

DRAFT: EXECUTIVE SUMMARY: NARROW-BARRED SPANISH MACKEREL

Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien



Status of the Indian Ocean narrow-barred Spanish mackerel (COM: *Scomberomorus commerson*) resource

TABLE 1. Narrow-barred Spanish mackerel: Status of narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the Indian Ocean

Area ¹	Indicators		2013 stock status determination
Indian Ocean	Catch ² 2012:	136,301 t	
	Average catch ² 2008–2012:	133,692 t	
MSY:	unknown		
F ₂₀₁₂ /F _{MSY} :	unknown		
	SB ₂₀₁₂ /SB _{MSY} :	unknown	
	SB ₂₀₁₂ /SB ₀ :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished (SB _{year} /SB _{MSY} < 1)	Stock not overfished (SB _{year} /SB _{MSY} ≥ 1)
Stock subject to overfishing (F _{year} /F _{MSY} > 1)		
Stock not subject to overfishing (F _{year} /F _{MSY} ≤ 1)		
Not assessed/Uncertain		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. There remains considerable uncertainty about stock structure and the total catches. No quantitative stock assessment is currently available for narrow-barred Spanish mackerel for the entire Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains **uncertain** (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. Although indicators from the Gulf and Oman Sea suggest that overfishing is occurring in this area, the degree of connectivity with other regions remains unknown.

Outlook. The continued increase of annual catches for narrow-barred Spanish mackerel in recent years has further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect that this increase may have had on the resource. The apparent fidelity of narrow-barred Spanish mackerel to particular areas/regions is a matter for concern as overfishing in these areas can lead to localised depletion.

Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted. The following should be noted:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the Indian Ocean is currently subject to a number of Conservation and Management Measures adopted by the Commission:

- Resolution 13/03 on the recording of catch and effort by fishing vessels in the IOTC area of competence
- Resolution 13/07 concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information
- Resolution 12/11 *on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties*
- Resolution 10/02 *mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's)*
- Resolution 10/08 *concerning a record of active vessels fishing for tunas and swordfish in the IOTC area*

FISHERIES INDICATORS

Narrow-barred Spanish mackerel: General

The narrow-barred Spanish mackerel (*Scomberomorus commerson*) is a pelagic, top level predator found throughout tropical marine waters of the Indo-West Pacific. Table 2 outlines some key life history parameters relevant for management.

TABLE 2. Narrow-barred Spanish mackerel. Biology of Indian Ocean narrow-barred Spanish mackerel (*Scomberomorus commerson*)

Parameter	Description
Range and stock structure	A pelagic, top level predator found throughout tropical marine waters of the Indo-West Pacific. Juveniles inhabit shallow inshore areas whereas adults are found in coastal waters out to the continental shelf. Adults are usually found in small schools but often aggregate at particular locations on reefs and shoals to feed and spawn. They appear to undertake lengthy migrations, however, larger individuals may be resident which contributes to a metapopulation structure. Feed primarily on small fishes such as anchovies, clupeids, carangids, also squids and shrimps. Genetic studies carried out on <i>S. commerson</i> from Djibouti, Oman and U.A.E. showed there were small genetic differences among stocks in these three places.
Longevity	~16 years
Maturity (50%)	Age: 1.9 yrs for males and 2.1 yrs for females Size: 72.8 cm for males and 86.3 cm for females.
Spawning season	Females are multiple spawners. Year-round spawning has been observed in east African waters, with peaks during late spring to summer (April-July) and autumn (September-November) coinciding with the two seasonal monsoons which generate high abundances of plankton and small pelagic fish. Spawning in the southern Arabian Gulf occurs in the spring and summer months between April and August.
Size (length and weight)	Maximum: Females and males 240 cm FL; weight 70 kgs.

n.a. = not available. Sources: Grandcourt et al. 2005, Froese & Pauly 2009, Darvishi et al. 2011

Narrow-barred Spanish mackerel – Fisheries and catch trends

Narrow-barred Spanish mackerel is targeted throughout the Indian Ocean by artisanal and recreational fishers. The main method of capture is gillnet, but significant numbers of are also caught trolling (Table 3; Fig. 1).

