Processing of YFT catch by size data (06/2005)

V. Nordstrom

Data available:

- Nominal catches, file NC_WPTT05_140605.xls, as of 14/06/2005
- C/E data, file CELL.txt, CEPSBB.txt and CEOTHR.txt , as of 14/06/2005 and 20/05/2005
- Size frequency data, file Sfyft.csv as of 30/05/2005

Some data, considered incomplete or very minor, were discarded.

Processing:

Data for LL, PS, BB, GILL and others have been processed - and all raised to the total catch.
The years covered were 1950-2003

Some changes were made to the nominal catches used:

Australia and India PS data were not used

India gear OTH → BB

Sri Lanka OTH before 1982 → BB

Australia BB not used

Fra-Mayotte → France

Australia and Taiwan Gill discarded

Tables 1-5 show the availability of data for the fisheries and the substitutions used for missing strata..

The final outputs for each type of fleet were 2 sets of raised files:

a) Country, year and quarter

b) Year and quarter

A cumulated file for all gears by year and quarter was also created

YFT LL:

Reformatting

1. Reformatting of C/E data.

The C/E LL data were reformatted to only include stratum header, effort and catch data for YFT in number of fish and/or weight. Certain yearly data were also recoded as month 17.

Calculation of mean weights and Japanese size profiles

2. Japan.

Calculation of mean weights and cumulated size frequency data for the japanese LL fleet. First the japanese C/E data (all in number of fish) for YFT were cumulated by quarter and 10x20 time-area strata. For the years 2002 and 2003 data are very scarce so the sum of 2001-2003 were used for 2002 and 2003.
The japanese size frequency data were then cumulated by quarter and 10x20 time-area strata, and they were then raised according to the number of fish reported in the corresponding C/E data.
Since some time-area strata (10x20, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.
The formula used for length weight conversions was a=.000018640 and b= 2.97400 (IOTC Secretariat 1992, Penang sampling program)

Mean weights were calculated for all the detailed strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata.
The mean weights were then output to a file, since they were to be used for conversion to weight of all C/E data reported in number of fish.
The size frequencies were equally completed and output to an intermediate file for all strata.

3. Taiwan

The taiwanese data are now available in E/W strata; the weight of the data for each stratum was added to the records

4. NEI-ICE

Data were cumulated by quarter and year and output to an intermediate file

Since some strata were missing, a substitution schema was used to complete the strata (10x20, quarterly, 1950-2003).

The following substitution schema was used if no data were present in a stratum or the sample size was too small (<30 fish)

1a. same area but previous quarter
1b. same area but following quarter
2a. same quarter but 10x20 to the east
2b. same quarter but 10x20 to the west
3a. previous quarter and 10x20 to the east
3b. following quarter and 10x20 to the east
4a. previous quarter and 10x20 to the west
4b. following quarter and 10x20 to the west
5a. same quarter but 10x20 to the south
5b. same quarter but 10x20 to the north
6a. previous quarter and 10x20 to the south
6b. following quarter and 10x20 to the south
7a. previous quarter and 10x20 to the north
7b. following quarter and 10x20 to the north

Then, if necessary, second, third, etc levels for longitudes. i.e. two squares away, then three etc.

At each level of substitution the data from the previous level were aggregated.

For the latitudes a second level for latitudes <=-10South was used

For strata not possible to substitute a yearly stratum with all longitudes was used.

This covered JPN, but left a problem for Taiwan, Arabian Sea, so the Taiwanese LL detailed size data 85-88 for those strata were used

For NEI-ICE, only one area was used.

For South Africa C/E data from 10East were considered Indian Ocean and included into the 20East stratum.

Raising of C/E

5. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and then all available C/E data were raised to the total reported nominal catch. When necessary the data were first converted from number of fish to weight using the mean weights calculated previously for the Japanese size frequency data.

