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STUDY ON THE BIG PURSE SEINERS FISHERY IN THE JAVA SEA

(I. The main pelagic species caught*)

by

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ABSTRACT : The big purse seiners that exploit the Java sea, unload large quantities of coastal pelagic fish in six harbours located along the North coast of the Java Island. Eleven species give 90% of the catch, i.e. about 100 000 tons in 1985. But the statistical data collecting system greatly varies according to the harbours or the provinces. The same species can be identified under some different common names or confused with another species. Visual criteria of species recognition are given and solutions are proposed for a better data collection and a better use of those statistical data.

ABSTRAK : **Studi tentang perikanan purse seine besar di laut Java. (I. Jenis-jenis utama ikan pelagik yang tertangkap)* oleh Subhat Nurhakim**, T. Boely*** dan M. Potier*****.

Purse seine besar yang beroperasi di laut Java, mendaratkan hasil tangkapannya yang berupa ikan-ikan pelagik dalam jumlah yang besar dienam pelabuhan sepanjang pantai utara Java. Sebelas species yang tertangkap mencapai 90% dari total hasil tangkapan yaitu sekitar 100 000 ton pada tahun 1985. Akan tetapi sistem pengumpulan data statistik setiap pelabuhan maupun propinsi menunjukkan perbedaan. Jenis-jenis yang sama dinyatakan dalam nama umum yang berbeda atau tertukar dengan nama untuk jenis-jenis yang berbeda. Kriteria secara visual untuk membedakan setiap jenis diuraikan dalam tulisan ini, dan diusulkan pula cara pemecahan untuk mengumpulkan data yang lebih baik untuk penyajian keperluan statistik.

RESUME : **Analyse de la pecherie des grands senneurs en mer de Java. I. Les principales especes pelagiques capturees.* par Subhat Nurhakim, T. Boely** et M. Potier*****.

Les grands senneurs qui exploitent la mer de Java debarquent dans six ports de la cote nord de l'ile de Java d'importantes quantites de poissons pelagiques. Onze especes representent 90% des apports, soit environ 100 000 tonnes en 1985. Mais le systeme de collectedes donnees statistiques varie selon les ports ou les regions. Lameme espece peut etre identifiee sous plusieurs noms communs oubien etre confondue avec une autre. Des criteres visuels de reconnaissance sont donnes et des solutions sont proposees pour une meilleure collecte et une meilleure utilisation des donnees statistiques.

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* This note belongs to a serie of papers analysing more precisely a synthesis document (BOELY and al. 1987) that gathers all the available basic data since 1976 on the activity of the big purse seiners based in the Central Java province.

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INTRODUCTION

The Java sea is an huge continental shelf that links the Java Island to Kalimantan. It is a large flat bottom basin, slightly tilted Eastwards with a mean depth around fifty meters. Several big rivers flows into this sea and enrich it with nutrients.

Those circumstances favour the presence of large pelagic fish populations and consequently very numerous species of pelagic fish cohabit in that sea. Those fish live near the surface and in the upper part of the water column, often in shoals more or less dense. In general, they also show a nycthemeral behaviour, staying nightly near the sea surface and daily more deeper (Boely and *al.*, 1986).

Amongst the dozen of pelagic fish families living in the Java sea (Sunda Shelf) four families are commercially very important and comprise numerous fish species. There are the Clupeidae, the Engraulidae, the Carangidae and the Scombridae. The first two families comprise only species with small size fish, the last two include also some species whose adults widely overreach fifty centimetres.

For all those families, most of species are linked to the continental shelf or to its immediate vicinity. Many are littoral or even estuarin species and in that case are as often as not small size (Clupeidae and Engraulidae). Some species inhabit the whole available space on the continental shelf and can accomplish large and seasonal movements, juveniles and young fish staying near the littoral.

In the Java sea, a large range of fishing gears is used to catch those pelagic species: traps, lift nets, anchored gill nets, drifting or circling gill nets, lines, seines and purse seines. Most of them are used near the coast by small scale boats as canoes and open boats with sculls, sails or out-board engines. Since 1975, the purse seine spreads out from the harbours of the North coast of the Java Island. Now that kind of fishing covers the whole Java sea. There are two types of vessels using purse seines: the "big purse seiners" and the "mini purse seiners".

