HETEROGENITY OF MINI PURSE SEINE NET FLEET IN JAVA SEA

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Abstract

The exploitation of the Java Sea small pelagic resources is performed mainly through three types of purse seine fleets which are broadly distinguished according to the size of the boat. The smallest boats, that is to say from 12 to 18 m total length, belong to the mini seiners fleet. They are not able to fish very far off shore but, on the other hand they move frequently along the Java North Coast. Recent census demonstrated the importance number of this fleet with approximately 1 600 fishing units. From the different recent censuses and a specific inquiry about the technical characteristics of these units, it is possible to discriminate this group between difference fishing fleets corresponding to the specific fishing strategies with specific innovations.

Key words : Java Sea, Mini seiners, Fishing strategies.

Introduction

The exploitation of the Java Sea small pelagic resources is performed mainly through three types of purse seine fleets which are broadly distinguished according to the size of the boat. During the first synthesis about these fleets, made in 1994 (Potier M. and S. Nurhakim, 1995), it appears that the fleet constituted by the smallest vessels using purse seine, take great part in the total pelagic fish catch made by the whole of the purse seines fishing units (Potier M. and B. Sadhotomo, 1995). Approximately, 30% of the pelagic fish landing issued from the Java sea are realised by this specific fleet (Potier M. and B. Sadhotomo, 1995). This article describe the first results obtained about this fleet, mainly showing that this whole of fishing units is not an homogeneous group but that it is made of different sets with different fishing strategies. This approach complete the work presented in this forum by Atmaja and Ecoutin (1995).

Materials and Method

Two different approaches are used to describe the mini purse seine fleet : first, the result of different censuses made in 1994 and 1995 as part of the PELFISH program ; second, an analysis of different technical specification of the vessel using mini purse seine.

The result of two censuses are used in this study, made in March and June 1995. During these censuses, some informations about the equipment of the unit are recorded : type of the vessel, geographical origin, type of engine, fish hold, light,... All informations easily to record during a census. During these censuses, more than fifty places are visited on the North Java coast between Sunda Strait ant Bali Strait (Fig. 1). Approximately 1 600 units using the mini ring seine are counted.

About the analysis of characteristic of vessel, the data are issued from twelve villages of Central Java and East Java but this table do not respect the equilibration of the sampling places issued of the different census.

Each questionnaire is focused on nine clusters of data :

- identification of the boat : landing place, vessel name, vessel origin, type and condition,
- stem shape : side and upper views,
- stern shape : side, upper views and upper view of the deck,
- fish storage,
- superstructure,
- observation of fish schooling,
- motorization : main engine position, type, number and shaft installation,
- lamps : type of light, electric generator,
- capstan : position of capstan engine.

In addition to these informations, some aspects of the boat's history and of the fishing strategy of the unit are collected.

For this last analysis, all the treatments involve the method of factorial correspondence analysis, so called reciprocal averaging. The initial data file contains 56 units which are described by 21 variables. After the elimination of defective items, this final active data file has only 20 variables which are divided into 49 disjunctive variables.

Results and Discussion

I. Presentation of the main types of vessel

There are 5 basic types of mini seiners along the North Java Coast. These types are called locally ***Kranji***, ***Bulu***, ***Dadap***, ***Sopek*** and ***Payang***. The three first types are boats which stern has wings. The two others have their stem and stern pointed and streamlined. Coupled with the development of mini seiners fisheries, they have subsequently developed and being modified.

Kranji type originally comes from Kranji, a small village in the North Coast of East Java.

