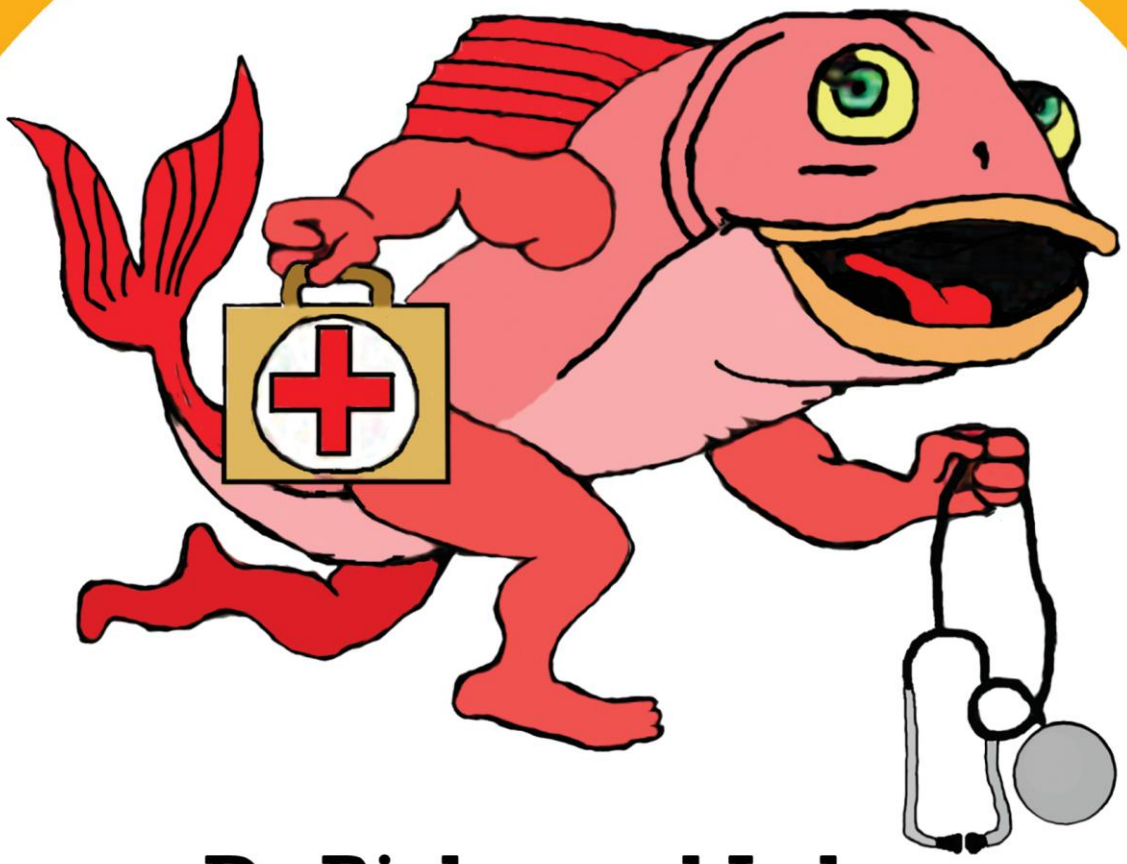
FISH VETTING ESSENTIALS



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Front cover: The Fish Vet's logo. Part fish, part vet.

FOREWORD

This is a revised version of the self-published "Australian Fish Vetting Essentials" (2007) by Drs Richmond Loh & Matt Landos. The purpose of this manual is to collate the knowledge that aquarists, aquaculturalists, public aquaria, local fish shops and veterinarians already have, and to filter out misinformation and then provide this information in a readily digestible form. The information contained in this publication has been in the process of compilation since 2001. This manual is not prescriptive, but rather, it is a collection from our combined knowledge to promote to the industry that veterinarians are best equipped to deal with aquatic animal health.

Worthy of note is that many diseases found in aquatics can be classified as emerging diseases since an "emerging disease" is one that has appeared in a population for the first time, or that may have existed previously but is rapidly increasing in incidence of geographic range.

