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**COUNTRY STATUS REPORT
MALAYSIA**

(3) PENINSULAR MALAYSIA

**COUNTRY STATUS REPORT: PELAGIC FISHERY RESOURCE
IN PENINSULAR MALAYSIA**

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1. INTRODUCTION

With the declaration of her exclusive Economic Zone, Malaysia waters has increased from 47,000 sq. mi. to 160,000 sq. mi. This bring the potential national income from fisheries sector particularly through deep sea fishing industries. At present more than 456 licences have been issued for the vessels of more than 70 GRT in the Peninsular Malaysia out of which 142 of them are purse seines. Total landing in the Peninsular Malaysia in 1993 had increased by 3.4 % from the previous year to 791,618 tonnes. The west coast of Peninsular Malaysia shows more significant increased mostly contributed by trawlers from 293,57 tonnes in 1992 to 446,515 tonnes in 1993. In year 1993 the total landing in the east coast had dropped from 473,995 m.t in 1992 to 345,103 tonnes in 1993 (**Fig. 1**). Trawl nets contribute 60.5% and 56.8% of the total landing by all gears in the west and east coast respectively. In term of number, drift nets and purse seines form the second and the third largest fishing gears behind trawlers in the west coast while purse seines and hook and lines have the largest number in the east coast.

2. TOTAL ANNUAL PRODUCTION AND CATCH RATES

The annual production of *Rastrelliger* spp. seems to decrease gradually from 1984 to 1993 (**Fig. 2**). The total landings of the *Rastrelliger* spp. by all gears had dropped by 28.8% from 69,877 tonnes in 1984 to 9,726 m.t. in 1993. The west coast recorded bigger decrease of the total landings of the *Rastrelliger* spp. compared to the east coast by 47.7% and 16% respectively. In contrast, the total landings of the *Decapterus* spp. in the east coast shows an increase by 200% from 13,890 tonnes in 1984 to 42,410 tonnes in 1993 while the total landings of the *Decapterus* spp. in Peninsular Malaysia in 1993 had increased by more than 120% compared to year 1987 (**Fig. 2**).

The total landings of the small tuna by all gears in the Peninsular Malaysia look constant from 1984 until 1993 (**Fig.1**) with exception of the total landings in 1987 where it showed a slight increase. The total landings in 1984 was 17,723 tonnes and dropped to 15,952 tonnes in 1993. The landings of the small tuna in the east coast is 3 time higher than the landings in the west coast. **Fig. 1** shows that in 1989, the total landings for these three group species which dropped drastically in the east coast and increased back in the following year especially the *Decapterus* species. The maximum sustainable yield for the *Rastrelliger* spp. and *Decapterus* spp. in the west coast calculated through surplus production model estimated to be 45,629 tonnes and 8,419 tonnes respectively and their fMSY in term of horse power are 88,631 and 1,108,126. This bring out the idea that the *Rastrelliger* stock in the west coast waters is slightly under exploited while the catch of the *Decapterus* spp. show the other way round. The estimated potential yield of small tuna solely in the east coast waters with regard to MSY is between 14,000 to 16,000 tonnes.

Apart from tuna landings by local boats in the west coast, there are Taiwanese boats using Penang Harbour as a landing base for their tuna catches. Their catches from Indian Ocean fishing areas comprised mostly of oceanic species such as albacore (*Thannus alalunga*), yellowfin (*Thannus albacares*) and bigeye (*Thannus obesus*) (Hsu & Liu, 1990). The total monthly landings pattern of the catches show a clear seasonality with the highest landing occurred in December/January while the lowest recorded landings were in the middle of the year. Total monthly landings ranged from 136-2,040 tonnes over the period of 1990-1994 (Chee, 1994).

Fig. 2 shows the different in catch rates by two major fishing gears; purse seines and drift nets in the west and east coast of Peninsular Malaysia. In 1991, there was a sudden drop of the catch rates from these two gears to the range of 13.07 - 4.78 tonnes and 0.42 - 0.73 tonnes for purse seines and drift nets respectively. This phenomena occurred probably due to a drastic increase of effort level (total no. of boats) in 1991.

3. LANDINGS PATTERN AND FISHING SEASON

Generally, the total monthly landings of small tuna in the west coast from 1990 to 1993 appeared to be constant ranging between 500 -1,000 tonnes, but between April to June the landings increased above 10,000 tonnes (**Fig. 4**). The total production in 1993 had increased by 15.2% for the west coast while the east coast recorded an increase of 31.1% during the same period. In the east coast, the fishing activities on the small tunas actively occurred immediately after the end of the north-east monsoon February till October.

For the *Rastrelliger* spp., the fishing season in the east coast seem to start from August till October just immediately before the north-east monsoon where the landings range from 1,500 - 2,300 tonnes. While in the west coast there is no clear fishing seasons were observed and total monthly landings ranged from 2,000 - 4,500 tonnes. However, the total catch of the *Rastrelliger* spp. appeared to drop in August except in year 1990 (Fig. 4).

