National Aquaculture Development Authority of Sri Lanka
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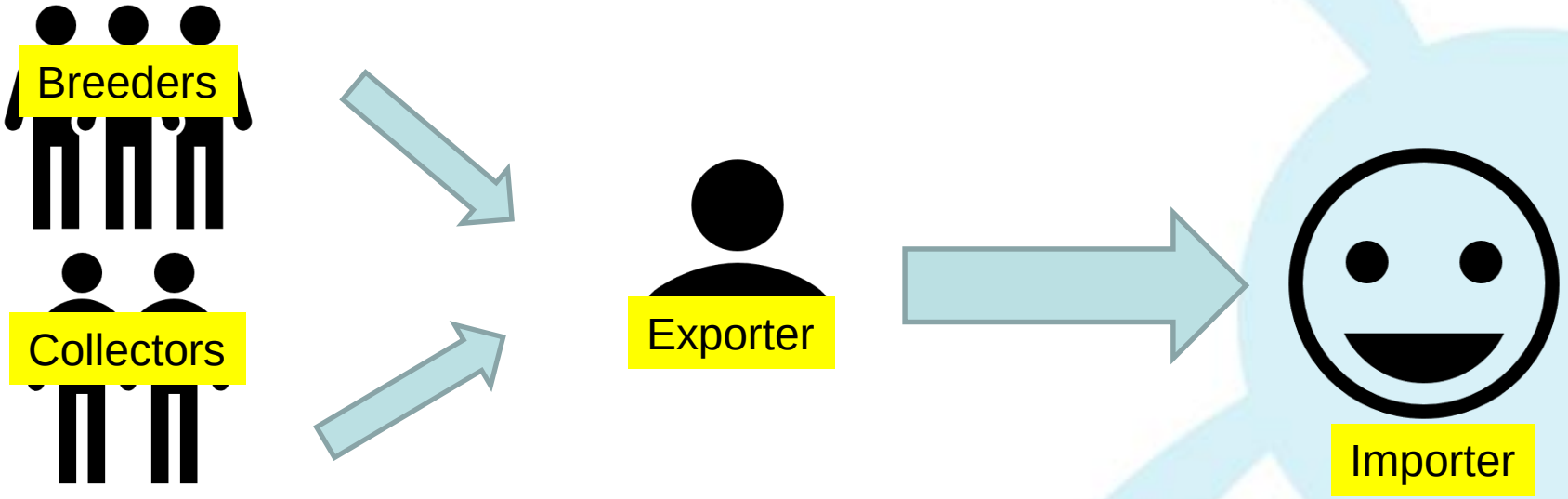
இலங்கை தேசிய நீர் உயிரினவளர்ப்பு அபிவிருத்தி அதிகார சபை