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ABOUT THE AUTHORS

Dr Richmond Loh

Dr Loh has always been interested in animals, nature and medicine, so naturally he studied to become a veterinarian at Murdoch University. However, his passion for all things fish was strong and so his first job was as a veterinary fish pathologist for the Tasmanian state laboratory, providing diagnostic services for the large aquaculture farms including species such as salmon, trout, ornamental fishes, abalone and oysters. At the same time, he was offering veterinary services to owners of ornamental fishes.

In 2006, he passed the examinations for Aquatic Animal Health for the Australian & New Zealand College of Veterinary Scientists (ANZCVS). In the same year, he was awarded a Master of Philosophy degree for cancer research in Tasmanian devils, publishing the seminal papers on Devil Facial Tumour Disease in Veterinary Pathology. To increase his depth of knowledge in the area of diseases, he studied for and passed the examinations for Pathobiology for the ANZCVS in 2009.

So far, he has given numerous talks at seven National Veterinary Conferences and also to the Pet Industry Australia Association delegates and at the New Zealand Companion Animal Conference. He regularly writes for aquarium and pet publications. These are an initiative to generate interest within the respective professions and industry to apply scientific reasoning for the better health and management of fishes. Through his veterinary career, he has appeared on TV (Creature Features, Stateline, Catalyst, ABC news), been interviewed on radio (Curtin FM), appeared in newspapers (The Sunday Times UK, Herald Sun, The Examiner, Sunday Tasmanian, The Cairns Post, Canning Times), magazines (Australian Aquarium Magazine, Aquarium Keeper Australia, TIME Australia Magazine, Your Pet Magazine, Woman's Day, Pets – Taking Care of Your Family's Best Friend, Animals' Voice) and appears on several local and international websites (ABC Online).

He is the consultant veterinarian to AQWA (the Aquarium of WA), is an adjunct lecturer at Murdoch University, is a founding member of the World Aquatic Veterinary Medical Association (WAVMA), is the secretary for the Aquatic Animal Health Chapter of the ANZCVSc and provides advice on fish health and welfare to several universities and the RSPCA. His clients are diverse and range from individual pet fish owners, to retailers, farmers (ornamental and food cultured fishes) and exporters.

Dr Matt Landos

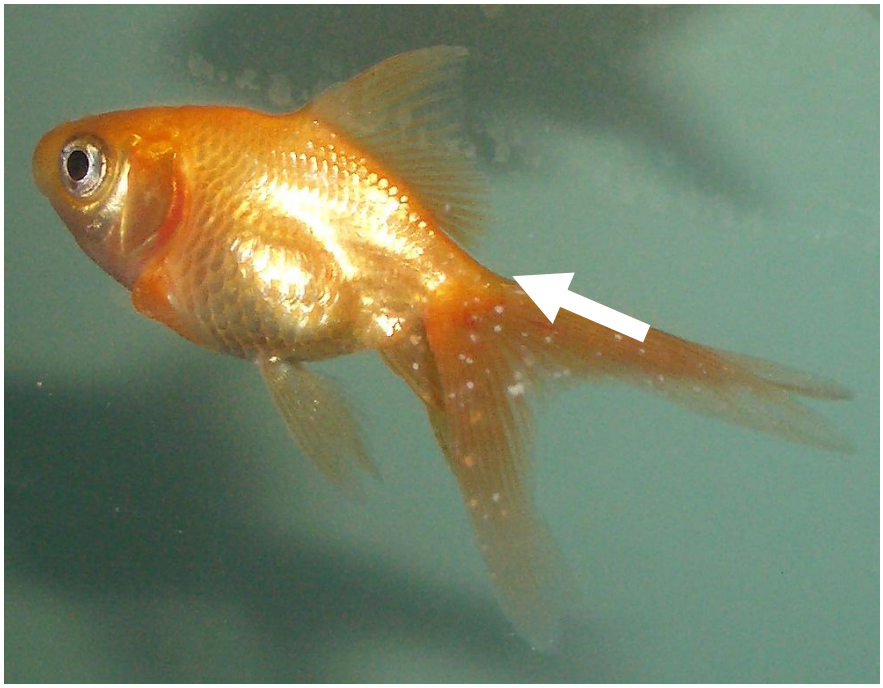
Dr Landos is the Founding Director of Future Fisheries Veterinary Service, is an honorary lecturer in aquatic animal health and associate researcher at the University of Sydney, Faculty of Veterinary Science and in 2011 he was the president of the Aquatic Animal Health Chapter of the Australian & New Zealand College of Veterinary Scientists.