The fishing season of the *Decapterus* spp. in the east coast occurs at the same period as of the *Rastrelliger* spp. But, in the west coast the total monthly landings fluctuated between 500 tonnes to 1,700 tonnes and decreasing toward the end of the year. Fig. 6 shows variation in monthly catch rates by purse seiner in one of the landing centre in the west coast. The catches appeared to be higher during March till October and start to lower toward the end of the year.

4. FISHING GEARS AND FISHING AREAS

Purse seine, drift net and trawler are the major fishing gears that catch *Rastrelliger* spp. in the west coast waters. Annual total landings in 1993 of the *Rastrelliger* spp. by trawlers and purse seines had drop in catches by 35% and 66% respectively. On the same period the drift nets have recorded an increase in catch by 50.6% (Table 1). For the small tuna and round scad, purse seines contributed more that 87% and 80% respectively of the total annual production in the west coast. There are two operation method of the purse seine where they use FAD (tuas) and spotlight to lure the fish, but the later method is more common and widely used by the fishermen. The trawlers of more than 70 GRT frequently operating using high opening trawl nets and *Rastrelliger brachysoma* form a dominant species caught by this gear.

Purse seines form the major fishing gear to catch small tuna, *Rastrelliger* spp. and *Decapterus* spp. in the east coast. The landings *Rastrelliger* spp. by this gear had dropped from 12,497 tonnes in 1987 to 9,807 tonnes in 1993. In contrast, the landing *Decapterus* spp. and small tuna record the increase by 6.6% and 50% respectively. Other fishing gears that contribute to the small tuna landings in the east coast are longlines and drift nets with the former form the second important gear after purse seines.

The majority of the drift nets fishermen operate along the coast line within 5nm from the shore with a depth range from 5 - 10 m. In the north western waters, the main fishing grounds for bigger GRT purse seines, extended from 10 nm from the coast toward Pulau Perak (Fig. 5). In the east coast, most of the purse seines operate around FAD areas more than 20 nm from the shore.

5. MAJOR PELAGIC SPECIES

The catch composition of the tuna group in the west coast is dominated by *Thannus tonggol* while *Euthynnus affinis* make up only small percentage. In the mackerel group, *Rastrelliger brachysoma* form the most abundance species. There are three species in Genus *Restralliger* occur in the west coast; *R. brachysoma*, *R. kanagurta* and *R. fughni*. Small pelagic caught by the purse seine nets in the west coast waters, mainly from species *Euthynnus affinis*, *Thannus tonggol*, *Decapterus* spp., *Rastrelliger kanagurta*, *Rastrelliger brachysoma*, and *Rastrelliger faughni* (Table 2). For the *Rastrelliger* spp. *Rastrelliger kanagurta* normally caught by using FAD while the *R. brachysoma* from the main *Rastrelliger* spp. caught by high opening trawlers. Other common pelagic species are *Atule mate*, *Sardinella fimbriata*, *Selaroides leptolepis* and *Scombermorus* spp. that are also caught by purse seine nets.

The main neratic tuna species in the east coast water comprise of *Euthynnus affinis*, *Thannus tonggol* and *auxis thazard* where the first two species form the main spp. caught by purse seine nets, lift nets and hook and lines. Generally, *Rastrelliger kanagurta* is the dominant species and may be the only *Rastrelliger* spp. caught in the east coast waters. For the *Decapterus* spp., it consists of *Decapterus ruselli*, *D. maruadsi* and *D. macrosoma* (ANON, 1978). However, in the west coast waters the *Decapterus maruadsi* appeared to be the main and most common spp. caught by purse seine nets whereas in the east coast, *Decapterus ruselli* is the major species.

6. FISHERIES BIOLOGY

Biological informations of all the small pelagic and tuna species still do not cover various aspects comprehensively. The total length and weight of the *R. kanagurta* ranging from 94 - 277 mm and 71.1 - 257.2 g respectively. The combine length-weight relationship of bot juvenile, male and female is $W = 3.04 \times 10^{-6} L^{3.245}$ (Mansor, 1994). For the *Decapterus ruselli*, the size of length and weight ranging from 97 - 168 mm and 9.1 - 167.7 g respectively. While the combined length-weight relationship is $W = 7.53 \times 10^{-6} L^{3.052}$ (Mansor, 1994).

The growth and mortality parameter recorded by Mansor (1994) for species *R. kanagurta* and *D. ruselli* from the east coast sample are shown in **Table 3**. In the west coast, the average size of *Rastrelliger kanagurta* and *Rastrelliger brachysoma* are ranged from 168 - 228.3 mm and 160 - 197 mm respectively.

Table 3: Growth and mortality parameters of *R. kanagurta* and *D. ruselli* (* average values from west coast samples).

