FISHKEEPERS' AND WATER GARDENE

BULLETIN

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CORYDORAS SP.
Picture by Dick Mills

See Corydoras Article on page 28

JOURNAL OF THE FEDERATION OF BRITISH AQUATIC SOCIETIES

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Dear Readers,

It is really nice to see a few articles in this issue from members of FBAS affiliated societies and a big thank you goes out to those who have contributed. Please let us have more of the same from others of you out there. It does not have to be anything scientific or complicated - how about an article on your club's last event or visit, or a spawning in your fish house or your tank that might be of interest. In fact, anything fishy that you want to tell us about. Accompanying pictures or diagrams where appropriate would be even better but are by no means essential.

The hot news on the Festival front is that, on the Saturday night, for your entertainment, we have THE HOLLIES.

Finally, I would like to offer a big thanks to Les Pearce who works hard to put the Bulletin together and print it.

Peter Furze
Editor.

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FLUFFY KILLERS: FUNGAL PATHOGENS

Dr Peter Burgess, Senior Consultant, Aquarian® Advisory Service
(email: *AquaticsDoctor@aol.com*)

Most fish-keepers will experience fungus outbreaks on their fish at some time or another. In this article we look at common types of fish fungus and consider treatment and prevention measures.

Fungi – what are they?

Undoubtedly, the best known fungus to affect fish is *Saprolgenia* which manifests as white-grey fluffy growths on the skin or other body surfaces. There are, however, several related fungi that may also attack fish, causing similar symptoms: notably, species of *Achyla* and *Aphanomyces*. Collectively, these aquatic fungi belong to the taxonomic class Oomycetes.

Strictly speaking, the Oomycetes are not true fungi, hence are unrelated to the yeasts and mushrooms. Instead, these primitive organisms seem to share their ancestry with certain types of algae known as chromophytes. However, most fish health experts still refer to *Saprolegnia* and its relatives as "fungi" or "water moulds".

Historically, descriptions of fungal infections of fish date from the middle of the 18th century.

Ubiquitous organisms.

Aquatic fungi occur naturally in most bodies of fresh water, including aquariums and ponds. Being largely intolerant of high salt levels, these fungi are only rarely encountered in marine environments. For most of the time they pose no health risks to fish. But should your fish become injured or badly stressed for any reason then fungi may take hold.

Physical features of aquatic fungi.

The commonly encountered *Saprolegnia* fungus possesses a thread-like structure comprising filamentous growths known as mycelia (singular = mycelium). The mycelia give the fungus its distinctive cotton wool- like appearance when seen on the skin or fins of affected fish. Under the microscope (around x 100 magnification) *Saprolegnia* appears as a mass of branched filaments, confirming that you are dealing with a fungus problem and not a bacterial infection (bacteria aren't branched). *Saprolegnia*, in common with other Oomycetes, have very complex life-cycles. They produce microscopic spherical stages known as spores. The fungus itself cannot move but its motile spores enable dissemination via the water. The spores are very resistant to desiccation and to ultra-violet light. Hence fungus spores cannot be eliminated by drying the aquarium or pond, or by the use of UV sterilizer units.

Fungi that affect aquarium and pond fish.

1) *Saprolegnia* and other Oomycetes
These fungi can affect virtually any type of freshwater fish (tropical and coldwater species) as well as fish eggs. In contrast, they are only rarely reported on marine fishes.

Saprolegnia, in common with other Oomycetes, rarely attacks healthy, uninjured fish. When *Saprolegnia* does strike it may occur anywhere on the body surface, including the eyes and gills. It rarely invades below the muscle layer. Typically, only one or a few fish are affected. The characteristic grey-white tufts are best observed when the fish is in the water. When viewed out of water the mycelia collapse to a flattened slimy mass that can easily be mistaken for a bacterial infection. Often there are just one or a few fungus tufts on the fish, but in extreme cases a large area of the fish's body surface may be affected, with life-threatening consequences. Over time (and particularly in ponds), the tangled mycelia passively entrap algae cells and other particulate matter. As a result, an untreated fungus growth may take on various shades of green, brown, or red.

2) Gill rot (*Branchiomyces*)
This is far less common than *Saprolegnia*, but may occasionally be encountered in pond fish. It is caused by *Branchiomyces* fungus. Affected gills become mottled in appearance and the fish may develop signs of respiratory stress: gasping, gulping at the surface, fast gill beats. If you discover pond fish with any of these symptoms then bear in mind that various gill parasites (e.g. gill flukes) and bacteria could be to blame, hence will need to be ruled out before considering gill rot. A fish health professional will be able to microscopically determine whether *Branchiomyces* is the cause. Predisposing factors for gill rot are warm water temperatures (above 20 C), especially when in combination with poor pond hygiene and overcrowding.

3) Mouth fungus
This disease manifests as fluffy white growths on the mouth and other surfaces. Despite its common name, it is caused by a type of bacteria (*Flavobacterium* species) and not a fungus. Hence, mouth fungus should be treated with a bacteria remedy.

Fungal infections: underlying causes

Fungi rarely attack healthy uninjured fish. Hence, if one or more of your fish develops a fungus infection it is important to investigate for any underlying cause(s). Predisposing factors include: unhygienic water conditions, overcrowding, skin injuries, and various skin infections such as caused by bacteria or skin parasites. Fish that are severely stressed or fed inferior diets are likely to have lowered immunity to disease, hence will be more vulnerable to fungus problems. Fish that are kept below their optimum temperature range will also be vulnerable to fungus attack: this explains why fungus can be a problem in over-wintering pond fish.

Fungus growths on dead fish and organic matter

Aquatic fungi may quickly colonise the tissues of a dead fish (just as terrestrial fungi attack dead trees). So if you happen to find a fish corpse that is covered with fungus this doesn't necessarily mean that the fungus caused its death – in most cases it won't have. Aquatic fungi may also colonise decaying organic matter, such as uneaten fish food that has been left in the water for several days.