MATERIAL AND METHOD

1. Subject of the note

This note concerns only the main pelagic species caught by the big purse seiners and unloaded in five harbours located in the Central Java province: Tegal, Pekalongan, Batang, Juwana and Rembang. The exploitation turns on about thirty pelagic or semi-pelagic species. Amongst those, eleven species provide 90% of the total catch (Table 1).

These eleven species are gathered in five statistical categories. But, they are frequently misidentified or badly allocated. Considering the volume of the catches, this not proposes solutions for a better collection of the necessary statistical data.

2. Material and available statistical data

Between 1984 and 1986, the landing places of the North coast of the Java Island were visited several times. All the available statistical data were collected by the Projects scientists in the landing places as well as in the fishing harbours or in the

Table 1. Total catch per category and per harbour of the big purse seiners of the Central Java province during 1985.

Categories	Tegal	Pekalongan	Batang	Juwana	Rembang
Layang	5 187	40 872	6 396	13 178	7 199
Kembung	2 009	18	4 113	1 801	965
Banyar	—	8 179	—	—	—
Tanjan	1 341	4 736	1 165	—	—
Lemuru	2 118	5 028	195	—	—
Selar	444	1 135	884	—	—
Bentong	2 283	4 450	—	—	—
Lain-lain	106	3 227	96	705	406
Total	13 488	67 645	12 849	15 684	8 570

Fisheries Administration. Those data cover the whole "Fishing System" of the Javanese big purse seiners and come from different sources: "Buku-Bakul", forms SL-3 and A1, enquiries (Boely and *al.*, 1987).

During the landing and the auction, the fish is classified into commercial categories, often peculiar to each harbour. Those categories take into account the market value of the species, the mean size of the unloaded fish and their freshness state. For example, the species *Decapterus russelli*, can be named in the Tegal harbour: layang, layang biasa, unyir, bloco, korok (Table 2). Then for Fisheries Administration's needs, those commercial categories are gathered in five statistical classes: Layang, Lemuru, Kembung, Tembang and Selar (Anonymous, 1976). The Tables 2 and 3 detail those different classes and categories.

Table 2. Others names categories used during the landings.

STATISTICAL CATEGORIES	TEGAL — PEMALANG — PEKALONGAN	
	Size categories	Species categories
LAYANG 2 species	UNYIR = very small BLOCO = small LAYANG = standard KOROK = big	L. biasa = D. russelli L. deles = D. macrosoma
KEMBUNG 2 species	KEMARI = small KEMBUNG = standard and big	Banyar* = R. kanagurta Kembung* = R. brachysoma
BENTONG Selar crumenophthalmus Selar boops	MANDRING = small BENTONG = standard and big.	
SELAR Selaroides	SELAR = standard COMO = big	

* Pekalongan only.

RESULT AND DISCUSSION

1. Result Categories and Species

That system is not accurate for several motives. First, a category gathers several species of a same genus (Layang, Tembang, Kembung) and sometimes several genus (Selar). In addition and according to the harbours, the same category does not always correspond to the same species. However, the vessels of the five harbours exploit the same fishing grounds and the same fish populations. Then, the species identification itself can be false during the landing or the selling. Lastly, fish in bad condition is very often sorted out in "Miscellaneous" ("Lain Lain"), even if the unloaded quantities are important.

In order to avoid those defaults, the Table 3 gives the correspondances between the different appellations used in the harbours, the statistical categories and the scientific names. The Table 4 provides the main visual recognition criteria for the eleven species that are caught by the purse seiners.

a. **Layang** — Round scads — *Decapterus macrosoma* and *D. russelli*.

These two species, easily recognizable, provide about 50% of the total landings. According to the season or to the fishing grounds, either prevail in the catches. Hence, the two species have to be dissociated during the landings and in the harbours statistics. A third species, *D. macarellus*, is not frequent.

b. **Lemuru** — Round sardinella — *Amblygaster sirm*.

This species, abundant in the Java sea, is mixed in the layang statistical category in the Juwana's and Rembang's harbours and in Tembang statistical category in the Eastern Java province. Hence, it is impossible to know the total catch for that species. First, it is necessary to identify it correctly in the harbours and second to open a new statistical category for that species really important in the landings.

c. **Kembung** — Mackerels — *Rastrelliger kanagurta* and *R. brachysoma*.

