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## B Kalita

College of Fisheries, Assam  
Agricultural University, Raha,  
Nagaon, Assam, India

## A Ali

College of Fisheries, Assam  
Agricultural University, Raha,  
Nagaon, Assam, India

## S Islam

College of Veterinary Science,  
Assam Agricultural University,  
Khanapara, Assam, India

## IA Hussain

College of Fisheries, Assam  
Agricultural University, Raha,  
Nagaon, Assam, India

## H Pokhrel

College of Fisheries, Assam  
Agricultural University, Raha,  
Nagaon, Assam, India

## Correspondence

### H Pokhrel

College of Fisheries, Assam  
Agricultural University, Raha,  
Nagaon, Assam, India

## Incidence of fish diseases in Assam

**B Kalita, A Ali, S Islam, IA Hussain and H Pokhrel**

### Abstract

A summary of the incidences of some fish diseases in 7 districts of Assam has been presented. During the two years (2013-15), a total of 39 incidences have been recorded from 29 fish farms in the study areas under the National Surveillance Programme for Aquatic Animal Diseases. These includes: 10 Epizootic Ulcerative Syndrome (EUS), 8 Argulus, 2 Myxobolus, 2 Fin-rot, 5 dropsy, 5 hemorrhagic septicemia and 7 of Environmental nature. Incidences of EUS is highest (25.64%) followed by Argulus (20.51%) and lowest in Myxobolus and fin-rot (5.13%) each. EUS happens to infect in greater (34.97%) areas followed by dropsy (33.80%). Most disease incidences occur in winter season contrary to Argulus that occurs throughout the year.

**Keywords:** Brahmaputra, epizootic ulcerative syndrome, Myxobolus, Argulus

### 1. Introduction

Occurrence of fish diseases in the freshwater aquaculture systems of the Brahmaputra valley has gained significant economic importance in recent times. It is well known that Assam is having heterogenous ecological systems in respect of inland water resources and more species diversification in culture activities. So intensification of culture activities increases the possibility of outbreak of unknown disease causing agents. Moreover, the state being situated in the subtropical region but enjoying a humid tropical climate may harbor a greater number of diseases causing agents in different seasons. Seasonal fluctuations of fish diseases have been recognized for many years, especially in the temperate regions of the world [22, 20]. The monthly distribution of parasitic and bacterial diseases among cultured catfish, minnows and wild fish shows the seasonal variation of diseases which are usually associated with changes in water temperature which leads to the increases in susceptibility of fish to diseases [14,19]. There are report which shows that there had been a differential pattern of spread of EUS among different species, during different seasons [5]. Except few instances which have been reported, EUS appears to occur during the colder months of the year or with decreasing water temperature [15]. As the atmospheric temperature of Assam varies greatly in different seasons resulting in disease intensity with fall a of water temperature from the months of October to January, also indicative of an account of common diseases incidences in fish culture ponds of Nagaon, Morigaon and Sonitpur districts of Assam in post flood period [2,8]. The present study tries to provide a brief account of two years summary (2013-2015) of disease incidences that have been investigated from 29 fish farms of Assam under the National Surveillance Programme for Aquatic Animal Diseases.

### 2. Materials and Methods

The present investigation was made under the national project on "National Surveillance Programme for Aquatic Animal Diseases" during 2013-15 in 7 districts of Assam. The study encompassed identification of disease, occurrence of incidence, species affected and infected water spread area of fish farm irrespective of management practices. About 29 numbers of fish farms were made spot visit and personal contact at different sites within these districts during the period after receiving information of disease incidence that occurred. Random samplings of fish by netting from the infected ponds were recorded and pooled data were used to find out the incidence, infected species, and area infected for each disease. Metazoan parasites were collected from the infested fish and preserved in 8% formalin and 70% ethanol for further diagnosis, while the tools and techniques were used to find out the causative agents for specific purposes.

**Parasitological techniques:** Sampled fishes were initially examined for the ectoparasites or lesions visible to the naked eye. Scrapping of body surface mucus from behind the pectoral fin adjacent to the dorsal fin and operculum, excised gills, lesions and intestine of fish were examined under microscope for proper identification. Use of fresh specimens facilitated visualization of motile parasites [18, 23, 24]. Specimens were preserved in 10% buffered formalin and 70% ethanol, stored for further identification, using keys [25, 12, 6].

**Bacteriological technique:** Selective media such as Rimler-Shotts [21] and King's B Medium [11] 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 standard technique of [1] and [13] were used. Culture exhibiting positive oxidase reaction, fermentative metabolism, motility and resistance to vibriostatic agent O/129 were considered to be *Aeromonas* spp. and further subjected to biochemical test [17] to ascertain the species. Identification of *Pseudomonas* to species level was done according to standard protocol [11].

