

**A STUDY OF DIFFERENT BAITS AND NEAP/SPRING TIDES  
ON THE CATCH COMPOSITION OF HOOK AND LINE  
IN SEPANGAR BAY**

**JAPSON WONG VUN HUENG**

**THE THESIS WHICH ATTACHED IS TO FULFILL  
PART OF THE REQUIREMENT TO OBTAIN  
A BACHELOR OF SCIENCE WITH HONOURS IN MARINE SCIENCE**

**MARINE SCIENCE  
SCHOOL OF SCIENCE AND TECHNOLOGY  
UNIVERSITI MALAYSIA SABAH**

**APRIL 2008**

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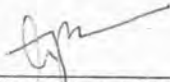
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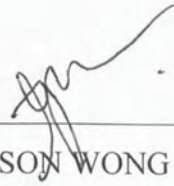
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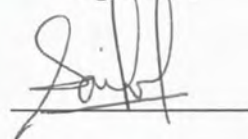


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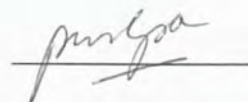
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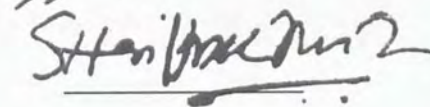
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## 4. DEAN

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## ACKNOWLEDGEMENT

First of all I would like to thank God for giving me a chance to do a study on the different baits and tides on the catch composition of hook and line in Sepangar bay. Without His protection and wisdom this study would not be a success. I hope through His grace and love, I could provide a better knowledge and data for the local fisherman around Sepangar Bay to improve the standard living of the local fisherman which still using traditional fishing gear.

I would like to express my gratitude and indebtedness to my supervisor Dr Saifullah A. Jaaman for his valuable supervision, guidance and co-operation in the research and preparation of this thesis possible. Without him my thesis would be a failure and in a mess. He encouraged me to go in detail study in Sepangar Bay area regarding of fishery study. His consistent motivation and encouragement allowed me to perform better and unleashed my capabilities in many areas, especially in the field related to this thesis.

Besides that I'll like to express my unlimited appreciation to the Universiti Malaysia Sabah boat house management staff; Mr. Bujang Kadir, Mr. Josli @ Roslan Pulau, Mr. Haron Mohamad Sharif and Mr. Jabdar Abdul Sahar for bringing me out to the station at Sepangar Bay using UMS Stenella for my fishing operation. Their patient and skills in the sea provide safety and security through out the fishing operation when overcoming adverse weather.

And I'll like to express my sincere thanks to my colleague, Mr Abd Hafis Bin Hussin, Mr Jopeny Ulak, Mr Kevin Zhang Xiaoyu, Miss Lee Shi Ping and others whom are not mentioned here for their friendship. Their advice, teamwork, support, cooperation, valuable suggestion and ideas are very important part in completing this study.

Finally, I am also grateful to my parents for their love, continuous support and encouragement in completing this research work.



