

(7) Striped Red Mullet *Mullus surmuletus*

1) Distribution

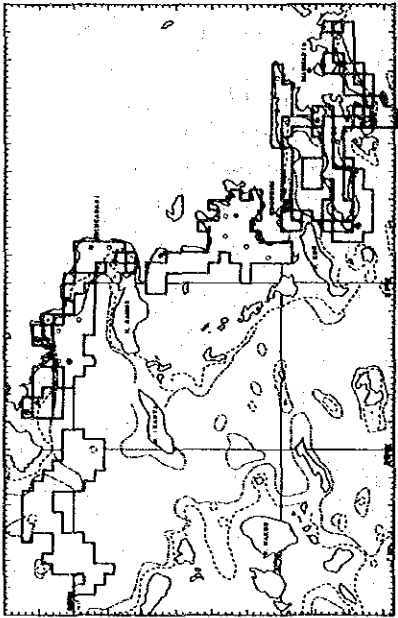
This species was distributed sporadically in the areas surveyed with the exception of The Sea of Marmara throughout all seasons. Furthermore, this species did not appear in the East Mediterranean Sea in winter (Figs. 5-1-3-7-1 to 5-1-3-7-4).

In addition, the appearance frequencies of this species in all areas was low at roughly 20% throughout all seasons (Table 5-1-3-19).

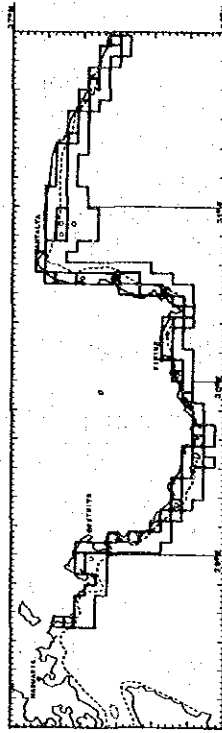
Table 5-1-3-19 Appearance Frequency of Striped Red Mullet\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	8	12	13	22
	101~200	63	75	18	25
	201~500	10	0	15	14
	Sub total	18	23	14	21
South Aegean Sea	20~100	50	23	31	40
	101~200	60	20	20	50
	201~500	33	0	10	0
	Sub total	48	14	22	31
West Mediterranean Sea	20~100	25	50	25	33
	101~200	0	33	0	33
	201~500	33	0	33	0
	Sub total	20	30	20	22
East Mediterranean Sea	20~100	25	17	39	0
	101~200	29	14	29	0
	201~500	25	25	0	0
	Sub total	26	17	32	0
All area	20~100	17	13	19	16
	101~200	39	43	17	24
	201~500	19	3	12	5
	Total	22	17	18	15

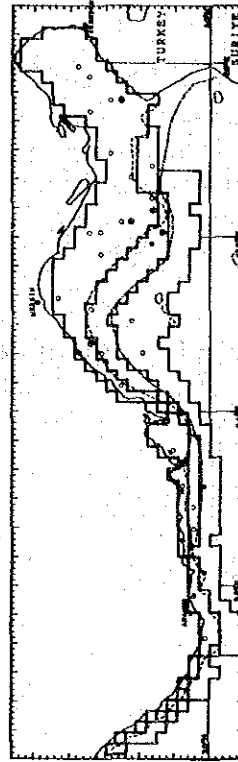
\* Appearance frequency: No. caught / No. of trawls x 100%



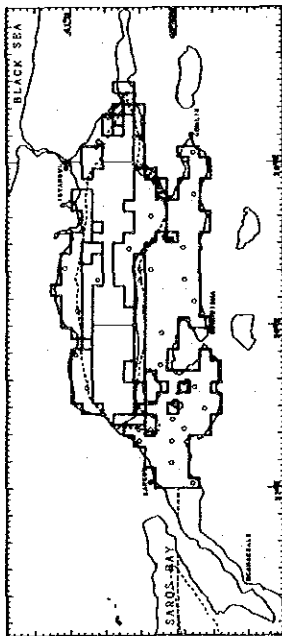
South Aegean Sea



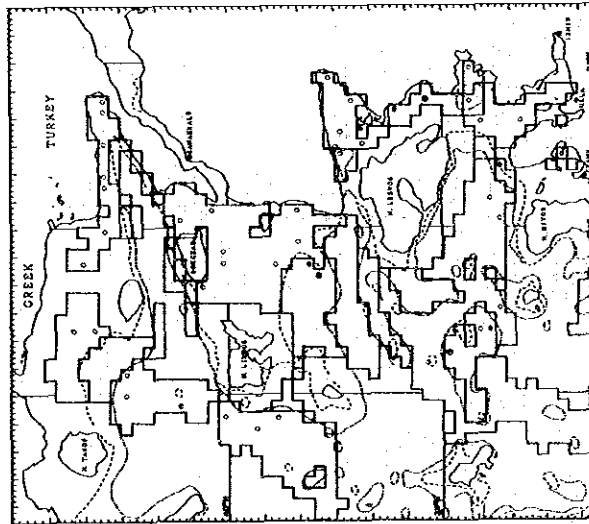
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

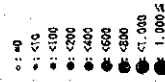
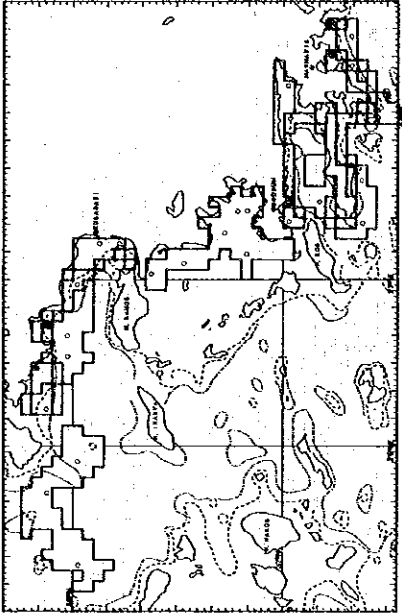
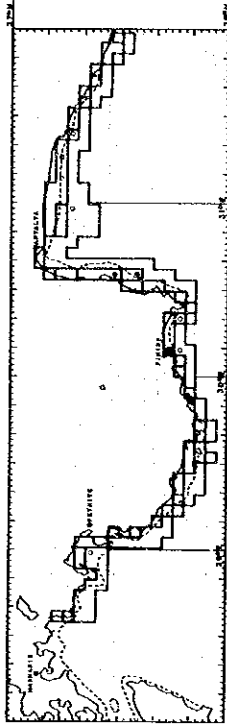


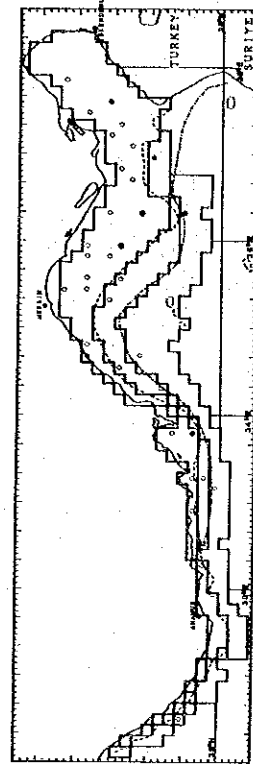
Fig. 5-1-3-7-1 The catch in kg of striped red mullet *Mullus surmuletus* at each stations in the spring season survey



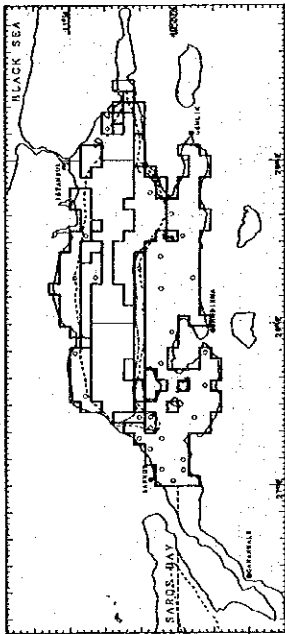
South Aegean Sea



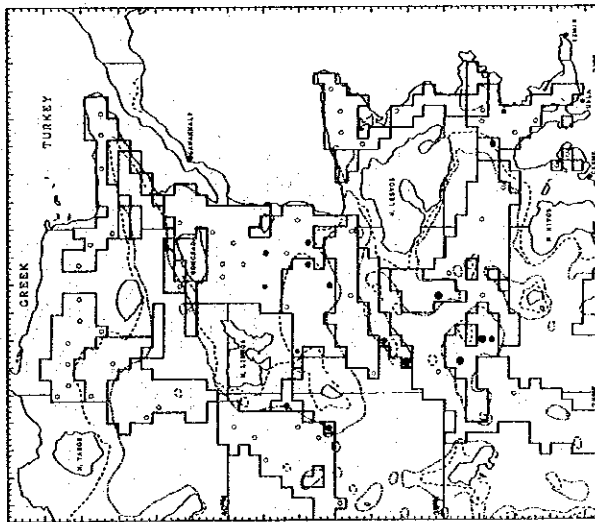
West Mediterranean Sea



East Mediterranean Sea



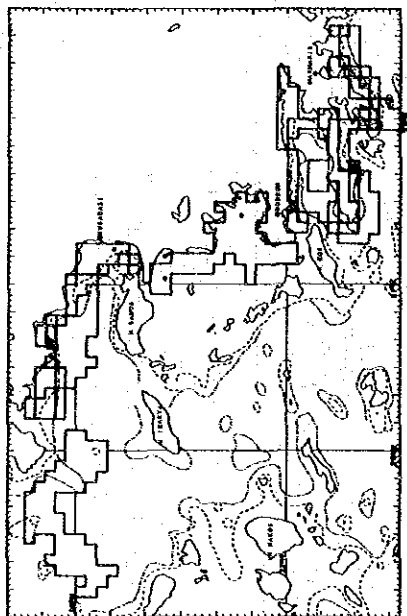
The Sea of Marmara



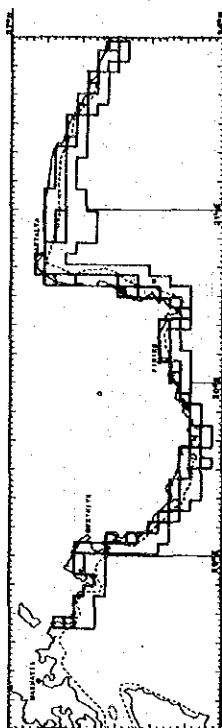
North Aegean Sea

The catch in kg of striped red mullet *Mullus surmuletus* at each station in the summer season survey

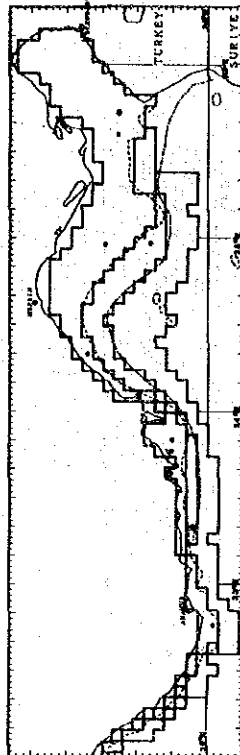
Fig. 5-1-3-7-2



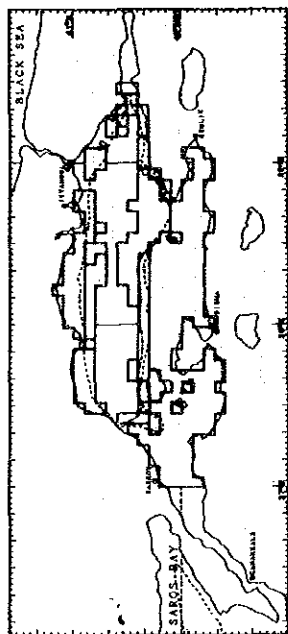
South Aegean Sea



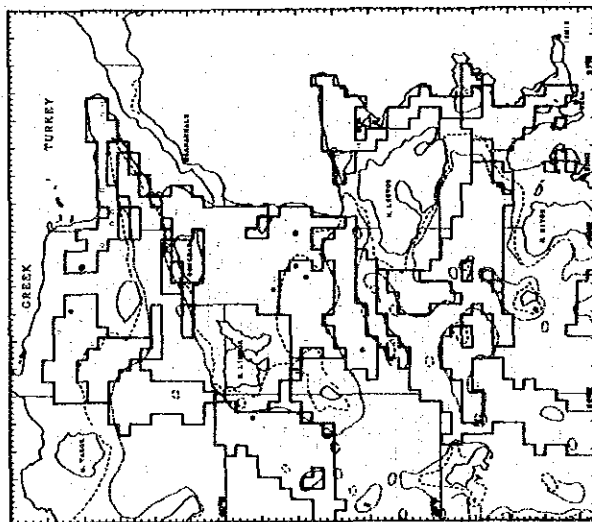
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara

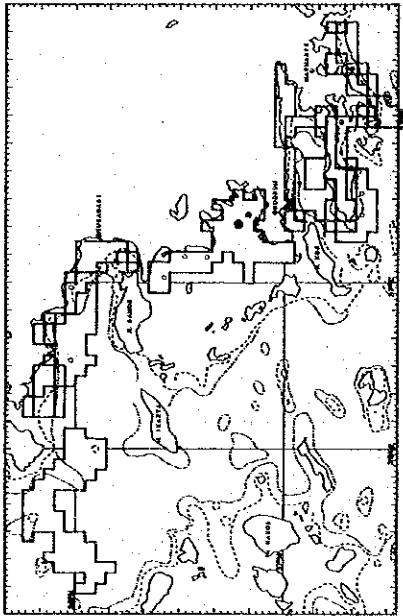


North Aegean Sea

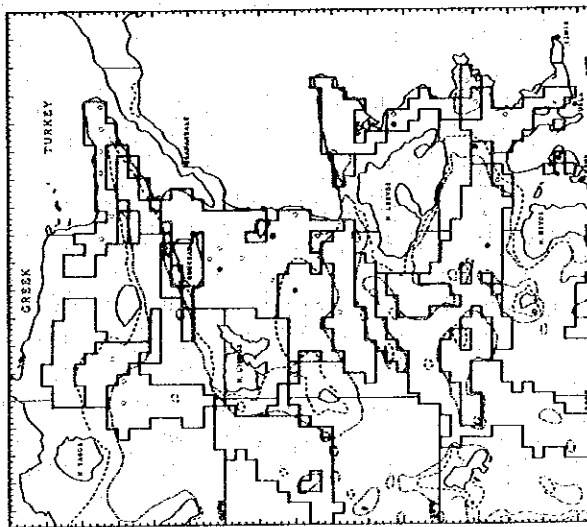


The catch in kg of striped red mullet *Mullus surmuletus* at each stations in the autumn season survey

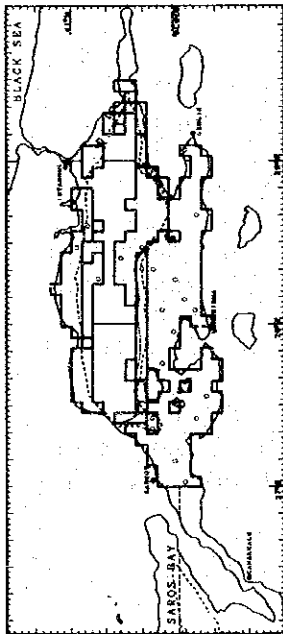
Fig. 5-1-3-7-3



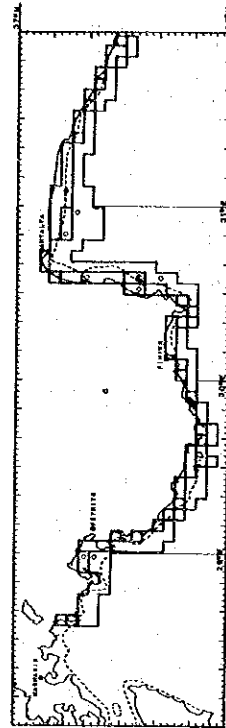
South Aegean Sea



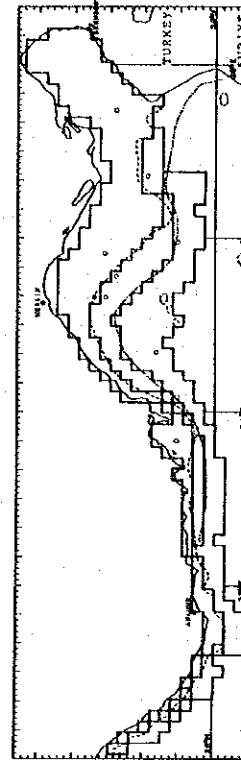
North Aegean Sea



The Sea of Marmara



West Mediterranean Sea



East Mediterranean Sea

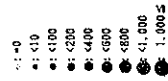


Fig. 5-1-3-7-4 The catch in kg of striped red mullet *Mullus surmuletus* at each station in the winter season survey

The CPUA values of this species in all areas were low throughout all seasons, being roughly only 1-6 (Table 5-1-3-20).

Table 5-1-3-20 Catch Per Unit Area of Striped Red Mullet

Sub area	Stratum (m)	Mean catch in kg/km <sup>2</sup>			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	1.2	1.5	0.8	1.9
	101~200	11.9	43.3	0.8	0.3
	201~500	0.4	0	0.8	0
	Sub total	3.0	10.5	0.8	1.1
South Aegean Sea	20~100	11.0	11.8	0.6	37.1
	101~200	4.6	7.8	4.1	0
	201~500	4.1	0	0	0
	Sub total	7.7	6.8	1.0	12.9
West Mediterranean Sea	20~100	21.8	7.2	2.5	0
	101~200	0	1.9	0	4.8
	201~500	5.6	0	1.1	0
	Sub total	10.4	3.4	1.3	1.6
East Mediterranean Sea	20~100	7.8	1.6	2.1	0
	101~200	4.2	0	2.1	0
	201~500	2.5	0	0	0
	Sub total	6.5	1.1	1.8	0
All area	20~100	4.8	2.8	1.0	4.2
	101~200	5.9	20.5	1.5	0.9
	201~500	2.1	0	0.4	0
	Total	4.4	5.8	1.0	2.5

## 2) Stock Size

The estimations of the stock size of striped red mullet are indicated in Table 5-1-3-21. The total stock size of this species by season consisted of 214 tons in spring (95% confidence interval:  $\pm 119$  tons, CV: 26%), 254 tons in summer (95% confidence interval:  $\pm 134$  tons, CV: 26%), 48 tons in autumn (95% confidence interval:  $\pm 27$  tons, CV: 28%) and 211 tons in winter (95% confidence interval:  $\pm 502$  tons, CV: 86%). There were no large differences in the stock size between seasons with the exception of autumn. The stock size in autumn was roughly 1/5 that of other seasons. The majority of the stock size was observed in the Aegean Sea, particularly in summer and winter.

Although there was a difference of approximately 200 tons between stock size in autumn and that in the other three seasons, in terms of estimation accuracy, were unable to conclude that the stock size changed according to the season.

Table 5-1-3-21 Estimation of Stock Size of Striped Red Mullet

Sub area	Stratum (a)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	15.5	12.5	9.7	15.0
	101~200	48.1	175.3	3.2	2.4
	201~500	3.7	0	7.8	0
	Sub total	67.3	187.8	20.8	17.5
South Aegean Sea	20~100	31.6	37.7	2.0	190.3
	101~200	5.0	9.5	5.0	0
	201~500	18.4	0	0	0
	Sub total	55.0	47.2	7.0	190.3
West Mediterranean Sea	20~100	24.3	8.0	2.8	0
	101~200	0	1.1	0	2.8
	201~500	8.1	0	1.6	0
	Sub total	32.4	9.1	4.4	2.8
East Mediterranean Sea	20~100	46.3	9.5	12.2	0
	101~200	7.4	0	3.8	0
	201~500	5.3	0	0	0
	Sub total	59.0	9.5	16.0	0
All area	20~100	117.8	67.7	26.8	205.3
	101~200	60.5	185.8	12.0	5.3
	201~500	35.5	0	9.5	0
	Total	213.8	253.6	48.2	210.6
* 95% confidence interval		± 118.7	± 133.8	± 27.2	± 502.4

\* 95% confidence interval was calculated to total stock size.

(8) Golden-Banded Goatfish *Upeneus moluccensis*

1) Distribution

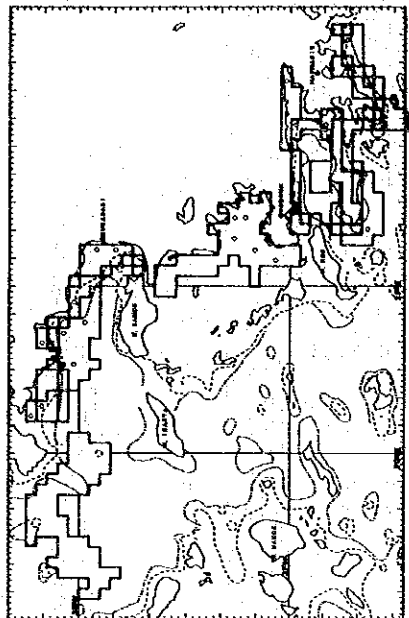
The distribution of this species was limited to points in the Aegean Sea and Mediterranean Sea south of 37° north latitude at depths of 200 m or less. The distribution of this species was primarily in the East Mediterranean Sea (Figs. 5-1-3-8-1 to 5-1-3-8-4). In addition, analysis of the appearance frequency of this species for each sub area revealed a value of 10% or less in the South Aegean Sea, a value of approximately 40% in the West Mediterranean Sea, and a value of approximately 40-70% in the East Mediterranean Sea (Table 5-1-3-22).

Table 5-1-3-22 Appearance Frequency of Golden-Banded Goatfish\*

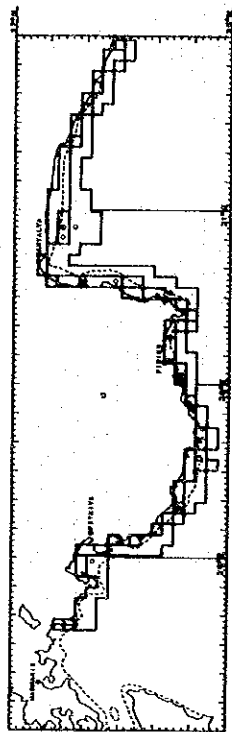
Sub area	Stratum (n)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	15	8	0
	101~200	0	0	0	25
	201~500	0	0	0	0
	Sub total	0	7	4	8
West Mediterranean Sea	20~100	75	50	100	67
	101~200	33	67	0	67
	201~500	0	0	0	0
	Sub total	40	40	40	45
East Mediterranean Sea	20~100	63	96	48	100
	101~200	29	43	14	100
	201~500	0	0	0	0
	Sub total	49	74	35	70
All area	20~100	21	28	17	13
	101~200	12	14	4	29
	201~500	0	0	0	0
	Total	15	19	11	14

\* Appearance frequency: No. caught / No. of trawls x 100%

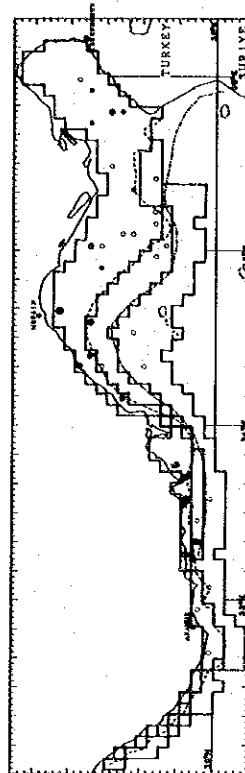




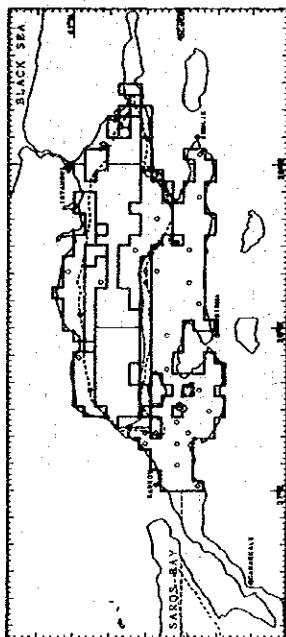
South Aegean Sea



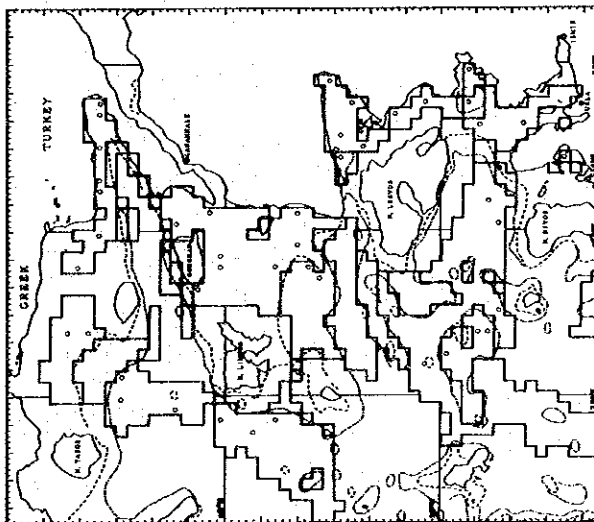
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

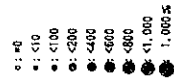
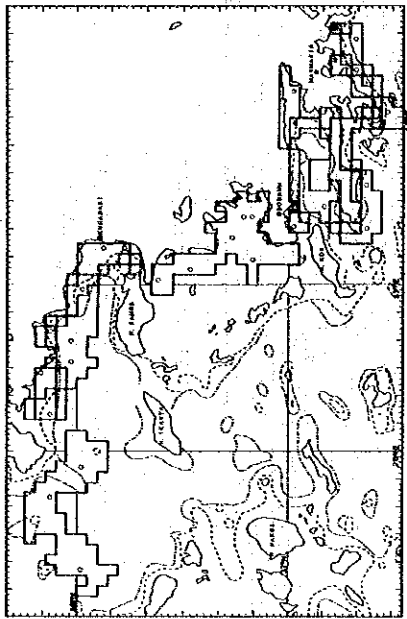
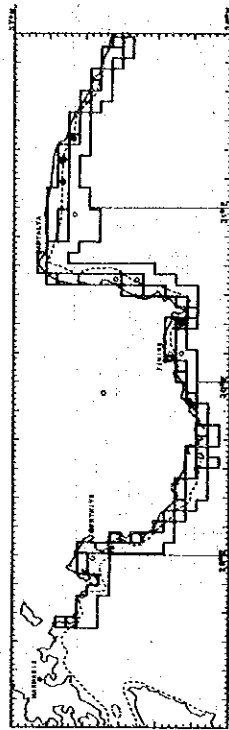


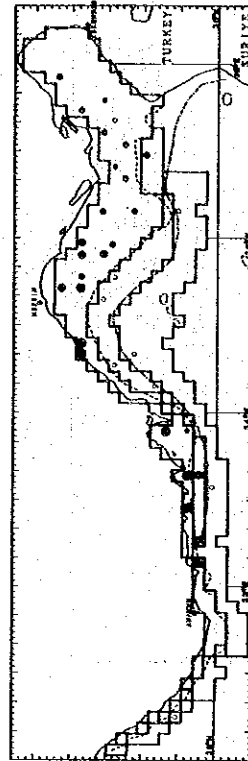
Fig.5-1-3-8-1 The catch in kg of golden-banded goatfish *Upeneus moluccensis* at each stations in the spring season survey



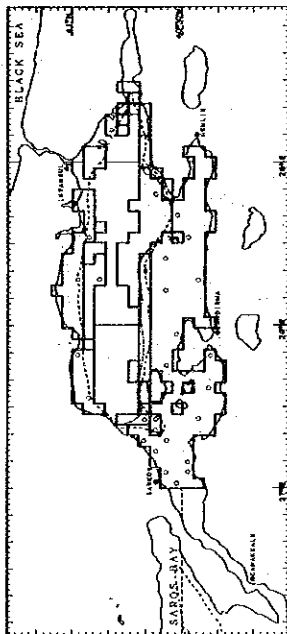
South Aegean Sea



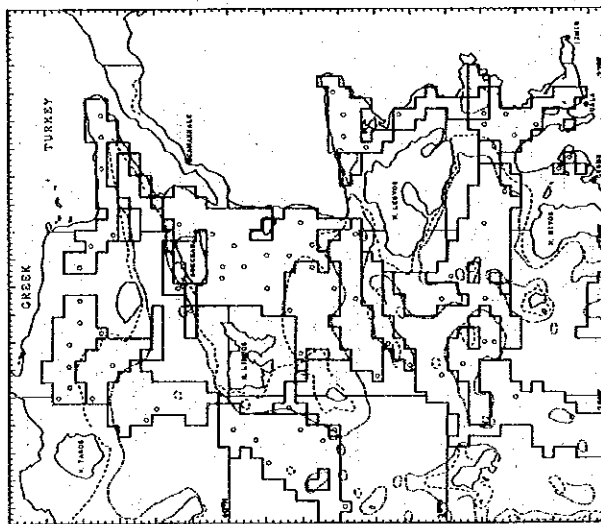
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

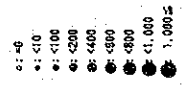
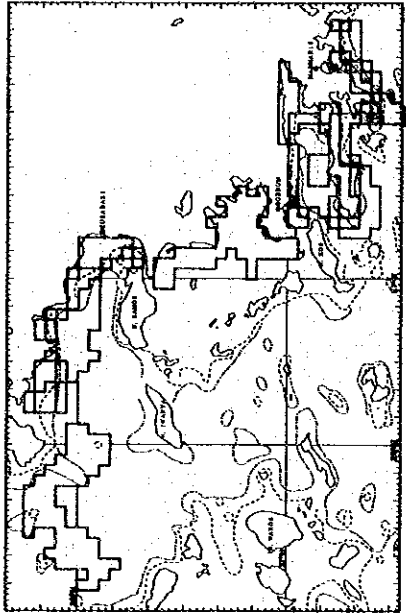
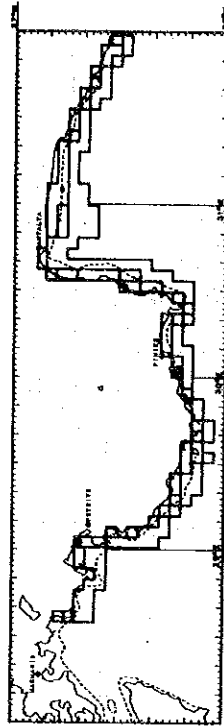


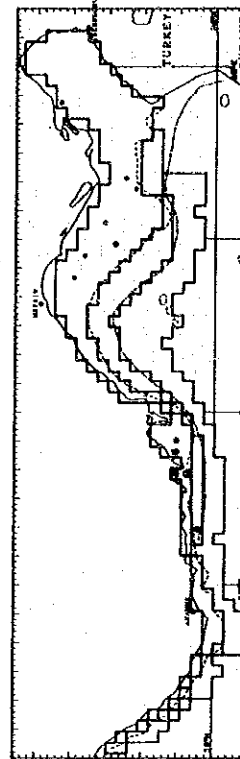
Fig. 5-1-3-8-2 The catch in kg of golden-banded goatfish *Upeneus moluccensis* at each stations in the summer season survey



