

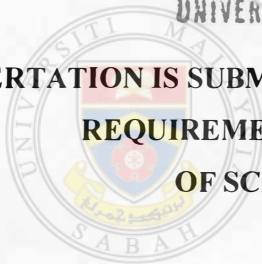
**STUDY ON COMMON FISH PARASITE INFESTATION OF CULTURED
FRESHWATER TILAPIA (*Oreochromis niloticus*) CULTURED IN EARTHEN PONDS IN
WEST COAST OF SABAH**

BY:

ABD RAHMAN BIN THAUFECK

PERKUSIA
UNIVERSITI MALAYSIA SABAH

**THIS DISSERTATION IS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE BACHELOR
OF SCIENCE (HONOURS)**



UNIVERSITI MALAYSIA SABAH

**AQUACULTURE SCIENCE PROGRAMME
SCHOOL OF SCIENCE AND TECHNOLOGY
UNIVERSITI MALAYSIA SABAH**

MARCH 2006

UNIVERSITI MALAYSIA SABAH

BORANG PENGESAHAN STATUS TESIS@

TITUL: STUDY ON COMMON FISH PARASITE INFESTATION
CULTURED FRESHWATER TILAPIA, Oreochromis niloticus cultured in
SARAWAK MUDA DEGAN KEPLOJIAN AKUAKULTUR

NAMA: ABD RAHMAN B. HANFELK
 (HURUF BESAR)

SESI PENGAJIAN: 2003/2006

Pengakuan membenarkan tesis (LPSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Universiti Malaysia Sabah dengan syarat-syarat kegunaan seperti berikut:-

1. Tesis adalah hakmilik Universiti Malaysia Sabah.
2. Perpustakaan Universiti Malaysia Sabah dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institutiti pengajian tinggi.
4. Sila tandakan (/)

PERPUSTAKAAN

UNIVERSITI MALAYSIA SABAH

(Mengandungi maklumat yang berdarjah keselamatan atau Kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

SULIT

TERHAD

TIDAK TERHAD

Disahkan Oleh

(TANDATANGAN PENULIS)

Alamat Tetap: Jabatan Berikenaan
 95000

(TANDATANGAN PUSTAKAWAN)

Dr. Siti Rehana Mhd Shaleh
 Nama Penyelia

Tarikh: 27/4/06

Tarikh: _____

PETAKATAN:- *Potong yang tidak berkenaan.

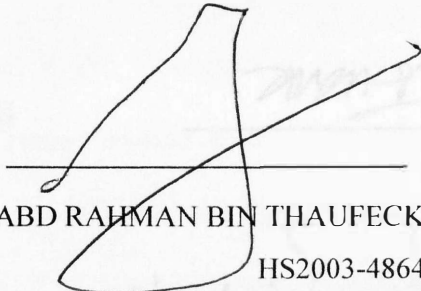
**Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa /organisasi berkenaan dengan menyatakan sekali sebab dan tempoh tesis ini perlu dikelaskan sebagai SULIT dan TERHAD.

@Tesis dimaksudkan sebagai tesis bagi Ijazah Doktor Falsafah dan Sarjana secara penyelidikan atau disertai bagi pengajian secara kerja kursus dan Laporan Projek Sarjana Muda (LPSM).

DECLARATION

I declare that this dissertation is the result of my own independent works, except where otherwise stated.

20 March 2006



ABD RAHMAN BIN THAUFECK
HS2003-4864



PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH

UMS
UNIVERSITI MALAYSIA SABAH

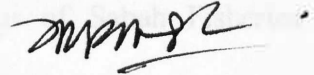
CERTIFICATION

CERTIFIED BY MEMBERS OF DISSERTATION COMMITTEE

Signature

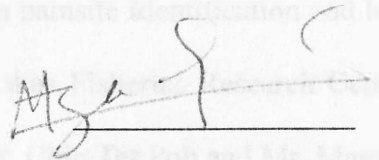
1. **SUPERVISOR**

(DR. SITTI RAEHANAH MUHD. SHALEH)



