Intensive culture of milkfish *Chanos chanos* in polyculture with white shrimp *Penaeus indicus* or mud crab *Scylla serrata* in brackishwater earthen ponds

Gerry S. Jamerlan, Relicardo M. Coloso, Nelson V. Golez
Intensive culture of milkfish *Chanos chanos* in polyculture with white shrimp *Penaeus indicus* or mud crab *Scylla serrata* in brackishwater earthen ponds

Gerry S. Jamerlan
Relicardo M. Coloso
Nelson V. Golez
Intensive culture of milkfish *Chanos chanos* in polyculture with white shrimp *Penaeus indicus* or mud crab *Scylla serrata* in brackishwater earthen ponds

JULY 2014

ISSN 0115-5369

Published and printed by:
Southeast Asian Fisheries Development Center
Aquaculture Department
Tigbauan, Iloilo, Philippines

Copyright © 2014
Southeast Asian Fisheries Development Center
Aquaculture Department
Tigbauan, Iloilo, Philippines

All rights reserved
No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher

For comments and inquiries SEAFDEC Aquaculture Department
Tigbauan, Iloilo 5021, Philippines

Tel (63-33) 330 7030 / 511 9172
Fax (63-33) 330 7031 / 511 8709
Email aqdchief@seafdec.org.ph
AQD website www.seafdec.org.ph
Milkfish is an important farmed fish in the Philippines, Taiwan and Indonesia. In the past five years, production in the Philippines has been increasing with brackishwater ponds still contributing the most volume. However, the industry remains confronted with problems such as inadequate fry supply, high cost of farm inputs, limited adoption of commercial-scale value-adding technologies, multi-layered & geographically constrained market distribution system, and limited product promotion for export trade.

SEAFDEC Aquaculture Department (AQD) has had 40 years of research and extension devoted to milkfish *Chanos chanos*. AQD studies on reproduction, larval biology and nutritional requirements of milkfish led to captive breeding and production of high quality fry. Hatcheries now supply most of the fry requirement of the industry which expanded from traditional brackishwater pond culture to pens and cages in freshwater and coastal waters.

This manual describes an innovation to milkfish farming: (1) the use of SEAFDEC-formulated diet and (2) intensive culture of milkfish in polyculture with either white shrimp or mud crab in brackishwater ponds. We hope that fishfarmers and other stakeholders would venture into this business while researchers and students gain knowledge and information from this manual to collaborate with us to further improve the technology.

---

Felix G. Ayson, D. Sc.
Chief
SEAFDEC Aquaculture Department
CONTENTS

Foreword

Introduction, p 1
Biology, p 2
Source of fry, p 4
  Hatchery, p 4
  Nursery, p 4
Site selection, p 5
Culture ponds, p 6
  Nursery pond, p 6
  Transition pond, p 8
  Grow-out pond, p 10
Pond management, p 12
  Water and soil, p 12
  Stocking and acclimation, p 13
  Feeds and feeding, p 14
  Sampling, p 16
Harvest and post-harvest, p 17
Common diseases, p 20
  Parasitic diseases, p 20
  Bacterial infection, p 20
  Environmental and non-infectious diseases, p 20
Economic analysis, p 22
References, p 27
Acknowledgment, p 28

About the authors, p 29
INTRODUCTION

The Philippines, Indonesia and Taiwan consider milkfish as an important food fish with a steadily increasing local demand and fast expanding international market. In the Philippines, milkfish or “bangus” culture is a pioneering and century-old industry and is currently facing new challenges like competing markets with new and novel species in aquaculture and improving growth and production to enable fish farmers to increase profits. Milkfish is reared in freshwater, brackishwater and marine waters.

SEAFDEC/AQD conducted studies that lead to the advancement in milkfish hatchery technology and availability of commercial feeds in the market, which enable fishfarmers to increase their stocking densities in brackishwater ponds and marine cages. AQD has (1) completed the life cycle of milkfish in captivity, (2) developed broodstock technology for milkfish to spawn naturally in captivity; (3) developed techniques for collection of spawned eggs in sea cages as well as in tanks, and (4) developed hatchery rearing technology. AQD continues to improve production, conducting studies on more cost-efficient and cost-effective formulated diets with lower feed conversion ratio (FCR).

Milkfish farmers, on the other hand, have intensified “bangus” farming in brackishwater ponds by stocking 7,000 to 15,000 fry per hectare and using formulated feeds. With feeds, they can “fatten” their stock and/or extend the culture period when there is shortage of natural food. However, the excessive use of feeds may pollute the pond environments and consequently bring about the occurrence of infectious and non-infectious diseases.

AQD is therefore recommending the polyculture of bangus and tiger shrimp (sugpo) and/or mud crab. This will improve the traditional culture of milkfish (stocking density of 1,500 to 2,500 fry per hectare) with farmers also profiting from high-value crops like shrimp and crab. Presently, in extensive milkfish polyculture, milkfish is stocked at 2,000 pieces per hectare, shrimp at 5,000 postlarvae per hectare and mud crab at 500 pieces per hectare.

This manual describes the intensive culture of bangus in polyculture with shrimp or mud crab in brackishwater earthen ponds.