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Observations on the capelin fishery of the Grand Banks, Newfoundland, June-July 1975

by

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INTRODUCTION

In the present paper some biological data and observations on the Capelin (Mallotus villosus) catches, as well as on other catch data in the directed fishery for capelin are summarized. These were carried out during June and July 1975 in the Southeast Shoal, Grand Banks (Fig. 1), Divisions 3N and 3O of I.C.N.A.F. area, with the factory trawler "RIBADEO".

DESCRIPTION OF THE FISHERY

The factory ship "RIBADEO" is one of the stern trwler type, with 1,500 GRT, two engines of 1,200 H.P. each one, and 68 meters length overall.

The fishing gear used was made of nylon, and it is midwater trawl with a vertical opening ranging from 18 to 20 meters. The codend mesh size was 50 mm.

Fishing operations started in the Southeast Shoal on the 3rd June, and continued until 10th July, in the area limited by the geografical coordinates 43º 56'N - 44º 50' N, and 49º 20' W - 50º 40' W.

Fishing operations were carried out during daylight only, from approximately 5.00 hours a.m. till approximately 9.00 hours p.m. (Newfoundland time). The Simrad EK 38 echograms shown (fig. 2), in differents hours the variations in the agregation of capelin

schools. During daylight time the capelin schools have high density and they are near the bottom (fig. 2A). However, at night they have a vertical migration towards surface waters, accompanied by a capelin schools disgregation (fig. 2C).

Fishing operations were carried out in depths ranging from 45 to 90 meters. The maximum catches were obtained in depths from 50 to 60 meters.

Variations in surface temperature through the season, are shown in fig. 3.

CHARACTERISTICS OF THE CATCH

The average catch per day fished was 90.42 MT, and the average catch per hour trawled was 11.63 MT. In figure 4 the fluctuation of catch per hour trawled during the survey are shown.

The average trawling time per day was 7 hours and 47 minutes. The average number of hauls per day was 2.5 with an average time of 3 hours per tow.

During the survey 11,234 individuals were measured. In Table 1, 2 and 3 data referent to length-frequency distribution for males and females of capelin for each week are shown. Figures 5 and 6 show the histograms corresponding to these data.

SEXUAL MATURITY AND SEX RATIO

Sex ratio of the catches for each week, are shown in figure 7. The sex rates, in the total catches, were 26.6% males and 73.4% females.

200 males and 250 females were observed for Gonada stages each week, acording to following criterion:

- Stage 3: mature fish (fully developed gonads
- Stage 4: spawning fish (running)
- Stage 5: post spawners (empty gonads)

These results analysis are shown in Table 4.

Table 1.- Length (mm) frequency distribution for capelin in Divisions 3 N and 3 O. Weeks 1 (23) and 2 (24) 1975.

(mm) Length	Week 1 (23)				Week 2 (24)			
	Males		Females		Males		Females	
	n^{er}	o/oo	n^{er}	o/oo	n^{er}	o/oo	n^{er}	o/oo
115			20	22				
120			37	42				
125			28	31			1	1
130	4	10	65	73			6	4
135	3	8	78	87			7	5
140	16	40	92	103	1	1	21	15
145	8	20	65	73	-	-	23	16
150	20	50	86	96	1	1	26	18
155	22	55	69	77	1	1	38	27
160	27	68	64	72	2	3	65	46
165	20	50	62	69	2	3	91	65
170	18	45	71	80	5	7	179	127
175	35	88	51	57	13	19	207	147
180	51	128	60	67	41	61	232	165
185	54	136	28	31	108	160	226	161
190	59	148	12	14	183	270	190	135
195	35	88	3	3	157	232	56	40
200	24	60	1	1	108	160	35	25
205	2	5	-	-	47	69	2	1
210					7	10	1	1
215					1	1		
Total	398		892		677		1406	

Table 2.- Length (mm) frequency distribution for capelin in Divisions 3 N and 3 O. Weeks 3 (25) and 4 (26) 1975.

