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Data Conversions for American Plaice from the Surveys Conducted by Spain in the
NAFO Regulatory Area of Divisions 3NO, 1995-2002

by

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Abstract

Since 1995, a stratified random spring bottom trawl survey in the NAFO Regulatory Area of Div. 3NO was conducted by Spain. The depth strata surveyed was extended to 1 464 m. The main propose of the surveys was obtain abundance and biomass indices and population structure for the commercial species in the area. In 2001, the trawl vessel was replaced in the realization of the trawls; so, the time series indices were transformed. The transformed entire series of abundance, biomass and length distribution for American plaice are presented for the period 1995-2000, and the no-transformed data for the years 2001 and 2002. The standard deviation was re shown for abundance and biomass. A decreasing in American plaice abundance and biomass is observed in last years. A high percent of juvenile individuals shows a good recruitment in recent years.

Material and Methods

Survey design and gear used

The surveys on NAFO Regulatory Area of Div. 3NO was initiated by Spain in 1995. Until 2001, the surveys were carried out in spring (May), on board the Spanish vessel *C/V Playa de Mendiúña* (338 GT and 800 HP) using bottom trawl net type *Pedreira*. Since that year, the *R/V Vizconde de Eza* replaced the *C/V Playa de Mendiúña* as the research vessel for the trawl, using bottom trawl net type *Campelen*. The main specifications and geometry of these gears, as the rigging profile and the net plan, and a sheet with the resume of the main technical data of the survey are described in previous paper (Walsh *et. al.*, 2001). In the Table 1 are presented the number of valid tows, the depth strata covered and the dates of the survey series. In the period 1998-2002, the surveyed depth strata was the same (extended to 1 464 m). The survey area was stratified following the standard stratification schemes (Bishop, 1994). Sets were allocated to strata proportionally to their size, with a minimum of two planned hauls per stratum and the trawl positions were chosen at random (Doubleday, 1981).

Biomass and abundance indices were calculated by the swept area method (Cochran, 1997), assuming catchability factor of 1.

The catch from each haul was sorted by species and weighed. Samples of American plaice were measured at random to the total length at cm below. Length distribution estimated from catches is presented for the period 1995-2002.

R/V Vizconde de Eza had replaced *C/V Playa de Mendiúña* in May 2001, so, in order to maintain the data series obtained since 1995, comparative fishing trials were conducted in May 2001 to develop factors between the two fishing gear combinations. A series of 92 paired hauls was carried out, 90 of then were valid hauls. Mean catch,

stratified mean catch, abundance, biomass and their respective standard deviations, and length distribution, were transformed from C/V *Playa de Menduña* series to R/V *Vizconde de Eza* series.

American plaice stratified mean catches and SD

The mean catch (\bar{y}_i) and the variance (Var_i) are calculated by stratum by the following formulas:

$$\bar{y}_i = \sum_{j=1}^{T_i} \frac{y_j}{T_i}, \quad i = 1, \dots, h$$

$$Var_i = \sum_{j=1}^{T_i} \frac{(y_j - \bar{y}_i)^2}{T_i - 1}, \quad i = 1, \dots, h$$

where: y_j is the catch in haul j in the stratum

T_i is the number of hauls in the stratum i

h is the total number of strata

and the stratified mean catch (\bar{y}_i^{str}) and the stratified variance (Var_i^{str}) by stratum are obtained as follow:

$$\bar{y}_i^{str} = \bar{y}_i n_i, \quad i = 1, \dots, h$$

$$Var_i^{str} = Var_i \frac{n_i^2}{T_i}, \quad i = 1, \dots, h$$

where: n_i is the area of the stratum i , $i = 1, \dots, h$

Then the total stratified mean catch (\bar{y}) and the variance (Var) by year are calculated according to the formulas:

$$\bar{y} = \sum_{i=1}^h \frac{\bar{y}_i^{str}}{N}$$

$$Var = \sum_{i=1}^h \frac{Var_i^{str}}{N^2}$$

where: $N = \sum_{i=1}^h n_i$ is the total area by year

The stratified standard deviation (SD) by year is calculated as the square root of the stratified variance by year.

Conversion factors

To convert data series it was necessary to calculate the factor power correction (FPC), typically estimated by use of catch per unit of effort (CPUE) observations for the two vessels. In this case, a multiplicative model solved by generalized method by haul was adjusted to convert mean catch, abundance and biomass. Although there are many models to convert the CPUE, we choose one of them that had less error (Wilderbuer *et al.*, 1998, González Troncoso and Paz, 2003).

Robson (1966) proposed the following multiplicative model to establish the relationship between the CPUEs for the two ships:

$$CPUE_{ij} = e^{\mu+t_i+h_j+\varepsilon_{ij}}$$

where: t_i is the effect of the ship i , $i = 1, 2$
 h_j is the effect of the haul j , $j = 1, \dots, 90$
 μ is the model parameter
 ε is the model error

A logarithmic transformation is performed in order to obtain a linear expression:

$$\ln(CPUE_{ij} + 1) = \mu + t_i + h_j + \varepsilon_{ij}$$

This equation was adjusted by generalized linear regression assuming the following restrictions necessary to estimate all parameters:

$$\sum_{i=1}^2 t_i = 0 \Rightarrow t_1 = t = -t_2 \quad \sum_{j=1}^{90} h_j = 0$$

giving the following estimation of the FPC (Sissenwine and Bowman, 1978):

$$FPC = \frac{CPUE_2}{CPUE_1} = e^{2t(1+0.5s^2)} \quad (1)$$

where s^2 is the variance obtained in the estimate of t .

This model was apply to convert mean catches, abundance and biomass.

In the other hand, to convert the length distribution, the following multiplicative model, proposed by Warren (1997) was adjusted:

$$Ratio = \alpha l^\beta e^{\delta l}$$

where: $Ratio = \frac{Campelen\ Catch}{Pedreira\ Catch}$ by length (2)

l is the length

α , β and δ are the estimated parameters.

For more details, see Paz *et al.* (2002).

Data series

For 1995-2000, transformed C/V *Playa de Menguíña* data series are presented. For 2002, original R/V *Vizconde de Eza* data series are presented. In 2001, the deeper strata were not surveyed by the calibration experience. As the objective is to have data in all the strata surveyed last years, to obtain the more annual homogeneity possible in the series, in the no surveyed strata by the R/V *Vizconde de Eza* the transformed C/V *Playa de Menguíña* data are put.

This was made to mean catch, stratified mean catch, abundance and biomass. In this way, in the strata surveyed the original R/V *Vizconde de Eza* data are presented and in the strata not surveyed the transformed C/V *Playa de Menduñía* are offered.

Results

American plaice Catches

To convert mean catches, the CPUE was adjusted in model (1), giving the $FPC_{bio} = 0.34181895$.

The American plaice mean catches by stratum are presented in Table 2, included swept area, number of hauls and SD. American plaice stratified mean catches and its SD are presented in Table 3. Data from year 1995 are added, although in that year a few sets were made, so it is not representative. The American plaice indices show an increasing until 2000, and a decreasing in the last two years (Fig. 1). The decreasing in 1997 value should be related to changes in the American plaice distribution.

American plaice Abundance and Biomass

To convert biomass, the CPUE was adjusted in model (1), giving the $FPC_{bio} = 0.34181895$. To adjust the abundance, the abundance per unit of effort was adjusted in the same model, obtained $FPC_{ab} = 0.44666399$.

Following the recommendations of the 2000 Scientific Council Meeting, the entire time series (1995-2002) of abundance and biomass and their SD estimates of American plaice are presented (updated) in Table 4 and Table 5, respectively. As in stratified mean catches, the abundance table shows an increasing in the survey estimates until 2000, and a decreasing since that year (Fig. 2), and quit the same occurs to biomass (Fig. 3). Anyway, the decreasing in abundance is quite less than in biomass. It shows that although the number of individual has increased, its weight has fell.

