

Dyp

GROWTH, SURVIVAL AND NET YIELD OF  
MILKFISH Chanos chanos, FORSKAL (1775)  
REARED IN FLOATING NET CAGES  
AT DIFFERENT STOCKING  
DENSITIES

FRIMO M. HUMILDE

INSTITUTE OF AQUACULTURE  
College of Fisheries and Ocean Sciences  
University of the Philippines in the Visayas  
Mangrove, Iloilo

Cavite State University (Main Library)



T5997

THESIS/SP 597 H88 2001c.2

May 2001

8  
1



✓  
GROWTH, SURVIVAL AND NET YIELD OF MILKFISH *Chanos*  
*chanos*, FORSKAL (1775) REARED IN FLOATING NET  
CAGES AT DIFFERENT STOCKING DENSITIES

A Thesis  
Submitted  
to the Graduate Faculty of the  
Institute of Aquaculture  
College of Fisheries and Ocean Sciences  
University of the Philippines in the Visayas

In Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science in Fisheries  
Major in Aquaculture



00000031

Growth, survival and net yield milkfish  
(*Chanos chanos*, Forskal 1775) reared in

597 1 2001  
T 5981

PRIMO MERINO HUMILDE  
May 2001

## ABSTRACT

**HUMILDE, PRIMO M. University of the Philippines in the Visayas. (2000) "Growth, Survival and Net Yield of Milkfish (*Chanos chanos*, Forskal 1775) Reared in Floating Net Cages at Different Stocking Densities".**

**Adviser: Dr. Crispino A. Saclauso**

This study determined growth, survival and production of milkfish (*Chanos chanos*) reared in floating net cages for 120 days at stocking densities of 12.5, 25, 50 and 100 individuals per cubic meter. Growth was inversely proportional with stocking density but differences were not significant among treatments. Survival on the other hand was almost similar in all the densities tested (99.33-99.83%). Production however, markedly increased with increasing density ( $P < 0.01$ ). Although incremental changes in production progressively increased with increasing density, it started declining beyond 50/m<sup>3</sup> corresponding to the observed marked decrease in growth of fish reared at this density.

The use of sinking pellets while theoretically should allow individuals at the bottom to have access to food because of vertical feed dispersion, seemed to favour only individuals that could manage to stay at the surface during feeding. A combination of floating and sinking pellets could perhaps increase food access and thus improve growth of populations reared at higher densities. Also, the practice of hand feeding may limit feed distribution and it is not very effective especially when it is raining, during hot days or when the sea condition is not good. However, this problem might be addressed by using mechanized feed spreader.

Results indicated that stocking density of milkfish could be further increased to the level when profitability starts to diminish with the declining growth of fish at higher population densities.

## TABLE OF CONTENTS

	Page
APPROVAL SHEET	ii
VITAE	iii
AKNOWLEDGEMENT	v
ABSTRACT	vi
 CHAPTER - I	
Introduction	1
 CHAPTER - II	
Review of Related Literature	2
A. Food and Feeding Habits	3
B. Nutritional Requirements	4
C. Cage Culture	5
 CHAPTER - III	
MATERIALS AND METHODS	6
A. Experimental Site	6
B. Experimental Set-up	7
C. Experimental Design and Treatments	9
D. Experimental Fish	9
E. Feeds and Feeding	9
F. Water Quality Parameters	10
G. Cage Management and Maintenance	10
H. Stocking and Sampling	11
I. Growth and Survival	11
J. Harvest/Post Harvest	12
K. Duration of the Study	12
L. Net Yield	12
M. Condition Factor	12
N. Feed Conversion Ratio	12
O. Cost and Return Analysis	13
P. Statistical Analysis	13

CHAPTER - IV	RESULTS AND DISCUSSION	13
	A. Growth	13
	B. Survival	17
	C. Net Yield	19
	D. Condition Factor	21
	E. Feed Conversion Ratio	22
	F. Monitoring of Unconsumed Feeds	23
	G. Water Quality	24
	H. Gut Content	24
	I. Cost and Return Analysis	25

CHAPTER – V	SUMMARY AND RECOMMENDATIONS	27
	LITERATURE CITED	28-31

#### LIST OF FIGURES

Figure		Page
1.	Location map of the experimental site	6
2.	Cage showing conical bottom trap for unconsumed feeds	8
3.	Experimental layout	9
4.	Final mean weight of milkfish ( <i>Chanos chanos</i> ) of different stocking densities.	14
5.	Size distribution of milkfish of different stocking densities	15
6.	Length-weight relationship of milkfish at different stocking densities	16
7.	Total net yield of milkfish at different stocking densities	19
8a.	Trend on production increment with increasing density	19

8b.	Trend in growth increment with increasing density	20
9.	Mean physico-chemical parameters of water for the whole culture period.	24

#### LIST OF TABLES

Table		Page
1.	Weight gain and daily increment of milkfish ( <i>Chanos chanos</i> ) at different stocking densities	14
2.	Survival of milkfish at different stocking densities	18
3.	Mean periodic and final condition factor of milkfish under different stocking densities	21
4.	Mean feed conversion ratio (FCR) of milkfish at different stocking densities.	23
5.	Identified planktons on gut contents of milkfish for the whole culture period.	25
6.	Cost and return analysis at different stocking densities	26

#### LIST OF PLATES

Plate		Page
1.	Experimental set-up	7
2.	Final average sizes of bangus at different stocking densities	15
3.	Bangus (representative of each treatment) with adipose tissue exposed.	22

#### APPENDICES

	Page
Tables	32-38
Statistical Analysis	35-37
Figures	39-40

## CHAPTER 1

### INTRODUCTION

Interest in finfish mariculture started only in recent years when the prawn industry collapsed due to disease outbreak and low market price of prawns (Juario, 1991). The growing interest is further influenced by the ban on the conversion of mangrove areas to aquaculture. The availability of artificial feeds provided also the added impetus particularly in high density culture where dependence on allochthonous feed sources is tremendous.

Finfish mariculture has several advantages over pond culture. It can be applied in marine coastal waters, protected coves and bays. Cage farming for instance has the obvious advantage in terms of convenience in site relocation hence, the usual problems encountered in pond culture such as floods, typhoons, water and soil acidity and pollution to name a few, are minimized if not totally precluded. Production in cage farming is also comparatively higher than in pond culture.

In the Philippines, the culture of fish in pens and cages have a long history. The culture of milkfish in floating net cages however is only recent and the practice is not well documented. It has a great potential in increasing total milkfish production with lesser inputs and more importantly, lesser environmental impact when properly regulated. The shift to milkfish cage culture becomes even more significant considering the intensification of milkfish pond culture which apparently curbed further conversion of mangrove areas to aquaculture, but may lead to the pitfalls of the prawn industry which suffered environmental backlash due to unregulated intensification.