TABLE 3. Narrow-barred Spanish mackerel: Best scientific estimates of the catches of narrow-barred Spanish mackerel by type of fishery for the period 1950–2012 (in metric tonnes) (Data as of October 2013)

Fishery	By decade (average)						By year (last ten years)									
	1950s	1960s	1970s	1980s	1990s	2000s	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Purse seine	0	0	284	2,352	4,136	5,435	4,692	4,692	4,563	4,695	7,326	5,918	6,654	8,358	8,916	9,023
Gillnet	8,680	16,862	29,732	51,762	60,008	64,079	63,079	63,079	61,991	53,776	65,162	69,226	73,119	69,190	75,109	81,234
Line	2,581	3,300	7,106	14,464	14,741	18,767	17,365	17,365	17,397	16,950	19,272	20,047	22,536	23,579	23,869	25,577
Other	57	96	468	5,614	9,739	20,995	18,285	18,285	19,528	18,327	23,309	24,271	23,652	27,933	25,589	27,821
Total	11,318	20,258	37,590	74,191	88,624	109,276	103,422	103,422	103,479	93,747	115,069	119,462	125,962	129,060	133,483	143,655

The catch estimates for narrow-barred Spanish mackerel were derived from very small amounts of information and are therefore highly uncertain¹. The catches provided in Table 3 are based on the information available at the IOTC Secretariat and the following observations on the catches cannot currently be verified. The catches of narrow-barred

¹ The uncertainty in the catch estimates has been assessed by the Secretariat and is based on the amount of processing required to account for the presence of conflicting catch reports, the level of aggregation of the catches by species and or gear, and the occurrence of non-reporting fisheries for which catches had to be estimated

Spanish mackerel increased from around 50,000 t the mid-1970's to over 100,000 t by the mid-1990's. The highest catches of narrow-barred Spanish mackerel were recorded in 2011, amounting to 143,700 t. Narrow-barred Spanish mackerel is caught in both Indian Ocean basins, with higher catches recorded in the west.

In recent years (2008–12), the countries attributed with the highest catches of narrow-barred Spanish mackerel are Indonesia (29%) and India (23%) and, to a lesser extent, Iran, Myanmar, Pakistan, and the UAE (27%) (Fig. 2).

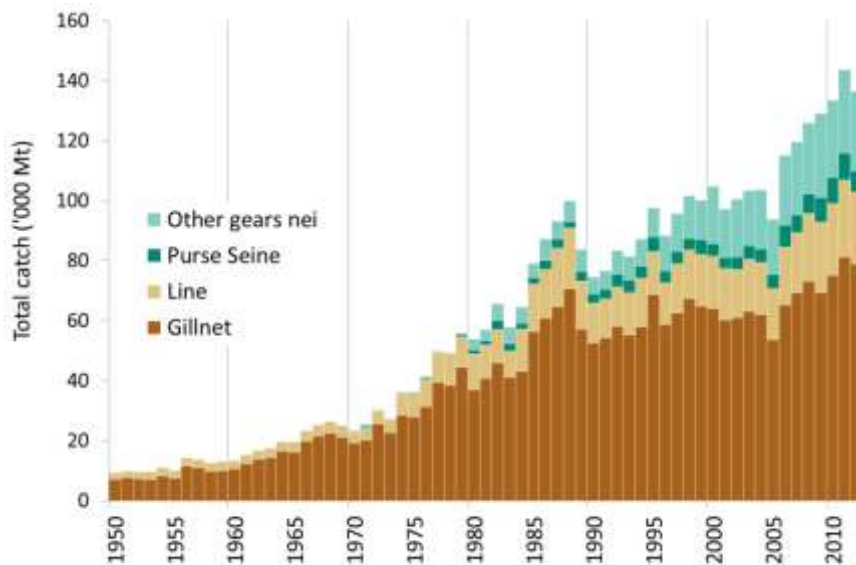


Fig. 1. Narrow-barred Spanish mackerel: Annual catches of narrow-barred Spanish mackerel by gear recorded in the IOTC database (1950–2012) (Data as of October 2013).