American plaice Length Distribution

The result of model (2) to American plaice was the following (for more details, see Paz *et al.*, 2002) (cf = conversion factor):

For $l \leq 12$: cf = 9

For $13 \leq l \leq 21$: cf = 0.63

For $22 \leq l \leq 51$: cf = $\exp(13.3892 - 5.722 \ln(l) + 0.1521 l)$

For $52 \leq l$: cf = 0.4

In Table 6 is shown American plaice length distribution per thousand, besides the sampled size and its catch for the period 1995-2002, and in Table 7 is presented the length distribution in estimated numbers for 1999-2002. In Fig. 4 and Fig. 5 we can see the length distribution evolution along the years. The presence of juveniles (length ≤ 20 cm.) is increasing in the last years, although in 2002 there is a decreasing in all the length classes. The evolution of males and females is almost the same in the period 1999-2002 (Fig. 6). The presence of juveniles individuals increasing in the last years (Fig. 7). These high presence of juveniles individuals indicates the recruitment of a new class-year with a size higher than last years average. The increase of this new class-year may contribute to the recovery of the stock. It would be necessary other studies to determinate the size and the quantitative importance of this year-class.

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TABLE 1. Spanish spring bottom trawl surveys on NAFO Div. 3NO: 1995-2002

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1995	C/V Playa de Menduïña	77	>56-731	May 18-May 29
1996	C/V Playa de Menduïña	112	>56-1098	May 07-May 24
1997	C/V Playa de Menduïña	128	>56-1280	April 26-May 18
1998	C/V Playa de Menduïña	124	>56-1464	May 06-May 26
1999	C/V Playa de Menduïña	114	>56-1464	May 07-May 26
2000	C/V Playa de Menduïña	118	>56-1464	May 07-May 28
2001	R/V Vizconde de Eza	83	>56-1116	May 05-May 23
2002	R/V Vizconde de Eza	125	>56-1464	April 29-May 19

TABLE 2.- Swept area, number of hauls and American Plaice mean catch (Kg) and SD (**) by stratum. Spanish Spring Survey on NAFO Div. 3NO: 1995-2002. Swept area in square miles. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Mendiña* data, and 2001-2002 data are original from R/V *Vizconde de Eza*. In 2001, (*) indicates transformed data from C/V *Playa de Mendiña*.

Stratum	1995				1996				1997				1998			
	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD
353	0.0353	3	78.08	46.077	0.0371	3	237.56	34.585	0.0480	4	52.73	27.575	0.0465	4	294.56	114.142
354	0.0353	3	137.05	72.968	0.0319	3	142.54	45.782	0.0233	2	37.55	20.279	0.0356	3	419.38	160.948
355	n.s.	n.s.	n.s.	n.s.	0.0221	2	60.67	27.312	0.0233	2	15.42	5.076	0.0221	2	148.04	146.133
356	n.s.	n.s.	n.s.	n.s.	0.0203	2	8.51	0.725	0.0225	2	8.96	4.544	0.0221	2	15.64	5.873
357	0.0109	1	9.69	-	0.0218	2	7.05	7.070	0.0443	4	2.04	1.155	0.0240	2	2.56	0.532
358	0.0319	3	24.63	14.603	0.0319	3	8.02	5.033	0.0563	5	4.89	4.854	0.0236	3	7.40	1.391
359	0.0345	3	62.91	69.261	0.0548	5	49.52	24.370	0.0690	6	33.11	17.340	0.0698	6	218.32	219.578
360	0.3563	31	38.77	31.114	0.3761	31	79.16	47.645	0.3754	32	28.74	19.611	0.2561	25	118.21	71.299
374	0.0225	2	3.61	3.275	0.0233	2	12.75	1.837	0.0353	3	9.23	3.485	0.0353	3	4.40	0.996
375	0.0225	2	2.34	1.402	0.0229	2	27.79	28.521	0.0116	1	2.03	-	0.0345	3	6.52	3.903
376	0.1729	15	6.12	1.895	0.1650	14	33.27	26.717	0.1583	14	13.78	9.609	0.0930	10	91.16	80.562
377	0.0221	2	8.73	4.544	0.0229	2	25.91	9.330	0.0116	1	23.04	-	0.0229	2	51.87	65.622
378	0.0435	4	12.26	0.746	0.0330	3	10.77	3.358	0.0210	2	2.05	1.740	0.0120	2	5.74	2.417
379	0.0221	2	14.40	13.982	0.0113	1	7.55	-	0.0206	2	1.95	1.723	0.0356	3	2.92	1.983
380	n.s.	n.s.	n.s.	n.s.	0.0221	2	7.54	2.635	0.0210	2	1.55	0.087	0.0113	2	1.86	1.039
381	n.s.	n.s.	n.s.	n.s.	0.0229	2	7.25	3.529	0.0221	2	1.70	0.984	0.0229	2	9.25	12.013
382	n.s.	n.s.	n.s.	n.s.	0.0338	3	9.79	6.929	0.0461	4	0.65	0.373	0.0229	3	4.79	3.316
721	n.s.	n.s.	n.s.	n.s.	0.0214	2	16.24	8.450	0.0221	2	14.73	13.439	0.0203	2	8.44	7.106
722	n.s.	n.s.	n.s.	n.s.	0.0206	2	8.00	9.040	0.0214	2	51.29	72.390	0.0101	2	2.19	2.610
723	n.s.	n.s.	n.s.	n.s.	0.0109	1	3.04	-	0.0210	2	9.66	6.006	0.0233	2	11.04	9.475
724	0.0105	1	11.52	-	0.0203	2	10.36	5.366	0.0225	2	14.66	18.715	0.0206	2	11.91	2.780
725	0.0334	3	15.13	22.725	0.0225	2	0.91	0.604	0.0206	2	1.44	0.969	0.0086	1	0.68	-
726	0.0214	2	2.88	2.816	0.0218	2	2.58	0.556	n.s.	n.s.	n.s.	n.s.	0.0094	2	3.25	2.997
727	n.s.	n.s.	n.s.	n.s.	0.0210	2	6.62	3.686	0.0094	1	10.30	-	0.0233	2	9.91	4.157
728	n.s.	n.s.	n.s.	n.s.	0.0218	2	55.99	57.380	0.0214	2	35.28	26.346	0.0206	2	17.13	5.076
752	n.s.	n.s.	n.s.	n.s.	0.0109	1	31.89	-	0.0218	2	123.89	140.792	0.0229	2	54.91	7.807
753	n.s.	n.s.	n.s.	n.s.	0.0199	2	239.65	252.917	0.0214	2	62.42	45.778	0.0218	2	161.58	14.599
754	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0330	3	6.04	7.088	0.0210	2	2.94	4.157
755	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0206	2	0.43	0.604
756	n.s.	n.s.	n.s.	n.s.	0.0210	2	24.20	0.580	0.0109	1	83.20	-	0.0225	2	219.60	283.831
757	n.s.	n.s.	n.s.	n.s.	0.0188	2	93.18	130.374	0.0304	3	688.24	828.196	0.0206	2	90.41	110.941
758	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.66	0.492	0.0105	2	4.43	6.260
759	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000
760	n.s.	n.s.	n.s.	n.s.	0.0210	2	16.80	2.538	0.0105	1	18.87	-	0.0214	2	8.84	6.067
761	n.s.	n.s.	n.s.	n.s.	0.0199	2	0.00	0.000	0.0315	3	1.33	2.148	0.0206	2	3.81	1.764
762	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.00	0.000	0.0094	2	0.00	0.000
763	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.09	0.121
764	n.s.	n.s.	n.s.	n.s.	0.0210	2	0.50	0.266	0.0206	2	0.18	0.261	0.0218	2	0.27	0.387
765	n.s.	n.s.	n.s.	n.s.	0.0199	2	0.00	0.000	0.0206	2	0.00	0.000	0.0098	2	0.00	0.000
766	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.00	0.000	0.0191	2	0.00	0.000
767	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0109	2	0.00	0.000

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 2 (cont.).- Swept area, number of hauls and American plaice mean catch (Kg) and SD (**) by stratum. Spanish Spring Survey on NAFO Div. 3NO: 1995-2002. Swept area in square miles. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduñia* data, and 2001-2002 data are original from R/V *Vizconde de Eza*. In 2001, (*) indicates transformed data from C/V *Playa de Menduñia*.

