



Australian Government

Australian Centre for  
International Agricultural Research

Fisheries

# Developing techniques for giant grouper (*Epinephelus lanceolatus*) aquaculture in Vietnam, the Philippines and Australia



## Overview

Groupers form the basis of the live reef food-fish trade in South-East Asia and the giant grouper, *Epinephelus lanceolatus*, is a high-value, fast-growing grouper species with significant aquaculture potential. However, commercial production of juveniles has not been achieved in Vietnam, the Philippines, or Australia.

The lack of success is largely due to limited knowledge about the giant grouper's maturation and spawning behaviour, and low larval survival. Only Taiwan produces significant numbers of giant grouper juveniles, yet it is a high priority species for many countries currently producing other grouper species.

The establishment of a sustainable giant grouper aquaculture industry is a high priority for Australia, India, Indonesia, Malaysia, the Philippines and Vietnam. However, research, and the grouper farming-industry as a whole, is hampered by the high level of investment required to hold and maintain giant grouper broodstock.

This project addresses this issue with a cooperative, multilateral approach that combines the resources of the partner countries and institutions.

## KEY FACTS

**ACIAR Project No.** FIS/2012/101

**Duration:** January 2014 to September 2019 (5 years)

**Target areas:** South-East Asia (Vietnam, Philippines)

**Budget:** A\$1,673,531

### Project Leader

Professor Abigail Elizur, University of the Sunshine Coast (USC)

### Key partners

- Department of Agriculture, Fisheries and Forestry
- Northern Fisheries Centre
- Research Institute for Aquaculture No. 1 (RIA1), Vietnam
- Southeast Asian Fisheries Development Center, Aquaculture Department, Philippines

### ACIAR Research Program Manager

Dr Ann Fleming

## Objective

**The project's aim is to establish a sustainable aquaculture industry for giant grouper in Vietnam and the Philippines through the development of captive breeding and larval-rearing techniques.**

**The project's specific objectives are to:**

- Develop reliable giant grouper captive-breeding technologies to reduce the time required to close its lifecycle.
- Explore the potential of germ-cell transplantation and surrogate technologies as alternative approaches to giant grouper seed production.
- Develop reliable larval-rearing technologies for giant grouper.
- Apply genetic approaches to broodstock management.
- Build capacity through knowledge transfer and training in larval rearing, genetics and biotechnology as it applies to giant grouper aquaculture.

## Expected scientific results

- New protocols for the captive breeding of giant grouper, including induction of sex reversal and synchronisation of spawning, and larval rearing.
- Better understanding of the factors controlling gonadal maturation, sex reversal and spawning of giant groupers.
- Development of alternative methods for giant grouper seed production, potentially through germ-cell transplantation and use of recently discovered peptides to advance sexual maturation.
- Identification of genetic markers, facilitating prevention of inbreeding through genetic management programs and initiation of genetic-selection programs for desirable traits including fast growth rate and disease resistance.
- Greater understanding of larval development through the use of advanced molecular techniques such as transcriptomics.
- Application of research findings in other grouper species not yet being grown in captivity to develop breeding and seed-production techniques for a large number of grouper species.

- Greater understanding of nutritional responses of larvae to copepods.
- Development of alternative broodstock systems for giant groupers, which will impact on the size of facilities and the time required to close the giant grouper's life cycle.

## Expected outcomes

- Further development of the grouper industry in the three partner countries.
- Development of technologies that will also improve the production of other large and commercially important marine finfish.
- Improved methods for controlled reproductive development and sex reversal and minimised handling of broodstock.
- Implementation of affordable and more easily managed commercial production systems.
- Improved household incomes, food and nutrition security due to expansion of the aquaculture industry in the Philippines and Vietnam.
- Greater resilience at the household, community and national levels to future changes in the wild-caught fish supply.
- Benefits to about 60 to 70% of the population in both the Philippines and Vietnam from the increased fish availability.
- Increased capacity of staff in the partner countries.