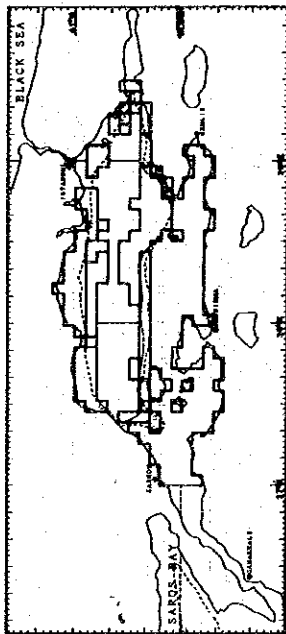
South Aegean Sea



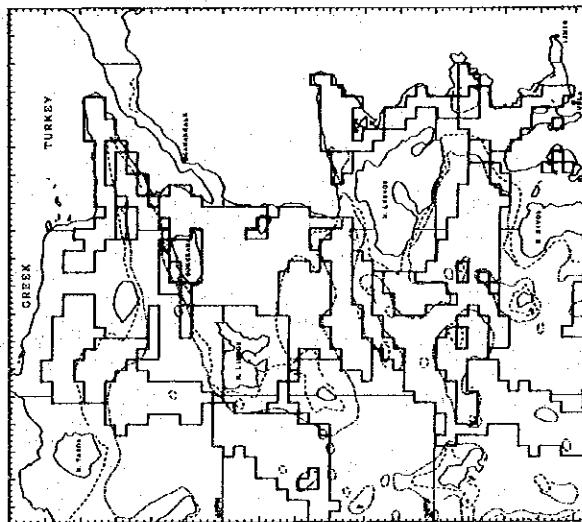
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

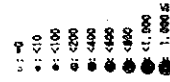
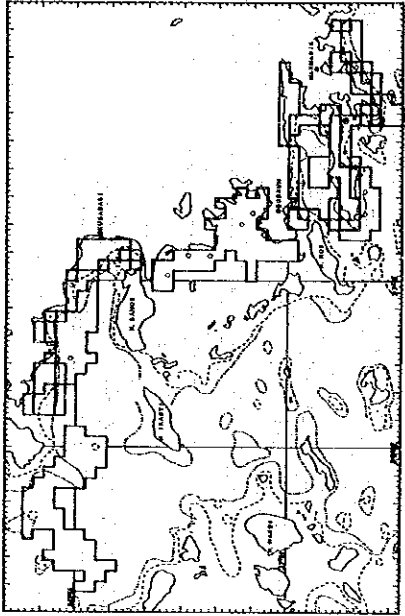
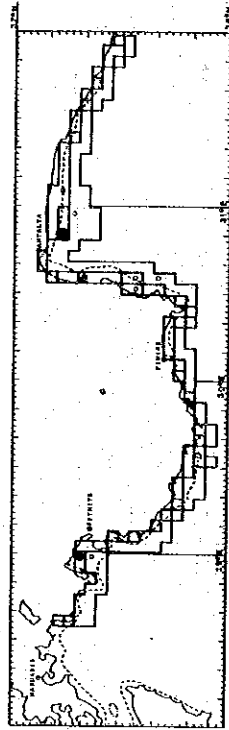


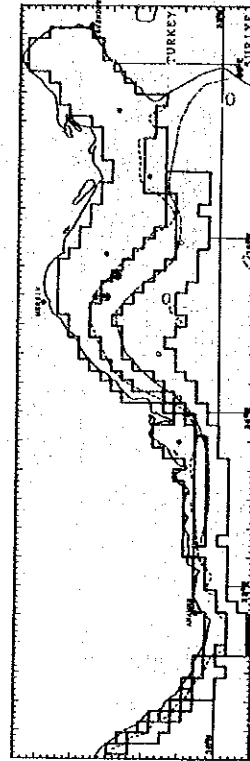
Fig. 5-1-3-8-3 The catch in kg of golden-banded goatfish *Upeneus moluccensis* at each station in the autumn season survey



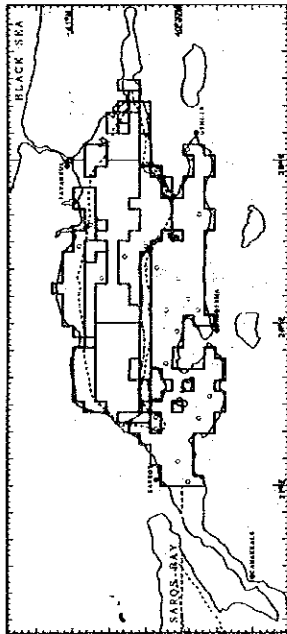
South Aegean Sea



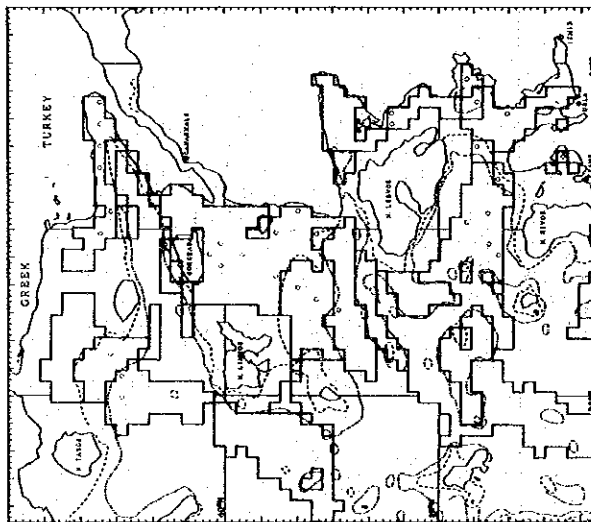
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

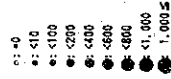


Fig. 5-1-3-8-4 The catch in kg of golden-banded goatfish *Upeneus moluccensis* at each station in the winter season survey

Although the CUPA values of this species occasionally demonstrated values of 100-200 depending on the season and water depth, the majority were below 50 (Table 5-1-3-23).

Table 5-1-3-23. Catch Per Unit Area of Golden-Banded Goatfish

Sub area	Stratum (m)	Mean catch in kg/k <sup>2</sup>			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	3.7	1.6	0
	101~200	0	0	0	3.8
	201~500	0	0	0	0
	Sub total	0	1.7	0.7	1.2
West Mediterranean Sea	20~100	9.7	59.7	19.0	21.6
	101~200	1.4	9.5	0	223.4
	201~500	0	0	0	0
	Sub total	4.3	26.7	7.6	81.7
East Mediterranean Sea	20~100	20.0	121.0	15.6	6.7
	101~200	13.6	36.5	4.0	101.7
	201~500	0	0	0	0
	Sub total	16.4	88.8	11.4	33.2
All area	20~100	4.0	32.6	5.0	2.2
	101~200	2.3	8.9	1.0	50.7
	201~500	0	0	0	0
	Total	2.8	20.3	3.2	13.5

## 2) Stock Size

The estimations of the stock size of golden-banded goatfish are indicated in Table 5-1-3-24. The total stock size of this species by season consisted of 154 tons in spring (95% confidence interval:  $\pm 97$  tons, CV: 30%), 873 tons in summer (95% confidence interval:  $\pm 334$  tons, CV: 18%), 126 tons in autumn (95% confidence interval:  $\pm 103$  tons, CV: 40%) and 380 tons in winter (95% confidence interval:  $\pm 393$  tons, CV: 37%). The stock size estimations were maximum in summer and minimum in autumn. Approximately 60% or more of the total stock size was observed in the East Mediterranean Sea, and this figure increased to roughly 80-90% for all seasons excluding winter.

Although the difference in the estimations of stock size between seasons with the exception of summer was approximately 30-250 tons, this was not significant in consideration of the 95% confidence intervals. However, the difference in the stock size estimations between summer and the other seasons, and particularly when compared with spring and autumn, was significant. These differences are believed to be mainly due to the seasonal migrations of this species. This species is known to be a tropical Indian-Pacific species that entered Israel and Lebanon in the Mediterranean Sea through the Suez Canal from the Indian Ocean. Consequently, this species is also presumed to

demonstrate north-south migration between seasons as was mentioned in the case of brushtooth lizardfish *Saurida undosquamis* described in section (1), a species having similar distribution characteristics as this species. In addition, although this species resides in shallower depths than red mullet *Mullus barbatus* described in section (6), since it is strongly gregarious in the same manner as red mullet, slight differences in the areas surveyed are thought to be able to have considerable effects on the stock size estimations.

Table 5-1-3-24 Estimation of Stock Size of Golden-Banded Goatfish

Sub area	Stratum (n)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	12.0	5.1	0
	101~200	0	0	0	4.1
	201~500	0	0	0	0
	Sub total	0	12.0	5.1	4.1
West Mediterranean Sea	20~100	10.9	66.7	21.2	24.1
	101~200	0.8	5.6	0	132.5
	201~500	0	0	0	0
	Sub total	11.7	72.3	21.2	156.6
East Mediterranean Sea	20~100	118.4	717.1	92.3	39.7
	101~200	24.0	72.0	7.1	179.3
	201~500	0	0	0	0
	Sub total	142.4	789.2	99.4	219.0
All area	20~100	129.3	795.8	118.6	63.8
	101~200	24.9	77.7	7.1	315.8
	201~500	0	0	0	0
	Total	154.2	873.5	125.7	379.6
* 95% confidence interval		± 96.6	± 333.5	± 103.2	± 392.6

\* 95% confidence interval was calculated to total stock size.

## (9) Gilt-Head Sea Bream *Sparus aurata*

### 1) Distribution

This species was distributed primarily in the South Aegean Sea and East Mediterranean Sea at depths of 100 m or less (Figs. 5-1-3-9-1 to 5-1-3-9-4). Although the appearance frequency was 20% at depths of 100 m or less in the South Aegean Sea, this figure was 10% or less in spring. The appearance frequency at depths of 100 m or less in the East Mediterranean Sea was roughly 10-50%, and gradually increased from spring to winter (Table 5-1-3-25).

Table 5-1-3-25 Appearance Frequency of Gilt-Head Sea Bream\*

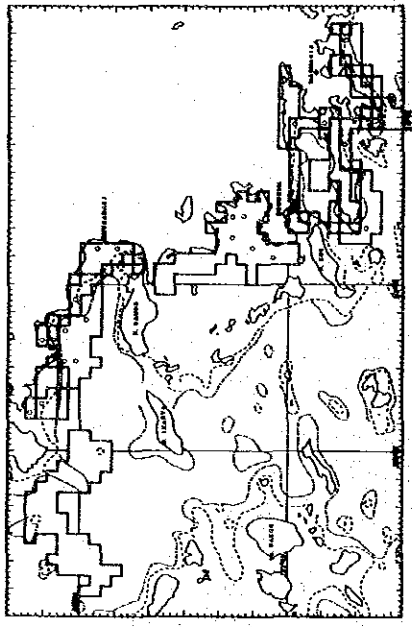
Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	8	23	23	20
	101~500	0	0	0	0
	Sub total	4	11	11	8
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	13	42	31	50
	101~200	0	0	0	33
	201~500	0	0	0	0
	Sub total	9	29	21	30
All area	20~100	5	13	11	7
	101~200	0	0	0	5
	201~500	0	0	0	0
	Total	3	8	7	5

\* Appearance frequency: No. caught / No. of trawls x 100%

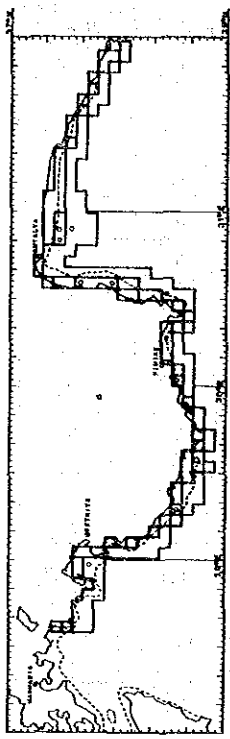
The CPUE values at strata of 20-100 m in the South Aegean Sea and East Mediterranean Sea were generally 10 or less throughout all seasons (Table 5-1-3-26).

Table 5-1-3-26 Catch Per Unit Area of Gilt-Head Sea Bream

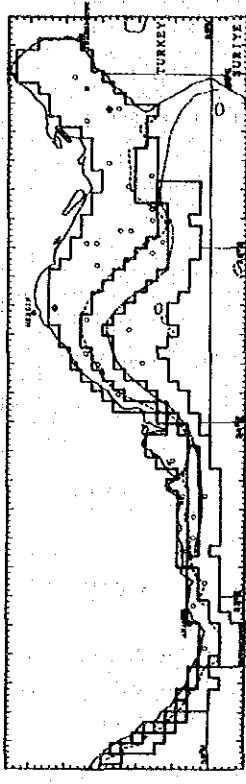
Sub area	Stratum (m)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	4.5	3.6	1.2	1.9
	101~500	0	0	0	0
	Sub total	2.2	1.7	0.5	0.7
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	4.3	5.3	4.0	12.9
	101~200	0	0	0	1.1
	201~500	0	0	0	0
	Sub total	2.9	3.5	2.7	5.5
All area	20~100	1.5	1.8	1.2	1.4
	101~200	0	0	0	0.2
	201~500	0	0	0	0
	Total	0.9	1.0	0.7	0.8



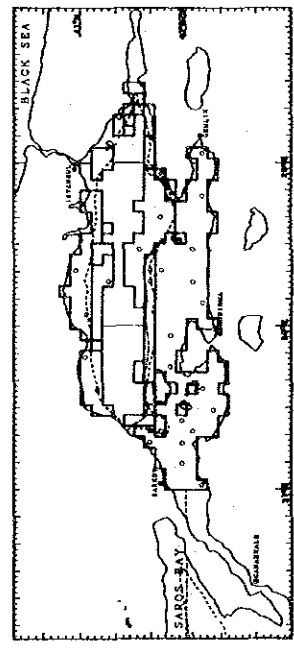
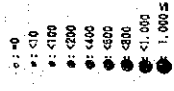
South Aegean Sea



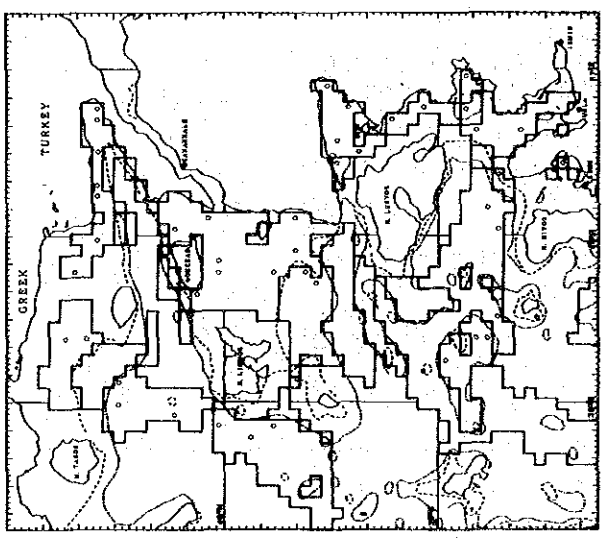
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara

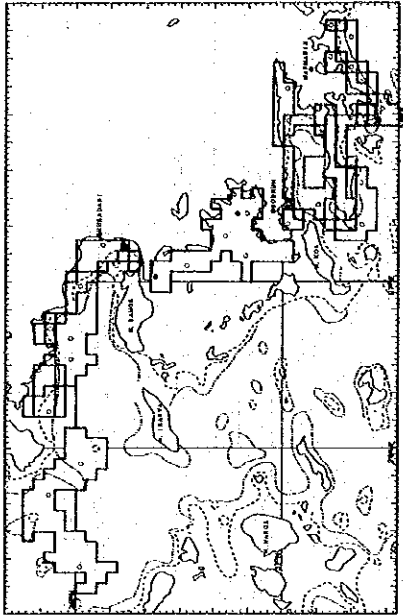


North Aegean Sea

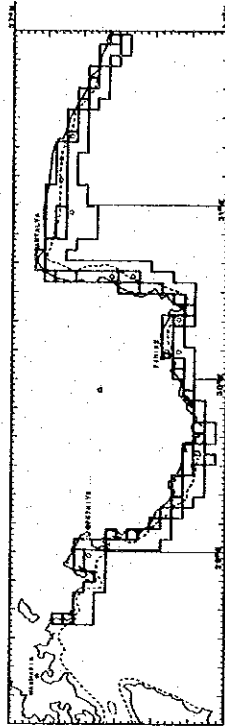
The catch in kg of gilt-head sea bream *Sparus aurata* at each station in the spring season survey

Fig. 5-1-3-9-1

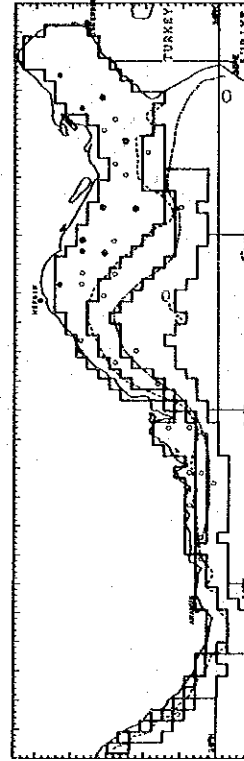




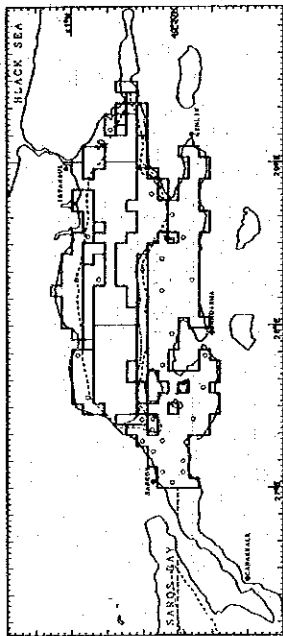
South Aegean Sea



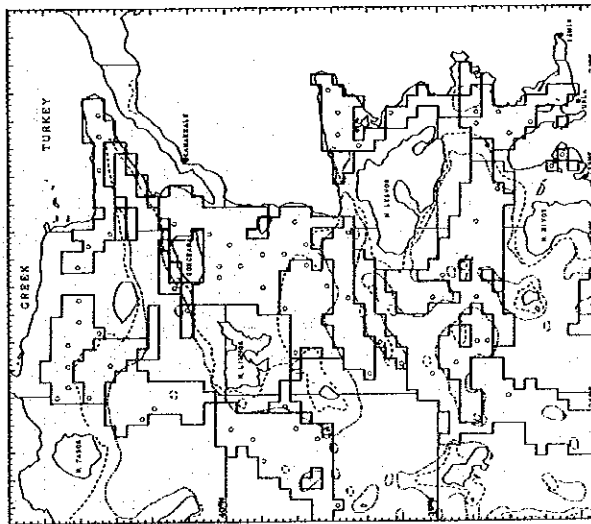
West Mediterranean Sea



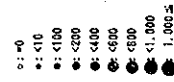
East Mediterranean Sea



The Sea of Marmara

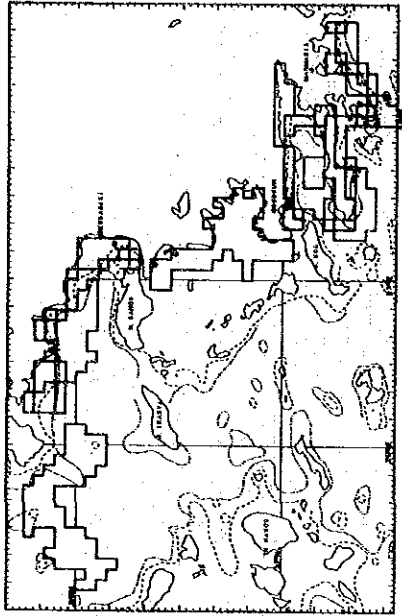


North Aegean Sea

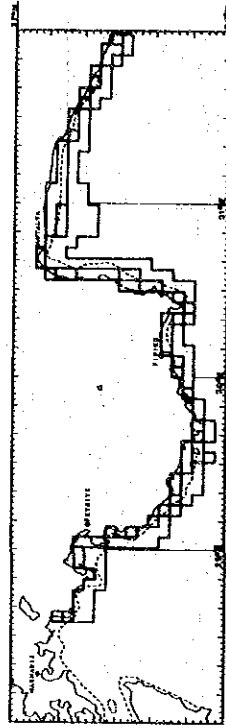


The catch in kg of gilt-head sea bream *Sparus aurata* at each station in the summer season survey

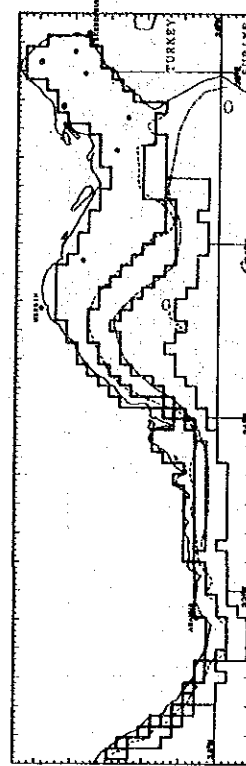
Fig. 5-1-3-9-2



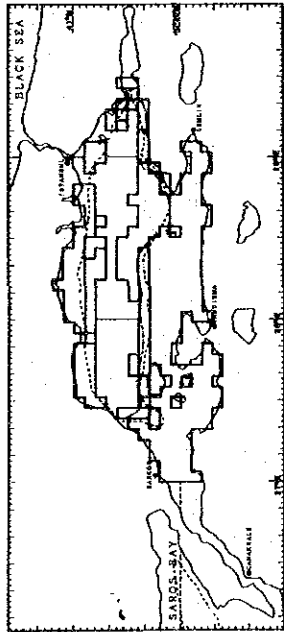
South Aegean Sea



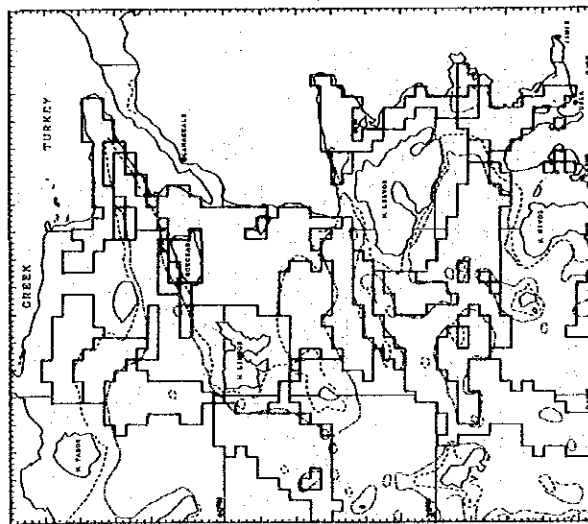
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

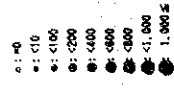
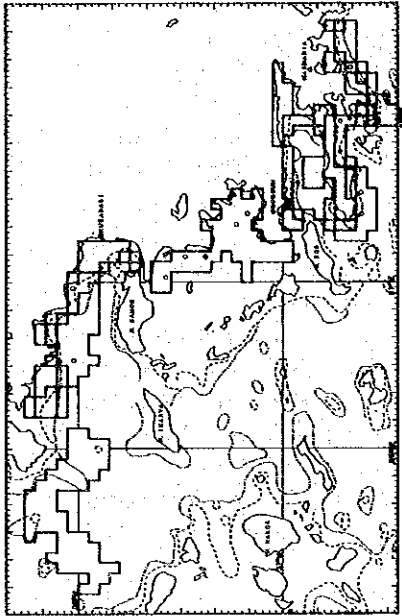
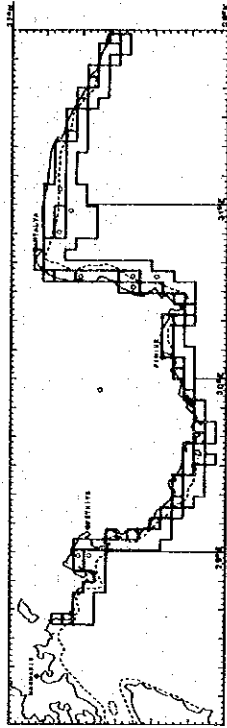


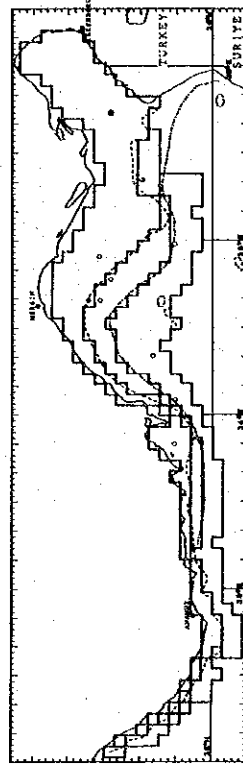
Fig. 5-1-3-9-3 The catch in kg of gilt-head sea bream *Sparus aurata* at each stations in the autumn season survey



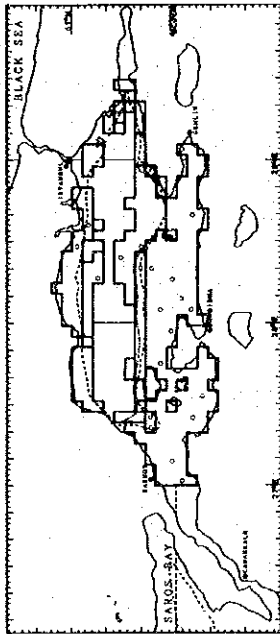
South Aegean Sea



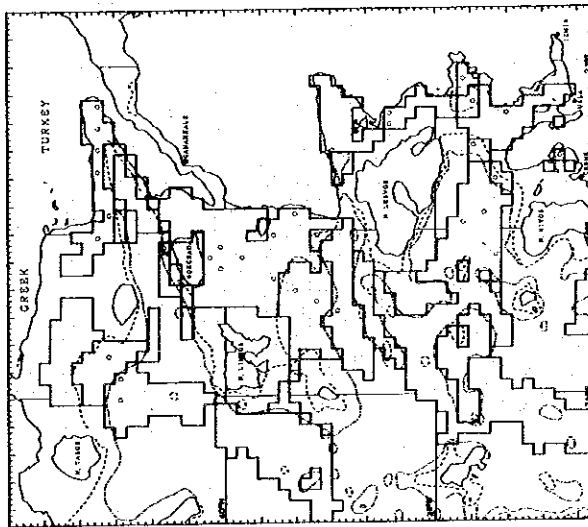
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

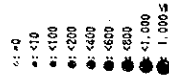


Fig. 5-1-3-9-4 The catch in kg of gilt-head sea bream *Sparus aurata* at each stations in the winter season survey

## 2) Stock Size

The estimations of the stock size of gilt-head sea bream are indicated in Table 5-1-3-27. The total stock size of this species was 100 tons or less in each season, consisting of 39 tons in spring (95% confidence interval:  $\pm 44$  tons, CV: 55%), 43 tons in summer (95% confidence interval:  $\pm 27$  tons, CV: 31%), 27 tons in autumn (95% confidence interval:  $\pm 35$  tons, CV: 62%) and 84 tons in winter (95% confidence interval:  $\pm 228$  tons, CV: 86%). The majority of the stock size of this species, namely 70-90%, was observed in the East Mediterranean Sea.

The difference between season in the estimations of stock size was roughly 60 tons, which is not significant in consideration of the estimation accuracy for each season (range of 95% confidence interval of each season: roughly 30-239 tons). In addition, since this species is an euryhaline (also thriving in brackish water) and sedentary (not migratory) species that thrives in sandy mud, eelgrass bed and rock crevices along coastlines (with immature fish present at depths of 30 m or less and mature fish present down to 150 m), this trawling survey did not accurately determine the stock size of this species.

Table 5-1-3-27 Estimation of Stock Size of Gilt-Head Sea Bream

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	13.7	11.6	3.6	4.9
	101~500	0	0	0	0
	Sub total	13.7	11.6	3.6	4.9
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	25.2	31.2	23.6	76.6
	101~200	0	0	0	2.0
	201~500	0	0	0	0
	Sub total	25.2	31.2	23.6	78.6
All area	20~100	39.0	42.8	27.2	81.5
	101~200	0	0	0	2.0
	201~500	0	0	0	0
	Total	39.0	42.8	27.2	83.5
* 95% confidence interval		$\pm 44.2$	$\pm 27.1$	$\pm 34.9$	$\pm 228.3$

\* 95% confidence interval was calculated to total stock size.

(10) Large-Eye Dentex *Dentex macrophthalmus*

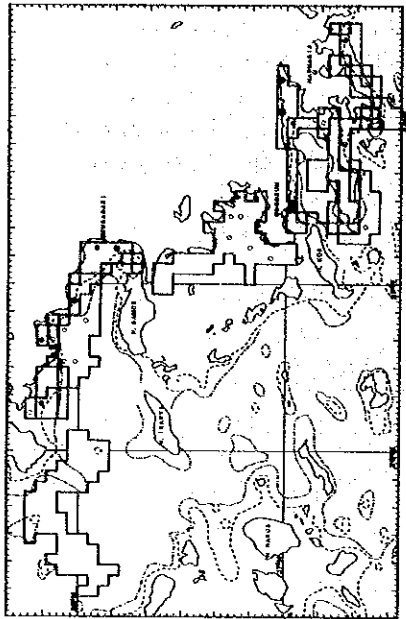
1) Distribution

This species was sporadically distributed from shallow to deep water in the Aegean Sea and Mediterranean Sea, but not The Sea of Marmara (Figs. 5-1-3-10-1 to 5-1-3-10-4). In addition, the appearance frequency in all areas surveyed was 20% throughout all seasons. Similarly, when looking at the appearance frequency by stratum, values were high at strata of 101-200 m, and generally 30-40% throughout all seasons (Table 5-1-3-28).

