



Research Note

Prevalent Diseases among Freshwater Ornamental Fishes in Nagaon District, Assam

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Disease is one of the limiting factors associated with ornamental fish trade. Office International des Epizootics (OIE) has detailed provisions for import or export of aquatic animals aimed at avoiding risk of disease transmittance (OIE, 1977). However, the ornamental fishes are not covered by these health codes and tropical ornamental fish trade operates without appropriate quarantine practices. International ornamental fish trade often sustains economic losses, as a result of various infections soon after arrival in importing country or during transportation (Jeong et al., 2002). The North Eastern Region is a hotspot of biodiversity, having 267 fish species of which 57% has ornamental potential (Sen, 2000). In view of the potential trade opportunities and government initiatives, many entrepreneurs are getting involved in ornamental fish trade in recent times. While bulk of the trade of exotic fishes is within the region, indigenous ones are exported through recognized traders in Kolkata (Kalita & Kalita, 2007). The objective of this investigation was to record disease incidences in captive culture of imported and locally collected potential ornamental fishes in Nagaon district of Assam.

A total of 932 fishes of fifteen species were examined from fish shops, instructional unit of the College of Fisheries, Raha and collection sites of Kollong River at regular intervals of 25 to 30 days during the year 2006 - 07. Parasitic incidences noticed were further examined by scraping body surface mucus from areas of the pectoral fin, adjacent to dorsal fin,

operculum, excised gills, lesions and intestine for proper identification under microscope. Use of fresh specimen facilitates visualization of motile parasite (Post, 1987; Southgate, 1994; Wildgoose, 1998). Others were preserved in 10% buffered formalin and 70% ethanol for identification using keys of Kabata (1985) and Cone (1995). For isolation of causative agent of bacterial diseases, selective media such as Rimler – Shotts (Shotts & Rimler, 1973) and King's B Medium (King, 1964) were used in addition to other standard media viz; nutrient agar, tryptone soya agar (TSA) and brain heart infusion broth. Pure culture was obtained by repeated streaking and about 100 colonies were randomly taken in TSA (Himedia, India) slant as stock culture. To identify the bacteria to genus level, the scheme of Bain & Shewan (1968) and Le Chevallier et al. (1980) were pursued. Cultures exhibiting positive oxidase reaction, fermentative metabolism, motility and resistance to vibriostatic agent O/129 were considered to be *Aeromonas* sp. and subjected to biochemical scheme proposed by Popoff & Veron (1984) to ascertain the species. Identification of *Pseudomonas* to species level was done following the scheme of King (1964).

Of the 932 fishes examined 26.5% was infested by 10 different diseases (Table 1). Four types of parasitic infections were due to one platyhelminth (*Clinostomum* sp.), two crustaceans (*Argulus foliaceus* and *Lernae cyprinacea*) and one sporozoan (*Myxobolus* sp.). The maximum prevalence (3.65%) was by *Clinostomum* sp., followed by *A. foliaceus* (3.43%) and least (0.64%) by *Myxobolus* sp. and *Lernae cyprinacea*. Two fungal diseases, Epizootic Ulcerative Syndrome (EUS) (5.69%) caused by *Aphanomyces* sp. and *Saprolegnia* sp. were recorded. The EUS infection was detected only in indigenous ornamental fishes.

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Table 1. Diseases observed in ornamental fishes of Nagaon district