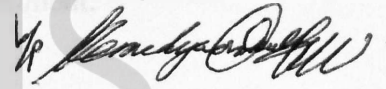
2. **EXAMINER 1**

(DR. SUJJAT AL-AZAD)



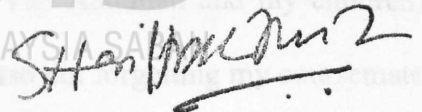
3. **EXAMINER 2**

(MR. JULIAN RANSANGAN)



4. **DEAN**

(SUPT/KS PROF MADYA DR. SHARIFF A.K OMANG)



PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH

UMS
UNIVERSITI MALAYSIA SABAH

Abd Rahman Bin Yusoff
UMS, Kota Kinabalu
14th Nov 2019

ACKNOWLEDGEMENT

Bismillahirrahmanirahim. First of foremost, I would like to express my heartfelt appreciation to my project supervisor Dr Sitti Raehanah Muhd. Shaleh for her supervision, support and guidance throughout the course of this project.

I wish to thank to Mr Rayner Datuk Stuel Galid, Director of Sabah Fisheries Department for his support, advice and assistance. Thanks should also be extended to Dr. Ahemad Sade and Pn. Suhadah Mustapha for their guidance in parasite identification and help in using laboratory equipments. Grateful thanks to Staff of Likas Fisheries Research Centre, Mr. Jephirin Wong, Mr. Lamjah Juka, Mr. Matlan Thaufeck, Mr. Chin Tet Poh and Mr. Masrani Madun for their generous help in providing me sample for my experiment.

Last but not least, I am grateful to my wife, Alyssa Yap Abdullah and my children, Mohd Aiman Abd Rahman and Mohd Azzam Abd Rahman, also not forgetting my coursemate for giving me a lot of support and help in completing my final year project.

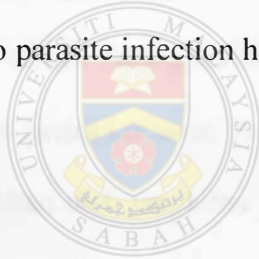
Abd Rahman Bin Thaufeck

UMS, Kota Kinabalu

March, 2006

ABSTRACT

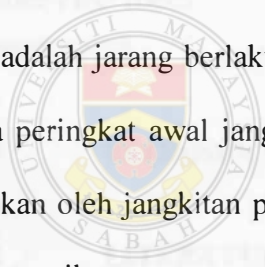
A total of forty one *Tilapia Oreochromis niloticus* cultured in earthen pond from 5 different locations in West Coast of Sabah were examined for ectoparasites and endoparasites. The result showed that ectoparasites infections are common, especially on the gills, body and fin. In all tilapia examined found to be harbouring various species of parasite, the five most encountered parasites were of which the most common was the *Dactylogyrus* sp (48.78%) followed by *Trichodina* sp (43.90%), *Argulus* sp, *Gyrodactylus* sp and *Vorticella* sp (all 7.32%). Percentage prevalence were high for monogenes and followed by protozoan infection. Mortality due to parasitic infection was rare among the adult cultured fish and treatment conducted accordingly at the early stage was found to be successful. Few disease and mortalities due to parasite infection have been reported in tilapia farms in the tropics.



