PRELIMINARY STUDIES ON MARKET POTENTIAL OF "IKAN SEBELAH", *Psettodes erumei* IN AQUACULTURE INDUSTRY

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TESIS INI DIKEMUKAN UNTUK MEMENUHI SEBAHAGIAN DARIPADA SYARAT MEMPEROLEHI IJAZAH SARJANA MUDA SAINS DENGAN KEPUJIAN

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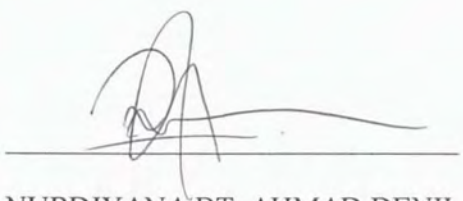
I hereby declare that this thesis contains my original research work. Sources of findings reviewed herein have been duly acknowledged.

21 February 2005



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ABSTRACT

This study was designed around the abundance of *Psettodes erumei*, a local flatfish resource that remained the predominant flatfish species still underutilized by the domestic industry. This study identified three specific objectives that had to be achieved before *Psettodes erumei* utilization opportunity would be actualized; to determine the acceptance of *P. erumei* in local market, to analyze the supply and demand of *P. erumei* in local market and to study the preference of dishes which can be prepared using *P. erumei*. Information on *P. erumei* resource availability, the landings and estimated sales and evaluation of *P. erumei* acceptance were gathered and analyzed. The results indicate that the acceptance of *P. erumei* by the society is relatively high as 73% respondents like to consume *P. erumei* and 82% respondents agree that *P. erumei* has potential in aquaculture industry in future. *P. erumei* is ranked 4th of the most preferred marine species by the public. The preference of *P. erumei* based on sensory evaluation shows that *P. erumei* has higher preference than other species that has been used as samples. The landing of *P. erumei* shows a relatively stable pattern landing pattern all year round. The estimated sales are very low compared to the amount of landings. This indicates that *P. erumei* is not fully utilized which results in unfairly low price, when in fact can bring profitable revenues to Sabah.

ABSTRAK

Penyelidikan ini berkaitan dengan *Psettodes erumei* ,sejenis ikan sebelah yang boleh didapati di sekitar perairan Sabah . Spesies ini masih belum diterokai sepenuhnya dalam industri tempatan. Kajian ini merangkumi tiga objektif utama yang harus diselesaikan iaitu mengetahui sejauh mana permintaan dan penawaran terhadap spesies ini serta penerimaan masyarakat terhadap spesies ini. Selain itu, kajian ini juga bertujuan untuk mengenalpasti hidangan yang menjadi pilihan masyarakat. Keputusan yang diperolehi menunjukkan penerimaan yang tinggi terhadap spesies ini daripada masyarakat kerana peratusan penerimaan adalah tinggi iaitu sebanyak 73% manakala 82% bersetuju akan potensi *Psettodes erumei* di pasaran tempatan. Di samping itu, Psettodes erumei telah mendapat kedudukan keempat tertinggi di antara sebelas spesies ikan marin yang lain. Berdasarkan analisis sensori yang telah dijalankan, didapati *P. erumei* lebih digemari berbanding dua spesies ikan lain yang telah dijadikan sebagai sampel. Pendaratan *P. erumei* boleh dikatakan stabil sepanjang tahun tetapi anggaran jualan spesies ini adalah sangat rendah. Secara tidak langsung, keadaan ini menunjukkan *P. erumei* belum lagi digunakan secara optimumnya dalam industri tempatan.

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CHAPTER 1

INTRODUCTION

1.1 Aquaculture Industry in the World

Aquaculture has grown dramatically worldwide in the past two decades. Although there have been culture systems developed for a wide array of aquatic species, the dominant species have been shrimp, salmon, catfish, carp and tilapia. Southeast Asia has been the leading production area.

Aquaculture is also a fast growing food industry around the world. The catfish industry in the south central United States has grown rapidly, while other production areas in the United States have experienced some success and some emerging species. New production areas may prove to be important in the future.

The growth of aquaculture industry appears assured with growing population, changing nutritional habits, increasing income, relatively constant catch from capture

sources and water pollution. All the aspects mentioned above suggest that the share of fish and seafood coming from culture sources will increase.

1.1 Flatfish Aquaculture

In order to ensure continued growth and health of the aquaculture industry, aquaculturists diversified their product lines and develop flatfish aquaculture. Flatfish aquaculture is rather a new comer to aquaculture industry. Despite being a new comer to aquaculture industry, flatfish culture already established a third position ranking in marine finfish culture (Seikai, 2000). Recent declines in the fishery, combined with a demand for high quality flatfish, have once again stimulated interest in the culture of various flatfish species (Howell, 2000). The examples of flatfish which are cultured around the world are Japanese flounder, summer flounder, Atlantic halibut, pacific flounder and many more.