Stratum	1999				2000				2001				2002			
	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD	Swept area	Tow number	A. Plaice Mean catch	A. Plaice SD
353	0.0360	3	427.60	41.360	0.0356	3	468.33	231.560	0.0341	3	451.08	185.936	0.0476	4	630.50	240.448
354	0.0218	2	202.41	109.950	0.0356	3	162.08	93.200	0.0338	3	172.21	144.326	0.0356	3	207.67	77.048
355	0.0229	2	66.86	33.113	0.0233	2	65.97	1.692	0.0240	2	206.75	85.065	0.0236	2	100.75	40.659
356	0.0229	2	34.59	26.249	0.0225	2	30.91	26.788	0.0240	2	83.56	40.362	0.0233	2	53.95	51.548
357	0.0236	2	3.37	2.103	0.0124	1	0.61	-	0.0244	2	76.85	105.720	0.0240	2	5.18	2.015
358	0.0349	3	9.95	16.541	0.0341	3	328.31	481.071	0.0345	3	35.80	28.161	0.0345	3	27.67	21.202
359	0.0364	3	533.03	93.042	0.0469	4	725.28	153.034	0.0803	7	347.89	328.624	0.0686	6	177.40	129.497
360	0.2325	19	289.97	100.724	0.2396	20	357.01	295.979	0.2423	20	261.79	173.177	0.2865	25	143.72	117.177
374	0.0244	2	48.37	1.644	0.0240	2	6.15	0.483	0.0240	2	14.95	1.909	0.0345	3	3.42	1.630
375	0.0236	2	46.40	17.088	0.0244	2	33.11	10.224	0.0338	3	4.77	1.680	0.0353	3	1.41	1.073
376	0.1219	10	131.81	68.980	0.1200	10	275.91	197.096	0.1155	10	46.95	32.487	0.1140	10	47.96	50.207
377	0.0240	2	94.72	128.972	0.0229	2	29.71	31.951	0.0229	2	21.09	10.204	0.0229	2	34.05	39.527
378	0.0229	2	7.84	4.617	0.0233	2	21.71	24.895	0.0236	2	2.75	1.287	0.0233	2	8.10	6.364
379	0.0236	2	0.85	0.338	0.0225	2	2.53	1.259	0.0229	2	0.84	0.092	0.0229	2	5.75	5.445
380	0.0236	2	2.44	0.073	0.0236	2	1.92	0.442	0.0206	2	3.26 (*)	0.701 (*)	0.0225	2	7.25	1.768
381	0.0229	2	0.65	0.254	0.0236	2	2.23	1.395	0.0236	2	2.58 (*)	0.169 (*)	0.0229	2	3.81	2.821
382	0.0484	4	2.47	0.671	0.0499	4	2.11	0.617	0.0469	4	3.32 (*)	1.022 (*)	0.0341	3	1.09	0.904
721	0.0244	2	22.05	11.408	0.0236	2	4.63	5.194	0.0248	2	115.20	86.974	0.0233	2	18.20	12.445
722	0.0229	2	2.67	0.773	0.0218	2	1.33	1.885	0.0233	2	30.29	35.511	0.0236	2	30.10	42.568
723	0.0229	2	37.43	32.920	0.0248	2	11.72	8.073	0.0240	2	36.15	39.244	0.0233	2	7.20	0.849
724	0.0225	2	10.87	11.505	0.0233	2	13.54	1.982	0.0353	3	26.47	26.158	0.0225	2	47.05	41.931
725	0.0229	2	2.72	0.080	0.0210	2	9.50	9.571	0.0116	1	3.63	-	0.0225	2	3.55	4.313
726	0.0225	2	43.92	51.724	0.0221	2	9.06	4.592	0.0116	1	2.10	-	0.0214	2	2.83	0.948
727	0.0236	2	8.31	8.411	0.0210	2	5.04	2.296	0.0225	2	9.30 (*)	5.801 (*)	0.0233	2	2.85	1.061
728	0.0233	2	41.70	24.509	0.0210	2	25.09	0.196	0.0229	2	6.43 (*)	1.257 (*)	0.0229	2	9.58	13.467
752	0.0233	2	39.22	12.013	0.0206	2	140.86	28.231	0.0210	2	17.36 (*)	8.709 (*)	0.0116	1	0.00	-
753	0.0229	2	16.20	5.462	0.0218	2	186.84	238.512	0.0214	2	65.90 (*)	75.169 (*)	0.0229	2	3.60	5.091
754	0.0206	2	0.00	0.000	0.0195	2	0.00	0.000	0.0195	2	1.38 (*)	1.958 (*)	0.0341	3	8.60	14.206
755	0.0311	3	0.06	0.099	0.0431	4	0.00	0.000	0.0416	4	0.00 (*)	0.000 (*)	0.0338	3	0.00	0.000
756	0.0225	2	136.69	48.872	0.0203	2	34.83	13.004	0.0113	1	5.80	-	0.0229	2	11.73	12.551
757	0.0233	2	18.77	4.157	0.0214	2	5.63	7.505	0.0233	2	115.62 (*)	163.024 (*)	0.0225	2	31.15	13.223
758	0.0214	2	0.34	0.481	0.0210	2	1.45	1.813	0.0218	2	0.17 (*)	0.242 (*)	0.0225	2	1.27	0.523
759	0.0218	2	0.38	0.532	0.0210	2	2.19	3.094	0.0221	2	0.29 (*)	0.411 (*)	0.0225	2	0.00	0.000
760	0.0225	2	22.32	31.083	0.0210	2	47.92	64.196	0.0229	2	37.80	37.618	0.0229	2	4.75	6.718
761	0.0210	2	0.00	0.000	0.0221	2	0.21	0.290	0.0225	2	0.25	0.346	0.0225	2	1.90	1.577
762	0.0210	2	20.32	28.738	0.0203	2	0.00	0.000	0.0116	1	0.00	-	0.0225	2	0.30	0.424
763	0.0311	3	0.00	0.000	0.0416	4	0.33	0.667	0.0330	3	0.00 (*)	0.000 (*)	0.0225	2	0.00	0.000
764	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0240	2	0.35	0.205	0.0236	2	0.50	0.707
765	0.0221	2	0.00	0.000	0.0203	2	0.00	0.000	0.0113	1	0.10	-	0.0236	2	0.64	0.792
766	0.0218	2	0.00	0.000	0.0214	2	0.00	0.000	0.0203	2	0.48 (*)	0.677 (*)	0.0233	2	0.00	0.000
767	0.0214	2	0.00	0.000	0.0210	2	0.12	0.172	0.0218	2	0.00 (*)	0.000 (*)	0.0225	2	0.05	0.071

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 3.- Stratified mean catches (Kg) and SD of American plaice by stratum and year (1995-2002). n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Mendiña* data. 2001-2002 data are original from R/V *Vizconde de Eza*. In 2001, (*) indicates transformed data from C/V *Playa de Mendiña*.

