Chapter III

RESULTS

1. Biochemical Analyses in Field Specimens

1.1 Biochemical analyses in various tissues

Biochemical component; total solid and water content, proteins, lipids, carbohydrates in the mantle tissue, non-mantle tissue and total tissue were given in Table 1,2,3 and 4 respectively. The percentage were given in both wet weight level and dry weight level. Standard deviations for each biochemical mean value in relation to the wet weight percentage were also given. Monthly variations in biochemical composition profile in various tissues were shown in Figure 2. Seasonal variations in biochemical composition in mantle, non-mantle and total tissue were shown in Figure 3,4,5 respectively. Analysis of Variance was applied to determine the differences in biochemical composition in various tissues. The F calculated values were shown in the farthest right-handed side column of each table (Table 1,2,3 and 4). The F values were calculated for each season of the year.

F-value from the table of F :-

$$F = 0.05\ (2,9) = 4.26$$

The symbol "$\pm$" indicated the standard deviation values. Thus it can be concluded according to each component as followed:

Month (size in cm.)	Total Solid (in percentage)			water content (in percentage)			Analysis of variance
	Mantle	Non-Mantle	Total	Mantle	Non-Mantle	Total	
Oct.1974 (1.67)	13.450 ±0.050	14.050 ±0.300	13.450 ±0.300	86.550	85.950	86.550	
Nov.1974 (2.53)	10.995 ±0.130	13.770 ±0.100	17.195 ±0.110	89.005	86.230	82.805	F-calculated for winter season
Dec.1974 (3.67)	10.345 ±0.330	12.725 ±0.010	11.685 ±0.100	89.655	87.275	88.315	= 1.7969
Jan.1975 (4.58)	12.645 ±0.090	13.610 ±0.160	13.175 ±0.250	87.355	86.390	86.825	
Feb.1975 (4.76)	12.435 ±0.170	12.765 ±0.160	12.715 ±0.10	87.565	87.235	87.285	
Mar.1975 (4.84)	13.685 ±0.090	14.035 ±0.315	13.705 ±0.065	86.315	85.965	86.295	F-calculated for summer season
Apr.1975 (5.05)	13.105 ±0.085	12.765 ±0.330	12.515 ±0.250	86.895	87.235	87.485	= 0.2589
May 1975 (5.25)	13.500 ±0.150	14.500 ±0.300	15.900 ±0.330	86.500	85.500	84.100	
Jun.1975 (5.96)	13.200 ±0.030	14.400 ±0.055	14.900 ±0.030	86.800	85.600	85.100	
July1975 (6.45)	14.634 ±0.110	16.100 ±0.220	15.900 ±0.030	85.366	83.900	84.100	F-calculated for rainy season
Aug.1975 (7.05)	14.825 ±0.055	14.400 ±0.055	14.380 ±0.050	85.175	85.600	85.620	= 0.5366
Sept.1975 (7.37)	15.860 ±0.010	15.585 ±0.130	15.852 ±0.020	84.140	84.415	84.148	
Analysis of variance	F-calculated = 6.5169	F-calculated = 5.9474	F-calculated = 1.0358	F = 0.05 (2,9) = 4.26			

Table 1 Seasonal variations in total solid and water content in mantle, non-mantle and total tissue in Mytilus viridis.

Month (size in cm.)	Protein component (in percentage).						Analysis of variance
	Wet weight level			Dry weight level			
	Mantle	Non-Mantle	Total	Mantle	Non-mantle	Total	
Oct.1974 (1.67)	6.9334 ±0.2570	6.9787 ±0.2720	8.2144 ±0.2968	51.5494	49.6705	61.0736	F-calculated for winter season = 1.6799
Nov.1974 (2.53)	5.9913 ±0.1100	7.0592 ±0.0787	9.6191 ±0.1256	54.4911	51.2651	55.9413	
Dec.1974 (3.67)	7.1029 ±0.0346	7.7031 ±0.0624	6.9963 ±0.0787	68.6602	60.5352	59.8742	
Jan.1975 (4.58)	8.1042 ±0.1894	9.3403 ±0.1038	8.5776 ±0.0777	64.0902	68.6282	65.1051	
Feb.1975 (4.76)	9.1921 ±0.1713	9.5143 ±0.1909	9.9487 ±0.0093	73.9212	74.5430	78.2346	F-calculated for summer season = 7.7888
Mar.1975 (4.84)	8.5146 ±0.1921	10.5291 ± 0.0983	10.1869 ± 0.1183	62.2071	75.0390	74.3163	
Apr.1975 (5.05)	9.2454 ±0.0326	10.5370 ± 0.0261	11.7112 ± 0.0202	70.5675	82.5687	93.3773	
May 1975 (5.25)	9.2650 ±0.0855	10.6147 ± 0.0747	10.4877 ± 0.0366	68.0296	73.2048	65.9604	
Jun.1975 (5.96)	9.5575 ±0.0540	8.6306 ±0.0588	9.9071 ±0.0466	72.4053	59.9347	66.4544	F-calculated for rainy season = 0.2935
July1975 (6.45)	9.7339 ±0.0533	8.8610 ±0.0370	10.2894 ± 0.0100	66.5156	55.0373	64.7132	
Aug.1975 (7.05)	10.7420 ± 0.0452	11.1820 ± 0.0122	11.6717 ± 0.0182	72.4587	77.6528	81.1662	
Sept.1975 (7.37)	11.0705 ± 0.0629	11.5413 ± 0.0691	10.6535 ± 0.0114	69.8014	74.0539	67.2060	
Analysis of variance	F-calculated = 22.4740	F-calculated = 6.1619	F-calculated = 8.6091	F = 0.05 (2,9) = 4.26			