	<i>L_∞</i>	<i>K</i>	<i>M</i>	<i>F</i>
<i>R. kanagurta</i>	252-322 29.2*	0.42-1.33 0.65*	101-214	1.56-1.56
<i>Decapterus ruselli</i>	235-322	0.56-1.10	1.01-2.07	0.13-3.23
<i>Euthynnus affinis</i>	65*	0.5*		

Irregular availability of sample for certain species were the limiting factor on biological sampling. This restricted the ability to provide comprehensive informations of the biological aspect particularly on species maturity. **Table 3** shows gonadosomatic indices for small pelagic and tuna species. For *Rastrelliger kanagurta*, highest values of *gsi* were recorded in March, April and August while for *Rastrelliger brachysoma*, the values seem to be high in all the year round except in August giving suggestion that *R. kanagurta* spawned twice a year while *R. brachysoma* spawned throughout the year.

Study on food habit of small tuna species in the east coast, shows the primary food items of the species consist of squid, anchovies, indian mackerels and filefishes (Zainuddin and Noordin, 1994). Landing pattern of the tuna species seems to exhibit similar trend of these prey particularly the squid and indian mackerels that prove close prey-predator relationship between tuna and these respective preys.

7. OCEANOGRAPHICAL INFORMATIONS

Very few data regarding oceanography informations on the coastal and offshore fishing areas are available. However, since 1992, study on fisheries oceanography have been carry out in the west coast particularly in the coastal areas off the northwest Peninsular Malaysia. Monthly data collection for certain parameters are still being carried out and it will be part of future fisheries research activities. On the deep sea fishing areas, the oceanographical data collection will be carried out along with the regular monthly monitoring to locate the main offshore fishing areas by using Resource Management Vessel (Kapal Pengurusan Sumber).

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Table 1: Major fishing gears used in the small pelagic fisheries in Peninsular Malaysia

WEST COAST		1987	1988	1989	1990	1991	1992	1993
Trawlers	Small tuna	6	1	0	14	5	26	37
	<i>Rastrelliger</i> spp.	16695	11858	15879	16543	10610	14600	10822
	<i>Decapterus</i> spp.	308	304	712	1708	898	1083	2084
Purse seines	Small tuna	6056	3193	3384	4416	4836	7644	4795
	<i>Rastrelliger</i> spp.	32380	18687	14775	20365	11940	17245	10922
	<i>Decapterus</i> spp.	13304	10578	12899	13850	5743	5886	8415
Drift nets	Small tuna	605	1841	281	196	209	524	625
	<i>Rastrelliger</i> spp.	7085	9427	12248	18365	12830	14221	14355
	<i>Decapterus</i> spp.	0	0	0	0	0	0	8
EAST COAST								
Trawlers	Small tuna		22	10	30	46	37	26
	<i>Rastrelliger</i> spp.	206	1525	569	894	1284	1745	1559
	<i>Decapterus</i> spp.	10	345	331	397	702	597	930
Purse seines	Small tuna	2721	8529	2737	3670	4020	3199	5441
	<i>Rastrelliger</i> spp.	12497	12494	9671	8461	12046	8746	9807
	<i>Decapterus</i> spp.	37665	23891	24612	33793	38160	26816	40339
Drift nets	Small tuna	4303	872	1848	1708	1297	1091	1099
	<i>Rastrelliger</i> spp.	161	286	133	597	480	1408	1652
	<i>Decapterus</i> spp.	0	3	1	0	0	0	12
Lift nets	Small tuna	35	11	13	30		1	83
	<i>Rastrelliger</i> spp.	26	8	136	46		7	8
	<i>Decapterus</i> spp.	1672	399	1802	547		385	1059
Long-lines	Small tuna	11699	6258	5351	4558	4456	3574	3761
	<i>Rastrelliger</i> spp.	631	569	168	138	511	595	270
	<i>Decapterus</i> spp.	1305	421	206	122	232	413	

Table 3: Average percentage of Gonadosomatic indices of small pelagic and tuna groups in the west coast of Peninsular waters.

	<i>R. kanagurta</i>		<i>R. brachysoma</i>		<i>A. thazard</i>		<i>E. affinis</i>		<i>D. maruadsi</i>	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
January			5.7	5						
February			3.6	4.2	0.26	0.57	0.71	1.24		
March	2.7	3.2	4.2	4.6						
April	3.3	2.8	2	1.4	0.06	0.09	0.04	0.02	0.96	1.64
May	0.2	0.4	4.8	3.6					0.03	0.01
June	0.3	0.4	4.8	3.2	0.49	0.64	0.05	0.01	1.71	2.61
July	0.6	0.8	3.7	4.8					2.62	1.42
August	2.1	2.1	0.2	0.6			3.55	7.07		
September			2.68	2.29						
October	1.61	1.58	3.7	3					0.1	0.32
November			5.8	4					0.46	1.25
December			2.9	2.2					5.72	10.56