Strata	1995	1996	1997	1998	1999	2000	2001	2002
353	21004.28	63904.76	14185.25	79237.31	115024.28	125981.57	121339.62	169604.50
354	33713.47	0.58	9237.01	103166.91	49792.39	39871.75	42363.66	51086.00
355	n.s.	0.82	1140.79	10955.09	4947.62	4881.86	15299.50	7455.50
356	n.s.	0.18	420.92	735.00	1625.83	1452.56	3927.32	2535.65
357	1589.25	1156.20	334.79	420.44	552.17	99.78	12602.58	848.70
358	5541.31	1803.52	1099.19	1664.06	2239.85	73868.78	8055.00	6225.00
359	26483.46	20846.19	13939.67	91912.62	224406.67	305342.88	146459.89	74685.40
360	107886.13	220304.67	79993.02	328968.58	806972.64	993561.87	728547.66	399985.01
374	773.55	2728.47	1975.03	941.19	10350.62	1316.69	3199.30	731.88
375	634.54	7531.06	550.24	1766.20	12574.92	8971.50	1291.77	381.21
376	8165.20	44380.51	18379.84	121607.03	175827.93	368063.17	62631.30	63978.64
377	873.35	2590.99	2303.86	5187.10	9471.80	2970.58	2108.50	3405.00
378	1703.93	1496.65	285.08	798.22	1090.42	3017.06	382.25	1125.90
379	1526.31	800.75	207.07	309.19	90.58	267.94	88.51	609.50
380	n.s.	723.56	148.32	178.84	234.62	183.93	313.38 (*)	696.00
381	n.s.	1043.50	244.88	1331.45	93.28	320.68	371.63 (*)	547.92
382	n.s.	3357.08	222.76	1641.41	847.09	722.52	1140.20 (*)	372.73
721	n.s.	1055.81	957.61	548.79	1433.08	301.17	7488.00	1183.00
722	n.s.	671.88	4308.35	183.76	223.96	111.98	2544.36	2528.40
723	n.s.	471.54	1498.06	1711.32	5801.52	1817.28	5603.25	1116.00
724	1428.39	1284.28	1817.70	1477.14	1347.86	1678.47	3281.87	5834.20
725	0.14	95.11	151.64	71.78	285.87	997.77	381.15	372.75
726	207.35	185.81	n.s	233.80	3162.51	652.19	151.20	203.76
727	n.s.	635.78	989.03	951.62	797.40	484.02	892.56 (*)	273.60
728	n.s.	111.98	2751.51	1335.76	3252.75	1957.12	501.24 (*)	747.05
752	n.s.	4177.81	16229.89	7193.63	5138.31	18453.13	2274.07 (*)	0.00
753	n.s.	33071.60	8613.43	22297.74	2235.91	25783.68	9104.01 (*)	496.80
754	n.s.	n.s.	1087.60	529.14	0.00	0.00	249.19 (*)	1548.60
755	n.s.	n.s.	n.s	164.50	21.93	0.00	0.00 (*)	0.00
756	n.s.	2444.28	8403.07	22179.76	13806.03	3517.97	585.80	1184.23
757	n.s.	9504.34	70200.01	9221.93	1914.12	574.41	11793.62 (*)	3177.30
758	n.s.	n.s.	65.75	438.23	33.67	143.82	16.92 (*)	125.73
759	n.s.	n.s.	n.s	0.00	47.75	277.83	36.90 (*)	0.00
760	n.s.	2587.26	2905.73	1360.75	3437.40	7380.14	5821.20	731.50
761	n.s.	0.00	227.37	651.73	0.00	35.07	41.90	324.05
762	n.s.	n.s.	0.00	0.00	4308.08	0.00	0.00	63.60
763	n.s.	n.s.	n.s	22.30	0.00	86.98	0.00 (*)	0.00
764	n.s.	49.56	18.37	27.35	0.00	0.00	34.50	50.00
765	n.s.	0.00	0.00	0.00	0.00	0.00	12.40	79.36
766	n.s.	n.s.	0.00	0.00	0.00	0.00	68.91 (*)	0.00
767	n.s.	n.s.	n.s	0.00	0.00	19.17	0.00 (*)	7.90
TOTAL	211530.67	429016.56	264892.84	821421.67	1463390.87	1995167.31	1201005.08	804322.34
(\bar{Y})	32.18	48.89	28.36	79.43	141.50	192.92	116.13	77.77
SD	4.00	4.40	5.60	7.15	7.53	21.15	12.32	7.46

TABLE 4.- Survey estimates (by the swept area method) of American plaice abundance (,000) and SD by stratum and year on NAFO Div. 3NO. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduña* data. 2001-2002 data are original from R/V *Vizconde de Eza*. In 2001, (*) indicates transformed data from C/V *Playa de Menduña*.

Strata	1995	1996	1997	1998	1999	2000	2001	2002
353	8509	25788	4426	20198	30075	51149	50091	69143
354	14107	15853	3742	27205	15502	9275	14254	21378
355	n.s.	1788	404	2795	663	1200	3949	1767
356	n.s.	205	172	204	380	279	1070	848
357	680	391	111	101	89	30	3963	273
358	2519	940	490	638	420	11755	2707	3171
359	19646	10128	5270	24164	53565	72503	46680	44928
360	60039	79967	26685	92575	170899	268540	296315	113601
374	361	1208	811	244	2371	315	1685	298
375	247	1566	146	420	2604	1562	321	92
376	3550	11923	5236	29624	32457	65809	14492	12313
377	533	1343	1189	1135	3482	729	2079	2447
378	1125	848	119	440	285	612	430	891
379	694	500	90	114	22	61	14	268
380	n.s.	448	107	156	58	53	125 (*)	307
381	n.s.	892	177	725	53	196	172 (*)	302
382	n.s.	2392	143	1078	439	276	405 (*)	362
721	n.s.	452	344	146	348	64	2011	425
722	n.s.	265	3081	119	36	19	795	583
723	n.s.	223	603	395	1310	333	1498	407
724	491	481	621	416	271	272	1455	1025
725	539	46	77	21	84	304	117	200
726	60	67	n.s.	168	810	186	37	30
727	n.s.	400	663	321	238	147	246 (*)	293
728	n.s.	2439	1597	647	987	572	122 (*)	177
752	n.s.	1447	6456	2618	1802	5644	658 (*)	0
753	n.s.	11767	2763	7360	601	7016	2241 (*)	90
754	n.s.	n.s.	280	157	0	0	54 (*)	285
755	n.s.	n.s.	n.s.	66	0	0	0 (*)	0
756	n.s.	851	2840	5812	3635	962	126	283
757	n.s.	3679	23842	2923	506	102	2442 (*)	535
758	n.s.	n.s.	14	198	10	27	6 (*)	69
759	n.s.	n.s.	n.s.	0	13	73	5 (*)	0
760	n.s.	1274	748	284	701	1289	848	114
761	n.s.	0	53	167	0	0	8	46
762	n.s.	n.s.	0	0	856	0	0	44
763	n.s.	n.s.	n.s.	6	0	14	0 (*)	0
764	n.s.	0	6	8	0	0	42	30
765	n.s.	0	0	0	0	0	11	57
766	n.s.	n.s.	0	0	0	0	16 (*)	0
767	n.s.	n.s.	n.s.	0	0	3	0 (*)	7
TOTAL	113100	179569	93308	223650	325571	501371	451490	277088
S.D.	17519	16440	17539	18475	17811	62484	60593	24569

TABLE 5.- Survey estimates (by the swept area method) of American plaice biomass (t) and SD by stratum and year on NAFO Div. 3NO. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduña* data. 2001-2002 data are original from R/V *Vizconde de Eza*. In 2001, (*) indicates transformed data from C/V *Playa de Menduña*.

