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Argulosis in fish culture ponds of selected areas of Mymensingh

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Abstract

An investigation on argulosis problem and aquaculture condition in Mymensingh area was conducted during the period of August 2004 to June 2005. In the study area, a total of 66 farms were selected for the study. General data were collected through a questionnaire interview from the owners of the farms. Majority of the farms were smaller (5-15 acres) in size. Among the total fish farmers most of them were educated up to primary level. Mortality of fishes by argulosis was 10% in small farms and 5% in the larger farms. Majority of the farm owners showed their preference for culturing major carps. Mainly June, July and August were the most potential months for *Argulus* infestation. *Labeo rohita* and *Cirrhinus mrigala* were higher susceptible species for Argulosis. Preferable site of infestation on the host body is pectoral region. Brood fishes were more susceptible to *Argulus* infestation, due to weaker physiological condition at the breeding season. Principal causes for *Argulus* infestation was the high stocking density, poor water quality and physical condition of the pond and lack of technical knowledge of the farmers. Most of the farmers used sumithion, dipterex, melathion against argulosis. Proper pond management could control argulosis in fish ponds of this region.

Keywords: Argulosis, Infestation, Aquaculture condition, Pond management

Introduction

Argulosis is one of the problems in fish culture program in Bangladesh. Fish farmers raise several complains to protect their crops from argulosis both in nurseries and culture ponds. The disease is caused by an ectoparasitic crustacean of the genus *Argulus*, the fish louse, is a small miniature with dorsoventrally flattened body provided with suckers and proboscis.

Argulus feed first by inserting a pre-oral sting which injects digestive enzymes into the body of fish. Then they suck out the liquated body fluids with their proboscis-like mouth. The various spines, suckers and hooks that lice use for attachment may also cause additional tissue damage (Shimura and Inoue, 1984).This fish louse has become a major problem causing mortality, morbidity and growth loss to the carp ponds in different fish farms and hatcheries throughout the world.

Several works have been done in other countries of the world on this issue. Thomas and Devaraj (1975) studied the taxonomy of *Argulus* and erected two new species *A. cauveriensis* and *A. fluviatilis*. He also provided a key for identification of the Indian species reported from fish. Gresty *et al.* (1993) stated that *A. japonicus,* an ectoparasite attaching to, and feeding on the skin of its host, is a potentially serious pathogen of native freshwater fishes. Padmavathi and Prasad (1998) studied on the control measures of argulosis using Nuvan and Ekalux. Omprakasam and Manohar (1992) described another new species of *Argulus* parasitic carps.

In Bangladesh (The then East Pakistan) Rahman (1968) noted on *Argulus* infestation particularly in pond fisheries. Such mortality takes a heavy toll of fish life resulting in partial or complete destruction of fish in the infected ponds. No suitable remedial measure for the control of *Argulus* has been prescribed with sufficient accuracy and favorable results. Ahmed (2004) worked o the development of environment friendly measures for the treatment of argulosis in carp brood ponds.

Argulus from freshwater wild fish was reported by Ahmed and Sanaullah (1978). Chandra *et al.* (2004) studied on affected fishes and found flesh of both sides of vertebral column of the infested fish was shrunk. When *Argulus foliaceus* and its related species lay eggs attach to fish can be seen with the naked eye. The attached area is often red and irritated- the fish show hemorrhagic reaction to the infection.

Recruitment of *Argulus* is continuous particularly during the summer months. After fertilization gravid females detaching from the hosts to lay eggs have to find a suitable substratum in the vicinity. The present work is therefore undertaken to understand the nature of mortality and infestation of *Argulus*, aquaculture condition of the fish farms, chemicals used for the treatment of *Argulus*, their dosages and effect on *Argulus* infestation and impact of *Argulus* including socio-economic condition of fish farmers in Mymensingh area.

Materials and Methods

Investigation was conducted during the period from August 2004 to June 2005 in different areas of Mymensingh region particularly in different upazilla. Sites were selected on the basis of available fish farms and hatcheries. Sampling areas Mymensingh Sadar, Muktagacha, Fulbaria, Fulpur, Gafargaon, Gouripur, Ishwargonj and Trishal upazilla. These upazillas were chosen as concentration of fish farm are more and many successful private fish farms are present in these areas.