NATIONAL AQUACULTURE
TRAINING INSTITUTE

SRI LANKA
EXPORT DEVELOPMENT
BOARD

Packing Fish 1

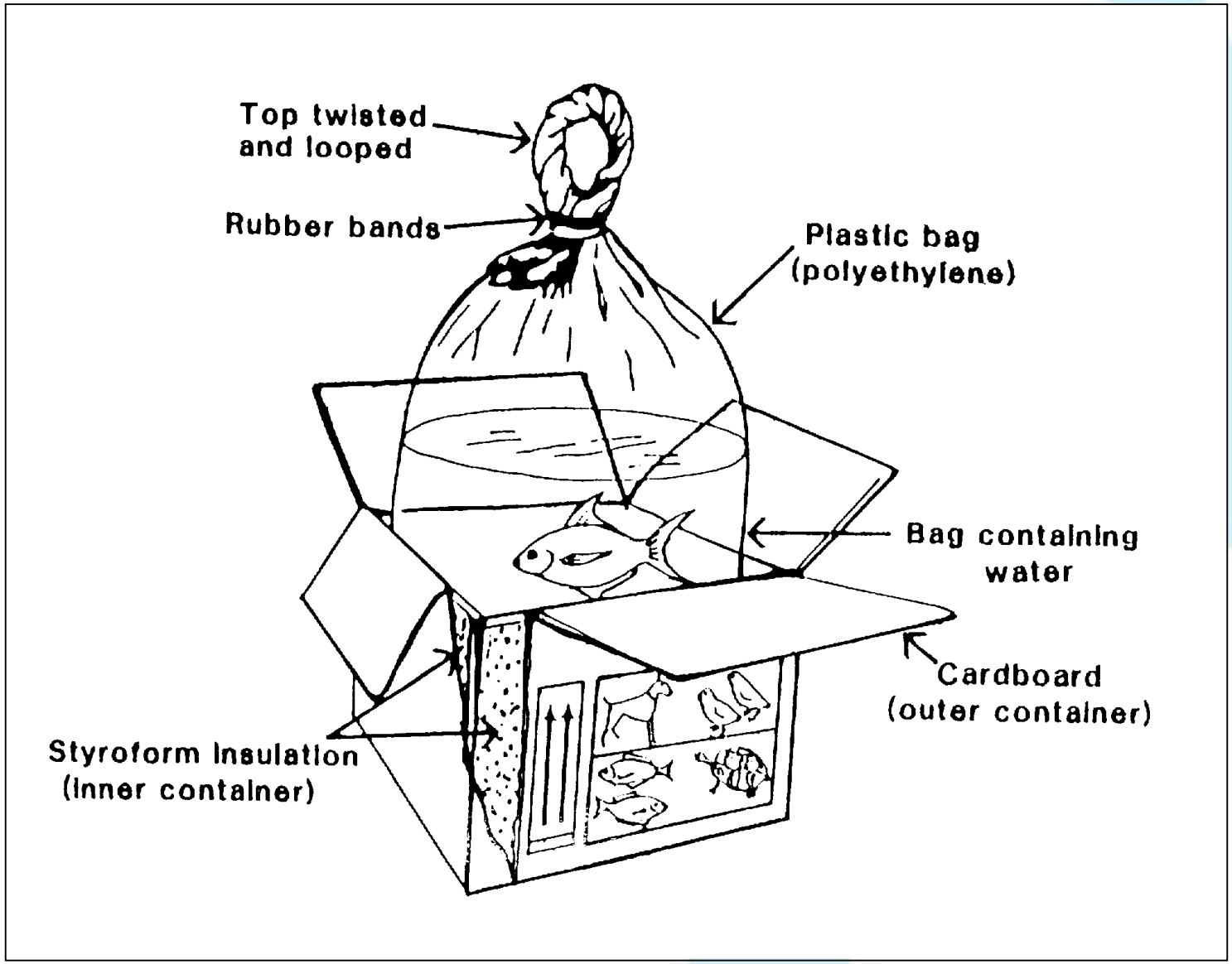
This document has been noted by the National Training Quality Council (NTQC) as meeting the quality criteria for training package support materials.



Fish has to go places

So they have to be packed

With Water and Oxygen

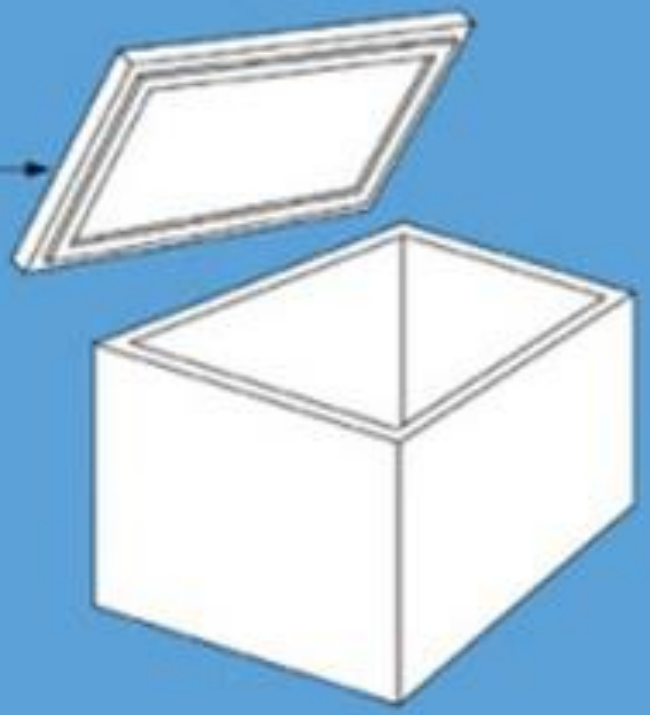

Top twisted and looped
Rubber bands
Plastic bag (polyethylene)
Bag containing water
Cardboard (outer container)
Styroform insulation (inner container)