Table 2 Seasonal variations in proteins in mantle, non-mantle and total tissue in Mytilus viridis

Month (size in cm.)	Lipid component (in percentage)						Analysis of variance
	Wet weight level			Dry weight level			
	Mantle	Non-Mantle	Total	Mantle	Non-Mantle	Total	
Oct.1974 (1.67)	0.3112 ±0.0583	0.9850 ±0.0995	0.5617 ±0.0458	2.3138	7.0107	4.1762	
Nov.1974 (2.53)	0.1416 ±0.0860	0.8798 ±0.0141	0.2885 ±0.0346	1.2879	6.3893	1.6778	F-calculated for winter season
Dec.1974 (3.67)	0.1281 ±0.0055	0.3915 ±0.1356	0.1831 ±0.0300	1.2383	3.0766	1.5670	= 11.1146
Jan.1975 (4.58)	0.0783 ±0.0245	0.9186 ±0.0872	0.1514 ±0.0359	0.6192	6.7494	1.1491	
Feb.1975 (4.76)	0.2519 ±0.0131	0.4716 ±0.0118	0.1232 ±0.0586	2.0257	3.6949	0.9688	
Mar.1975 (4.84)	0.3239 ±0.0005	0.4943 ±0.0425	0.0885 ±0.0114	2.3664	3.5228	0.6456	F-calculated for summer season
Apr.1975 (5.05)	0.3314 ±0.0191	0.3866 ±0.0204	0.2504 ±0.0450	2.5295	3.0294	2.0008	= 7.8129
May 1975 (5.25)	0.2035 ±0.0794	0.3016 ±0.0398	0.2795 ±0.0282	1.5074	2.0800	1.7577	
Jun.1975 (5.96)	0.1998 ±0.0148	0.1984 ±0.0111	0.2000 ±0.0139	1.5136	1.3778	1.3423	
July1975 (6.45)	0.1619 ±0.0110	0.1608 ±0.0050	0.2357 ±0.0204	1.1063	0.9988	1.4824	F-calculated for rainy season
Aug.1975 (7.05)	0.1200 ±0.0114	0.1633 ±0.0440	0.2447 ±0.0226	0.8094	1.1361	1.7017	= 4.3676
Sept.1975 (7.37)	0.0846 ±0.0255	0.1188 ±0.0083	0.1894 ±0.0643	0.5334	0.7623	1.1948	
Analysis of variance	F-calculated = 3.8545	F-calculated = 14.7688	F-calculated = 0.8807	F = 0.05 (2,9) = 4.26			

Table 3 Seasonal variations in lipids in mantle, non-mantle and total tissue in Mytilus viridis

Month (size in cm.)	Carbohydrate Component (in percentage)						Analysis of variance
	Wet weight level			Dry weight level			
	Mantle	Non-Mantle	Total	Mantle	Non-Mantle	Total	
Oct.1974 (1.67)	0.1100 ±0.0200	0.1350 ±0.0083	0.0950 ±0.0050	0.8178	0.9609	0.7063	
Nov.1974 (2.53)	0.1500 -	0.1130 ±0.0007	0.3930 ±0.0300	1.3643	0.8206	2.2855	F-calculated for winter season = 0.8864
Dec.1974 (3.67)	0.4395 ± 0.0234	0.1480 ±0.0118	0.1765 ±0.0224	4.2484	1.1631	1.5105	
Jan.1975 (4.58)	0.2900 ± 0.0167	0.2767 ±0.0033	0.6900 ±0.0767	2.2934	2.0331	5.2372	
Feb.1975 (4.76)	0.6300 ± 0.0880	0.5133 ±0.0940	0.6300 ±0.0060	5.0663	4.0216	4.9542	
Mar.1975 (4.84)	0.5333 ± 0.0045	0.7266 ±0.0030	0.5133 ±0.0130	3.8963	5.1783	3.7447	F-calculated for summer season = 3.2259
Apr.1975 (5.05)	0.7867 ± 0.0028	0.7667 ±0.0089	0.5133 ±0.0061	6.0047	6.0079	4.1015	
May 1975 (5.25)	0.8120 ± 0.0001	0.8180 ±0.0027	0.3220 ±0.0094	6.0148	5.6414	2.0252	
Jun.1975 (5.96)	2.6667 ± 0.0009	3.6333 ±0.0058	2.5667 ±0.0347	20.2023	25.2313	17.2262	
July1975 (6.45)	3.1367 ± 0.0063	2.5667 ±0.0045	2.1367 ±0.0041	21.4334	15.9422	13.4384	F-calculated for rainy season = 2.3620
Aug.1975 (7.05)	2.4166 ±0.0033	2.9167 ±0.0070	2.5000 ±0.0060	16.3008	20.2549	17.3853	
Sept.1975 (7.37)	1.4167 ±0.0020	3.5833 ±0.0080	2.8333 ±0.0069	8.9325	22.9920	17.8735	
Analysis of variance	F-calculated = 27.6102	F-calculated =104.7449	F-calculated = 110.9426	F = 0.05 (2,9) = 4.26			