## ABSTRAK

Kajian “A Study of different baits and neap/spring tides on the catch composition of hook and line in Sepangar Bay”, pancing menggunakan ikan dan sotong sebagai umpan dibuat bandingan terhadap pasang surut perbani dan pasang surut anak di teluk Sepangar. Empat set pancing disediakan; dua pancing menggunakan umpan ikan dan dua pancing lagi menggunakan umpan sotong. Ikan basung (*Decapterus macrosoma*) dan sotong (*Loligo spp*) telah dipilih untuk penkajian ini. Proses memancing dijalankan dari lapan malam hingga ke enam pagi untuk pasang surut perbani dan pasang surut anak di teluk Sepangar dengan menggunakan boat UMS *Stenella*. Empat malam pasang surut perbani dan empat malam pasang surut anak telah dipilih mengikut jadual pasang surut dari bulan July 2007 hingga bulan November 2007. Objektif pengkajian ini ialah untuk mengenalpasti spesis ikan yang dapat ditangkap menggunakan pancing di teluk Sepangar, untuk mengenalpasti perbeza jumlah tangkapan antara umpan ikan dan umpan sotong di teluk Sepangar dan untuk mengenalpasti perbezaan tangkapan antara pasang surut perbani dan pasang surut anak di teluk Sepangar. Nama spesis, nama tempatan, panjang badan, berat, lokasi memancing, saiz mata kail dan jenis umpan yang digunakan dicatatkan. Jumlah 138 ikan telah ditangkap dan dalam kajian statistik menunjukkan ada perbezaan yang ketara dalam jumlah, berat dan panjang kesemua 23 spesis ikan. Antara umpan (ikan dan sotong) dan pasang surut (perbani dan anak) tidak menunjukkan perbezaan dalam jumlah spesis, tangkapan, purata panjang serta berat di teluk Sepangar. Dalam kajian ini, spesis yang kerap dipancing iaitu melebihi lima ekor turut dikaji statistiknya antara umpan (ikan dan sotong) dan pasang surut (perbani dan anak) dalam jumlah tangkapan, purata berat dan panjangnya. Daripada kajian, tidak menunjukkan perbezaan dalam semua kajian untuk spesis yang kerap dipancing. Ini telah menunjukkan bahawa memancing di Teluk Sepangar adalah tidak dipengaruhi oleh umpan serta pasang surut.





## ABSTRACT

In the study of different baits and neap/spring tide on the catch composition of hook and line in Sepangar Bay, fish-baited and squid-baited hook and line fishing was being chosen to compare between spring and neap tide in Sepangar Bay. A series of fishing materials was being used to set up four sets of fishing equipments; two for fish-baited hook and line fishing and another two for squid-baited hook and line fishing. The fish bait used is of *Decapterus macrosoma* (basung) and the squid bait is of *Loligo spp* (sotong). Fishing operation was being conducted from 8pm to 6am in the spring tides and the neap tides by using UMS Stenella. A total of four spring tides and four neap tides were being chosen from the tide table for this study from July 2007 until November 2007. The objectives of this study are to identify fish species that can be caught using baited hook and line in Sepangar Bay; to determine the different amount of catches between fish and squid-baited hook and line in Sepangar Bay; and to determine the different amount of catches between spring and neap tides using baited hook and line in Sepangar Bay. Species name, local name, length, weight, location of sampling, hook size and bait used are all recorded. A total 138 specimens was caught and there is a highly significant different between the 23 species that was being caught in the amount of catches, average length and weight. Between the baits (fish and squid) and the tides (spring and neap) there is no significant in the number of species caught, amount of catches average weight and length. In this study, the frequently caught species which is more than five fishes caught was being tested statistically between baits (fish and squid) and the tides (spring and neap) for their amount of catches, average weight and length. From all the tests, there show no significant different. This indicates that fishing in Sepangar Bay is not affected by baits used and the tides.



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**LIST OF SYMBOLS/ SHORTFORMS/ TERMS**

spp	Species
%	Percentage
m	Meter
cm	Centimeter
mm	Milimeter
lb	Pound
g	Gram
mt	Metric ton
min	Minimum
max	Maximum
ave	Average
no.	Number
H <sub>0</sub>	Null hypothesis
H <sub>1</sub>	Alternate hypothesis
Hp	Horse Power
GPS	Global Position System
UMS	Universiti Malaysia Sabah
$\chi^2$	Chi-Square
df	Degree of freedom



## CHAPTER 1

### INTRODUCTION

#### 1.1 Fish Status.

Seventy percent of the world is covered with water and there are over 30,000 species of fish and several hundreds more being discovered every year in the ocean (Froese & Pauly, 2007). There might be lots more have not been discovered as the ocean is too deep and too vast for humans to discover all of them. This makes them the most diverse group of vertebrates. Just like in the book of Genesis 1:20-22 of the Holy Bible, God commanded, and “Let the water filled with many kind of living being, and let the air be filled with birds.” So God created the great sea monsters, all kinds of creatures that live in the water, and all kinds of birds. And God was pleased with what he saw. He blessed them all and told them to increase in number (Good News Bible, 1992).