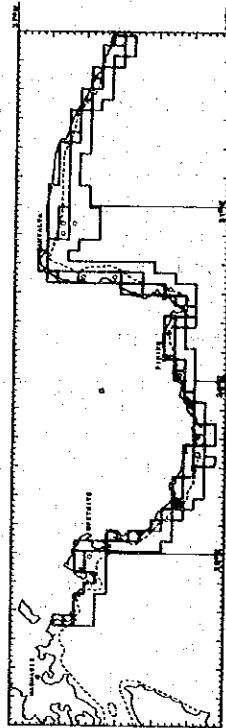
Table 5-1-3-28 Appearance Frequency of Large-Eye Dentex\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	19	29	31	17
	101~200	13	25	46	25
	201~500	0	0	0	0
	Sub total	13	20	27	15
South Aegean Sea	20~100	42	46	46	0
	101~200	80	40	40	75
	201~500	17	0	0	0
	Sub total	44	29	29	23
West Mediterranean Sea	20~100	0	0	0	100
	101~200	33	100	67	100
	201~500	0	0	0	0
	Sub total	10	30	20	67
East Mediterranean Sea	20~100	4	0	0	0
	101~200	43	43	43	0
	201~500	50	50	0	33
	Sub total	17	14	9	10
All area	20~100	13	16	17	13
	101~200	35	34	41	38
	201~500	12	5	0	5
	Total	17	18	18	18

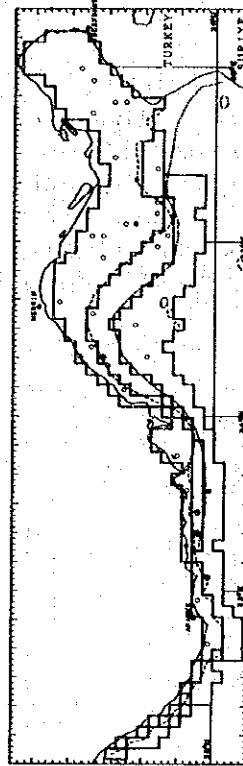
\* Appearance frequency: No. caught / No. of trawls x 100%



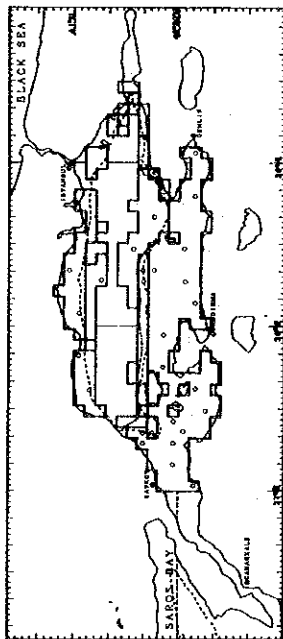
South Aegean Sea



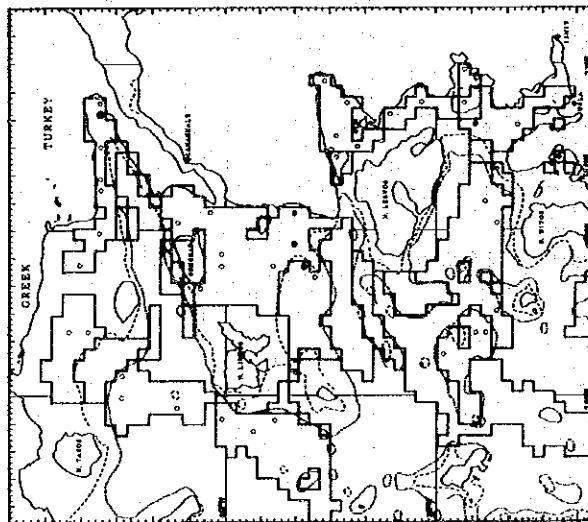
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

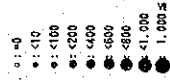
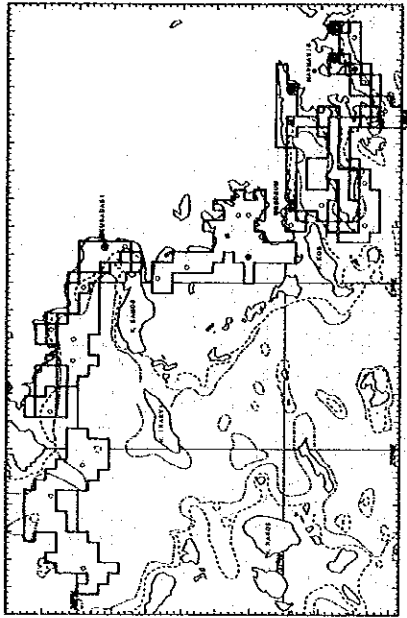
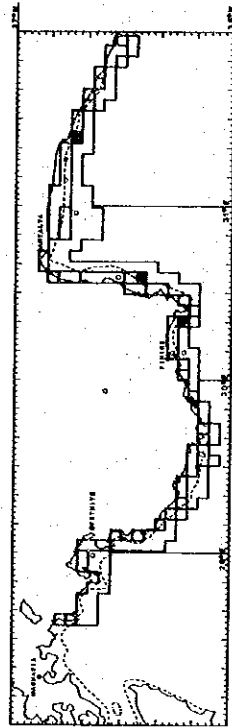


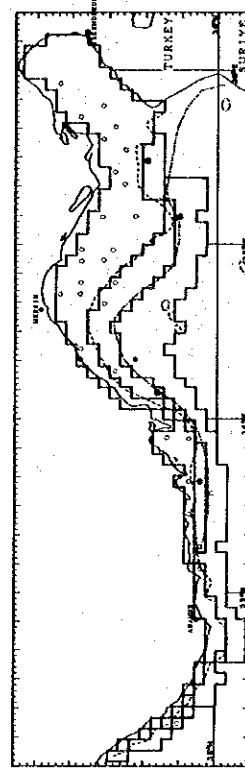
Fig. 5-1-3-10-1 The catch in kg of large-eye dentex *Dentex macrophthalmus* at each stations in the spring season survey



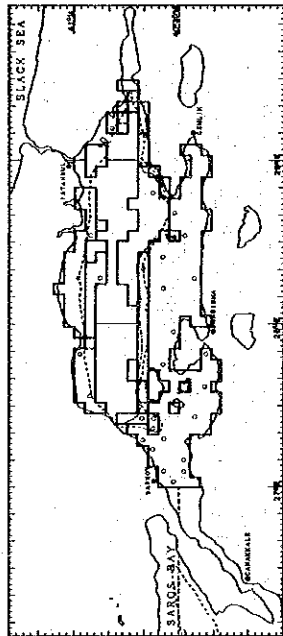
South Aegean Sea



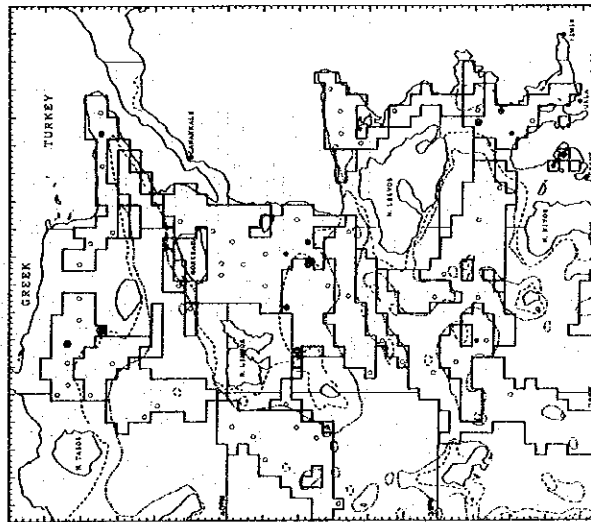
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

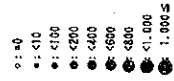
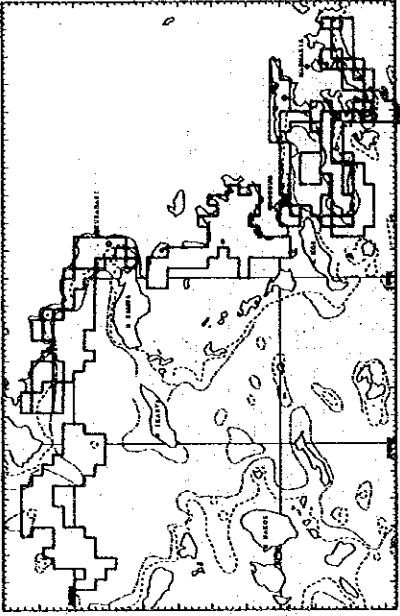
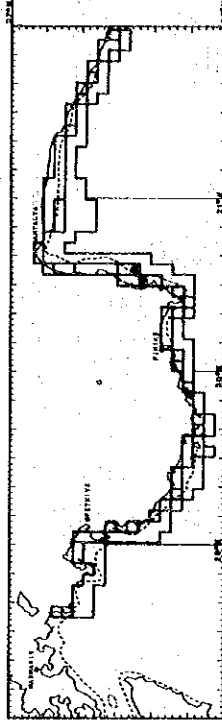


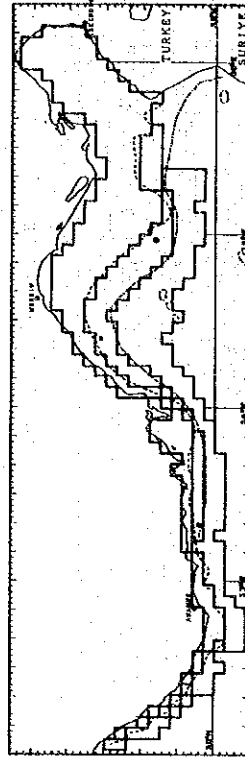
Fig. 5-1-3-10-2 The catch in kg of large-eye dentex *Dentex macrophthalmus* at each station in the summer season survey



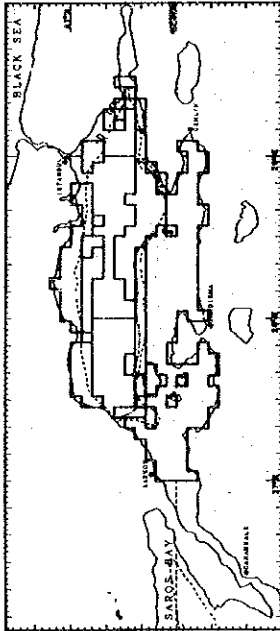
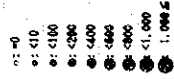
South Aegean Sea



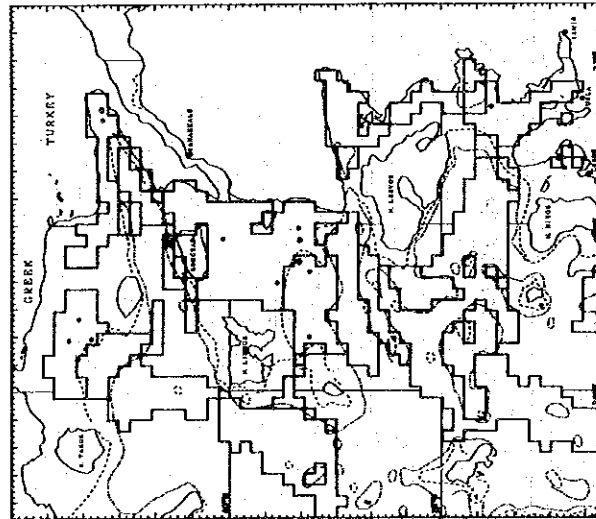
West Mediterranean Sea



East Mediterranean Sea



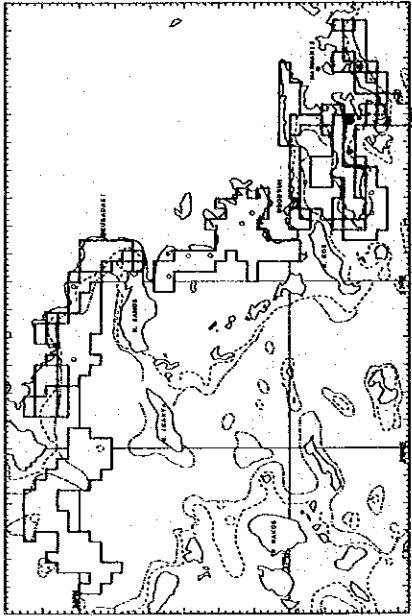
The Sea of Marmara



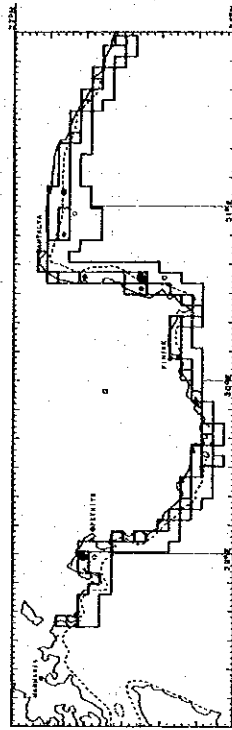
North Aegean Sea

Fig. 5-1-3-10-3 The catch in kg of large-eye dentex *Dentex macrophthalmus* at each station in the autumn season survey

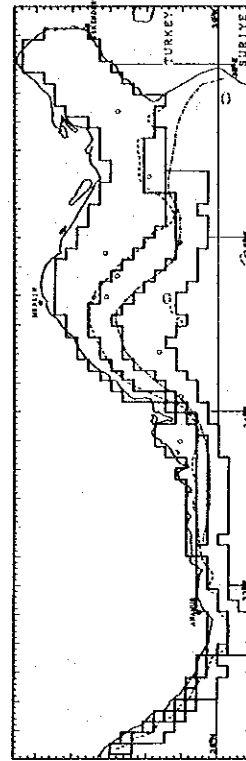




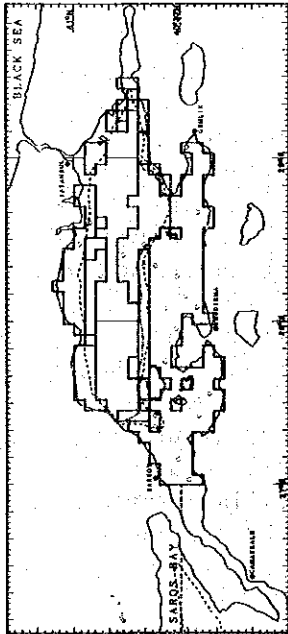
South Aegean Sea



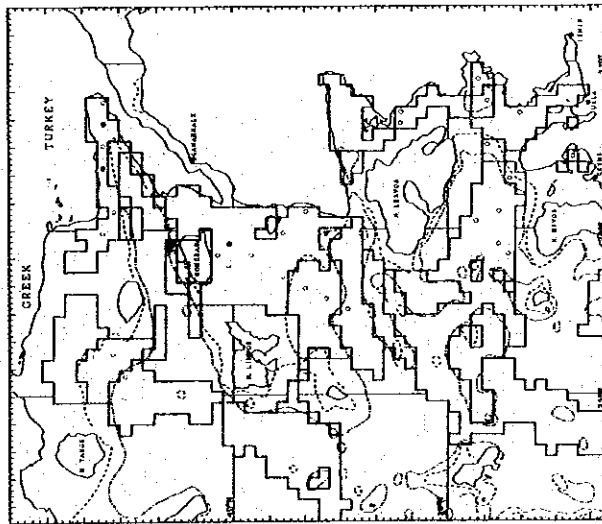
West Mediterranean Sea



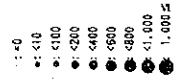
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of large-eye dentex *Dentex macrophthalmus* at each station in the winter season survey

Fig.5-1-3-10-4

The CPUA values of this species in all areas surveyed were 4-22, 22 in summer and 10 or less in other seasons. However, the CPUA values of 100-200 were also observed depending on the season and stratum (Table 5-1-3-29).

Table 5-1-3-29 Catch Per Unit Area of Large-Eye Dentex

Sub area	Stratum (m)	Mean catch in kg/km <sup>2</sup>			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	7.3	14.1	2.8	1.3
	101~200	6.9	13.9	10.5	2.0
	201~500	0	0	0	0
	Sub total	5.5	10.1	3.6	1.2
South Aegean Sea	20~100	16.2	195.9	15.6	0
	101~200	5.5	3.3	29.6	120.9
	201~500	0.4	0	0	0
	Sub total	9.5	91.5	12.5	36.8
West Mediterranean Sea	20~100	0	0	0	12.2
	101~200	7.9	147.6	39.3	90.5
	201~500	0	0	0	0
	Sub total	2.4	44.3	11.8	34.2
East Mediterranean Sea	20~100	0.3	0	0	0
	101~200	17.0	10.2	2.1	0
	201~500	6.8	8.8	0	0
	Sub total	4.4	3.2	0.4	0
All area	20~100	5.2	31.0	3.1	1.4
	101~200	7.3	21.2	13.7	36.3
	201~500	0.7	0.9	0	0
	Total	4.7	22.2	4.4	9.6

## 2) Stock Size

The estimations of the stock size of large-eye dentex are indicated in Table 5-1-3-30. The total stock size of this species by season consisted of 192 tons in spring (95% confidence interval:  $\pm 130$  tons, CV: 33%), 932 tons in summer (95% confidence interval:  $\pm 923$  tons, CV: 46%), 176 tons in autumn (95% confidence interval:  $\pm 127$  tons, CV: 33%) and 219 tons in winter (95% confidence interval:  $\pm 372$  tons, CV: 53%). Comparison of the stock size between strata in all areas revealed large stock size in spring and summer at strata of 20-100 m, and large stock size in autumn and winter at strata of 101-200 m, with stock size at those strata accounting for roughly 60-90% of the total stock size. The majority of the stock size was observed in the Aegean Sea (the South Aegean Sea and the North Aegean Sea with respect to sub areas), accounting for 70-90% of the total stock size throughout all seasons.

Differences in the stock size between seasons ranged from roughly 20-800 tons, indicating a large fluctuation in the estimated values. However, differences in the stock size are not

significant in consideration of the 95% confidence intervals for each season. This species is known to thrive along rocks or sandy mud at depths of 20-300 m, and demonstrate seasonal migration in which it repeatedly moves close to shore and then out to deeper water according to physical and chemical changes in sea water as well as its biological life cycle.

Table 5-1-3-30 Estimation of Stock Size of Large-Eye Dentex

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	54.3	120.4	24.2	10.4
	101~200	27.9	56.3	40.7	7.1
	201~500	0	0	0	0
	Sub total	82.2	176.7	64.8	17.5
South Aegean Sea	20~100	49.8	628.8	48.2	0
	101~200	7.3	4.0	36.2	134.3
	201~500	1.9	0	0	0
	Sub total	59.1	632.8	84.4	134.3
West Mediterranean Sea	20~100	0	0	0	13.7
	101~200	4.7	87.5	23.3	53.7
	201~500	0	0	0	0
	Sub total	4.7	87.5	23.3	67.3
East Mediterranean Sea	20~100	1.6	0	0	0
	101~200	30.0	15.3	3.7	0
	201~500	14.8	19.2	0	0
	Sub total	46.3	34.5	3.7	0
All area	20~100	105.7	749.2	72.4	24.0
	101~200	69.9	163.2	103.9	195.1
	201~500	16.7	19.2	0	0
	Total	192.3	931.5	176.2	219.1
* 95% confidence interval		± 129.5	± 923.0	± 127.1	± 372.4

\* 95% confidence interval was calculated to total stock size.

(11) Annular Sea Bream *Diplodus annularis*

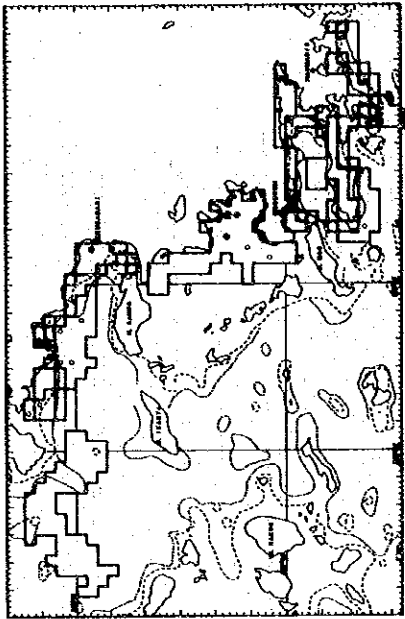
1) Distribution

This species was primarily distributed in the Aegean Sea and Mediterranean Sea, and sporadically distributed in the southwest portion of The Sea of Marmara at depths of 100 m or less in winter (Figs. 5-1-3-11-1 to 5-1-3-11-4). In addition, the appearance frequency of this species in all areas was roughly 10-20% throughout all seasons. The appearance frequency of this species in the South Aegean Sea was relatively higher than other areas, maintaining a level of roughly 20-50% throughout all seasons (Table 5-1-3-31).

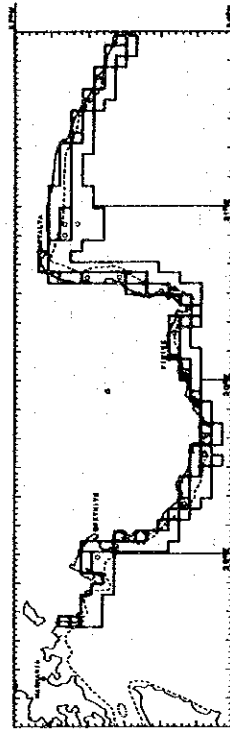
Table 5-1-3-31 Appearance Frequency of Annular Sea Bream\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	0	0	0	20
	101~500	0	0	0	0
	Sub total	0	0	0	14
North Aegean Sea	20~100	33	37	19	17
	101~500	0	0	0	0
	Sub total	20	18	11	9
South Aegean Sea	20~100	67	100	54	60
	101~500	0	0	0	0
	Sub total	35	47	25	23
West Mediterranean Sea	20~100	25	75	50	33
	101~500	0	0	0	0
	Sub total	10	30	20	11
East Mediterranean Sea	20~100	17	46	22	25
	101~500	0	0	0	0
	Sub total	12	32	15	10
All area	20~100	25	41	22	25
	101~500	0	0	0	0
	Total	16	23	13	13

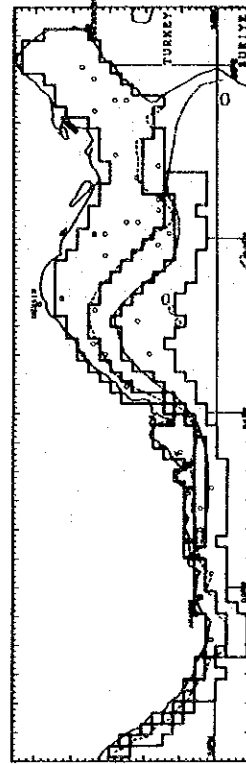
\* Appearance frequency: No. caught / No. of trawls x 100%



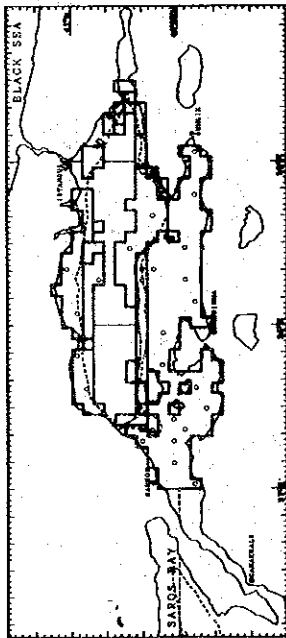
South Aegean Sea



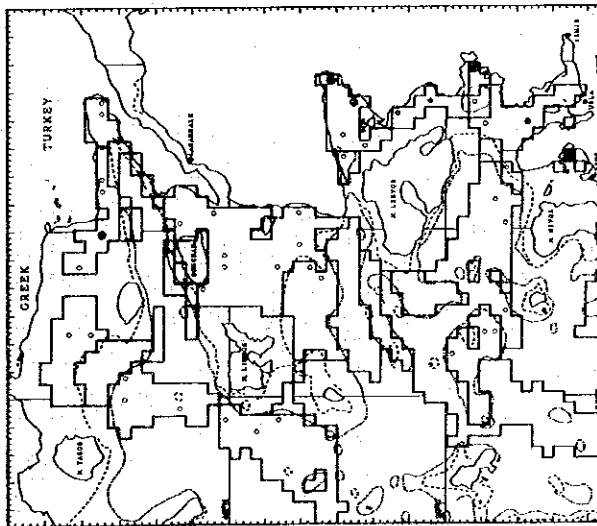
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

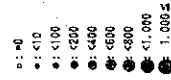
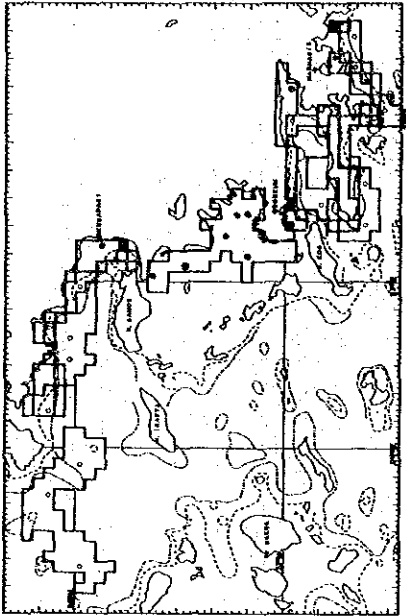
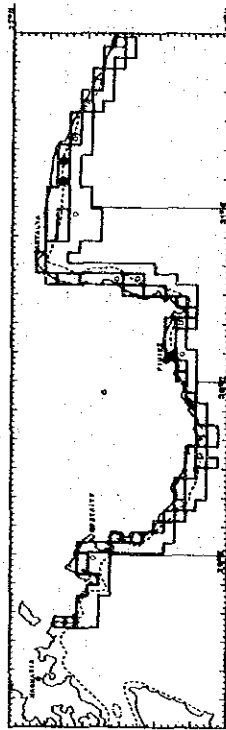


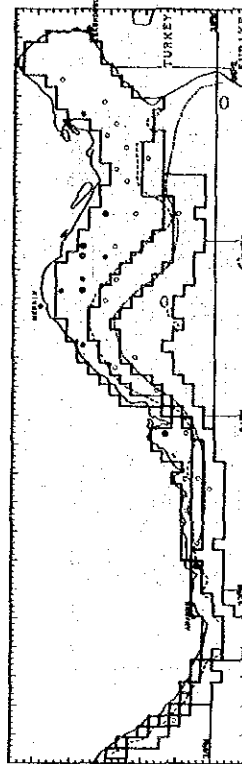
Fig. 5-1-3-11-1  
The catch in kg of annular sea bream *Diplodus annularis* at each station in the spring season survey



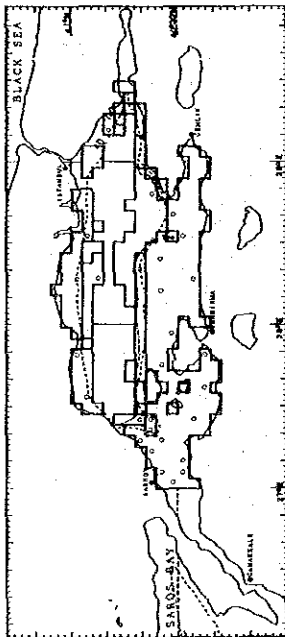
South Aegean Sea



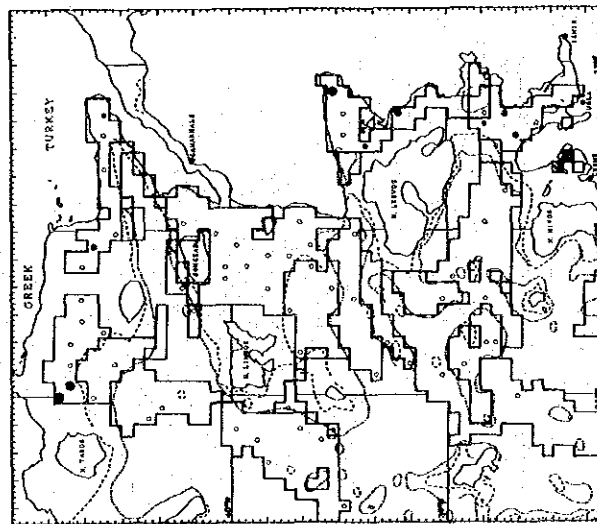
West Mediterranean Sea



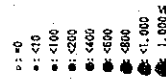
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of annular sea bream *Diplodus annularis* at each station in the summer season survey

Fig. 5-1-3-11-2

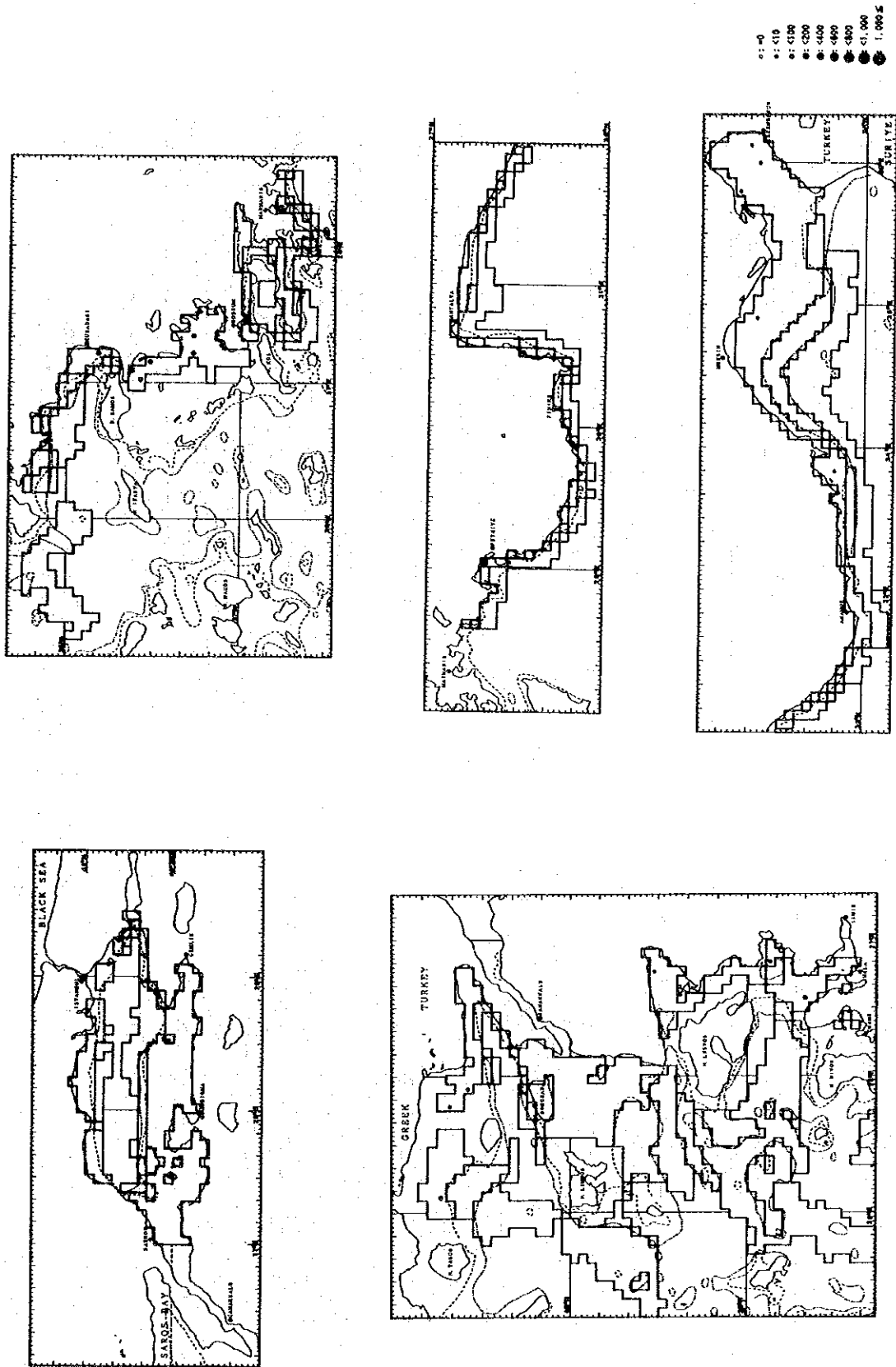
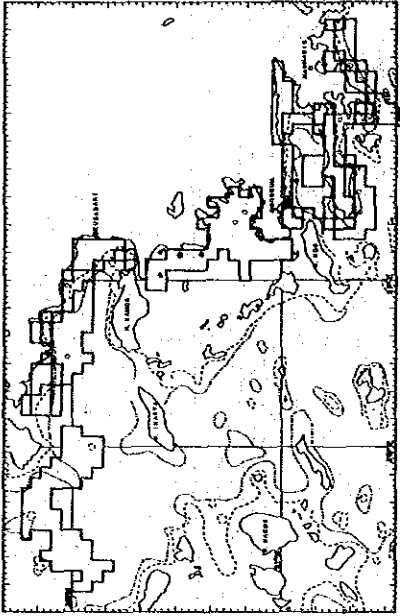
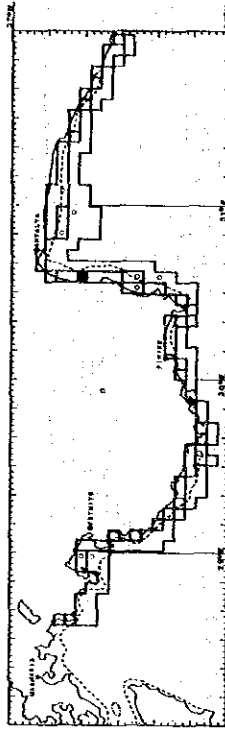


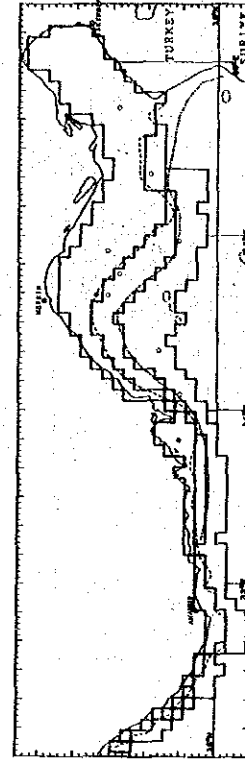
Fig. 5-1-3-11-3 The catch in kg of annular sea bream *Diplodus annularis* at each station in the autumn season survey



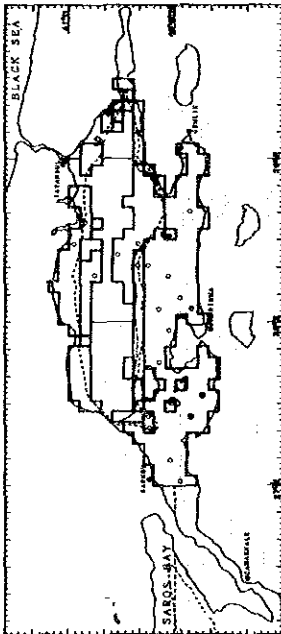
South Aegean Sea



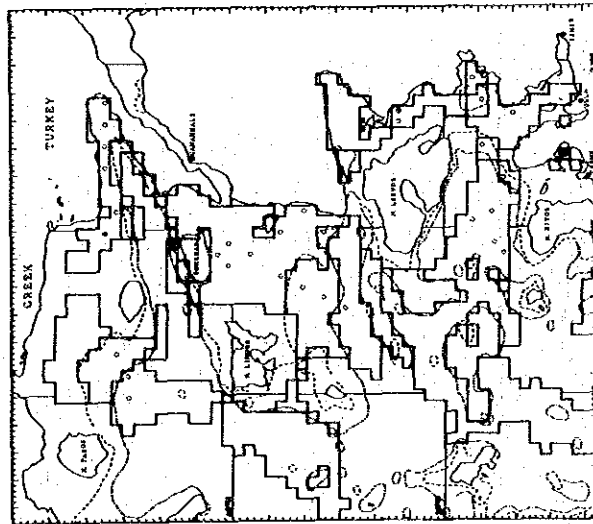
West Mediterranean Sea



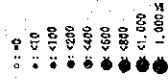
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of annular sea bream *Diplodus annularis* at each station in the winter season survey

Fig. 5-1-3-11-4



The CPUA values of this species in all areas were high at 18 in summer and 10 or less in other seasons. In looking at CPUA by season, sub area and strata, the maximum CPUA of this species was roughly 120. In addition, the CPUA values of this species tended to be high in the South Aegean Sea and West Mediterranean Sea (Table 5-1-3-32).