1.3 "Ikan Sebelah", *Psettodes erumei*

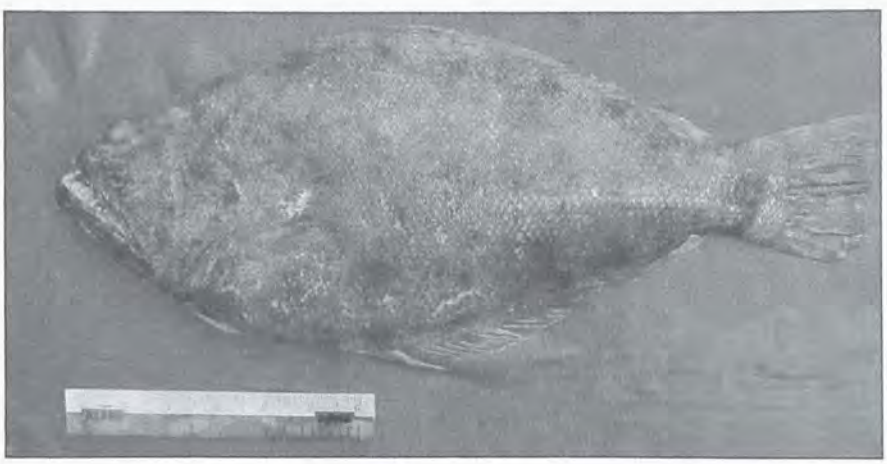

Photo 1.1 "Ikan sebelah", *Psettodes erumei*

Table 1.1 Systematic status of *Psettodes erumei* (Bloch & Schneider 1801)

Phylum	: Chordata
Class	: Actinopterygii
Order	: Pleronectiformes
Family	: Psettodidae
Genus	: Psettodes
Species	: erumei
Name	: Indian Spiny Turbot

"Ikan sebelah", *Psettodes erumei* belongs to the family Psettodidae. This species can be found almost throughout the area except for south of Delagoa Bay and off the southwest, south and east coast of Madagascar. They occur in the Indo-west Pacific ocean, from the Red sea and east Africa to Japan and Australia. This species is also widespread in the Eastern Indian Ocean and Western Central Pacific. Apart from that, they can also be found in Malaysian waters, both in Sabah waters and west Malaysian waters.

"Ikan sebelah", is one of the flatfishes which can be found in Malaysia. The common name of this species is 'ikan sebelah'. Apart from that, it is also known as 'togok'(Fisheries Department of Sabah).

1.4 Justification of Dissertation Topic

My choice to study the market potential of "ikan sebelah", *Psettodes erumei* is because, the demand for other flatfishes is very high in species like the Japanese flounder, summer flounder, Atlantic halibut and other flatfishes. Therefore, from this research, I would like to know whether *P. erumei* has the potential to be one of the

most desirable flatfishes in the aquaculture industry. Apart from that, I also hope to increase the market price and expand the market possibilities of *P. erumei* in future.

The blue fin tuna was once low in demand and the market price of blue fin tuna in Australia was only a few cents per pound. In the early 90's, the blue fin tuna was used only as cat food and the demand for blue fin tuna was very low.

After the Australians realized the market potentials and possibilities of blue fin tuna in Japan, they started to export the blue fin tuna to Japan. This immediately appreciated the price of blue fin tuna, increases the demand and expanded blue fin tuna market potentials.

1.5 Objectives and study approach

It is evident from above discussion that there is a dire need for investigations on market potential of *P. erumei*. Observations and surveys on the evaluation of the resource availability of *P. erumei* in aquaculture industry and evaluation on *P. erumei* acceptance can be taken to improve the market possibilities of *P. erumei* in future. This study was undertaken to fill the vacuum in knowledge on these aspects. The specific objectives were:

- To determine the acceptance of *P. erumei* in local market
- To analyze the supply and demand of *P. erumei* in local market

The eventual aim of this effort was to improve and to increase the market value of *P. erumei*. Apart from that, this effort is also held in order to help expand market possibilities of *P. erumei* and to instill awareness to the public and aquaculture industry of the potentials of *P. erumei* as an aquaculture species.

CHAPTER 2

LITERATURE REVIEW

2.1 Flatfishes around the World

Flatfish is a common name for any member of the unique and widespread order Pleronectiformes. There are about 500 to 600 species of flatfish species including the flounders, halibuts, plaices, soles and turbots. Flatfishes are common in both the Atlantic Ocean and Pacific Ocean.

The flatfishes are a very homogenous tribe. They are very different from all other types of fishes that no one is likely to mistake any one of them for any other sort of fish. What strikes one first is their flatness; less obvious is the fact that they do not lie on the belly but on one side, right or left. Apart from that, their skull twists in the course of development where the eye which was originally on the side that is fated to be underneath, migrates around the head, until both the eyes finally come to lie close together, on the side that is uppermost as the fish lies on bottom. The mouth however, retains its original position more nearly; therefore it is often described as opening sidewise.