Prevention and treatment.

Small patches of body fungus, although rarely life-threatening, should be promptly treated to prevent any further spread. If the fungus extends over a significant proportion of the fish's body (as can happen in extreme cases), or affects the gills, then the fish may be overwhelmed and die.

Although fungus isn't highly contagious (assuming the other fish are healthy, uninjured and unstressed) it is preferable to isolate affected cases so they can be treated by themselves.

Fungal diseases aren't always easy to cure. Malachite green, given alone or in combination with formalin, is a traditional treatment for *Saprolegnia* fungus. It is generally administered as a short-term bath. However, malachite green is considered potentially hazardous to humans, especially in powder or concentrated liquid form. It should therefore be handled with caution: wear protective gloves and avoid inhaling the powder. Formalin by itself has been used to treat gill rot (*Branchiomyces* infection) but is reported to be less effective against *Saprolegnia*.

Salt (sodium chloride) has been used to prevent fungus invasion of damaged skin. It is generally administered as a long-term bath containing up to 3 - 5 grams of salt per litre of water. The limitation to using salt is that not all fish species are salt-tolerant. Lower levels of salt may be ineffective, due to the presence of salt-adapted strains of *Saprolegnia* (as shown in scientific studies by Langvad, 1994).

More recently, a natural plant-derived fungus treatment, Pimafix™, has come on to the market. It was developed by Aquarium Pharmaceuticals Inc. (API), the manufacturers of Melafix ®. Pimafix™ contains several antimicrobial substances including the phenolic compound eugenol (4-allyl-2-methoxyphenol) which has been scientifically proven to control *Saprolegnia* (Hussein *et al*, 2000. "Antimycotic activity of eugenol against selected water moulds". *Journal of Aquatic Animal Health*, **12**: 224-229).

For those fish-keepers who prefer a more chemical approach, API have recently launched a neutroflavine-based fungus remedy (Fungus Cure™) that additionally helps protect the fish's skin from secondary infections. Both Pimafix™ and Fungus Cure™ are available in the UK.

In addition to treating a fungus outbreak, consider why the fish developed fungus in the first place. If you don't tackle any underlying causes (such as overcrowding, poor nutrition, poor water conditions) then fungus problems are likely to reoccur.

BREEDING CHARACINS THE TERRY HEWITT STYLE

Terry Hewitt - Bracknell AS

Breeding characins is not over-hard, it's just a bit different. It is soft water and feeding tiny fry that seems to be the problem, so I will explain how I have had some measure of success over the years with various species. As one method seems to work for most kinds, I'll start at the end, the last species I spawned, the Black Neon *Hyphessobrycon herbetaxelrodi*.

THE TANK

I use a 10" x 8" x 8" (250 x 200 x 200 mm) or 12" x 8" x 8" (305 x 200 x 200 mm) tank. I use the smaller one if available to keep the fish closer together. I clean the tank, using water as hot as my hand can take, with a Scotchbright pad. I make sure I get into all the corners and edges, then rinse with cold water. For the spawning medium I use nylon wool (if that makes sense) killifish mops. Don't be tempted to use one each end - if you do, one fish will be in one and the other fish in the other then nothing happens. I use a floating mop on top of a sunken mop up close to the corner. Leave space so the fish can get all the way around. At this time I do not use a filter and, as my fish house is space heated, there is no need for a heater. The sides of the tank must be blacked out. I use towels stuck at the top with masking tape and tucked in the bottom as best as I can, when this is done the tank is ready.

THE WATER

In most cases the water must soft to very soft. Soft being rainwater and very soft being deionised. I have had poor results with RO water so I stick with what I know works for me. With the Black Neons I used soft water, 90 percent rainwater, 10 percent tank water at a PH of 7. I don't acidify the water with this particular species but if I did, it would be by the way of black water tonic, peat extract, or bogwood. The depth of the water is about 5 inches, (125 mm) and a temperature of 74° F, (24° C). When I move fish from hard to soft water or back, I use a small show tank with a 50-50 mix of the two tank waters, and let the fish acclimatise for some time before I put them in the tank. This helps to avoid too much stress.

THE FISH

In characins, most males and females look the same. In some species the male has a tiny hook at the bottom of the anal fin so, when the fish are tipped out of a net, sometimes you see one left hanging upside-down. That is a male. But this never happens when you need it to, so it is best guess. When choosing your breeders, look for the biggest plumpest fish, this will be a female, the more slender fish will be the male. If you can view the fish end on, the belly should be wider than the top in the females.

THE METHOD

Introduce the fish to the tank a couple of hours before the lights go out, so they have a little time to get used to their new surroundings. The fish will spawn in the next three days, (I don't feed in the breeding tank). As soon as the fish have finished spawning remove the pair straight away, by way of the little tank first. Now I put in a small sponge filter with very light aeration, you must also black out the tank, I just lay a towel over the tank. The eggs take about 24 hours to hatch. The fry hang on for another 3 days.

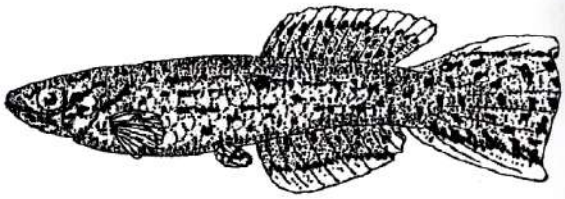
As soon as the eggs are laid you must prepare their first food, Infusoria. Take a two litre plastic Coke bottle (cleaned) fill almost to the top with the adults' tank water, add a few drops of Liquifry and leave in a warm light place until the fry are free swimming. Then, siphon through an airline into the tank of hungry fry, reduce the flow with an airline clamp to just a drip or two per second but make sure there is enough space in the tank for the bottle of water. This will slowly harden the water as well. After a few days, the fry will be able to take newly hatched brine shrimp. At this stage add two or three apple snails (pea size) if you have them as the they will eat all the left over food. As the fry grow, increase the size of food, like grindle worm, and flake food. I use Aquarian growth food, it is a small flake but will need to be crushed between your fingers as you feed for some time. Growth is slow in the first few weeks but then it switches to overdrive and growth is rapid. Do not be in too much of a rush to do a water change, let the fish grow to 5-6 mm, and then it's only change a tiny drop at a time.

