

Study on regional differences in soil-water characteristics and their relevance to aquaculture productivity and fish disease

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Abstract

A total of 45 ponds used for fish polyculture were investigated in three zones of Bangladesh to identify the differences among the zones in respect to aqua-ecology, culture practices, fish productivity and health management. Four hundred and fifty fish from three zones were clinically examined by naked eye and histopathology. Out of total number of fish examined, 45 fish from Dhaka zones were examined for parasites and bacteria in addition to histopathology. Faded and haemorrhagic gill, skin, fin, scale loss and lesions were observed during fish examination. *Aeromonas* spp. *Pseudomonas* spp. and *Streptococcus* spp. were isolated respectively from 56%, 46% and 39% affected fish. Among the five water quality parameters analyzed, the highest average hardness and alkalinity respectively were recorded in Rajshahi (156 ppm and 142 ppm) followed by Dhaka (146 ppm and 132 ppm) and Chittagong (81 ppm and 90 ppm). The highest average pH was recorded in Mymensingh (7.52) followed by Rajshahi (7.13) and Chittagong (7.05). Water holding capacity of soil in Rajshahi zone was poor compared to other zones and farmers were found to be reluctant to fish farming.

Key words: Polyculture, Fish ponds, Soil-water characteristics, Fish diseases

Research findings

- A total of 45 ponds under fish polyculture were investigated in Dhaka, Chittagong and Rajshahi zones to identify the differences among the zones in respect to aqua-ecology, water quality parameters, culture practices, productivity and fish health management.
- Among the five water quality parameters analyzed, the highest average hardness and alkalinity respectively were recorded in Rajshahi (156 ppm and 142 ppm) followed by Dhaka (146 ppm and 132 ppm) and Chittagong (81 ppm and 90 ppm). The highest average pH was recorded in Mymensingh (7.52) followed by Rajshahi (7.13) and Chittagong (7.05).
- Water holding capacity of soil in Rajshahi zone was poor compared to other zones and farmers were found to be reluctant for fish farming.

- Farmers in Dhaka zone were found to stock higher number of fish compared to Chittagong and Rajshahi.
- Out of total number of fish examined, forty five fish from Dhaka zones were immediately carried to BFRI fish disease laboratory, Mymensingh and investigated for parasites and bacteria in addition to histopathology.
- Clinical signs and symptoms of the disease were faded skin and gills, haemorrhagic skins and fins, scale loss, lesions of variable sizes, sluggish movement, loss of appetite, etc.
- *Aeromonas* spp. were isolated from 56%, *Pseudomonas* spp. from 46% and *Streptococcus* spp. from 39% affected fishes. Even a few unaffected fish carried *Aeromonas* spp. and *Pseudomonas* spp. on their skin.
- Trichodinids, *Chilodonella*, *Costia*, *Dactylogyrus* spp., *Gyrodactylus* spp. and *Argulus* spp. were as well isolated from skin and gills during microscopic examination of both diseased and healthy fishes.
- Higher infestation of parasites was observed in fishes of Dhaka zone and was followed by Chittagong and Rajshahi zones.

Policy implications

- A National Aquatic Animal Health Management Policy needs to be formulated for sustainable production, environment protection and food safety.
- Adoption of epidemiology based investigations on fish disease was found to be more reasonable rather than concentrating on pathogen and treatment.
- Understanding of current fish health management strategies by the concerned GO and NGO personnel is of great value. Therefore, GO and NGO personnel should be trained on Aquatic Animal Health Management.

Livelihood implications

Bacterial infection due to poor water quality and management causes up to 80% fish mortality. The fish loss due to the disease can be very frustrating to rural poor fish farmer. Fish farmers can reduce the risk of the disease by minimizing the hazards as mentioned, without using any expensive and toxic chemicals.