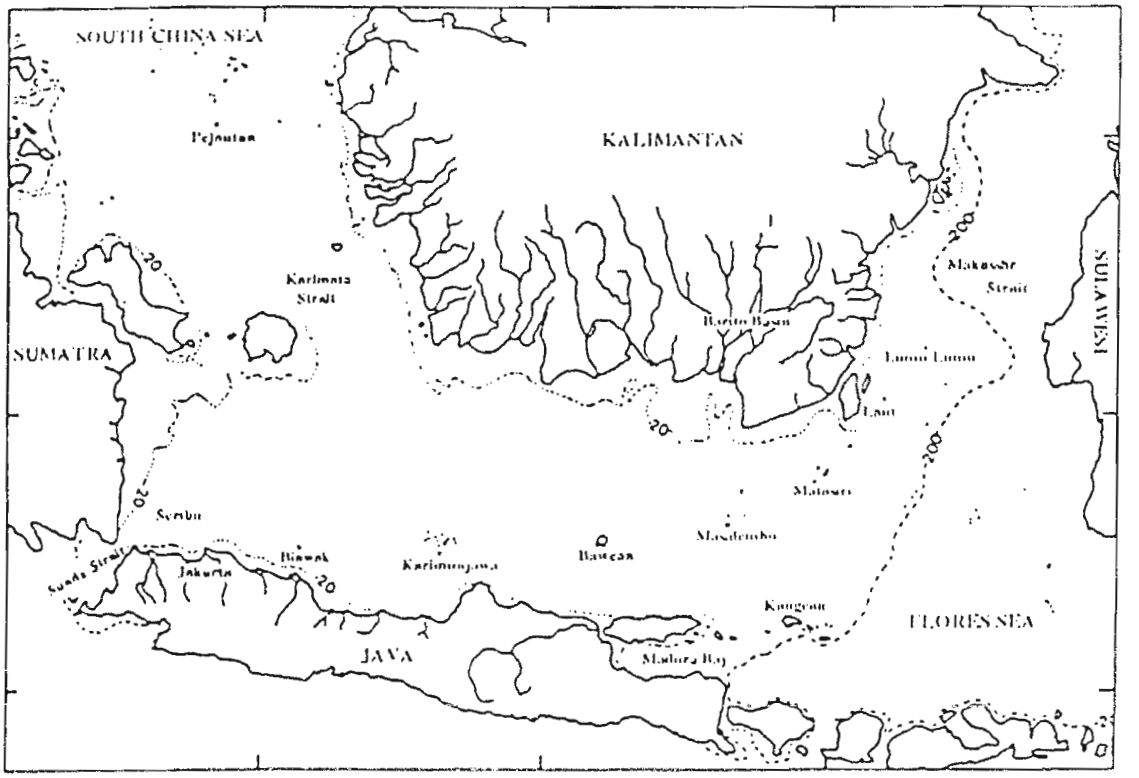

Fig. 1. The geographical environment of the Java Sea.

In 1970's, the fishermen from this village have operated mini purse seine in which their vessel type was built by indigenous boat builders. Coupled with the migration of fishermen, this vessel type spread to other places in the East Java and North Madura.

Bulu type was initially built in Bulu, a border village in East Java. Subsequently, it spread and being built in different villages of Central Java and South Madura. In the later area, most of fishermen were modified the stern part and superstructure of their vessels. During the different censuses of 1995, there was found other types of mini seiner vessels which the hull shape of the vessels was similar with Bulu type. They are provided by deckhouse, inboard engine which eventually linked with capstan, full decked stern. It seems that they were modification type of Bulu.

Dadap type has an appearance closely to the ***Kranji*** type. The difference lies on the vessel construction, ratio of the main dimension and fishing aids. The vessel construction provided by insulated fish hold, hull planking more neatly and strongly tied to the close frames. The ratio of length to breadth is smaller than ***Kranji*** type. It means that of the same length, the vessels of ***Dadap*** type are wider than ***Kranji*** type. These vessels provided by mercury and halogen lamps for fishing aids and an electric generator which usually linked with capstan engine.

Sopek and payang types were commonly used in the Javanese small scale fisheries ; however, the vessels size of both types which used for purse seiners were larger than the boats used for other fishing techniques. Hull shape of these vessels was pointed stern.

II Geographical Distribution : the result of census

During the censuses of March and June 1995, the geographical distribution of the vessel types was recorded (Fig. 2 and 3).

According to the results of the figure 2, it seems that it has not great difference between the two censuses : more than 1.660 units in March against approximately 1.600 in June

It has to be noted that the number of vessel types existing in each area will always change due to some of them were the migrated vessels. Migration of mini seiner fleet closely related to their fishing strategies. Potier and Petit (1995) explained that during July-December period the mini seiners remain in the vicinity of their registration places. From January to April, the mini seiners of East Java Province move to the Madura Strait or to the Western part of the Java Island in order to avoid the rough condition of the Java Sea. These units laund their catches in some harbours of these last area where some units were recorded during the whole of the year.