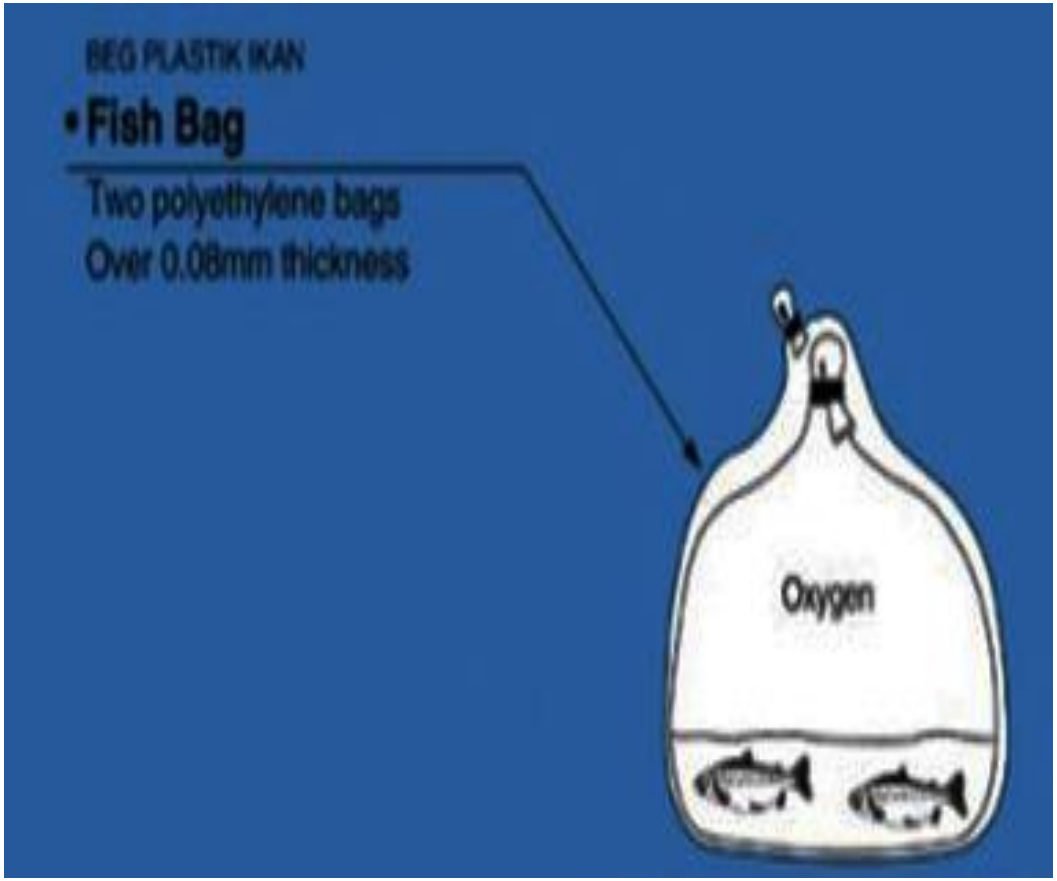
STYROFOAM BOX SPECIFICATIONS

WEIGHT	STYROFOAM DENSITY
20 KG	35 KG/M^3
30 KG	35 KG/M^3
40 KG	40 KG/M^3

KOTAK LUAR (STYROFOAM)

- **Outside container**
  Styrofoam box with thickness of over 3cm





Square Bottom Bag

- **Gummed tape**

Over 4cm in width

(Sectional picture)

Plastic Containers


LIVE FISH
GENTLY

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)