Dr Landos commenced his consultancy practice in aquatic animals in 2005 after a 5 year stint with the NSW DPI as the Veterinary Officer in Aquatic Animal Health. The client base is located throughout Australia, and it ranges from small native fish hatcheries to 3,000 tonne sea cage operations. He works with all aquatic species including molluscs, crustacea and finfish. He reviews emergency disease preparedness plans and develops health management plans for aquaculture industries. He has had a prominent media profile in recent years associated with investigation of the impacts of environmental pollutants on fisheries in relation to the notorious two-headed Australian bass larvae case from the Noosa River.

White Spot Disease ('Ich')
– *Ichthyophthirius multifilis* (freshwater) & *Cryptocaryon irritans* (marine).

'Ich' is a very common protozoan disease of both marine and freshwater fish. The organism is a small, round ciliated protozoan with a distinctive horse-shoe shaped nucleus that lives on the skin and gills of the fish where it produces lesions that take on the form of tiny (~1mm) white cystic nodules.

Clinical Signs
The parasitic cysts are so large that they are visible to the naked eye. Affected fish will look as though they have been sprinkled with sugar and will often demonstrate irritation; scratching and rubbing against the rocks and tank. However, this may not always be present if only the "swarmer" stages are present. Thickening of the skin epithelium and increased mucus production on the skin may occur, but these may only be appreciated microscopically. The fins may also become ragged.



Since the gills are also exposed to the external aqueous environment, the organism will also parasitise the gills, causing increased mucus production as well as gill epithelial hyperplasia. This leads to respiratory embarrassment and fish will present with increased respiratory rate and flared opercula. In heavy infestations, fish will become lethargic and depressed, their respiratory rate slows down and becomes shallow. Ulcers form when the encysted stages break out of the skin and the gills. In heavy infections, mortality can be high which may be in part due to electrolyte loss (in freshwater fishes) or dehydration (marine fishes) through these ulcers. In those that survive the initial insult, the ulcers would provide portals of entry for secondary infection with bacterial and fungal opportunists.

Transmission
'Ich' is a very common infection of fish in both freshwater and marine systems and, in low numbers, may produce little or no clinical signs. It is important therefore to

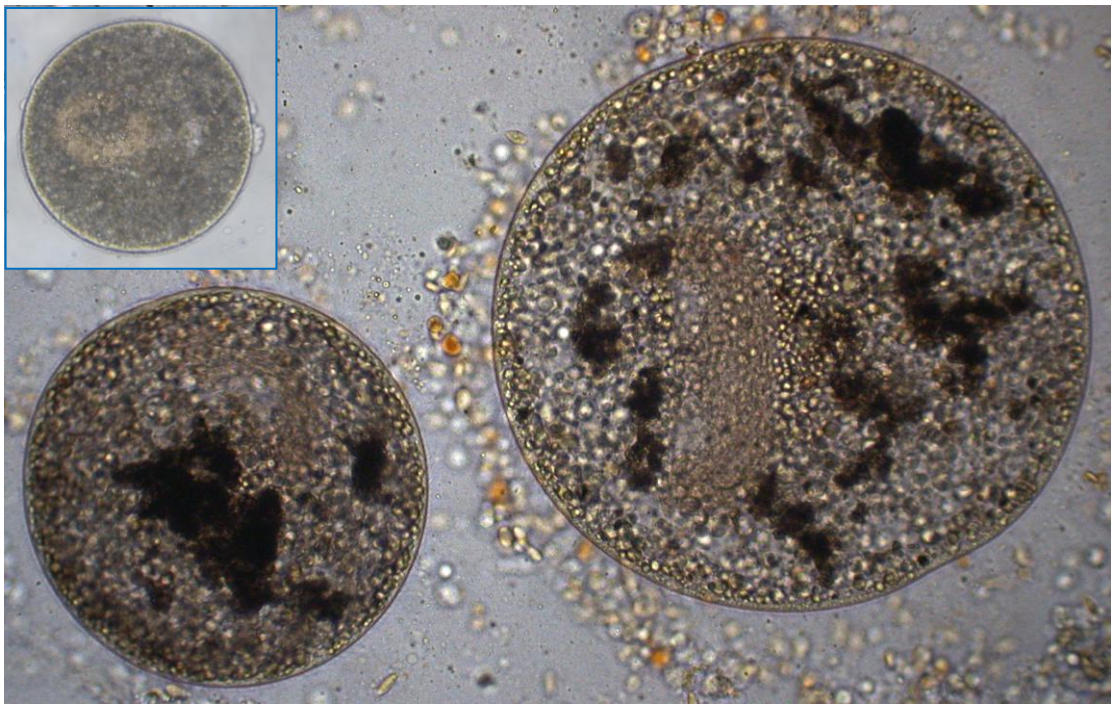
always look for other pathogens (bacteria, fungi, other protozoa etc.) when presented with a sick fish with only a small burden of Ich, as this may be an incidental problem.

