

## ATLANTIC BLUEFIN TUNA SEX RATIO IN THE CATCHES OBTAINED BY JAPANESE LONGLINERS

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## RESUMEN

## SUMMARY

The sex ratio of the Atlantic bluefin tuna catches obtained by Japanese longliners was examined, based upon the sexed catch-by-size data. The present analysis shows that in the Gulf of Mexico during the spawning season there is a predominance of males above 262 cm while there are fewer males below 262 cm.

Se examinó la proporción de sexos en las capturas atlánticas de atún rojo de los palangreros japoneses, en base a los datos de captura por talla y por sexo. El presente análisis muestra que en el Golfo de México, durante la época de desove, predomina la presencia de machos en las tallas que sobrepasan los 262 cm, siendo más escasos por debajo de dicha talla.

## RESUME

Le sex-ratio des prises de thon rouge de l'Atlantique effectuées par les palangriers japonais est examiné à partir des données de capture par taille selon le sexe. La présente analyse montre une prédominance des mâles au-dessus de 262 cm, par rapport à ceux de moins de 262 cm, dans le golfe du Mexique pendant la saison de frai.

The purpose of this paper is to investigate sex ratio of Atlantic bluefin tuna catches based on sexed size data reported from the Japanese longliners.

Significant data on sex ratio were collected in 1978 during 1970-1981 with occasional observations in 1971 and 1972. The sampling time, area covered and sample size are summarized as follows:

	Sampling time	Area covered	Sample size
1971	Sept. - Dec.	34 - 40N 37 -75W	11
1972	June - Dec.	33 - 44N 2 -75W	34
1978	Feb. - May	25 - 28N 85 -92W	970

Table 1 gives the bluefin tuna catches in number by sex and sex ratios (expressed in percentage of the number of males to the total) for every 2 cm intervals( FL ). In table 2 are shown the results of chi-square tests assuming the 50 % sex ratio hypothesis for each three length groups in the 1978 sample.

From these tests it is apparent that the sex ratio is higher than

50 % for the 262-302 cm fish group while that lower than 50 % for the 234-262 cm fish group. In case of the fish smaller than 234 cm sex ratios become variable with decreasing sample size, being smaller than 50 % for the entire group below 234 cm.

The results obtained in the present analysis were essentially similar to Maguire and Hulburt (1983) except the smallest group, where sex ratio of the group considered was approximately equivalent to 50 % in the Canadian trap catches.

All those data used in the present analysis were reported from the Gulf of Mexico in the spawning season, hence all findings obtained are not general.

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#### Reference

Maguire, J.J. and T. Hulburt 1983. Bluefin tuna sex proportion at length in the Canadian samples 1974 - 1983., Int. Comm. for the Conserv. of Atlantic tunas SCRS/83/84, 11p.



Table 1. ( Continued )

