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ANALYSIS OF THE COMMERCIAL TRAWL CATCH OF THE ARABIAN GULF

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ABSTRACT

The study was concentrated on the analysis of the total catch of the fishing vessel (f/v) Gazelle during the years 1977 and 1978 . The annual landing amounted to about 197 and 253 tons, respectively. It was found that the groupers (family Serranidae), and the seabreams (family Lethrinidae) together contributed about half the total yield. The goat fish (family Mullidae) and the jacks (family Carangidae) together gave more than 20% of the catch. The threadfin breams (family Memipteridae) and barracuda (family Sphyrinidae) together contributed about 13%. The rest were some marketable fish amounting to nearly 17% of the total catch.

INTRODUCTION

The fishery resources of the Gulf attracted increasing attention of those interested in commercial exploitation. The Arabian Gulf (Fig. 1) penetrates from the Indian Ocean, covers an area of 239000 square kilometers. It is a shallow sea having a mean depth of only 35 meters, and the greatest depth is about 90 meters or so in the middle of the Gulf. The water is very shallow near the delta of Shatt El-Arab at the northern end of the Gulf. Along the Iranian coast, there is the central deeper part ranging from 70 to 90 meters. The bottom sediments in the deepest part, as well as in Shatt El-Arab is soft mud and clay which was brought into the Gulf by the rivers and the desert storms.

The countries bordering the Gulf are rich not only in petroleum, but also in fish, shell fish and shrimps. Several countries develop fishing industry with some success as an additional source of income to oil (Al-Kholy, 1973). The potential yield is belived to be as much as 50,000 tons of demersal species only, (FAO 1980).

MATERIAL AND METHODS

Trawl fishing of demersal fish was recently introduced in 1975 by a stern trawler namely the fishing vessel (f/v) Gazelle. The vessel makes short

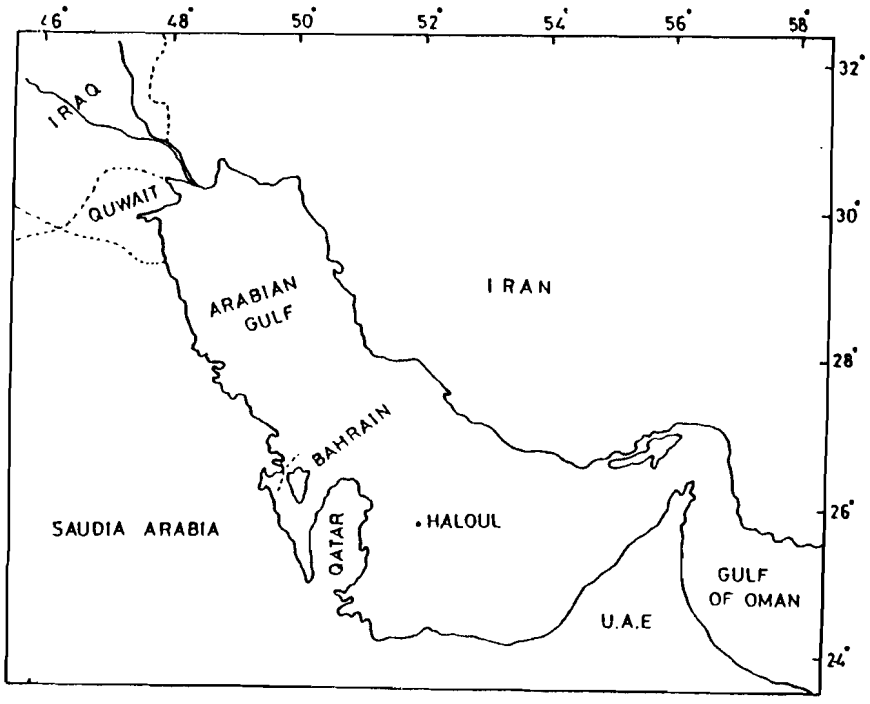

Fig. 1
A Map of the Arabian Gulf.

trips in the area between Qatar and United Arab Emirates (U.A.E.). The area used to be dragged by f/v Gazelle is shown by squares in, (Fig. 2). This area is limited between longitudes 51° and 54° around Haloul Island. Fishing is conducted during daylight only.

The net used for fishing is a high opening bottom trawl, designed for a stern trawler with 600 H.P. which is the main engine of f/v Gazelle. The net is constructed throughout from nylon webbing 200 mm mesh bar in the wings and 30 mm mesh bar in the condend. The head and footropes of the net are 34.0 and 39.0 meters long, respectively.

