

## **Seabob Shrimp Small-scale Fishery in Southeastern of Mexico**

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### **ABSTRACT**

Capture of seabob shrimp *Xiphopenaeus kroyeri* is one of the most important coastal fishing activities in southeastern Mexico. Its annual landings over the last five years varied from 1,500 t to 2,000 t (whole shrimp). In the present work a revision of existing information was made, carrying out surveys on the primary fishing grounds, where interviews to fishermen, local buyers and residents were applied. Ecological aspects are described, such as behavior of the incidental capture of other species, technical aspects, such as fishing gear types, as well as fishing maneuvers and strategies. Fishing aspects are analyzed for capture trends, effort, and yields. Also, commercialization presentations of the product and their consumption are described. Finally, some economic aspects are discussed, such as profitability, organization in work groups of fishermen, and its life condition. Results show that: a) seabob resource is at maximum yield, b) established fishing season avoids high percentage of incidental capture of other species, in addition to greater economic yields, and c) is necessary to implement new mechanisms of commercialization to increase economical profits to fishermen.

**KEY WORDS:** Seabob shrimp, *Xiphopenaeus kroyeri*, fisheries, México

## **La Pesquería Ribereña del Camarón Siete Barbas en el Sureste de México**

La captura del camarón siete barbas *Xiphopenaeus kroyeri*, es una de las actividades pesqueras ribereñas más importantes en el sureste de México. Sus capturas anuales en los últimos 5 años se han mantenido alrededor de las 1,500 a 2,000 t (camarón entero). En el presente trabajo se realizó una revisión de la información existente sobre este recurso, además de efectuar visitas a los principales lugares de captura, donde se entrevistó a pescadores, compradores y residentes locales. Se describen aspectos ecológicos, tales como el comportamiento de la captura incidental de otras especies, aspectos técnicos, como lo son el arte de pesca utilizado, así como las maniobras y estrategias de pesca. Se analizan aspectos pesqueros como la tendencia de las capturas, esfuerzo y rendimientos. También se describen la comercialización, presentaciones del producto y su consumo. Por último se presentan algunos aspectos socio

económicos, tales como el comportamiento de las ganancias, organización en el trabajo de los grupos de pescadores y su condición de vida. Los resultados nos muestran que: a) el recurso se encuentra en su máximo rendimiento, b) La temporada de pesca establecida evita altos porcentajes de captura incidental de otras especies, además de propiciar que se obtengan los mayores rendimientos económicos y c) es necesario implementar nuevos mecanismos de comercialización para aumentar el ingreso de los pescadores.

**PALABRAS CLAVES:** Camarón siete barbas, *Xiphopenaeus kroyeri*, pesquería, México

### INTRODUCTION

The distribution of seabob, *Xiphopenaeus kroyeri*, is from North Carolina, U.S. A. to Santa Carolina, Brazil, including the Gulf of Mexico and Caribbean. It occurs on muddy and sandy bottom at 1 to 70 meters depth, usually lower than of 27 meters. It is very abundant near estuaries and deltas (Holthius 1980). Seabob fishing is very important locally in some countries including the United States, Panama, Nicaragua, Costa Rica, Colombia, French Guyana, Brazil, and Mexico (Neiva and Wise 1963).

The seabob shrimp small-scale fishery in the southeast of Mexico is of economical and social importance. From 1994 to 2002, the annual production exceeded 1,500 metric tons of whole shrimp. Most of this production came from the coast near Ciudad del Carmen, Campeche. There is know published information in the international journals about the Mexican seabob. This paper describes the seabob fishing boats and gear, harvesting, processing and marketing methods, the form of the group of fishermen, and consumption of seabob in southeast Mexico.

### METHODS

Most of the information reported herein was obtained by a prospecting study of the fishery from January 1994 to July 1997. It covered the fishing area from Chiltepec, Tabasco to Isla Aguada, Campeche, but Cd. del Carmen, Campeche was particularly emphasized due to its relevance in production. This study was conducted by interviewing fishermen, processor, and buyers, and making visual observations and photographing. The prices are reported in U. S. dollars (currency change February 2003, \$11.10 Mexican Pesos = \$ 1.00 U.S.D.).

