
Improving growth and survival of tilapia in brackish water

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Global shrimp farming faces numerous problem related to environmental and climate change such as, disease outbreaks, rising of sea level and seawater intrusion. Those effects on shrimp farming are linked with livelihood security of small-scale shrimp farmers. In Indonesia, half a million households are involved directly in brackish water pond aquaculture producing mainly shrimp. Disease outbreaks in shrimp ponds have recurrently caused serious crop failures. As a result, many small-scale farmers face severe financial difficulties and are looking for alternative crops to secure their livelihoods. An economically promising alternative is to culture shrimp with tilapia in a so-called polyculture system. Salinity levels in shrimp ponds, however, vary greatly and cause large mortalities and poor growth in currently available strains of tilapia. What is needed is a strain of tilapia that has good growth and survival over a range of (fluctuating) salinities. For these traits, estimation of genetic parameters and accurate selection for salinity tolerance is needed. The starting material for research and breeding of salinity tolerance tilapia are available however the breeding program is needed. Objectives of the research are: 1) new fundamental knowledge about genetics of growth and survival under fluctuating salinities in tilapia, and 2) to develop an optimised breeding strategy to improve growth rate and survival of tilapia grown in brackish water ponds. There are several steps to reach the objectives: 1) obtain genetic parameters for growth rate and survival and calculate genotype by environment interaction of Nile tilapia in freshwater and brackish water, 2) obtain genetic parameter for tilapia reproduction, 3) identify physiological trait for salinity adaptation and 4) design an optimal breeding program for increased growth and survival in shrimp-tilapia systems. Results from the project are expected to allow the development of a sustainable breeding program for tilapia that supports an aquaculture production system that is accessible, affordable and applicable for farmers with brackish water ponds in Indonesia and elsewhere.