Data were collected through questionnaire prepared before interview. A set of preliminary questionnaire was prepared. For the interview, simple random sampling method was followed. A total of 66 farmers having different farm size were interviewed. Prior to field survey, background information on the number, location and distribution of fish farms and aquaculture activities was collected. Cross check interviews were also conducted with key informants such as District Fisheries Officer and Upazilla Fisheries Officer.

The interview schedule for collecting of data was divided into five broad headings.

i. Physical information
ii. Socio-economic information
iii. Culture information
iv. Problems confronted
v. Suggestions to overcome the problems

Samplings were done weekly throughout the six months (June 2005 to November 2005) from the commercial nursery ponds and also stocking ponds. Fish fry and fingerlings were collected from different ponds of each location. Fish body was divided into seven regions (Head region, scapular region, dorsal region, pectoral region, pelvic region, anal region and caudal region).

After sampling the fishes were examined for parasitic infestation. Body surface of the host fishes were carefully observed using magnifying glasses. Different regions of the fish body like pectoral, lateral and anal regions found to be attacked by different stages of *Argulus.* They were collected and preserved for further study. The damage caused by the fish lice were also noted, other data on host size, number of parasites were recorded.

Argulus were collected from external body surface of the host fishes by rubbing with sponge and also by thumbs and forceps and were first placed into a jar containing pond water and allowed them to swim around the container for several hours before preservation. After washing, live specimens were dropped into a vial containing 70% alcohol (Fig.1). The filled interview schedule was thoroughly checked to see if there is any discrepancy regarding documentation of the information.

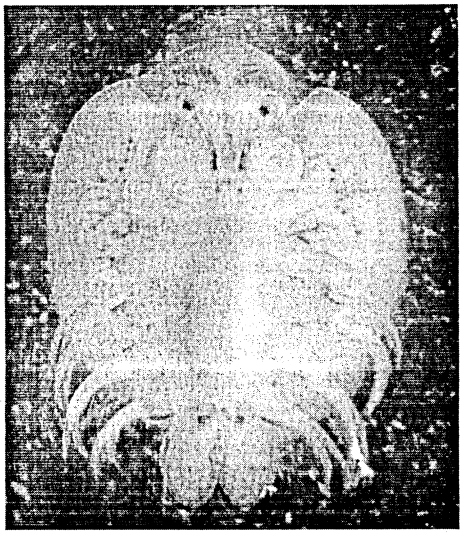

Fig.1 *Argulus* collected from the infested fish

Results and Discussion

It was observed that most of the farmers (55%) were the owner's of small lands (5-15 acres). Few ponds were recorded larger in size (above 50 acres). Depths of most ponds were of 5-6ft. Pond depth of maximum farms in Mymensingh area is 5 to 6 feet.

Most farmers are interested in polyculture (64.15%) than monoculture, because of high production. Though *Argulus* infestation is higher in polyculture ponds. Mainly three groups of fishes are cultured in this region; carps, pangus and tilapia. More or less similar observation was recorded by Ali *et al.* (1995), where the maximum fish farmers in the eastern region of Bangladesh largely culture Indian major carps. Islam (1975) reported 92% of the pond owners wanted to culture fish and all of them were in favor of carp culture. In case of monoculture system the stocking density was observed as 65-150 fish per decimal.

The use of supplementary feed is very common in this region. However, they mostly use complete feed (pelleted). Ingredients of feed are Mastered oil cake (MOC), Rice bran, Wheat flour, Soybean, Fish meal and Meat and Bone meal.

Argulus infestations in fish farms of Mymensingh area are reported to occur throughout the year. However, the prevalence (%), intensity seems to vary in different seasons of the year. Farmers reported disease outbreak 96.97% in June and July 53 (80.30%) in August 11(16.67%) in September 5 (7.58%) in November 10 (15.15%) in December 10 (15.15%) in January 12 (18.18%) in February 28 (42.42%) in March 31(46.97%) in April. Though its infestations recorded throughout the year most prevalence were noted in five months. (Table 1)

Most of the farmers (90%) take some measures to prevent Argulosis in their ponds. The preventive measures include pond drying, addition of water, removal of water and use of chemicals.