**Histological techniques:** Standard histological technique [3] was followed in the present investigation.

### 3. Results and Discussion

A total of 39 incidences of fish diseases were recorded from 29 numbers of fish farms of 7 districts of Assam during 2 years of investigation is shown in the Table 1. Seven numbers of fish diseases have been recorded and identified, out of which 2 parasitic, 3 bacterial, 1 fungal and 7 are of an environmental nature. Most of the indigenous and exotic carps were affected by the incidences. Out of 39 incidences of fish diseases-recorded, 10 EUS, 8 Argulus, 2 Myxobolus, 2 Fin-rot, 5 Dropsy, 5 Hemorrhagic septicemia and 7 are of an environmental nature. Among the disease's incidences of EUS was the highest (25.64%) followed by Argulus (20.51%), Dropsy (12.82%), Environmental nature (17.95%), Hemorrhagic septicemia (12.82%), and lowest in Myxobolus and Fin-rot (5.31%) each, which is shown in table 2. A greater area (34.97%) happened to be infected by EUS followed by dropsy (33.80%), Argulus (16.99%), Hemorrhagic septicemia (6.80%), Environmental nature (6.60%) and other infect comparatively very low by, Fin-rot (0.51%) and Myxobolus (0.33%).

Incidences of bacterial diseases were highest (30.77%) followed by parasitic and fungal (25.64%) each, while that of environmental nature recorded (17.95%) during the period Table 2. Most of disease incidences occurred during winter season except contrary to *Argulus* sp., which recorded throughout the year. The parasitic disease, *Argulus* infestation caused by *Argulus foliaceus* recorded highest incidence (20.51%) compared to that of *Myxobolus* (5.13%). Report suggest that slight change in the management practices, result in considerable stress on the homeostatic mechanism of fish, rendering more susceptible to infection with a variety of parasite [24]. Risk factors associated with *Argulus* infestation

in ponds might be the presence of brown algal bloom, high organic load, stocking of infected seed and raising water temperature in summer months [10]. The highest prevalence of *Argulus* infestation (34.10%) recorded in Nagaon district followed by North Lakhimpur (28.57%), where the cause of the problem may be inundation of fish farms due to flood water, which increases the risk of health hazard through water quality deterioration [9]. *Myxobolus* sp. was involved in the incidence (5.31%) that occurred during monsoon season. From the observation it can be assumed that summer months are more favourable for parasite reproduction as many of the incidences have been noticed during this period and less incidences during the winter season. The parasites recorded from open water bodies are not included in this report.

Bacterial disease incidence accounted (30.77%) during the investigation. The maximum (12.82%) was recorded by both bacterial hemorrhagic septicemia caused by *Aeromonas* sp. and *Pseudomonas* sp. and dropsy (7.69%) caused by *Aeromonas hydrophila*. While, fin-rot (5.13%) caused by *Pseudomonas* sp. was the lowest. It was observed that more number of incidences of hemorrhagic septicemia (5) occurred during winter season and dropsy (5) and fin-rot (2) recorded during the monsoon months. *Aeromonas hydrophila* and *Pseudomonas* spp. were the most serious bacterial disease organisms infecting the fish ponds and both occur at any time of the season but more abundant during winter. The greatest number of *A. hydrophila* and *Flavobacterium columnaris* infection occurred in any time of the year but was more abundant in spring and early summer [16]. Incidences of fungal disease Epizootic Ulcerative Syndrome (EUS) were recorded in different farms of the districts affecting all the fish species during the winter months. EUS recorded highest incidence (26.90%) with maximum severity in winter seasons affecting all the species in Assam and Northeast region [7,4]. Barring few exceptions, the outbreak of EUS was first recorded in the months of September in Sonitpur, October in Nagaon and February in Morigaon district during 2009, indicating its relationship with fall of temperature in the region [15, 8].

Among the diseases EUS recorded highest (34.97%) infected area of the total infected farm area followed by dropsy (33.80%) and Argulus (16.99%); others remained comparatively low. The possible reason may be that as EUS is an epizootic in nature and had maximum occurrence during investigation.

### 4. Conclusion

The present study revealed that the incidences of EUS is highest followed by Argulus, Myxobolus and fin-rot. Most of the disease incidences occur in winter season contrary to some exception like Argulus which occurs through the year. The rise in incidence of disease in the winter season may be contributed to the fact that either the disease-causing pathogen may be temperature sensitive or declining water temperature reduces the immunity of the fish and thus fish becomes more susceptible to diseases outbreak.