F/V Gazelle began the experimental fishing on July 1975. Irregular trips operated at 1976 in an attempt to draw a map for trawl fishing in the area north east to and around Haloul Island. Trawl fishing on the commercial basis began from January 1977.

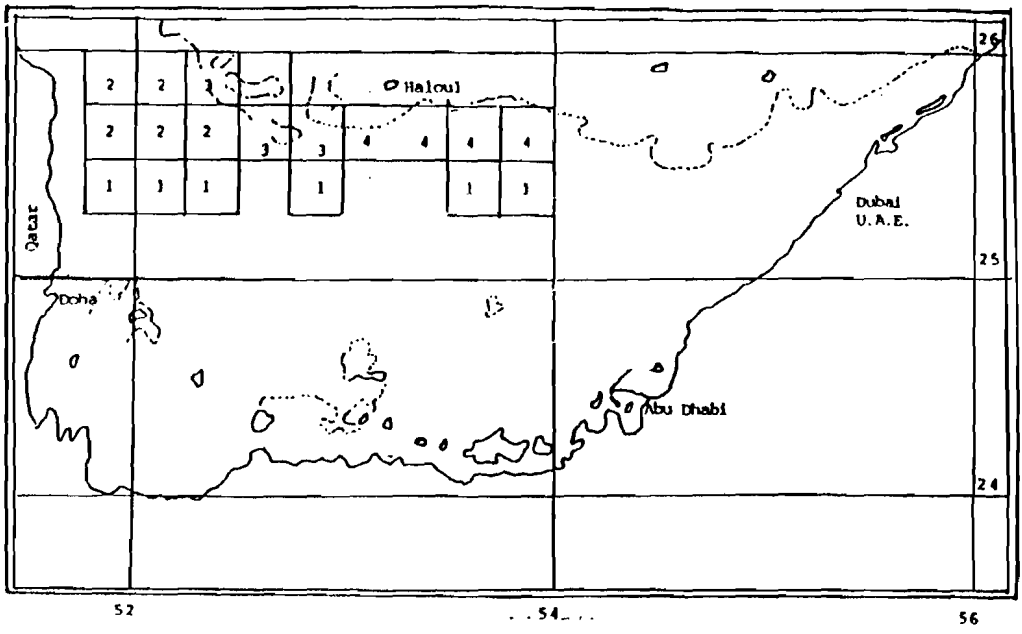

Fig. 2
Areas dragged by F/V Gazelle.

The f/v Gazelle conducted 56 trips from February to December 1977, and 74 trips during the same period in 1978, as January is the annual month fro repair and maintenance. The summery reports of these trips executed during this period were analysed to determine the total catch, variation in the catch according to different seasons and the aviability of marketable fish.

RESULTS AND DISCUSSION

The total catch of the fishing vessel Gazelle during the period from 1975 to 1980 is given below:

Year	Total Catch (ton)
1975	60
1976	121
1977	197
1978	253
1979	433
1980	486

The catch during the period from 1975 to 1978 was obtained by a trawl net of mesh size 30 mm of the codend. The low production during the years 1975 and 1976 was due to the use of f/v Gazelle for experimental fishing. The total yield during the years 1977 and 1978 increased because of the regular trips conducted after the experimental fishing. The production of f/v Gazelle was nearly doubled during 1979 due to the change of the mesh of the codend from 30 mm to 45 mm. The total yield during the years 1979 and 1980 will be discussed seperately due to the change in the mesh size of the codend. Analysis of the fishing logs of the vessel during this period shows that fishing was restricted to a narrow band immediately within the 38 metres isobath (20 fathoms) from the Qatar Peninsula across to the coast of U.A.E. However most of the effort during this period was expended in the area around Haloul Island.

Hydrographic Conditions in the Gulf Area:

The temperature in the Gulf plays an important role in the fishing operations. The consecutive four seasons can not be clearly observed. There is only a long hot season and a short warm one. The hot season extends to more than seven months when the temperature ranges between 30 and 45°C. The rest of the year is merely cool when the temperature ranges between 18 and 30°C. The average air and water temperatures through the years 1977 and 1978 are shown in Table (1).

The daily air temperature in winter reaches a minimum of 18°C causing the sea water temperature to fall to 15°C. In summer, the daily air temperature rises to an average of 42°C and the sea water temperature reaches 35°C and even more in August. The water of the Gulf attains temperatures that are the highest of any enclosed sea in the world.