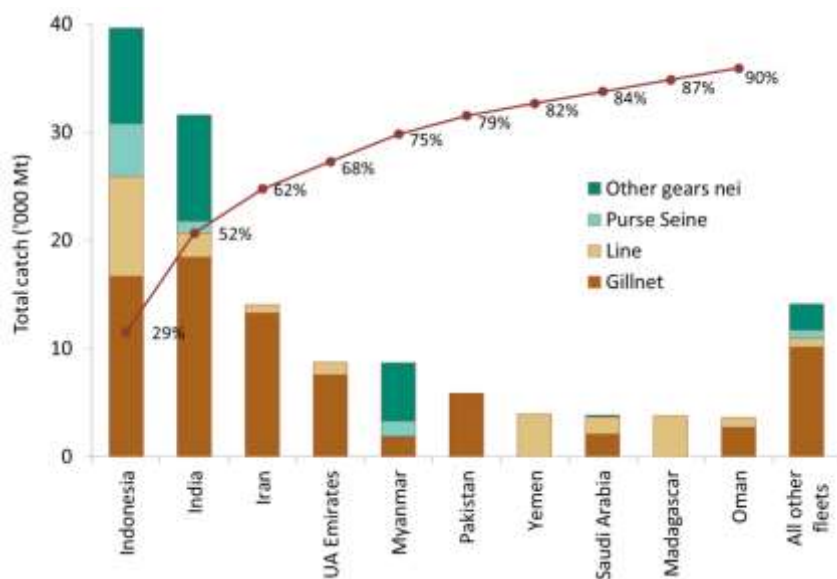


Fig. 2. Narrow-barred Spanish mackerel: Average catches in the Indian Ocean over the period 2010–12, by country. Countries are ordered from left to right, according to the importance of catches of narrow-barred Spanish mackerel reported. The red line indicates the (cumulative) proportion of catches narrow-barred Spanish mackerel for the countries concerned, over the total combined catches of this species reported from all countries and fisheries (Data as of October 2013).

Narrow-barred Spanish mackerel – uncertainty of catches

Retained catches are uncertain (Fig. 3), notably for the following fisheries:

- Artisanal fisheries of India and Indonesia: India and Indonesia have only recently reported catches of Spanish mackerel by gear, including catches by gear for the years 2005–08 and 2007–08, respectively. In the past, the IOTC Secretariat used the catches reported in recent years to break the aggregates for previous years, by gear and species. However, in a recent review the catches of narrow-barred Spanish mackerel were reassigned by gear using other sources. The catches of narrow-barred Spanish mackerel estimated for this component represent around 52% of the total catches of this species in recent years.

- Artisanal fisheries of Madagascar: To date, Madagascar has not reported catches of narrow-barred Spanish mackerel to the IOTC. During 2012 the IOTC Secretariat conducted a review aiming to break the catches recorded in the FAO database as narrow-barred Spanish mackerel by species, on the assumption that all catches of tunas and tuna-like species had been combined under this name (the review used data from various sources including a reconstruction of the total marine fisheries catches of Madagascar (1950–2008), undertaken by the Sea Around Us Project). The new catches estimated are thought to be very uncertain.
- Artisanal fisheries of Somalia: Catch levels are unknown.
- Other artisanal fisheries UAE do not report catches of narrow-barred Spanish mackerel by gear. Although most of the catches are believed to be taken by gillnets, some narrow-barred Spanish mackerel may be also caught by using small surrounding nets, lines or other artisanal gears. In addition, Thailand report catches of narrow-barred Spanish mackerel and Indo-Pacific king mackerel aggregated.
- All fisheries: In some cases the catches of seerfish species are mislabelled, the catches of Indo-Pacific king mackerel and, to a lesser extent, other seerfish species, labelled as Spanish mackerel. Similarly, the catches of wahoo in some longline fisheries are thought to be mislabelled as Spanish mackerel. This mislabelling is thought to have little impact in the case of the Spanish mackerel but may be important for other seerfish species.
- Discard levels are believed to be low although they are unknown for most fisheries.
- Changes to the catch series: The catch series of narrow-barred Spanish mackerel has not changed substantially since the WPNT meeting in 2012. The catch series estimated for the WPNT in 2013 show lower catches of narrow-barred Spanish mackerel between the mid-1990's and early 2000's, following a review of the catch series in India.