Most characin fry swim in mid water or near the surface and are easy to see, but not black neon's, they hide and they are good at it. They are so difficult to see, you may think you have failed. Trust me they are there and my advice is to feed the tank for two weeks and see what happens,

Give it a try, you have nothing to lose. This is the basic method I use for most of the characins I breed.

KNOW YOUR FISH

Blue Lyretail - *Fundulopanchax gardneri gardneri* (Boulenger, 1911)



Common Name: Blue Lyretail or Gardeners Aphyosemion

Scientific Name: *Fundulopanchax gardneri gardneri*

Synonyms: *Aphyosemion gardneri, Aphyosemion gardneri gardneri, Fundulus gardneri, Aphyosemion bruceii, Haplochilus bruceii* and several others.

Where found: West Cameroon to Eastern Nigeria (Cross River and lower part of the Beno).

Characteristics: Basic body colour is grass green becoming bluish green posteriorly and shading brownish towards the dorsal contour, whitish on belly, red spots and blotches are present tending to form broken horizontal lines. The lower lip has a red edge which runs beneath the eye and obliquely across the operculum. The dorsal is green with red spots, an orange red border and an inner red margin. The caudal is blueish green with red markings, the upper and lower are bright yellow, the inner margins are red. The anal fin is blueish green with red spots, a yellow-orange border and a red margin. The pelvics are red with a yellow-green border, pectorals are pale green with red spots.

Remarks: The specimen illustrated and described is of the Port Harcourt population, one of the many locations which are inhabited by varieties and sub-species, whose members differ in size, colour, body and finnage shape. Occurs in brooks, swamps, polls and streams in the humid forested areas and highland savanna and rainforest. Not a seasonal killifish. Bottom spawner. 1 month incubation.

FBAS Show Class: 'F'

CLEAR AS MUD OR DULL AS DITCHWATER?

Dick Mills

With the new Show season about to get underway, exhibitors whose fish will be competing in the various FBAS Championship Trophy Classes will again see their points awarded differently to those fishes in non-Trophy Classes.

As in 2006, the '20 for Size' points allocation will again be divided into two 'Tens' with each 'Ten' allocated for **'Size'** and **'Presentation'** respectively.

The 'Size' category is self-explanatory. Incidentally, 'Size' is the only finite thing the Judges have to go on as all the other parameters are based on subjective opinions, rather than a distinct 'measurable' quality.

'Presentation' may be a mixture of both real and speculation, as the Judge looks at the overall presentation of the exhibit. Exhibitors may well wonder what is being considered under this particular evaluation process.

Speaking recently to a well-travelled judge (no names, no pack-drill!) brought forth some subjects for discussion.

Room - Whether or not the fish has adequate room to manoeuvre, or find a position it's comfortable with.

Water - Is it clear? Is it clean? Is the water depth enough? Is it discoloured in any way?

Tank - Is it well-made? Is it clean inside and out (including cover glass)? Does any 'black taping' comply with Show Rules? Is it leaking? Have all previous labels been removed? Any cracks? Is the base glass coloured correctly?

Sealant - Is there an over-abundance of sealant?

Debris - Is there debris on the tank floor?

Overall - What might it tell you about the fishkeeper's prowess? Does it give a good impression of fishkeeping as a hobby?

With the apparent decline in interest in the hobby, these points - which are only one Judge's personal viewpoints - might well be worth considering, if we are to persuade, rather than deter, any visiting members of the general public into the hobby.

Finally, with the Animal Welfare Bill coming into force this year, we cannot afford to allow the hobby to fall into disrepute by presenting it in anything but the best possible light.

Postscript to 2006: It seems from talking to exhibitors and Judges alike, that the re-allocation of points made little actual difference to the outright results in each Class but, if you'd like to comment, then please feel free to do so. Send in your views to the Editor.

WINTER IN THE FISH HOUSE

Eric Franklin (SPASS)

In January, coldwater fishkeepers, and fancy goldfish breeder's in particular, generally have a lull in their fish houses. The fish are still in winter hibernation (although this year being a very mild winter the fish are more active). I say generally because some breeders select their stock in December, and try to get an early spawning for the first of January. The reason they do this is to achieve maximum size for the breeders' classes in the forthcoming show season.

The show season starts with the AMGK show in June (Coventry)
The NGPS follows a few weeks later (Manchester)
The BAS show is in early September (Bristol)
The GSGB Show in late September (Essex)
Finishing with the Goldfish Show at the "Festival of Fishkeeping" (Hayling Island, 13th October 2007)

All these shows are run to the Nationwide Goldfish Standards of Great Britain. The breeders class factions within the NWGSGB, or 'Nationwide' as it is called, are as follows:

Breeder's Team
4 Fish (current)
Breeder's Single Entry
1 Fish (year's fish)
Matched Pairs
Last year's fish

All size is important. With the type of fish I breed, colour is the most important as you get points for colour and points for special characteristics (Intensity of Colour). I personally find raising fish too warm makes the colour thin and it fades quickly, so I use the January/February lull to 'take stock', as they say.

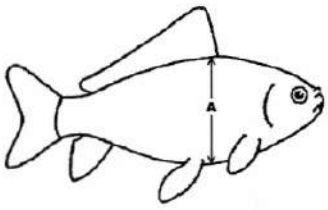
I study the parent stock and I look at the fish produced last year, checking their colour and their body shape. Once all the points are noted, whether they are good or bad, I dream a little and make an informed choice as to which fish I will use for the forthcoming breeding season.