UMS
UNIVERSITI MALAYSIA SABAH

ABSTRAK

Sebanyak empat puluh satu ekor sampel ikan Tilapia, *Oreochromis niloticus* yang ditenak di dalam kolam tanah yang berasal dari lima lokasi yang berbeza di Pantai Barat Sabah, telah diperiksa untuk mengetahui kehadiran ektoparasit dan endoparasit. Keputusan ujikaji menunjukkan bahawa jangkitan ektoparasit adalah biasa terjadi terutamanya di kawasan insang, badan dan sirip ikan. Dalam kebanyakan Tilapia yang dikaji menunjukkan bahawa ianya mengandungi bermacam spesis parasit, lima spesis parasit yang paling banyak dan biasa ditemui ialah *Dactylogyrus* sp. (48.78%) diikuti oleh *Trichodina* sp.(43.90%), *Argulus* sp., *Gyrodactylus* sp. dan *Vorticella* sp. (kesemuanya masing-masing 7.32%). Peratusan jangkitan oleh monogenean adalah tinggi dan diikuti oleh jangkitan protozoa. Kematian disebabkan oleh jangkitan parasit adalah jarang berlaku kepada ternakan ikan yang dewasa dan rawatan sesuai yang dibuat pada peringkat awal jangkitan didapati sangat berkesan. Beberapa penyakit dan kematian disebabkan oleh jangkitan parasit telah dilaporkan terjadi pada ikan tilapia yang di ternak di kawasan tropika.



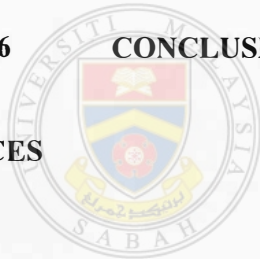
UMS
UNIVERSITI MALAYSIA SABAH

1.1	1
1.2	2
1.3	3
1.4	4
1.5	5
1.6	6
1.7	7
1.8	8
1.9	9
1.10	10
1.11	11
1.12	12
1.13	13
1.14	14
1.15	15
1.16	16
1.17	17
1.18	18
1.19	19
1.20	20
1.21	21
1.22	22
1.23	23
1.24	24
1.25	25
1.26	26
1.27	27
1.28	28
1.29	29
1.30	30
1.31	31
1.32	32
1.33	33
1.34	34
1.35	35
1.36	36
1.37	37
1.38	38
1.39	39
1.40	40
1.41	41
1.42	42
1.43	43
1.44	44
1.45	45
1.46	46
1.47	47
1.48	48
1.49	49
1.50	50

CONTENTS

	Page
TITLE	i
DECLARATION	ii
CERTIFICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
ABSTRAK	vi
CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF PHOTOS	xi
LIST OF ABBREVIATIONS	xii
LIST OF APPENDIXES	xiii
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW	8
2.1 History of Aquaculture and Fish Farming	8
2.2 Tilapia	10
2.3 Tilapia Earthen Pond Culture System	12
2.4 Parasite Diseases of Freshwater Fish	14
2.5 Common Parasite Infested Freshwater Tilapia	18
2.5.1 <i>Ichthyophthirius multifiliis</i>	20
2.5.2 <i>Trichodina</i> sp.	21
2.5.3 <i>Chilodonella</i> sp.	22
2.5.4 <i>Oodinium</i> sp.	22
2.5.5 <i>Ichthyobodo</i> sp.	23
2.5.6 <i>Vorticella</i> sp.	24
2.5.7 <i>Gyrodactylus</i> sp.	25
2.5.8 <i>Dactylogyrus</i> sp.	26

	2.5.9 <i>Lernea</i> sp.	26
	2.5.10 <i>Argulus</i> sp.	27
	2.5.11 <i>Piscicola</i> sp.(Leeches)	28
CHAPTER 3	MATERIALS AND METHODS	30
	3.1 Sampling method	30
	3.2 Sample of Parasite	31
	3.3 Laboratory Examination	32
	3.3.1 Necropsy	32
	3.3.2 Endo and Ekto parasite detection method	33
CHAPTER 4	RESULTS	40
CHAPTER 5	DISCUSSION	49
CHAPTER 6	CONCLUSION	53
REFERENCES		54
APPENDIX		59



UMS
UNIVERSITI MALAYSIA SABAH

LIST OF TABLES

No.		Page
2.1	Parasite Diseases Reported in Malaysia for Year 1978.	17
2.2	List of Parasite established in Philippines for Year 1978 that infested tilapia.	19
4.1	Prevalences of infection of parasites in Freshwater Tilapia, <i>O.niloticus</i> From five different locations.	46