Length (mm)	Week 3 (25)				Week 4 (26)			
	Males		Females		Males		Females	
	n^{er}	o/oo	n^{er}	o/oo	n^{er}	o/oo	n^{er}	o/oo
115								
120							3	1
125			4	2			4	2
130			3	2			13	6
135			6	4			20	9
140	1	1	32	20			69	31
145	-	-	26	16			86	39
150	-	-	60	37	2	3	148	67
155	1	1	81	50	2	3	162	74
160	4	6	110	68	7	11	246	112
165	15	22	131	81	19	29	226	103
170	18	27	194	120	45	68	287	131
175	33	49	232	144	61	92	251	114
180	63	94	260	161	112	169	297	135
185	108	162	216	134	122	184	178	81
190	174	260	157	98	154	232	146	66
195	129	193	75	47	72	108	44	20
200	102	153	22	14	54	81	16	7
205	17	25	1	1	12	18	2	1
210	3	4			2	3		
215								
Total	668		1610		664		2198	

Table 3.- Length (mm) frequency distribution for capelin in Divisions 3 N and 3 O. Weeks 5 (27) and 6 (28) 1975.

Length (mm)	Week 5 (27)				Week 6 (28)			
	Males		Females		Males		Females	
	n^er	o/oo	n^er	o/oo	n^er	o/oo	n^er	o/oo
115			1	1				
120			1	1			2	2
125			6	5			2	2
130			16	13			21	24
135			40	32			46	53
140			101	80			123	141
145	1	3	120	95	1	4	128	146
150	2	7	186	149	4	14	185	211
155	6	20	157	124	10	36	111	127
160	20	66	154	122	19	68	92	105
165	27	89	105	83	23	83	53	61
170	44	106	131	103	37	103	38	43
175	27	129	77	61	25	120	21	24
180	53	175	97	77	38	137	22	25
185	42	139	45	36	36	129	16	18
190	41	136	20	16	42	151	13	15
195	26	86	4	3	22	79	1	1
200	11	36	2	2	17	61	1	1
205	2	7			4	14		
210								
215								
Total	302		1266		278		875	

Table 4.- Distribution (in per cent) of maturity stages.

Week	Males			Females		
	Stages			Stages		
	3	4	5	3	4	5
1 (23)	56.2	43.8		100		
2 (24)	52.3	47.7		78.1	19.3	2.6
3 (25)	7.3	92.7		69.6	18.2	12.2
4 (26)		98.5	1.5	63.2	20.6	16.2
5 (27)		76.4	23.6	54.7	37.4	7.9
6 (28)		41.3	58.7	38.1	42.8	19.1

