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Cuban Research Report for 1997.

by

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1. Status of the Fishery

During 1997 the Cuban fleet conducted a directed fishery on silver hake during February-September southward of the SMGL in Div. 4WX. A total of 10 large-tonnage trawlers were involved in the fishery.

Silver hake total catch during 1997 amounted to 12 696 tons (Table 1), resulting in a 9 500 tons decrease approximately of the overall catch of the species in 1996 (22 279 tons). Fishing began in February with one trawler, being the rest of the vessels further involved in the fishery as the season progressed. Full fishing effort capacity was achieved during April-June with 10 vessels in the fishery.

Although the highest catches were obtained during May-June, the best catch rates, however, were achieved early in the season (February and March) with 1.61 and 1.58 t/h, respectively. As the season progressed catch rates decreased, first to a rather stable value of 1.0 t/h (April-June) and later to 0.28-0.12 t/h during July-September (Table 2). An abrupt fall was observed in July with no further recovery of the fishery. Fishing extended to September (only 2 ships as "scouting vessels") in an effort to find silver hake aggregations. A mean catch rate of 0.86 t/h was calculated for 1997, a lower figure than that obtained in 1996 (1.21 t/h). In general monthly silver hake CPUE in 1997 were lower than in 1996 (except in May with similar values, Table 2). From end of June to August this decrease could be related to the occurrence of squid in the fishing area (in high concentrations) and the movement of silver hake northward of the SMGL.

The bulk of the fishing effort on the silver hake fishery (76%) took place in Div. 4W (Fig. 1), with the most intensively fished area being that of the canyons (from "No Name" to Dawson Canyon) between 61°00' and 63°00'W.

By-catch percents of haddock, pollock and cod were within the regulation limits.

2. Special Research Studies

a) Environmental Researches

From May to August a commercial vessel ("Rio Jatibonico") conducted a research dealing with the effect of the near bottom temperature on catches of silver hake in Div. 4WX. The ship was provided with a temperature and depth sensor (MINILOG system) placed on the headrope, registering the temperature and depth variations along the trawl on the bottom. The system did not allow to know the bottom temperature in "real time" (that is, during the trawl) but after it have ended up.

A total of 238 sets were done using this computerized system, being registered all the detailed observations of the trawl. Highest catches of silver hake were obtained from 7.2 to 10.5°C and the lowest values in temperatures close to 5°C and near 12°C (Table 3).

b) Biological Studies

During July-September biological samplings were conducted on two Cuban commercial vessels in Div. 4WX. Sampling was aimed to the main species sought, silver hake, and to the by-catch species (haddock, pollock, cod and squid). Sampling for silver hake included a random length sample (by sex and maturity, the latest occasionally) of the total catch prior to the discard and also a stratified subsample of otoliths. The rest of the species were only sampled by length and in the case of haddock occasionally by sex. Biological sampling was conducted following the Canadian scientific observer program requirements.

Results of sampling including length frequency, mean length, etc., for the above-mentioned species are given in Tables 4 and 5. Silver hake total length composition of the catches came from a relatively small sample and suggests a dominance of fish between 14 and 41 cm, showing two modes in 20 and 29 cm. Mean length was 23.7 cm with a correspondent mean weight of 98.1 gr.

Table 1. Summary of catches of the main species in 1996 and 1997.

Species	1996			1997		
	4W	4X	Total	4W	4X	Total
Silver hake	19525	2754	22279	9215.2	3481.7	12696.9
Shortfin squid	349	144	493	2511	466.8	2977.8
Pollock	120	7	127	41.5	15.8	57.3
Haddock	32	9	41	20	6.9	26.9
Cod	1		1	0.022	0.421	0.443
Red hake	415	13	428	213.5	45.7	259.2
Mackerel	77	1	78	112	1.8	113.8
Herring	200	13	213	250.9	2.3	253.2
Groundfish (NS)	202	210	412	86.4	77.4	163.8
TOTAL	20921	3151	24072	12450.5	4098.8	16549.3

Table 2. Catch, effort and CPUE on the Cuban directed silver hake fishery in Div. 4WX during 1996 and 1997.

<i>DIVISION 4W</i>							
1996				1997			
Month	Catch	Hours	CPUE	Month	Catch	Hours	CPUE
	(t)	fished	(t/ha)		(t)	fished	(t/ha)
Feb.				Feb.	386.5	240.75	1.61
March	2288.3	1294.5	1.77	March	1086.2	686.75	1.58
April	4680.1	3533.5	1.32	April	2090.3	2129.5	0.98
May	4221.9	4350.75	0.97	May	2712.7	3024.75	0.90
June	5941.5	4190	1.42	June	2358.7	2128.5	1.11
July	2392.8	2917.25	0.82	July	552.3	2135.25	0.26
August				August	19.2	831	0.02
Sept.				Sept.	9.3	67	0.14
TOTAL	19524.6	16286	1.20	TOTAL	9215.2	11243.5	0.82
<i>DIVISION 4X</i>							
1996				1997			
Month	Catch	Hours	CPUE	Month	Catch	Hours	CPUE
	(t)	fished	(t/ha)		(t)	fished	(t/ha)
Feb.				Feb.			
March				March			
April	34.2	24.25	1.41	April			
May	267.2	260.25	1.03	May	1384.8	1067.75	1.30
June	218.5	199.75	1.09	June	1831.7	1928.25	0.95
July	334.3	236.25	1.42	July	129.1	340.5	0.38
August	1899.6	1335.25	1.42	August	134.7	245	0.55
Sept.				Sept.	1.4	25	0.06
TOTAL	2753.8	2055.75	1.34	TOTAL	3481.7	3606.5	0.97
<i>TOTAL DIVS. 4WX</i>							
1996				1997			
Month	Catch	Hours	CPUE	Month	Catch	Hours	CPUE
	(t)	fished	(t/ha)		(t)	fished	(t/ha)
Feb.				Feb.	386.5	240.75	1.61
March	2288.3	1294.5	1.77	March	1086.2	686.75	1.58
April	4714.3	3557.75	1.33	April	2090.3	2129.5	0.98
May	4489.1	4611	0.97	May	4097.5	4092.5	1.00
June	6160	4389.75	1.40	June	4190.4	4056.75	1.03
July	2727.1	3153.5	0.86	July	681.4	2475.75	0.28
August	1899.6	1335.25	1.42	August	153.9	1076	0.14
Sept.				Sept.	10.7	92	0.12
TOTAL	22278.4	18341.75	1.21	TOTAL	12696.9	14850	0.86