This is the time when you can remember the Judges' comments from last year's shows and, if needed, rectify faults by selection of breeding stock.

As an example of this, a couple of years ago a well-known Coldwater Judge at an FBAS Show said to me, "Your commons are getting a bit chesty."

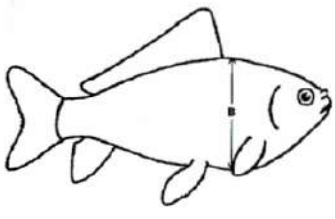
I had been breeding commons for their deep red colour, which I had achieved, and had been having good success at shows over many years. Because I had been concentrating on the colour, I had not noticed the forward movement of the deepest part of the fish's body. **'He'** was right, sometimes you need other people to look at your fish with fresh eyes. This is a good reason why if you breed fish, you should show them. You get a free fault check!

The next year I selected shallower bodied breeding males and eliminated this fault. **This proves a point that not all Judges talk rubbish.**



Left:
Nationwide standard common goldfish body shape - deepest part of body at 'A'

Right:
Incorrect 'chesty' common goldfish body shape - deepest part of body at 'B'



I normally start to breed my fish in April/May going through to July. I breed London Shubunkins, Common Goldfish & Metallic Fantails. The fish are spawned in bottom tanks over Java moss. I believe this is a very natural spawning medium. The fish do not suffer any scale damage, the eggs have plenty of surfaces to adhere to, it keeps the water sweet and it produces a myriad of tiny creatures the fry can browse on.

I would normally spawn fantails first, as they can be selected for divided tails quite easily, thus quickly reducing the number of fry kept.
The Londons (shubunkins) would be spawned next as these can be selected by removal of the pink (matt) and the

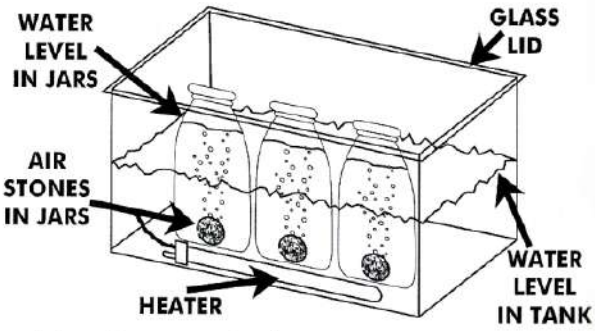
olive (metallic) fish. This reduces the spawning by approximately two thirds.

Lastly, the common goldfish would be spawned. These are much more difficult to select as they breed fairly true, with only small faults on shape and finnage occurring. You have to wait for them to decolour before proper selection can take place. This means raising quite a lot of fish for about 12 weeks.

At this time of year, April onwards, the Brine Shrimp hatching task is at full

a glass lid and is placed to receive maximum daylight.

To each four pint jar I add one and a half tablespoons of Tidemans Sea Salt and four to six small teaspoons of eggs. I pour on cold water which has stood for 24 hours to let the chlorine gas dissipate. I place the jar in the tank with a 1½ inch ball type air stone. The eggs will hatch in eighteen to twenty four hours. I use the shrimp from each jar in rotation and refill the jar after use, thus keeping a constant supply of shrimp hatching. See sketch below.



production.. If you want to breed goldfish, first you must learn how to hatch Brine Shrimp. Every breeder has his own pet way for a hatching set up. I use four pint pickle jars, three in number, in a small aquarium. 18 x 9 x 10 inches deep. The aquarium has a heater/stat set at 82 degrees Fahrenheit,

I will close now as the Editor is chasing me for copy. Next time, I will write about parents, colour, raising, feeding and selection.

TTFN Eric Franklin

POND FISH HEALTH

Gerry & Rod Isted - Healthy Koi Co. Ltd.

How do you know if your fish are unwell?

We have been approached by many people who comment: "I wish my Koi would talk and tell me if there is a problem".

Well - They Do!
Before you all rush of and make arrangements to have both of us 'committed', just stop and think for a few moments.

All living creatures have a way of communicating and each time you look at your Koi & other Fish, they are giving you an insight into their world with their possible inherent problems. With the onset of most difficulties, there is a change in behavioural pattern in advance – its their early warning system.

Obviously, acute problems you can recognise immediately. However, with time, you will learn to read the 'signals' at the onset of most ailments and be able to take any remedial action required at an earlier stage. This will help to reduce the possibility of a major disaster and the ensuing mortality.

Look at your fish for any changes in:

- Unsociability
- Bottomed-out (Sitting)
- Lethargy
- Skittish (unsettled)
- Flashing
- Abnormal Gill Movement
- Body Shape
- Frayed or Split fins
- Hanging around air/ water inlets Or gasping on the surface
- Spinal Curvature (Bending)
- Deportment & Attitude
- Use of fins (single or both fins clamped)
- Change in Mucus Layer
- Raised Scales
- Red 'veining' on the body or fins
- Change in Faeces
- Skin Blemishes, Lesions, Lumps, Bumps, Lustre & Colour

If you note any minor changes, Don't Panic

Like Humans, your fish can have 'off-days'. It may be due to 'stress' from the Cat next door or a slight temperature variation, change in feed etc. – There are many reasons for changes.....JUST REMAIN OBSERVANT.

If you have behavioral changes to your fish and they do not rectify themselves within a day or two or increase in severity, and you are concerned and not too sure what to do, then SEEK ADVICE. If you do not have a trusted mentor in your local club with the

experience you require, then give us a call on the telephone number at the end of the article.

If there is a problem, don't hesitate to phone us – we are more than happy to discuss fishy problems at any time! It is very difficult to diagnose correctly over the phone and we cannot do this but we will point you in the right direction. We will indicate the areas you should be looking at and the tests which you can undertake. If you need further assistance or help on site with water testing, microscope scrapes, clinical examinations and other diagnostics, we are always pleased to assist and we are used to working nationwide.