Table 5-1-3-32 Catch Per Unit Area of Annular Sea Bream

Sub area	Stratum (a)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	0	0	0	9.4
	101~500	0	0	0	0
	Sub total	0	0	0	7.1
North Aegean Sea	20~100	31.7	39.5	1.5	1.0
	101~500	0	0	0	0
	Sub total	17.9	19.5	0.8	0.5
South Aegean Sea	20~100	34.9	71.2	27.3	9.8
	101~500	0	0	0	0
	Sub total	17.5	33.0	12.4	3.4
West Mediterranean Sea	20~100	1.7	116.0	45.6	68.9
	101~500	0	0	0	0
	Sub total	0.7	46.4	18.3	23.0
East Mediterranean Sea	20~100	0.8	11.2	0.5	0
	101~500	0	0	0	0
	Sub total	0.6	7.4	0.3	0
All area	20~100	16.6	31.0	6.4	9.4
	101~500	0	0	0	0
	Total	9.9	17.6	3.8	5.0

## 2) Stock Size

The estimations of the stock size of annular sea bream are indicated in Table 5-1-3-33. The total stock size of this species by season consisted of 423 tons in spring (95% confidence interval:  $\pm 297$  tons, CV: 34%), 762 tons in summer (95% confidence interval:  $\pm 394$  tons, CV: 21%), 150 tons in autumn (95% confidence interval:  $\pm 185$  tons, CV: 39%) and 149 tons in winter (95% confidence interval:  $\pm 366$  tons, CV: 57%). 60-98% of the stock size of this species was observed in the Aegean Sea except in winter. 1/2 of the stock size of this species in winter was in the West Mediterranean Sea.

The maximum difference in the stock size estimations between seasons was roughly 600 tons (between summer and autumn). However, based on the accuracy of the estimations for each season (95% confidence intervals), it cannot be concluded that these differences were the result of seasonal changes in the stock size of this species. It is known that this species thrives in eelgrass bed and sandy mud primarily in extremely shallow areas close to shore. In addition, immature fish (juvenile fish) are

strongly gregarious, moving into brackish water and lagoons at the end of winter and maturing in one year (to a length of roughly 10 cm). It is considered that the stock size of this species continuously fluctuates in one year units based on the short span of its reproduction period. And, the surveyed areas are not included in the depths of 20 m or less, brackish water and lagoons. The underestimations of the stock size may be resulted from those facts mentioned above.

Table 5-1-3-33 Estimation of Stock Size of Annular Sea Bream

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	0	0	0	36.8
	101~500	0	0	0	0
	Sub total	0	0	0	36.8
North Aegean Sea	20~100	314.0	337.5	12.2	10.1
	101~500	0	0	0	0
	Sub total	314.0	337.5	12.2	10.1
South Aegean Sea	20~100	102.0	228.5	84.2	25.2
	101~500	0	0	0	0
	Sub total	102.0	228.5	84.2	25.2
West Mediterranean Sea	20~100	1.9	129.4	50.9	76.9
	101~500	0	0	0	0
	Sub total	1.9	129.4	50.9	76.9
East Mediterranean Sea	20~100	4.9	66.1	2.7	0
	101~500	0	0	0	0
	Sub total	4.9	66.1	2.7	0
All area	20~100	422.8	761.5	150.0	148.9
	101~500	0	0	0	0
	Total	422.8	761.5	150.0	148.9
* 95% confidence interval		± 296.5	± 394.2	± 184.7	± 365.8

\* 95% confidence interval was calculated to total stock size.

## (12) Common Two-Banded Sea Bream *Diplodus vulgaris*

### 1) Distribution

This species was distributed in extremely narrow locations at depths of 100 m or less in the Aegean Sea and East Mediterranean Sea (Figs. 5-1-3-12-1 to 5-1-3-12-4). In addition, the appearance frequency of this species in all areas was 5% or less in all seasons (Table 5-1-3-34).

Table 5-1-3-34 Appearance Frequency of Common Two-Banded Sea Bream\*

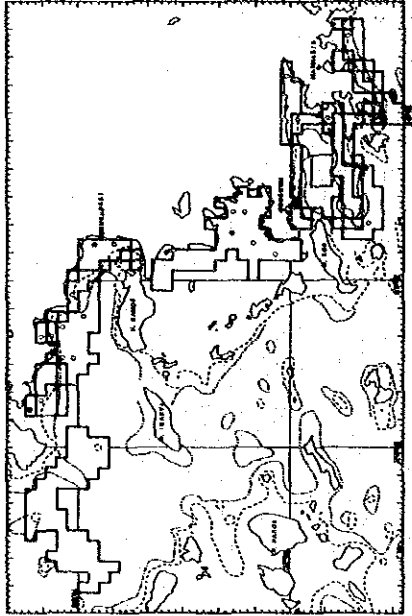
Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	8	9	0	11
	101~500	0	0	0	0
	Sub total	5	4	0	6
South Aegean Sea	20~100	25	0	0	0
	101~500	0	0	0	0
	Sub total	13	0	0	0
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	4	21	9	0
	101~500	0	0	0	0
	Sub total	3	14	6	0
All area	20~100	7	8	2	5
	101~500	0	0	0	0
	Total	4	5	1	2

\* Appearance frequency: No. caught / No. of trawls x 100%

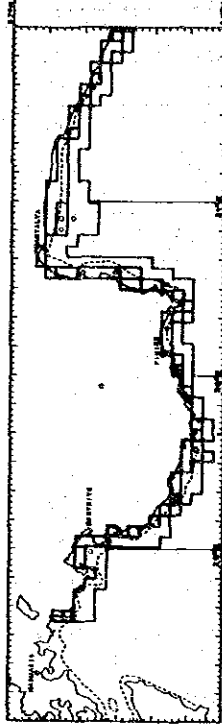
The CPUE values of this species demonstrated a maximum of 17 (winter, the North Aegean Sea) (Table 5-1-3-35).

Table 5-1-3-35 Catch Per Unit Area of Common Two-Banded Sea Bream

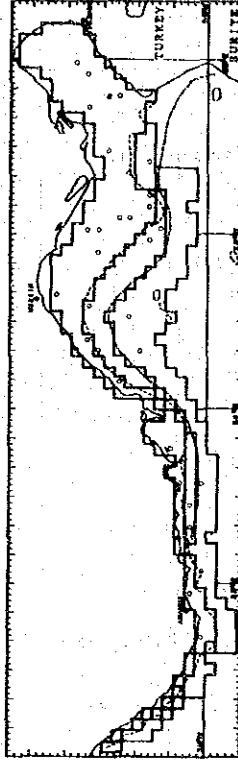
Sub area	Stratum (m)	Mean catch in kg/km <sup>2</sup>			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	2.4	1.8	0	17.0
	101~500	0	0	0	0
	Sub total	1.4	0.9	0	9.5
South Aegean Sea	20~100	0.7	0	0	0
	101~500	0	0	0	0
	Sub total	0.4	0	0	0
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	0.2	0.8	1.7	0
	101~500	0	0	0	0
	Sub total	0.2	0.6	1.1	0
All area	20~100	1.0	0.8	0.4	6.8
	101~500	0	0	0	0
	Total	0.6	0.5	0.3	3.6



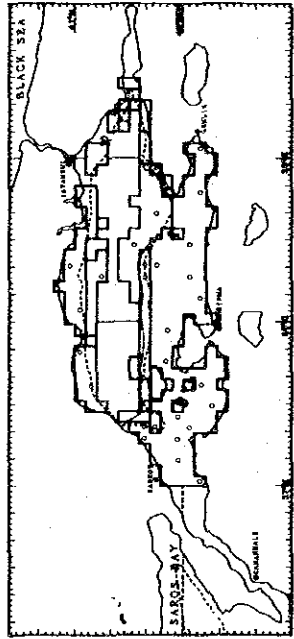
South Aegean Sea



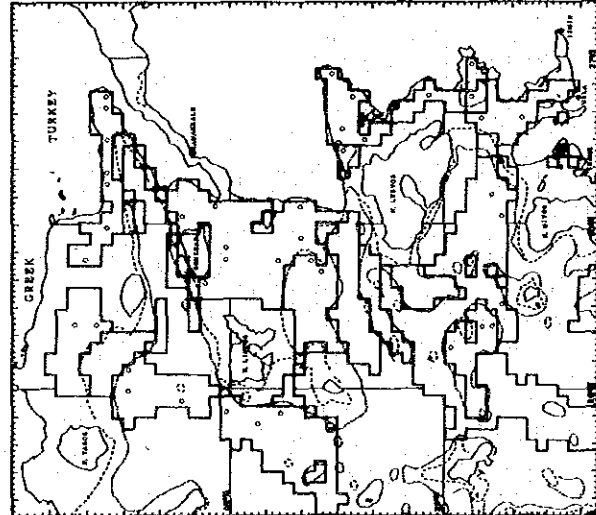
West Mediterranean Sea



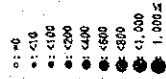
East Mediterranean Sea



The Sea of Marmara

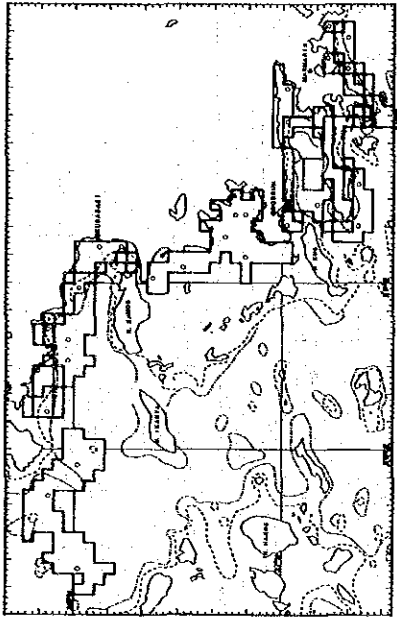


North Aegean Sea

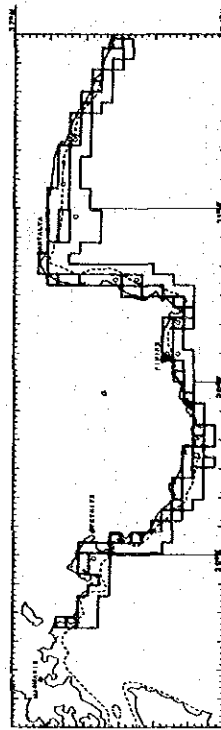


The catch in kg of common two-banded sea bream *Diplodus vulgaris* at each stations in the spring season survey

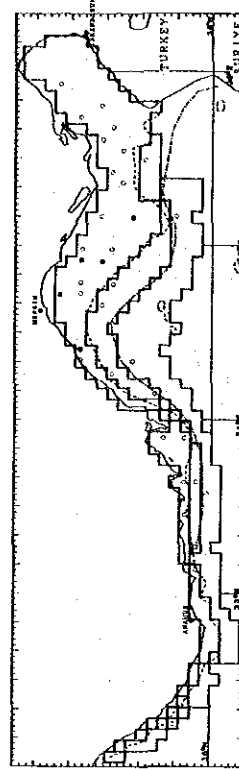
Fig. 5-1-3-12-1



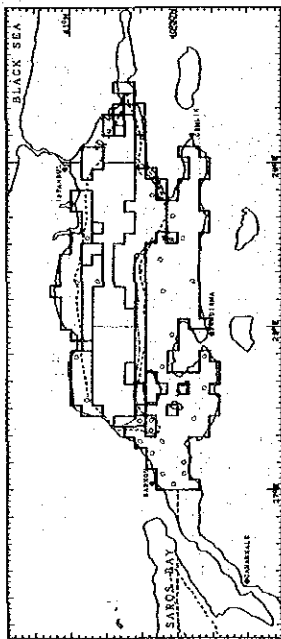
South Aegean Sea



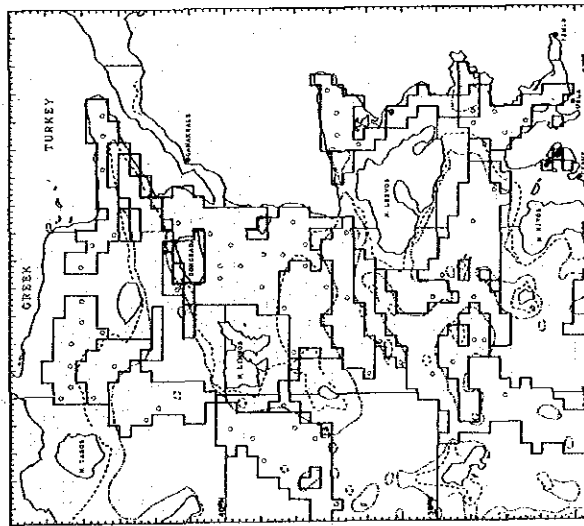
West Mediterranean Sea



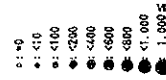
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of common two-banded sea bream *Diploodus vulgaris* at each station in the summer season survey

Fig. 5-1-3-12-2

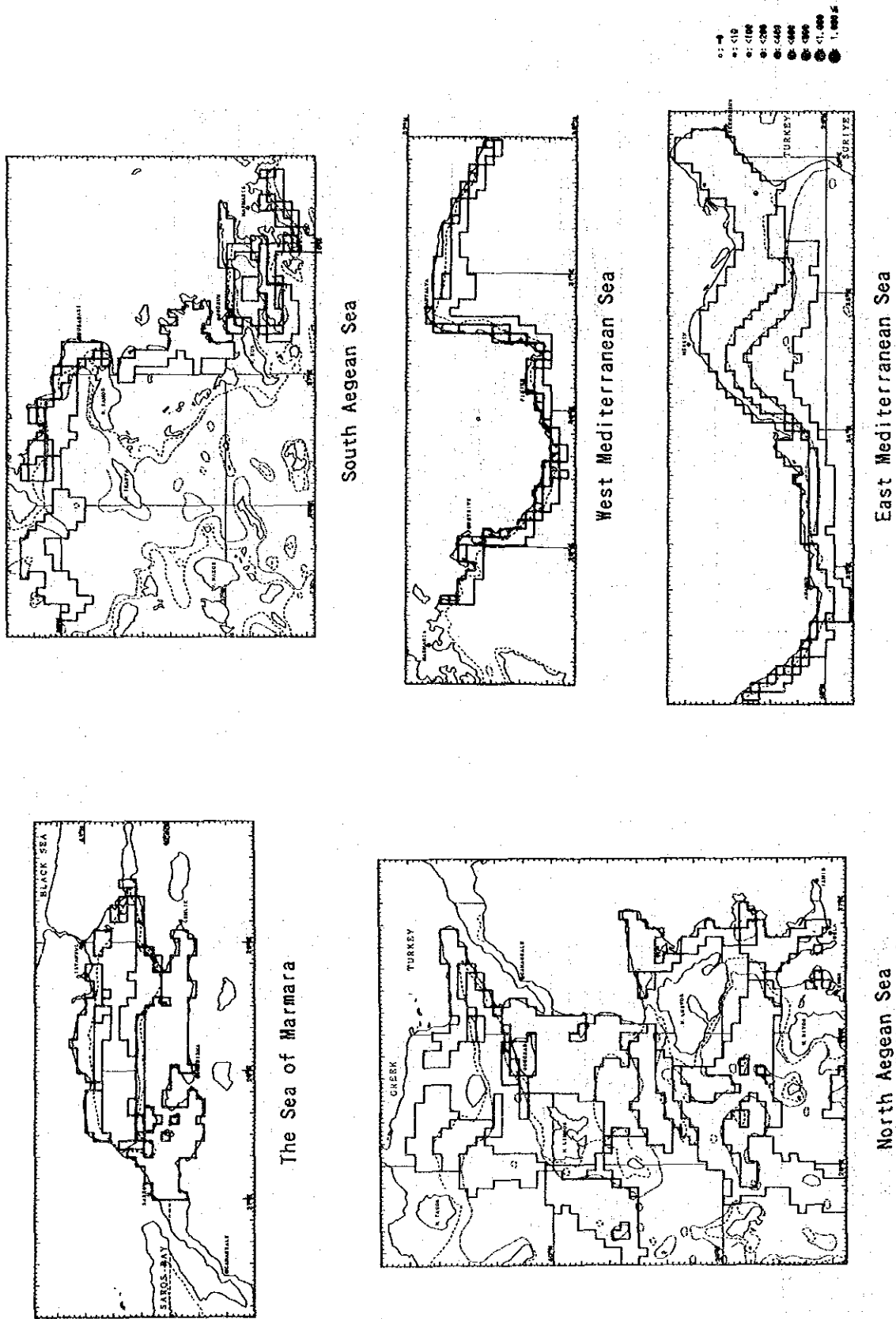
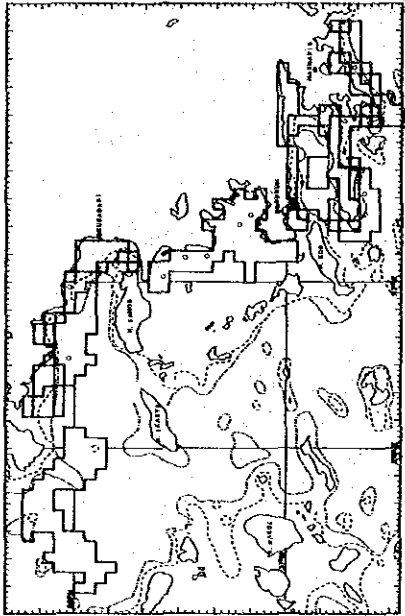
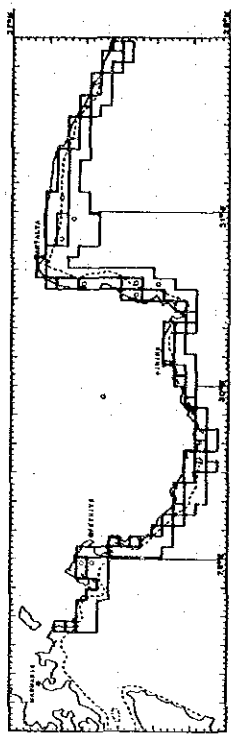


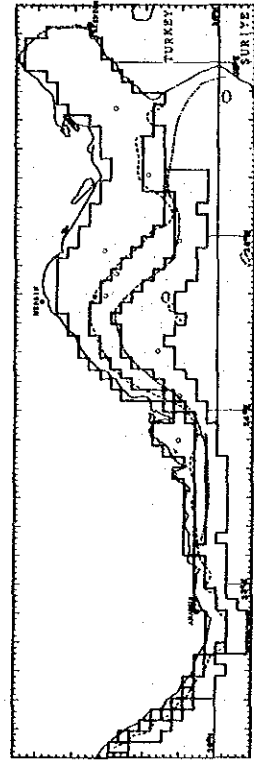
Fig. 5-1-3-12-3 The catch in kg of common two-banded sea bream *Diplodus vulgaris* at each station in the autumn season survey



South Aegean Sea

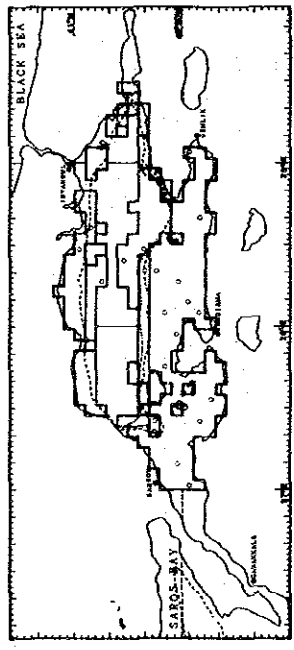


West Mediterranean Sea

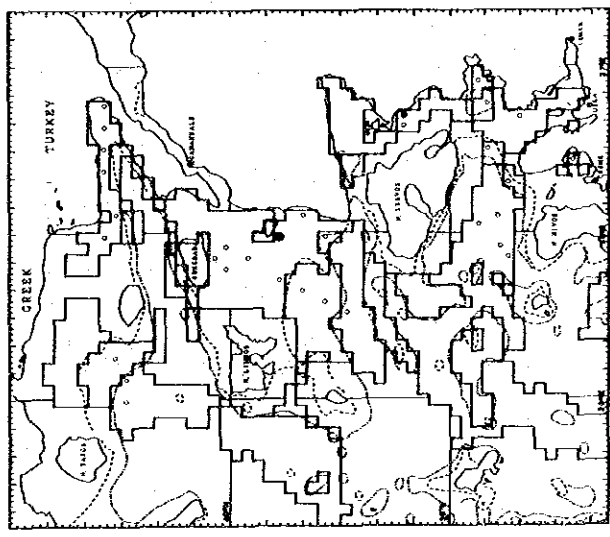


East Mediterranean Sea

- : 0
- : 100
- : 200
- : 300
- : 400
- : 500
- : 1,000



The Sea of Marmara



North Aegean Sea

The catch in kg of common two-banded sea bream *Diplodus vulgaris* at each stations in the winter season survey

Fig. 5-1-3-12-4

## 2) Stock Size

The estimations of the stock size of common two-banded sea bream are indicated in Table 5-1-3-36. The total stock size for each season demonstrated a maximum of 144 tons in winter (95% confidence interval:  $\pm 277$  tons, CV: 91%), and was 10-20 tons in the other seasons. Differences with the stock size estimations between seasons are not significant in consideration of the 95% confidence intervals.

**Table 5-1-3-36 Estimation of Stock Size of Common Two-Banded Sea Bream**

Sub area	Stratum (a)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	17.7	15.1	0	144.0
	101~500	0	0	0	0
	Sub total	17.7	15.1	0	144.0
South Aegean Sea	20~100	2.3	0	0	0
	101~500	0	0	0	0
	Sub total	2.3	0	0	0
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	1.4	5.0	9.9	0
	101~500	0	0	0	0
	Sub total	1.4	5.0	9.9	0
All area	20~100	21.5	20.1	9.9	144.0
	101~500	0	0	0	0
	Total	21.5	20.1	9.9	144.0
* 95% confidence interval		$\pm 32.7$	$\pm 22.6$	$\pm 20.6$	$\pm 276.6$

\* 95% confidence interval was calculated to total stock size.



(13) Common Pandora *Pagellus erythrinus*

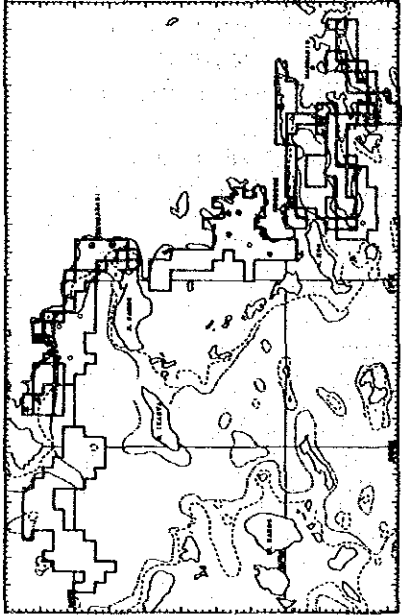
1) Distribution

This species was relatively widely distributed at depths of 200 m or less in the areas surveyed, and primarily at depths of 100 m or less (Figs. 5-1-3-13-1 to 5-1-3-13-4). In addition, the appearance frequencies of this species in all areas was roughly 40% throughout all seasons. The appearance frequency of this species tended to be high in the Mediterranean Sea (Table 5-1-3-37).

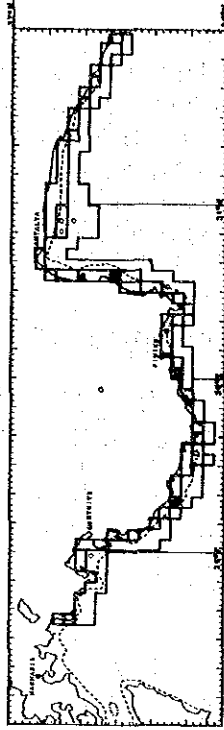
Table 5-1-3-37 Appearance Frequency of Common Pandora\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	14	14	24	27
	101~500	0	0	0	0
	Sub total	11	11	19	19
North Aegean Sea	20~100	56	60	38	61
	101~200	25	13	18	38
	201~500	0	0	0	0
Sub total	38	32	25	43	
South Aegean Sea	20~100	92	77	62	40
	101~200	20	20	20	50
	201~500	0	0	0	0
Sub total	52	39	32	31	
West Mediterranean Sea	20~100	100	75	100	100
	101~200	33	67	67	67
	201~500	0	0	0	0
Sub total	50	50	60	56	
East Mediterranean Sea	20~100	79	71	78	75
	101~200	72	14	86	100
	201~500	0	0	0	0
Sub total	69	52	71	60	
All area	20~100	59	55	51	51
	101~200	35	17	38	48
	201~500	0	0	0	0
Total		44	35	38	38

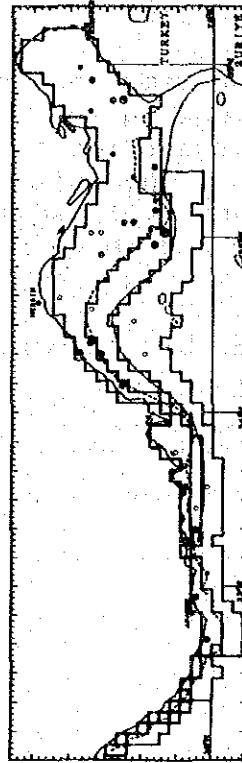
\* Appearance frequency: No. caught / No. of trawls x 100%



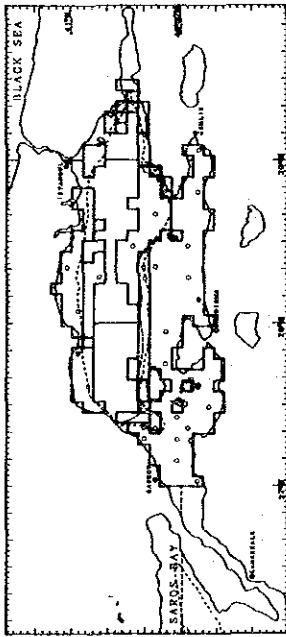
South Aegean Sea



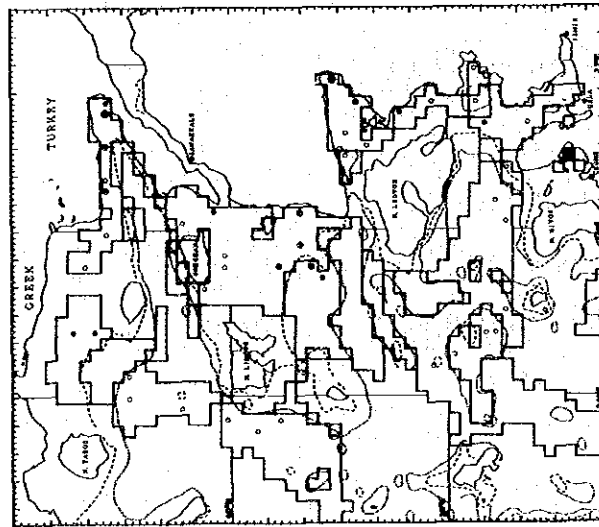
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

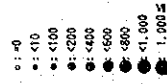
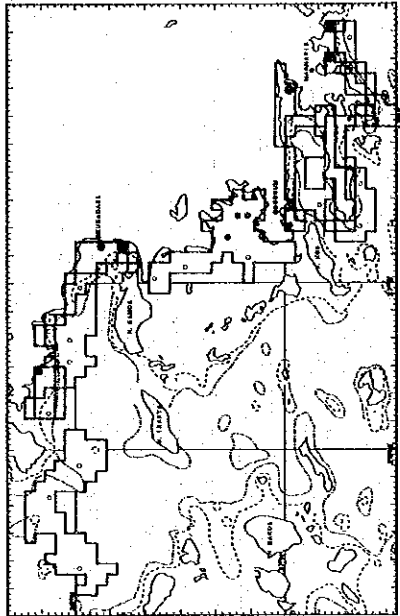
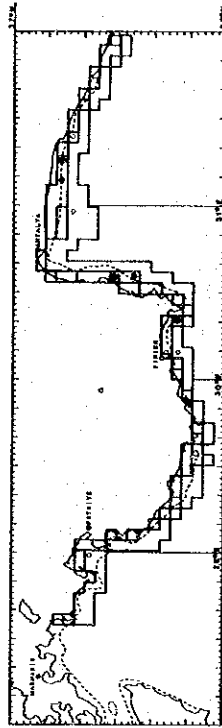


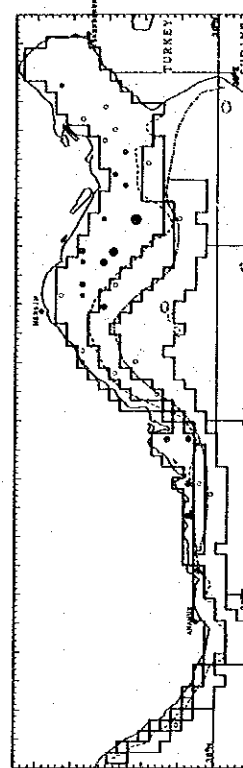
Fig. 5-1-3-13-1 The catch in kg of common pondora *Pagellus erythrinus* at each station in the spring season survey