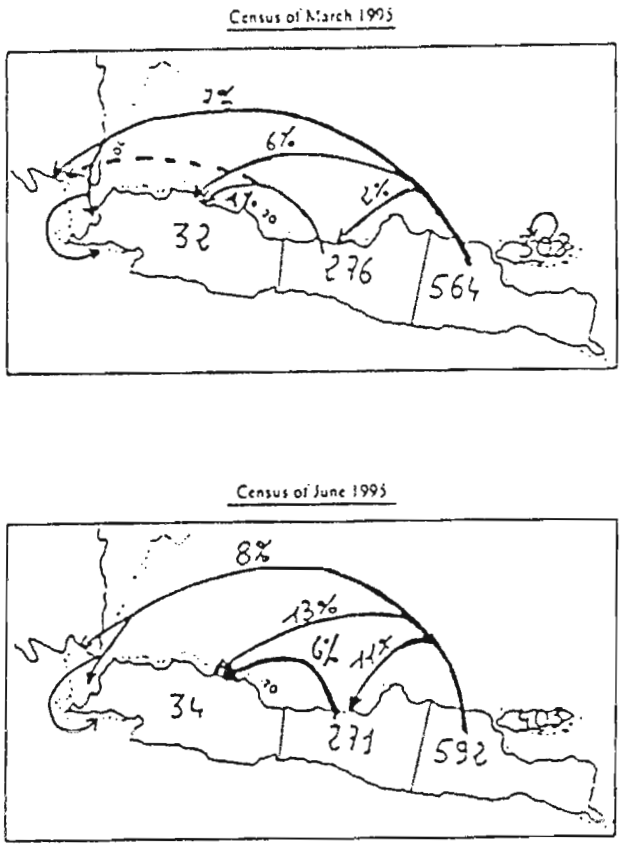

Fig. 2. Repartition of the fishing units in function of their origin with indication of pourcentage of migration between each main geographical zone.

III Fleet dynamic in relation with the characteristic of the vessel type

III.A Result of the study on the characteristics of the vessel

Many treatments are realized on the different files derived from the initial data set. The difference reflects the number of variables used, this number varying between 15 and 20. Successive analysis explain well over one half of the inertia of the data with the three first axis. On the whole, these successive analysis present the same results with three groups of boats which are markedly differentiated.

• 1st group (presented in term of declining statistical significance) : situated near the first axis issued from the analysis (Fig. 4). It coresponds to the fleet of the ten units observed in a same village, namely units having their origin from this village (Mayangan, East Java). The fleet is composed by :

- boats with a axial main engine linked with the capstan. This main engine is mainly an inboard engine,
- the stern on these boats is square on upper view, always decked and these vessel have a permanent superstructure.

Fig. 3. Repartition by type of vessels in function of their origin with indication of pourcentage of migration.

This « vessel type » is usually unknown or not named by the fishermen.

* 2nd group : situated on the fourth quarter of the graph issued from the analysis (Fig. 4), it is composed by the ***payang*** and the ***sopek***. This group is completment opposite of the first group along the first axis.

These are units with a streamlined stern and an engine in starboard position ; without superstructure, these units have always an observation point constituted by a real observation chair.

Stem and stern of the three ***payang*** are also streamlined with a rounded shape. The shape of two ***sopek*** is right.

This fleet is formed by all the boat with streamlined and pointed « etraves ».

* 3rd group : the group, situated on the positive side of the third axis (Fig. 4), comprises by three boats which represent all the ***Dadap*** vessels originally from Dadap.

Four characteristics are dominant and exclusive : presence of all kinds of lamps with petromax, mercury and galaxy, requiring a generator linked with the capstan engine ; these units have also insulated fish holds. Taken jointly, these characteristics describe a fleet which appears have a higher level of technological complexity.

To conclude this analysis, the first axis contrast units with two streamlined « etraves » from the fleet formed by boats without structures well-known in the case of mini purse seine fleet. The second axis seems describe the contraste between fleets searching fish school and fleets attracting the fish with light. Finally, the third axis is describing the level of technology.

III.B Relations between the fishing tactis and characteristis of the vessels

Mini seiners fleet along the Java North Coast carried out various fishing tactics adapted to the target species and referred to the geographical areas. There were 3 kinds of fishing tactics employed :

- fishing with light,
- fishing with light and Fish Aggregating Devices, locally called rumpon (FADs),
- fishing by hunting.

Fishing with light

Most of the mini seiners fleet utilized paraffin pressure lamps (petromax) to aggregate fish. This tactic is locally called ***ngobor***. The fishermen usually stay only 1 day at sea. That were why most of the mini seiners vessels are not to be provided by insulated fish hold.