Fish Disease Diagnosis – Deciding what is wrong!

We have worked in the field of fish disease diagnostics for many years and give many talks on this topic. Anybody can 'guess' what the problem is. However, as you will often have only one opportunity to treat the difficulty, you must get it right first time. As an example, if you medicate when it's a toxicity problem in the pond, the fish are likely to deteriorate fast and you may well experience mortality. We have seen this on many occasions where the best of intentions and kindness have led to disastrous results.

Before treating the fish or your aquatic system, you must always undertake a diagnosis. **This is a deduction** as to the cause of the problem **supported by firm evidence.** If you are not sure of the problem – **DON'T TREAT.**

There are six principal factors which cause disease and mortality in fish. These are:

- Water toxicity
- Parasitic
- Bacterial
- Viral
- Internal organ failure
- Mechanical damage/external stressors

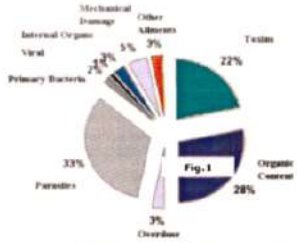
The diagnosis is undertaken by using the above framework and a process of elimination through testing, biopsies, clinical examinations etc.

During the period June 2000 to November 2005, we have visited over 600 ponds. Our records during this period are shown opposite:

You will note that 53% of the problems were directly caused by water quality. In addition, a further 33% of the cases

Primary Cause of Disease

(The Analysis of 591 Health Visits from June 2000 to November 2005)



Common Problems

- **Water Quality 53%**
  - **Toxins (22%)**
  - **Organic Content (25%)**
  - **Overdoses (3%)**
- **Parasites 33%**
- **Primary Bacteria 2%**
- **Viral 0.5%**
- **Internal Organs 3%**
- **Mechanical Damage 5.5%**
- **Other Ailments 3%**

Percentage Occurrence

related to parasite invasion. However, if the water is kept in very good condition, this should keep parasites and pathogens at bay.

As a result, you could say that about **86%** of the difficulties encountered are attributed to unsatisfactory water quality. This highlights the importance of making sure that the water you keep is in excellent condition – not just 'mechanically' clear as some people think but more importantly, 'chemically' acceptable.

Looking at Bacteria, this can be sub-divided into two origins.

A **Primary Bacterial** is a bacteria which is not 'native' to your pond eco-system – it has been brought in from 'outside' by an external carrier ie. a new fish, birds, reptiles etc.

Dip Slide – High bacterial colonization level measured in the pond water

An **Opportunist Bacteria** is a bacteria which normally lives in your pond

environment in harmony with the balanced system until something 'tilts the scales' allowing our fish to be overwhelmed. The bacteria will become virulent and overwhelm your fish when aided by poor environmental conditions such as poor water quality, parasites, organic content (water quality again!,) or stress. An 'Opportunist bacterial infection' is considered to be due to a secondary mechanism and the prime cause must be determined and eliminated.

A clinical examination of the infection sites will determine whether the infection is systemic (internal) or through lesions & ulcerations and this will narrow the mechanism.

As the Opportunist Bacteria infection is 'secondary' resulting from other causes, only Primary Infections (from outside sources) were recorded in Fig 1 above and amounted to only 2% of all cases.

As a starting point, should you have a problem with your fish, check the most obvious causes first ie:

- Test your water quality.
- Take (or arrange for somebody) to take a mucus scrape (biopsy) to check for 'parasitic infestation.

Remember that just watching the behavior of your fish and undertaking a good clinical examination can reveal a lot of information

If you are having high levels of mortality, the water temperature is between 18 deg.C and 30 deg.C and only Koi are affected, then a Viral infection should be considered.

As a result of the very warm sustained weather in June and July last year with record pond water temperatures, we have seen a significant increase in the occurrence of Koi Herpes Virus (KHV). Hopefully, we will not see the same level of difficulties this year. However, testing for KHV has moved on very fast and both the CEFAS Fish Disease Laboratory in Weymouth and the specialist laboratory we use in Lincolnshire is in a position now, to detect your Koi's exposure to KHV with limited confidence from the build-up of antibodies through blood samples which we take site. This avoids the need to sacrifice the fish using the former polymer chain reaction (PCR) test.

Our approach to diagnosis using the above proven framework includes an assessment of:

1. HISTORY

- relevant events
- past pond and fish records
- recent changes
- stocking history

2. EXAMINATION OF THE KOI

- Visual
- Clinical

- Biopsy
- Swabs (for pathogen identification and antibiotic sensitivity testing
- Blood sampling (if viral problem suspected)

3. WATER QUALITY TESTING

- Products of Respiration & Excretion
- Dissolved Oxygen Level
- Toxins - Organic (plants, oils)
- Toxins – Heavy metals
- Toxins - Others
- Chemical (Water supply, spillage, paints/ coatings)
- Organic Content
- Leechate
- Specific targeted Dip Slide with dual coatings

4. CAREFUL EXAMINATION OF THE POND, FILTRATION AND AIR SUPPLY.

5. EXAMINATION OF THE LOCAL AND ADJOINING ENVIRONMENT

- Toxic Planting
- Safe Materials
- Coatings/ treatments
- Has the neighbour been using weed killer/ sprays?

In summarising health problems you need:

1. To effect a cure, you need to determine 'WHY' the problem occurred and not just 'WHAT' the problem is.
2. Look for the Most Obvious Cause and not some obscure problem (ie Water Quality, Parasites etc).