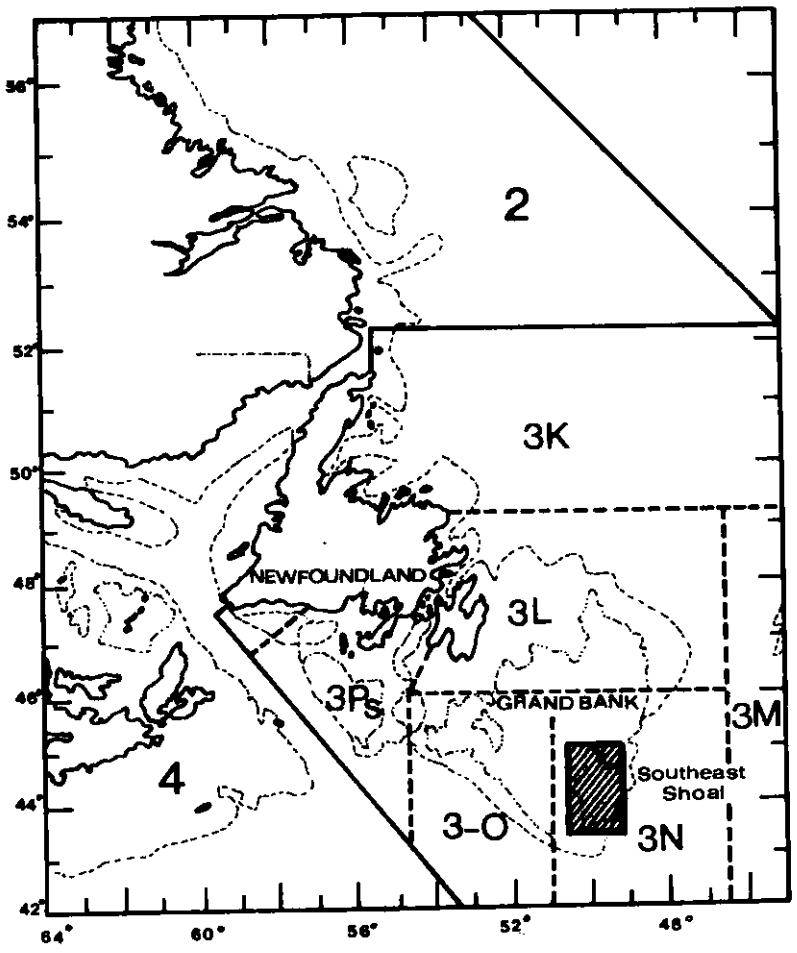

Fig. 1. Fishing areas.