Fish fossils have been found all around the world and the oldest fish fossils is found in sandstone in the Flinders Range in South Australia. Scientists working in the South Australia Museum paleontologist Jim Gehling have discovered the fish-like fossil of 560-million-year-old fish, the oldest fish fossils found in the world. Where as humans have only lived since 250,000 years ago (CNN, 2003).





In 1950, the total catch of ocean fish increased from 18.5 million metric tonnes to 73.5 million metric tonnes in 1996, an increase of close to 400%. The rapid increase in catch began to level off in the 70's and the catch per capita peaked at 14.4 kg per person per year (WWF, 2007). The total fish harvest has continued to increase, due to the increase in fish farm production. Fish has been the major food resources for human population in the whole world. The demand for fish as food resources have shot sky high as human population is increasing drastically.

## **1.2 History of Fishing.**

The history of fishing goes back as far as the history of human. About 7,000 years ago, people of ancient times began fishing for food, when pieces of bone were used as hooks and lengths of vine as line (Cederberg, 1991). The oldest known painting of an angler using a rod or staff comes from Egypt and history dates it from about 2000 BC (Cederberg, 1991). This shows that fishing is the main activities in those times to hunt for food. People in the Stone Age had been fishing for food; they mostly used nets to catch as many fish as quickly as possible. They make nets by spinning grasses, or spinning wool. Often men did the spinning to make nets for fishing or hunting. At that time, they knotted the strings together in complicated patterns to make the nets, and attached stones or bits of clay or lead to the bottom of the net to weight it down so it would not float and attached bits of wood to the top so it would float (Cederberg, 1991). The methods and techniques used for fishing have improved slowly through time. Fishing rods and hooks are being introduced too.



### 1.3 Modern Fishing

The most common form of recreational fishing is using a rod, reel, line, hooks and any form of baits. Other devices are also being used to further improve the efficiency and effectiveness of the bait in line fishing. Some examples of the devices are the weights, floats, and swivels. Lures are often being used to substitute bait. Most types of fishing gear and equipments are made in a professional manufacturing facility while others are hand made. Some examples of hand made gear include plastics from fishing worm molds and flies. The practice of catching or attempting to catch fish with a hook is also sometimes known as angling. One method of growing popularity is kayak fishing. Kayak fishermen fish from sea kayaks in an attempt to level the playing field with fish and to further challenge their abilities. Kayaks are extremely stealthy and can allow anglers to reach areas far from land or by conventional boat. The most common fish sought after are marlin, tuna, sailfish, shark and mackerel along with other species of fish (Wikipedia, 2007).

Commercial fishing provides a lot of fish product for food to many countries around the world. Those which practice it often go out into the ocean under extreme conditions to fetch higher yield. Commercial fishermen harvest almost all types of species which includes tuna, cod and salmon to shrimp, krill, lobster, clams, squid and crab. Commercial fishing methods have become very efficient and effective using large nets (Bannerot & Bannerot, 2000).

Fishing methods vary according to the region, the species being fished for, and the technology available to the fishermen. A commercial fishing enterprise may vary





from one man with a small boat with hand-casting nets or a few pot traps, to a huge fleet of trawlers processing tons of fish every day. Commercial fishing gears today are purse seine net, seine nets, trawls, dredges, hooks and lines, lift nets, gillnets, entangling nets and traps.

#### 1.4 Study Background

Previously there have been some studies on the catch composition in Sepangar Bay and Gaya Bay area using traditional fishing gear by the Universiti Malaysia Sabah undergraduate students. The study was being supervised by the Prof. Ridzwan from the Borneo Marine Research Institute in 2003 and traditional fishing gear that was being studied is the long line fishing, cages and nets.

Study on the influence of tides and the depth towards the catch composition in Gaya Bay using long line fishing was being conducted. Two stations were chosen to conduct the study. Total of eight species of fish was caught and total number of 26 fishes caught. Comparison between the stations, tides and depth was analyzed using ANOVA. He found out that the long line fishing yields more fishes as compare to other traditional fishing gear. The fishes caught are of deeper water (Abdul Mu'aiz Bin Sa'aban, 2003).