### SEABOB LANDINGS STATISTICS

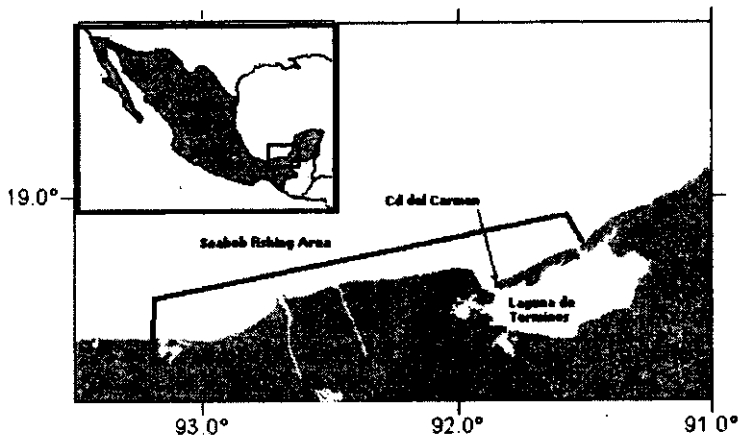
Before 1994, seabob fishing was prohibited because the trawl net can not be used in less than five fathoms. However, seabob was captured illegally using boats near the coast. Landings statistics before this year were not available. About 90 % of seabob production was landed in the region near Ciudad del Carmen, Campeche and the rest in the state of Tabasco.

Most of the production is landed from November to March. In 1998 –

2000 seabob landings ranged from 129 to 581 tons of shrimp heads on /month, with an average of 350 t shrimp head son/month. Seabob landings have increased. Annual landings were only 1,266 t in 1994 – 1995 but has risen to 2,098 t in 2000 – 2001.

#### FISHING AREA

The fishing area covers the southern part of Mexico, from Chiltepec, Tabasco to Isla Aguada, Campeche. Seabob are present in major concentrations within a range of 2 to 4 fathoms (3.6 to 7.2 m) associated with the mouth of the Terminos Lagoon and lagoons from Tabasco (Figure 1).



**Figure 1.** Fishing grounds of Seabob shrimp in southeast Mexico

#### SEABOB BIOLOGY AND ECOLOGY

Seabob used the shallow coastal areas. It enters to Terminos Lagoon, only when the northern winds change the coastal currents and the water salinity above 20 ‰ (Smith 1988).

Recently, Flores Hernández et al., (2002), found that seabob shrimp is present all year in Terminos Lagoon, and this condition is explained by appreciable changes over the isohalines in the interior of this lagoon.

The environmental factors that regulate the production of seabob are little known. The massive capture along the coast of Campeche is strongly correlated with the southern winds. In the north Gulf of Mexico, the production appears to be related to the northeast winds (Loesch 1960, 1975). It is highly probable that the wind coming from the continent plays an important role (Smith, 1988).

The bulk of the seabob harvest in Campeche is during the later fall and winter months of November through February. Massive captures of seabob occur when the passage of a cool front churns up the nearshore waters and then

calms after the presence of strong southeastern winds. This occurred a day or two prior to the new cold front's passage. This seems to be the triggering mechanism for the seabob "run".

Seabob spat fall occurs all year with two peaks; one from February to March and the other from June to September. The latter is the most important (Nuñez and Wakida 1997, 2003). Recruitment have two peaks. One in June and a larger one in October – November (Nuñez and Wakida 1997).

The most important bycatch species in the trawl fisheries of *X. Kroyeri* are: Lesser blue crab *Callinectes similis*, star drum *Stellifer lanceolatus* tonguefish *Symphurus spp.*; sea trout *Cynoscion arenarius*, Atlantic cutlass fish *Trichiurus lepturus*, and cock shrimp *Exhippolystomata oplophoroides*.