UMS
UNIVERSITI MALAYSIA SABAH

LIST OF FIGURE

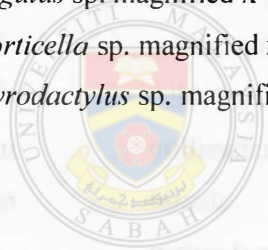
No.		Page
3.1	Location of the sample collected from five different location; Beaufort, Kota Kinabalu, Kota Belud, Kota Marudu and Kudat	39
4.1	Numbers of Tilapias, <i>O. niloticus</i> infected with multiple parasite and single parasite at one time.	47
4.2	Location of the parasite found in host, <i>O. niloticus</i>	47
4.3	Number of parasite found in five different locations	48



UMS
UNIVERSITI MALAYSIA SABAH

LIST OF PHOTOS

No.		Page
1.1	Freshwater Tilapia, <i>Oreochromis niloticus</i>	7
3.1	Technique used to kill the fish humanely and without undue tissue damage by cutting of the spinal cord.	36
3.2	The measurement has to be taken before the process of autopsy	36
3.3	Technique used to remove the fin for observation later under the Microscope.	37
3.4	The entire alimentary canal and associated organs are exposed and examined.	37
3.5	Technique for making a blood smear.	38
4.1	<i>Dactylogyrus</i> sp. magnified x 100 isolated from <i>Oreochromis niloticus</i>	41
4.2	<i>Trichodina</i> sp. magnified x 250 isolated from <i>Oreochromis niloticus</i>	42
4.3	<i>Argulus</i> sp. magnified x 100 isolated from <i>Oreochromis niloticus</i>	43
4.4	<i>Vorticella</i> sp. magnified x 100 isolated from <i>Oreochromis niloticus</i>	44
4.5	<i>Gyrodactylus</i> sp. magnified x 100 isolated from <i>Oreochromis niloticus</i>	45



UMS
UNIVERSITI MALAYSIA SABAH

LIST OF ABBREVIATION

			Page
CaO	Calcium oxide		
CH ₃ COOH	acetic acid		
cm	centimeter		
CuSO ₄	Copper sulphate		
CuCl ₂	Copper chloride		
DDT	Dichlorodiphenyltrichloroethane		
ft	feet		
g	gram		
ha	hectares		
in	inch		
kg	kilogram		
KMnO ₄	potassium permanganate		
km ²	kilometer square		
m	meter		
m ²	meter square		
m ³	cubic meter		
mm	millimeter		
min	minute		
mt	metric ton		
NaBO ₄ 4H ₂ O	sodium perborate		
NaCl	sodium chloride		
NaClO ₃	Sodium hypochloride		
ppm	parts per million		
RM	Ringgit Malaysia		
sp	species		
µm	micrometer		
>	bigger than		
<	smaller than		
%	percent		

LIST OF APPENDIX

No.		Page
	CHAPTER I	
A	List of material use	59
B	The parasite found in Freshwater Tilapia from Beaufort	60
C	Parasite found in Tilapia from Babagon Penampang and Kota Belud	61
D	Parasite found from Tasik Buyut Kota Marudu and Kudat	62



UMS
UNIVERSITI MALAYSIA SABAH

CHAPTER 1

INTRODUCTION

The freshwater tilapia culture in Sabah is gaining popularity especially Red Tilapia, in the State the large scale commercial culture of tilapia limited to the culture of three species : *Oreochromis niloticus*, *Oreochromis mossambica* and *Oreochromis aureus* but of the three tilapia species, the Red tilapia, *Oreochromis niloticus* (Photo 1.1) is by far the most commonly used species in fish farm. They have become a top priority fish for culture in the tropics because of their fast growth, efficient use of natural aquatic food, propensity to consume a variety of supplemental feeds, herbivorous nature, resistance to disease and handling, ease to reproduction in captivity and tolerance to wide ranges of environmental conditions (Lovell, 1989).

