Assessment of EHP Infection, Water Quality & *Vibrio* Abundance in Pacific White Shrimp *(Litopenaeus vannamei*) Farming in Sri Lanka

S. Beulah[1], P.P.M. Heenatigala[2], S. Thatchaneshkanth[1]
[1]Department of Animal Science, Faculty of Agriculture, University of Jaffna, Sri Lanka.
[2]National Aquatic Resources Research and Development Agency (NARA), Sri Lanka.
*dbeulah638@gmail.com

Shrimp aquaculture is one of the fastest-growing sectors of the global aquaculture industry and contributes significantly to export earnings, employment, and food security. However, disease outbreaks and poor water-quality management remain major constraints to sustainable shrimp production. Among the emerging pathogens, *Enterocytozoon hepatopenaei* (EHP) and *Vibrio* spp. are recognized as major threats affecting shrimp health, growth performance, and farm productivity. This study investigated the prevalence of EHP infection and its relationship with physicochemical and bacteriological parameters in shrimp ponds located in the Northwestern Province of Sri Lanka. Pond water and shrimp hepatopancreas samples were collected from *Litopenaeus vannamei* culture ponds across five major shrimp-farming zones. Physicochemical parameters including temperature, pH, salinity, dissolved oxygen (DO), alkalinity, and total ammonia nitrogen (TAN) were analyzed according to APHA (2017) standard methods. Total Vibrio counts were determined using Thiosulphate Citrate Bile Salt Sucrose (TCBS) agar, while EHP infection was detected through DTAB–CTAB DNA extraction followed by nested PCR amplification and agarose gel electrophoresis. The results showed that EHP-positive ponds generally exhibited higher Vibrio loads than EHP-negative ponds, although the correlation between EHP occurrence and total Vibrio count was not statistically significant ($r = 0.459$, $p = 0.1821$). EHP-positive ponds were characterized by lower dissolved oxygen levels (2–6 mg/L), higher ammonia concentrations (1–3 mg/L), elevated salinity (10–20 ppt), and higher alkalinity levels (200–300 mg/L $CaCO_3$), whereas EHP-negative ponds maintained comparatively favorable water-quality conditions, including higher DO levels (6–10 mg/L), lower ammonia concentrations (0–1 mg/L), lower salinity (5–10 ppt), and lower alkalinity levels (100–200 mg/L $CaCO_3$). In addition, EHP-positive ponds maintained relatively stable alkaline pH (7–9) and warm temperatures (28–30°C), conditions that may favor EHP persistence and bacterial proliferation. Overall, the findings indicate that deteriorating water quality may increase the susceptibility of shrimp ponds to EHP infection and opportunistic Vibrio colonization. The study highlights the importance of maintaining optimal water-quality conditions through proper aeration, salinity regulation, ammonia control, and improved biosecurity practices to reduce disease risks and promote sustainable shrimp aquaculture development in Sri Lanka.

Keywords: *Dissolved Oxygen, Enterocytozoon hepatopenaei, Shrimp aquaculture, Vibrio spp, Water quality*