Raising of size data to C/E

6. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' and the size data were raised to the corresponding catch. When possible, size data from the same country (as the C/E data), were used. Otherwise the size profiles used were from the Japanese or Taiwanese data:

Raising of data to NC for data without C/E

7. Some fleets only reported nominal catches. When possible, size data from the same country (as the NC data), were used. Otherwise, for yearly catches without size nor C/E data, the Japanese or Taiwanese size profiles for large strata were used according to the operating areas of the fleets concerned. First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Cumulating into quarterly catch by size

8. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter
b) Year and quarter

Table 1 shows the options used for each fleet.

YFT PS:

Reformatting

1. Reformatting of C/E data.

The C/E PS data were reformatted to only include stratum header, effort and catch data for YFT, BET and SKJ (free schools, log schools and unclassified type of gear) in weight (MT). Certain yearly data were also recoded as month 17.

Calculation of mean weights and PS-European fleets size profiles

2. PS-EUR

Calculation of mean weights and cumulated size frequency data for the PS-EUR fleet.

The PS-EUR size frequency data are reported in raised monthly 5x5 format with separation of log and free schools. They were cumulated by quarter and 10 large time-area strata used in general for the PS-EUR fleet processing, see Figure 1.

Since some time-area strata (school, 10areas, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.

All size frequencies being expressed in length, the weights of these strata were calculated using the length weight formula with a= 0.000015849 and b= 3.04600 for fish >=64 cm, and a= 0. 000053130 and b= 2.75366 for fish <64 cm.

Mean weights were calculated for all the detailed and cumulated strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata. The mean weights were then output to a file, although only for comparison purpose.

The size frequencies were equally completed and output to an intermediate file for all strata.

3. JPN

The size frequency data were coded as area 97(East) and the weight of the data for each stratum was calculated and added to each record.

Raising of C/E

4. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and all available C/E data were then raised to the total reported nominal catch.

Raising of size data to C/E

5. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' according to the time area strata (year, quarter, 10areas and type of school) and the size data selected were raised to the corresponding catch. The size profiles used were from the PS-EUR data, except for Japan East. If the exact school type was detailed in the C/E data, size profiles with the exact school type was used, if not, cumulated profiles for log and free schools (and unclassified) were used.

For Japan, data were available for 1995-2001 with only one record per year, unclassified schools (1998 log and free schools were cumulated). These data were used for the Eastern JPN PS catches, all years (years prior to 1995 were assigned the 1995 profile) and were raised to the total catch.

Raising of data to NC for data without C/E

6. Some fleets only reported nominal catches. For these yearly catches (without size nor C/E data), the PS-EUR size profiles for large strata by quarter (cumulated school type) were used according to the operating areas of the fleets concerned.

First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Years prior to the first year with available size data have been assigned a profile corresponding to the first year.

Cumulating into quarterly catch by size

7. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter

b) Year and quarter

Table 2 shows the options used for each fleet.

YFT other gears (BB, GILL and OTHERS):

1.BB

For all BB fisheries, yearly BB size frequency data from the Maldivian fishery were used.. These size data are available from 1983 to 2000 and 2003, but only data from 1985-1998 and 2003 were considered for the calculations. For the years 1999 and 2000, data for 1998 were used and for2001 and 2002 data for 2003 were used.

All size frequencies being expressed in length, the weights of these data were calculated using the the same length weight formula as for the PS data with a= 0.000015849 and b= 3.04600 for fish >=64 cm, and a= 0. 000053130 and b= 2.75366 for fish <64 cm.

The nominal yearly catches by country were then assigned a size profile, and the weight of the size profile was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch.

Years prior to 1985 have been assigned a size data profile corresponding to an average of 1986-1990.

2.GILLNET

For the GILL fisheries, data availability is shown in table 3. These data were cumulated by year and country. A yearly profile with combined data from Iran, Oman and Pakistan was also created. For each year , the data for each of these three countries were first raised to the total nominal catch. For the year 2000, data from 1999 were used.

