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Environmental Factors Associated with the Presence of Vibrionaceae in Tropical Cage-Cultured Marine Fishes

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Abstract

This study investigated the environmental factors associated with the presence of Vibrionaceae in economically important cage-cultured tropical marine fishes: the Asian Seabass *Lates calcarifer*, snapper *Lutjanus sp.*, and hybrid grouper *Epinephelus sp.* Fish sampling was conducted at monthly intervals between December 2016 and August 2017. The body weight and length of individual fish were measured, and the skin, eye, liver, and kidney were sampled for bacterial isolation and identification. Water physicochemical parameters during the sampling activities were determined, and the enumeration of total Vibrionaceae count was also conducted from water and sediment samples. Nine species of *Vibrio* were identified, including *V. alginolyticus*, *V. diabolicus*, *V. harveyi*, *V. campbellii*, *V. parahaemolyticus*, *V. rotiferianus*, *V. furnissii*, *V. fluvialis*, and *V. vulnificus*. *Photobacterium damsela* subsp. *damselae* was also identified. A total of 73% of the isolated *Vibrio* belonged to the Harveji clade, followed by the *Vulnificus* clade (5.5%) and *Cholera* clade (0.6%). Highest occurrence of *Vibrio* spp. and *P. damsela* subsp. *damselae* was found in hybrid grouper (72%), followed by Asian Seabass (48%) and snapper (36%). The associations of *Vibrio* spp. and *P. damsela* subsp. *damselae* with the host fish were not species specific. However, fish mortality and fish size showed strong associations with the presence of some *Vibrio* spp. On average, 60% of the infected cultured fish exhibited at least one clinical sign. Nevertheless, inconsistent associations were observed between the pathogens and water quality. The yearlong occurrence and abundance of Vibrionaceae in the environmental components indicate that they might serve as reservoirs of these pathogens.

Keywords

KeyWords Plus: MUSCLE NECROSIS DISEASE; ANTIBIOTIC-RESISTANCE; PATHOGENIC VIBRIOS; SCALE DROP; PARAHAEMOLYTICUS; HARVEYI; COASTAL; ALGINOLYTICUS; DIVERSITY; ECOLOGY

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