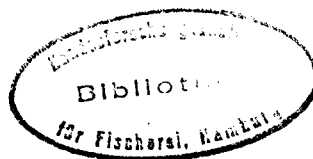


International Council for
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LATVIAN GILLNET COD FISHERY IN 1993-1994

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Abstract

In 1990s the gillnet were broadly introduced into cod fishery in the Eastern Baltic. In 1993 gillnets accounted for 85%, in 1994 - about 60% of the Latvian cod catches. Commercial samples were taken during the cod spawning time and in late autumn in 1992-1993, but in 1994 data was collected quarterly on board of the gillnet vessel. 4-6 year old specimens (length 45-60 cm) prevailed in catches in the first half of the year and 3-5 old fishes (length 40-55 cm) in the second half of the year. Number of nets within section varied from 6 to 10-15 on the gillnets vessels, therefore catches per section were incomparable. Discard data were collected in 1993-1994 on board of gillnets vessels. Share of cod with minimum landing size of 33 cm varied from 1 to 15% of the whole number of individuals in gillnet catches in 1993-1994.

Introduction

Broad application of gillnets for cod catches in eastern Baltic started from 1990. By 1992 the share of gillnet catches reached about 25% for Denmark, it contributed 50-60% to the total catches of Poland, Sweden and Russia (Anon., 1994). Latvian trawling vessels (150-300 HP) use nets with mesh size of 110-140 mm. The share of gillnet catches grew from 4.5% in 1990 to 30% in 1991-1992, and to 85% in 1993. In 1994 Latvian fishermen caught by nets about 60% of the total cod catch.

Gillnet cod fishery turned to be more profitable due to reduction of cod stock and rarefied cod concentrations, moreover, fishermen started to catch fishes in the areas with stony grounds which had been inaccessible for trawling, especially in the Liepāja region (SD 26).

Material and method

Samples were taken from unsorted gillnet commercial catches by a specialist directly on board of a fishing vessel. In 1992-1993 cod were sampled from commercial catches during their spawning and feeding (autumn); in 1994 cod were sampled quarterly in SD 26 and 28, and in certain months (February, May) in SD 25 (Table 1.). For all net fleets with different mesh sizes catch was recorded in the number of cod individuals and in kg. When catches were small practically all fishes were measured. At large catches no less than 1000 fishes were measured in each subdivision. Biological analysis was carried out for 200-300 individuals and otoliths were collected to determine cod age. Sex and the stage of gonads maturity (in spring) was determined for a major part of measured fishes. All fishes with length less than the minimum landing size (33 cm) were measured. Registration of cod discard started in 1994, i.e. fishes having length less than the minimum landing size were recorded as well as fishes of low marketability (injured or having remained in nets for a long time).

Characteristics of fishing gears and fishery intensity

Latvian fishermen use nets with mesh size 110, 120, 130, 140 mm, but usually they apply nets with mesh size 110 and 120 mm. Net sizes quite vary on different vessels ranging from 45 to 110 m in length and from 2.6 to 4.8 m in height. Besides the number of nets quite differs in one so called section - from 6 to 15-30. Duration of catches also fluctuates from 9-12 to 24-36 hours, sometimes reaching 72-96 hours, especially at bad weather conditions. Due to these facts the index "catch per section" is very relative and it cannot be used to determine the intensity of catches. To make a more correct comparison we used the index "catch per 24 hours per section" with the same number of nets. This index quite varies by subdivisions, depths and months. In February-April of 1992-1993 catch per section was little: 13-15 kg; in the third fourth quarters it grew up to 20-40 kg. In the first quarter of 1994 cod catches per section were only 15-20 kg in SD 26 and 28 (Table 2). In Subdivisions 26 and 28 a vessel using 140 fleets caught 3-4 t of cod monthly, in Subdivision 25 it caught about 6 t monthly.

During the third and the fourth quarters of 1994 cod concentrations increased in the Latvian fishery zone and catches per vessel (80-100 sections) were 20-35 t for a ten-day period. In autumn of 1994 catch per fleet was three times higher than it was in autumn of 1993. This was not only connected with cod stock increase (Anon., 1994) but also due to formation of more dense cod concentrations during feeding period.