Tilapia are natives of Africa and the natural distribution of *Oreochromis niloticus* has spread from an origin in the Nile Valley to central and western Africa and have been introduced into a large number of tropical and sub-tropical countries around the world, since 1924 *Tilapia nigra* have been kept in ponds in Kenya. (Huet, 1994 ; Pillay ,1990 ; Bromage and Robert, 1995 ; Lucas and Southgate, 2003; Stickney, 2000 ; Ghosa , 2003). *Tilapia* had become an intercontinental traveler by 1939 when naturally propagating stocks of *tilapia mossambica* were discovered in Java (Bardach *et al.*, 1972) .

The interest in tilapia aquaculture potential led to nearly worldwide distribution. This species is presumed to have been introduced into Malaysia by Japanese from Java sometimes during 1942-1945. (Mohsin and Ambak, 1983; Pathmasothy, 1992; Hasliwati, 1998) and then introduce to Sabah for aquaculture purpose in 1951 (Berita Perikanan, 1998; Tony, 2000). In Philippines, the first tilapia to be introduced was the *Oreochromis mossambicus*, imported in 1950 from Thailand and now this species reproduced rapidly and is now found in both fresh and brackish water throughout the country (Natividad, 1987).

Aquaculture is a relatively young industry in Malaysia. According to Leong and Wong (1986), aquaculture first introduced in Malaysia in the early 1900's with the culture of the common carp (*Cyprinus carpio*) in abandoning mining pools. In 1995, Malaysia ranked 18th in the world Global Aquaculture nations in term of production with the amount produced are 132,700 tons (Stickney, 2000). The aquaculture sector in Malaysia has a large potential and can be contribute significantly to the country's total fish requirement in future. Careful planning and serious efforts have been made to develop this sector.

Malaysia Aquaculture production in 2001 continued to be influenced by the production of cockles and fish from freshwater pond culture. The total production was 177,019 tonnes valued at RM1, 206 million, which was an increased of 5.43% over the year 2000. A total 22,108 fish farmer was involved in aquaculture industry in 2001 and the bulk of the culturists were involved in the freshwater sector accounting for 77.6% of all fish farmers (Annual fisheries Statistics, 2002).

Freshwater aquaculture in Malaysia contribute 24.5% of the total aquaculture production in 2001 and freshwater pond culture spearheaded production from freshwater system with 78% (33,882 tonnes) of the total freshwater production, decreasing 12.8% when compared to production in 2000. In terms of value, it recorded a decrease of 18.18% from RM251.65 million to RM205.88 million. Red Tilapia, *Oreochromis niloticus* ranked second in freshwater species cultured with the amount of 8,497 tonnes (Annual Fisheries Statistic, 2002).

In Sabah, for the year 2002 the estimated freshwater fish production is 5,580 tonnes with value of RM72.387 million with Red Tilapia, *Oreochromis niloticus* contribute about 54182 Kg of landings which contribute 46% of the total freshwater fish landings in Sabah for the year 2002 (Annual Sabah Fisheries Statistic, 2002). The freshwater tilapia aquaculture development in Sabah is mainly focused on earth pond culture system operated mostly by fish farmers in rural areas. The main activity is usually small scale and being operated at a part time basis for subsistence and pond area average less than 0.1 hectare per pond and the number of ponds is usually not more than two. Fish ponds are mainly concentrated in the West Coast of Sabah (46%) totaling 17,468 with an area 1,534.647 hectares.

In the last few years, the freshwater aquaculture in Sabah has gained popularity due to raising demand and high value of freshwater fish in the local market. Incentives provided by the Sabah Fisheries Department like cash subsidy for ponds construction and the free supply of locally bred fish fry from its freshwater fish breeding stations has also added to this development. In 1993 alone about RM193, 905.00 cash subsidy given for ponds construction in Sabah. (Berita Perikanan, 1994). Now the most commonly cultured freshwater species in Sabah are Nile tilapia (*Oreochromis niloticus*), Javanese carp (*Puntius*

gonionotus), red tilapia (*Oreochromis* sp), common carp (*Cyprinus carpio*), jelawat (*Leptobarbus hoevenii*), bighead carp (*Aristichthys nobilis*), silver carp (*Hypthamichthys molitrix*), patin (*Pangasius sutchi*), African catfish (*Clarias gariepinus*), and grass carp (*Ctenopharyngodon idellus*) (Tony, 2000)