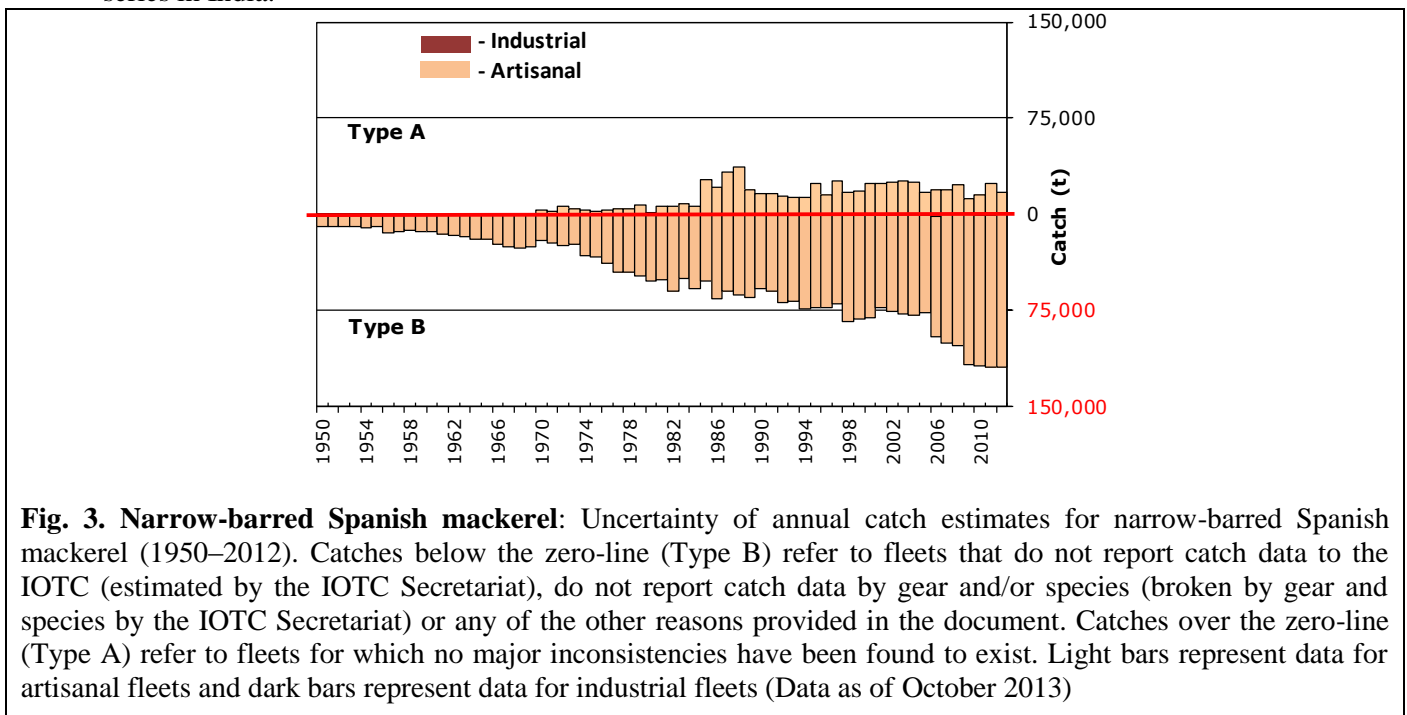


Fig. 3. Narrow-barred Spanish mackerel: Uncertainty of annual catch estimates for narrow-barred Spanish mackerel (1950–2012). Catches below the zero-line (Type B) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets (Data as of October 2013)

Narrow-barred Spanish mackerel – Effort trends

Effort trends are unknown for narrow-barred Spanish mackerel in the Indian Ocean.