Table 3. Near bottom temperature ranges associated to silver hake mean catches in the Cuban directed silver hake fishery in 1997.

<i>Div.</i>	<i>Temperature ranges (°C)</i>	<i>Silver hake mean catch (t)</i>
4WX	5.1-7.0	0.21
4WX	7.1-9.0	1.41
4WX	9.1-11.0	1.57
4WX	11.1-13.0	0.94

Table 4. Intensity sampling during 1997 by species, Division and months.

<i>Species</i>	<i>Div.</i>	<i>Month</i>	<i>No. Samples</i>	<i>No. Fish Measured</i>	<i>Length range(cm)</i>	<i>Sampling Weight (kg)</i>	<i>No. of otoliths</i>
Silver hake	4W	July	8	1945	14-37	216	90
	4W	August	1	228	15-35	20	76
	4X	August	2	565	23-37	89	
	4W	Sept.	10	2783	15-41	230	20
	4X	Sept.	4	954	14-38	80	8
Haddock	4W	July	14	498	21-53	257	
	4W	August	17	513	20-47	146	
	4X	August	4	166	21-50	75,8	
	4W	Sept.	7	600	21-56	180	
	4X	Sept.	2	37	23-62	17	
Pollock	4W	July	10	632	31-64	572,9	
	4W	August	16	235	31-62	242,5	
	4X	August	3	3	38-49	3,2	
	4W	Sept.	2	188	31-42	103	
	4X	Sept.	1	2	46-49	2	
Cod	4W	August	4	6	30-38	3,3	
	4X	August	1	2	34-35	1,8	
Squid	4W	July	9	2158	11,5-22,5	216,2	
	4W	August	8	1826	13,0-26,0	174	
	4X	August	1	274	15,0-21,5	20	
	4X	Sept.	2	442	16,5-25,0	68	

Table 5 : Silver hake length frequency from the Cuban commercial fishery in Div. 4W and 4X by Months in 1997.

length(cm)	July	August			September			GENERAL
	4W	4W	4X	Total	4W	4X	Total	TOTAL
14	1					1	1	2
15	6	1		1	1	5	6	13
16	20	2		2	14	21	35	57
17	93	4		4	54	51	105	202
18	117	18		18	165	90	255	390
19	151	30		30	300	100	400	581
20	99	35		35	463	95	558	692
21	84	32		32	428	77	505	621
22	68	14		14	385	77	462	544
23	77	3	2	5	242	76	318	400
24	127	13	3	16	167	29	196	339
25	164	7	3	10	132	33	165	339
26	171	8	13	21	91	37	128	320
27	163	19	42	61	60	61	121	345
28	153	11	89	100	59	65	124	377
29	148	18	147	165	59	51	110	423
30	130	3	105	108	61	31	92	330
31	82	5	75	80	33	23	56	218
32	39	1	53	54	34	16	50	143
33	25	2	18	20	13	11	24	69
34	17	1	8	9	8	3	11	37
35	4	1	4	5	9		9	18
36	2		2	2	2		2	6
37	4		1	1	2		2	7
38				0		1	1	1
39				0			0	0
40				0			0	0
41				0	1		1	1
No Fish Meas.	1945	228	565	793	2783	954	3737	6475
No Samples	8	1	2	3	10	4	14	25
Sampling weight(Kg)	216	20	89	109	230	80	310	635
Mean length(cm)	24.7	22.8	29.6	27.6	22.3	22.9	22.4	23.7
Mean weight(gr)	111	87.7	157.5	137.4	82.6	83.8	82.9	98.1
Depth range	190-400	190-200	200-300	190-300	200-270	190-268	190-270	190-400

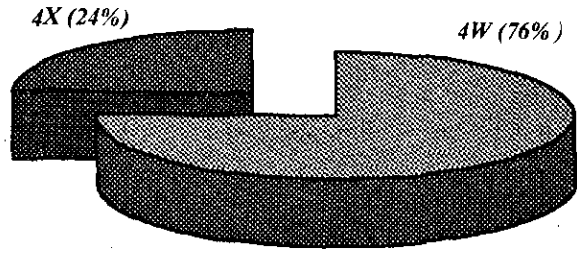


Fig. 1. Breakdown of the 1997 Cuban directed effort on the silver hake fishery.