These two mackerels, easily recognizable, are commercially very important. They present a different spatial and seasonal distribution, *R. brachysoma* being more coastal. The last one is more fished by gill nets and mini purse seiners, *R. kanagurta* by the big purse seiners. Owing to their economical importance, it is necessary to clearly note those two species in the landings.

d. **Tembang** — Flat sardinella — *Sardinella* spp.

All the flat sardinella are gathered in that commercial and statistical category, but only two species seem to be landed in large quantity: *Sardinella fimbriata* and *S. gibbosa*. Their differentiation is easy, *S. gibbosa* having a fine gold stripe along the body. It must not include others species than flat sardinella in that statistical category.

Table 3. Names used for the main commercial categories in the different harbours.

NAME		CORRESPONDING SCIENTIFIC NAMES				
LANDING PLACES	STATISTICAL	TEGAL	PEKALONGAN	BATANG	JUWANA	REMBANG
LAYANG	LAYANG	Decapterus • macrosoma • russelli	Decapterus • macrosoma • russelli	Decapterus • macrosoma • russelli	Decapterus • macrosoma • russelli Amblygaster sirm	Decapterus • macrosoma • russelli Amblygaster sirm
LEMURU —SIRO	LEMURU	Amblygaster sirm	Amblygaster sirm	Amblygaster sirm		
KEMBUNG	KEMBUNG	Rastrelliger • kanagurta • brachysoma	Rastrelliger • brachysoma	Rastrelliger • kanagurta • brachysoma	Rastrelliger • kanagurta • brachysoma	Rastrelliger • kanagurta • brachysoma
BANYAR			Rastrelliger • kanagurta			
TANJAN —JUWI	TEMBANG	Sardinella • fimbriata • gibbosa • others	Sardinella • fimbriata • gibbosa • others	Sardinella • fimbriata • gibbosa • others		
BENTONG	SELAR	Selar • crumenophthalmus 79-82 and 85 • boops	Selar crumenophthalmus	Selar crumenophthalmus		
SELAR		Selaroides Selar crumenophthalmus 83-84	Selaroides	Selaroides	Selaroides Selar crumenophthalmus	Selar crumenophthalmus
LAIN-LAIN	LAIN-LAIN				Sardinella spp.	Sardinella spp.

Table 4. Scientific and common names of the eleven main species. Visual criteria of recognition.

SCIENTIFIC NAME		COMMON NAME		SUCCINCT DESCRIPTION	Do not Confuse
SPECIES	SYNONYM	ENGLISH	INDONESIAN		
Amblygaster sirm WALBAUM, 1792	Sardinella sirm	Spotted sardinella	Siro - Lemuru	Round and oblong body. 8 ventral fin rays (i, 7) 10/20 small black spots along upper flanks.	A. leiogaster A. clupeoides S. lemuru
Sardinella lemuru BLEEKER, 1853	Sardinella longiceps		Lemuru	Round and oblong body. 9 ventral fin rays (i, 8) long-head	A. sirm
Sardinella gibbosa BLEEKER, 1849		Goldstripe sardinella	Tanjan - juwi Tembang	Body deep, moderatly compressed. 8 ventral fin rays (i, 7). Black spot at basis of anterior dorsal rays. Narrow horizontal gold line along flanks.	S. fimbriata S. brachysoma
Sardinella fimbriata VALENCIEN-NES, 1847		Fringoscale sardinella	Tembang - juwi Tanjan	Body deep, moderatly compressed. 8 ventral fin rays (i, 7). Flanks silvery. Plain blue-green back. Anterior scales perforated and fimbriated.	S. gibbosa S. brachysoma
Sardinella brachysoma BLEEKER, 1852		Deep body sardinella	Tanjan Tembang	Body deep and compressed. 8 ventral fin rays (i, 7). Flanks silvery. Black spot at dorsal fin origin.	S. gibbosa S. fimbriata

Table 4. (Continued). Scientific and common names of the eleven main species. Visual criteria of recognition.