Preparation of Packing water

Filter through diatom filter

Keep well oxygenated but not supersaturated

Best not to add chemicals and medications to the bulk water

Add appropriate mixture when packing in bag

Make sure an alkalinity between 80 – 120 mg/l is maintained

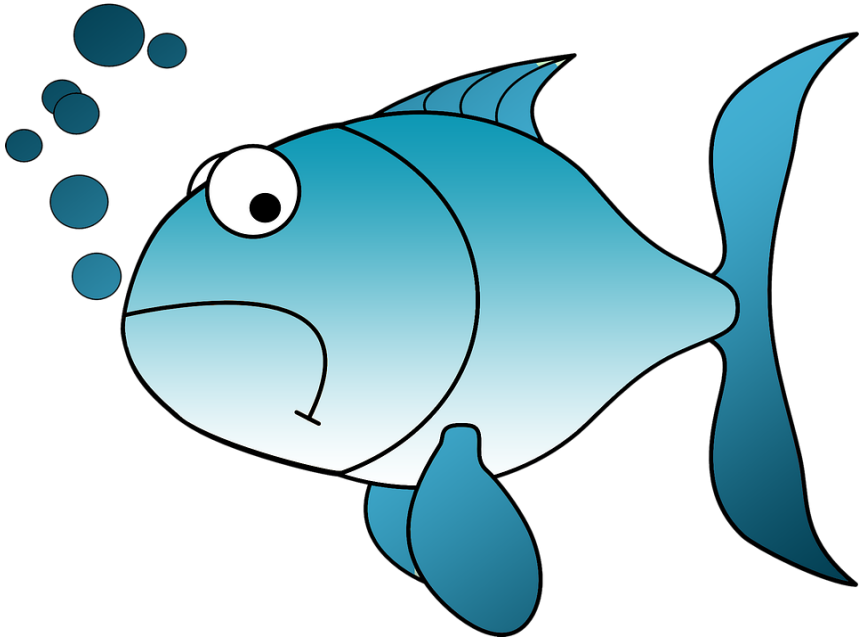
Keep temperature equal to fish holding water

If cold water is used:

Most tropical fish: 22 – 23^{O}C (71 – 73 ^{O}F)
Sensitive fish such as Discus: 24 -26^{O}C (75 – 79^{O}F)
Temperate species : 15-18^{O}C (59 – 65 ^{O}F)

Fish Length (inches)	Standard Pack (24 hrs)	Extended Pack (72 hrs)
1.5	200	150
2.0	150	100
2.5	100	75
3.0	75	50
4.0	50	35
5.0	12	20
6.0	10	15

What Happens to the Fish?



What Happens to the Water?

Stress in Fish

1st Stage

- **Elevated Heart Beat**
- **Increased Blood Pressure**
- **Increased Glucose in the blood**
- **Increased Red Blood Cells**
- **Minimizing Digestive activities**

Returns to normal when stressor is removed

2nd Stage

- **Osmotic Breakdown**
- **Overworked Kidneys**
- **Energy Drain**
- **Exhaustion**