Species of ornamental fish	No. of fish examined	No. of fish infected	Fish diseases									EUS
			Nodular disease	Parasitic Argulus	Lernaeosis	Clinostomumosis	Dropsy	Bacterial Fin rot	Ulcer	Exophthalmia	Fungal Saprolegniasis	
Carp (<i>Cyprinus carpio</i>)	60	26	-	15	-	-	6	-	-	-	-	5
Koi (<i>Cyprinus carpio carpio</i>)	45	5	-	-	-	-	5	-	-	-	-	-
Goldfish (<i>Carassius auratus</i>)	125	36	5	12	6	-	10	3	-	-	-	-
Spotfin barb (<i>Puntius sophore</i>)	55	21	-	-	-	-	-	5	-	-	4	12
Ticto barb (<i>Puntius ticto</i>)	70	26	-	-	-	-	-	-	-	-	-	26
Scissortail rasbora (<i>Rasbora trilineata</i>)	50	3	-	-	-	-	-	-	-	3	-	-
Blue gourami (<i>Trichogaster trichopterus</i>)	72	20	-	-	-	-	12	8	-	-	-	-
Giant dwarf gourami (<i>Colisa fasciata</i>)	35	34	-	-	-	34	-	-	-	-	-	-
Angel (<i>Pterophyllum scalare</i>)	70	10	-	-	-	-	-	10	-	-	-	-
Sword tail (<i>Xiphophorus helleri</i>)	80	12	-	-	-	-	-	12	-	-	-	-
Black molly (<i>Poecilia sphenops</i>)	150	28	-	-	-	-	-	28	-	-	-	-
Black shark (<i>Morulus chrysophekadion</i>)	30	5	1	-	-	-	-	-	2	-	2	-
Indian featherback (<i>Chitala chitala</i>)	15	7	-	5	-	-	-	-	-	-	2	-
Indian potasi (<i>Pseudotropheus atherinoides</i>)	50	4	-	-	-	-	4	-	-	-	-	-
Golden snakehead (<i>Channa punctatus</i>)	25	10	-	-	-	-	-	-	-	-	-	10
Total no. of fishes	932	247	6	32	6	34	37	66	2	3	8	53
Prevalence (%) of infected fish	-	26.50	0.64	3.43	0.64	3.65	3.97	7.08	0.21	0.32	0.86	5.69

Four types of bacterial diseases namely finrot, dropsy, exophthalmia and ulcer were recorded, with maximum prevalence (7.08%) of finrot caused by *Aeromonas* sp and *Pseudomonas fluorescens*, followed by dropsy (3.97%) and exophthalmia (0.32%) caused by *A. hydrophila* and the least (0.21%) ulcer caused by *Aeromonas* sp.

Infestation of the platyhelminth parasite *Clinostomum* sp in giant gourami, *Colisa fasciata* was observed in

those collected from wild sources but not in those reared in aquariums. Wright (1971) reported that Gastropoda and Pelecypoda were the main primary hosts of this parasite. Migratory birds visit the natural resources from where the gourami were collected and probably that was how *Clinostomum* sp was transmitted from bird to mollusk and finally to *C. fasciata*. Infestation of crustacean parasite *A. foliaceus* was more in carps and goldfish than in

others and *L. cyprinacea* occurred in gold fish only. Within a short period of infestation by the parasites, the fishes died due to punctate haemorrhages, lesions and destruction of tissues. Similar pathogenicity and haemorrhages due to heavy infestation, causing serious mortality of fish had been reported by Gratzek (1993). Infestation of *L. cyprinacea* in black molly, *Xiphophorus sphenops* was reported by Jeong et al. (2002). Hoffman (1998) reported infestation of this copepod in a wide range of ornamental fishes, frog tadpoles, salamanders, fishes in aquaculture and natural environment. Thilakaratne et al. (2003) reported 2.20% prevalence of *L. cyprinacea* infestation in freshwater ornamental fishes like gold fish, platy and carps in Srilanka. The infestation potential of *A. foliaceus* in cultured carp species varied from 68.36% in *Labeo rohita* to 23.45% in *Catla catla* (Kalita et al., 2007). Similar observations were made by Rao (1998) that significant mortality of juveniles and adult *L. rohita* in ponds of Andhra Pradesh was due to Argulosis. Nodular disease caused by sporozoan *Myxobolus* sp was detected in *Carassius auratus* and *Morulius chrysophekadion*, initially as small white cream coloured raised lump on dorsal surface of the body, that gradually enlarged to rupture and caused death of the fish. When kept separately in aquarium, the infected fish survived for a long time. Similar

symptomatic features of the disease was recorded in cichlids, carps and other ornamental fishes by Zaidi (2002).

Of the two fungal diseases recorded in the investigation, EUS caused by *Aphanomyces* sp in barbs, *Puntius sophore*, *P. ticto*, *Channa punctatus* and *Cyprinus carpio* was severe in winter season causing mortality. EUS, a seasonal epizootic condition in fresh and estuarine warm waters, is of complex infectious etiology, characterized by presence of invasive *Aphanomyces*. Das & Das (1997) reported that wild and cultured fishes were infected by EUS in winter in the North east region of India. Lilley et al. (1998) reported EUS infection in snakeheads, catfish, *Puntius* sp, blue gourami, *Glossogobius giurinus*, *Mastacembelus armatus* and several other wild fishes. EUS infection in this investigation however was not observed in exotic fishes. Srivastava (1980) reported infections of *Aphanomyces* sp in *L. rohita* and *P. ticto*

