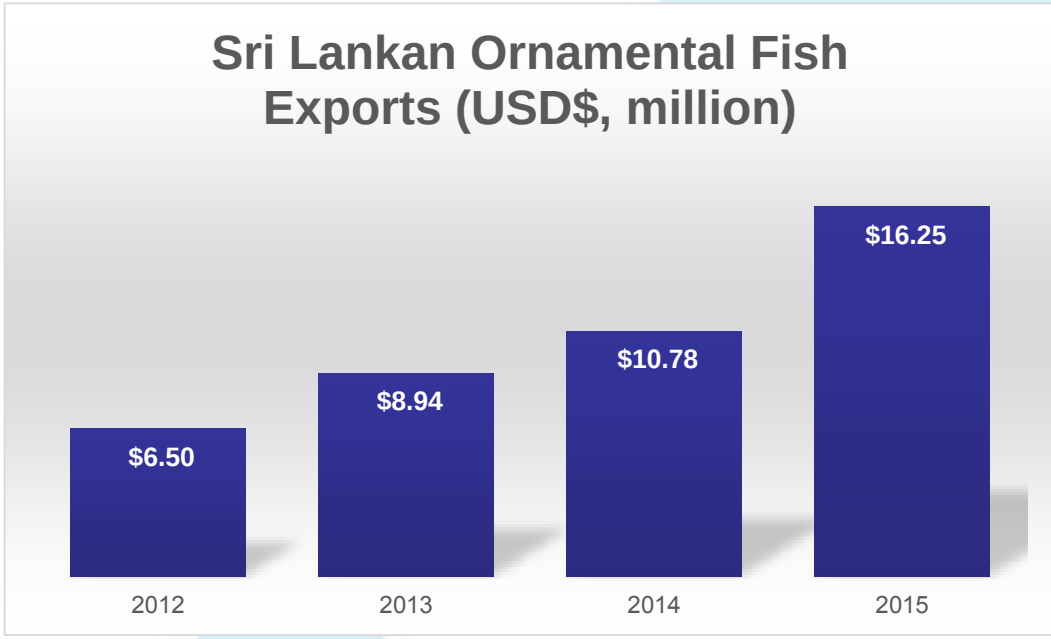


So what is happening with Sri Lanka?

- Exports are growing steadily, Marine and freshwater
- Major markets USA and EU
- Reef clean-up day a brilliant concept!

Major Export Destinations for Sri Lanka 2015 (USD$,million)





Opportunities for Sri Lanka

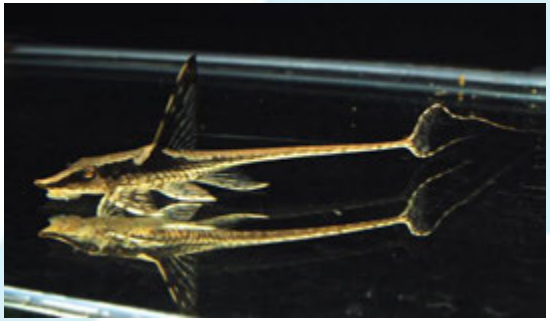
- Improve disease status of guppies
  - Still hear complaints of Skin and Gill Flukes on Guppies
  - Tetrahymena
- Expand production of other 'bread and butter' species, particularly small species
  - Tetras: Neon, Cardinal, Rummynose, Serpae
  - rasboras, barbs
  - Mollies, Platys, Swordtails – need to be cheaper to compete

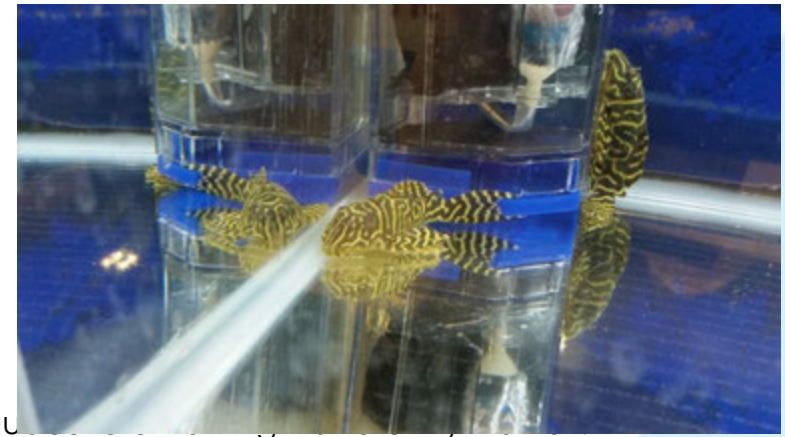
Opportunities for Sri Lanka

- Sharks
  - Redtail, Rainbow, Silver
- Clown Loach
- Discus – aim for a cheap assorted mix for chain stores

Opportunities for Sri Lanka

- Catfish
  - Mid-priced species such as Panda, Schwartzi, Sterbai and similar species
  - L-numbers – target smaller species eg Clown Pleco





Opportunities for Sri Lanka

- Problematic species (sometimes hard to source good quality)
- Oscars – mainly come from Thailand but have issue with ‘sleeping sickness’
- Goldfish – Chinese supplies becoming difficult due to disease, pollution and land use conflict
- Dwarf Gouramis – need Megalocytivirus free

Thankyou

- Questions?