A range of chemical treatments are also reported to perform by the farmers. Liming is the most common treatment followed by application of salt, potassium permanganate, pesticides and insecticides. The highest number of farmers (95%) use sumithion, dipterex, lime, potassium permanganate ($KMnO_4$) and formalin. Some farmers (5%) do not treat their diseased fish at all. It is also observed that the argulus is getting resistance to chemicals, day by day. Farmers/ farm owners demanding new medicine to control argulosis to save their crops.

Maximum farmers reported that the carps are more susceptible host for *Argulus* sp. Where rui and mrigal were the most susceptible hosts for *Argulus* (100%). On the other hand catla (86.36%) and sharputi (19.7%) were infested by fish louse (Table 2, Fig. 2). Pangus was not reported as a victim for fish louse.

From seven locations of body surface (Head region, scapular region, dorsal region, pectoral region, pelvic region, anal region and caudal region) *Argulus* was counted organoleptically at all of these regions. In mrigal the highest infestation (40%) of *Argulus* sp. was in the pelvic region, 30% in the pectoral region, 5% in the dorsal region, 10% in the anal region, 10% in the caudal region, and 5% in scapular region. In rui (46%) it was in the pelvic region, 25% in the pectoral region, 4% in the dorsal region, 12% in the anal region, 10% in the caudal region, and 3% in scapular region. The pattern of infestation was more or less similar in catla (Fig. 3). Suitability of attachment site may be related with the easy and security of *Argulus* to obtain blood foods and protection from rubbing of body of host.

Ahmed (2004) suggested that fixing of bamboo splits in the pond, periodic use of lime and presence of *Chanda nama* can considerably reduce the threat of argulosis. However *C. nama* should be restricted in major carp ponds only and must not be allowed to invade the silver carp ponds as they prefer to feed on silver carp scales.

Maximum farmers reported that, the susceptibility of argulosis is higher in brood fishes are of 56.92% in culture fish 39.39% and lower in fingerlings 4.61% (Fig. 4). Susceptibility may be associated with the weaker physiological condition of animal. As brood fishes become weak at the breeding time and parasitic infestation becomes prevalent.

Table 1. Infestation of *Argulus* in different months of the year in Mymensingh region

Area	No. of farmers interviewed	Farmer's opinion on *Argulus* infestation at different months of the year											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mymensingh Sadar	9	2	-	3	5	4	9	9	8	1	-	-	1
Muktagacha	4	-	-	1	4	2	4	4	3	-	-	1	1
Fulbaria	11	1	2	3	4	9	10	10	10	2	-	-	1
Fulpur	13	3	2	3	2	3	13	13	11	1	-	1	1
Gafargaon	4	-	1	2	2	4	4	4	4	3	-	-	2
Gouripur	4	-	2	2	3	4	4	4	3	-	-	1	1
Ishawargonj	5	2	-	5	3	5	5	5	4	-	-	-	-
Trishal	4	-	2	2	4	4	3	3	2	2	-	-	1
Bhaluka	12	2	3	7	4	8	12	12	8	2	-	2	2
Total (%)	66	10 (15.15%)	12 (18.18%)	28 (42.42%)	31 (46.97%)	33 (50%)	64 (96.97%)	64 (96.97%)	53 (80.30%)	11 (16.67%)	0	5 (7.58%)	10 (15.15%)

Table 2. Infestation of *Argulus* in various cultured species in different Upazilla of Mymensingh region