C/E data were cumulated in quarterly strata by country. For Oman 1990 gear ‘uncl’ was recoded to gill. C/E data for Pakistan 1987 were discarded. For Iran the c/e data were cumulated for all years (1993-1995) to obtain a mean c/e ‘profile’ to be used for all raisng. For Indonesia C/E data, the sum the data for 1983-1990 were used for the years 1982-1990 as mean profile.

For the size frequency data, Pakistan 1991,1990 and 1987 were not used, as these data were considered incomplete.

Some quarterly strata for Iran were completed by strata from the previous or following year (or mean of the two where possible).

The size profiles assigned by country were the following:

- Sri Lanka, for years with size data, the Sri Lankan size profiles were used; for the other years, a mean profile using all years of Sri Lankan data was used

- Indonesia, for years with size data, the Indonesian size profiles were used; for the other years, a mean profile using all years of Indonesian data was used.
- Australia – Indonesian size data profiles were used.
- For all the others, the combined profile from Iran, Oman and Pakistan were used, except for Pakistan previous to 1987, for which a mean 1987-1989 profile with Pakistan data only was used

Then, the weight of each size profile thus assigned was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch by country and year.

3. OTHER SURFACE GEARS

For the other gears (handline, lines, trolling and others), two subgroups were created for the raising, one for TROL and another for HAND and UNCL, since the size frequency distributions were quite different. C/E data were only available for MDV

The size profiles used were as follows:

- 1. Trol West with data from LKA by qtr
- 2. Trol East with data from IDN by qtr
- 3. HAND+HATR LKA by qtr
- 4. Rest West, GILL yearly distribution
- 5. Rest East GILL yearly distribution

For all countries except MDV, the size data were raised directly to the NC, since no C/E available.

Then, the weight of each size profile thus assigned was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch by country and year.

Table 3 shows the options used for each fleet.

Table 1 : Longline

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
AUS	1989-1991 1992-2003	No Yes (w)	No	JPN SE	NC: 235 (14-642)
CHN	1985-1998 1999-2003	No Yes (w)	No Yes	Mean Chn 94-97 for 1998; Twn for 2002-2003	NC: 1080 (137-2361)
ESP	1993-2003	No	No	JPN W	NC: 35 (8-108)
FRAT	1998,2001-2003	No	No	JPN W	NC: 194
FRA-REU	1991-2003	Yes (n/w)	No	JPN W	NC: 175 (18-360)
GIN	2001-2003	Yes	No	JPN IO	
IDN	1973-2001 2002-2003	No No	No Yes	Twn IDN	NC: 9175 (114-40445)
IND	1983-1990 1991 1992-1993 1994-1997 1998-2001 2002-2003	No Yes (w) No Yes (w) No Yes	No No No No No Yes	JPN N JPN N JPN N JPN N JPN N JPN N	NC: 140 (5-645)
IRN	1976-2002	No	No	JPN NW	NC: 1057 (25-4980)
JPN	1952-2003	Yes (n)	Yes		NC: 12201 (2023-38100)
KEN	1980-1983	No	No	JPN IO	NC: 220 (77-370)
KOR	1965-1974 1975-1990 1991-1993 1994-2000 2001-2003	No Yes (n) Yes (n) Yes (w) Yes (w)	No No Yes Yes (Yes)	JPN IO JPN 10x20 JPN 10x20 JPN 10x20 JPN 10x20	Few size data, not used NC: 9107 (100-31383)
MDV	1988-1998 2001-2003	No	No	JPN IO	NC: 5 (1-19)
MUS	1978-2000 2001-2003	No Yes	No Yes	JPN IO	NC: 50 (1-219)
NEI-DFRZ	1985-1989 1990-1991 1992-2003	No Yes (w) No	No No No	JPN IO JPN IO JPN IO	NC: 7936 (56-22272)
NEI-ICE	1989-1997 1998-2003	No No	No Yes	JPN SE NEI-ICE	NC: 18975 (10615-27614) used
NEI-IDN	1986-1999	No	No	Twn	NC: 7564 (42-16099)
PAK	1991-2000	No	No	JPN NW	NC: 5769 (133-28188)
PHL	1998-2003	Yes	No	JPN SE	NC: 514 (299-623)
PRT	1999-2003	No	Yes	JPN W	NC: 8 (4-10)
SUN	1964-1990	No	No	JPN IO	NC: 5 (2-8)
SYC	1983-1985 1995-2003	Yes (w)	No Yes(96-2002)	JPN 10x20 SYC	NC: 73 (5-170)
THA	2000-2003	No	No	JPN IO	NC: 227
TWN	1954-1966 1967-1979 1980-2003	No Yes (n & w) Yes (n & w)	No No Yes	JPN 10x20 Twn Twn	NC: 17406 (3355-88026) TWN used
URY	2001-2003	No	No	JPN IO	
ZAF	1998-2003	Yes	(Yes)	JPN W	