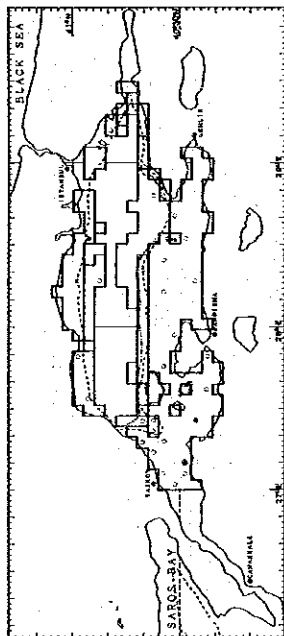
South Aegean Sea



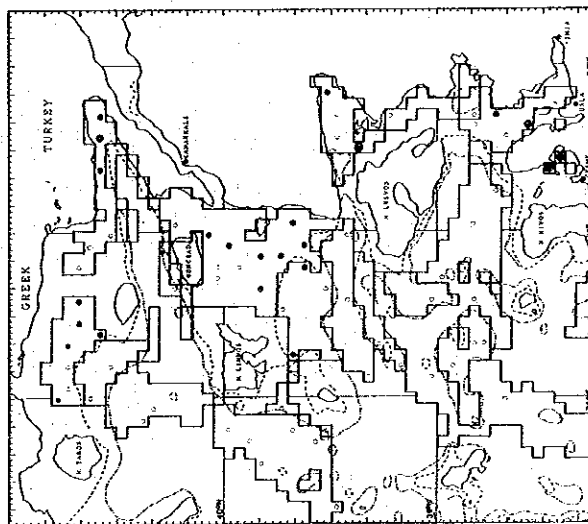
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

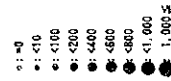
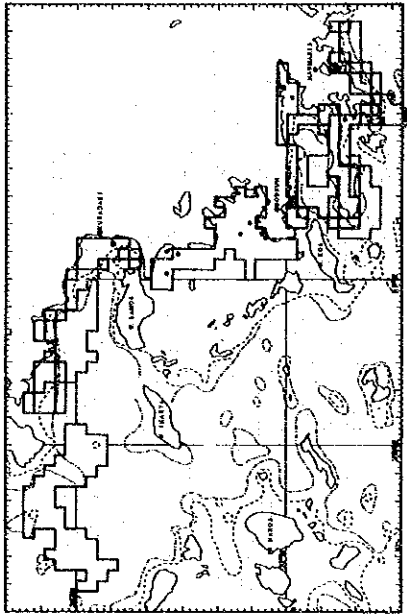
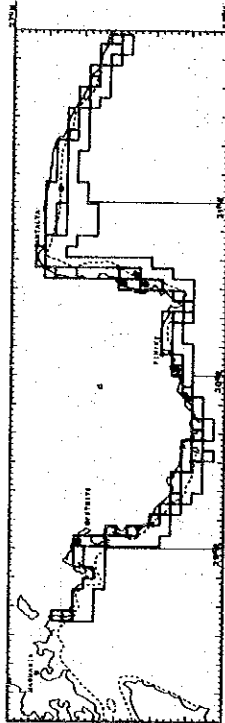


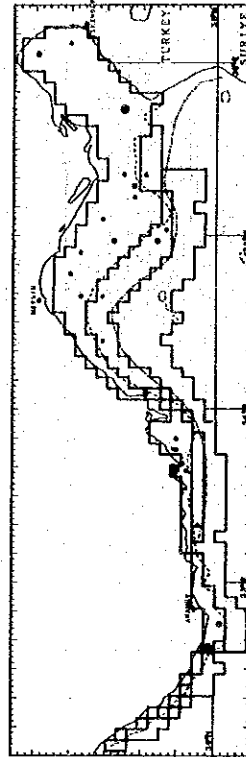
Fig. 5-1-3-13-2 The catch in kg of common pondora *Pagellus erythrinus* at each stations in the summer season survey



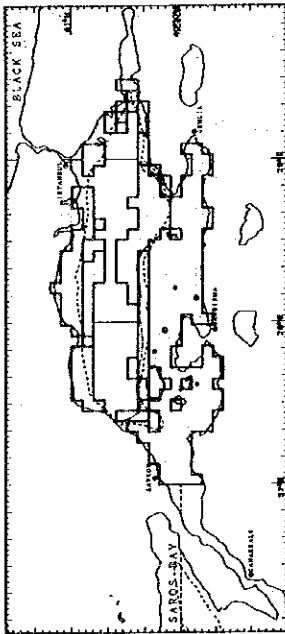
South Aegean Sea



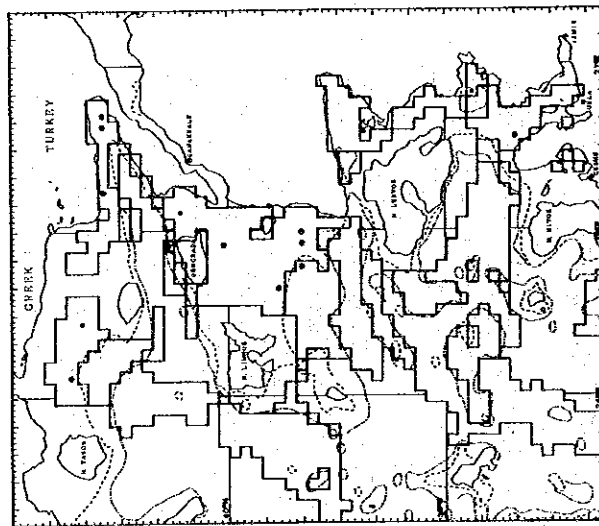
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

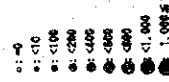
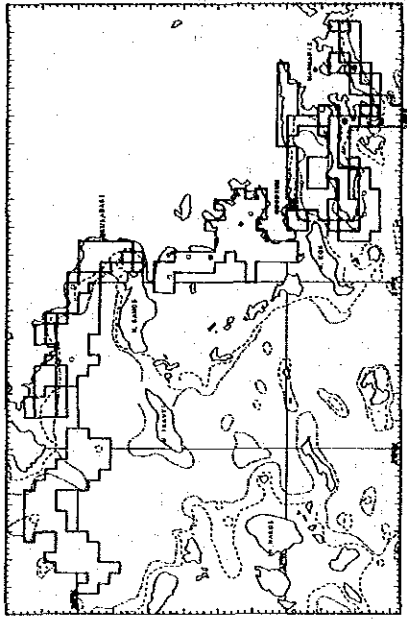
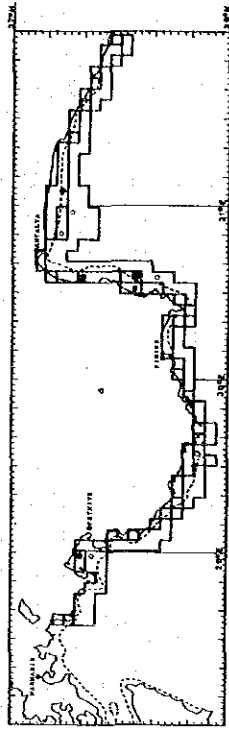


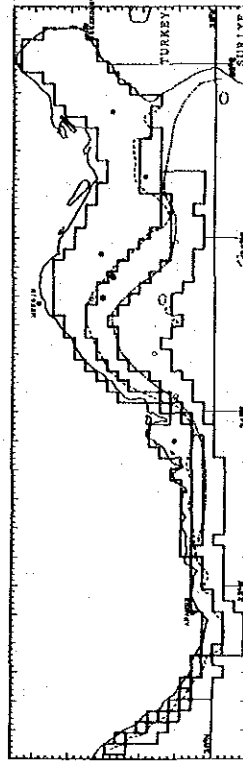
Fig. 5-1-3-13-3 The catch in kg of common ponda *Pagellus erythrinus* at each stations in the autumn season survey



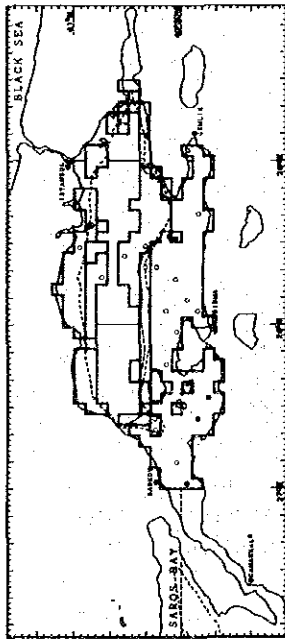
South Aegean Sea



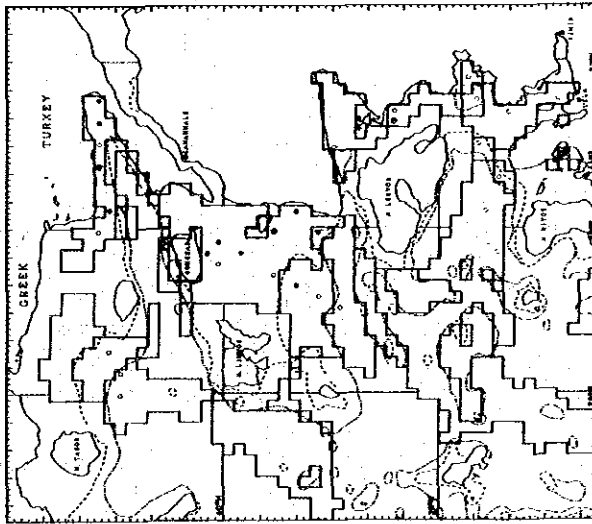
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



Fig. 5-1-3-13-4 The catch in kg of common pondora *Pagellus erythrinus* at each station in the winter season survey

The CPUA values of this species in all areas were from 10-30 throughout all seasons. Although the CPUA values by strata were high in strata of 20-100 m in all seasons except winter, that in winter was high at strata of 101-200 m. The CPUA values were 100 and above at strata of 20-100 m in the South Aegean Sea and West Mediterranean Sea in spring and summer (Table 5-1-3-38).

Table 5-1-3-38 Catch Per Unit Area of Common Pandora

Sub area	Stratum (m)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	1.4	1.0	1.3	0.9
	101~500	0	0	0	0
	Sub total	1.0	0.8	1.0	0.7
North Aegean Sea	20~100	30.4	39.5	7.8	7.9
	101~200	2.5	9.1	1.2	0.3
	201~500	0	0	0	0
	Sub total	17.7	21.5	4.7	4.5
South Aegean Sea	20~100	45.2	136.6	25.8	0
	101~200	0.4	2.2	2.0	20.6
	201~500	0	0	0	0
	Sub total	22.7	63.8	12.1	6.3
West Mediterranean Sea	20~100	126.6	130.3	63.5	39.3
	101~200	3.5	29.9	20.0	60.1
	201~500	0	0	0	0
	Sub total	51.7	61.1	31.4	33.1
East Mediterranean Sea	20~100	34.7	41.2	24.8	3.8
	101~200	88.3	6.6	11.0	16.2
	201~500	0	0	0	0
	Sub total	41.5	28.9	19.0	6.4
All area	20~100	31.2	47.9	15.6	6.6
	101~200	14.9	8.3	5.6	15.6
	201~500	0	0	0	0
	Total	21.6	28.8	10.4	7.3

## 2) Stock Size

The estimations of the stock size of common pandora are indicated in Table 5-1-3-39. The total stock size for each season consisted of 896 tons in spring (95% confidence interval:  $\pm 403$  tons, CV: 19%), 1,241 tons in summer (95% confidence interval:  $\pm 484$  tons, CV: 19%), 414 tons in autumn (95% confidence interval:  $\pm 224$  tons, CV: 27%) and 224 tons in winter (95% confidence interval:  $\pm 126$  tons, CV: 24%). The stock size estimations of this species were high in spring and summer, and low in autumn and winter, and this finding was observed in each sub area excluding The Sea of Marmara.

The maximum difference in the stock size between seasons for this species was roughly 1,000 tons (between summer and winter). This fluctuation was believed to be mainly caused by seasonal migration of this species. This species is known to be demersal.

species that thrives on various sea bottoms normally at depths down to roughly 300 m. It is also known to be a gregarious species that migrates and settles at lower depths in winter. Based on these facts, it is presumed that this species, which is broadly distributed throughout all areas surveyed in summer, gradually migrates and settles in deeper areas starting in autumn and into winter (including depths of 400 m or more beyond the maximum water depth surveyed since none of this species was caught at strata of 201-500 m throughout all seasons). It is then presumed to migrate in reverse fashion to shallower areas along the shore starting in winter and into spring and summer. Thus, confirmation of this seasonal migration of this species, along with an explanation of relevant factors, will have to wait until additional surveys and research in the future.

Table 5-1-3-39 Estimation of Stock Size of Common Pandora

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	6.7	5.5	7.0	6.6
	101~500	0	0	0	0
	Sub total	6.7	5.5	7.0	6.6
North Aegean Sea	20~100	230.9	336.9	71.2	63.5
	101~200	10.3	37.0	4.7	1.2
	201~500	0	0	0	0
	Sub total	241.1	374.0	75.9	64.7
South Aegean Sea	20~100	142.9	438.6	79.7	0
	101~200	0.5	2.7	2.4	22.0
	201~500	0	0	0	0
	Sub total	143.4	441.3	82.1	22.0
West Mediterranean Sea	20~100	141.3	145.4	70.9	43.9
	101~200	2.1	17.8	11.9	35.7
	201~500	0	0	0	0
	Sub total	143.4	163.1	82.8	79.6
East Mediterranean Sea	20~100	205.7	244.4	146.8	22.5
	101~200	155.6	13.2	19.4	28.6
	201~500	0	0	0	0
	Sub total	361.3	257.6	166.2	51.1
All area	20~100	727.4	1,170.8	375.5	136.5
	101~200	168.4	70.7	38.5	87.4
	201~500	0	0	0	0
	Total	895.8	1,241.4	414.0	224.0
* 95% confidence interval		± 402.6	± 483.7	± 224.2	± 125.5

\* 95% confidence interval was calculated to total stock size.

(14) Axillary Sea Bream *Pagellus acarne*

1) Distribution

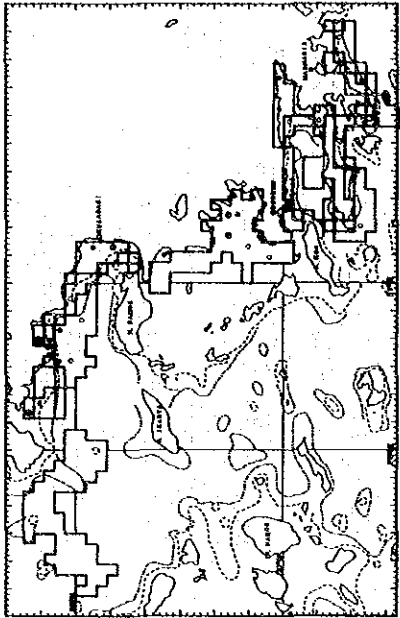
This species was sporadically distributed from shallow to deep areas in the Aegean Sea and Mediterranean Sea (Figs. 5-1-3-14-1 to 5-1-3-14-4). In addition, the appearance frequencies of this species in all areas were roughly 10-20% throughout all seasons (Table 5-1-3-40).

Table 5-1-3-40 Appearance Frequency of Axillary Sea Bream\*

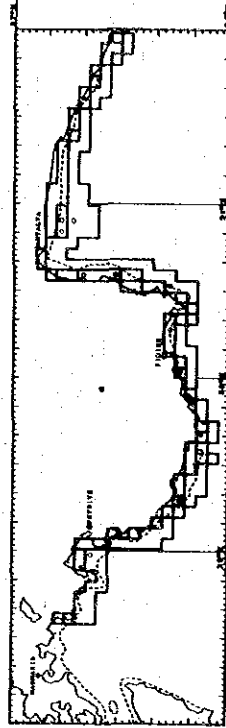
Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	19	26	13	17
	101~200	13	0	9	13
	201~500	0	0	0	0
	Sub total	13	13	9	12
South Aegean Sea	20~100	67	46	54	20
	101~200	40	0	20	0
	201~500	17	0	0	0
	Sub total	48	22	29	8
West Mediterranean Sea	20~100	50	25	75	67
	101~200	0	100	33	33
	201~500	0	33	0	0
	Sub total	20	50	40	33
East Mediterranean Sea	20~100	17	38	26	0
	101~200	43	43	0	0
	201~500	0	50	0	0
	Sub total	20	40	18	0
All area	20~100	22	26	22	13
	101~200	23	17	10	10
	201~500	4	8	0	0
	Total	19	20	15	9

\* Appearance frequency: No. caught / No. of trawls x 100%

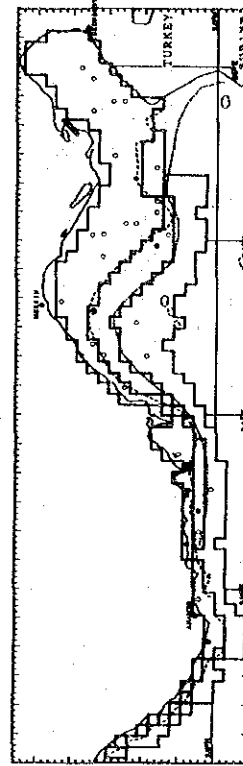




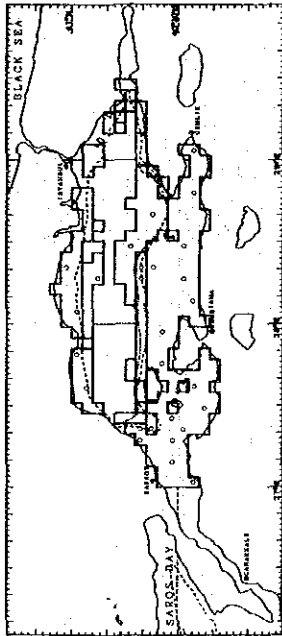
South Aegean Sea



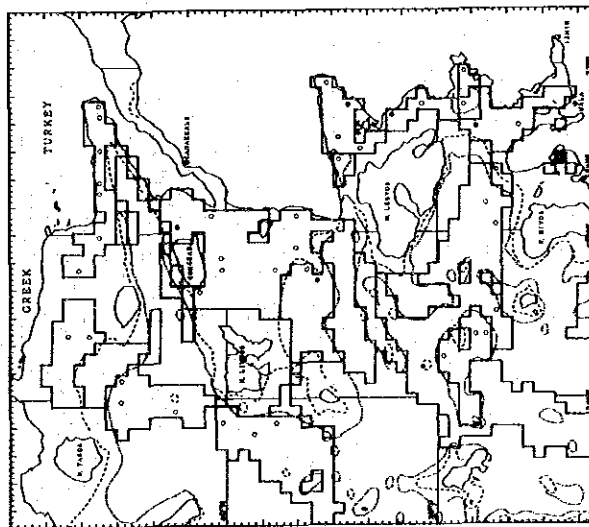
West Mediterranean Sea



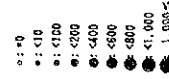
East Mediterranean Sea



The Sea of Marmara

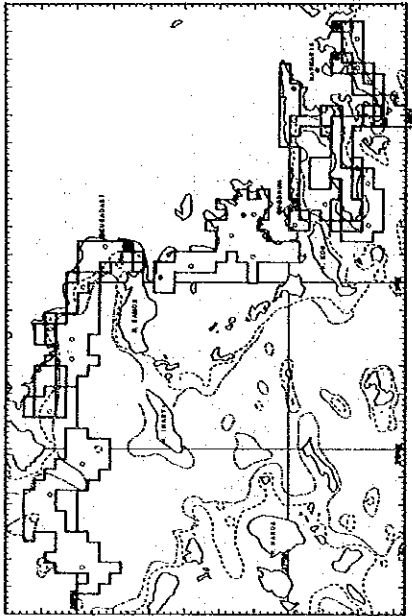


North Aegean Sea

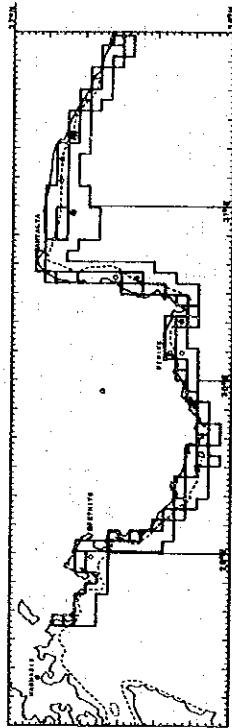


The catch in kg of axillary sea bream *Pagellus acarne* at each stations in the spring season survey

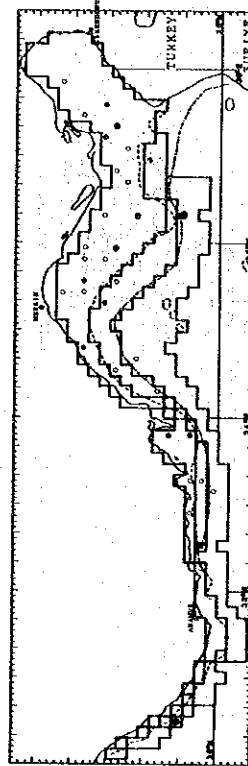
Fig. 5-1-3-14-1



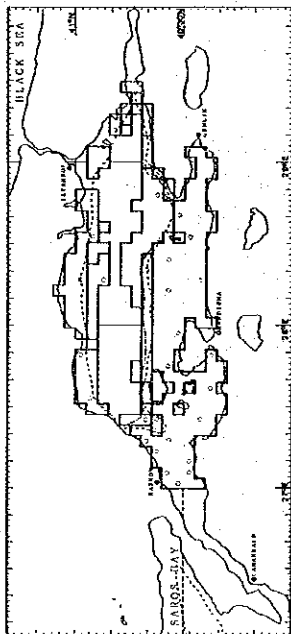
South Aegean Sea



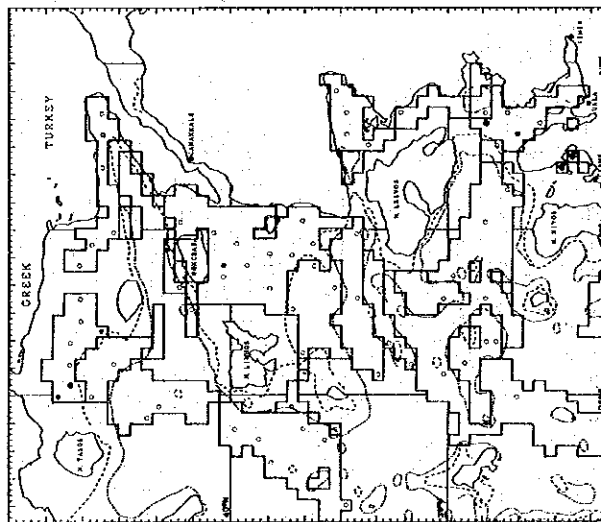
West Mediterranean Sea



East Mediterranean Sea



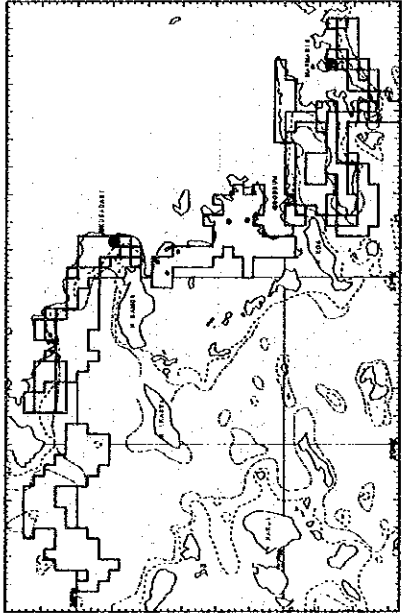
The Sea of Marmara



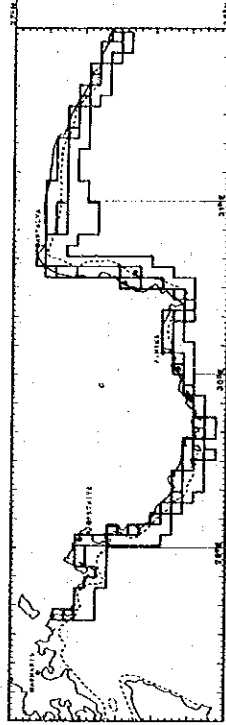
North Aegean Sea

The catch in kg of axillary sea bream *Pagellus acarne* at each stations in the summer season survey

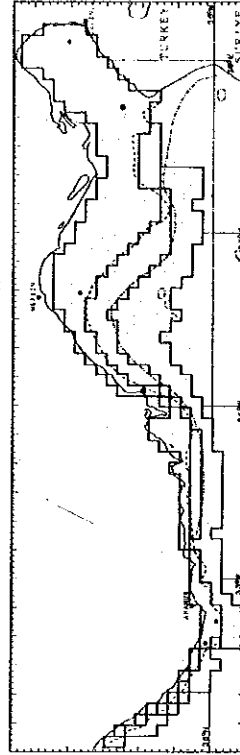
Fig. 5-1-3-14-2



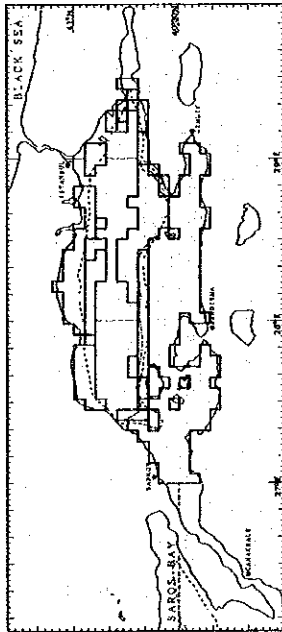
South Aegean Sea



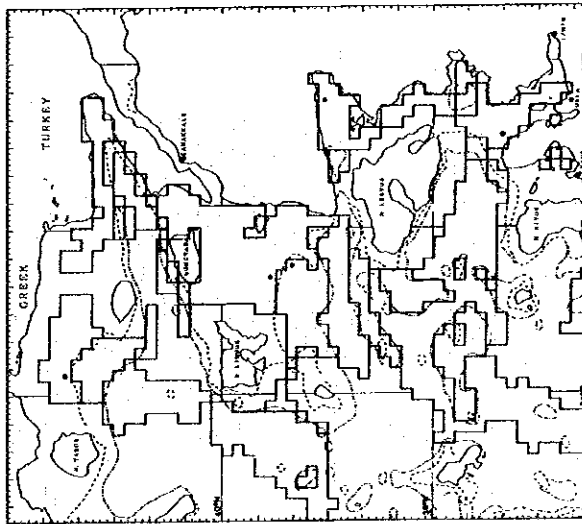
West Mediterranean Sea



East Mediterranean Sea



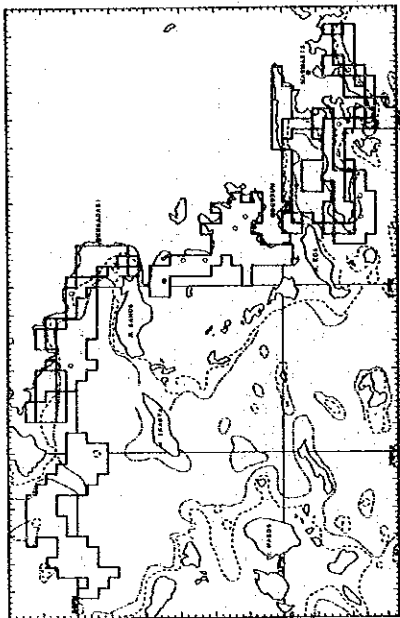
The Sea of Marmara



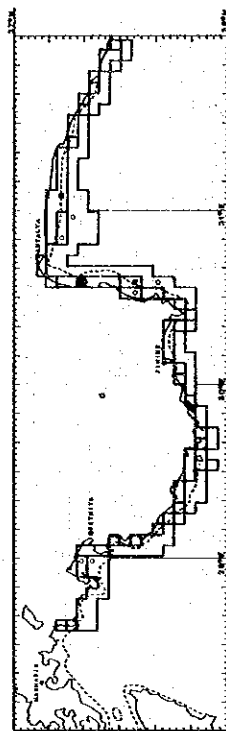
North Aegean Sea

The catch in kg of axillary sea bream *Pagellus acarne* at each stations in the autumn season survey

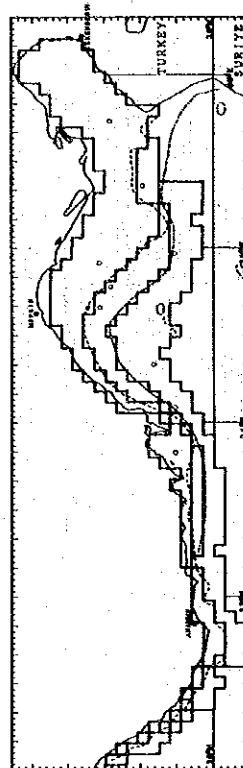
Fig. 5-1-3-14-3



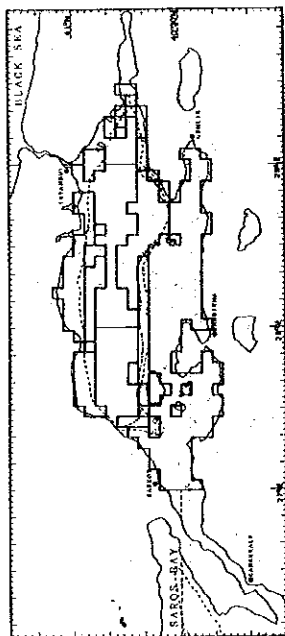
South Aegean Sea



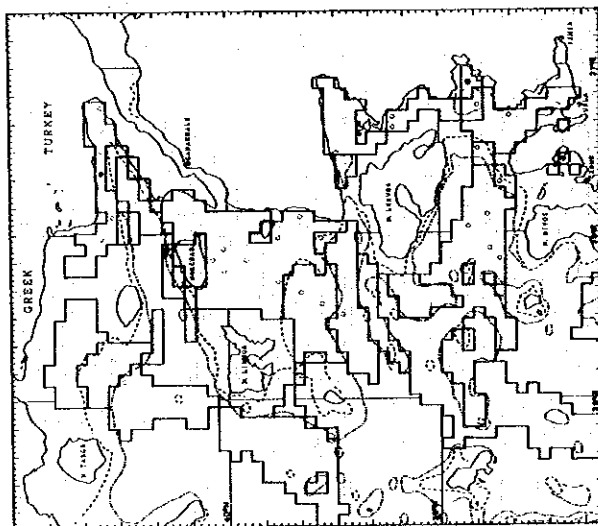
West Mediterranean Sea



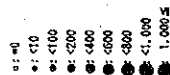
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of axillary sea bream *Pagellus acarne* at each stations in the winter season survey

Fig. 5-1-3-14-4

The CPUA values of this species in all areas were roughly 4-10 throughout all seasons. However, the CPUA values of 100 were demonstrated depending on the season and strata. Areas having the high CPUA values consisted of the South Aegean Sea (excluding winter) and the West Mediterranean Sea in winter (Table 5-1-3-41).

Table 5-1-3-41 Catch Per Unit Area of Axillary Sea Bream

Sub area	Stratum (a)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	9.5	3.9	3.0	1.8
	101~200	0.4	0	0	0
	201~500	0	0	0	0
	Sub total	5.5	1.9	1.7	1.0
South Aegean Sea	20~100	33.5	34.2	119.7	1.1
	101~200	0.4	0	0.7	0
	201~500	1.0	0	0	0
	Sub total	17.1	15.9	54.6	0.4
West Mediterranean Sea	20~100	0	1.7	4.8	87.7
	101~200	0	10.5	0.6	0
	201~500	0	7.0	0	0
	Sub total	0	6.0	2.1	29.2
East Mediterranean Sea	20~100	16.1	5.9	1.9	0
	101~200	1.8	5.1	0	0
	201~500	0	42.0	0	0
	Sub total	11.4	9.7	1.3	0
All area	20~100	11.5	7.5	18.3	7.0
	101~200	0.5	2.0	0.2	0
	201~500	0.3	4.9	0	0
	Total	7.0	5.7	11.0	3.7

## 2) Stock Size

The estimations of the stock size of axillary sea bream are indicated in Table 5-1-3-42. The total stock size for each season consisted of 257 tons in spring (95% confidence interval:  $\pm 250$  tons, CV: 48%), 298 tons in summer (95% confidence interval:  $\pm 277$  tons, CV: 36%), 418 tons in autumn (95% confidence interval:  $\pm 519$  tons, CV: 57%) and 116 tons in winter (95% confidence interval:  $\pm 386$  tons, CV: 78%).

