

The presence of Vibrionaceae, *Betanodavirus* and *Iridovirus* in marine cage-cultured fish: Role of fish size, water physicochemical parameters and relationships among the pathogens

ABSTRACT

The study determines the presence of Vibrionaceae, Betanodavirus and Iridovirus in marine cage-cultured fish, while identifying the roles of fish size, water physicochemical parameters and relationships among the pathogens itself. Cultured grouper and snapper were randomly sampled from a commercial fish farm between February and December 2014. The total body weight and length of individual fish were measured. The kidney, liver and spleen were sampled for bacteria isolation, while for viral identification, the sample of brain, eye, kidney and spleen were used. Water physicochemical parameters during the sampling activities were also determined. Laboratory results revealed isolations of multiple pathogens including *Vibrio alginolyticus*, *V. vulnificus*, *Photobacterium damsela* subsp. *damsela* (PD), Nervous Necrosis Virus (NNV) and Iridovirus (IV) at low to high prevalence throughout the study period. The weight of affected groupers ranged between 98 g and 719 g, while snappers between 67 g and 982 g. There was a weak and moderate negative correlation between the grouper's weight and the presence of NNV ($R = -0.3684$; $P < 0.05$) and *V. vulnificus* ($R = -0.6451$; $P < 0.05$), respectively. No significant ($P > 0.05$) difference was noted in the rate of isolated pathogens between groupers and snappers, and between the pathogens affecting snappers. However, detection of IV in groupers was significantly ($P < 0.05$) higher than *V. alginolyticus*, *V. vulnificus* and PD. Isolations of *V. vulnificus* in groupers showed strong and moderate positive correlations with isolations of PD ($R = 0.7069$; $P < 0.05$) and IV ($R = 0.6665$; $P < 0.05$), respectively. In snappers, there was strong positive correlation between isolation of *V. alginolyticus* and NNV ($R = 0.7526$; $P < 0.05$). Multivariate analyses showed that water temperature, dissolved oxygen, ammonia, iron and nitrite were the most significant water physicochemical parameters associated with presence of these pathogens.

Keyword: Grouper; Snapper; Vibrionaceae; Betanodavirus; *Iridovirus*