Length and age structures of cod catches

In the first halves of 1993 and 1994 age groups 4-6 with length 45-60 cm prevailed in net catches, age groups 3-5 with length 40-55 cm dominated in the second halves (Table 3,4). In the end of summer and in autumn age group 1 appeared in catches reaching 0.7% in the fourth quarter of 1993 and 3% in the fourth quarter of 1994 of the whole amount of individuals.

Length structure of catches varied in nets with different mesh size (Table 5). The bulk of catches in nets with mesh sizes 110-120 mm and 130-140 mm was formed by fishes having length 45-60 cm; the share of cod with length more than 60 cm was 2-3 times larger in nets with mesh size 130-140 mm than it was in nets with mesh size 110-120 mm.

Length structure of catches in 1994 is shown in Fig. 1-3.

Discard

As it was supposed to change the minimum commercial length of cod a special attention was paid to registration of undersized fishes in catches. Table 6 shows the share of fishes with length less 33 cm in net catches of 1993 and 1994. The average by-catch of those fishes was in 1994 about 6% of the whole number of individuals and 3-4% of the total weight of catches. The share of undersized fishes fluctuated by subdivisions and months. It was especially large in Subdivision 28 (Ventpils region) reaching 14.7% in February of 1994. In December of 1994 the share of undersized cod and fishes of low marketability (injured or remained in nets for a long time) were registered in discards. By-catches of undersized cod were 7.3% of the whole number of individuals, the share of discarded fishes that had low marketability was 7.8% of the whole number of individuals (5-6% of the total weight of catches).

References

Anon., 1994: Report of the Working Group on the Assessment of Demersal Stocks in the Baltic. - ICES C.M. 1994/Assess:17

Table 1. Samples of cod in number from gillnet catches

Year	Month	SD	Area	Number of fishes	
				Measured	Age determined
1992	April-May	28	Ventspils	906	200
		26	Gotland	123	
				Total 1029	
1993	October	26	Liepaja	2290	
	February	26	Liepaja	3293	200
	September	26	Liepaja	2576	335
		26	Gotland	799	
				Total 3375	
1994	February	26	Liepaja	1597	340
		26	Gotland	1470	
				Total 3067	
	May	26	Liepaja	342	364
		26	Gotland	1324	
		28	Ventspils	334	
		25	Bornholm	1350	
1994				Total 3350	
	May	26	Liepaja	370	
	September	26	Liepaja	1818	266
	November-December	26	Liepaja	2437	472
		26	Gotland	600	
				Total 3037	

Table 2. Cod gillnet catches (kg) per section per day

Year	Month	SD	Area	Catch per section, kg					Mean catch, kg
				Mesh size, mm					
				110	120	130	140	150	
1992	April	28	Ventspils			11	18		15
	Oktober	26	Liepaja			27	28		28
1993	February	26	Liepaja		10	17	10		13
	August	26	Liepaja						49
	September	26	Gotland	9		34	4	4	18
		26	Liepaja	9		4	5	7	6
	December	26	Gotland		13	26	26		23
		26	Liepaja	25	28	30			29
1994	February	26	Gotland	2	2.6	3			2.3
		26	Liepaja	8	11	2			9
		28	Ventspils	30	42	8			36
		25	Bornholm	19	16				18
	April	26	Liepaja			26			26
	May	28	Hiumaa	10	9				10
		26	Liepaja	16	19				17
		25	Bornholm	55	28		41		49
	September	26	Liepaja						228
	Oktober	26	Liepaja			36			36
		28	Ventspils			43			43
	November-December	26	Liepaja		58	44			50
		26	Gotland			197			197