Narrow-barred Spanish mackerel – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are available from some fisheries but they are considered highly incomplete (Table 4). In most cases catch-and-effort data are only available for short periods. Reasonably long catch-and-effort data series (extending for more than 10 years) are only available for Sri Lanka gillnets (Fig. 4). The catches and effort recorded are, however, thought to be unrealistic due to the dramatic changes in CPUE recorded in 2003 and 2004.

TABLE 4. Narrow-barred Spanish mackerel: Availability of catches and effort series, by fishery and year (1970–2012)². Note that no catches and effort are available for the period 1950–84 and 2008–12

Gear-Fleet	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	00	02	04	06	08	10	
PSS-Indonesia									■							■						
PSS-Malaysia																						
GILL-Indonesia								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
GILL-Sri Lanka									■	■	■	■	■	■	■	■	■	■	■	■	■	■
GILL-Malaysia																						
GILL-Oman																						
GILL-Pakistan									■	■	■	■	■	■	■	■	■	■	■	■	■	■
LINE-Australia																						
LINE-Malaysia																						
LINE-Yemen																						
LINE-South Africa																						
OTHR-Sri Lanka																						
OTHR-Indonesia																						
OTHR-Malaysia																						

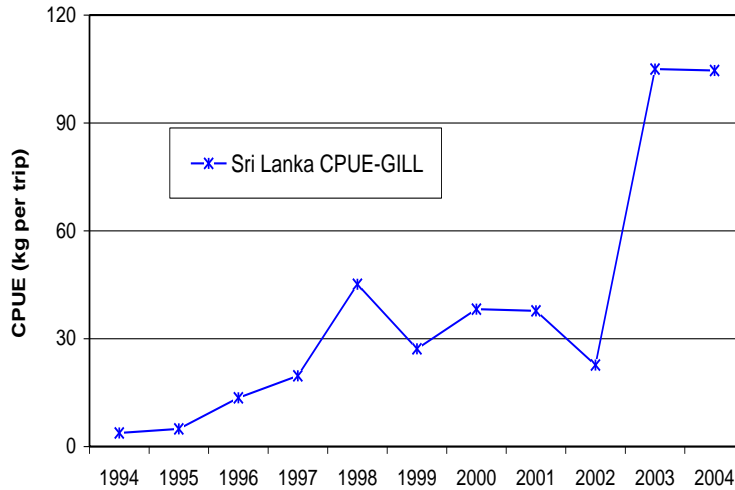


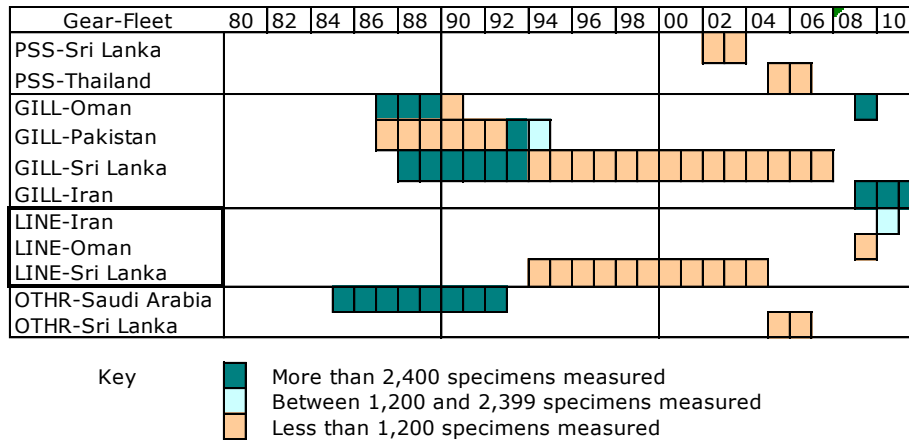
Fig. 4. Narrow-barred Spanish mackerel: Nominal CPUE series for the gillnet fishery of Sri Lanka derived from the available catches and effort data (1994–2004)