Area	No.of farms	*Argulus* infestation on different fish species					
		Labeo rohita	*Cirrhinus mrigala*	*Catla catla*	*Hypophthalmicthys molitrix*	*Puntius gonionotus*	*Pangasius hypophthalmus*
Mymensingh Sadar	9	+	+	+	-	-	-
Muktagacha	4	+	+	+	-	+	-
Fulbaria	11	+	+	+	-	-	-
Fulpur	13	+	+	+	-	-	-
Gafargaon	4	+	+	+	-	-	-
Gouripur	4	+	+	-	-	+	-
Ishawargonj	5	+	+	-	-	+	-
Trishal	4	+	+	+	-	-	-
Bhaluka	12	+	+	+	-	-	-

The mortality of fish was comparatively higher in small farms (10%) and lower in larger farms (5%). The mortality percentage was determined by the approximate assumption of the respondent farmers. The highest mortality of fish was recorded in Gouripur upazilla (10%) and the lowest mortality was in Fulbaria upazilla (1%). Economic loss occurs only for purchasing of chemicals such as sumithion, dipterex etc. In Gouripur, Jhalok fish hatchery owner reported that they expend about Tk. 25,000 every year to buy chemicals.

Fish farmers or farm owners of Mymensing region are reported to face a number of problems in controlling argulosis. The major problems are lack of technical knowledge on aquaculture, disease treatment, loan from any source, training, medicine for disease treatment and consultancy or technical assistance from the government officials. Problems associated with fish culture system is arranged in percent and presented (Fig. 5). Associated factors of *Argulus* infestation are high stocking density of fishes, poor water quality of the ponds, seasons, amount of waste materials in the ponds, physical condition of the pond, pond management, technical knowledge of the farmers for controlling argulosis these associated factors could be improved by providing training of fish farmers/owners for proper management of fish farms.