Evaporation of the water produces very high salinities of about 48 parts per thousand, and over 100% in some shallow bays.

TABLE 1
Average air and water temperature in °C elsius
in the years 1977 and 1978.

Month	1977		1978	
	Air	Water	Air	Water
January	18.2	19.1	17.7	18.5
February	18.6	19.3	18.5	19.1
March	20.5	21.2	21.1	22.2
April	23.9	24.8	25.5	26.5
May	30.8	28.5	31.2	29.4
June	35.6	32.1	35.2	32.2
July	39.5	35.4	39.2	35.9
August	45.7	38.5	45.6	38.6
September	40.1	36.5	41.1	39.9
October	35.7	30.7	37.7	30.2
November	28.3	27.3	28.9	26.9
December	19.1	20.9	18.5	19.8

Seasoanl Fluctuations in the Catch

The annual landing of f/v Gazelle during the years 1977 and 1978 amounted to 196665 and 253182 kilograms, respectively, as shown in Tables (2) and (3) and represented in Figs. (3) and (4). It was found that the catch was rich during the hot season, and comparatively poor during the warm one. Although the data was analysed according to the consecutive four seasons of the year, yet it was very clear that the catch was higher during the period from April to October, than from November to March. The catch varied considerabely according to the area dragged, nature of the bottom, differences in the gear effeciency, fish behaviour and time of the day, beside some other factors.

The seasonal variations in the commercial catch are given in tables 4 and 5 while the total catch and catch rate/hour of the marketable fish families were shown in table 6. The mean value of the catch for the species belonging to the genus **Epinephelus** was about 12.3 kg/hour in 1977 decreased to 9.8 kg/hour in 1978. This is not due to the decrease in the total yield of the groupers, but due to the increase in the total catch of 1978. The catch of the pigface breams coincided with the groupers, so that the high yield of the year 1978, due to the increase in number of trips, lowered both the percentage composition in the catch and consequently the catch per hour.

TABLE 2

Total catch (Kg) obtained by f/v gazelle through the year 1977
(Percentages between barantheses).

Sp.No. Month	1	2	3	4	5	6	7	8	9	10	11	12
Jan.												
Feb.												
Mar.	8364	8004	392	532	1076	4459	176	17	260	625	1840	-
	(26)	(24.9)	(1.2)	(1.6)	(3.4)	(13.9)	(1.1)	(0.1)	(0.8)	(1.9)	(5.7)	
Apr.	4378	10538	1159	96	838	1465	77	-	936	281	2163	-
	(17.8)	(43.1)	(4.7)	(0.4)	(3.4)	(6.0)	(0.3)	-	(3.8)	(1.1)	(8.8)	
May.	2627	12802	1799	26	783	1515	18	-	887	230	4672	40
	(8.6)	(42.0)	(5.9)	(0.1)	(2.6)	(5.0)	(0.1)	-	(2.9)	(0.8)	(13.3)	(0.1)
Jun.	1154	8756	1237	-	-	1799	-	-	59	360	5281	-
	(5.4)	(41.0)	(5.8)	-	-	(8.4)	-	-	(0.3)	(1.7)	(24.8)	-
Jul.												
Aug.	560	5180	603	-	-	1112	-	-	-	200	628	104
	(6.0)	(55.4)	(6.5)			(11.9)				(2.1)	(6.7)	(1.1)
Sep.	279	7146	1175	-	-	2188	-	-	-	902	1520	270
	(7.7)	(42.9)	(7.1)			(13.1)				(5.4)	(9.1)	(1.6)
Oct.	1328	8176	1109	165	-	2812	44	-	187	835	1098	561
	(6.6)	(40.6)	(5.5)	(0.8)		(14.0)	(0.2)		(0.9)	(4.1)	(5.4)	(2.8)
Nov.	897	2815	255	242		2665	367	113	56	831	375	313
	(4.7)	(14.8)	(1.3)	(1.3)		(14.0)	(1.9)	(0.6)	(0.3)	(4.4)	(2.0)	(1.6)
Dec.	1312	4297	164	160	-	3817	300	114	-	2455	522	84
	(5.5)	(15.7)	(0.7)	(0.7)	-	(16.1)	(1.3)	(0.5)	-	(10.4)	(2.2)	(0.4)
Total	20899	76716	7893	1212	2697	21832	1132	244	2385	6719	18099	1372
	(10.6)	(34.4)	(4.0)	(0.6)	(1.4)	(11.1)	(0.6)	(0.1)	(1.2)	(3.4)	(9.2)	(0.7)