Gram Staining – G.Neg. bacteria Aeromonas

3. Systematically check all Parameters against a logical framework.
4. Bear in mind 'Synergy' - Several minor infringements of parameters can lead to catastrophic results.
5. Don't Blame your Fish or Koi Dealer
   - The majority of Koi Dealers are very professional, competent & caring individuals – it is not in their interest to sell you a 'duff' fish.
   - In most cases, the problem area relates to the change in environment (ie. **Your 'husbandry'**) such as:
   - Change in Water Temperature –

White Spot/ stressing
   - Water Quality deterioration from overstocking
   - Lack of Quarantine Facilities
6. If you have an Acute Problem (large numbers of Koi affected) which onset rapidly, try a Water Change to try to reduce immediate difficulties. You will still need to diagnose the problem. Remember – Always use a purifier or de-chlorinator and be aware of water temperature changes.
7. Diagnosing a problem is not difficult – just apply good Common Sense.
8. Obtain the necessary basic equipment.
9. If in difficulties, shout 'HELP'

G.Neg. Bacteria Pseudomonas

Should you require help, we will be very pleased to discuss any problems with you and we are always available near the end of a phone for the cost of a call. As well as the water quality management which we undertake at fish shows, Gerry & I carry out **all aspects of work** involved with disease diagnostics including:

- Visual & Clinical fish examinations
- Habitat examination
- Water testing
- Microscopy
- Biopsy, swab and blood sampling
- Water bacterial colony counts
- Gram & sensitivity testing and pathogen identification
- Diagnosis and remedial measures and treatment

Finally, have a safe and trouble free year for 2007.

Gerry and Rod Isted
South Hants Section BKKS.

HEALTHY Koi
AQUATIC CONSULTANCY

FEDERATION OF BRITISH AQUATIC SOCIETIES
Founded 1938

South Hants Tropical & Coldwater Fish Show

Show will be judged to FBAS show rules in full, including complaints procedures.

To be held on

Sunday 27th May 2007

at the
South Downs College
College Road
Waterlooville, Hampshire, PO7 8AA

Benching commences at 8.30 am - Restaurant Facilities Available

Held by kind invitation of the
South Hants Section
of the
B.K.K.S.
16th Annual Koi Open Show.

NUTRITION AND ALGAE CONTROL

Rupert Bridges (Tetra)

It may be surprising to know that the food you feed to your fish has a significant impact on the growth of algae. In fact, feeding a good quality food is an important part of managing algae in an aquarium; this being even more important since tighter regulations were brought in to govern the sale of algaecides. In this article we will look at how food influences algae, and why it's therefore important not to cut corners on the diet you give to your fish.

Algae

Algae come in all shapes and sizes, leading to problems such as green water, filamentous growths on plants, and thin growths over the aquarium glass. Algae are everywhere, and we cannot prevent them entering the aquarium. Therefore we have to manage their growth to prevent them from causing a problem.

In order to thrive, algae require light, warmth, and nutrients such as phosphorus and nitrogen (along with numerous trace elements). An aquarium can therefore be an ideal environment for them, especially as nutrient levels tend to be very high. For example, in natural freshwater systems you might expect a phosphorus level of around 0.03mg/l, and a nitrogen level of 0.3mg/l (Boyd, 1991). Even this is enough for some algae growth, so you can see the potential in an aquarium where phosphorus levels may be several mg/l, and nitrogen (primarily as nitrate) may be above 50mg/l in some cases.

Controlling the amount of nitrogen and phosphorus in the aquarium is therefore a key method for limiting algae growth. The principal source of nitrogen and phosphorus is fish food. Around 16% of the protein in food is composed of nitrogen, and the phosphorus content of fish foods is usually around 0.7-1.5%. The amount added to the aquarium depends on the digestibility of the food, the efficiency with which nitrogen and phosphorus are retained, and the total amount of food given.

Foods will vary in the amount of waste they produce, so it is important to choose a quality one to avoid the excessive release of nitrogen and phosphorus into the water.

Phosphorus

In aquatic systems, phosphorus (P) exists primarily as a phosphate molecule (PO_4). It is present in both organic and inorganic forms, with algae requiring inorganic P. It is also an important constituent of fish food, with

all fish requiring a minimum amount for good health and growth.

Phosphorus is found in every cell in the body, and is an important constituent of bone, cell membranes, and DNA. It is also found in ATP, the main energy storage molecule found in fish and other animals. A lack of phosphate in the diet quickly leads to ill-health and deficiency symptoms. Studies on P requirements suggest that most fish require around 0.5-0.9% available phosphorus in the diet. Not all the phosphorus in the food is available. For example, the P in fish meal is around 40-60% available, and in cereal and vegetable ingredients it is even lower (Halver & Hardy, 2002). This is because in cereal and vegetable ingredients much of the P is in the form of phytic acid, which is not readily usable by fish. Good quality foods will use forms of P that are readily available to fish, and where cereal or vegetable ingredients are used they will be carefully treated to improve P availability. Often diets will be supplemented with dicalcium phosphate to ensure that the fishes' requirements are met. With high quality salmon diets it is possible to achieve very low P levels in the diet (perhaps as low as 0.7-0.9%), as they have a stomach where gastric juices can improve its availability. For warmwater tropical species, such as those we keep in aquariums, levels as low as this may not be easily achieved, as many lack a stomach and therefore cannot use as much of the P in the diet.

Whilst too little P is dangerous to fish health, excessive phosphate in the food will lead to water pollution and increased algae growth. Any undigested food that is excreted by the fish will eventually be broken down to release phosphates into the water. In addition, any digested phosphate that is surplus to requirements will be voided in the urine. P is excreted in soluble and particulate forms, with inorganic soluble P being directly available to algae. Depending on a variety of factors, around 36-70% of the total P excreted is in soluble form, with a large portion being inorganic (Halver & Hardy, 2002).

Good quality foods will use more expensive production techniques that make them more digestible, and will have carefully included levels of P to prevent nutritional deficiencies and avoid excessive pollution of the water. The use of a good quality food, coupled with careful feeding (i.e. not overfeeding), will help to limit P accumulation. This in turn will help to restrict algae growth.