Strata	1995	1996	1997	1998	1999	2000	2001	2002
353	1788	5164	1182	6816	9585	10609	10667	14245
354	2869	3300	795	8688	4579	3358	3766	4302
355	n.s.	406	98	990	433	420	1275	631
356	n.s.	40	37	66	142	129	327	218
357	146	106	30	35	47	8	1034	71
358	522	170	98	211	193	6494	700	541
359	2303	1904	1212	7906	18508	26056	12775	6530
360	9388	18157	6819	32110	65946	82926	60148	34903
374	69	235	168	80	849	110	267	64
375	56	658	47	154	1065	736	115	32
376	708	3766	1626	13076	14427	30672	5423	5612
377	79	227	198	454	789	260	184	298
378	157	136	27	133	95	260	32	97
379	138	71	20	26	8	24	8	53
380	n.s.	65	14	32	20	16	30 (*)	62
381	n.s.	91	22	116	8	27	31 (*)	48
382	n.s.	298	19	215	70	58	97 (*)	33
721	n.s.	99	87	54	118	25	605	102
722	n.s.	65	403	36	20	10	219	214
723	n.s.	43	143	147	507	147	467	96
724	136	127	162	143	120	144	279	519
725	143	8	15	8	25	95	33	33
726	19	17	n.s.	50	281	59	13	19
727	n.s.	61	105	82	68	46	79 (*)	24
728	n.s.	402	257	130	280	186	44 (*)	65
752	n.s.	384	1492	629	442	1789	217 (*)	0
753	n.s.	3328	806	2050	195	2371	852 (*)	43
754	n.s.	n.s.	99	50	0	0	26 (*)	136
755	n.s.	n.s.	n.s.	16	2	0	0 (*)	0
756	n.s.	233	773	1972	1227	347	52	104
757	n.s.	1014	6933	894	165	54	1015 (*)	282
758	n.s.	n.s.	6	83	3	14	2 (*)	11
759	n.s.	n.s.	n.s.	0	4	26	3 (*)	0
760	n.s.	246	277	127	306	703	509	64
761	n.s.	0	22	63	0	3	4	29
762	n.s.	n.s.	0	0	410	0	0	6
763	n.s.	n.s.	n.s.	2	0	8	0 (*)	0
764	n.s.	5	2	3	0	0	3	4
765	n.s.	0	0	0	0	0	1	7
766	n.s.	n.s.	0	0	0	0	7 (*)	0
767	n.s.	n.s.	n.s.	0	0	2	0 (*)	1
		0						
TOTAL	18521	40826	23995	77650	120936	168193	101309	69498
S.D.	2254	3449	4942	6702	6403	18402	10855	7097

TABLE 6. American plaice length distribution. Estimated numbers in frequency in %. Spanish Spring Survey on NAFO 3NO: 1995-2002. Indet. means indeterminate. 1995-2000 data are transformed C/V *Playa de Mendiña* data. 2001-2002 data are original R/V *Vizconde de Eza* data.

Length (cm.)	1995			1996			1997			1998		
	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	1.687	1.979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.677	0.483	1.326	0.000	0.000	0.242	0.147	0.141	0.000	0.095	0.047	0.000
16	1.074	5.711	0.260	0.860	3.800	0.437	0.358	0.355	0.000	3.238	0.754	0.000
18	6.518	11.120	0.000	4.951	10.250	0.615	4.804	7.015	0.000	0.047	1.265	0.000
20	36.710	34.065	0.000	11.893	30.703	0.049	12.799	12.317	0.208	1.348	2.757	0.000
22	103.095	85.333	0.000	17.857	30.053	1.220	24.149	16.185	0.000	5.045	2.561	0.000
24	115.225	92.506	0.000	34.541	26.570	0.000	30.225	21.191	0.000	12.515	11.150	0.000
26	85.269	70.240	0.000	78.419	42.835	0.653	35.859	32.910	0.000	27.226	24.943	0.000
28	50.805	54.851	0.000	94.606	80.057	0.000	66.489	38.829	0.000	38.188	30.363	0.000
30	26.027	40.658	0.000	59.199	84.828	0.000	105.701	39.706	0.000	56.128	37.124	0.000
32	15.541	35.784	0.000	32.341	74.243	0.000	64.821	56.279	0.000	61.696	45.419	0.000
34	9.379	28.700	0.000	19.096	59.648	0.076	53.040	61.678	0.000	47.208	73.088	0.000
36	5.786	18.636	0.000	13.115	52.256	0.000	34.960	61.320	0.000	28.884	96.736	0.000
38	3.533	13.078	0.000	5.757	37.396	0.000	13.842	59.370	0.000	14.847	104.550	0.000
40	2.144	9.763	0.000	2.820	23.794	0.000	9.032	44.142	0.000	7.063	80.918	0.000
42	1.275	8.057	0.000	1.736	16.625	0.000	2.639	31.087	0.000	2.474	61.949	0.000
44	0.636	5.293	0.000	1.021	12.014	0.000	2.204	20.888	0.000	1.230	43.524	0.000
46	0.468	3.996	0.000	0.399	7.237	0.000	1.607	8.772	0.000	0.788	26.917	0.000
48	0.023	2.753	0.000	0.227	5.112	0.000	0.175	8.825	0.000	0.379	18.724	0.000
50	0.051	2.797	0.000	0.064	4.690	0.000	0.054	7.849	0.000	0.018	9.270	0.000
52	0.000	1.884	0.000	0.000	3.904	0.000	0.000	2.286	0.000	0.000	5.805	0.000
54	0.000	1.271	0.000	0.000	4.145	0.000	0.000	2.013	0.000	0.000	3.394	0.000
56	0.000	1.146	0.000	0.000	2.489	0.000	0.000	1.169	0.000	0.474	2.954	0.000
58	0.000	0.421	0.000	0.000	1.182	0.000	0.000	0.594	0.000	0.000	2.191	0.000
60	0.000	0.647	0.000	0.000	0.976	0.000	0.000	0.618	0.000	0.000	2.636	0.000
62	0.000	0.742	0.000	0.000	0.657	0.000	0.000	0.313	0.000	0.000	0.600	0.000
64	0.000	0.041	0.000	0.000	1.244	0.000	0.000	0.396	0.000	0.000	0.682	0.000
66	0.000	0.446	0.000	0.000	0.641	0.000	0.000	0.449	0.000	0.000	0.440	0.000
68	0.000	0.000	0.000	0.000	0.278	0.000	0.000	0.189	0.000	0.000	0.349	0.000
70	0.000	0.000	0.000	0.000	0.122	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72	0.000	0.091	0.000	0.000	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	464.234	532.200	3.566	378.901	617.807	3.292	462.905	536.887	0.208	308.891	691.109	0.000
N° Ind.:	6652	6614	9	6569	10111	21	8297	5729	3	4640	7390	0
N° samples:		77			100			116			108	
Range:		12-71			14-71			14-68			13-68	
Total catch:		2381			5701			4576			9384	
Sampled catch:		3037.033			4846.300			4471.710			5200.395	
Total hauls:		77			112			128			124	

TABLE 6 (cont.). American plaice length distribution. Estimated numbers in frequency in %. Spanish Spring Survey on NAFO 3NO: 1995-2002. Indet. means indeterminate. 1995-2000 data are transformed C/V *Playa de Mendiña* data. 2001-2002 data are original R/V *Vizconde de Eza* data.