May show inappetance and cornering

3rd Stage

- **Immune system Failure**
- **Opportunistic Bacteria take over**

Infections and Death

Stressors in Fish

- Unfavorable Environment
- Sudden Changes
- Management Activities

❑Unfavorable Environment

- pH
- Temperature
- Alkalinity
- Ammonia
- Nitrite
- Oxygen
- Salinity

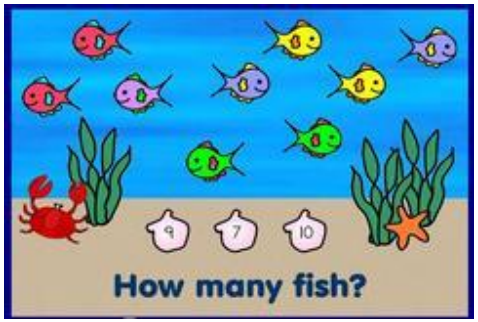
❑Sudden Changes

- pH
- Temperature
- Salinity

❑Management Activities

- Netting
- Counting
- Sorting
- Packing
- Transport

Activities leading to packing



Count

Dlp

Pack

Net

Sort

Continuous Prolonged Stress

Do not take fish out of water

Keep net with fish under water, use spoon to scoop fish from net

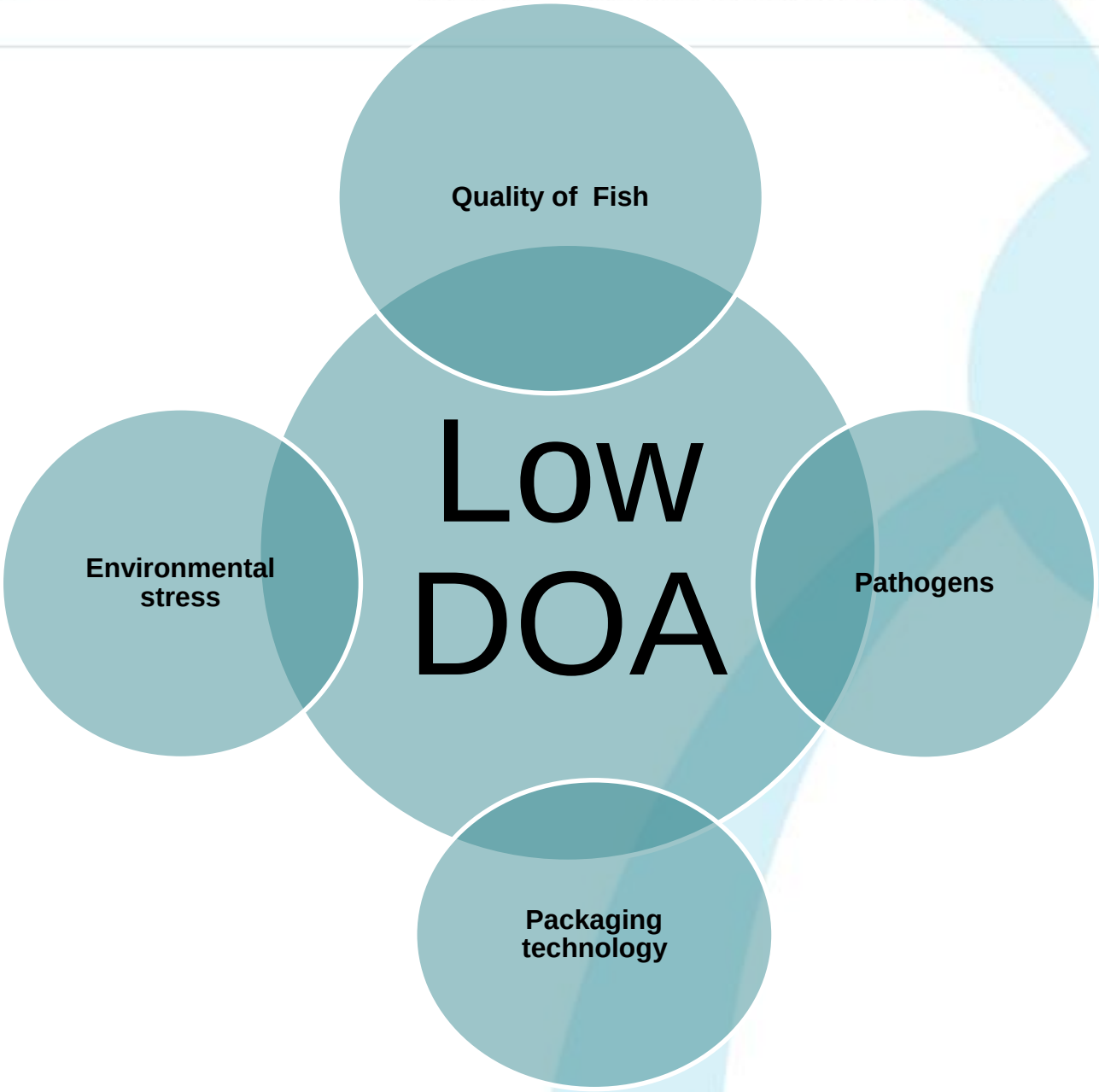
Harvest, Sort and Count at least 2 weeks before packing

Check for external parasites and treat at least 10 days before shipment with indefinite bath