Narrow-barred Spanish mackerel – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

- The size of narrow-barred Spanish mackerel taken by the Indian Ocean fisheries typically ranges between 30 and 140 cm depending on the type of gear used, season and location (Fig. 5). The size of narrow-barred Spanish mackerel taken varies by location with 32–119 cm fish taken in the Eastern Peninsular Malaysia area, 17–139 cm fish taken in the East Malaysia area and 50-90 cm fish taken in the Gulf of Thailand. Similarly, narrow-barred Spanish mackerel caught in the Oman Sea are typically larger than those caught in the Persian Gulf.
- Trends in average weight can only be assessed for Sri Lankan gillnets (Fig. 5) but the amount of specimens measured has been very low in recent years. The length frequency data available from the mid-eighties to the early nineties was obtained with the support of the IPTP (Indo-Pacific Tuna Programme). Unfortunately, data collection did not continue after the IPTP activities came to an end.
- Catch-at-Size(age) data are not available for the narrow-barred Spanish mackerel due to the paucity of size data available from most fleets (Table 5) and the uncertain status of the catches for this species. Length distributions derived from the data available for some selected fisheries are shown in Fig. 5.
- Sex ratio data have not been provided to the Secretariat by CPCs.

² Note that the above list is not exhaustive, showing only the fisheries for which catches and effort are available in the IOTC database. Furthermore, when available catches and effort may not be available throughout the year existing only for short periods

TABLE 5. Narrow-barred Spanish mackerel: Availability of length frequency data, by fishery and year (1980–2011). Note that no length frequency data are available for the period 1950–84