Table 3. Length distribution (%) of cod in commercial gillnet catches

Year	Quarter	Length groups, cm											Number
		20	25	30	35	40	45	50	55	60	65	>70	
1993	I		0.5	1.1	0.5	0.9	10.1	42.9	34.8	7.5	0.8	0.9	3293
	III	0.6	0.5	0.7	5.3	21.2	29	15.6	15	9.3	2.3	0.6	3375
	IV	0.1	0.5	1.3	0.3	6.5	51.2	29.7	6.2	2.4	1.1	0.7	3067
1994	I	0.3	2	3.7	1.8	5.6	48.5	26.9	7.3	2.1	0.9	0.9	2000
	II		2.2	10.4	7.6	5.7	29.2	28.3	9.3	3.5	2.4	1.4	370
	III	0.4	1.7	1.5	8.8	21.5	33.2	17.6	12.1	3.1	0.7	0.4	1818
	IV	0.5	2.5	6.2	2	18.5	39.5	22.5	5.8	1.6	0.4	0.5	3037

Table 4. Age composition (%) of cod in commercial gillnet catches

Year	Quarter	Age groups									
		1	2	3	4	5	6	7	8	9	>10
1993	I		2.3	10	44.2	32.5	10.1	0.4	0.4	0.1	
	III	1.1	9.8	34	28.7	23.5	2.5	0.1	0.1	0.1	0.1
	IV	0.7	7	32.9	42.2	16	0.8	0.3	0.1		
1994	I		7	3.5	29	34.8	21.5	4	0.2		
	II		18.2	4.9	15	30.8	23.2	5.7	2.2		
	III	1.1	11.9	36.7	29.4	18.3	1.7	0.8	0.1		
	IV	3	15	34	30.8	16	1	0.2			

Table 5. Length distribution (%) of cod from gillnet catches with different mesh size

Year	Quarter	SD, Area	Mesh size, mm	Length groups, cm										
				20	25	30	35	40	45	50	55	60	65	>70
1993	I	26	120		0.1	0.3	0.1	2.1	21.5	45.4	24.2	4.8	0.8	0.7
		Liepaja	130		0.5	1.6	0.5	0.5	6.7	46.5	34.5	7.3	0.7	1.2
			140		0.6	1.6	0.6	0.3	5	39.8	41.2	9.2	0.9	0.8
	III	26	110				6	28	35.3	17.7	6.9	5.2	0.9	
		Liepaja	130			0.1	4.7	24.3	38.8	16.8	9.5	4.6	0.9	0.5
			140-150			0.2	7.3	19	10.6	13	27.1	16.3	5	1.6
	IV	26	110	0.2	0.3	1.6	0.4	9	53.5	26.6	4.4	2.4	1	0.7
		Liepaja	120		0.2	0.2	0.2	5.3	54.1	30.9	6.5	1.7	0.5	0.4
			130	0.3	2.8	4	0	5	43.8	30.4	7.5	3.4	0.9	1.9
			140			3.4	1.7	1.7	17.8	42.4	16.9	7.6	6.8	1.7
1994	I	28	110	1.6	2.4	7.3	4.1	7.3	30.1	25.2	15.5	4.1	1.6	0.8
		Ventspils	120		1.2	4.1	4.8	3	27.8	34.3	18.9	4.1	1.2	0.6
		26	110			0.5	0.4	8.2	57.3	26.9	4.6	1.3	0.3	0.5
		Liepaja	120			0.2	1.2	2.5	50.1	34.4	7.8	1.9	1.1	0.8
		26	110	0.7	2.5	2.5	3.7	12.6	43.4	23.3	3.8	3.2	1.2	3.1
		Gotland	120			2.6	0.6	7	47.1	30.6	7.6	1.9	1.3	1.3
		25	110	0.2	0.3	1.7	8.1	26.8	57	4.8	0.7	0.2	0.1	0.1
		Bornholm	120-140			2.7	8	18.7	20	28.7	18	3.3	0.6	
	II	26	110			2.6	10.4	13	38.3	23.5	8.7	1.7	0.9	0.9
		Liepaja	120			5.5	6.9	2.7	28.6	35	10.9	5	3.6	1.8
	III	26	110				0.6	35.8	55.3	6.8	1.3	0.1	0.1	
		Liepaja	120		0.1	0.3	3.8	12.1	22.1	30	22.8	6.5	1.4	0.9
	IV	26	110	0.5	2.6	6.6	2.8	29.9	45.7	8.7	2	0.8	0.2	0.2
		Liepaja	120	0.6	2.9	7	1.6	4	32	38.5	10	2	0.6	0.8