Feed with Vitamin, fat, carotene added feed 4 times daily

Syphon tank bottom well and starve for at least 24 hrs. (Depends on fish) before netting out

Keep tank water well oxygenated and Ammonia etc. free and use same water for packing


Quality of Fish
Low DOA
Environmental stress
Pathogens
Packaging technology


P
145 - 192


1/6 (D)
1/12 (D)
14"x30"
12"x30"
1/4 (S)
1/4 (S)
1/6 (S)
1/8 (S)
1/12 (S)

Thank You

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Packing Fish 2

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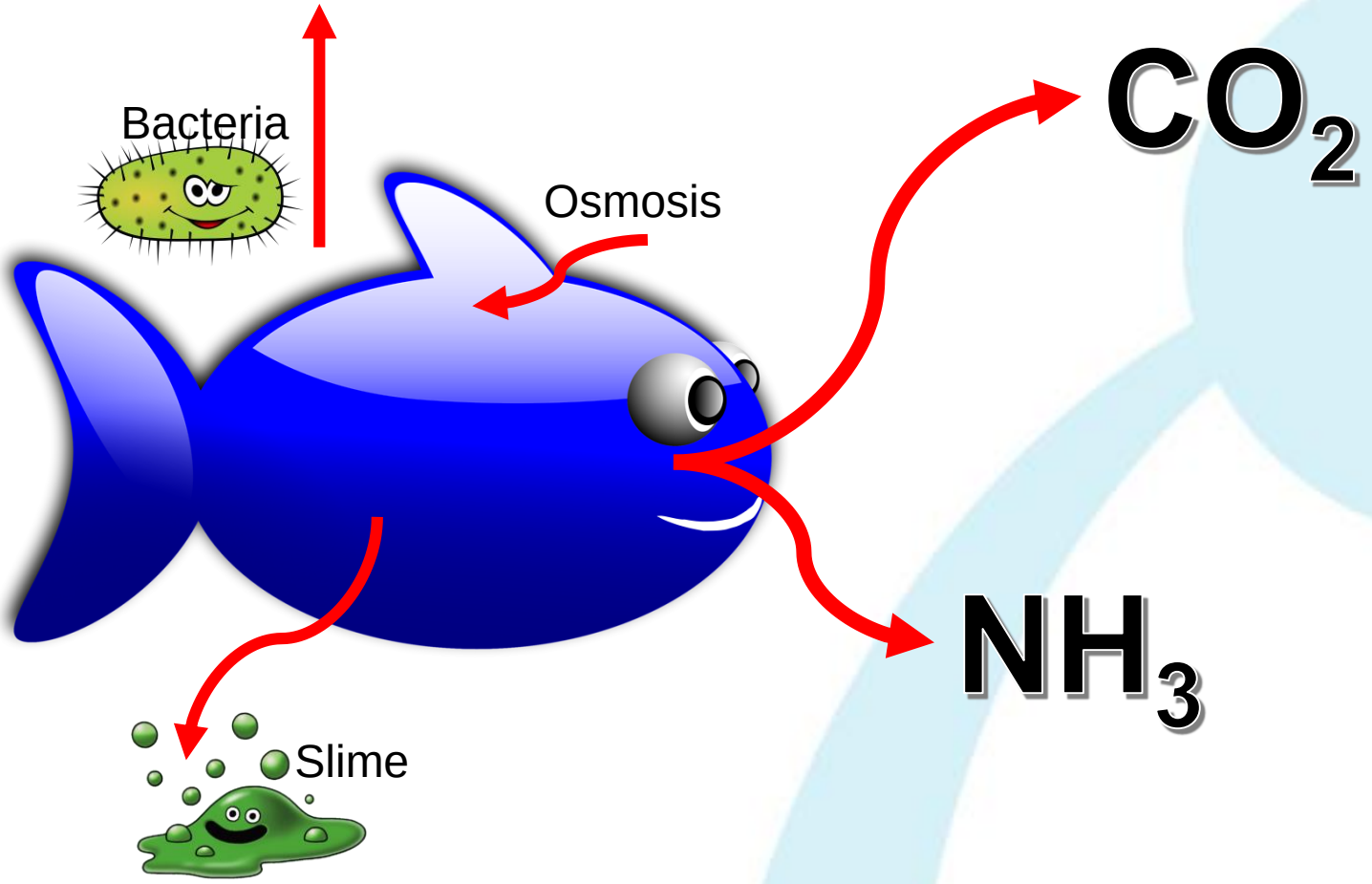