Length (cm.)	1999			2000			2001			2002		
	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.192	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.032	4.613	0.026	0.000	0.169
10	0.000	10.157	10.157	0.000	0.000	0.000	0.294	0.686	0.985	0.586	1.306	0.000
12	0.000	40.627	13.617	10.698	25.583	0.693	1.915	3.100	0.432	7.108	14.576	0.468
14	0.000	0.819	0.384	15.366	18.444	0.016	8.895	12.887	1.267	14.487	17.729	0.114
16	2.600	5.960	0.000	79.373	93.141	0.000	10.853	13.335	0.201	4.276	5.762	0.000
18	3.830	9.909	0.000	89.110	130.726	0.016	44.285	48.188	0.020	10.335	12.819	0.000
20	1.281	0.205	0.000	25.490	47.860	0.000	123.739	107.422	0.000	26.639	27.380	0.000
22	2.682	4.656	0.000	5.750	6.284	0.000	97.613	101.564	0.000	54.975	38.631	0.000
24	5.344	2.799	0.000	3.756	2.614	0.000	31.528	49.790	0.000	107.492	95.184	0.000
26	20.950	5.200	0.000	3.878	3.475	0.000	8.114	11.576	0.000	88.930	119.780	0.000
28	50.324	21.458	0.000	6.752	1.604	0.000	5.438	5.230	0.000	34.962	69.061	0.000
30	75.587	36.551	0.000	19.107	4.813	0.000	14.805	2.829	0.000	14.692	23.490	0.000
32	87.005	39.576	0.000	35.107	9.473	0.000	28.915	2.546	0.000	18.181	7.458	0.000
34	61.324	35.358	0.000	30.705	21.049	0.000	34.747	6.459	0.000	20.738	4.457	0.000
36	37.180	44.072	0.000	19.680	24.748	0.000	24.994	14.652	0.000	15.765	4.408	0.000
38	18.814	68.415	0.000	10.322	29.060	0.000	9.627	22.493	0.000	9.927	8.116	0.000
40	8.781	67.097	0.000	5.139	39.649	0.000	4.338	25.245	0.000	3.758	17.625	0.000
42	3.282	66.384	0.000	1.865	43.205	0.000	1.871	25.718	0.173	1.808	21.227	0.000
44	1.237	45.965	0.000	0.836	39.312	0.000	1.222	26.655	0.000	0.527	21.186	0.000
46	0.706	28.116	0.000	0.575	28.460	0.000	0.258	23.126	0.000	0.260	18.817	0.000
48	0.000	18.464	0.000	0.507	18.084	0.000	0.000	13.860	0.000	0.026	12.071	0.000
50	0.066	14.648	0.000	0.095	11.692	0.000	0.000	7.571	0.000	0.071	8.838	0.000
52	0.000	8.879	0.000	0.272	12.249	0.000	0.000	4.674	0.000	0.058	4.187	0.000
54	0.000	7.740	0.000	0.000	7.866	0.000	0.000	2.836	0.000	0.058	4.099	0.000
56	0.000	5.619	0.000	0.000	5.848	0.000	0.000	2.345	0.000	0.000	2.493	0.000
58	0.000	2.379	0.000	0.000	3.033	0.000	0.000	0.799	0.000	0.000	1.400	0.000
60	0.000	1.578	0.000	0.000	2.373	0.000	0.000	0.868	0.000	0.000	0.415	0.000
62	0.000	1.029	0.000	0.000	2.353	0.000	0.000	0.739	0.000	0.000	0.654	0.000
64	0.000	0.852	0.000	0.000	1.091	0.000	0.000	0.216	0.000	0.000	0.116	0.000
66	0.000	0.250	0.000	0.000	0.674	0.000	0.000	0.000	0.000	0.000	0.136	0.000
68	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.000	0.000	0.144	0.000
70	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.045	0.000	0.000	0.000	0.000
72	0.000	0.000	0.000	0.000	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	380.993	594.850	24.157	364.382	634.893	0.726	453.472	537.646	8.883	435.686	563.564	0.751
N° Ind.:	4541	7742	4	3732	7721	5	4996	7906	114	5873	7234	12
N° samples:		93			96			81			108	
Range:		10-77			11-72			5-70			7-68	
Total catch:		11614			17075			11477			9201	
Sampled catch:		5974.244			5457.327			3387.690			3675.226	
Total hauls:		114			118			83			125	

TABLE 7.- American plaice length distribution in estimated numbers (,000). Spanish Spring Survey on NAFO 3NO: 1999-2002. Indet. means indeterminate. 1999-2000 data are transformed C/V *Playa de Menguña* data. 2001-2002 data are original from R/V *Vizconde de Eza*.

Lenght (cm.)	1999			2000			2001			2002		
	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.	Males	Females	Indet.
6	0	0	0	0	0	0	0	0	530	0	0	0
8	0	0	0	0	0	0	9	14	2053	7	0	47
10	0	1743	1743	0	0	0	131	305	438	162	362	0
12	0	6972	2337	4103	9813	266	852	1379	192	1969	4039	130
14	0	140	66	5894	7075	6	3958	5735	564	4014	4912	32
16	446	1023	0	30445	35726	0	4830	5934	90	1185	1597	0
18	657	1700	0	34180	50142	6	19707	21444	9	2864	3552	0
20	220	35	0	9777	18358	0	55064	47802	0	7381	7587	0
22	460	799	0	2206	2410	0	43438	45196	0	15233	10704	0
24	917	480	0	1441	1003	0	14030	22157	0	29785	26374	0
26	3595	892	0	1488	1333	0	3611	5151	0	24641	33190	0
28	8636	3683	0	2590	615	0	2420	2328	0	9688	19136	0
30	12972	6273	0	7329	1846	0	6588	1259	0	4071	6509	0
32	14932	6792	0	13466	3633	0	12867	1133	0	5038	2067	0
34	10524	6068	0	11777	8074	0	15462	2874	0	5746	1235	0
36	6381	7564	0	7549	9492	0	11122	6520	0	4368	1221	0
38	3229	11741	0	3959	11146	0	4284	10009	0	2751	2249	0
40	1507	11515	0	1971	15208	0	1930	11234	0	1041	4884	0
42	563	11393	0	715	16572	0	833	11444	77	501	5882	0
44	212	7888	0	321	15079	0	544	11861	0	146	5870	0
46	121	4825	0	220	10916	0	115	10291	0	72	5214	0
48	0	3169	0	194	6937	0	0	6167	0	7	3345	0
50	11	2514	0	36	4485	0	0	3369	0	20	2449	0
52	0	1524	0	104	4698	0	0	2080	0	16	1160	0
54	0	1328	0	0	3017	0	0	1262	0	16	1136	0
56	0	964	0	0	2243	0	0	1044	0	0	691	0
58	0	408	0	0	1163	0	0	356	0	0	388	0
60	0	271	0	0	910	0	0	386	0	0	115	0
62	0	177	0	0	902	0	0	329	0	0	181	0
64	0	146	0	0	418	0	0	96	0	0	32	0
66	0	43	0	0	259	0	0	0	0	0	38	0
68	0	0	0	0	0	0	0	71	0	0	40	0
70	0	0	0	0	38	0	0	20	0	0	0	0
72	0	0	0	0	12	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0
78	0	15	0	0	0	0	0	0	0	0	0	0
Total	65385	102087	4146	139765	243524	278	201794	239251	3953	120723	156157	208
Nº Ind.:	4541	7742	4	3732	7721	5	4996	7906	114	5873	7234	12
Nº samples:		93			96			81			108	
Range:		10-77			11-72			5-70			7-68	
Estim.												
Biomass:		120936			168193			101309			69498	
Total catch:		11614			17075			11477			9201	
Sampled catch:		5974.244			5457.327			3387.690			3675.226	
Total hauls:		114			118			83			125	

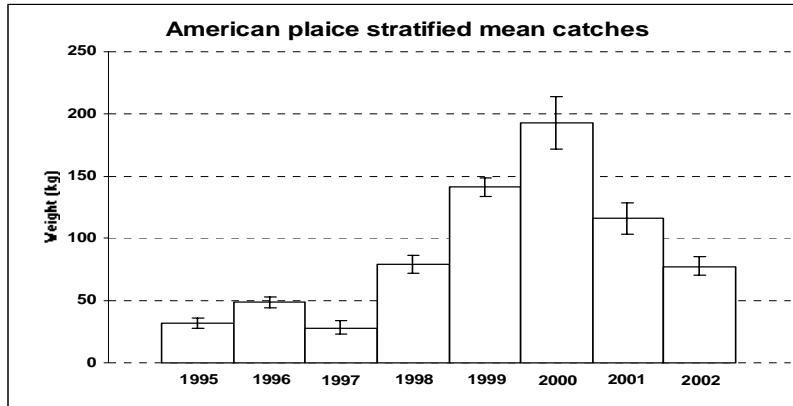


Fig. 1. American plaice stratified mean catches in Kg and \pm SD by stratum and year. Spanish Spring surveys on NAFO Div. 3NO: 1995-2002 (1995-2000 transformed data from *C/V Playa de Menduña*; 2001-2002 original data from *R/V Vizconde de Eza*).