Table (2). (Continued)

Sp.No. Month	13	14	15	16	17	18	19	20	21	22	23	24	Total
Jan.													
Feb													
Mar.	232 (0.7)	461 (1.4)	1820 (5.7)	17 (0.1)	482 (1.6)	2765 (8.6)	-	-	134 (0.4)	254 (0.8)	94 (0.3)	21 (0.1)	32166
Apr.	-	640 (2.6)	376 (1.5)	337 (1.4)	484 (2.0)	572 (2.3)	-	-	127 (0.1)	149 (0.6)	-	15	24631
May	14 (0.1)	1194 (3.9)	1000 (3.2)	865 (2.8)	994 (3.3)	631 (2.1)	56 (0.2)	-	120 (0.4)	206 (0.7)	-	-	30479
Jun	-	535 (2.5)	103 (0.5)	878 (4.1)	779 (3.6)	161 (0.8)	132 (0.6)	6	80 (0.4)	51 (0.3)	-	-	21371
July													
Aug.	-	352 (3.8)	-	-	470 (5.0)	115 (1.2)	-	-	-	25 (0.6)	-	-	9351
Sep.	77 (0.5)	798 (4.8)	-	-	741 (4.7)	275 (1.5)	-	-	80 (0.5)	65 (0.5)	-	150 (1.0)	15606
Oct.		581 (2.8)	181 (1.0)	312 (1.5)	1779 (8.8)	876 (4.3)	-	-	40 (0.2)	145 (0.7)	-	-	20153
Nov.		142 (0.8)	-	53 (0.3)	7418 (39.0)	1352 (7.1)	587 (3.1)	-	441 (2.3)	120 (0.6)	-	-	19042
Dec.		71 (0.3)	80 (0.3)	-	5585 (23.6)	4367 (18.4)	-	-	372 (1.6)	167 (0.8)	-	-	23876
Total	323 (0.2)	4696 (2.4)	3562 (1.8)	2462 (1.3)	18732 (9.5)	11118 (5.6)	775 (0.4)	6	1294 (0.7)	1202 (0.6)	34 (0.04)	196 (0.09)	196665

TABLE 3

Total catch (Kg) obtained by f/v gazelle through the year 1978.
(Percentage between barantheses).

Sp.No. Month	1	2	3	4	5	6	7	8	9	10	11	12
Jan.												
Feb.	1584	3797	20	85	-	2623	245	-	-	939	895	12
	(9.4)	(22.5)	(0.1)	(0.4)	-	(15.5)	(0.4)	-	-	(5.6)	(1.4)	(0.1)
Mar.	1487	1632	19	-	-	1232	92	-	45	343	479	-
	(22.3)	(24.4)	(0.3)	-	-	(18.5)	(1.4)	-	(0.7)	(5.1)	(7.2)	-
Apr.	4327	2196	-	410	596	1720	14	-	-	1272	656	-
	(29.0)	(14.7)	-	(2.7)	(4.0)	(11.5)	(0.1)	-	-	(8.5)	(4.4)	-
May	3270	7434	722	196	607	1888	-	-	625	1126	3543	155
	(12.8)	(29.0)	(2.8)	(0.8)	(2.4)	(7.4)	-	-	(2.4)	(4.4)	(13.8)	(0.6)
Jun.	1624	8798	458	103	280	1639	3	-	238	529	10645	-
	(5.8)	(31.2)	(1.6)	(0.4)	(1.0)	(5.8)	-	-	(0.8)	(1.9)	(37.9)	-
Jul.	1982	8741	387	167	200	2684	-	-	90	372	9055	-
	(7.2)	(31.7)	(1.4)	(0.6)	(0.7)	(9.7)	-	-	(0.3)	(1.3)	(32.9)	-
Aug.	1460	5454	587	120	814	1083	-	45	-	496	6065	-
	(8.1)	(30.1)	(3.2)	(0.7)	(4.5)	(6.0)	-	(0.2)	-	(2.7)	(33.5)	-
Sep.	2044	12044	120	98	636	2776	114	-	70	637	3776	-
	(5.6)	(39.1)	(0.4)	(0.3)	(2.1)	(9.0)	(0.4)	-	(0.2)	(2.1)	(12.2)	-
Oct.	1912	30320	1592	74	1504	3238	-	-	80	1090	3734	-
	(3.7)	(58.7)	(3.1)	(0.1)	(2.9)	(6.3)	-	-	(0.2)	(2.1)	(7.2)	-
Nov.	874	7134	108	-	763	1884	-	-	-	1378	515	10
	(3.6)	(29.8)	(0.5)	-	(3.2)	(7.9)	-	-	-	(5.7)	(2.1)	-
Dec.	363	747	-	-	301	1047	-	-	20	635	307	-
	(4.2)	(8.6)	-	-	(3.5)	(12.0)	-	-	-	(7.3)	(3.6)	-
Total	1945	38297	4013	1233	5701	21814	466	45	1168	8817	39436	177
	(8.2)	(34.9)	(1.6)	(0.6)	(2.3)	(8.6)	(0.2)	(0.02)	(0.5)	(3.5)	(15.6)	(0.7)