'Ich' replicates quickly and so a minor burden in one fish tank can rapidly become a serious burden to a tank full of fishes if left untreated. Mature Ich parasites that have been feeding on the host eventually fall off the host to the bottom of the tank. There they secrete protective cysts around themselves and begin to divide, producing many hundreds of swarmers (infective stages) which swim off in search of a host.

The transmission of 'ich' is facilitated by high stocking densities of fish. Individual encysted stages on fish may go unnoticed by fish-owners and yet be a major source of infection to other fish. Temperature also plays a big role in disease transmission with the lifecycle being completed more rapidly at higher temperatures (3-4 days at 21^{o}C vs 5 weeks at 10^{o}C). This factor is particularly important when dealing with Cryptocaryon outbreaks as it is more temperature-governed than Ichthyophthirius.

Diagnosis

Diagnosis is made by performing a skin or gill scraping in the region of one of the white lesions and by identification of the spherical ciliate organisms, with their characteristic slow spinning motion, in a fresh wet preparation. Notice also that the parasites can be of various sizes, which is pathognomonic for "Ich" (other ciliated parasites are of uniform size and shape). Notice the horse-shoe shaped nucleus (inset).



Treatment

Formalin may be used, however, because it displaces dissolved oxygen, it is not recommended if fish exhibit severe respiratory embarrassment. Malachite green + formalin combination is the most effective treatment since the mixture has a "synergistic effect" and a smaller concentration of each ingredient is used. Dip treatments and osmotic challenges will only be effective against the non-encysted

stages of the parasites. Thus, this will need to be repeated every 2-3 days for 10 days. Thermal challenge by raising the water temperature to at least 32^{o}C for a few hours every 3 to 5 days (provided the water is well-aerated and that the fishes will tolerate it) is another method used. The high temperature interferes with the reproduction of the parasites. Since the organisms are obligate parasites, allowing the aquarium or pond to be left fish-free for at least 7 days at >20^{o}C usually eliminates the white spot parasites.

It has been reported that some fishes that recover from the infection will develop immunity to the disease.

See the medication section under "*Protozoa – General"*.

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The Fish Vet

The original handbook, published in 2007, is widely used in veterinary schools, labs, clinics and even zoos. The revised 2011 edition is a comprehensive resource that incorporates elements of fish keeping, clinical medicine and fish pathology.

Important information for fish vets in this revised edition include:

- How to diagnose common fish diseases?
- How to medicate fish?
- How to treat fish diseases using drugs available in your surgery?
- How to interpret water quality results?
- How to anaesthetise fish?
- Notes on surgery and imaging.
- How to identify fish into their broad categories?
- How to breed fish using hormones?

This truly is an essential manual for veterinarians dealing with fishes.