INTRODUCTION

In many tropical countries, brackish water shrimp farming is a lucrative and quickly expanding sector. However, the deterioration of water quality frequently restricts shrimp production in ponds (Gupta et al., 2004). The quality of the water is influenced directly or indirectly by physical and chemical elements such as salinity, temperature, dissolved gases, total suspended solids (TSS) and nutrients. Salinity also has a significant impact on the physiological processes of cultured organisms. The hydrogen ion concentration in water (pH) and pond bottom soil plays a major role in the growth, survival and health of aquatic animals. The balance of salt and water is important for maintaining the physiological functions of the organisms. Basically, water quality management involves maintaining the water ideal conditions for the selected species growth on a daily basis. The regulation of water quality is a key factor in shrimp farming since poor water quality inhibits shrimp survival and growth (Tharavathy, 2014). Water quality issues caused by overstocking, higher feeding rates and intake of polluted water are becoming more widespread in shrimp aquaculture (Venkateswarlu et al., 2019).

The best water quality parameters in a shrimp growing pond are maintained by a combination of physical factors and biotic characteristics (Jones et al., 2001). Achieving a healthy Carbon: Nitrogen (20:1) and Nitrogen: Phosphate (15:1) ratio is important to be able to develop and maintain good water quality in ponds (Avnimelech and Ritvo, 2003). Water quality management in shrimp culture plays a crucial role because of its impact on shrimp growth and survival. Shrimp can survive in an ideal range of water quality conditions. Any increase or decrease in the ideal range will cause a negative or positive impact...
was in the range 418 Nos. L\(^{-1}\) to 460 Nos. L\(^{-1}\) (Ara et al., 2018). Throughout the culture period, a total 15 different species of phytoplankton belonging to four different classes were observed. Some researchers have reported 28 genera of phytoplankton from Mymensingh region Bangladesh (Hossain et al., 2006) and 17 genera of phytoplankton from Rajshahi, Bangladesh (Hossain et al., 2007). Species belonging to the class Bacillariophyceae, such as Actinoptychus sp., Bacillaria sp., Bidodaphia sp., Chaetoceros sp., Coscinodiscus sp., Navicula sp., Nitzchia sp., Pseudonitzchia sp. and Thalassiosira sp. were found during the culture period. Species belonging to the class Dinophyceae such as Ceratium sp., Peridinium sp. and Prorocentrum sp., Oscillatoria sp. belonging to Cyanophyceae and Tintinnopsis sp. belonging to Ciliatea. Saraswathy et al. (2013) recorded 29 different phytoplankton species from L. vannamei cultured ponds of the Kancheepuram district of Tamil Nadu, India and among them, the dominant phytoplankton group was Chlorophyceae followed by Bacillariophyceae and Cyanophyceae.

In the present study, the zooplankton density observed was in the range from 12 to 404 Nos. L\(^{-1}\). Preston et al. (2003) observed zooplankton abundance range from 15/L to 1626/L from P. monodon cultured ponds in Australia. Zooplankton reported belonged to two major groups, rotifers and copepods. Total 8 different species of zooplankton were observed throughout the culture period. Rotifers were dominated by Branchionus sp., Keratella sp., Bdelloidea sp. and Lecane sp. were dominant. Copepods, such as Acartia sp., Calanus sp., Cyclops sp. and Oncaea sp. Similarly, 12 species of zooplankton were reported from L. vannamei cultured ponds of the Kancheepuram district of Tamil Nadu, India. Zooplankton belonged to rotifera, cedopera and cladocera groups (Saraswathy et al., 2013). Effendy et al. (2016) reported ciliates, protozoans, rotifers, crustacean larvae and copepods from shrimp ponds. Similar observations were also reported by Ara et al. (2018) in which the major groups of zooplankton observed in tiger shrimp aquaculture ponds were copepods, rotifers, sergestidae, gastropod larvae, bivalve larvae, pelagic polychaetes, nematodes, crustacean nauplii, insects and mysidacea.

CONCLUSION

The study conducted included data on the hydrobiological assessments as well as the management role of shrimp farmers from the Navsari region, Gujarat. This study has shown that the majority of the hydrobiological parameters conformed with the optimum recommended ranges observed in the published literature. However, the hydrobiological parameters of the shrimp farms were significantly influenced by the culture practices, stocking density, and location of the shrimp farms. This research will be useful to all shrimp farmers from the Navsari region of Gujarat as a baseline study to follow proper management measures in the future during culture.

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REFERENCES


Boyce C E (1979) Water quality in warm water fish ponds. Agricultural Experiment Station, Auburn University, Auburn, AL. Sportfish Pond Fertilization 257, 598-604.


