

Contents

	Page
Abstract	iii
Acknowledgements	vi
Contents	vii
List of Tables	ix
List of Figures	x
Chapter	
1. Introduction	
1.1 Background	2
1.2 Literature reviews	7
2. Methodology	
2.1 Data sources and measurements	13
2.2 Path diagram	16
2.3 Data analysis	17
2.4 Statistical methods	18

Contents

	Page
3. Preliminary Data Analysis	
3.1 Description of the variables	21
3.2 Time series plot of catch weight	22
3.3 Distributions of the blue swimming crab catch	24
3.4 Box plots of the blue swimming crab catch	26
3.5 Descriptive statistics and time series plots of the environmental factors	27
3.6 Relationship between catch weight and environmental factors	29
4. Statistical Modeling	
4.1 Model of catch weight with environmental factors	33
4.2 Model of catch weight with month, year and gear	37
4.3 Models of catch weight by gear with month and year	40
5. Conclusion and Discussion	
5.1 Conclusion	44
5.2 Discussion	46
5.3 Limitations and further study	48
References	49
Vitae	53

List of Tables

Table	Page
Table 1.1 Total crab landed at fishery ports in Thailand during 2001-2005	4
Table 3.1 Study variables	21
Table 3.2 Descriptive statistic for environmental factors during 2003-2006	27
Table 3.3 Correlation coefficients of environmental factors	32
Table 4.1 Linear regression model for logarithms of monthly catches and morning air temperature, water level and rainfall	33

Prince of Songkla University
Pattani Campus

List of Figures

Figures	Page
Figure 1.1 Geographical distribution of blue swimming crab	2
Figure 1.2 Map of Thailand coastal zones	3
Figure 1.3 Map of Songkhla Lake and ten fish catch landing sites for collection	7
Figure 1.4 Morphology of blue swimming crab	8
Figure 1.5 Sexual dimorphisms of blue swimming crab	9
Figure 1.6 Life cycle of blue swimming crab	11
Figure 2.1 The main gear types used in Songkhla Lake: trap	13
Figure 2.2 The main gear types used in Songkhla Lake: set bag net	14
Figure 2.3 The main gear types used in Songkhla Lake: gill net	14
Figure 2.4 Locations of water level measurements in the south of Thailand	16
Figure 2.5 Path diagram of the study	17
Figure 3.1 Blue swimming crab landed at Songkhla lake ports during 2003-2006	22
Figure 3.2 Blue swimming crab landed at Songkhla lake ports during 2003-2006 using trap, set bag net and gill net	23
Figure 3.3 Histogram of blue swimming crab catch in Songkla Lake during 2003-2006	24
Figure 3.4 Histogram of blue swimming crab catch by trap, set bag net and gill net before and after transformation	25

Figures	Page
Figure 3.5 Boxplot of the blue swimming crab catch compare by gear type, Year and month	26
Figure 3.6 Average and morning air temperature ranges during 2003-2006	28
Figure 3.7 Relative humidity ranges during 2003-2006	28
Figure 3.8 Water level ranges during 2003-2006	29
Figure 3.9 Rainfall ranges during 2003-2006	29
Figure 3.10 Relationship between catch weight and average air temperature	30
Figure 3.11 Relationship between catch weight and morning air temperature	31
Figure 3.12 Relationship between catch weight and relative humidity	31
Figure 3.13 Relationship between catch weight and water level	31
Figure 3.14 Relationship between catch weight and rainfall	32
Figure 4.1 Plot of observed values and fitted values and residuals plot from model of logarithm of catch weight with morning air temperature, water level and rainfall	34
Figure 4.2 Total actual and estimated catch weight based on model of logarithm of catch weight with morning air temperature, water level and rainfall as determinants	35

Figures	Page
Figure 4.3 Actual and estimated catch weight using trap based on model of logarithm of catch weight with morning air temperature, water level and rainfall as determinants	35
Figure 4.4 Actual and estimated catch weight using set bag net based on model of logarithm of catch weight with morning air temperature, water level and rainfall as determinants	36
Figure 4.5 Actual and estimated catch weight using gill net based on model of logarithm of catch weight with morning air temperature, water level and rainfall as determinants	36
Figure 4.6 Scatter plot of observed values and fitted values and residual plot from model of logarithm of catch weight with month, year and gear	37
Figure 4.7 Blue swimming crab catch by factor, adjusted for all other factors	38
Figure 4.8 Actual and estimated catch weight based on model of logarithm of catch weight with month year and gear as determinants	39
Figure 4.9 Diagnostic plots of linear models for trap, set bag net and gill net	40
Figure 4.10 Blue swimming crab catch by three gear types, adjusted for other factors	42
Figure 4.11 Actual and estimated catch weight based on model of logarithm of catch weight separated by gear	43