The maximum difference in the stock size estimations between seasons was roughly 300 tons (between summer and winter), and the minimum difference was roughly 40 tons (between spring and summer). These differences are not significant in consideration of the estimation accuracy of each season (range of 95% confidence intervals: 250-520 tons).

Table 5-1-3-42 Estimation of Stock Size of Axillary Sea Bream

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	70.9	33.7	25.2	14.9
	101~200	1.5	0	0	0
	201~500	0	0	0	0
	Sub total	72.4	33.7	25.2	14.9
South Aegean Sea	20~100	81.2	109.8	374.9	2.8
	101~200	0.5	0	0.8	0
	201~500	4.4	0	0	0
	Sub total	86.1	109.8	375.7	2.8
West Mediterranean Sea	20~100	0	1.9	5.4	97.9
	101~200	0	6.2	0.4	0
	201~500	0	10.1	0	0
	Sub total	0	18.3	5.8	97.9
East Mediterranean Sea	20~100	95.3	34.8	11.4	0
	101~200	3.2	10.3	0	0
	201~500	0	91.5	0	0
	Sub total	98.5	136.6	11.4	0
All area	20~100	247.4	180.2	416.9	115.5
	101~200	5.2	16.5	1.2	0
	201~500	4.4	101.7	0	0
	Total	257.0	298.3	418.1	115.5
* 95% confidence interval		± 249.5	± 276.6	± 518.9	± 385.5

\* 95% confidence interval was calculated to total stock size.

(15) Red Sea Bream *Pagellus bogaraveo*

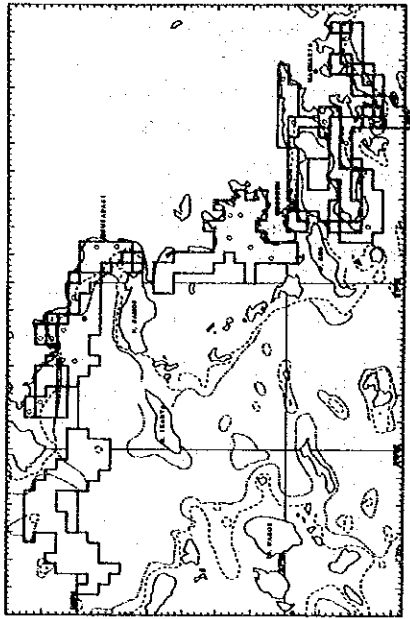
1) Distribution

This species was distributed from shallow to deep strata in the Aegean Sea and Mediterranean Sea (Figs. 5-1-3-15-1 to 5-1-3-15-4). In addition, the appearance frequencies of this species for all areas was roughly 10% throughout all seasons (Table 5-1-3-43).

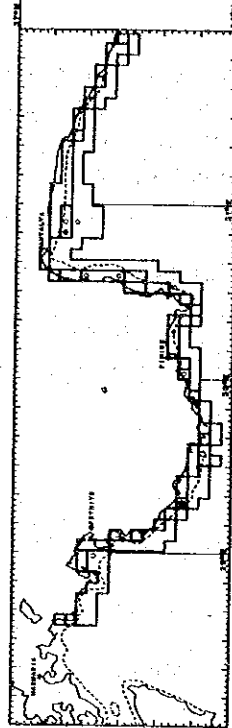
Table 5-1-3-43 Appearance Frequency of Red Sea Bream\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	4	6	16	22
	101~200	25	0	27	25
	201~500	60	20	15	43
	Sub total	20	9	18	27
South Aegean Sea	20~100	0	0	8	0
	101~200	0	0	0	0
	201~500	17	20	0	0
	Sub total	4	7	4	0
West Mediterranean Sea	20~100	0	0	25	0
	101~200	67	0	0	0
	201~500	0	0	0	0
	Sub total	20	0	10	0
East Mediterranean Sea	20~100	0	0	13	0
	101~200	0	0	29	0
	201~500	0	25	0	33
	Sub total	0	3	15	10
All area	20~100	1	2	11	9
	101~200	15	0	17	10
	201~500	27	18	6	20
	Total	9	5	11	12

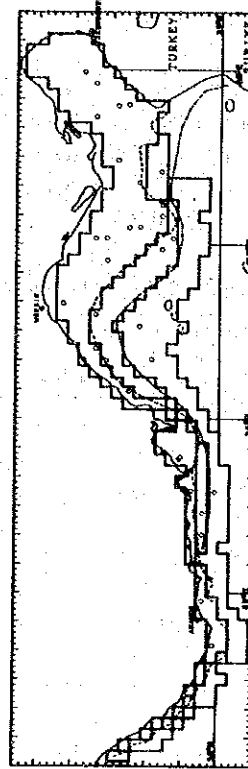
\* Appearance frequency: No. caught / No. of trawls x 100%



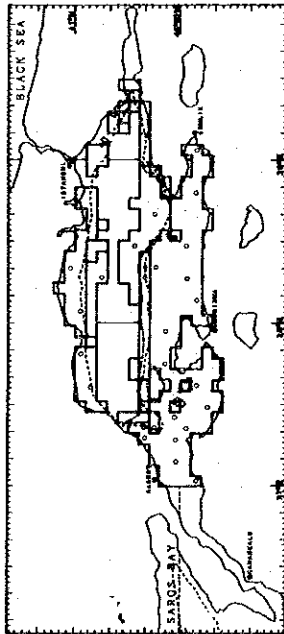
South Aegean Sea



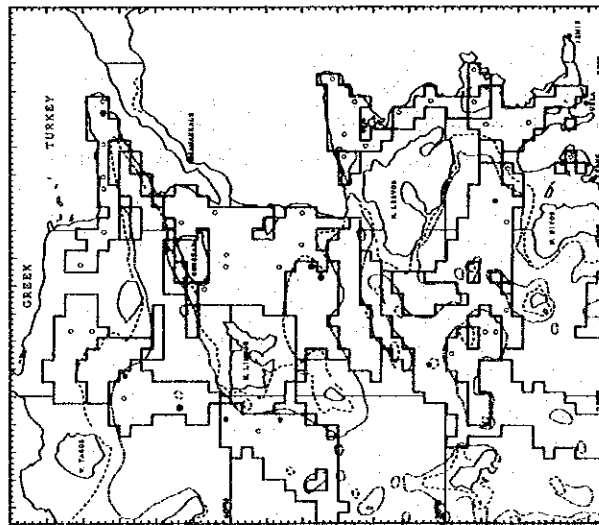
West Mediterranean Sea



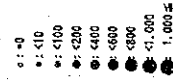
East Mediterranean Sea



The Sea of Marmara



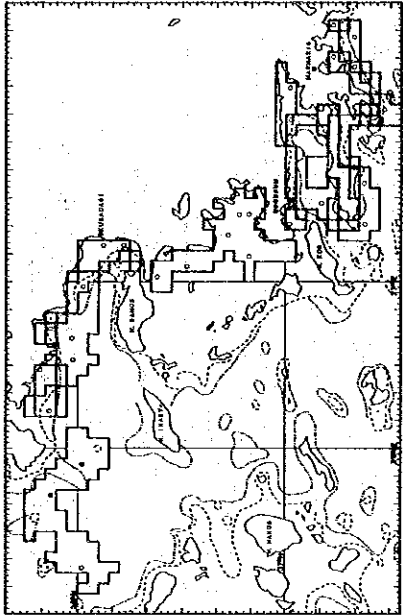
North Aegean Sea



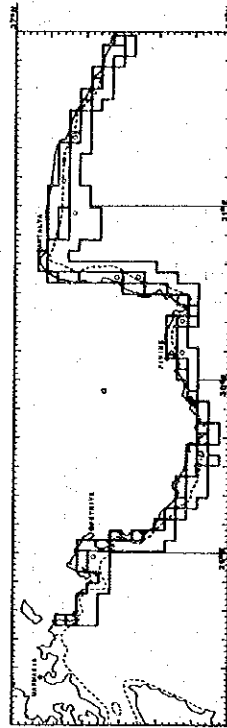
The catch in kg of red sea bream *Pagellus bogaraveo* at each stations in the spring season survey

Fig. 5-1-3-15-1

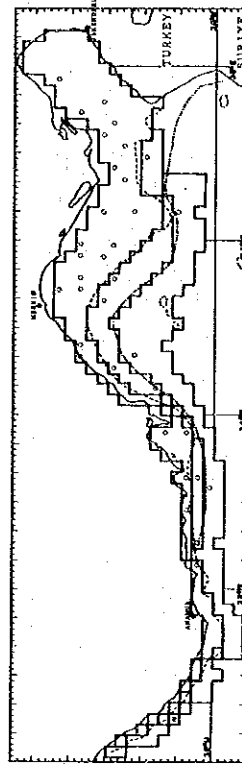




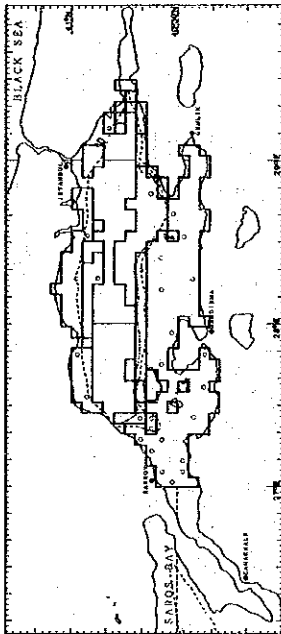
South Aegean Sea



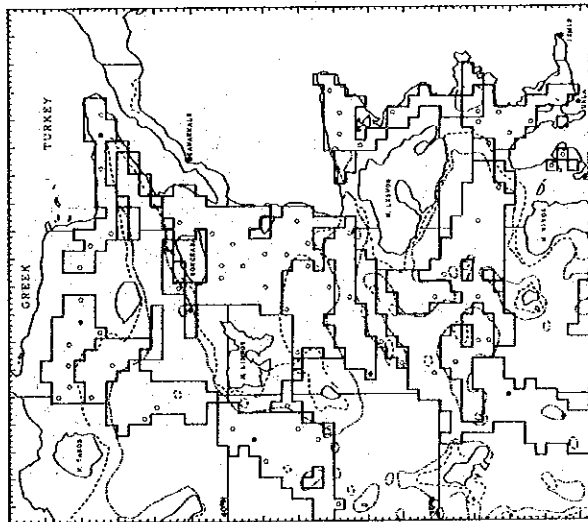
West Mediterranean Sea



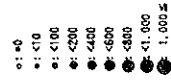
East Mediterranean Sea



The Sea of Marmara

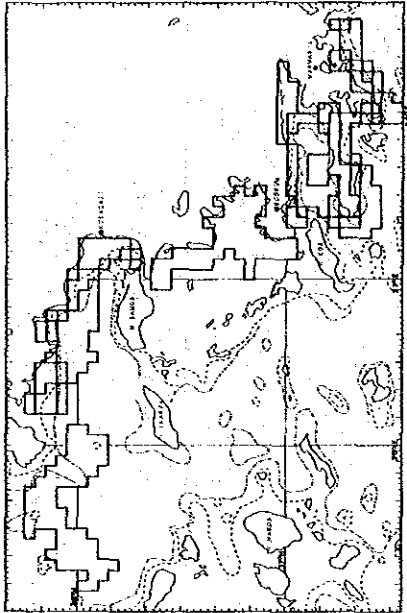


North Aegean Sea

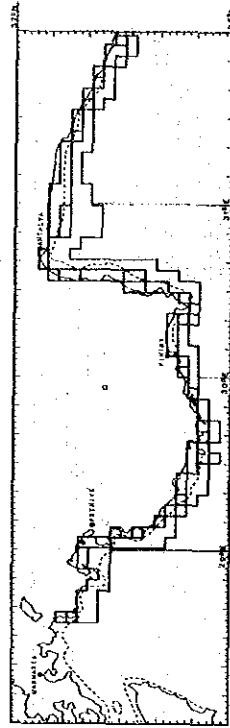


The catch in kg of red sea bream *Pagellus bogaraveo* at each station in the summer season survey

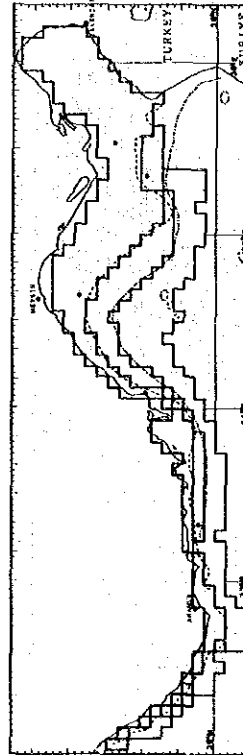
Fig. 5-1-3-15-2



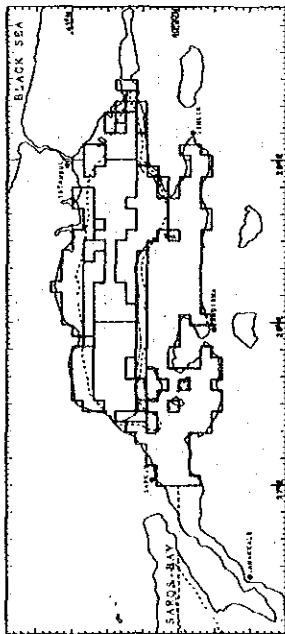
South Aegean Sea



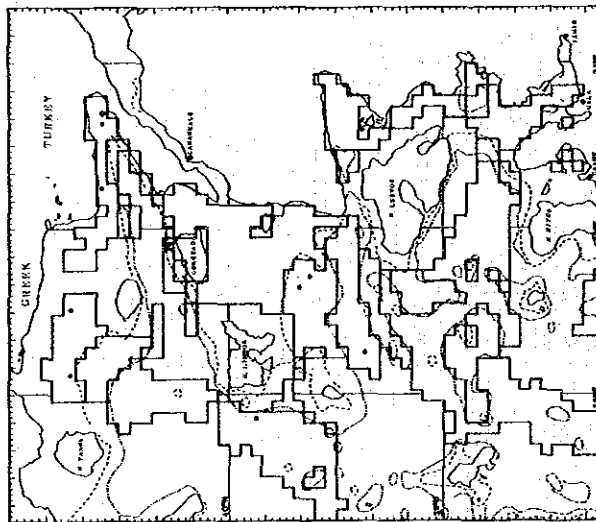
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara

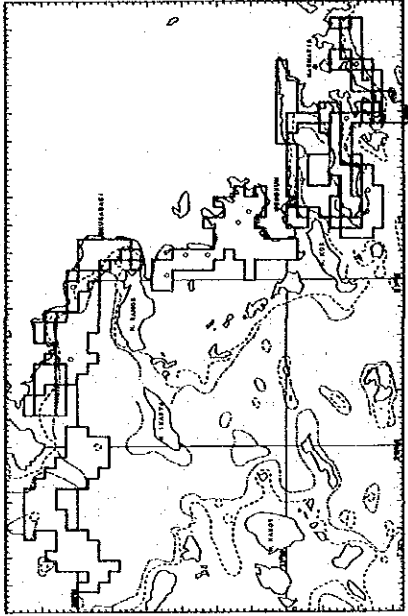


North Aegean Sea

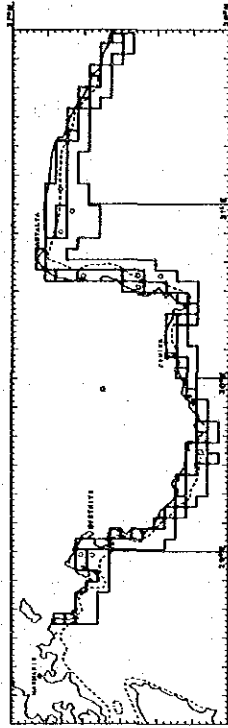


The catch in kg of red sea bream *Pagellus bogaraveo* at each station in the autumn season survey

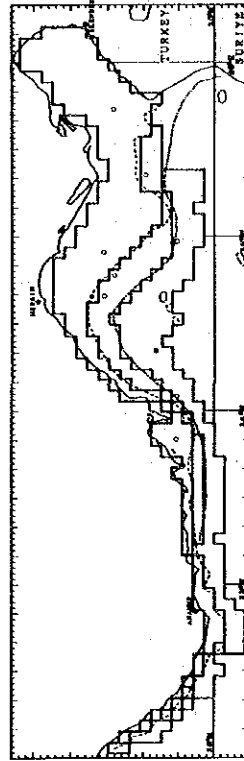
Fig. 5-1-3-15-3



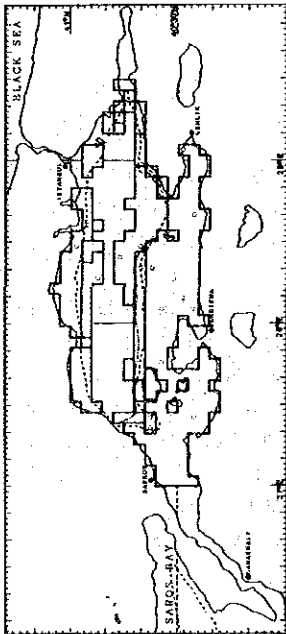
South Aegean Sea



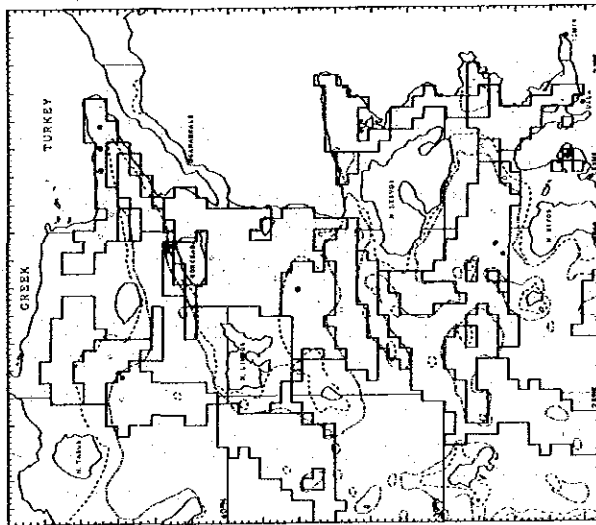
West Mediterranean Sea



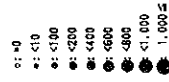
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of red sea bream *Pagellus bogaraveo* at each station in the winter season survey

Fig. 5-1-3-15-4

The CPUA values of this species in all areas were 2 or less throughout all seasons. In terms of the CPUA values by season, sub area and stratum as well, the maximum value was only 19 (Table 5-3-1-44).

Table 5-1-3-44 Catch Per Unit Area of Red Sea Bream

Sub area	Stratum (a)	Mean catch in kg/km <sup>2</sup>			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	1.5	0.2	0.6	3.4
	101~200	4.3	0	0	5.6
	201~500	3.9	0.4	0.4	0.4
	Sub total	2.6	0.2	0.4	3.3
South Aegean Sea	20~100	0	0	0.3	0
	101~200	0	0	0	0
	201~500	1.0	1.2	0	0
	Sub total	0.3	0.4	0.1	0
West Mediterranean Sea	20~100	0	0	0	0
	101~200	19.4	0	0	0
	201~500	0	0	0	0
	Sub total	5.8	0	0	0
East Mediterranean Sea	20~100	0	0	0.1	0
	101~200	0	0	0	0
	201~500	0	1.0	0	1.4
	Sub total	0	0.1	0.1	0.4
All area	20~100	0.5	0.1	0.3	1.4
	101~200	4.0	0	0	2.0
	201~500	1.9	0.6	0.1	0.4
	Total	1.5	0.2	0.2	1.3

## 2) Stock Size

The estimations of the stock size of red sea bream are indicated in Table 5-1-3-45. The total stock size for each season was extremely low at only 10-80 tons throughout all seasons. The majority of the stock size of this species distributed in the Mediterranean Sea (different from the East and West Mediterranean Sea as referred to in the sub areas of this survey) is known to be located in the West Mediterranean Sea, with none or extremely small stock size distributed in the East Mediterranean Sea beyond the Sicilian Straits. Consequently, it is only natural that the stock size of this species in the areas surveyed was extremely small. In addition, the main age composition of this species caught during this survey was immature fish mainly 1 and 2 years old.

Table 5-1-3-45 Estimation of Stock Size of Red Sea Bream

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~100	11.4	1.6	5.3	27.5
	101~200	17.5	0	0	19.9
	201~500	39.1	3.9	3.5	4.3
	Sub total	68.1	5.5	8.7	51.7
South Aegean Sea	20~100	0	0	1.0	0
	101~200	0	0	0	0
	201~500	4.5	5.2	0	0
	Sub total	4.5	5.2	1.0	0
West Mediterranean Sea	20~100	0	0	0	0
	101~200	11.5	0	0	0
	201~500	0	0	0	0
	Sub total	11.5	0	0	0
East Mediterranean Sea	20~100	0	0	0.5	0
	101~200	0	0	0	0
	201~500	0	2.2	0	3.0
	Sub total	0	2.2	0.5	3.0
All area	20~100	11.4	1.6	6.8	27.5
	101~200	29.0	0	0	19.9
	201~500	43.7	11.3	3.5	7.3
	Total	84.1	12.9	10.2	54.7
* 95% confidence interval		± 71.6	± 11.6	± 9.5	± 54.4

\* 95% confidence interval was calculated to total stock size.

(16) *Barracuda Sphyraena sphyraena*

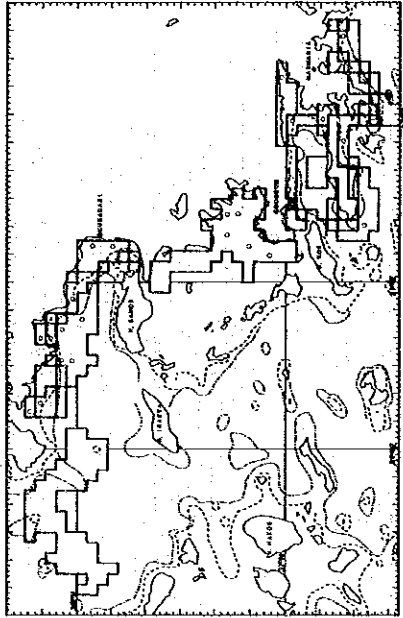
1) Distribution

This species did not appear in The Sea of Marmara or the North Aegean Sea throughout all seasons. It did appear slightly in the South Aegean Sea and Mediterranean Sea depending on the season (Figs. 5-1-3-16-1 to 5-1-3-16-4). The appearance frequency of this species in all areas was either 0 or only a few percent (Table 5-1-3-46).

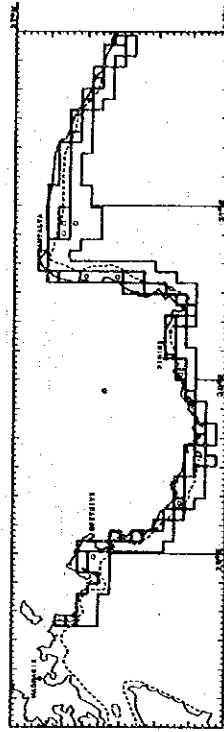
Table 5-1-3-46 Appearance Frequency of Barracuda\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	0	0
	101~200	0	0	0	25
	201~500	0	0	0	0
	Sub total	0	0	0	8
West Mediterranean Sea	20~100	0	50	0	0
	101~500	0	0	0	0
	Sub total	0	20	0	0
East Mediterranean Sea	20~100	0	17	4	0
	101~500	0	0	0	0
	Sub total	0	12	3	0
All area	20~100	0	6	1	0
	101~200	0	0	0	5
	201~500	0	0	0	0
	Total	0	5	1	1

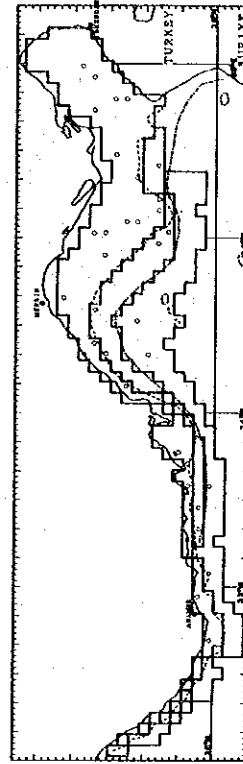
\* Appearance frequency: No. caught / No. of trawls x 100%



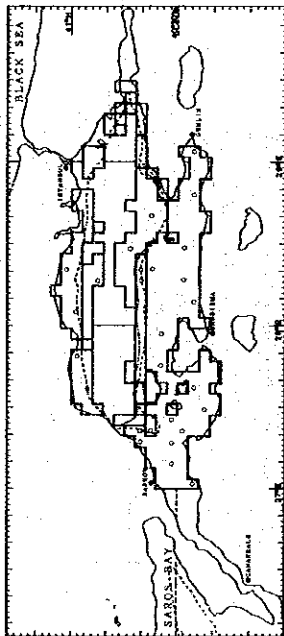
South Aegean Sea



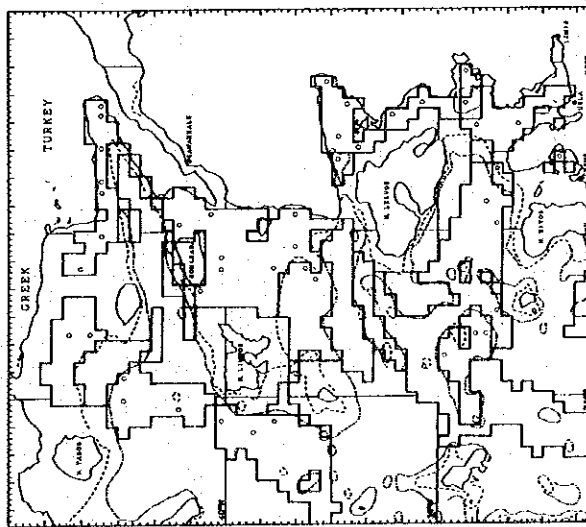
West Mediterranean Sea



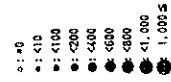
East Mediterranean Sea



The Sea of Marmara

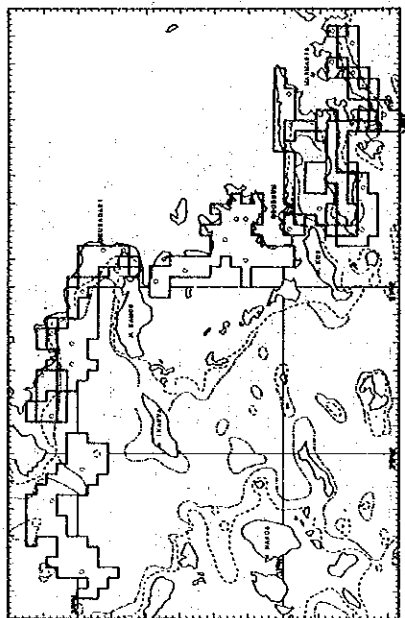


North Aegean Sea

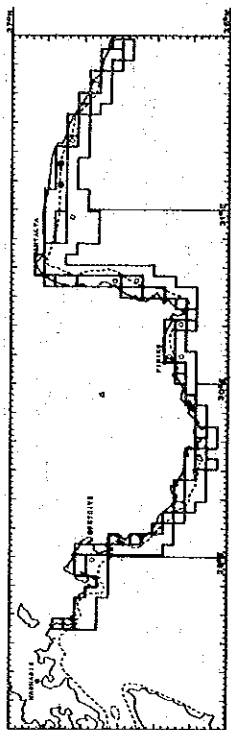


The catch in kg of *barracuda Sphyræna sphyraena* at each stations in the spring season survey

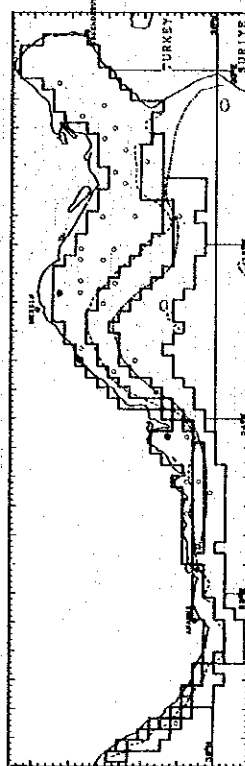
Fig. 5-1-3-16-1



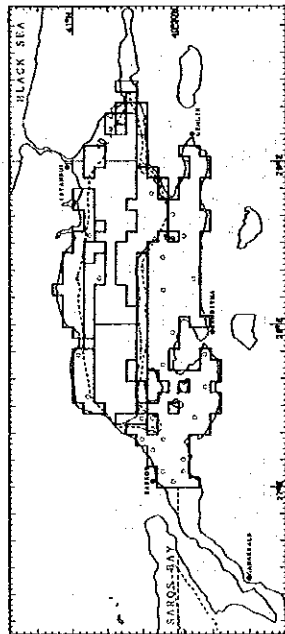
South Aegean Sea



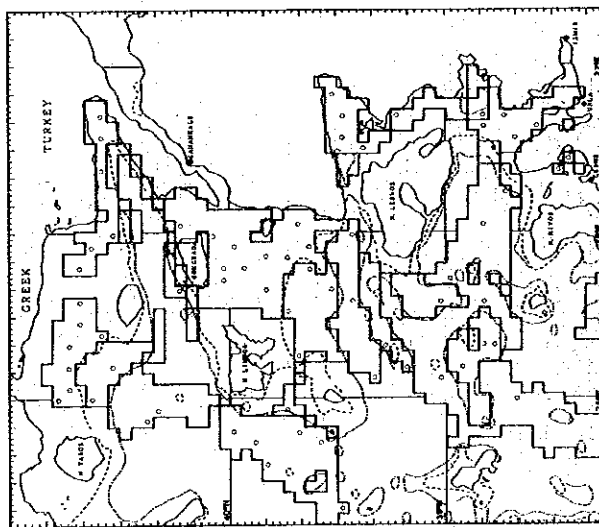
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

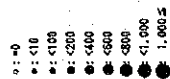
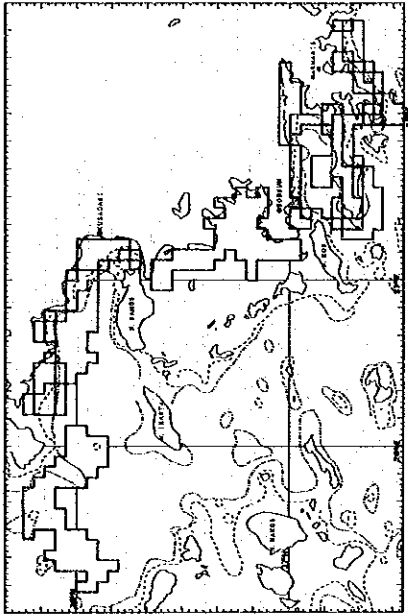
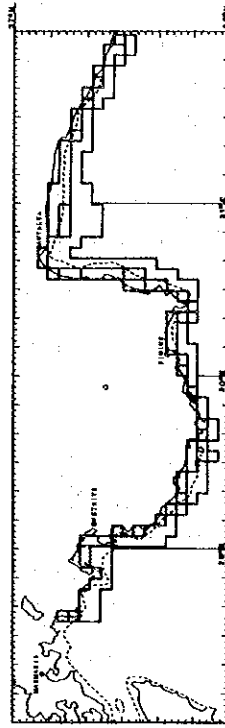


Fig. 5-1-3-16-2 The catch in kg of barracuda *Sphyraena sphyraena* at each stations in the summer season survey