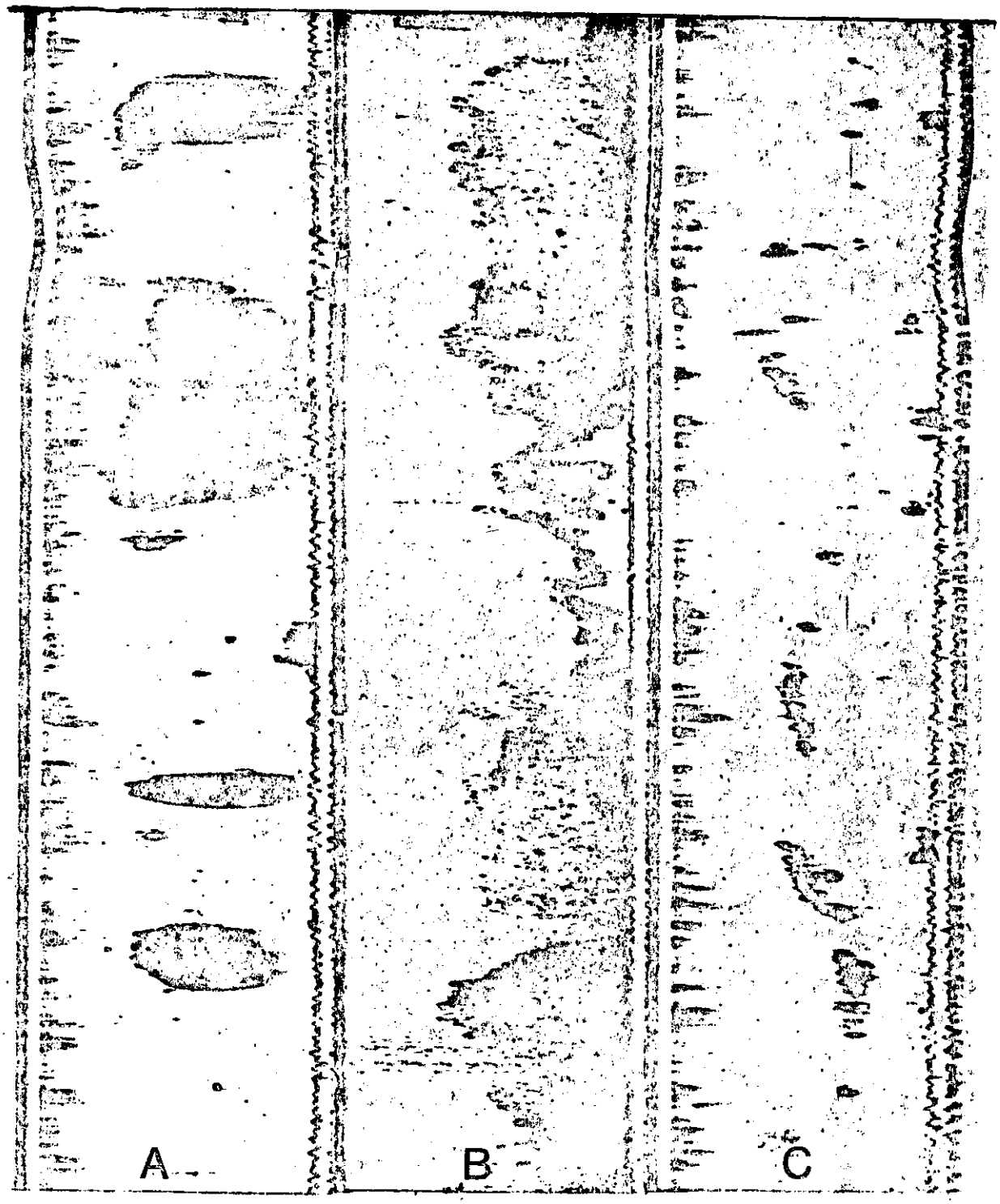

Fig. 2. Echograms (SIMRAD EK 38) of capelin. A - During the day; B - At the sunset (20 hours); C - During the night.

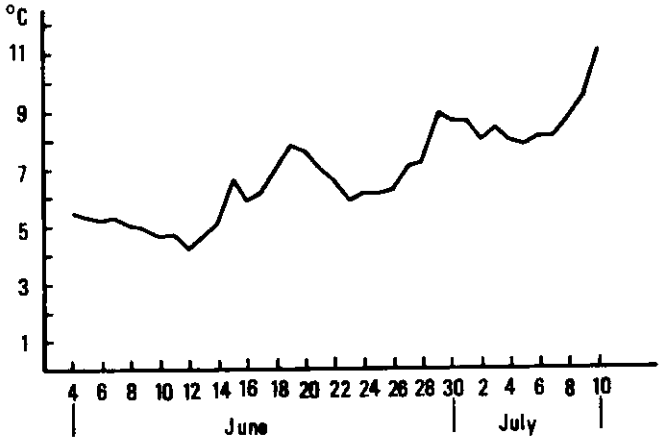

Fig. 3. Variations of sea surface temperatures.

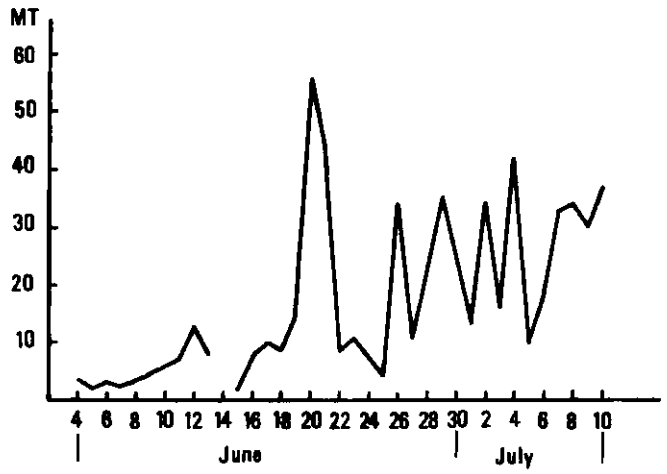

Fig. 4. Evolution of catch/hour fished during the survey.