The seabob shrimp by-catch ratio varies around 1:0.81 to 1:5.08. Less values of by-catch percentages were in November to April. Small scale fishing of seabob shrimp has a strong conflict with industrial fleet, because the incidental catch of white shrimp. High catch of white shrimp occurs from July to October.

#### SOCIAL - ECONOMIC ASPECT

Most of fishermen belong to cooperatives and social groups. There are 53 groups, 48 are cooperatives and five social groups. The number of boats by group varies between 1 to 10. Most of them are sited in Cd. del Carmen. Independently to kind of group that they belong, the labor structure is the following: the boat owners and the fishermen. The fishermen are divided by their experience in captain and crew; the profit is divided in two equal parts, generally. One is for the boat owner, and the other is divided between fishermen.

The profits are shared after gas, oil and other provisions for fishing the next day have been purchased. The boat owner pays the cost of maintenance, while the consumer pays the tax payment through an increase in price or by the fishermen and boat owner by quote per pound.

#### The Fishermen

Almost all seabob fishermen are males, but there are a few women; the fishermen live in Cd. del Carmen and neighboring towns. The recorded number of fishermen in different kinds of organizations is 600, but there are fishermen who do not belong to any group. Their number is not available.

Results of a socioeconomic survey in Cd. del Carmen, Campeche indicates that seabob fishermen have low incomes and little education, approximately second grade of primary school, and most of the fishermen come from neighboring towns and places in Campeche and Tabasco near to Cd. del Carmen. A high percentage of the fishermen have more than 15 years of experience in fishing activities, beginning early in life. Most fishermen live in their own homes, many built with low cost material, and the average number of people living per room was of 3.8; a fishermen's family lives crowded (Wakida - Kusunoki 1994).

### The Fishermen and Their Methods

The seabob shrimp fishery utilizes small fiberglass boats of 6.4 to 7.25 m (23 to 25 feet) equipped with outboard motors of about 45 and 65 Hp. A small trawl net (between 12 to 13 m of head rope), of 24.5 mm of mesh size (1 inch) hauls in the shrimp from 9.15 m (permitted depth). The fishermen use a table on the boat to sort the shrimp (Figure 2).

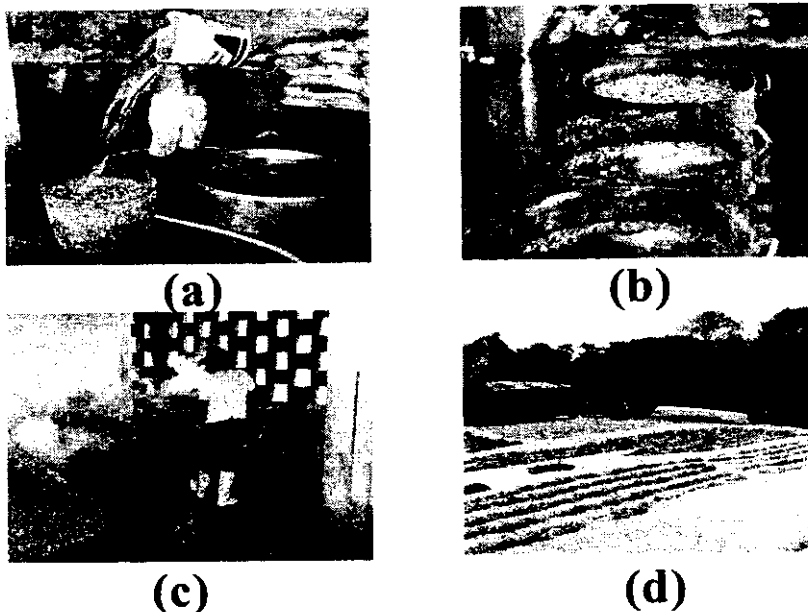


**Figure 2.** Fishermen sorting seabob from the trawl catch

Two men are present in each boat. The fishermen work in the morning, generally from 7 to 13 hours. But in the season of northern winds, the best capture is at night before the wind change direction to north caused by the new cold front's passage. The tow duration depends on a "try tow". Fisherman observe the try tow capture, and if they consider that the capture was sufficient, they will tow about an hour. Regularly, the boat makes five to seven tows per day. The capture depends on the month; on average it is 80 kg of shrimp heads-on per trip in the good season. The fishermen return to the port and head their capture by themselves or with help of other people. The official fishing season had not been modified in the last four years (from November to April), but in 2003 the start of fishing season was changed to October.