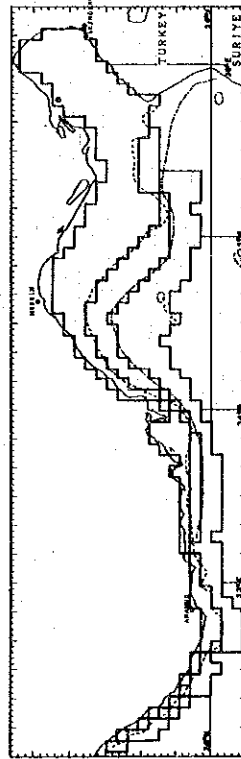




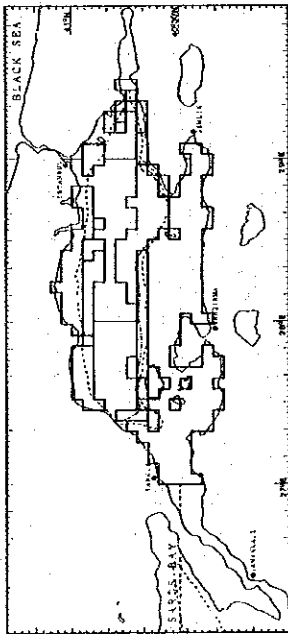
South Aegean Sea



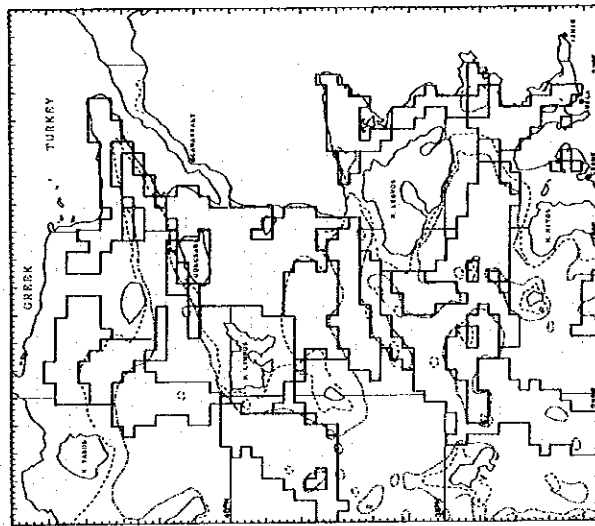
West Mediterranean Sea



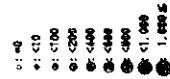
East Mediterranean Sea



The Sea of Marmara

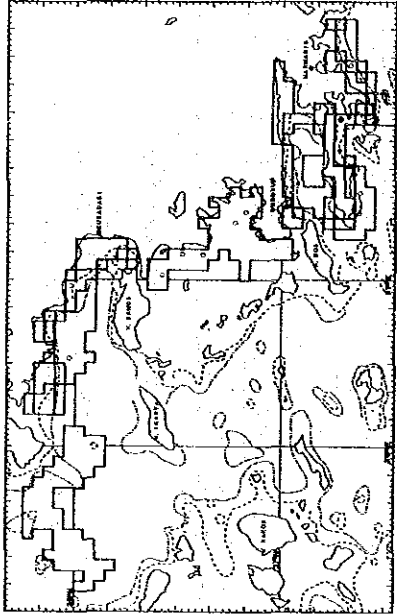


North Aegean Sea

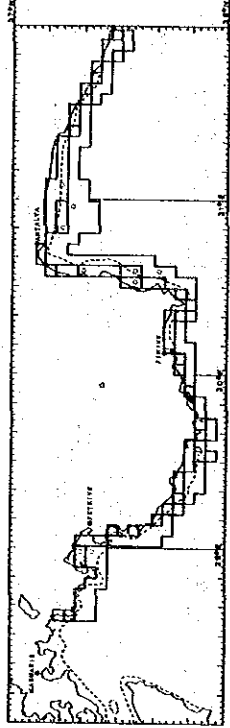


The catch in kg of barracuda *Sphyraena sphyraena* at each station in the autumn season survey

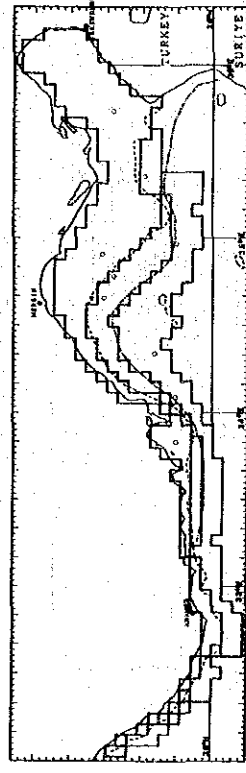
Fig. 5-1-3-16-3



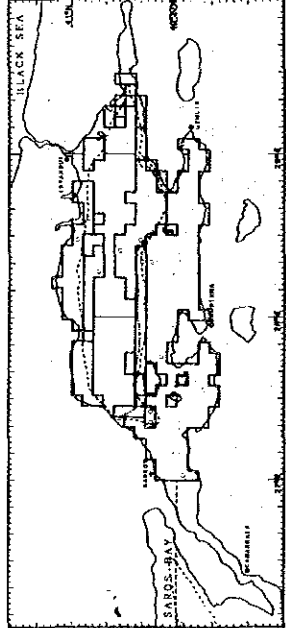
South Aegean Sea



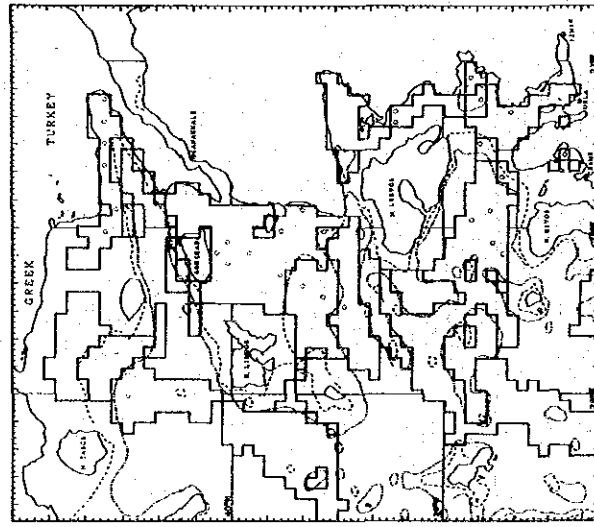
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

- 0
- <10
- <100
- <200
- <400
- <800
- <1,000
- 1,000.5

Fig. 5-1-3-16-4 The catch in kg of barracuda *Sphyraena sphyraena* at each stations in the winter season survey

The CPUA values of this species in all areas were 1 or less, and the maximum CPUA was only 7 when considered in terms of season, sub area and strata as well (Table 5-1-3-47).

Table 5-1-3-47 Catch Per Unit Area of Barracuda

Sub area	Stratum (m)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	0	0
	101~200	0	0	0	5.3
	201~500	0	0	0	0
	Sub total	0	0	0	1.6
West Mediterranean Sea	20~100	0	6.9	0	0
	101~500	0	0	0	0
	Sub total	0	2.8	0	0
East Mediterranean Sea	20~100	0	6.0	1.3	0
	101~500	0	0	0	0
	Sub total	0	4.0	0.9	0
All area	20~100	0	1.7	0.3	0
	101~200	0	0	0	1.0
	201~500	0	0	0	0
	Total	0	1.0	0.2	0.2

## 2) Stock Size

The estimations of the stock size of this species are indicated in Table 5-1-3-48. The total stock size of each season was extremely small, being only on the order of 0-40 tons. This species is known to pelagic zone, and rarely thrives near the bottom. It is also known to swim in schools forming water columns. In view of this mode of life, surveying of the stock size of this species by bottom trawling is considered to be underestimated.

Table 5-1-3-48 Estimation of Stock Size of Barracuda

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Narmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	0	0
	101~200	0	0	0	5.7
	201~500	0	0	0	0
	Sub total	0	0	0	5.7
West Mediterranean Sea	20~100	0	7.7	0	0
	101~500	0	0	0	0
	Sub total	0	7.7	0	0
East Mediterranean Sea	20~100	0	35.4	7.8	0
	101~500	0	0	0	0
	Sub total	0	35.4	7.8	0
All area	20~100	0	43.1	7.8	0
	101~200	0	0	0	5.7
	201~500	0	0	0	0
	Total	0	43.1	7.8	5.7
* 95% confidence interval		± 0	± 44.5	± 16.2	± 18.1

\* 95% confidence interval was calculated to total stock size.

(17) Obtuse Barracuda *Sphyraena chrysotaenia*

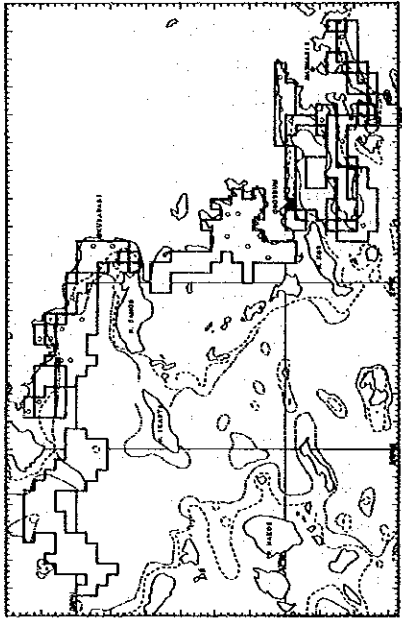
1) Distribution

This species was sporadically distributed mainly at depths of 100 m or less in the Mediterranean Sea (Figs. 5-1-3-17-1 to 5-1-3-17-4). The appearance frequencies of this species in all areas was roughly 0-10% (Table 5-1-3-49).

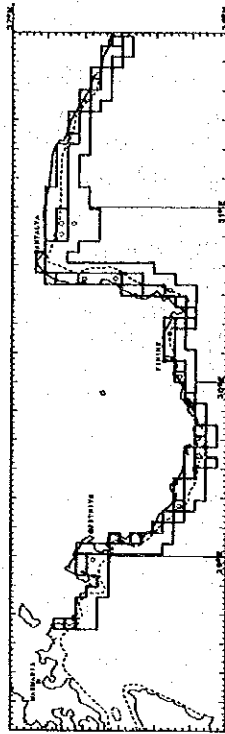
Table 5-1-3-49 Appearance Frequency of Obtuse Barracuda\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	8	0
	101~500	0	0	0	0
	Sub total	0	0	4	0
West Mediterranean Sea	20~100	0	25	25	33
	101~200	0	0	0	33
	201~500	0	0	0	0
	Sub total	0	10	10	22
East Mediterranean Sea	20~100	0	33	9	50
	101~200	0	0	0	67
	201~500	0	0	0	0
	Sub total	0	23	6	40
All area	20~100	0	9	4	7
	101~200	0	0	0	14
	201~500	0	0	0	0
	Total	0	5	3	7

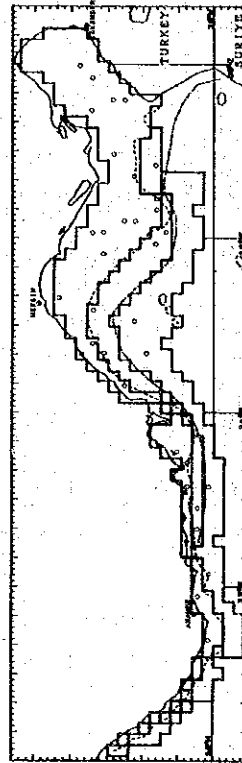
\* Appearance frequency: No. caught / No. of trawls x 100%



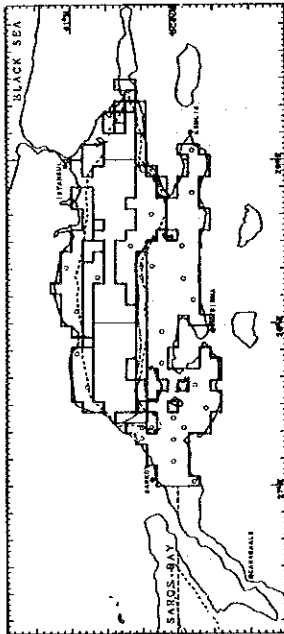
South Aegean Sea



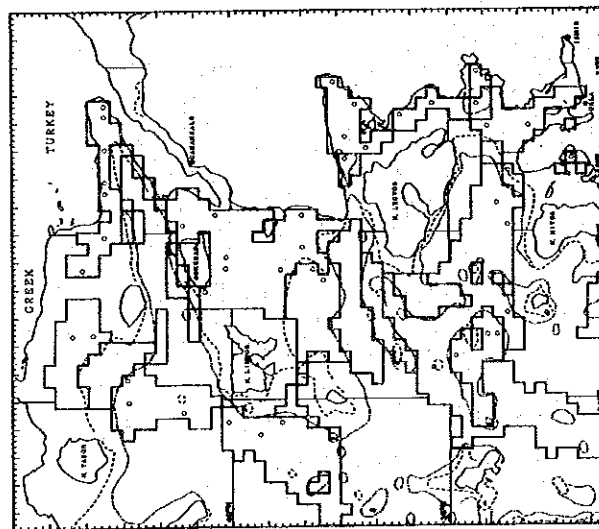
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara

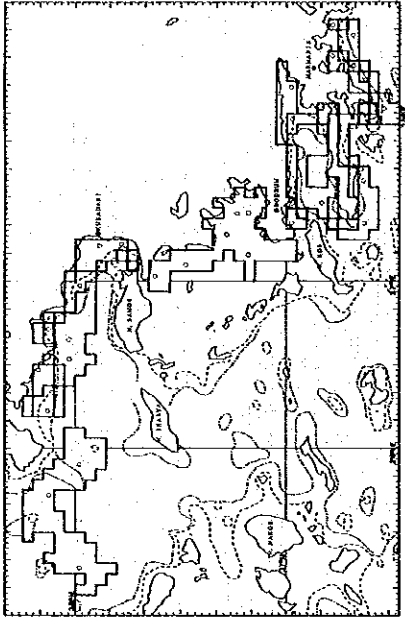


North Aegean Sea

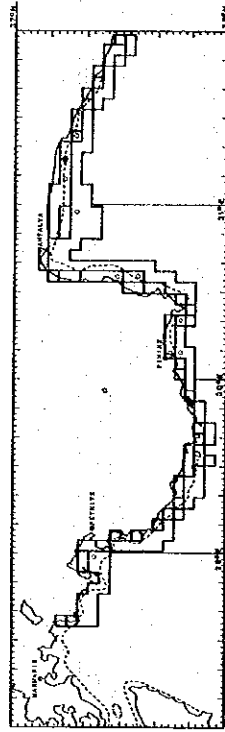


The catch in kg of obtuse barracuda *Sphyraena chrysofaenia* at each stations in the spring season survey

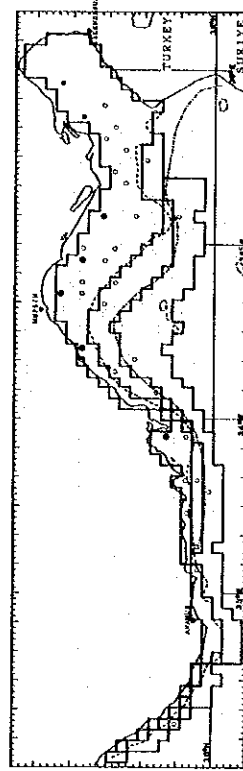
Fig. 5-1-3-17-1



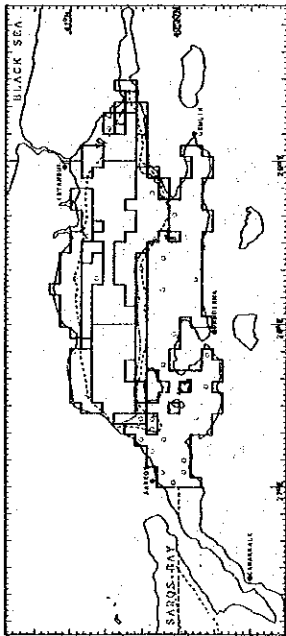
South Aegean Sea



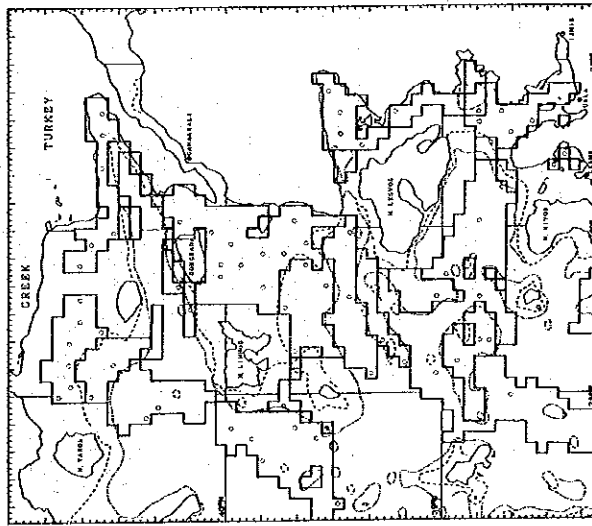
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara



North Aegean Sea

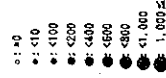
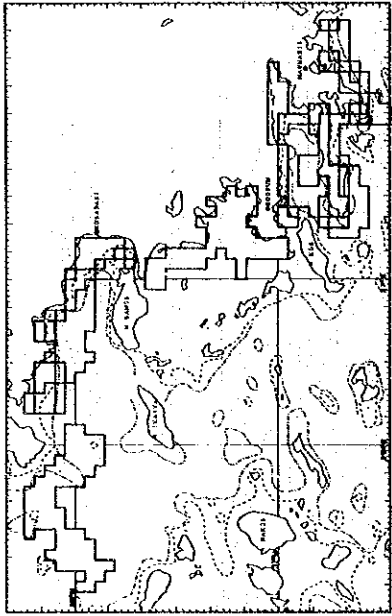
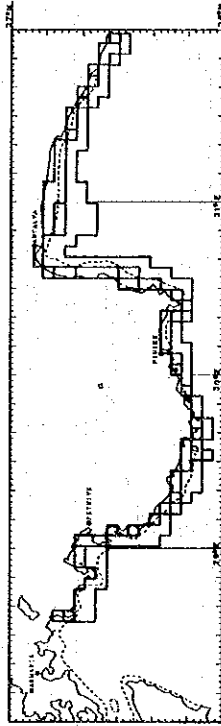


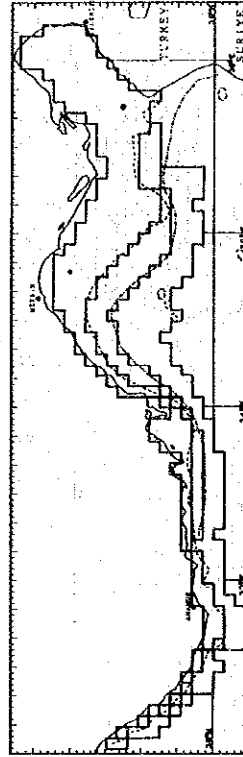
Fig. 5-1-3-17-2  
The catch in kg of obtuse barracuda *Sphyræna chrysoleaenia* at each station in the summer season survey



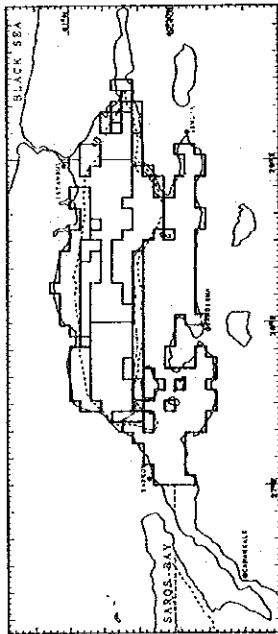
South Aegean Sea



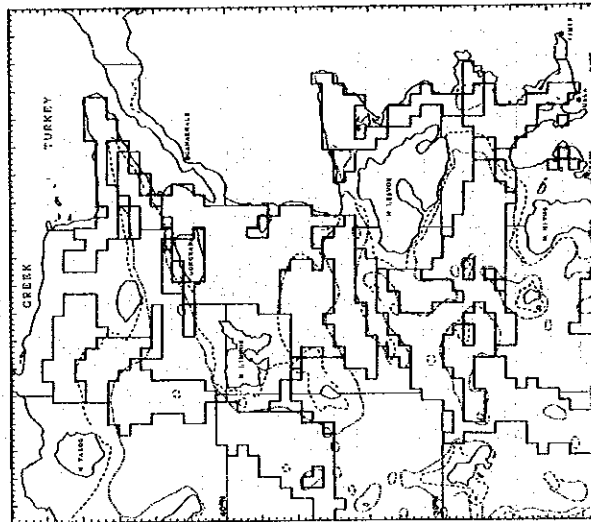
West Mediterranean Sea



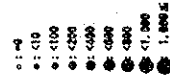
East Mediterranean Sea



The Sea of Marmara



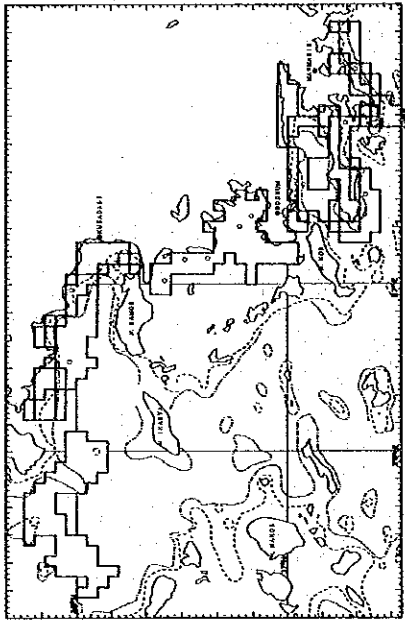
North Aegean Sea



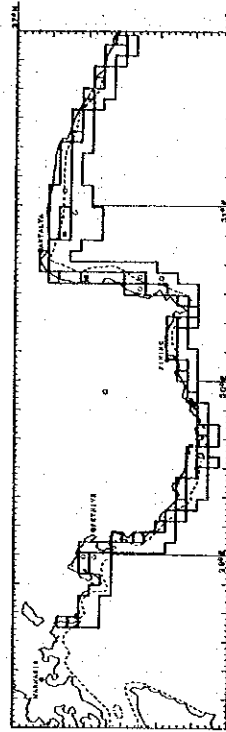
The catch in kg of obtuse barracuda *Sphyræna chrysotaenia* at each station in the autumn season survey

Fig. 5-1-3-17-3

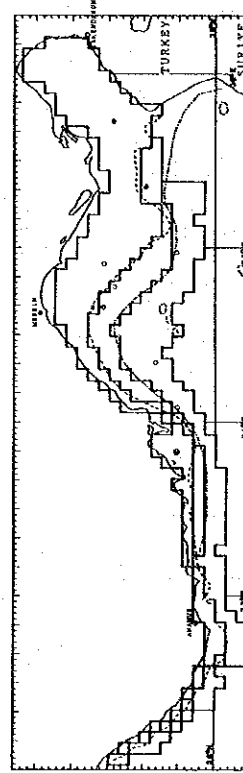




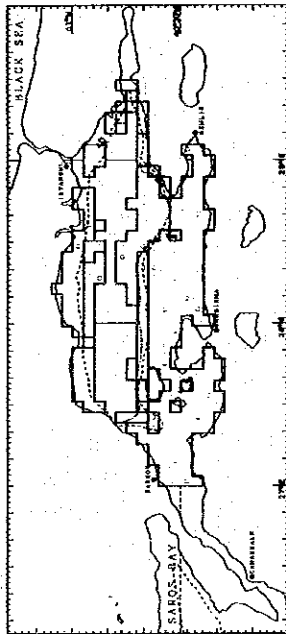
South Aegean Sea



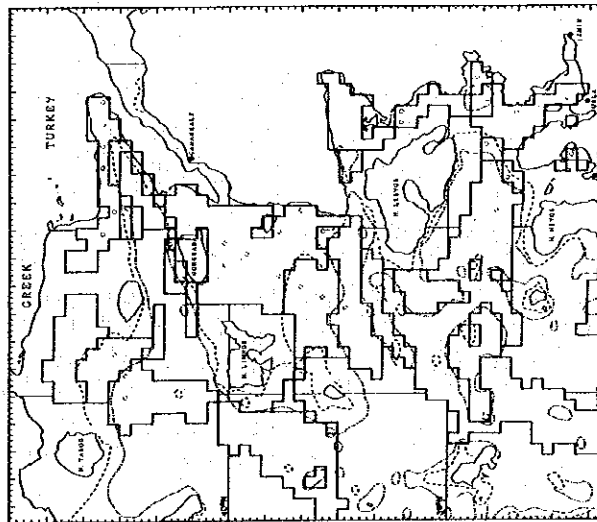
West Mediterranean Sea



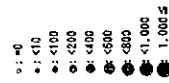
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of obtuse barracuda *Sphyraena chrysoaenia* at each station in the winter season survey

Fig. 5-1-3-17-4

The CPUA values of this species in all areas were extremely low, only on the order of 0-1. The maximum CPUA was 12 even when considered by season, sub area and strata (Table 5-1-3-50).

Table 5-1-3-50 Catch Per Unit Area of Obtuse Barracuda

Sub area	Stratum (m)	Mean catch in kg/kw			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	1.0	0
	101~500	0	0	0	0
	Sub total	0	0	0.4	0
West Mediterranean Sea	20~100	0	11.8	0.8	0
	101~500	0	0	0	0
	Sub total	0	4.7	0.3	0
East Mediterranean Sea	20~100	0	6.1	0.6	12.3
	101~200	0	0	0	4.9
	201~500	0	0	0	0
	Sub total	0	4.0	0.4	6.4
All area	20~100	0	2.0	0.3	1.2
	101~200	0	0	0	0.7
	201~500	0	0	0	0
	Total	0	1.1	0.2	0.8

## 2) Stock Size

The estimations of the stock size of obtuse barracuda are indicated in Table 5-1-3-51. The total stock size of this species for each season was low at 7-80 tons with the exception of 0 tons in spring. The majority of the stock size of this species was observed in the East Mediterranean Sea.

Differences in the total stock size between seasons was not significant in consideration of the 95% confidence intervals. The center area of the distribution of this species throughout the Mediterranean Sea is known to be along the coasts of Israel, Lebanon and Egypt, and this species is also known thrive both in pelagic zone and on the bottom by forming water columns in both areas. Thus, the small stock size of this species as determined in the areas surveyed is only natural in view of its distribution. In addition, since the estimations of the stock size of this species by bottom trawling do not include the stock size on in pelagic zone, the actual stock size is believed to be larger.

Table 5-1-3-51 Estimation of Stock Size of Obtuse Barracuda

Sub area	Stratum (n)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~500	0	0	0	0
North Aegean Sea	20~500	0	0	0	0
South Aegean Sea	20~100	0	0	3.0	0
	101~500	0	0	0	0
	Sub total	0	0	3.0	0
West Mediterranean Sea	20~100	0	13.2	0.8	0
	101~500	0	0	0	0
	Sub total	0	13.2	0.8	0
East Mediterranean Sea	20~100	0	35.9	3.5	72.8
	101~200	0	0	0	8.6
	201~500	0	0	0	0
	Sub total	0	35.9	3.5	81.3
All area	20~100	0	49.1	7.3	72.8
	101~200	0	0	0	8.6
	201~500	0	0	0	0
	Total	0	49.1	7.3	81.3
* 95% confidence interval		± 0	± 51.3	± 8.8	± 192.7

\* 95% confidence interval was calculated to total stock size.

(18) Common Sole *Solea vulgaris*

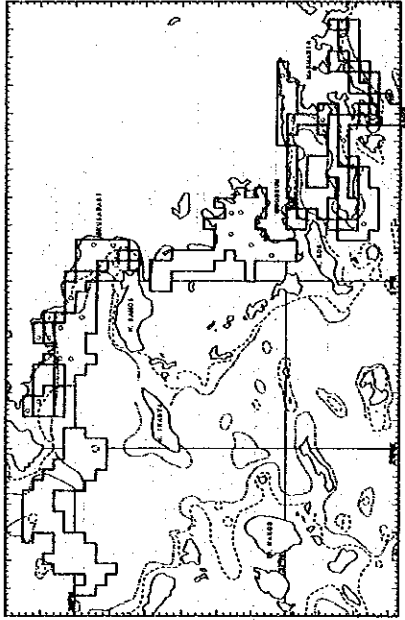
1) Distribution

This species was sporadically distributed at depths of 100 m or less in all areas surveyed excluding the West Mediterranean Sea (Figs. 5-1-3-18-1 to 5-1-3-18-4). In addition, the appearance frequencies of this species in all areas were roughly 10% with the exception of a value of 4% in spring. The appearance frequencies of this species in The Sea of Marmara and the East Mediterranean Sea tended to be relatively high (Table 5-1-3-52).