Saprolegniasis caused by *Saprolegnia* sp was observed in *P. sophore*, *Morulius chrysophekadion* and young *Chitala chitala*. The infection was characterized by presence of cotton wool growth on open wounds of the body. These were secondary infections on ulcers caused by other disease conditions. Incidence of saprolegniasis in the investigation was

Table 2. Bacteria associated with ornamental fishes under observation

Infected fish species	Incidence No. observed due to				
	Dropsy	Finrot	Ulcer	Exophthalmia	
	<i>Aeromonas hydrophila</i>	<i>Aeromonas</i> sp.	Causative Agent <i>fluoriscens</i> <i>Pseudomonas</i>	<i>Aeromonas</i> sp.	<i>Aeromonas hydrophila</i>
Carp (<i>Cyprinus carpio</i>)	6	-	-	-	-
Koi (<i>Cyprinus carpio carpio</i>)	5	-	-	-	-
Goldfish (<i>Carassius auratus</i>)	10	3	-	-	-
Spotfin barb (<i>Puntius sophore</i>)	-	3	2	-	-
Scissortail rasbora (<i>Rasbora trilineata</i>)	-	-	-	-	3
Blue gourami (<i>Trichogaster trichopterus</i>)	12	5	3	-	-
Angel (<i>Pterophyllum scalare</i>)	-	10	-	-	-
Swordtail (<i>Xiphophorus helleri</i>)	-	12	-	-	-
Black molly (<i>Poecilia sphenops</i>)	-	23	5	-	-
Black shark (<i>Morulius chrysophekadion</i>)	-	-	-	2	-
Indian potasi (<i>Psuedeutropius atherinoides</i>)	4	-	-	-	-
Total	37	56	10	2	3

low. Srivastava (1980) observed infections of *Saprolegnia* sp in *C. lalia*, *Nandus nandus*, *Heteropneustes fossilis* and *Notopterus notopterus*.

Bacterial diseases and the number of incidence in the fishes examined is presented in Table 2. Finrot caused by *Aeromonas* sp and *Pseudomonas fluorescens* was more in *Poecilia sphenops*, *C. auratus*, *Xiphophorus helleri* and *Pterophyllum scalare* reared in aquarium. Hettiarachchi & Cheong (1994) reported that *A. hydrophila* caused distinct pathological conditions of tail/finrot and haemorrhagic septicaemia in fish. *P. fluorescens* had been implicated in epizootic outbreaks of several cultured fishes (Miyashita, 1984; Thune et al., 1993). Ahne et al. (1982) stated that bacterial finrot is a contagious infection. Sterba (1956) opined that ecological factors favoured appearance of this disease. Dropsy recognized by ascites and ventral body swelling in *C. auratus*, *Trichogaster trichopterus*, *Cyprinus carpio carpio* and few other was caused by *A. hydrophila* and at later stages, it caused distended abdomen of the fishes with ulcers. Abdominal dropsy caused by *Aeromonas* sp. was also significantly higher in this investigation. Shome et al. (1999) reported that *A. hydrophila* caused acute infectious abdominal dropsy in many freshwater fishes. Austin & Austin (2007) reported that the distended abdomen of fishes may be a sign of many diseases caused by *A. hydrophila*, *A. salmonicida*, *P. fluorescens* and similar microorganisms. Exophthalmia in *Rasbora trilineat*, characterized by bulging eyes leading to corneal opacity was due to infection of *A. hydrophila*. Austin & Austin (2007) reported that eye damage and corneal opacity in fish leading to corneal rupture were due to infection of *A. hydrophila*, *A. caviae* and similar pathogens. Bacterial ulcers of *M. chrysophekadion*, initially appearing as small ulcer or shallow open sores on body surface and later spreaded as irregular large ulcers in the fish was caused by *Aeromonas* sp. (Monhar et al., 1976; Kumar et al., 1986; Karunasagar et al., 1988; Sahu et al., 1996). It was also observed that *Aeromonas* and *Pseudomonas* bacteria caused ulcers in fish populations stressed by high stocking density and low water quality.

Incidence of parasitic and microbial diseases in ornamental fishes affect relationship between the population density, source and water quality of the rearing environment. Constant monitoring of water quality, quarantine treatments and disease preventive measures may ensure growth of a sound trade of these fishes in the region.

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