### PROCESSING SEABOB

Seabob is processed in several different forms: One is shrimp heads-off, boiled, and peeled. Another is whole shrimp or shrimp heads-off boiled in brine and dried in the sun ("sancochado" in spanish), which is the most common presentation (Figure 3). For every pound of shrimp boiled in brine and dried, 2.5 pounds of fresh shrimp are processed.



**Figure 3.** Seabob shrimp Processing. a) cleaning, b) cooked with salt, c) cooled, and d) sun dried

#### LOCAL CONSUMPTION

Seabob is served in many different ways:

- i) In cocktails with added onion, chili, oil, salt ketchup, hot pepper and coriander.
- ii) In a soup with blue crabs, fish and oysters, and
- iii) Cooked with rice.

Another presentation is as snack and for salads. Dried shrimp is used in many plates. Seabob is consumed in ceviche, which is prepared with fresh and peeled seabob shrimp with lemon juice and chili, tomatoes, onion, coriander, and ketchup.

#### MARKET AND MARKETING

One part of production is sold and consumed in the region, and the other part of the boiled, brine dried seabob is transported and sold in other cities, such as Merida, Monterrey, Campeche, Puebla, and Mexico City. Dealers buy directly from the fishermen, and they process the product and send it to different cities.

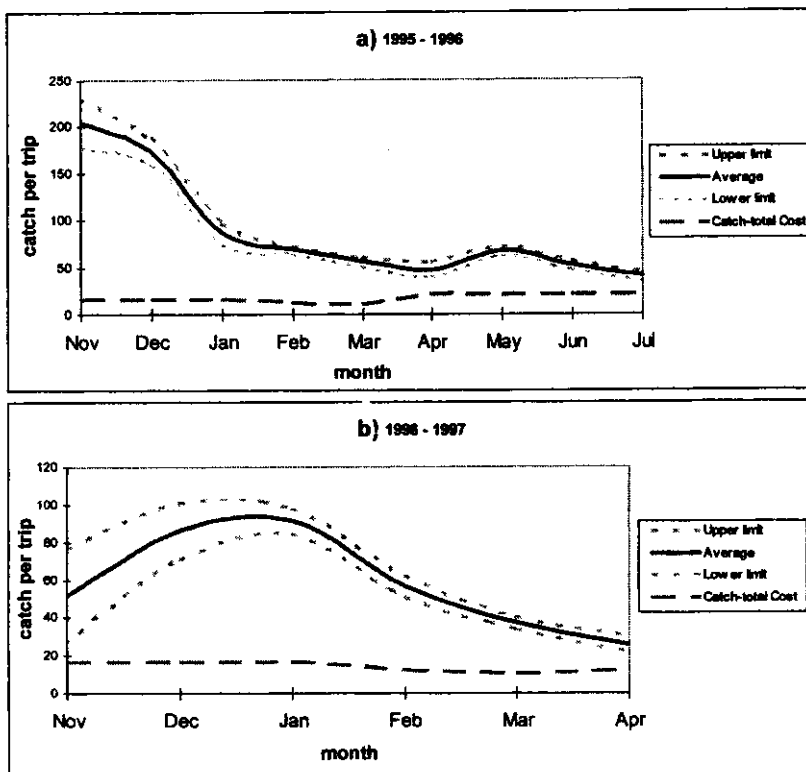
The prices paid by the buyers are variable during the fishing season, the highest price during the lent period of March and April, is US\$3.57/kg of heads-off shrimp and US\$1.78/kg of whole shrimp; the lowest prices were in

November (US\$2.67/kg heads-off shrimp and US\$1.34/kg whole shrimp).