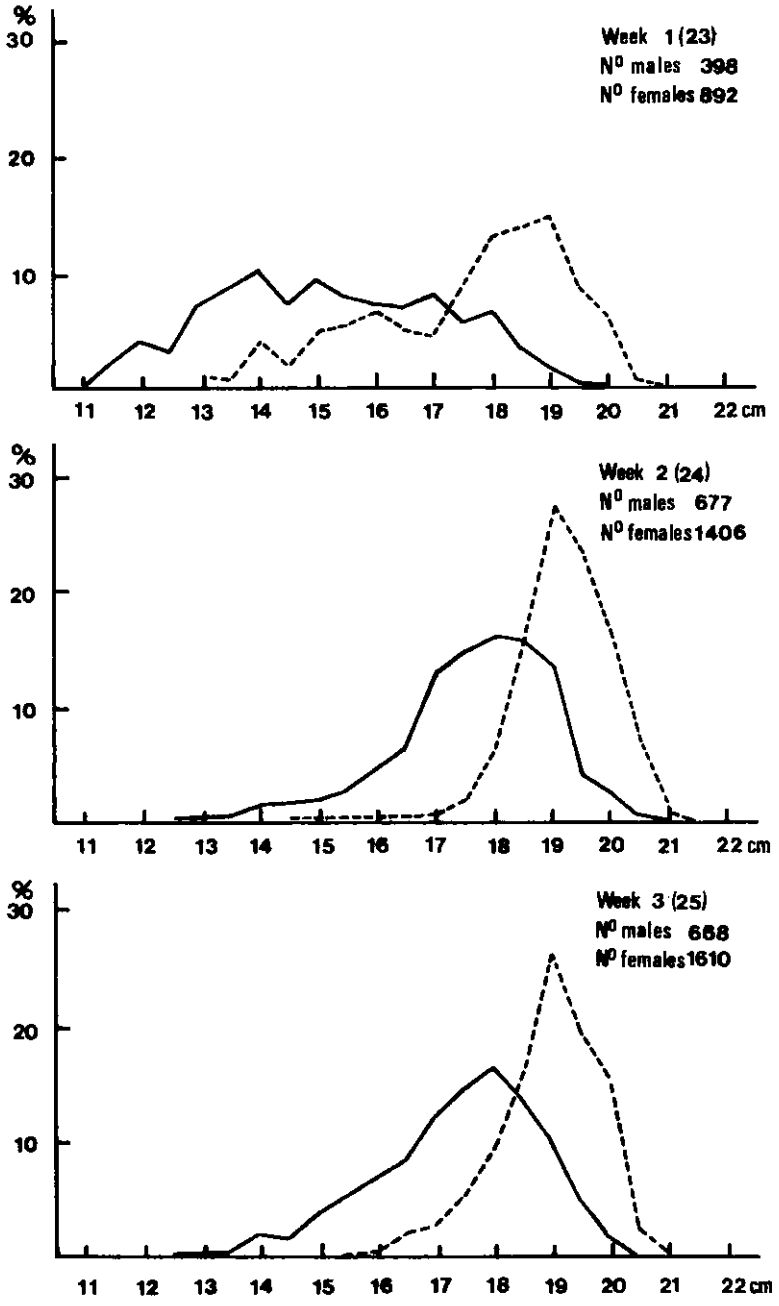

Fig. 5. Length frequency distributions from each week.
Broken line: females; whole line: males.

