Association between bacterial community structures and mortality of fish larvae in intensive rearing systems

Abstract

Bacterial community structures were analyzed in water used for rearing fish larvae by fluorescence in situ hybridization. In Experiment 1, red sea bream Pagrus major larvae were reared in two commercial seed production tanks. The survival rate in Tank 1 was higher than in Tank 2, even though phytoplankton, Nannochloropsis sp., was added to both tanks. In Tank 2, γ-proteobacteria became dominant (~70% of total bacteria) on day 13, thereafter heavy larval mortalities occurred. In Tank 1, however, α-proteobacteria and the Cytophaga-Flavobacterium cluster were predominant from day -1 until day 13; no significant mortality was recorded. In Experiment 2, marble goby Oxyeleotris marmoratus larvae were cultured with or without Nannochloropsis sp. At the end of the experiment, larval survival rates in aquaria with Nannochloropsis sp. were significantly ($P < 0.05$) higher than those without. In rearing water without Nannochloropsis sp., γ-proteobacteria increased during rearing. In rearing water with Nannochloropsis sp., α-proteobacteria and the Cytophaga-Flavobacterium cluster were predominant at the beginning of the experiments and the relative abundance of γ-proteobacteria was maintained at a lower level throughout the experiments. The predominance of α-proteobacteria and the Cytophaga-Flavobacterium cluster appears to be a good indicator of successful larval production. © 2007 Japanese Society of Fisheries Science.