Study on the influence morning/ night and depth towards the catch composition in Gaya Bay using cages was being conducted. Two stations were chosen to conduct the study. Total of nine species of fish were caught and total number of 59 fishes caught. Comparison between the stations, morning/ night and depth was





analyzed using T-test and Mann-Whitney U test. She found out that the time for putting net for fishing is best to do at morning and area of deeper water would yield more catches. She also suggested that the sampling effort should be increase and longer observation to be done onto the project (Nor Juneta Bt. Abu Seman, 2003).

Study the influence of tides and depth towards the catch composition in Gaya Bay using bottom-set trammel net was being conducted. Two stations were chosen to conduct the study. Total of 15 species of fish was caught and total number of 44 fishes caught. Comparison between the stations, tides and depth was analyzed using T-test. She found out that the yield of catches is higher at high tides as compare to low tides. Besides that she also finds out that the yield is more at shallower area. But statistically there are no significant difference between the tides and depth of water. The catches are not sufficient to undergo a proper statistical test and more sampling needed to be done to increase the number of catches (Salina Binti Matt, 2003).

### **1.5 Significant of Study**

This study was being done to understand the baits and tides difference in the catch composition of hook and line in Sepangar Bay. After analyzed the collected data through out this operation, important knowledge on the baits used and tides difference would be taken as reference by the local fishermen who harvest fish around the Sepangar Bay area. This could save effort and time spends on fishing around Sepangar Bay, specific tides and baits use could produce high yield from the bay. Besides that, specific sizes and species of fishes which are high in market value can be targeted in specific tides and using specific baits in Sepangar Bay. Through this study I hope the



by-catches and under size fishes will be reduce, ecosystem will be maintain and the fish resources in Sepangar Bay would be sustainable.

Besides that, I sincerely hope this study would provide a base for further research and development in the fishery industries regarding fishes that could be harvested from the area; fishing equipment which enhance more yield and further understanding of other factors on fishing.

### **1.6 Aim of Study**

Through this study I hope to provide information regarding baits and tides onto hook and line fishing in Sepangar Bay for the local fisherman with the hope to improve the standard living of the local fisherman which still using traditional fishing gear. Besides that, I hope the result gathered provide a core data for further studies on the fishery landings, gears and improve the economic of the state.

### **1.7 Objectives.**

- 1) To identify fish species that can be caught using baited hook and line in Sepangar Bay.
- 2) To determine the different amount of catches between fish and squid-baited hook and line in Sepangar Bay.
- 3) To determine the different amount of catches between spring and neap tides using baited hook and line in Sepangar Bay.



## 1.8 Scope

In this study, there were lots of factors which have to be considered before starting the operation. To obtain better results and accuracy in the study, standards had been sets and taken to account. Factors and variable were sets for the study. The baits that were being used (fish bait and squid bait) and the tides (spring tide and neap tide) were the variables that are being studied. The factors that were being standardize were the fishing equipment used (hook size 15 and line); time of operation (8pm to 6am); and the location of sampling is at Sepangar Bay.

In this study, there were factors that were out of our controls. They were not consistent and might affect the operation. The wave, weather, water current, winds, moon light, depth, salinity, water temperature, and other parameters might affect the catch composition through out the operation. Besides that the fish behavior and seasons could affects the catch composition in the area too.





## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Fishing

Fishing is the activity to hunt for fish by using hook and line, traps or any other methods to gather the fish. In more detail, it is also pursuing other aquatic animals such as shellfish, squids, octopus, turtles, frogs and some edible marine invertebrates. It is not included pursuing aquatic mammals such as whale where the word for is whaling is more often being used. Fishing is practice in the ancient and worldwide with various techniques and traditions and it has been improve and developed by modern technologies. Besides providing food, modern fishing is both a recreation ad professional sport (Green, 1993)

According to FAO statistic, total number of fishermen and fish farmers is estimated to be 38 million. Fisheries provide direct and indirect employment to an estimated of 200 million people in the world (FAO, 2004).