Table (3). (Continued).

Sp.No. / Month	13	14	15	16	17	18	19	20	21	22	23	24	Total
Jan.													
Feb.	-	-	-	-	2055	4714	-	-	-	255	-	-	17006
	-	-	-	-	(11.8)	(27.3)	-	-	-	(1.5)	-	-	
Mar.	-	104	-	-	52	1023	-	-	-	170	-	-	6678
	-	(1.6)	-	-	(0.8)	(15.3)	-	-	-	(2.5)	-	-	
Apr.	-	69	-	-	318	2943	-	-	189	249	-	-	14965
	-	(0.5)	-	-	(2.1)	(19.6)	-	-	(1.3)	(1.7)	-	-	
May	-	480	-	-	2633	2490	20	-	-	428	-	-	25817
	-	(1.9)	-	-	(10.3)	(9.7)	(0.1)	-	-	(1.7)	-	-	
Jun.	-	545	28	-	2311	502	-	-	-	278	-	146	28154
	-	(1.9)	(0.1)	-	(8.2)	(1.8)	-	-	-	(1.0)	-	(0.5)	
Jul.	-	624	-	-	2007	885	-	-	-	292	-	66	27562
	-	(2.3)	-	-	(7.3)	(3.2)	-	-	-	(1.1)	-	(0.2)	
Aug.	36	382	-	82	1133	75	4	-	-	67	-	220	18132
	(0.2)	(2.1)	-	(0.5)	(6.2)	(0.4)	-	-	-	(0.4)	-	-	
Sep.	137	766	64	-	4159	2806	10	-	-	184	-	421	30862
	(0.4)	(2.5)	(0.2)	-	(13.5)	(9.1)	-	-	-	(0.6)	-	(1.4)	
Oct.	104	1376	172	-	4246	1088	-	-	-	168	-	976	51674
	(0.2)	(2.7)	(0.3)	-	(8.2)	(2.1)	-	-	-	(0.3)	-	(1.9)	
Nov.	80	186	2151	-	3271	1787	25	-	1426	28	347	-	23968
	(0.3)	(0.8)	(9.0)	-	(13.6)	(15.6)	(0.1)	-	(6.0)	(0.1)	(1.5)	-	
Dec.	-	66	1230	-	1990	2196	-	-	110	-	80	-	8692
	-	(0.8)	(14.1)	-	(18.3)	(25.3)	-	-	(0.8)	-	(0.7)	-	
Total	147	4598	3645	82	23720	22509	59	-	1725	2119	427	1829	253507
	(0.2)	(1.8)	(1.5)	(0.1)	(9.4)	(8.9)	(0.1)	-	(0.7)	(0.8)	(0.2)	(0.7)	