Table 6. Discard (%) of cod in gillnet catches

Year	Month	SD	Area	Mesh size, mm	Discard (%) of cod with length less 33 cm	Discard (%) of cod of low marketability
1993	September	26	Liepaja	Total 110-150	1.2	
	December	26		110	3.1	
				120	0	
				130	5.5	
				Total 110-130	2	
		26	Gotland	110	2.1	
				120	0.3	
				130	6.6	
				Total 110-130	1.7	
1994	February	28	Ventspils	110	8.1	
		26	Gotland	120	4.1	
				Total 110-120	14.7	
				110	3.8	
				120	1.3	
				Total 110-120	3.2	
		26	Liepaja	Total 110-120	3.1	
		25	Bornholm	110	0.9	
				130-140	0.7	
				Total 110-140	0.9	
	May	26	Liepaja	Total 110-120	7.4	
	September	26	Liepaja	Total 110-120	1.5	
	December	26	Liepaja	Total 110-120	7.3	7.8

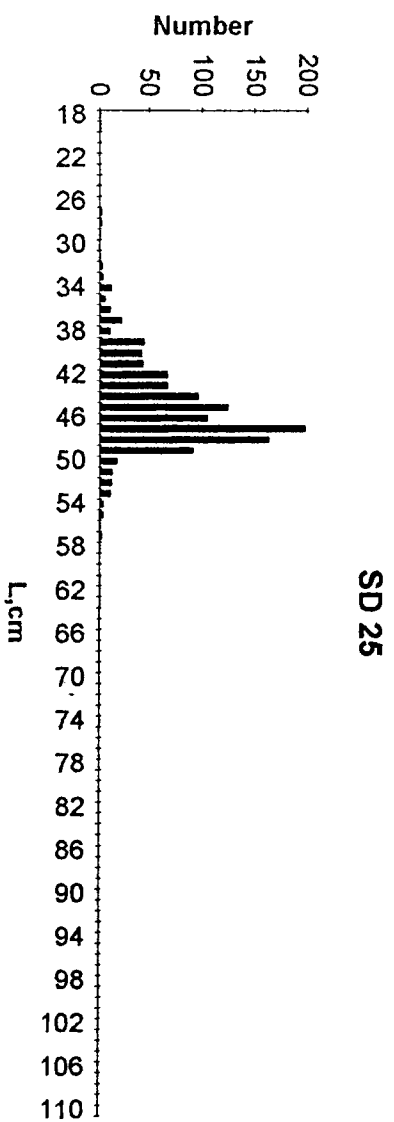
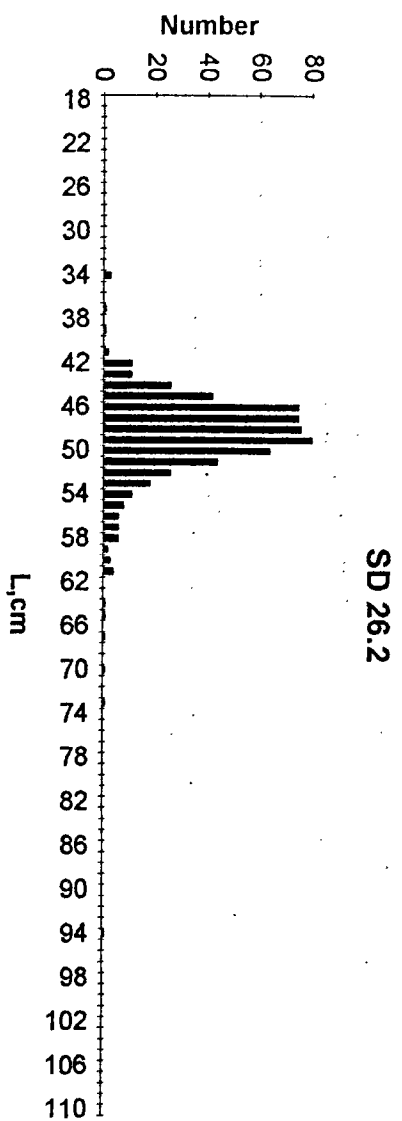
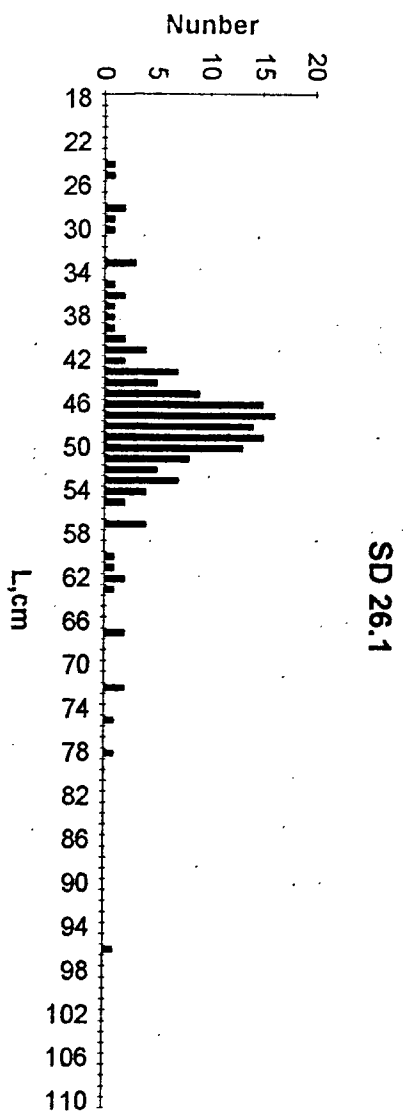
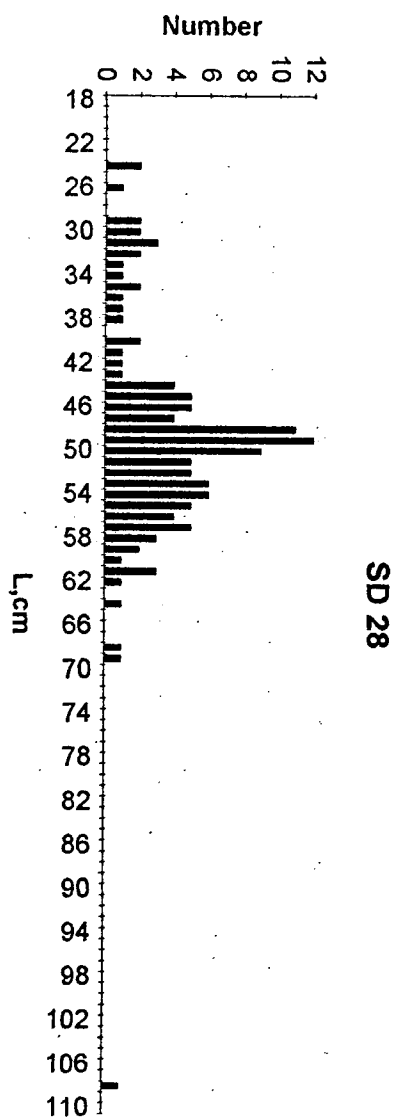


Figure 1. Length distribution of cod gillnet catches (mesh size 110 mm) in February of 1994