As the development of freshwater fish cultures intensify, so are important factors in fish management such as fish disease which occur occasionally. Most fish farmers in Sabah lack the knowledge in fish disease aspects, which are very much interrelated to the culture management practices and water quality in the system. Disease is one major problem in the aquaculture sector that is been focused upon to increase fish production. Aquaculture, imposes the extreme conditions of population density are conducive to the movement of pathogens from host to host (Post, 1987). Unnatural high population density favors the spread of many diseases and parasites (Kabata, 1985). Loses due to diseases related problems were experienced by the operators, such as high mortalities and poor growth, in most cases, parasites were the main causative problems observed in ornamental fish trade (Siti Zahrah *et al.*, 1994).

According to Liang and Leong (1992), parasite related disease outbreaks in intensive fish culture are becoming a serious problem in Asia. Leong and Wong (1988) reported that frequent outbreaks of disease which have resulted in great financial loses to many fish farmers in Malaysia.

Aquaculture is an expanding industry in Malaysia and has been given priority in the economic development program of the country. Fish one of the cheapest sources of protein, particular to the rural population. However, in recent years its availability has decline rapidly. As a result of this decline, the government of Malaysia has given priority to

aquaculture as a means of increasing fish production. Some studies on diseases occurring in pond-culture freshwater species have been made. Although no mass mortalities have been traced to introductions of fish from foreign countries. The study of fish parasites has been carried out for quiet some time in Malaysia. Most early studies dealt mainly with taxonomic descriptions of parasites. The systematic study of fish disease is a recent occurrence in Malaysia, brought about the increase intensity of the aquaculture industry.

According to Suhairi *et al.* (1982), fish diseases are at present not emphasized in Malaysia because aquaculture itself relatively young industry and not yet intensive. Nevertheless, freshwater fish ponds are becoming popular particular in Sabah and demand for fish fry is rapidly increasing. Mass mortalities in public waters or in fish ponds are not common, although isolated cases have occurred in government fish breeding stations (Siti Zahara *et al.*, 1994).

The common causal parasite found in freshwater fish in Malaysia are *Ichthyophthirius multifiliis*, *Lernea* sp, *Argulus* sp, *Dactylogyrus* sp, *Chilodonella* sp, *Myxobolus* sp, *Henneguya* sp, *Ichthyobodo* sp, *Gyrodactylus* sp and *Trichodina* sp. (Shariff , 1984). Leong and Wong (1986) reported that 24 species parasites (five nematodes, six cestodes, eight nematodes, three acanthocephalans and two crustaceans) were recorded from 13 species of freshwater fishes.



UMS
UNIVERSITI MALAYSIA SABAH

The exclusive objectives of the study were as follow:-

- i. To identify most common endoparasite and ectoparasite infested the freshwater tilapia reared in earthen pond in West Coast of Sabah.
- ii. To study location of the parasite infested inside and outside tilapia body.
- iii. To recommend the appropriate culture system for tilapia culture.

The result will be useful in providing effective and practical health practice and benefit all parties involve in tilapia cultured from the findings and can prevent financial loses in the future for those involve in tilapia cultured.



UMS
UNIVERSITI MALAYSIA SABAH



Photo 1.1 Freshwater Tilapia, *Oreochromis niloticus*



UMS
UNIVERSITI MALAYSIA SABAH

CHAPTER 2

LITERATURE REVIEW

2.1 History of Aquaculture and Fish Farming.

According to Barnabe (1990), the term “*aquaculture*” covers all activities aimed at producing, processing and marketing aquatic plants and animal from fresh, brackish and saltwater. In narrow terms aquaculture embraces the use and manipulation of natural and artificial bodies of water to produce species required by man and thus concerns all activities concerned with breeding and culture of aquatic organism. Pillay (1990), describe the definition of “*aquaculture*”, though used rather widely for over a decade to denote all form of culture of aquatic animals and plants in fresh, brackish and marine environments. Lucas and Southgate (2003) , describe the definition of aquaculture is understood to mean the farming of aquatic organisms, including fish,molluscs, crustaceans and aquatic plant and he describe the word “*Fish Farming*” is used in the sense of aquaculture of fish, crustaceans, mollusks, etc, but not plants.