Fishing is being done by humans since ancient time back to at least to the Mesolithic period about 10,000 years ago (BBC News, 2006). Archaeological features which found such as shell midden (University of York, 2004), discarded fish bones, and cave painting show that the activity fishing is important for survival. At that time, most people lived a hunter-gather lifestyle and were constantly moving around. The Neolithic culture and technology spread all around the world between 4,000 and 8,000 years ago. With new technologies of farming and pottery came the basic forms of all main fishing methods which are still using till today (Cederberg, 1991).

## **2.2 Fishing Lines**

Fishing line is any line made for fishing. Some important parameters of a fishing line are its length, material, and weight; thicker, sturdier lines are more visible to fish. Factors that may determine what line a fisherman chooses for a given fishing environment include breaking strength, knot strength, UV resistance, cast ability, limpness, stretch, abrasion resistance, and visibility (Baron, 2004).

## **2.3 Hook and Line**

It is not hard to catch fish, all that is needed is a hook fixed onto a line and bait. But to improve the catch its better to have a rod, a reel, some hooks or lures, a bobber, a few sinkers and a container of bait (Minnesota Department of Nature Resources, 2007).



Rod is a stick-like pole which is long and sharp at the end. Almost any type of rod is useful in fishing. The basic fishing rod is 6 feet long and has a medium weight which means it is a good all-purpose rod. A cane pole or even a long stick will work for fishing (Allen, 1997).

Reel is a compartment which is use to retread the line in a systematic manner. The easiest is to use spin-cast reels. Spinning reels are popular, but they are a bit harder to use. If a cane pole or a stick is used, just tie the line to the end and it can be used (Lapsley, 1992).

Line is made up of nylon. Some are superimpose with steel within it. Line is sold according to its strength, which ranges from 2-pound test up to more than few hundred pound test. It can use to catch guppies to as big as a 7-foot fish (Green, 1993).

Hooks is made up of bones, steal, carbon, nickel and any substances which is sharp at one end and bend into a "J" or a "G" shape. Any type of hook is suitable for fishing. It depends on the type of fish that is being targeted. The hook size is being categorized according to numbers. The smaller number of the hook meaning the larger the hook size. Hook size can be group according to range from one to twenty. Hooks with a long "shank", the part between the eye and the barb, are easier to remove from fish with small mouths (Bannerot & Bannerot, 2000).

Sinkers are often make of heavy metal which helps the baited hook or lure sinks. It is often made of lead steel ceramics or cement as it does not get rust from salt



water. It is also called as split-shot; these weights keep the bait down near the lake or river bottom, where most fish swim (Cederberg, 1991).

Bobber is bulbs-like or rod like which float on the surface water. Usually colourful and comes in different sizes. The smaller and thinner bobbers work best. When the bobber goes under the water surface, it indicates that a fish has taken the bait. A bobber also adds weight to the line to help casting farther (Baron, 2004).

Bait is used to attract the fish towards the hook. It can stimulate movement, colour or smells. There is a lot to choose from. For most fish, the best all-around baits are nightcrawlers, squids, or worms. A needle-nosed pliers is often used to remove the hook from the mouth of any fish that is caught (Roberts, 2000).

Lures is a bait-like attraction for the fish. It looks like real insects or animals. Fishes often mistaken it and of the hundreds of lures on the market, the most popular are spinners, crankbaits, and jigs with feathers or rubber bodies (Bannerot & Bannerot, 2000).

Jig is simply a hook with a lead ball near the eye. A jig is being retrieved by bouncing it along the bottom of the lake or river. Nowadays jigs are modified to catch squids only (Bannerot & Bannerot, 2000).

Spinners are like a lure which vibrates when retrieved through the water, attracting fish. They are easy to use and will catch a wide variety of fish. Spoons are also another type of lure. It can be cast far out into a lake or river (Cederberg, 1991).



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