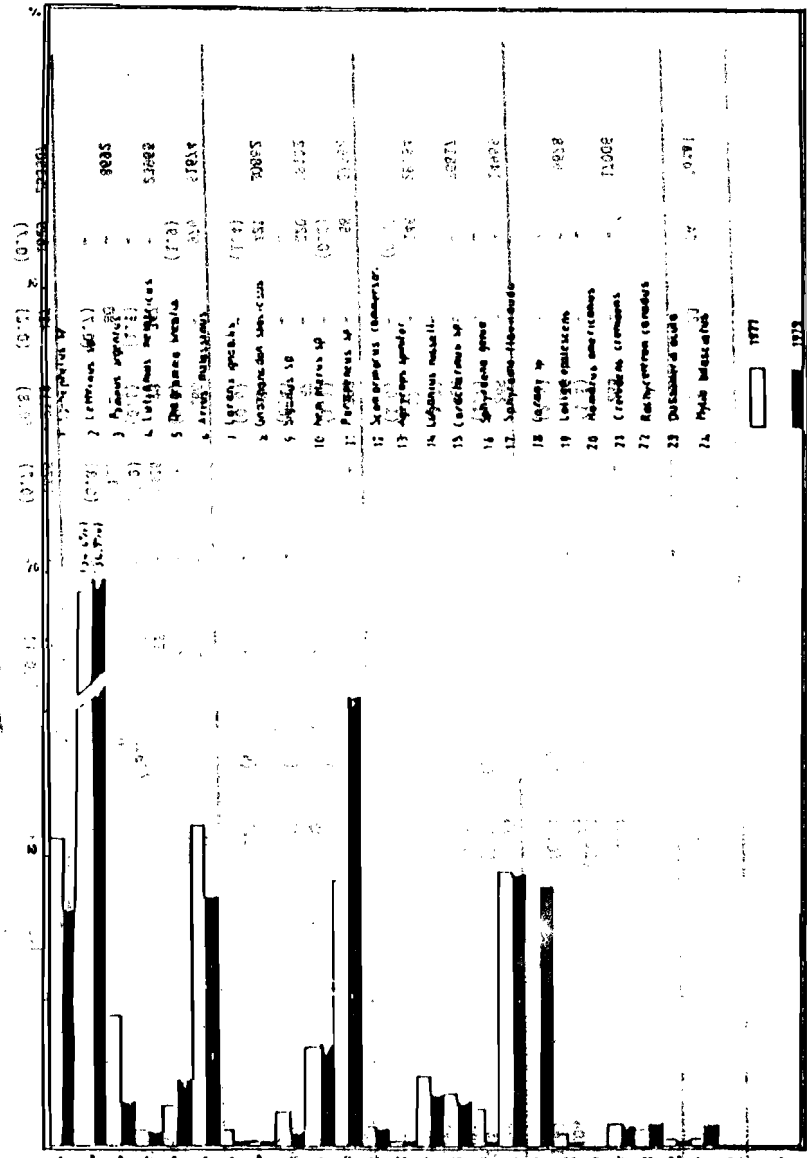

Fig. 3
Total catch obtained by F/V Gazele
in 1977 and 1978

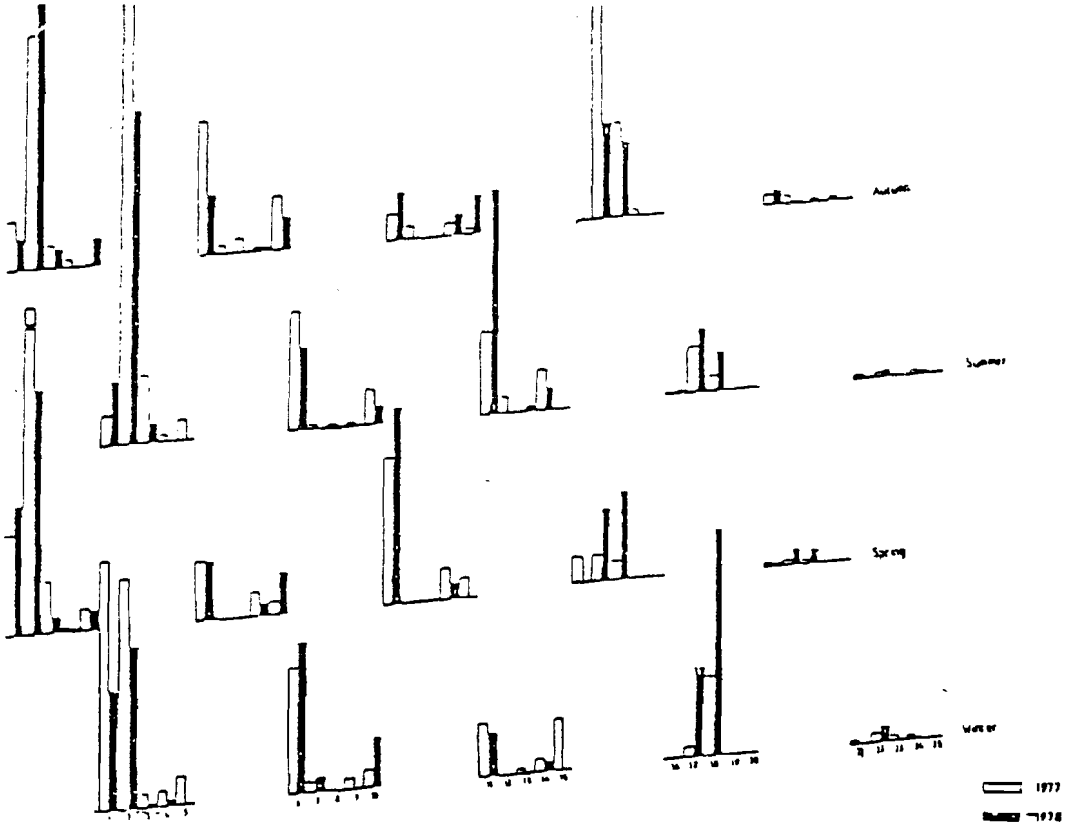

Fig. 4
Seasonal catch obtained by F/V Gazele
in 1977 and 1978

Table (4)
seasonal catch and catch rate / hour of commercial families
obtained by f/v Gazelle, 1977.

Season	Winter		Spring		Summer		Autumn	
Number of trips	12		14		10		20	
Number of hours	324		420		336		624	
Catch by Family	Total (Kg)	Kg/h	Total (Kg)	Kg/h	Total (Kg)	Kg/h	Total (Kg)	Kg/h
Serranidae	8364	25.8	8159	19.5	839	2.5	3537	5.7
Lethrinidae	8004	24.7	32096	76.4	12328	36.7	15281	24.5
stromattidae	392	1.1	4195	9.9	1778	5.3	1528	2.4
Lutjanidae	1216	3.8	2495	5.9	1227	3.7	1283	2.1
Carangidae	3108	9.6	1459	3.5	390	1.2	7533	12.1
Scombridae + Siganidae	260	0.8	1922	4.6	374	1.1	1201	1.9
Nemiptridae + Mullidae	2465	7.6	12987	30.9	3250	9.7	5116	8.2
Sphyrinidae	499	1.5	4337	10.3	1211	3.6	15147	24.3
Marketable fishes	7858	24.3	8371	19.9	3650	10.9	12409	19.9
Total	32166		76381		25047		63071	

Table (6)
Seasonal catch and catch rate/hour of commercial families
obtained by f/v gazelle during 1978

Season	Winter		Spring		Summer		Autumn	
Number of trips	9		15		29		26	
Number of hours	230		292		835		813	
Catch by family	Total (Kg)	Kg/h	Total (Kg)	Kg/h	Total (Kg)	Kg/h	Total (Kg)	Kg/h
Serranidae	3071	13.3	9539	32.7	5486	6.6	3149	3.9
Lethrinidae	5429	16.9	18628	63.8	29239	35.0	38201	47.1
Stromatidae	39	0.2	1180	4.1	794	0.9	1725	2.2
Lutjanidae	169	0.7	1883	6.5	2330	2.8	1834	2.3
Carangidae	6072	26.4	5952	20.4	3925	4.7	7071	8.7
