Re-estimations of the mixing proportion of O and J Stocks in sub-areas 2, 11 and 7 following the guidelines offered in Appendix 15 of Annex D (RMP Sub-Committee Report).

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INTRODUCTION

During the 2000 IWC/SC meeting, the RMP Sub-committee agreed that new estimates of the mixing proportion for sub-areas 2, 7 and 11 should be conducted using new samples from the Sea of Japan and sub-area 2. Guidelines for these estimations are offered in Appendix 15 of Annex D of the RMP Sub-committee Report. In this paper we re-estimated the J stock proportion in sub-areas 2, 7 and 11 following these guidelines.

MATERIALS AND METHODS

Mathematical model for estimating mixing proportion

We estimated the 'J' stock proportion in sub-areas 2, 7 and 11 using a maximum-likelihood method (Kishino *et al.*, 1994), previously used by Pastene *et al.* (1998) to estimate the 'J' stock proportion in sub-area 11.

Baseline stocks

J' stock

The baseline samples for the J stock were as for Cases 4 (all the new by-catch data, n=53) and 5 (by-catch plus past commercial data, n=81) in Appendix 15. The Case 5 is used as a sensitivity test. The new by-catches in the Sea of Japan were presented and discussed in Goto *et al.* (2001).

O' stock

The baseline samples for the O stock were JARPN samples (1994-1999) from sub-areas 8 and 9 excluding the samples from the western part of sub-area 9 in 1995 (n=201).

Mixed assemblage

Sub-areas 7 and 11

The mixing proportion in sub-areas 7 and 11 were calculated by sub-area, month and gender. The samples in sub-areas 7 and 11 were from two main sources:

a) JARPN surveys 1994-99
b) commercial operations 1983-7

Sub-area 2

The 13 by-catch samples from sub-area 2 were from 1996-2000 and different months (Pastene *et al.*, 2001). A single estimation using the total sample (males + females) was made in this sub-area.

RESULT AND DISCUSSION

Table 1a shows estimates (and their standard errors) of the mixing proportions of 'J' stock in sub-area 2, 7 and 11 by month and sex, according Case 4. Table 1b shows the results according to Case 5.

Results in Table 1a and 1b are similar. According to results in Table 1a, estimations for most cases in sub-area 7 are zero for both female and males. In some cases the estimations are relatively large (e.g. May/female: 0.0625; September/female: 0.0891) but such estimations have large standard error (0.0601 and 0.0548, respectively).

In sub-area 11, a significant mixture of ' J' stock was observed for females in April and July and males in July and August. The estimates for females in June is relatively high, however this estimation present a large standard error.

The mixing proportions for the 'J' stock in sub-area 2 is high. It should be noted that sample size in this sub-area is small (n=13).

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Table 1a. Re-estimation of the proportion of 'J' stock in sub-areas 2, 7 and 11, by month and sex. The baseline samples for the J stock were all the new by-catch data as shown in Goto *et al*. (2001) (Case 4; n=53). The baseline samples for the O stock were JARPN samples (1994–1999) from sub-areas 8 and 9 excluding the samples from the western side of sub-area 9 in 1995 (n=201).

Case 4							
Sub-area	Month	Sex	N	Years	Estimate	SE	Data used
2	All	Both	13	1996–2000	0.6843	0.1194	mtDNA
7	Apr.	Female	19	1984–87	0.0000	0.2346	mtDNA
7	Apr.	Male	20	1983–87	0.0000	0.0564	mtDNA
7	May	Female	16	1983–87, 1998	0.0625	0.0601	mtDNA
7	May	Male	66	1983–87, 1998	0.0090	0.0323	mtDNA
7	Jun.	Female	15	1983–86, 1999	0.0105	0.0684	mtDNA
7	Jun.	Male	55	1983–86, 1997–99	0.0000	0.0414	mtDNA
7	Jul.	Female	12	1986, 1996	0.0000	0.2898	mtDNA
7	Jul.	Male	14	1984–87	0.0000	0.2673	mtDNA
7	Aug.	Male	19	1986, 1996	0.0000	0.2266	mtDNA
7	Sep.	Female	7	1986–87, 1996	0.0000	0.3499	mtDNA
7	Sep.	Male	31	1986–87, 1996	0.0891	0.0548	mtDNA
11	Apr.	Female	55	1984–87	0.5698	0.0650	mtDNA
11	May	Female	41	1984–87	0.0510	0.0415	mtDNA
11	May	Male	9	1984–86	0.0000	0.3228	mtDNA
11	Jun.	Female	17	1984–87	0.1641	0.0921	mtDNA
11	Jun.	Male	8	1984–87	0.0000	0.3632	mtDNA
11	Jul.	Female	23	1984–87, 1999	0.3803	0.0988	mtDNA
11	Jul.	Male	28	1986, 1999	0.1606	0.0731	mtDNA
11	Aug.	Female	16	1986–87, 1996	0.0028	0.0654	mtDNA
11	Aug.	Male	22	1986–87, 1996	0.2996	0.1012	mtDNA

Table 1b. Re-estimation of the proportion of 'J' stock in sub-areas 2, 7 and 11, by month and sex. The baseline samples for the J stock were all samples both by-catch plus commercial data as shown in Goto *et al*. (2001) (Case 5; n=81). The baseline samples for the O stock were JARPN samples (1994–1999) from sub-areas 8 and 9 excluding the samples from the western side of sub-area 9 in 1995 (n=201).

Case 5							
Sub-area	Month	Sex	N	Years	Estimate	SE	Data used
2	All	Both	13	1996–2000	0.6340	0.1426	mtDNA
7	Apr.	Female	19	1984–87	0.0000	0.2298	mtDNA
7	Apr.	Male	20	1983–87	0.0000	0.2045	mtDNA
7	May	Female	16	1983–87, 1998	0.0625	0.0601	mtDNA
7	May	Male	66	1983–87, 1998	0.0000	0.1114	mtDNA
7	Jun.	Female	15	1983–86, 1999	0.0000	0.2378	mtDNA
7	Jun.	Male	55	1983–86, 1997–99	0.0000	0.1284	mtDNA
7	Jul.	Female	12	1986, 1996	0.0000	0.2779	mtDNA
7	Jul.	Male	14	1984–87	0.0000	0.2673	mtDNA
7	Aug.	Male	19	1986, 1996	0.0000	0.2180	mtDNA
7	Sep.	Female	7	1986–87, 1996	0.0000	0.3499	mtDNA
7	Sep.	Male	31	1986–87, 1996	0.0705	0.0476	mtDNA
11	Apr.	Female	55	1984–87	0.6050	0.0653	mtDNA
11	May	Female	41	1984–87	0.0271	0.0267	mtDNA
11	May	Male	9	1984–86	0.0000	0.3149	mtDNA
11	Jun.	Female	17	1984–87	0.1364	0.0873	mtDNA
11	Jun.	Male	8	1984–87	0.0000	0.3542	mtDNA
11	Jul.	Female	23	1984–87, 1999	0.3178	0.1015	mtDNA
11	Jul.	Male	28	1986, 1999	0.1441	0.0663	mtDNA
11	Aug.	Female	16	1986–87, 1996	0.0000	0.2399	mtDNA
11	Aug.	Male	22	1986–87, 1996	0.2363	0.1078	mtDNA