Bacteria
Osmosis
CO_2
NH_3
Slime

Effects of High CO_2

- Carbon dioxide is a waste product
- In a closed system, the CO_2 levels will increase with time
- makes the water acidic
- Low pH + high CO2 reduces the carrying capacity of blood
- This can suffocate the fish even when the DO level is high
- However, the low pH reduces ammonia toxicity
- Buffers are expensive and benefit of reduced ammonia toxicity offset this

Managing CO_2

Starving and/or anaesthetizing

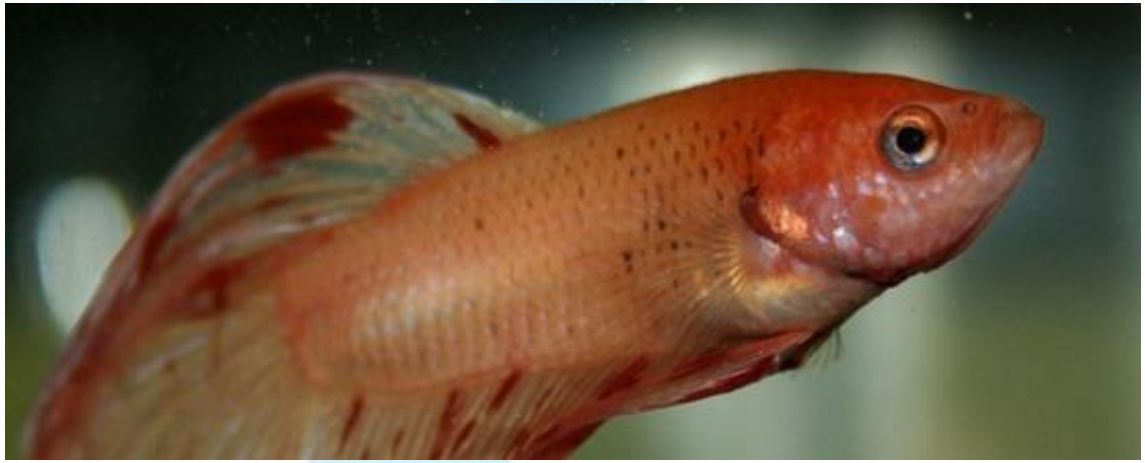
Low Metabolism Rate

Decreased CO_2 excretion

$$CaCO_3 + CO_2 + H_2O \rightleftharpoons Ca(HCO_3)_2$$

Effects of NH_3 Poisoning

1. Purple, red or bleeding gills
2. Clamped Fins, Fish may appear darker in color
3. Red streaking on the fins or body
4. Fish may gasp for air at the surface
5. Torn & jagged fins
6. May appear weak and lay at the bottom of the tank
7. DOA or DOH



Managing NH_3

Starving

Low Metabolism Rate

Decreased NH_3 Production

Ammonia Absorbers – Zeolite

Ammonia Binders – Amquel

Lower metabolism rate by anaesthetizing
Finquel - Ethoxyquin

Other factors

Increased Slime may help increase bad bacterial load

Opportunistic bacteria may infect the fish

- Acriflavine
- Salt
- Methylene Blue

Temperature control with ICE during summer and Heat-pack during Winter

Most tropical fish: 22 – 23^{O}C (71 – 73 ^{O}F)
Sensitive fish such as Discus: 24 -26^{O}C (75 – 79^{O}F)
Temperate species : 15-18^{O}C (59 – 65 ^{O}F)

Use of selected probiotics can:

- Oxidize ammonia and nitrites
- Breakdown organic Load
- Prevent the growth of bad bacteria
- Prevent infection of abrasions etc.

Remember if probiotics are used no bacteriostats can be used


Thank You