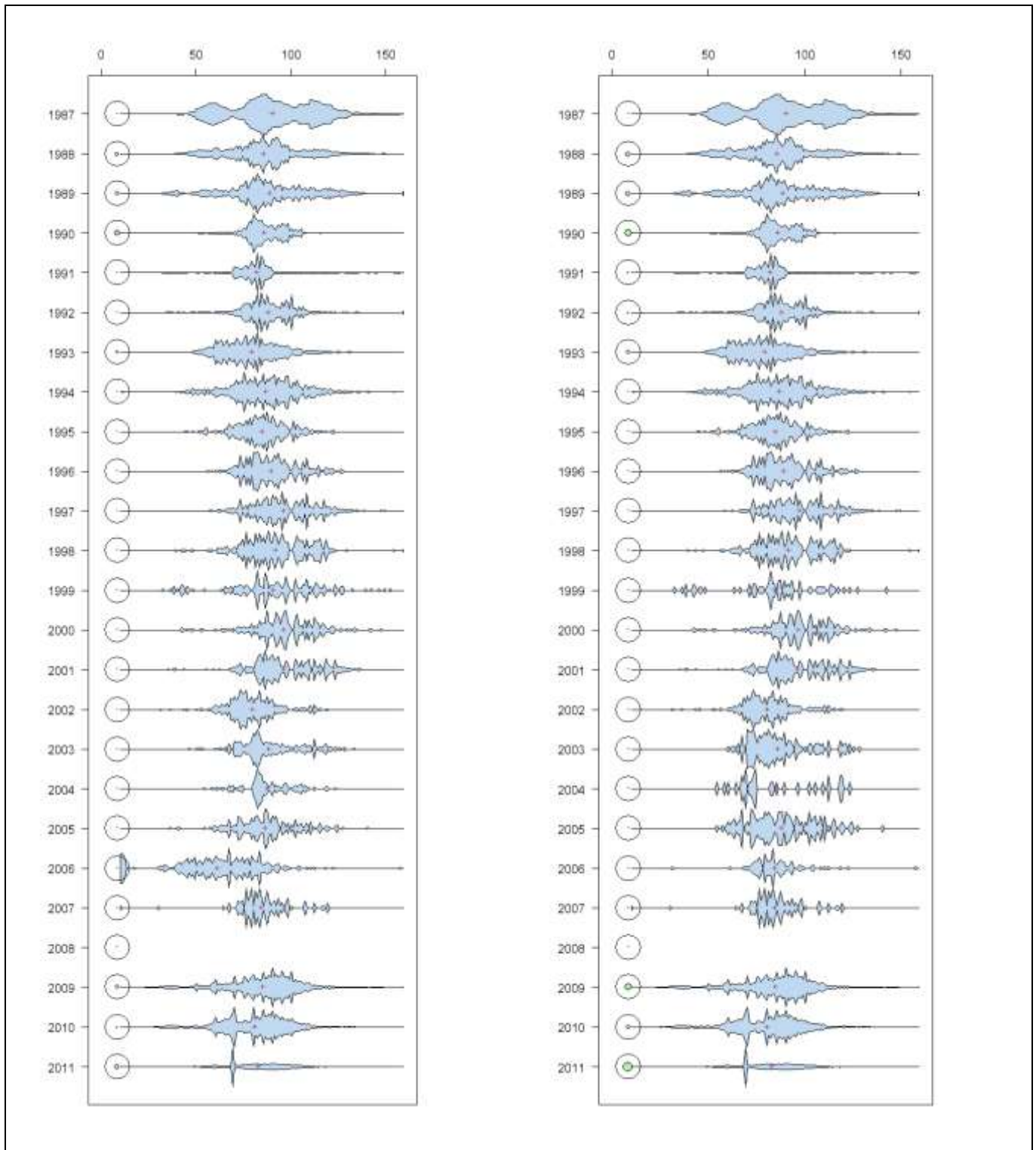


Fig. 5. Narrow-barred Spanish mackerel: Length frequency distributions (total amount of fish measured by 1cm length class) derived from the data available at the IOTC Secretariat for selected fisheries and periods, by gear and year. The black outline circles (to the left of each chart) indicate the minimum sampling standard set by IOTC of one fish per metric tonne; the green proportional circles indicate the relative sampling coverage in each year (i.e., circles with areas greater than the minimum sampling standard indicate relatively high sampling coverage in a given year).

STOCK ASSESSMENT

No quantitative stock assessment for narrow-barred Spanish mackerel in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Sri Lankan gillnet fishery (described above). However, there is considerable uncertainty about the degree to which this and other indicators

represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing (Table 6).

TABLE 6. Narrow-barred Spanish mackerel (*Scomberomorus commerson*) stock status summary

Management Quantity	Aggregate Indian Ocean
2012 catch estimate	136,301 t
Mean catch from 2008–2012	133,692 t
MSY (80% CI)	unknown
Data period used in assessment	–
F_{2012}/F_{MSY} (80% CI)	–
B_{2012}/B_{MSY} (80% CI)	–
SB_{2012}/SB_{MSY}	–
B_{2012}/B_0 (80% CI)	–
SB_{2012}/SB_0	–
$B_{2012}/B_{0, F=0}$	–
$SB_{2012}/SB_{0, F=0}$	–

LITERATURE CITED

- Darvishi M, Kaymaram F, Salarpouri A, Behzadi S, Daghooghi B (2011) Population dynamic and biological aspects of *Scomberomorus commerson* in the Persian Gulf and Oman Sea (Iranian coastal). IOTC–2011–WPNT01–23
- Froese R, Pauly DE (2009) FishBase, version 02/2009, FishBase Consortium, www.fishbase.org
- Grandcourt EM, Al Abdessalaam TZ, Francis F, Al Shamsi AT (2005) Preliminary assessment of the biology and fishery for the narrow-barred Spanish mackerel, *Scomberomorus commerson* (Lacépède, 1800), in the southern Arabian Gulf Fish Res 76:277–290
- McPherson GR (1989) North-eastern Australian mackerel (*Scomberomorus*) fishery. In: Chavez EA, Ed). Proceedings of the workshop Australia-Mexico on marine sciences, Quintana Roo, Mexico, 6-17 July 1989. Quintana Roo, Mexico. pp. 341-348