SCIENTIFIC NAME		COMMON NAME		SUCCINCT DESCRIPTION	Do not Confuse
SPECIES	SYNONYM	ENGLISH	INDONESIAN		
Decapterus russelli RUPPELL, 1828	Decapterus maruadsi	Round scad	Layang	Body elongate and slightly compressed. Pectoral fin falcate, reaching to below origin of the second dorsal fin. Small black spot on margin of operculum. Finlets.	D. macrosoma S. crumenophthalmus
Decapterus macrosoma BLEEKER, 1851		Layang scad	Layang	Body very elongate and round. Pectoral fin no falcate reaching to below posterior spines of first dorsal fin. Straight part of the lateral line short. Small black blotch on margin of operculum. Finlets.	D. russelli D. macarellus
Selar crumenophthalmus		Bigeye scad	Selar Bentong	Oblong and moderatly compressed body. Large eye. Deep furrow on lower margin of gill opening.	D. macrosoma S. boops
Selar boops VALENCIENNES, 1833		Oxeye scad	Selar Bentong	A deep furrow on lower margin of gill opening. Lateral line becoming straight before origin of second dorsal fin. Broad golden band along the flanks.	S. crumenophthalmus S. leptolepis
Selaroides leptolepis VALENCIENNES, 1833		Yellowstripe trevally	Selar	Oblong and compressed body. Dorsal and ventral profiles equally convex. Black spot on operculum. Bright golden yellow band from snout to caudal fin.	S. boops
Rastrelliger brachysoma		Short-bodied mackerel	Kembung perempuan	Body very deep. A row of dark spots along back. Intestine very large.	R. kanagurta
Rastrelliger kanagurta CUVIER, 1816		Indian mackerel	Banyar Kembung laki	Body moderatly deep. Two rows of small dark spots below dorsal fin bases. Dark or golden longitudinal streachs on back. A black spot below pectoral fin.	R. brachysoma

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e. **Selar** — Big eye scad — *Selar crumenophthalmus* — *Selar boops* and *Selaroides leptolepis*.

That category groups three species, belonging to two genus. *S. boops* and *S. leptolepis* are more coastal than *S. crumenophthalmus*. Very often, the three species are confounded, harbours people confusing them. Then, *S. boops*, abundant, never appears in the statistics. Due to their commercial importance, it is necessary to separate those three species in the harbours statistics.

f. **Lain-lain** — "Miscellaneous".

That category have only to comprise the occasional species caught by the purse seiners and not at all the fish of the previous species in bad condition or the smallest ones.

DISCUSSION AND RECOMMENDATIONS.

An effort had to be undertaken in the landing places for a better species identification and to give the same appellation for the same species along all North coast of the Java Island. Indeed, the correspondences between the common and scientific names are also valid for the landings of the mini purse seiners that fish until fifteen nautic miles from the littoral.

The misidentification of the main pelagic species and the mixing of different species inside a same category complicate very much the legislator's and scientist's work. Owing to the lack of precise species identification, it is almost impossible to express a reasonable view about the state of this or that fish population or stock, even for their natural seasonal variations. That is why the scientists have to put heavy sampling structures in position that frequently seem to be useless repetition with the statistical data already collected by official bodies or other offices.

Our purpose is not to modify the system already in position. But it is possible to improve it and, also, that system can very quickly produce a better appreciation of the state of the pelagic stocks in the Java sea. Thus, it will be able to assume better its target of fish stocks management. In the case of the Javanese big purse seiners fishery, improvements relate to the following items:

In the landing places and fishing harbours:

— Train people to clearly recognize the different species.
— Harmonize the different common appellations.
— Identify clearly by species the different commercial categories.
— Provide the landings per species and not per statistical categories to the other administrations and offices.

In the provincial administration offices:

— Harmonize the different appellations between the districts and the provinces.
— Verify that the same common or statistic appellation refers to the same species.

— Place at different users' disposal the catches per species provided by the landing places and the fishing harbours. After for Fisheries Administration needs, it is possible to gather the catches per species into the statistical categories already defined.
— Create a new statistical category for the species *Amblygaster sirm*, named "siro" and not "lemuru". The category lemuru will stay valid for *Sardinella lemuru* in the Bali Straits and in the Indian ocean.

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