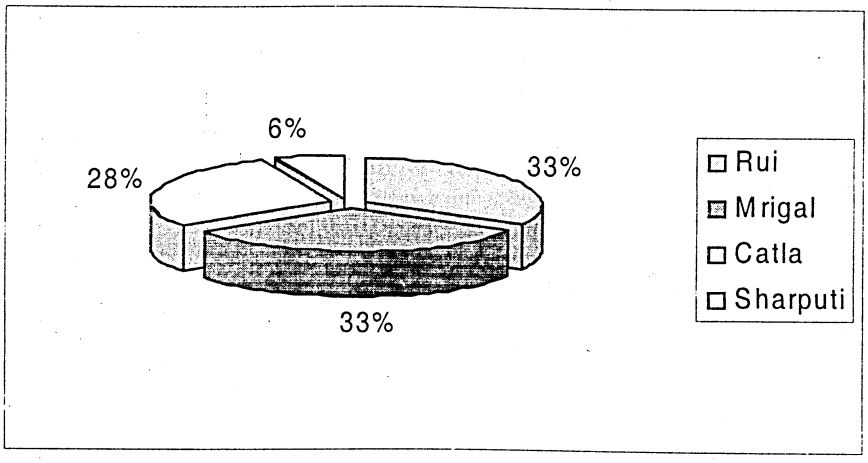

Fig. 2. Infestation of *Argulus* in different fish species in Mymensingh region

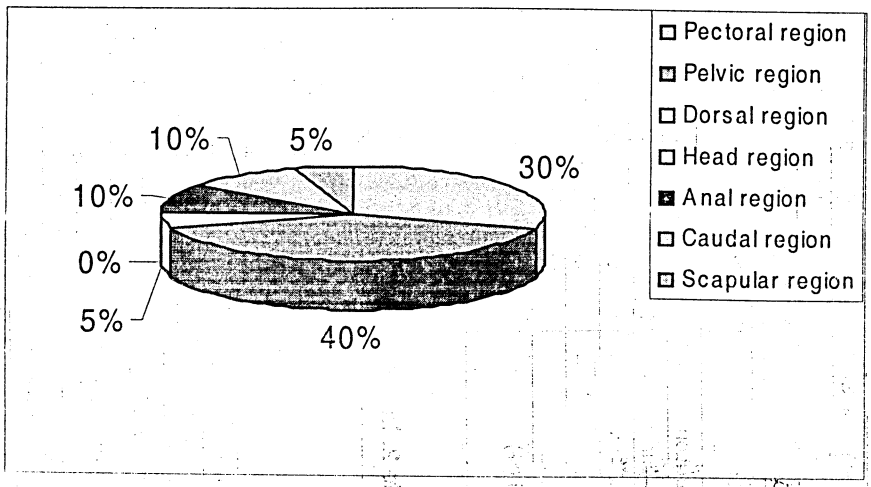

Fig. 3. Percentage distribution of *Argulus sp.* on *Cirrhinus mrigala*

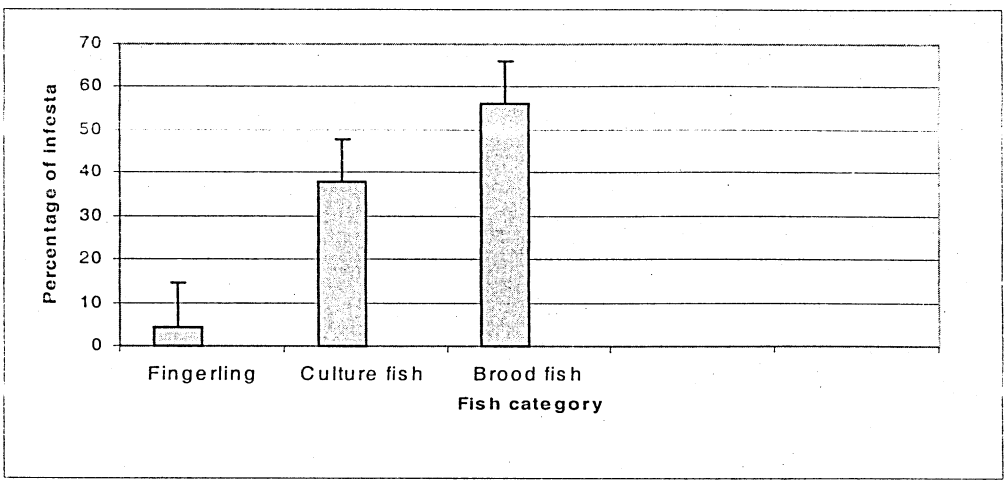

Fig.4. Percentage infestation of *Argulus* in different size group of fish

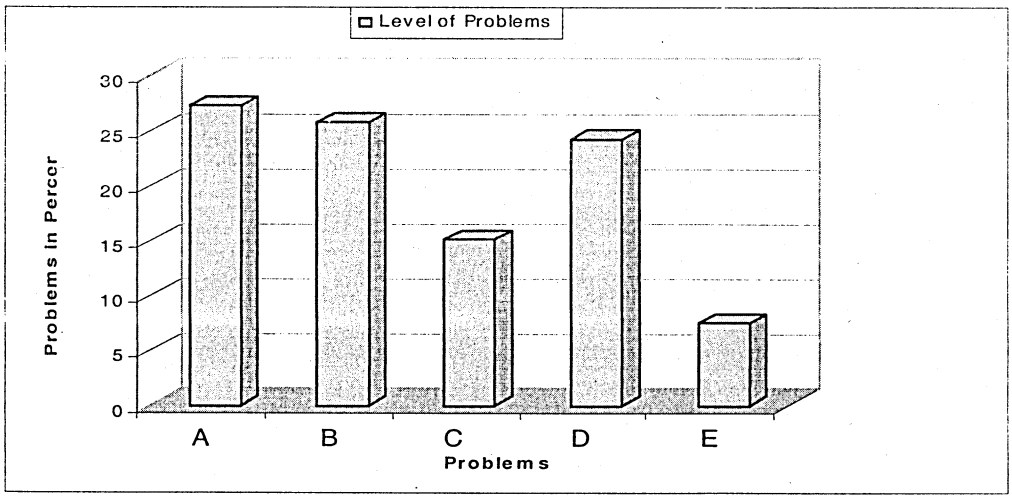

Fig. 5. Problems confronted by the farmers to control argulosis in different study area

A = Lack of technical assistance
B = Lack of proper knowledge
C = Lack of medicine
D = Lack of training
E = Lack of financial support

Acknowledgements

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