Aquaculture is a relatively new word used to describe the art, science and business of producing aquatic plants and animals useful to human, aquaculture and fish farming have some similarities. Aquaculture occurs in these general environments such as warm water aquaculture, coldwater aquaculture and mariculture (Parker, 2002).

Fish farming is very old and has a history that likely goes back over 4,000 years, the Romans were able to maintain and raise fish in brackish water along the Italian coast, and they probably learned methods of primitive fish farming from the Etruscans. Roman aquaculture focused on mullet and trout and Pliny the Elder has recorded that saltwater and freshwater fish cultured was practiced in Rome in the first century B.C. (Parker, 2002).

In China and Indo-Pacific regions fish culture is very old and reported began around 3500 B.C. with culture of common carp. These carp were grown in ponds in silkworm farms. The silkworm pupae and feces provided supplemental food for fish, the origin of aquaculture or fish farming in China is commonly attributed to Wen Fang, the founder of Chou Dynasty. In 460 B.C, Fan Li wrote his *Fish Culture Classic* in 475 B.C, which describe in detail the result of numerous experiments made by Fan Li and others. Emperor Li of the Tang Dynasty (A.D. 618-906) who was considered to be sacred, banned the culture of carp because the word for carp was Li (Brown, 1983; Parker, 2002; Hickling , 1971; Ling, 1977). From China, aquaculture spread via Korea to Japan, perhaps as early as 200 A.D. The Japanese began by copying Chinese methods, but during the Tokugawa era (1603-1868) they initiate farming of the sea (mariculture) (McLarney, 1984).

Early aquaculture for Egyptians likely evolved as part of the irrigation systems they developed. Aquaculture in Egypt focused on tilapia and developments seems consistent with those carp in China. No written documents from early Egyptians aquaculture exist but drawings in tombs dated about 2000 B.C show tilapia. Hieroglyphs in the tombs of Pharaohs depict what appears to be tilapia (Parker, 2002; Stickney, 2000).

There is little information dating the origins of aquaculture in Southeast Asia, but they are certainly to some extent related to the arrival of Chinese immigrants. The Chinese immigrants brought Chinese fishes to Southeast Asia, but regional aquaculture also involves native fishes, of which there is greater diversity in China. More important, the tropical climate permits higher production rates than in China (McLarney, 1984).

2.2 Tilapia

Tilapia belongs to the family of Cichlidae, a large family of tropical freshwater fish. *Tilapias* are robust fish, they withstand high water temperature well and their respiratory demands are slight, they are easy fish to transport with easy reproduction (Huet, 1994). *Tilapia* is a generic term used to designate a group of commercially important food fish belonging to the family Cichlidae, the expression is derived from the African native Bechuana word “thiape” meaning fish. *Tilapia*, especially Red Tilapia is well known as highly demanded fish in Malaysia and Sabah, this is due to its taste and red colour that make it famous among the Chinese. At present the price of the fish is between RM8 to RM25/Kg (Berita Perikanan, 1998)

Because of overlap of morphological characteristics, taxonomists have tried to split the genus of *tilapia* based on largely on their breeding behavior which also coincides roughly with macrophytophagous, microphagous or omnivorous feeding habits. (Pillay , 1990). According to Lucas and Southgate (2003), the common term of ‘*tilapias*’ refers to pure species as well as hybrids belonging to the genera *Tilapia*, *Sarotherodon* and *Oreochromis*, several characteristics distinguish these three genera but possibly the most critical relates to reproductive behavior, especially the larger species that are commercially exploited. The three major genera are differentiated by the way they brood their eggs and