Table 2 : Purse seine

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
AUS	1981-1988	No	No	PS-EUR	NC: 28 (8-43)
ESP	1984-2003	Yes (w)	Yes	PS-EUR	NC: 41903 (11453-65143)
FRA	1981-2003	Yes (w)	Yes	PS-EUR	NC: 33900 (199-59913)
IDN	1974-2003	No	Some	PS-EUR	1986-1988 NC: 325 (21-814)
IND	1998	No	No	PS-EUR	NC: 14
IRN	1992-1995 1996-2003	No Yes (w)except 2001, 2003	No (Yes)	PS-EUR West	NC: 2676 (1607-4300) except 1996
JPN	1977-1988 1989-1994 1995-2001 2002-2003	No Yes (w) Yes (w) Yes	No No Yes No	 PS-EUR West JPN East	NC: 2180 (32-11882) Eastern IO
LKA	1993	No	No	PS-EUR	NC: 1
MUS	1983-1987 1988-2000	No Yes (w)	No Some	PS-EUR West	NC: 1319 (109-2621) 1989-1990
NEI-EUR	1983-2003	Yes (w)	Yes	PS-EUR	NC: 13732 (661-27049)
NEI-SUN	1990-2003	Some	No	PS-EUR West	1992-1993 NC: 9494 (804-17002)
SUN	1963-1965 1983-1984 1985-1991	No No Yes (w)	No No No	PS-EUR	NC: 1693 (5-4153)
SYC	1991-1992 1993-2003	No Yes (w)	No Yes	PS-EUR West	NC: 6306 (221-12007)
THA	2000 2001	No Yes	No No	PS-EUR	NC: 250

Table 3 : Artisanal

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
Baitboat					
AUS	1989- 1996,2001	No(minor)	No	MDV 1983-2001	NC: 4 (1-11)
ESP	1981-1982	No	No	MDV 1983-1985	NC: 209 (55-363)
IDN	1985-1988	No	No	MDV 1983-2000	NC: 122 (4-256)
IND	1976-1991 1999-2003	Yes (w) No	No No	MDV 1983-1985 MDV 1983-2003	NC: 366 (25-1214)
LKA	1982-1993	No	No	MDV 1983-2000	NC: 167 (4-452)
MDG	1973-1975	No	No	MDV 1983-2000	NC: 630 (180-1160)
MDV	1950-1969 1970-1982 1983-1985 1986-1988 1999-2000 2001 2002 2003	No Yes (w) Yes (w) Yes Yes Yes No No	No No (Not used) Yes No No No Yes	MDV 1986-1990 MDV 1986-1990 MDV 1986-1990 MDV MDV 1998 MDV 2003 MDV 2003 MDV 2003	NC: 4874 (1000-12994) Size 1983-84 not used
Gillnet					
AUS	1995-2003	No	No	IDN mean profile	NC: 1 (1-1)
IDN	1950-1983 1984-1986 1987-2003	No Yes (w) No	No Yes No	IDN mean profile IDN 1984-1986 IDN 1986	NC: 251 (29-526)
IND	1950-1978 1979-1981 1998-2003	No (Yes (w)) No	No No No	Combined (IRN+OMN+PAK)	NC: 630 (4-1969)
IRN	1989-1992 1993-1995 1996-2003	No Yes (w) No	No Yes Yes	Combined (IRN+OMN+PAK) for missing	NC: 13634 (980-28465)
LKA	1950-1974 1975-1984 1985-1991 1992-2001 2002-2003	No No Yes (w) No Yes	No Yes Yes Yes Yes	LKA mean profile for missing	NC: 11048 (5151-27139)
OMN	1950-1986 1987-1994 1990,1996 1995,1997-99 2000-2003	No No Yes No Yes	No Yes No No No	Combined (IRN+OMN+PAK) for missing	NC: 11076 (2237-21276) Some C/E 1996 & 2000
PAK	1950-1986 1987-1991 1992-1994 1995-2003	No Yes (w) No No	No Yes Yes No	Combined (IRN+OMN+PAK) for missing	NC: 2436 (351-8747)
TWN	1986-1991	Yes (n & w)	No	Combined (IRN+OMN+PAK)	NC: 36 (1-88)
TZA	1970-2003	No	No	Combined (IRN+OMN+PAK	
YEM	1950-2003	No	No	Combined (IRN+OMN+PAK	