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ıe dorsal and one anal fin, both
pale and somewhat translucent;
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the soles and the flounders. The
and Achiridae and the flounders,
and Pleuronectidae, right-eyed

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side of the body. There are many
bottom areas and are sometimes
e able to change their colouration
e to predators. The right-eyed
nand are characterized by having

Flounders prefer to make their habitat at the bottom of most warm or moderate oceans but can normally be found in the shallow waters along the coast. Flounders are adapted to living and staying on the bottom where they are generally either ambush or stalking predators. Their flattened but powerful body allows them to hide close to or in sediments, and then to stalk and dart swiftly and seize they prey. Flounders are top carnivores in ocean food chains, the larger species are generally fish feeders.

The colour of flounders is variable, the shades of brown depending on the nature of the ground from which the fish was taken, but generally mottled with darker brown; the fins light brown, occasionally varied with patches of darker brown, but generally lighter than the body. Sometimes they occur with a few indistinct reddish spots on the upper surface. Flounders are the true masters of camouflage where they are able to alter their coloration and also patterning at will. In addition to this, some species of flounders often also bury themselves into the bottoms, by using a fluttering motion to cover themselves with a thin layer of sand, leaving only the eyes exposed. Most species also have protruding eyes which moves as they watch their predators or preys. When flounders are disturbed, this amazing fish will quickly swims away in a fluttering motion that throws up a cloud of silt around their body. As they reach a safe distance from the disturbance, they will settle back in the bottom and quickly becomes invisible.

2.2 History and Outline of Flatfish Culture

In recent years, the expansion of aquaculture of yellowtail and red sea bream has neared to the ceiling in both amount of production and area of available aquaculture

sites. Therefore, the attention of aqua culturists turned to flatfish. Flatfish culture is relatively a new comer to aquaculture. Despite being a new comer, it has already established a third position ranking in marine finfish culture, with production exceeding landings since 1990 (Seikai, 2000). Recent declines in the fishery, combined with a demand for high quality flatfish, have once again stimulated interest in the culture of various flatfish species (Howell, 2000). The first successful flatfish fry production was by Kinki University in 1965 (Seikai, 2000). The success in rearing flatfishes fry has opened a new window for aquaculture, and the technology for mass fingerlings production was established during the 1980's. Since then, cultured flatfish production in Japan expanded very quickly.

2.3 Flatfish Cultured Around the World

2.3.1 Japanese flounder, *Paralichthys olivaceus*

Photo 2.1 Japanese flounder, *Paralichthys olivaceus*
(Source: Mr. Ha Hou Chew)

The Japanese flounder, *Paralichthys olivaceus* belonging to the family Paralichthyidae, can be found throughout Japanese waters, with the exception of the Pacific coast of Hokkaido. This species is one of the most familiar species to the

The winter flounder, *Pseudopleuronectes americanus* is a right eyed flounder from the family Pleuronectidae. The winter flounder is also known as black back flounder, lemon sole and black flounder. This species is a right-eyed flounder (family Pleuronectidae) that can be found along the east coast of North America from Labrador, Canada to Georgia, USA (Howell, 2000). The maximum size of this species is usually 2.25kg and 65 cm, although they occasionally grow to over 3 kilograms. Among the flounders species found along the coast of New England, winter flounder are the heaviest per unit length. The winter flounder has been exploited both commercially and recreationally for well over a century (Howell, 2000).

2.3.3 Summer flounder, *Paralichthys dentatus*

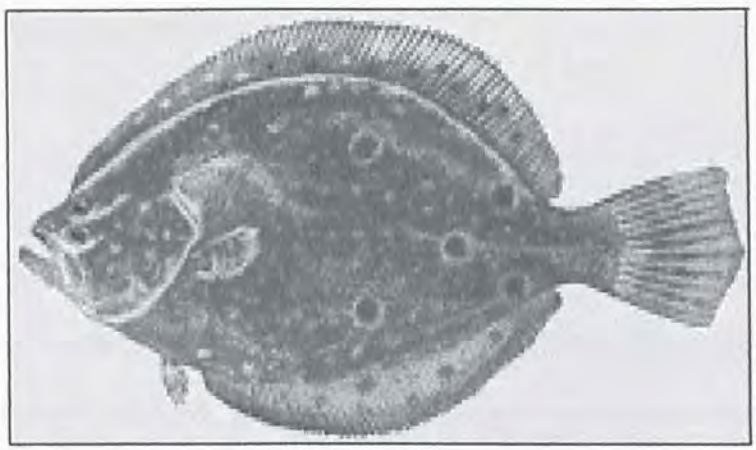

Photo 2.3: Summer flounder, *Paralichthys dentatus*
Source: http:// www. njscuba. net/ biology / sw-fish-flounders. html

The summer flounder, or fluke, *Paralichthys dentatus* is a left-eyed flounder that ranges from Maine to Florida, along the east coast of United States. As summer flounder is a highly prized food fish sought by both commercial and recreational

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