Nitrogen (N)

The principal source of nitrogen in aquariums is the ammonia that fish produce. Algae may use both ammonium (NH_4^+) or nitrate (NO_3^-) to fuel their growth. Nitrate is the principal nutrient in aquariums, as most of the ammonium is oxidised into nitrate by the biological filter. Ammonia is derived from the

breakdown of protein for energy, and also from any undigested food that is excreted. Approximately 16% of the protein in food is nitrogen, and this is converted to ammonia during energy production.

Protein is of course an essential nutrient for fish, being used for growth, the immune system, and a host of other processes. The trick is to ensure that as much of the protein as possible is used for these useful processes, whilst as little as possible is used for energy production. This way the food is used more efficiently, and ammonia (and ultimately, nitrate) production is reduced.

Good quality foods will pay careful attention to their protein to energy ratios. By 'sparing' protein through the use of alternative energy sources (principally oil), the amount of protein used for energy is reduced. In addition, highly digestible foods will result in less nitrate production, as the fish is able to gain more nutrition from a given quantity of food. This means less is required to sustain the fish in good health, thereby decreasing the total amount of protein offered, as well as the amount of waste released. Simply reducing the protein level of the diet is not always the answer, as this may reduce the overall digestibility of the food. Instead it is necessary to improve the efficiency with which the protein is used.

The factors governing nitrate production are quite complex, and it is important that diets are properly tested to ensure they are used efficiently. Unfortunately there is no way that we as consumers can tell this from the pack. Instead we must put faith in products that have a good reputation, and that are made by companies who invest in researching and developing their food properly.

What This Means for Our Aquariums

There is no doubt that food is the most important influence on nutrient build-up in an aquarium. Therefore, it is directly responsible for much of the problems we have with algae. It is therefore only logical to look at the food we are using when we run into such problems. Unfortunately though it is often the last thing that people think of, and instead we end up trying to treat the problem and not the cause.

Therefore, here are a few practical tips on feeding sensibly to control nutrient build-up:

1. Never be tempted to overfeed. Whatever food you are giving it is not going to be used as efficiently when given in excess. As much as the fish eat within a minute or two is a good rule of thumb.

2. If you switch to a new diet, observe the amount of filter cleaning and general maintenance you are having to

do. Although not a precise measure, a lot of additional work would suggest the diet is producing more solid waste. The chances are that it will also be releasing more phosphorus and nitrogen.

3. Test your aquarium and tap water for phosphate and nitrate regularly. Although levels in the aquarium will accumulate over time (unless you are using a specific remover), a sudden increase after switching diets might indicate a problem.

4. Use diets that have been researched properly. Retailer recommendation, as well as manufacturer reputation are important. Never buy food on price alone – it may be a great bargain but you don't know what impact it might have on your fish and the aquarium.

If you have constant algae problems, try a different diet or reduce feeding levels. Keep a close eye on the fish as well – remember that their health comes first. Some diets may produce less P or N, but they are not necessarily as nutritionally complete.

ALGAE - A FEW FACTS

Reproduced from *Aquarium World* - the magazine of the FNZAS

What produces most of the earth's oxygen? Trees? Plants? ALGAE.

Their net oxygen output is higher than that produced by all the trees and other land based plants put together. Ancient algae is also the main constituent of oil and gas.

Algae releases oxygen as a waste product of photosynthesis. Blue-green algae, or cyanobacteria, is earth's earliest known life form with fossils that date back to 3.6 billion years ago. They have debated as to which family they belong to , but the classification of algae is that it is a bacteria, not a plant. It is also very significant for the future that possibly algae is grown on land that is not fertile, using brackish water. It is a crop that does not cause soil erosion, requires no fertilisers or pesticides and refreshes the atmosphere more than anything else that grows.

One form of Algae, spirulina, yields twenty times more protein than soya beans. It consists of 70% protein (beef is only 22%), 5% fat, no cholesterol and an impressive array of vitamins and minerals. It also boosts the immune system, particularly the production of protein interferons, the body's front line defence against viruses and tumour cells.

So it may be a pest to us fishkeepers, but it does have importance!

FESTIVAL OF FISHKEEPING 2007 UPDATE

"It never rains, but pours" is the current phrase being bandied about by Joe Nethersell, Organiser of the annual FBAS Festival of Fishkeeping event.

It could just be a justifiable comment on the current weather situation, but it's a bit more pertinent to the Festival than that (although the Festival has suffered from a literal deluge in the past).

The recent move, in 2005, to its now present home at Mill Rythe Holiday Village on Hayling Island was traumatic enough – just ask any of the 'moving gang' involved. Then, last year, the longstanding sponsorship from Rolf C Hagen came to an end, with the result that the 2007 event will take on a different appearance.

"Let me say at the outset," says Joe "that the Federation of British Aquatic Societies owes a tremendous debt of gratitude to all at Rolf C Hagen for the wonderful support they gave us over many, many years. They really helped us put the annual Festival on the aquatic map."

"However, times change and we are faced with carrying on despite their absence. But we are not 'high and dry' (sorry about another weather pun!) as we have also been fortunate over the years to have had generous support from others, notably Tetra, Aquarian, Practical Fishkeeping and RO-Man too."

"You will see from our new Festival logo, that these Companies will be

continuing with their support for the Festival and I would take this opportunity of thanking them for their support and for their confidence in the FBAS to make yet another successful event for aquarists in the UK."

"Obviously, it would be impossible to stage such an event without support from many sources – from the Aquatic Trade and Societies alike – but there just isn't room for everyone's name on the logo however much we'd like to acknowledge their support."

"As this year progresses (there's only any 8 months to go to the Festival) you will see more and more people coming forward to get involved. One exciting feature I can reveal at this early stage is actually nothing to do with fishkeeping, but I know it will cause a stir of excitement for all those appreciative of the Festival's social aspect, especially the Saturday night cabaret. This year we are repeating the popular music attraction by featuring that outstanding group, the Hollies."