Scombridae + siganidae	57	0.3	1018	3.5	160	0.2	110	0.1
Nemiptridae + Mullidae	2396	10.4	17840	61.1	20418	24.5	7659	9.4
Sphyrinidae	2052	8.9	5262	18.0	5581	6.7	9107	11.2
Marketable fishes	4280	18.6	7428	25.4	9621	11.5	15450	19.1
Total	23565		68730		77554		84333	

Table (5)

Total and catch rate/hour of commercial fishes through the years 1977 and 1978. (percentage between parantheses)

Catch/family	1977		1978	
	total/Kg	Kg/h	total (Kg.)	Kg/h
Serranidae (groopers	20935 (10.7)	12.3	21245 (8.4)	9.8
Lethrinidae (pigface breams)	67709 (34.5)	39.7	91497 (36.0)	24.2
Stromatidae (pomfrets)	7893 (4.1)	4.6	3765 (1.5)	1.7
Lutjanidae (snappers)	6221 (3.2)	3.7	6216 (2.4)	2.9
Carangidae (Jacks, trevallies, scads)	12490 (6.4)	7.3	23020 (9.1)	10.6
Scombridae + Siganidae (mackerels + rabbit fish)	3757 (1.9)	2.2	1345 (0.01)	0.6
Nemiptridae + Mullidae (threadfin bream + goat fishes)	23818 (12.1)	13.9	48313 (19.0)	22.3
Sphyrinidae (barracude)	21194 (10.8)	12.4	22002 (8.7)	10.1
Marketable fishes	32288 (16.3)	18.9	36779 (14.5)	17.0

From the observations recorded during the fishing trips, it was noteworthy that the commercially highly valued species of the family Serranidae were concentrated towards the southern coast of the Gulf, and near to the coast of U.A.E. From Fig. (2). square (1), this area has a rocky nature, beside many coral reef islands, followed by thick coral reefs till the southern shore of the Gulf. All these areas are known to be the natural habitat for the groupers. The f/v Gazelle frequently drags on and around the edges of these areas.