Year	1971			1972			1978			Total				
	FL	CM	M	F	M/F+M	M	F	M/F+M	M	F	M/F+M	M	F	M/F+M
176-178			0.	0.	0.	1.	0.	100.	0.	0.	0.	1.	0.	100.
178-180			0.	0.	0.	1.	0.	100.	0.	0.	0.	1.	0.	100.
180-182			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
182-184			1.	0.	100.	1.	0.	100.	0.	0.	0.	2.	0.	100.
184-186			0.	0.	0.	1.	0.	100.	0.	0.	0.	1.	0.	100.
186-188			0.	0.	0.	2.	3.	40.	0.	0.	0.	2.	3.	40.
188-190			0.	0.	0.	2.	0.	100.	0.	0.	0.	2.	0.	100.
190-192			0.	0.	0.	1.	1.	50.	0.	0.	0.	1.	1.	50.
192-194			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
194-196			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
196-198			0.	0.	0.	1.	1.	50.	0.	0.	0.	1.	1.	50.
198-200			0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
200-202			0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
202-204			0.	0.	0.	1.	1.	50.	0.	1.	0.	1.	2.	33.
204-206			0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
206-208			0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	2.	0.
208-210			0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	2.	0.
210-212			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
212-214			0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
214-216			1.	1.	50.	0.	0.	0.	2.	1.	67.	3.	2.	60.
216-218			0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	4.	0.
218-220			1.	0.	100.	0.	0.	0.	2.	2.	50.	3.	2.	60.
220-222			1.	0.	100.	0.	0.	0.	2.	2.	50.	3.	2.	60.
222-224			0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	4.	0.
224-226			0.	0.	0.	0.	0.	0.	4.	8.	33.	4.	8.	33.
226-228			0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	3.	0.
228-230			0.	1.	0.	0.	0.	0.	8.	17.	32.	8.	18.	31.
230-232			0.	0.	0.	0.	0.	0.	1.	4.	20.	1.	4.	20.
232-234			0.	1.	0.	0.	1.	0.	3.	9.	25.	3.	11.	21.
234-236			1.	0.	100.	0.	0.	0.	8.	12.	40.	9.	12.	43.
236-238			0.	0.	0.	0.	0.	0.	5.	25.	16.	5.	25.	16.
238-240			0.	0.	0.	0.	0.	0.	17.	36.	32.	17.	36.	32.
240-242			0.	0.	0.	0.	0.	0.	6.	22.	21.	6.	22.	21.
242-244			0.	0.	0.	0.	0.	0.	12.	6.	67.	12.	6.	67.
244-246			0.	0.	0.	0.	1.	0.	11.	35.	24.	11.	36.	23.
246-248			0.	0.	0.	0.	0.	0.	10.	35.	22.	10.	35.	22.
248-250			0.	0.	0.	0.	1.	0.	35.	44.	44.	35.	45.	44.
250-252			0.	0.	0.	0.	0.	0.	16.	23.	41.	16.	23.	41.
252-254			0.	0.	0.	0.	0.	0.	13.	13.	42.	13.	18.	42.
254-256			0.	0.	0.	0.	0.	0.	22.	46.	32.	22.	46.	32.
256-258			0.	0.	0.	0.	0.	0.	35.	47.	45.	35.	47.	43.
258-260			0.	0.	0.	0.	0.	0.	38.	42.	43.	38.	42.	48.
260-262			0.	0.	0.	0.	0.	0.	16.	21.	43.	16.	21.	43.
262-264			0.	0.	0.	0.	0.	0.	44.	16.	73.	44.	16.	73.
264-266			0.	0.	0.	0.	0.	0.	33.	12.	73.	33.	12.	73.
266-268			0.	0.	0.	0.	0.	0.	26.	7.	79.	26.	7.	79.
268-270			0.	0.	0.	0.	0.	0.	25.	7.	78.	25.	7.	78.
270-272			0.	0.	0.	0.	0.	0.	10.	0.	100.	10.	0.	100.
272-274			0.	0.	0.	0.	0.	0.	6.	1.	86.	6.	1.	86.
274-276			0.	0.	0.	0.	0.	0.	8.	3.	73.	8.	3.	73.
276-278			0.	0.	0.	0.	0.	0.	8.	0.	100.	8.	0.	100.
278-280			0.	0.	0.	0.	0.	0.	3.	1.	89.	3.	1.	89.
280-282			0.	0.	0.	0.	0.	0.	5.	0.	100.	5.	0.	100.
282-284			0.	0.	0.	0.	0.	0.	2.	0.	100.	2.	0.	100.
284-286			0.	0.	0.	0.	0.	0.	6.	0.	100.	6.	0.	100.
286-288			0.	0.	0.	0.	0.	0.	1.	0.	100.	1.	0.	100.
288-290			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
290-292			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
292-294			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
294-296			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
296-298			0.	0.	0.	0.	0.	0.	1.	0.	100.	1.	0.	100.
298-300			0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
300-302			0.	0.	0.	0.	0.	0.	1.	0.	100.	1.	0.	100.
Total			6	5	55	21	13	62	450	520	46	477	538	47

Table 2. Chi-square tests of sex ratios for the Atlantic bluefin tuna in the 1978 sample.

Length (FL) group	Sample size	Observed		Expected		Chi-square	P*
		Males	Females	Males	Females		
202-234 <sup>cm</sup>	82	22	60	41	41	17.61	< 0.005
234-262	657	244	413	328.5	328.5	34.58	< 0.005
262-302	231	184	47	115.5	115.5	81.25	< 0.005

\*: Probability for the observed chi-square.