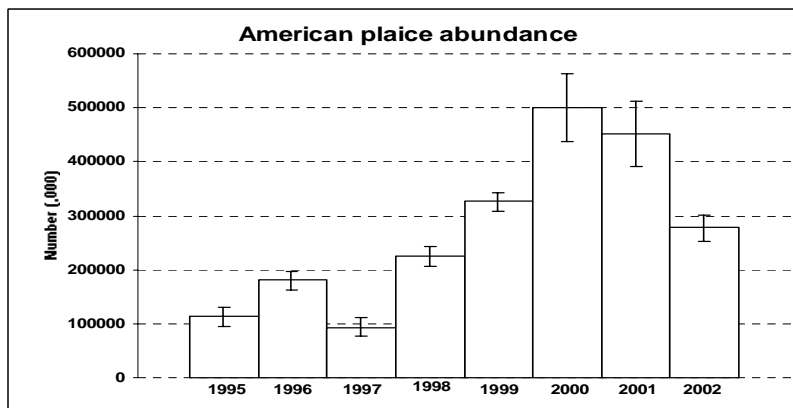


Fig. 2. American plaice abundance in thousand and \pm SD by stratum and year. Spanish Spring surveys on NAFO Div. 3NO: 1995-2002 (1995-2000 transformed data from *C/V Playa de Menduña*; 2001-2002 original data from *R/V Vizconde de Eza*).

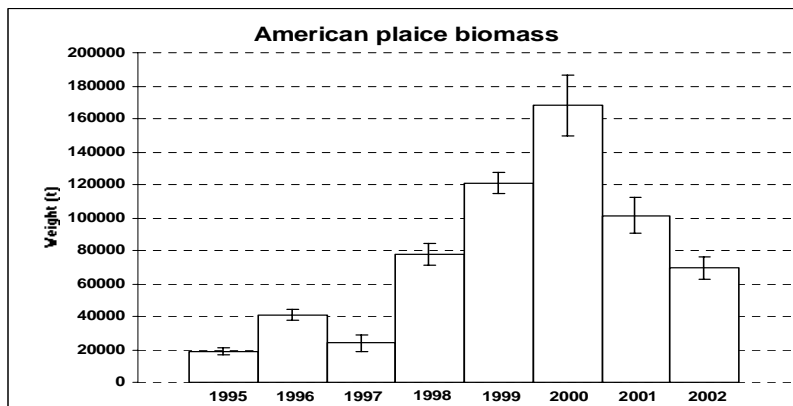


Fig. 3. American plaice biomass in tons and \pm SD by stratum and year. Spanish Spring surveys on NAFO Div. 3NO: 1995-2002 (1995-2000 transformed data from *C/V Playa de Menduña*; 2001-2002 original data from *R/V Vizconde de Eza*).

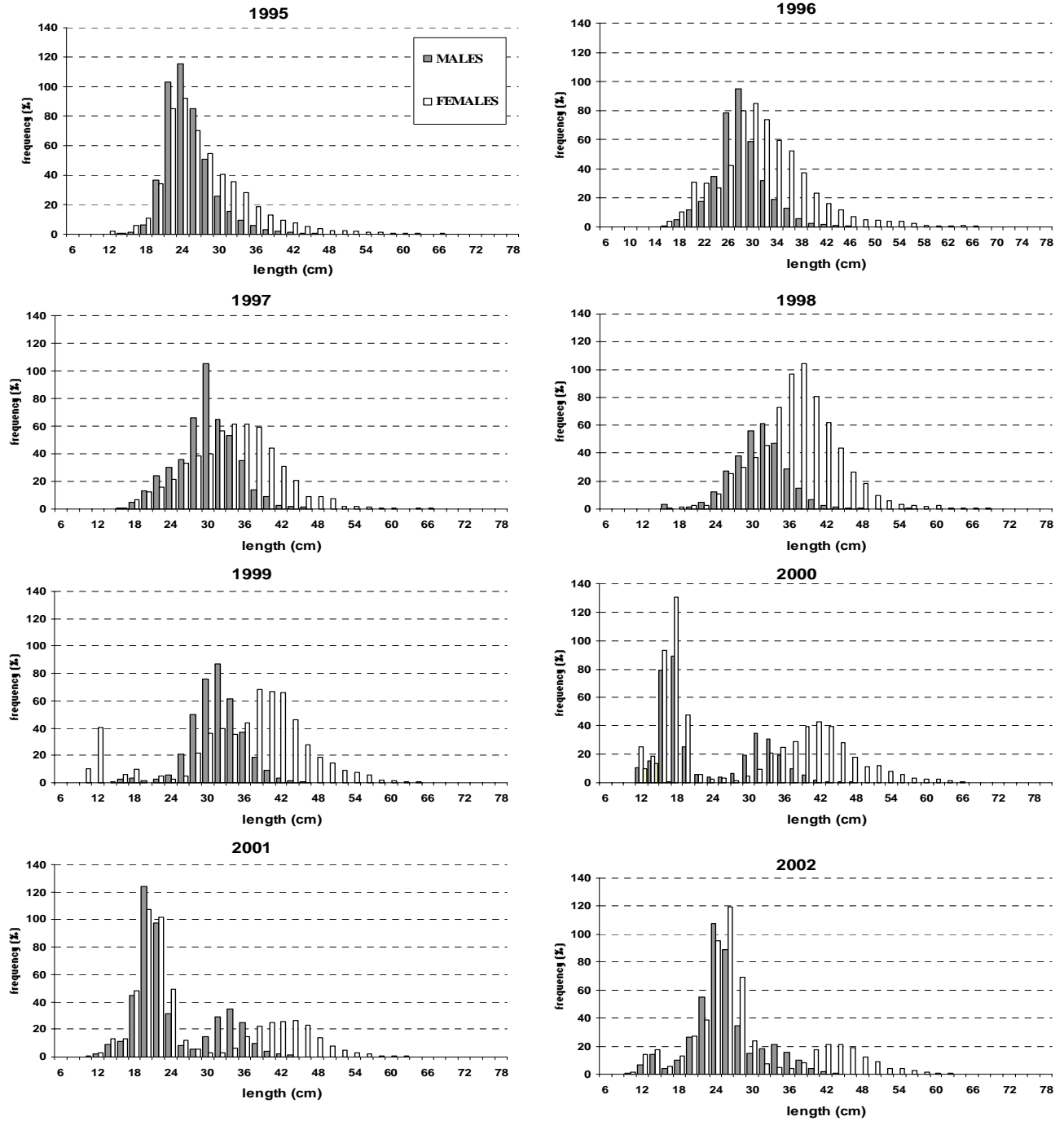


Fig. 4. American plaice length distribution (cm) on NAFO 3NO: 1995-2002. Frequency in %. 1995-2000 data are transformed data from *C/V Playa de Menduña*, and 2001-2002 data are original from *R/V Vizconde de Eza*.