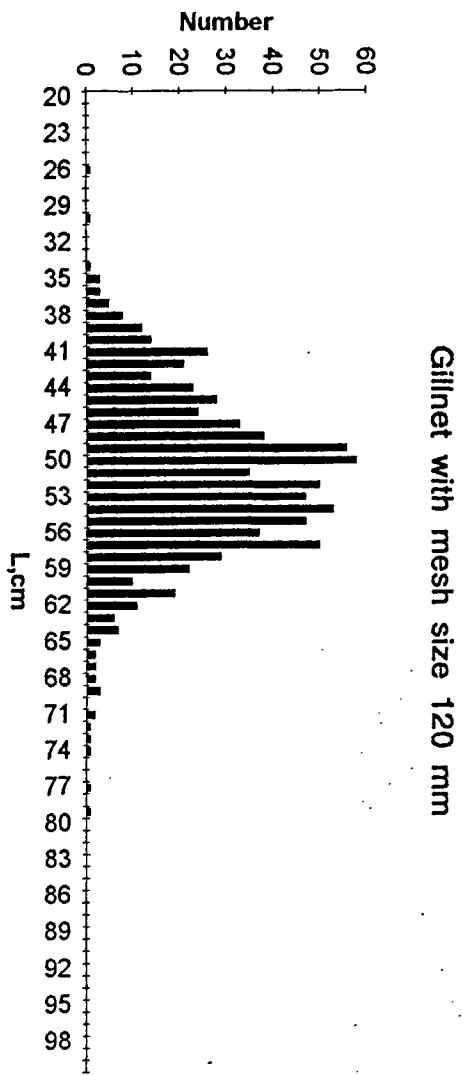
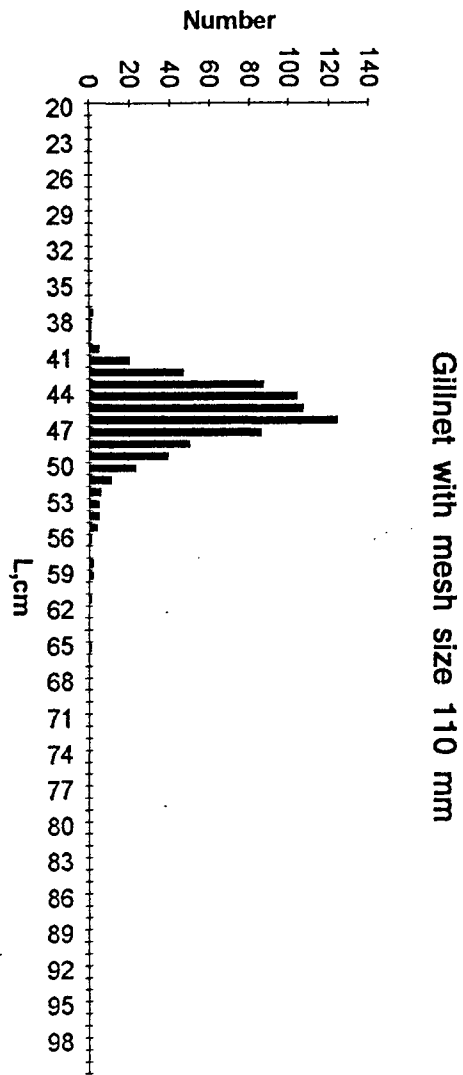
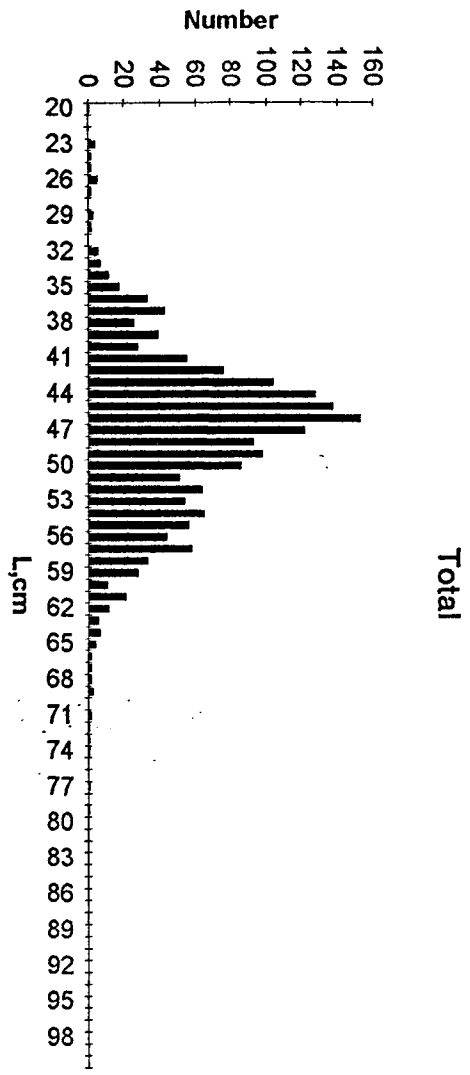
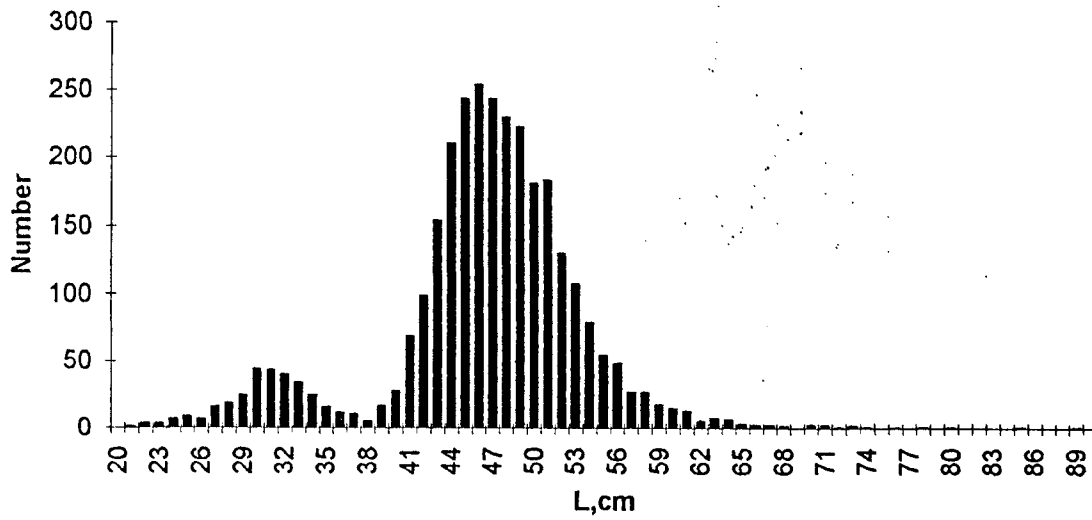


