

a tumbling or ameboid fashion. A similar organism, *Cryptocaryon irritans*, causes ich in saltwater fish. *Ichthyobodo* (previously known as *Costia*) is a small flagellate that attaches to the gills or skin of fish. This parasite is commonly missed by experienced aquarists who “scope” their own fish. It is difficult to recognize at magnification less than 400x, but its characteristic cork-screw-like swimming pattern will suggest its presence to the careful observer. Once it attaches to gill or skin epithelium, it is difficult to see without oil immersion. The best place to look for this parasite is on the edge of the gill filament or skin mucus.

A final parasite worthy of individual mention is *Hexamita* (soon to be renamed *Spironucleus*), an intestinal flagellate common in the gut of cichlids but also found in other species. A typical case history includes chronic weight loss, decreased fecundity, and poor survival of fry. The organism is easily identified in fecal smears or wet mounts of intestinal tissue examined under 100x to 400x magnification. The organism, if problematic, will be present in large numbers, and the intestinal contents will be “alive” with small, rapidly moving flagellates. Clinical disease attributed to *Hexamita* seems most pronounced in fish maintained under unsanitary conditions or subjected to recent shipment and handling.

Fungal Disease

Although several systemic fungal diseases of fish have been reported, the most common fungal infections are limited to epithelial surfaces of gill, skin, or fin. In general, most of these are arbitrarily assigned to the genus *Saprolegnia* and can be presumptively identified by the presence of broad, aseptate hyphae from suspect lesions. Should fungal cultures be desired, Sabaroud-Dextrose medium is a good choice for initial isolation. Most external fungal infections are secondary to husbandry problems, particularly overcrowding and poor sanitation.

Viral Diseases

Although there are some viral diseases of tropical fish, most are poorly understood, and diagnosis is based on “ruling out” other problems. Lymphocystis is caused by an Iridovirus and can infect many species of fish. It results in blister-like skin lesions caused by hypertrophy of epithelial cells and can be presumptively identified by the appearance of giant cells in skin scrapings of suspect lesions.

Recently, an Iridovirus has been associated with systemic disease in gouramis. Affected populations can suffer significant mortality (>50%).

A Paramyxovirus was associated with systemic disease and heavy mortality (>50%) of angelfish in 1990. Infected fish huddled in corners, clamped their fins together, and often developed severe tail rot in the absence of obvious parasites or bacteria.

A Retrovirus has been associated with the presence of lip fibromas in angel fish (Figure 3); but affected fish were not systemically ill, and surgical removal of the mass was effective.

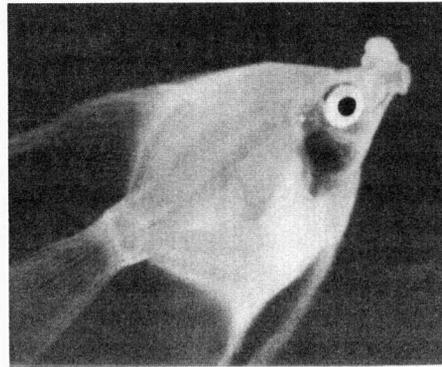


Figure 3. Lip fibromas in angel fish *Pterophyllum scalare*. Presence of these lesions has been associated with retrovirus-like particles, identified by transmission electron microscopy. Clinical management by surgical removal of lesions has been successful.

TREATMENT OF COMMON DISEASES

Treatment of External Parasitic, Bacterial, and Fungal Infections

Most external parasite infections of fish can be controlled with one of the following compounds: salt, formalin, potassium permanganate (KMnO₄), or copper sulfate (CuSO₄). All are similarly effective, although potassium permanganate may be a little more efficacious against *Saprolegnia* and *columnaris* bacteria (external infections only).

Although not specifically approved for aquaculture use, salt has been designated as a “low regulatory priority” compound by the FDA, and its use is widespread in most aquaculture industries. It can be added to freshwater recirculating systems or small ornamental ponds, as a permanent treatment, at concentrations of 0.02 to 0.1%, depending on the species of fish. At this concentration, most chronic problems caused by protozoans will be eliminated. When receiving a new group of fish, a 3% salt dip will effectively eliminate many external parasites from freshwater fish, whereas a freshwater dip will similarly benefit marine fish.

Formalin is FDA approved for control of external parasites on channel catfish, salmonids, and penaeid shrimp. It is effective against monogenes and many protozoans.

Formalin can be added to aquaria at a concentration of 25 mg/L for a long-term bath, which is approximately 1 ml per 10 gallons of water. Short-term baths of 250 mg/L for 30 to 60 minutes can be used to treat fish in the clinic. However, treatment of a sick animal can result in its death, so be cautious and never leave a fish unattended during treatment. Formalin is algicidal, and each 5 mg/L chemically removes 1 mg/L dissolved oxygen from water, so aeration is mandatory during treatment. For this reason, formalin is not recommended for use in ornamental ponds with marginal aeration and/or heavy algal blooms.

Potassium permanganate is not FDA approved, but has been used for many years by aquaculturists as an oxidizing