The mini seiners fishermen convinced that the higher intensity of lamps the more fish can be aggregated. Consequently, the recent development showed that mini seiner fleet from Dadap have replaced paraffin pressure lamps by mercury and halogen lamps for aggregating fish, with small electric generator as a power supply. The results of different censuses confirm that.

Fishing with light and FADs (***rumpon***)

Lamps and FADs (***rumpon***) were combined to aggregate fish. Construction of ***rumpon*** consist of raft, coconut leafs as an attractant, and anchor. These parts were connected by ropes and setted in the water column. Paraffin pressure lamps (petromax) were used as light source. In fishing operation, paraffin pressure lamps were setted and illuminating around the rumpon.

This fishing tactic was carried out by fishermen from Rembang (Central Java) and Blimbing (East Java). Rembang's fishermen performed this tactic during period of March-May with the target species of scads and sardines. While the Blimbing's fishermen held in period of July-October, when they occupied the fishing ground off East Java waters with the target species of scads.

By this tactic, the fishermen generally stay at sea 3 days and over. For Rembang's fishermen, staying along their rumpon they entrust their catch to "sell on behalf of" through the other vessels which were going back to the fish landing. This manner means to avoid fish spoiled due to their vessels not to be provided by insulated fish hold. The Blimbing's fishermen brought insulated fish box in their fleets when they went to fish for staying more than 3 days at sea or during migration.

Fishing by hunting

Fishing by hunting of fish schoals was performed in the day time or in the night through observing phosporus light in the sea surface caused by fish schooling movement (Potier and Petit, 1995). The observer sit on the chair at upper part of mast to observe fish schoals and their swimming direction, mainly in Madura Strait.

In connection with this tactic, the mini seiners of ***Dadap*** type, ***Kranji*** type, and mainly ***payang*** type from Kraksaan (Probolinggo, East Java) were provided by observation chair in the upper part of mast, either simple chair (for ***Dadap*** and ***Kranji*** types) or real chair (for ***payang*** type).

The fishermen from Probolinggo and Situbondo (East Java), which used mini seiners of payang type more often performed this tactic where locally called ***gurahan***. In Kranji (East Java) this tactic called ***borahan***, which was taken place during October-December with the target species of small tunas and

mackerels. In Dadap (West Java), it called ***gurah*** which was performed during March-April with the target species of mackerels.

Conclusion

These two descriptions (census and migration, analysis of characteristics of the vessel) linked with the description of daily tactics, seem indicate that the mini purse seine fleet are not really an homogeneous fleet and it is possible to describe inside five groups :

- the first is composed by the boats centering their searching of fish shoal with a point of observation (issued from analysis of characteristics and fishing tactic),
- the second is formed by the units which search the fish with a higher level of technological complexity (analysis of characteristics and census),
- the third correspond with the fleet which give greater place to catch the fish near the village of the origin of the fishermen : it is the case of the units from Mayangan, but others villages show the same comportment (analysis of characteristics and census),
- between the fourth and the fifth groups, the difference depends of the capability of migration ; the fleet using ***rumpon*** usually against the fleet moving seasonally to search the fish. This aspect will be described by the communication of Atmaja and Ecoutin (1995) in this forum.