Figure 2. Length distribution of cod gillnet catches in September of 1994

Total, SD 26.2



Length distribution of cod discard

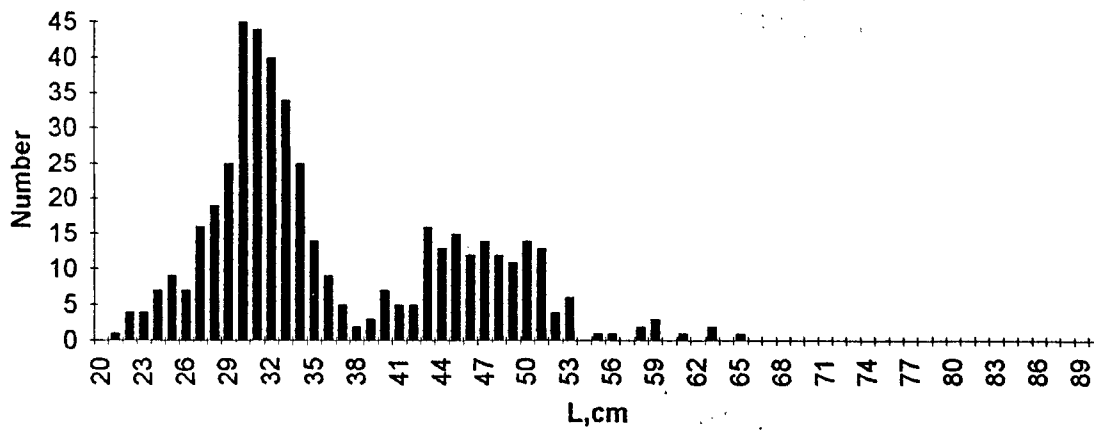


Figure 3. Length distribution of cod in gillnet catches and in discard in December of 1994