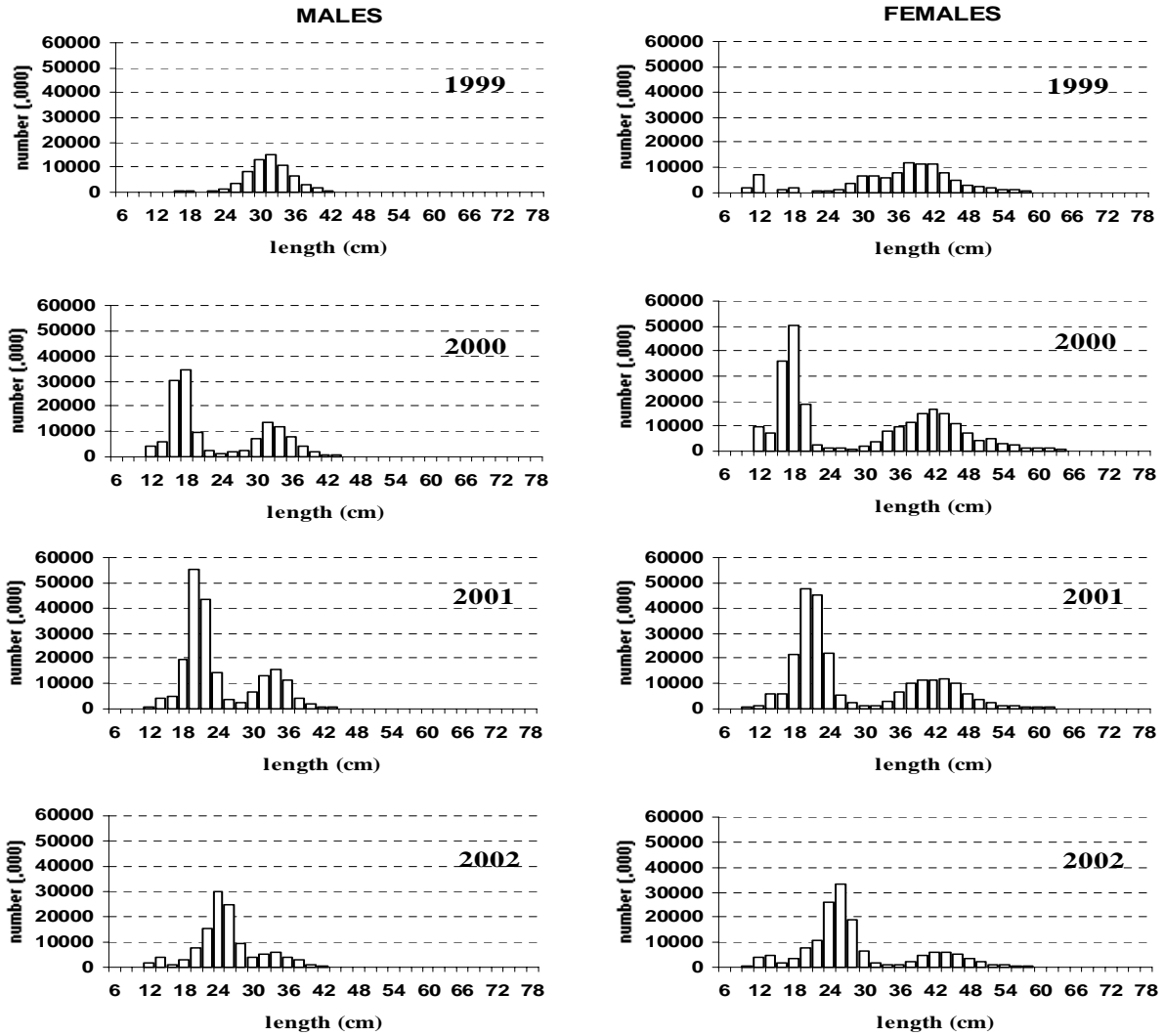


Fig. 5. Length distribution by sex of American plaice in estimated numbers ('000) on NAFO 3NO for the period 1999-2002. 1999-2000 data are transformed C/V Playa de Mendiña data.

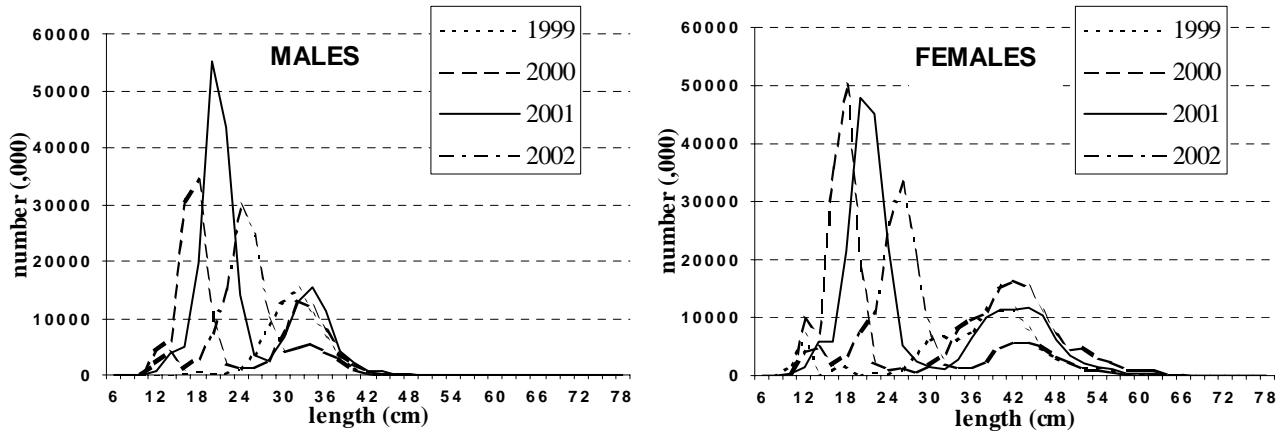


Fig. 6. American plaice length distribution comparison by sex and year in estimated numbers ('000) from Spanish Bottom Trawl Survey on NAFO 3NO for the period 1999-2002. 1999-2000 data are transformed C/V *Playa de Menduña* data.

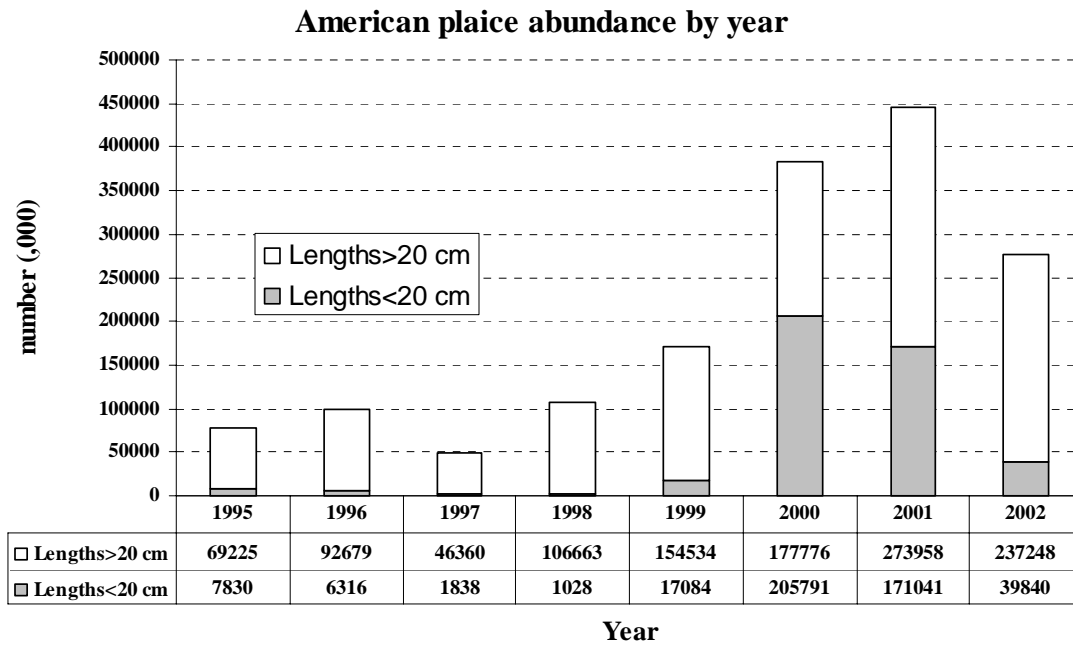


Fig. 7. Presence of juvenile individuals (length ≤ 20 cm) respect to total abundance of American plaice on NAFO 3NO: 1995-2000 data are transformed data from C/V *Playa de Menduña*, and 2001-2002 data are original from R/V *Vizconde de Eza*.