**Table 1:** Details of disease incidences in 7 districts of Assam during 2 years (2013-15).

Sl. No.	Disease/ Causative agents	No of incidence	Total area (ha)	Infected area (ha)	Species affected	Season of occurrence
1	Epizootic Ulcerative Syndrome (EUS) <i>Aeromonas</i> sp.	10	3.60	0.13	<i>C. mrigala</i>	Pre monsoon
			29.00	29.00	<i>L. rohita</i> , <i>C. mrigala</i> , <i>C. catla</i> , <i>P. javanicas</i>	Winter
			5.73	0.58	<i>L. bata</i> , <i>P. javanicas</i> , <i>L. rohita</i> , <i>L. gonius</i>	Winter

			0.40	0.40	<i>L. rohita, C. reba</i>	Winter
			0.70	0.70	<i>L. rohita, L. goniuis, C. mrigala, C. catla, C. reba, H. molitrix</i>	Winter
			3.00	0.41	<i>P. javanicas, C. mrigala</i>	Winter
			9.33	2.66	<i>L. rohita, C. mrigala, C. catla, Channa sp., Anabus sp. Puntius sp.</i>	
			0.80	0.80	<i>C. reba and L. rohita</i>	Winter
			0.67	0.67	<i>L. rohita, C. mrigala</i>	Winter
			1.00	0.86	<i>P. javanicas, L. rohita</i>	Winter
<b>Total</b>			<b>54.23</b>	<b>36.21</b>		
2	Argulus <i>Argulus foliaceus</i>	8	2.66	0.60	<i>L. rohita, C. mrigala, C. catla, C. carpio</i>	Year-round
			2.66	2.66	<i>L. rohita, C. carp</i>	Year-round
			0.40	0.40	<i>L. rohita, C. catla,</i>	Year-round
			3.00	3.00	<i>Chitala chitala</i>	Year-round
			3.00	1.00	<i>C. mrigala, P. javanicas</i>	
			6.94	6.94	<i>L. rohita, C. mrigala, C. catla, C. carpio, C. idella, H. molitrix</i>	Year-round
			1.00	1.00	<i>L. rohita, C. mrigala, C. catla, C. carpio, C. idella, H. molitrix</i>	Year-round
4.00	2.00	<i>L. rohita, C. catla, C. carpio, C. idella</i>	Year-round			
<b>Total</b>			<b>23.66</b>	<b>17.6</b>		
3	<i>Myxobolus</i> sp.	2	2.30	0.26	<i>C. mrigala,</i>	Monsoon
			2.00	0.08	<i>Chitala chitala</i>	Summer
<b>Total</b>			<b>4.30</b>	<b>0.34</b>		
4	Fin-rot <i>Pseudomonas</i> sp.	2	0.80	0.13	<i>C. catla, P. javanicas</i>	Winter
			0.40	0.40	<i>C. idella, H. molitrix, C. carpio, L. goniuis</i>	Winter
<b>Total</b>			<b>1.20</b>	<b>0.53</b>		
5	Dropsy <i>Aeromonas hydrophila</i>	5	0.40	0.40	<i>C. mrigala, C. catla, P. javanicas</i>	Winter
			2.30	0.20	<i>C. mrigala, C. catla, P. javanicas</i>	
			2.50	0.75	<i>C. catla</i>	
			18.66	18.66		
<b>Total</b>			<b>15.00</b>	<b>15.00</b>		
6	Hemorrhagic septicemia <i>Aeromonas</i> sp. <i>Pseudomonas</i> sp.	5	2.66	2.66	<i>L. rohita, L. goniuis, C. idella</i>	Winter
			0.80	0.40	<i>P. javanicas, C. catla</i>	Winter
			17.4	3	<i>L. rohita, C. catla</i>	Winter
			5.73	0.58	<i>L. bata, P. javanicas, L. rohita, L. goniuis</i>	Winter
			0.40	0.40	<i>P. javanicas</i>	Winter
<b>Total</b>			<b>26.99</b>	<b>7.04</b>		
7	Environmental Disease	7	4.00	0.50	<i>C. catla</i>	
			2.50	2.50	<i>L. goniuis, P. javanicas</i>	
			0.13	0.13	<i>L. rohita, C. ctla, P. javanicas, C. idella, H. molitrix</i>	Monsoon
			0.20	0.20	<i>L. rohita, C. ctla, C. mrigala, L. goniuis, P. javanicas, Channa spp.</i>	
			0.20	0.10	<i>L. rohita, C. mrigala, L. goniuis, L. boga, C. idella</i>	
			0.40	0.40	<i>L. rohita, C. catla,</i>	Monsoon
			3.00	3.00	<i>C. Catl, L. rohita</i>	Monsoon
<b>Total</b>			<b>10.43</b>	<b>6.83</b>		

**Table 2:** Pool data on disease incidences and infected areas in 7 districts of Assam during 2 years (2013-15).

Sl. No.	Disease	No of incidences	Disease incidence %	% of area infected over total infected farm area
1	Epizootic Ulcerative Syndrome (EUS)	10	25.64	34.97
2	Argulus	8	20.51	16.99
3	Myxobolus	2	5.13	0.33
4	Fin rot	2	5.13	0.51
5	Dropsy	5	12.82	33.80
6	Hemorrhagic septicemia	5	12.82	6.80
7	Environmental nature	7	17.95	6.60
<b>Total</b>		<b>39</b>	<b>100</b>	<b>100</b>

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