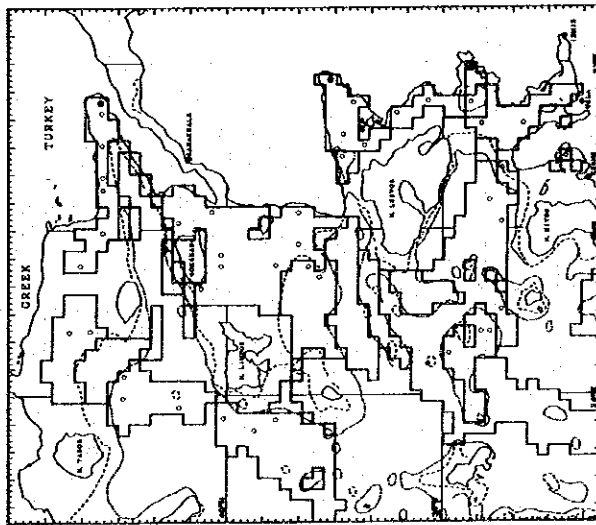
Table 5-1-3-52 Appearance Frequency of Common Sole\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	10	5	48	33
	101~500	0	0	0	0
	20~500	8	4	37	24
North Aegean Sea	20~100	11	3	6	6
	101~500	0	0	0	0
	Sub total	7	2	4	3
South Aegean Sea	20~100	0	8	0	20
	101~500	0	0	0	0
	Sub total	0	4	0	8
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	4	63	9	25
	101~500	0	0	0	0
	Sub total	3	43	6	10
All area	20~100	7	18	15	18
	101~500	0	0	0	0
	Total	4	11	9	9

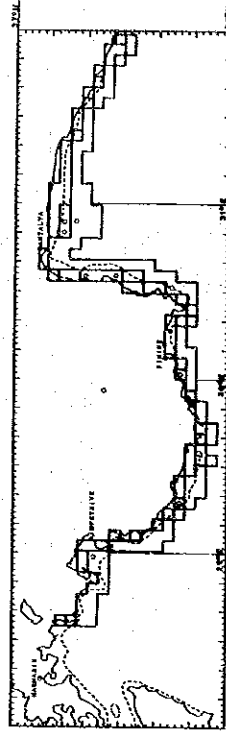
\* Appearance frequency: No. caught / No. of trawls x 100%



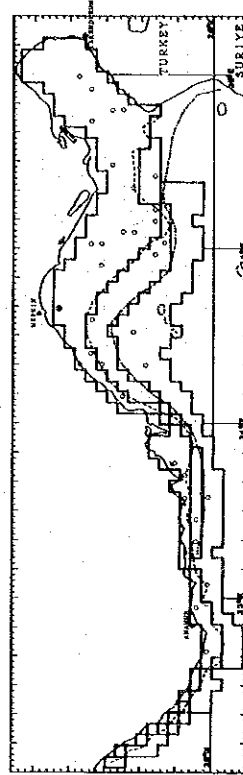
The Sea of Marmara



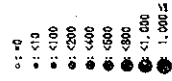
North Aegean Sea



South Aegean Sea



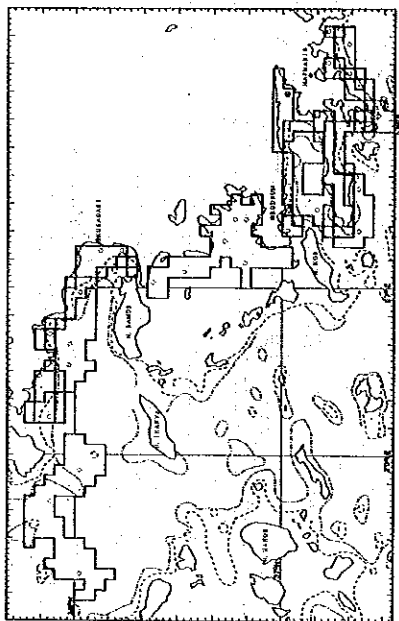
West Mediterranean Sea



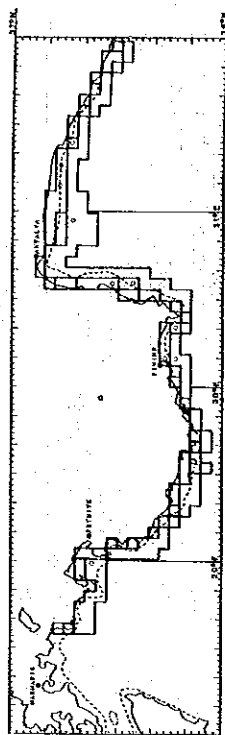
East Mediterranean Sea

The catch in kg of common sole *Solea vulgaris* at each stations in the spring season survey

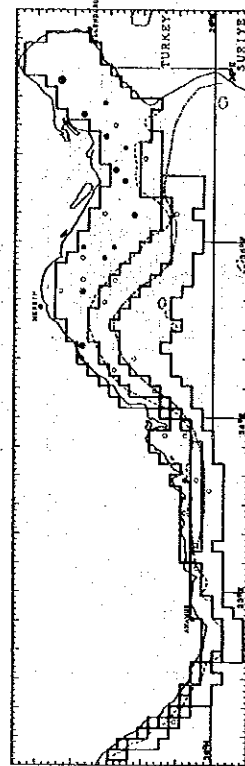
Fig. 5-1-3-18-1



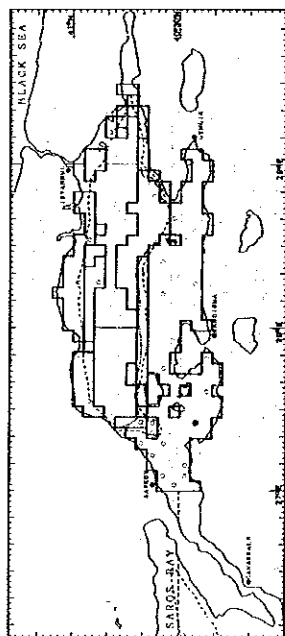
South Aegean Sea



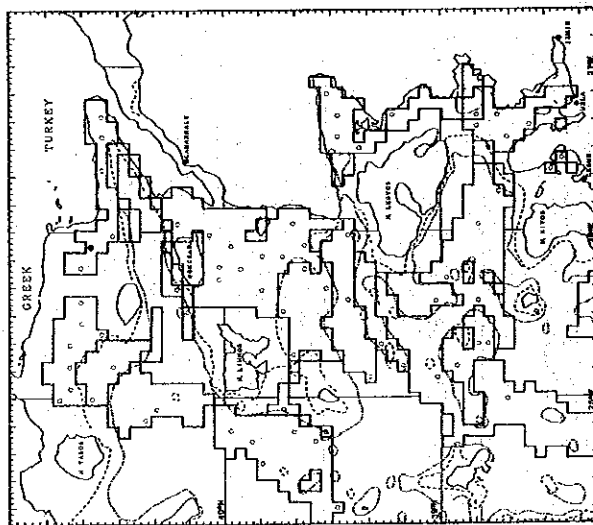
West Mediterranean Sea



East Mediterranean Sea



The Sea of Marmara

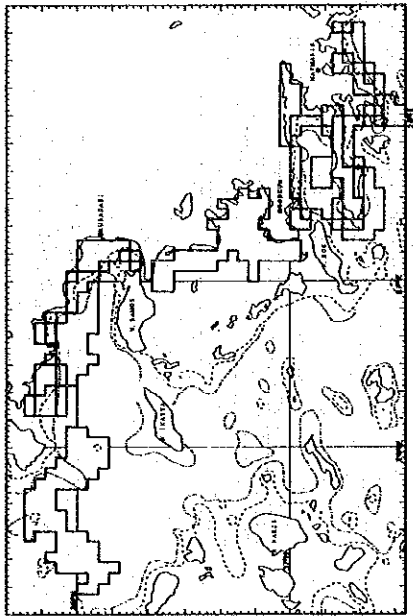


North Aegean Sea

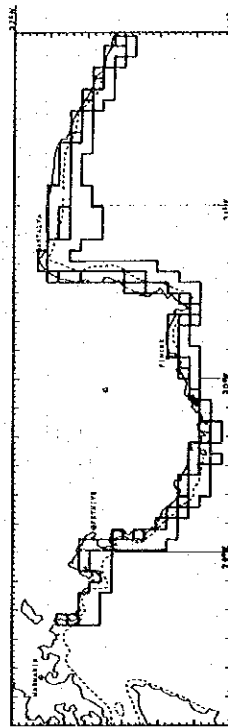


The catch in kg of common sole *Solea vulgaris* at each stations in the summer season survey

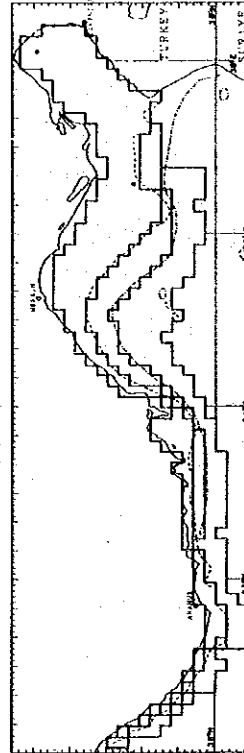
Fig. 5-1-3-18-2



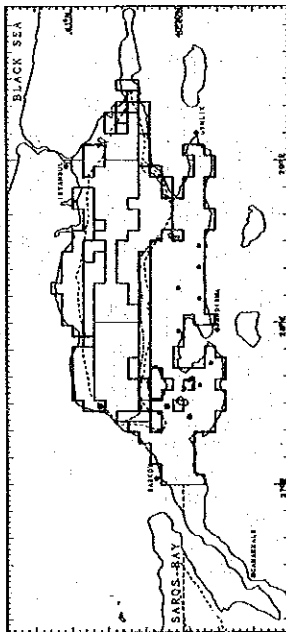
South Aegean Sea



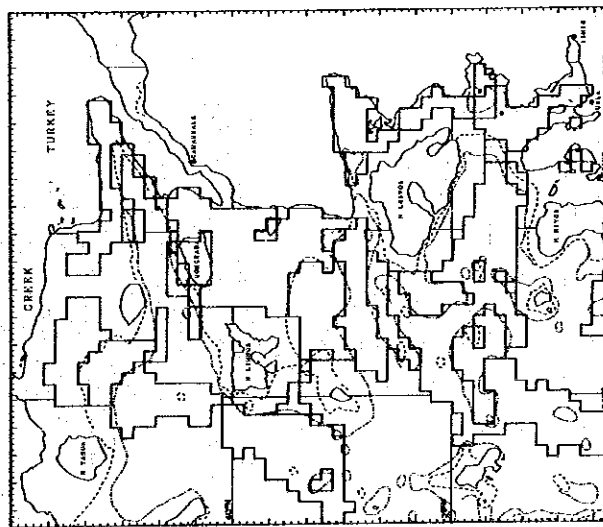
West Mediterranean Sea



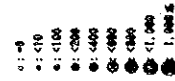
East Mediterranean Sea



The Sea of Marmara

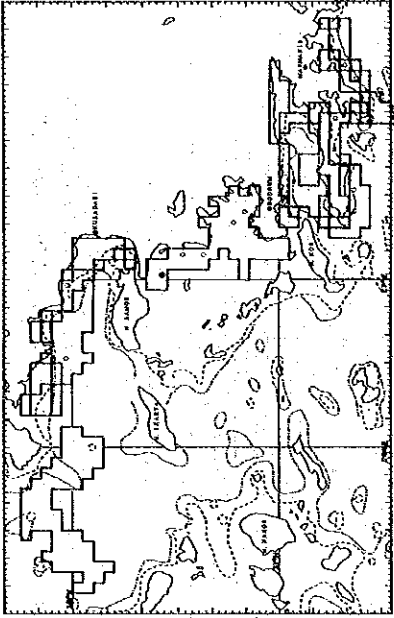


North Aegean Sea

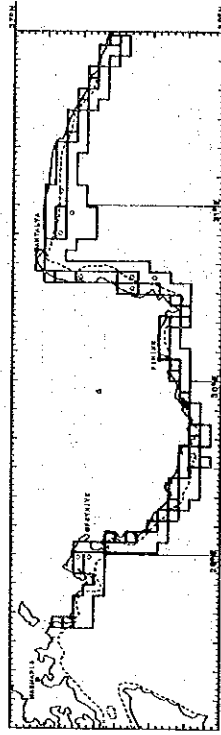


The catch in kg of common sole *Solea vulgaris* at each stations in the autumn season survey

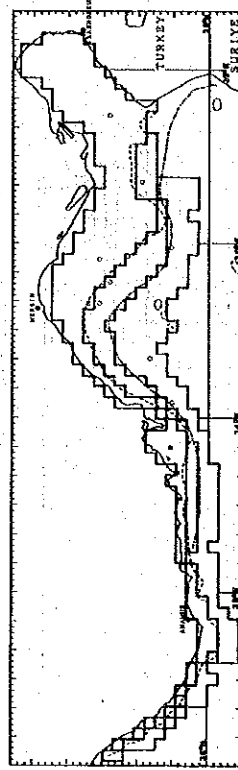
Fig. 5-1-3-18-3



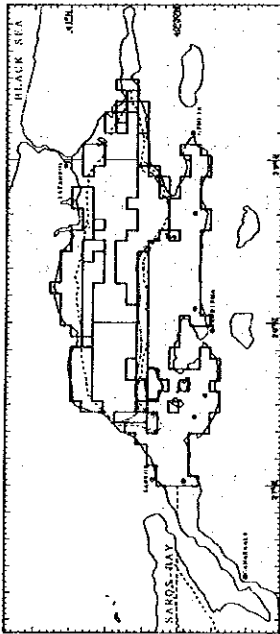
South Aegean Sea



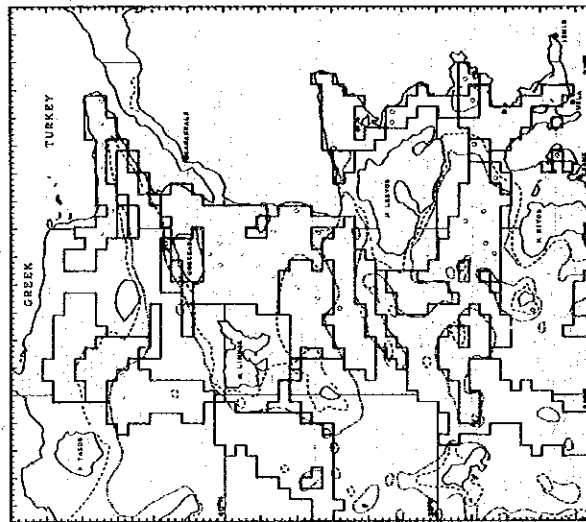
West Mediterranean Sea



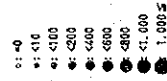
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of common sole *Solea vulgaris* at each station in the winter season survey

Fig. 5-1-3-18-4



The CPUA values of this species in all areas were extremely low at roughly only 1-3 throughout all seasons, while the maximum CPUA was 20 when examined by season, sub area and strata (strata of 20-100 m in the East Mediterranean Sea in summer) (Table 5-1-3-53).

Table 5-1-3-53 Catch Per Unit Area of Common Sole

Sub area	Stratum (m)	Mean catch in kg/kd			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	0.8	1.3	3.7	2.2
	101~500	0	0	0	0
	Sub total	0.6	1.0	2.9	1.7
North Aegean Sea	20~100	1.7	0.5	0.5	0.3
	101~500	0	0	0	0
	Sub total	0.9	0.2	0.3	0.1
South Aegean Sea	20~100	0	1.5	0	3.3
	101~500	0	0	0	0
	Sub total	0	0.7	0	1.2
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	1.5	20.3	0.4	1.8
	101~500	0	0	0	0
	Sub total	1.0	13.6	0.3	0.7
All area	20~100	1.0	5.6	1.1	1.3
	101~500	0	0	0	0
	Total	0.6	3.2	0.7	0.7

## 2) Stock Size

The estimations of the stock size of common sole are indicated in Table 5-1-3-54. The total stock size of this species by season were roughly 30 tons or less with the exception of 136 tons in summer (95% confidence interval:  $\pm 110$  tons, CV: 39%).

Differences in the estimated stock size between seasons were not significant in consideration of the estimation accuracy. This species is known to be a demersal species that thrives on sandy and muddy bottoms from coastal waters down to a depth of 200 m, and is also commonly observed in estuaries and coastal pools. If the majority of this species were thriving in coastal areas at depths of 20 m or less, the actual stock size would be larger.

Table 5-1-3-54 Estimation of Stock Size of Common Sole

Sub area	Stratum (m)	Stock size in tons (t)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	3.8	6.9	19.3	10.7
	101~500	0	0	0	0
	Sub total	3.8	6.9	19.3	10.7
North Aegean Sea	20~100	15.0	4.1	4.5	4.1
	101~500	0	0	0	0
	Sub total	15.0	4.1	4.5	4.1
South Aegean Sea	20~100	0	4.7	0	8.5
	101~500	0	0	0	0
	Sub total	0	4.7	0	8.5
West Mediterranean Sea	20~500	0	0	0	0
East Mediterranean Sea	20~100	8.7	120.6	2.3	10.5
	101~500	0	0	0	0
	Sub total	8.7	120.6	2.3	10.5
All area	20~100	27.5	136.4	26.1	33.9
	101~500	0	0	0	0
	Total	27.5	136.4	26.1	33.9
* 95% confidence interval		± 25.0	± 110.4	± 13.2	± 36.3

\* 95% confidence interval was calculated to total stock size.

(19) Deep-Water Pink Shrimp *Parapenaeus longirostris*

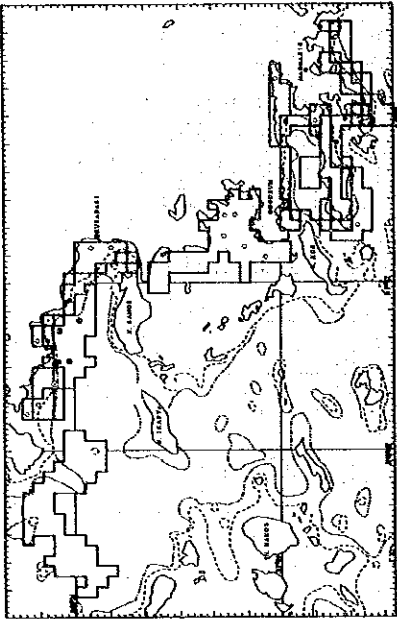
1) Distribution

This species was widely distributed throughout all areas surveyed (Figs. 5-1-3-19-1 to 5-1-3-19-4). In addition, the appearance frequency of this species in all areas was roughly 40-50% throughout all seasons, and high at strata of 201-500 m for each season. The appearance frequency of this species in The Sea of Marmara was extremely high at 80-100% (Table 5-1-3-55).

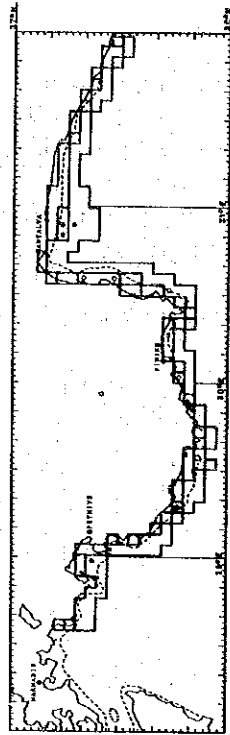
Table 5-1-3-55 Appearance Frequency of Deep-Water Pink Shrimp\*

Sub area	Stratum (m)	Appearance Frequency (%)			
		Spring	Summer	Autumn	Winter
The Sea of Marmara	20~100	81	82	72	100
	101~200	100	100	100	100
	201~500	100	100	100	100
	Sub total	85	86	78	100
North Aegean Sea	20~100	8	14	31	22
	101~200	50	13	36	38
	201~500	80	70	92	100
	Sub total	31	30	47	43
South Aegean Sea	20~100	0	8	15	0
	101~200	80	60	40	25
	201~500	67	60	70	50
	Sub total	35	36	39	23
West Mediterranean Sea	20~100	0	0	0	0
	101~200	100	33	33	67
	201~500	67	100	67	33
	Sub total	50	40	30	33
East Mediterranean Sea	20~100	25	13	44	25
	101~200	57	72	57	33
	201~500	100	50	100	100
	Sub total	40	29	53	50
All area	20~100	29	28	40	45
	101~200	69	43	48	48
	201~500	81	69	85	80
	Total	46	40	51	54

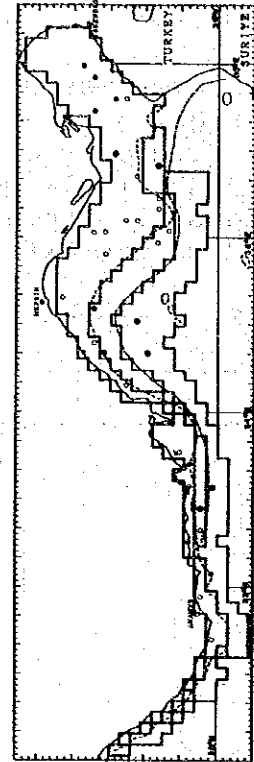
\* Appearance frequency: No. caught / No. of trawls x 100%



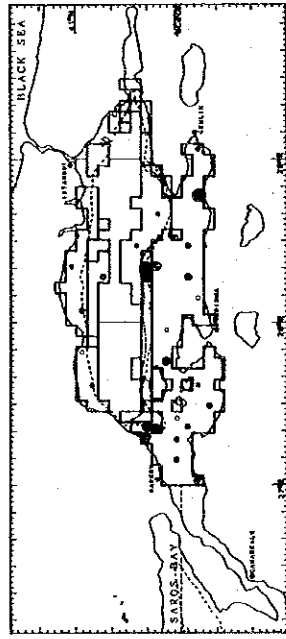
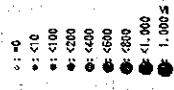
South Aegean Sea



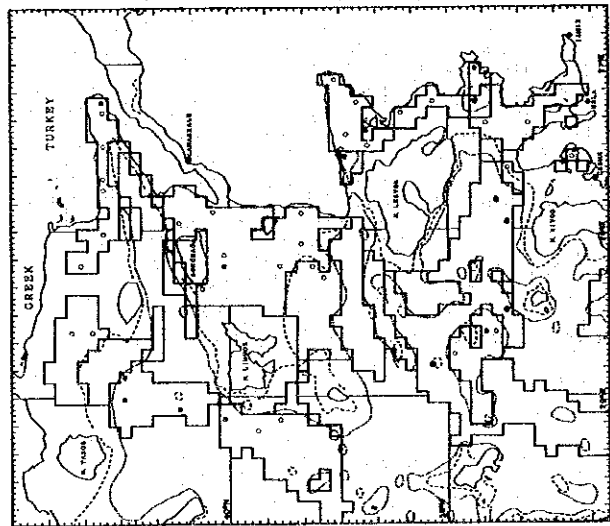
West Mediterranean Sea



East Mediterranean Sea



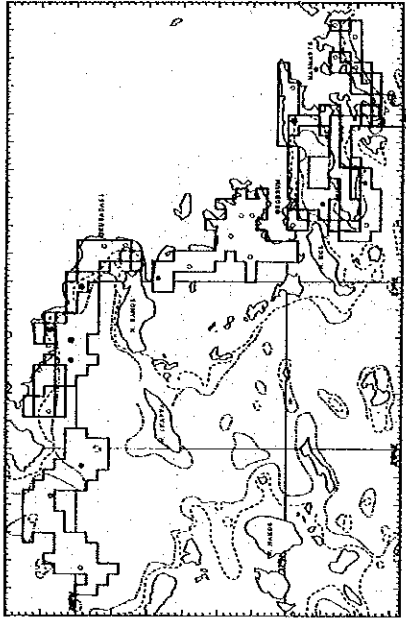
The Sea of Marmara



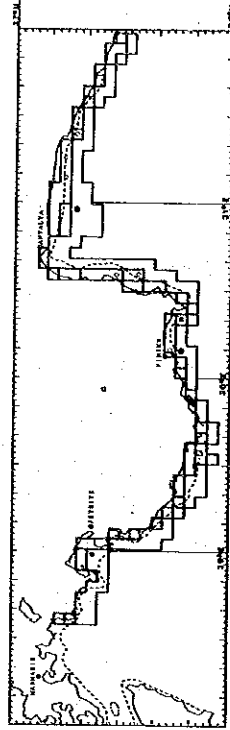
North Aegean Sea

The catch in kg of deep-water pink shrimp *Parapenaeus longirostris* at each station in the spring season survey

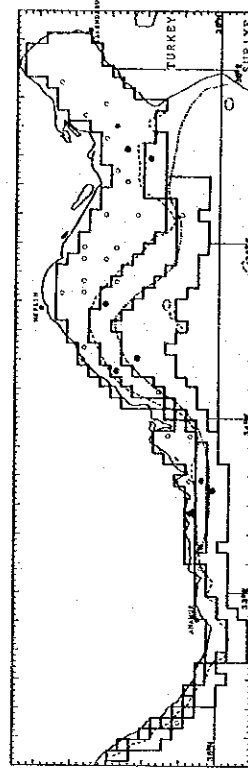
Fig. 5-1-3-19-1



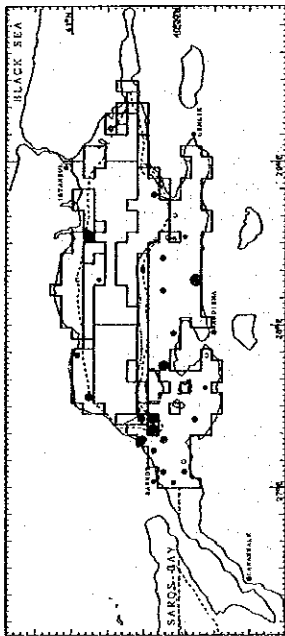
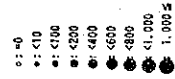
South Aegean Sea



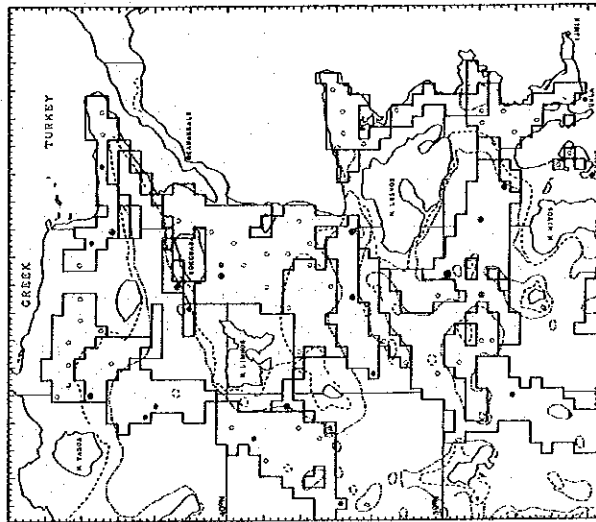
West Mediterranean Sea



East Mediterranean Sea



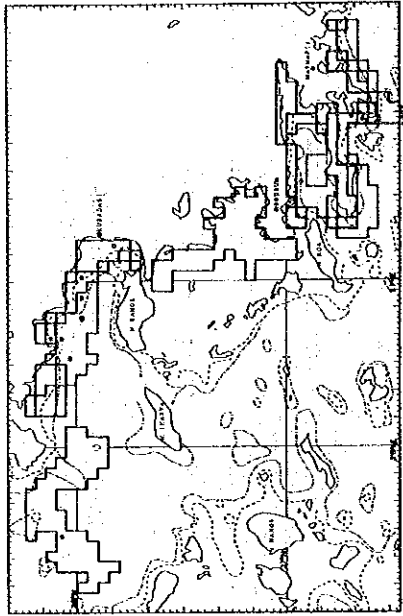
The Sea of Marmara



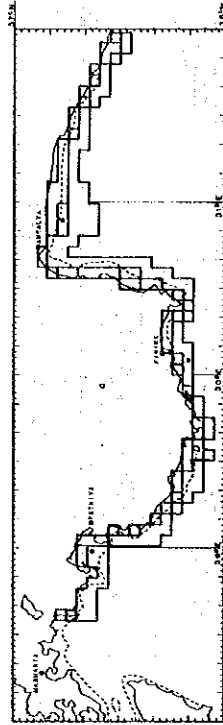
North Aegean Sea

The catch in kg of deep-water pink shrimp *Parapenaeus longirostris* at each station in the summer season survey

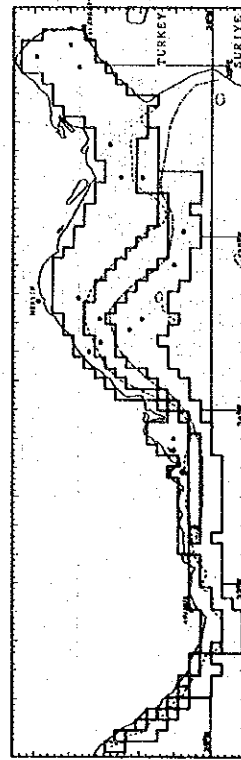
Fig. 5-1-3-19-2



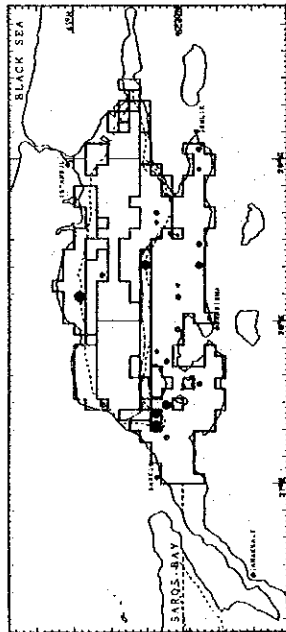
South Aegean Sea



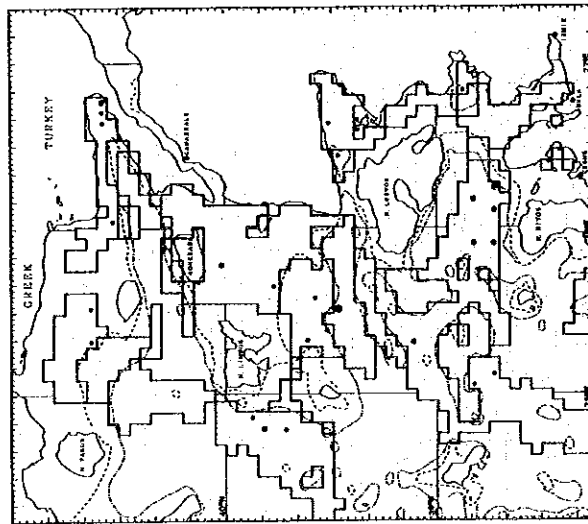
West Mediterranean Sea



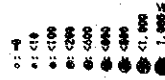
East Mediterranean Sea



The Sea of Marmara

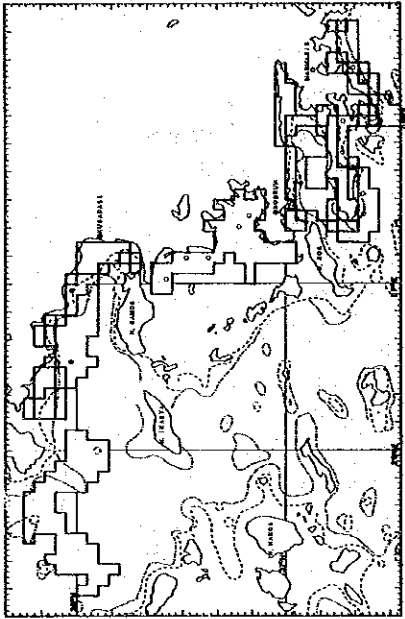


North Aegean Sea

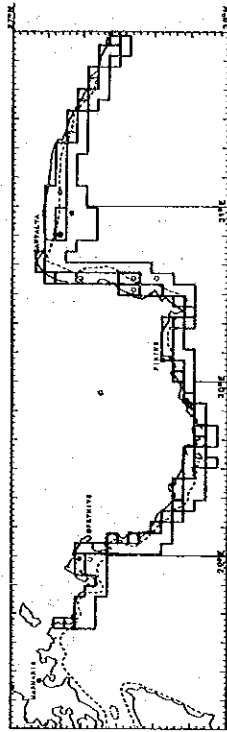


The catch in kg of deep-water pink shrimp *Parapenaeus longirostris* at each station in the autumn season survey

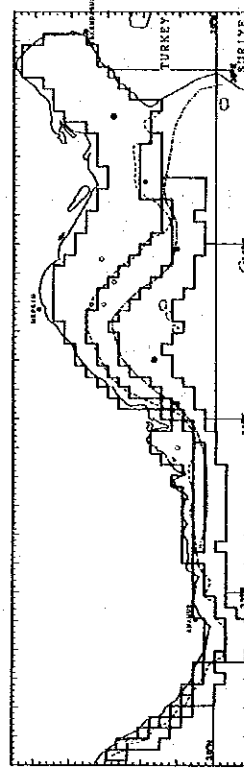
Fig.5-1-3-19-3



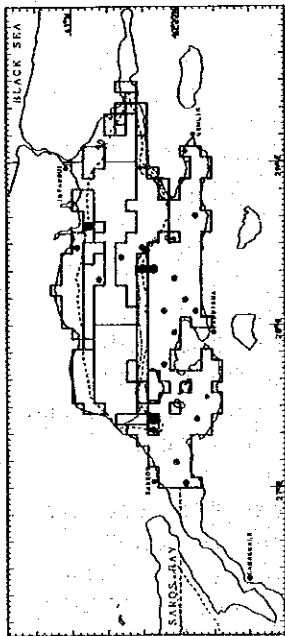
South Aegean Sea



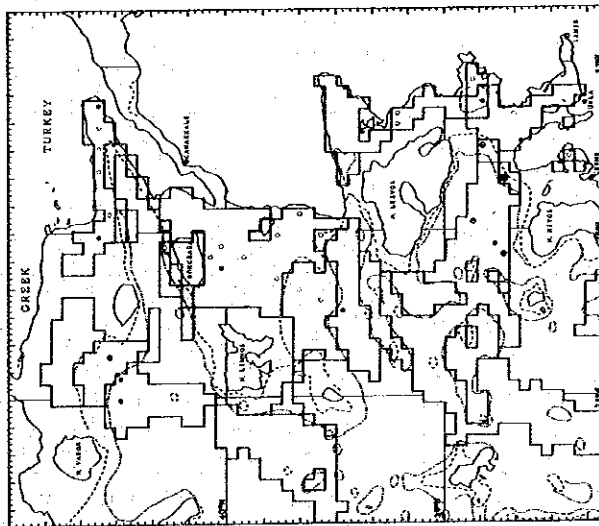
West Mediterranean Sea



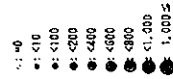
East Mediterranean Sea



The Sea of Marmara



North Aegean Sea



The catch in kg of deep-water pink shrimp *Parapenaeus longirostris* at each station in the winter season survey

Fig. 5-1-3-19-4