The form by which the fishermen sells his product depends on the landings. If the capture is high, he sells heads-on shrimp, and if the capture is low will sell his entire catch heads-off. The fishermen may pay labor to head the shrimp — 1.5 pesos per pound of shrimp heads-off or he gives a pound to every person. The price of processing shrimp (cook and dried) depends on the place and presentation. If it is heads-off shrimp and dried, the price is between US\$8.79 - 10.71/kg, and if it is whole shrimp and dried, it is between US\$4.46 to \$7.14/kg.

### BIOECONOMICAL ANALYSIS

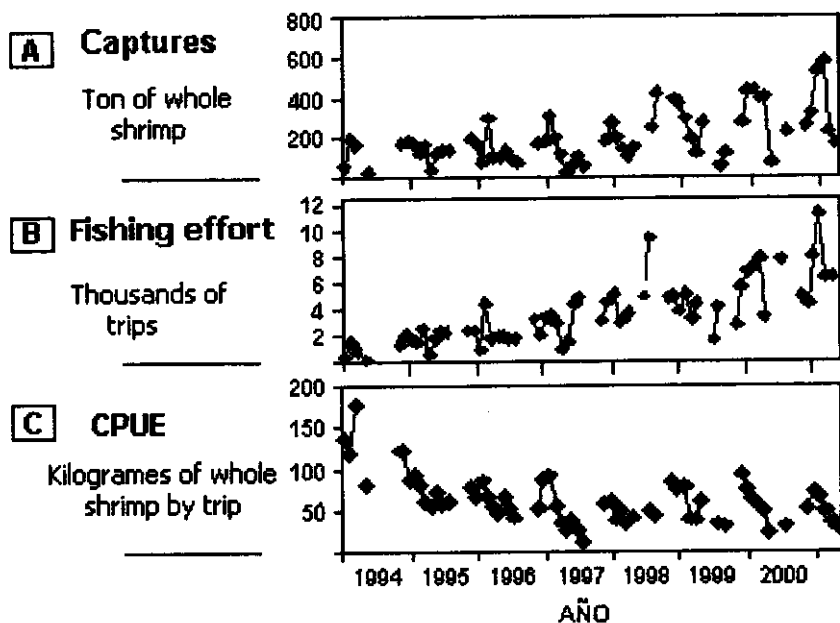
A simple analysis of yield per trip, and total trip costs show us that the greatest economical profits in the seabob shrimp fishery are in November to February (Figure 4). Seabob fishing profits for the rest of year is compensated with the increase of incidental white shrimp catch, in particular during April to July.



**Figure 4.** a) Catch, b) fishing effort, and c) catch per effort unit of small scale seabob shrimp fishery

## FISHING RESOURCE SITUATION

Seabob landings have increased. Production was only 1,266 in 1994 – 1995, but it had risen to 2,098 t in 2000 – 2001. It is the result of fishing effort increase ( 16,863 trips in 1994 – 1995 compared to 41,502 trips in 2000 – 2001). However, capture by effort unit (CPUE) decreased 75 kg to 50 kg in 1994 of whole shrimp/trip. This yield had been maintained during the subsequent five years (Figure 5) .



**Figure 5.** Catch per trip (average and limits) and catch necessary to pay trip total. Cost (catch-total cost). Fishing season: a)1995 – 1996 and b)1996 - 1997)

Wakida-Kusunoki and Nuñez (2003) mentioned that seabob fishing is being exploited at its maximum yield. The CPUE that has remained stable due to the expansion of the fishing .

## GOVERNMENT ADMINISTRATION

In November 1997, the federal Government sets several regulations to protect the fishery. Government fixed the number of small boats that can fish to 250, and established the fishing season from November to April.

## CONCLUSION

The seabob resource is at maximum sustainable yield. An established fishing season avoids the high percentage of incidental capture of other



species, and provides greater economic yields. It is necessary to implement new mechanisms of commercialization to increase the economic profits to the fishermen.

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