The Carangidae (scads, mackerels and trevallies) evedently form one of the highest percentages of the commercially valuable categories in the catch. The average catch/hour was 7.3 kg, increased to 10.6 kg in the two successive years. The catch of **Caranx sp.** increased during 1978 by more than 10 tons than during 1977. The knowledge of the nature of fish behaviour is one of the important factors influencing the size of the catch. It is known that jacks are strong swimmers, beside being midwater fishes. During hot season, the jacks dwell to the cool water layers, thus becoming available to the high opening of the trawl net. The long hot season which prevailed during 1978, played an important role in increasing the carangids catch. They were concentrated in the squares designated by number 3, west to Halaul island, and squares 4, south to Halaul Island. All the obtained yield was concentrated in the drags operated during midday. The trevally **Caranx speciosus** was collected just by hand net in the evening around the Gazelle

vessel. At the end of the day, the f/v Gazelle returned back to Haloul Island. The jacks trevally were jumping over the water surface, and became available to fishing in large amounts by the handnet. More than 80 kgs were collected within less than 3 hours.

The pigface bream belonging to family Lethrinidae, was more abundant in the catch than serranids. The average catch amounted to 39.7 kg. / hour through 1977 and 24.2 kg / h. during 1978. Their abundance covered all the squares shown in Fig.(2). Also, their size increased as the f/v Gazelle dragged towards the coral reef area and rocky bottom. The moderate sized fishes (12-20 cm.) were concentrated in the squares 2 and 3, around and west to Haloul Island, while the big sized fishes were mostly obtained from squares 1.

Stromatids showed a distinct decrease in the catch from 4.6 to 1.7 kg/h. The pomfrets are sensitive to any temperature change. The average catch rate of 4.6 kg/h recorded in Table (4), was due to the long hot season prevailed in 1977, and forced these pelagic fishes to be demersal and available to the trawl net. The catch rate for family Stromatidae during spring and summer was 9.9 and 5.5 kg/h., respectively. High temperature (41.1°C) recorded in autum 1978 was also one of the main factors causing a relative increase in the trawl catch rate of such pelagic fishes to 2.2 kg/h. Pomfrets were mainly concentrated in squares 2 and 3. Their catch increased as the temperature increased by daytime. Maximum yield was obtained in the midday drage.

The catch of family Lutjanidae was nearly the same in the successive two years, but the increase in the total yield of 1978 affected the average catch rate/hour. The snappers follow the groupers in their abundance in the catch. Both species increase in size as the f/v Gazelle dragged towrds the southern coast of the gulf. Also, some drags have more than 50% of its commercial catch made up of groupers and snappers only.

Scombridae and Siganidae are fast swimmers, beside being pelagic fishes. Their presence in the catch is greatly affected by the temperature variations, the difference in gear effeciency at the area trawlled in relation to current, and the fish behaviour itself. This was clearly observed in the difference in their catch rate / hour in both the two successive years, as shown in Table (4). Mackerels and rabbit fishes were concentrated in squares 2 and 3 only, west to Haloul Island. They were seldom caught from squares 1 and 4. Scombrids and siganids are commercially valuable fishes in the Gulf area.

The catch rate of threadfin breams **Nemiptridae** and red mullets **Mullidae** increased from 13.9 kg/h during 1977 to 22.3 kg/h in 1978. This increase comprised both the catch rate and the total yield. This is due to the fact that f/v Gazelle concentrated its dragging in the squares 2 and 3 in short trips near to the eastern coast of Qatar Peninsula. For this reason, the

number of trips increased from 56 trips during 1977 to 74 trips during 1978, beside the smooth bottom, which is suitable for trawling, and in the same time favourable for these bottom feeder species of the threadfin breams and the goat fishes. The big catch of such demersal fishes during 1978 which was as nearly twice as the catch of 1977, may compensate the low catch of both scombrids and siganids.

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