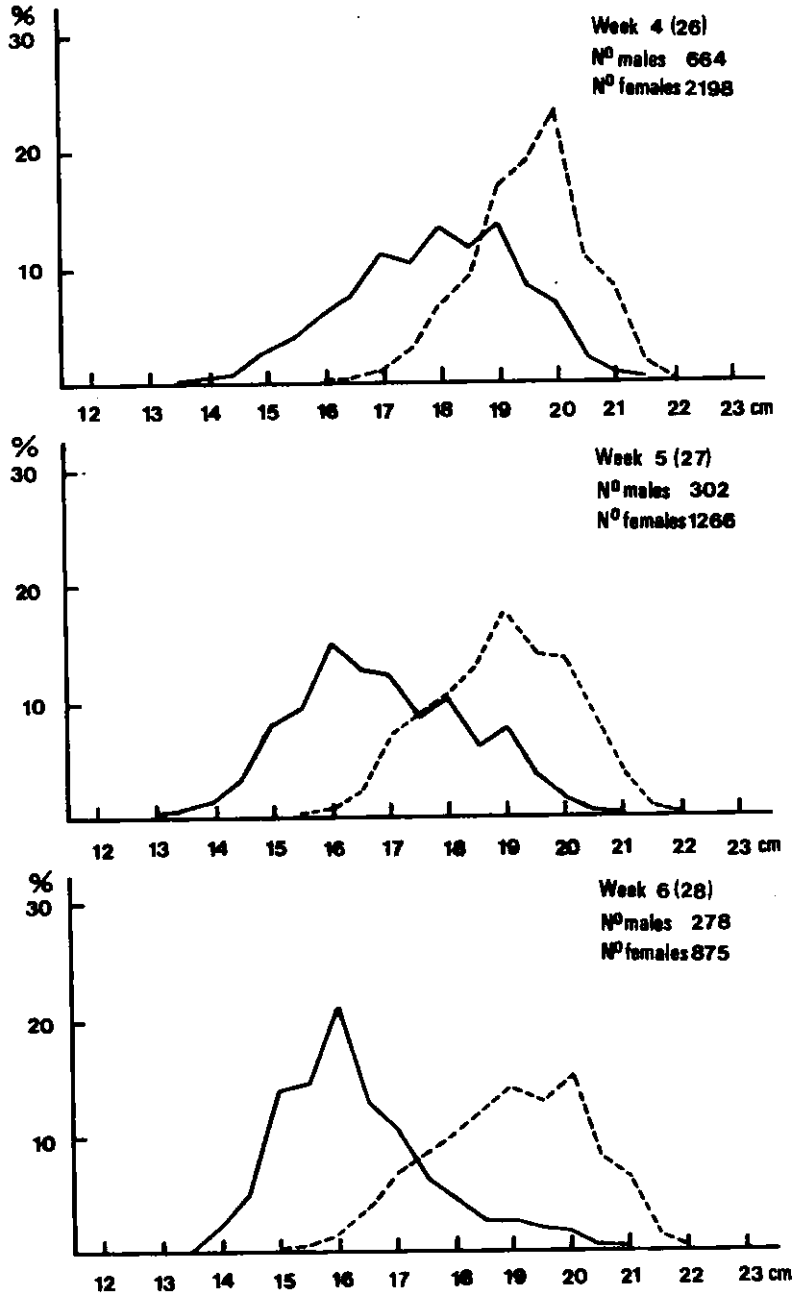

Fig. 6. Length frequency distributions from each week.
Broken line: females; whole line: males.

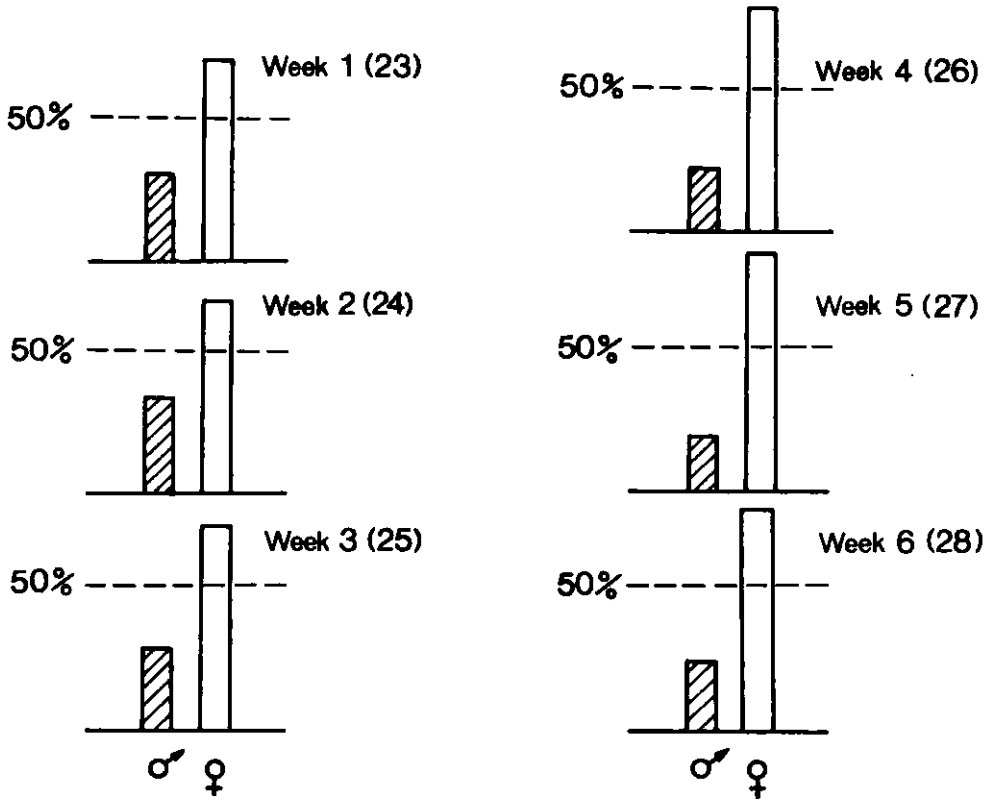

Fig. 7. Variations of sex ratio.