Table 3 : Artisanal (continued)

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
Others					
AUS-Rest	1990-1993	No	No	4	NC: 9 (1-34)
	1994-2002	Yes			
	2003	No			
AUS-Troll	1977-2003	No		1	
BGD	1985	No	No	2	
COM-Rest	1970-2003	No	No	5	NC: 1927 (100-5609)
COM-Troll	1979-2003			5	
F/RUN-Rest	1993-2000	No	No	5	NC: 207 (79-416)
	2001-2003	Yes			
F/RUN-Troll	1950-1992	No		5	
FRAT Rest	1995-2003	No	No	5	
FRAT Troll	1995-2003	No	No	5	
IDN-Troll	1950-1984	No	No	5	Some information
	1985-1990	Yes	Yes		(troll)
	1991-2003	No	No		NC: 639 (44-2915)
IDN-Rest	1950-1982	No	No	5	
	1983-1990	Yes	Yes		
	1991-2003	No	No		
IND-Rest	1985-2003	No	No	5	NC: 655 (2-7155)
IND-Troll	1976-1991	Yes		5	
	1992-2003	No			
KEN-Troll	1984-2000	No	No	5	NC: 59 (19-80)
LKA-Rest	1950-1993	No	No	3	NC: 3216 (2-9000)
	1994-2003	No	Yes		
LKA-Troll	1950-1993	No	No	2	
	1994-2003	No	Yes		
MDV-Rest	1984-1993	(yes)	No	5	NC: 389 (150-1591)
	1994-2003	No			
MDV-Troll	1970-1993	Yes		2	
	1994-2003	No			
MUS-Troll	1977-2003	No	No	2	NC: 78 (8-249)
SYC-Rest	1970-2003	No	No	5	NC: 122 (1-949)
SYC-Troll	1970-1991			5	
TMP-Rest	2000-2003	No	No	5	NC: 2 (1-3)
TZA-Rest	1979,1981-1982	No	No	5	NC: 525 (300-700)
TZA Troll	1970-2003 (not all years)			2	
YEM-Rest	1953,1983-2003	No	No	5	NC: 716 (5-2367)
YEM Trol	1950-2003			2	
ZAF-Rest	1979-2003	No	No	5	NC: 35 (1-166)

Strates:

1. trol west: LKA by qtr
2. trol east: IDN by qtr
3. hand+hatr LKA: LKA by qtr
4. rest west: gill yearly distribution 1/4 for each quarter
5. rest east: gill yearly distribution 1/4 for each quarter

Table 4: YFT data available by gear, country and year

See yfttable4.doc

Figure 1: EUR-PS areas

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