"By paying attention to all aspects of the Festival – apparently there is life away from the Show Benches – we hope to continue to bring all that's best in the hobby to fishkeepers, wherever they may come from, and who are lucky enough to get to Hayling 2007."

Bookings are already pouring in for the 2007 Festival of Fishkeeping (October 12th-14th).

Ring Grace on 0208 847 3586 or email her:

grace@the-nethersells.fsnet.co.uk

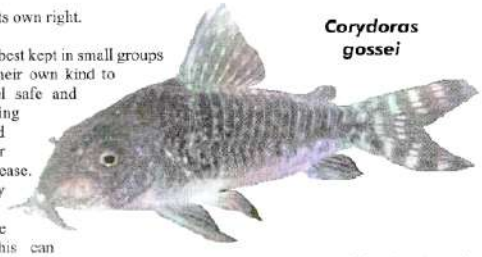
CORYDORAS

Paul Billaney - Kapi-Mana Aquarium Club
Reproduced from *Aquarium World* - the magazine of the FNZAS

Genus *Corydoras* or, as they are affectionately known in the hobby, 'Corys' seem to work their way in to most people's tanks at one time or another. I think we have all seen the common Bronze (*C. aeneus*) Peppered (*C. paleatus*) and the bronze colour morph, the albino Cory, around but there are in fact over 115 species of Corydoras all originating from South America and more being discovered all the time. This makes them one of the most interesting as well as most popular, tropical fish around.

Early fish keepers of the 1880s in Europe used to keep the Cory only for its cleanup value as it scavenged for food left by their 'real' fish. I'm very pleased to day this is no longer the case as its value as a wonderful asset to a aquarium community is now recognised in its own right.

Corydoras are best kept in small groups of 6 - 10 of their own kind to help them feel safe and secure, reducing their stress and therefore their risk of disease. Sharp stony substrates should be avoided as this can damage their delicate barbels and also cause injury while foraging for food.



Their body is armoured to protect them from predators and they also have 'spines' on their pectoral fins which they can lock - much to the dismay of any larger fish who try to swallow them. It has been known for large Oscars to choke to death with a Cory stuck in their throat.

Most *Corydoras* species grow to between 4 - 8cm in length; the largest being *Corydoras barbatus*, growing up to 13 cm and the smallest, *Corydoras pygmaeus* or *C. hastatus*, growing to no more than 3cm. All are peaceful, undemanding community fish making them perfect for the beginner or advanced aquarist alike.

As a rule they prefer a pH of a neutral 7.0 but can tolerate anything from 6.0 - 8.0. A temperature range between 21-26°C is recommended for most species and a temperature drop of 2 - 3° can often stimulate them into breeding.

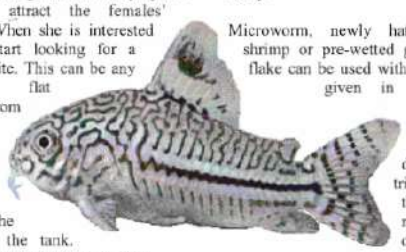
Unlike a lot of catfish, the Cory is active in the daytime and not shy about giving anyone watching a cheeky wink as if to say "Cute aren't I?" So full of character you can't help but love them. The Cory's diet includes all flake, frozen or freeze dried morsels your other fish may be enjoying but live food such as bloodworm, micro worms, tubifex worms etc. are preferred.

Special consideration should be given to the fact that they are bottom feeders so if your tank has other top and mid-level feeders ensure that enough food is provided that will reach the bottom before its all gone. A good trick to ensure they get their fair share is to feed just before, or just after, the lights are turned out as Corys locate food by a sense of smell rather than sight.

Sexing *Corydoras* is not too difficult when they are mature. If you look down from above, the females will look distinctly wider across the body near the pectoral fins and if viewed from the side have a deeper body and may bulge if ripe with eggs. If you are not sure of

the sex, especially with younger fish, the tried and true method is to buy a group of 6-10 younger fish and let them work out who is what sex themselves.

Spawning the *Corydoras* can be an exciting and rewarding experience. The first sign that something is about to happen is usually increased activity with dashing around, as well as up and down, the tank glass - normally by the males to attract the females' attention. When she is interested she will start looking for a spawning site. This can be any available flat surface from leaves to filters and quite often the sides of the tank but rarely the bottom of the tank. When the chosen site has been cleaned more serious activity occurs with the female 'T-Boning' the male with gentle nudges on his side.



Locked in this position the female's eggs and the male's milt is released, fertilising the eggs. Sometimes this is achieved without T-boning and close proximity is enough. The sticky eggs are then picked up be the female, either by having them stick to her underbody or her pectoral fins, and placed at the previously cleaned spawning site. This will be repeated over and over until all the female's eggs, totaling anywhere from 30 to 800, have been released and fertilised.

Depending on the species, the eggs may take from 3 - 10 days to hatch. There will be no parental care of either the eggs or the fry, but parents will eat their young if hungry so removing the parents or eggs will result in a higher survival rate. After they hatch their yolk sac will be absorbed in 2 - 3 days, at which time small food should be ready.

Microworm, newly hatched brine shrimp or pre-wetted good quality flake can be used with feeds being given in small and regular intervals 3 - 4 times a day. The trick is to give them all they need without over-feeding and polluting the water. Fry are very susceptible to poor water conditions so small regular water changes should be done to reduce losses and promote good strong growth rates. If using baby brine shrimp (BBS), a small light can be placed outside the tank at bottom level. This will attract the BBS to the level where the baby catfish will be looking for food.

Growth is fairly rapid with good food and conditions and pretty soon you will be fascinated by a whole new *Corydoras* family.

Pictured:
Corydoras trilineatus.