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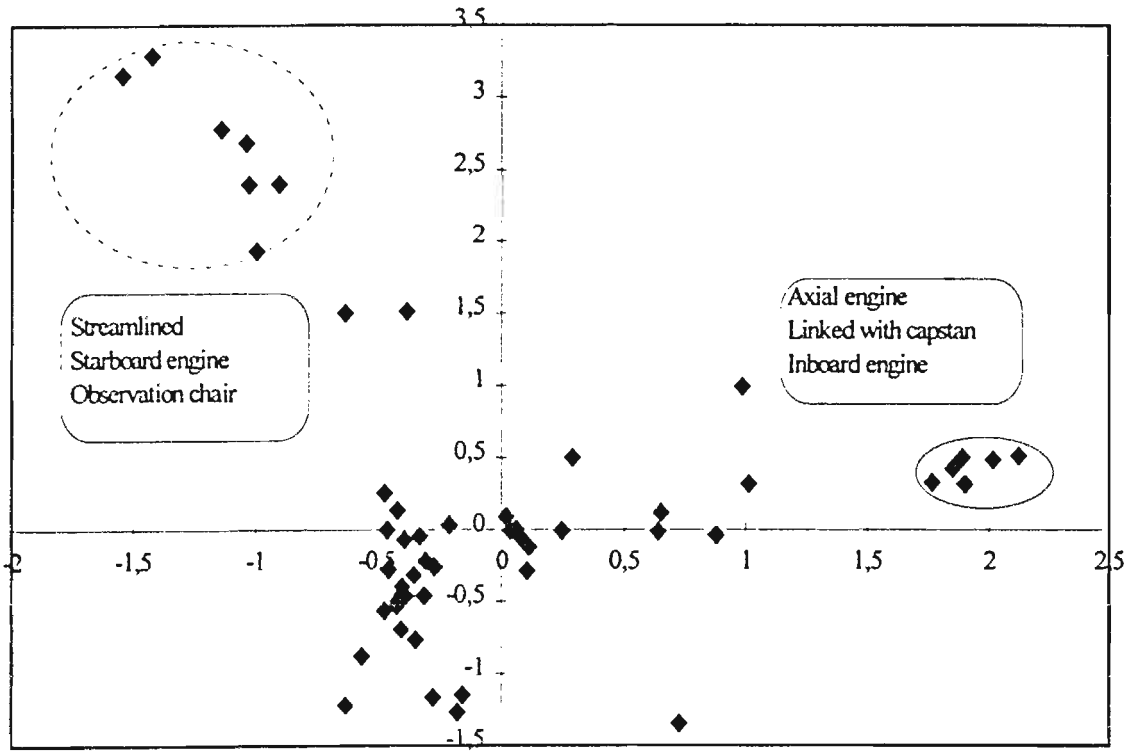
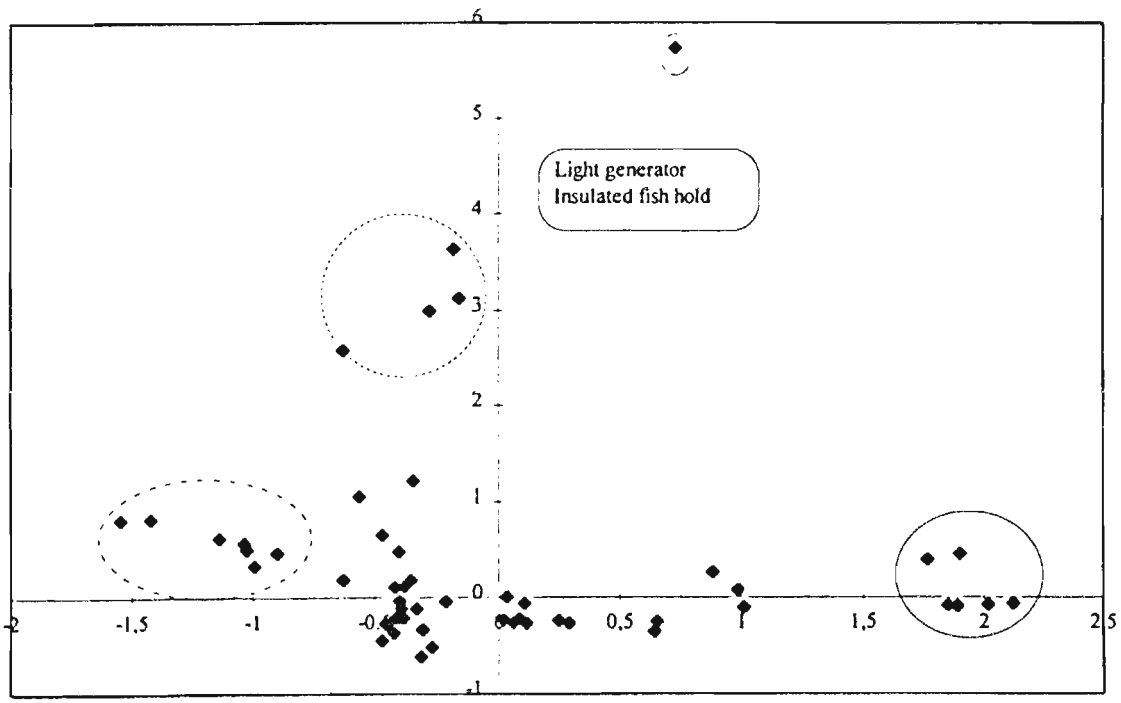


A- Diagram axis I-axis II



B- Diagram axis I-axis III

Fig. 4. Presentation of the results of the statistical analysis of the characteristics of the vessel

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