Table 4 Seasonal variations in Carbohydrates in mantle, non-mantle and total tissue in Mytilus viridis

1.1.1 Total solid

For each season, the total solid in the mantle, non-mantle and total tissue were always the same at 5% level of significance. Water content was given in relation to total solid. It followed the same pattern as the total solid since these two values were interconvertible.

1.1.2 Protein content

In the mantle, non-mantle and total tissues, there was no significant differences in proteins for winter and rainy season at 5% level of significance. But in summer, the protein content varied in the mantle, non-mantle and total tissue at 5% level of significance. The mantle tissue showed the least content of proteins.

1.1.3 Lipid content

The lipid contents in the mantle, non-mantle and total tissues did show variation in each season at 5% level of significance. The highest lipid content usually occurred in the non-mantle tissue since this included the viscera organs.

1.1.4 Carbohydrate content

There was no difference in the mean value of carbohydrates for each season in the mantle, non-mantle and total tissues at 5% level of significance.

1.2 Seasonal changes in biochemical composition

Seasonal changes of each component namely total solid and water content, proteins, lipids, and carbohydrates were also given in Table 1,2,3 and 4 respectively. Seasonal variations in total solid, water content, proteins, lipids and carbohydrates were shown respectively in Figure 6,7,8,9 and 10. Analysis of Variance was also applied here to determine whether there was any difference in the mean value of each biochemical composition in various tissue for each season. The F calculated values were given in the bottom row of each table.

F-value from the table of F :-

$$F = 0.05\ (2,9) = 4.26$$

The results were concluded as followed:-

1.2.1 Total solid

There was no difference in the total solid in total tissue according to the season at 5% level of significance. But at the same level of significance, total solid did show seasonal variation in the mantle and non-mantle tissues.

1.2.2 Protein content

Protein content did show seasonal variation in various tissues at 5% level of significance. The protein content tended to increase from winter to rainy season in

the mantle and non-mantle tissues. The highest protein content was found in September. This was not the same for the total tissue because the protein value fluctuated. The highest value was found in April.

1.2.3 Lipid content

Lipid content did not show seasonal variation in the mantle and total tissues at 5% level of significance. But in the non-mantle tissue, the lipid content tended to show the seasonal variation at the same level of significance. The lipid content was decreasing from October 1974 toward September 1975. The lowest value was found in September.

1.2.4 Carbohydrate content

Carbohydrate content significantly showed the seasonal variation for all tissues. The carbohydrate content was increasing toward the month of September. But in the mantle tissue, it was increasing rapidly until September when it decreased.

1.3 Biochemical composition according to growth

The size, measured as total shell length for each month, was given in centimeters shown in each table. All the biochemical composition happened to be related to the size as shown in Figure 18,19,20 respectively. The total solid, protein content and carbohydrate content seemed to

increase correspondingly with growth. But for the lipid value, this was the opposite. The lipid value declined as the animals became larger in size.

1.4 The relationship among these biochemical composition

Since proteins were the major component in various tissues, the balance between carbohydrates and proteins in tissues could be expressed, in term of the carbohydrates: proteins ratio. The profile was constructed in Figure 11. The lipids: proteins ratio was also determined and shown in Figure 12. The carbohydrates:proteins ratio tended to increase toward the summer. This was the opposite for the lipids: proteins ratio.

2. Biochemical Analyses in Laboratory Specimens

The size of the specimens kept in the laboratory for the one month interval was about 5.0 cm in length. Biochemical composition in these specimens were compared with biochemical composition in the field specimen of the same month and of approximately the same size. The results were shown in Table 5 both in wet weight level and dry weight level. Standard deviations were calculated in relation to the wet weight percentages. Student's t-test was applied here as a test for the significance of the difference between the two means. The t-values were given in Table 6.

Components	Laboratory (in wet weight level percentage)			Field (in wet weight level percentage)		
	Mantle	Non-Mantle	Total	Mantle	Non-Mantle	Total
Total solid	13.400 ±0.020	12.700 ±0.035	12.800 ±0.100	13.500 ±0.150	14.500 ±0.300	15.900 ±0.030
Water content	86.600	87.300	87.200	86.500	85.500	84.100
Proteins	9.6668 ±0.0568	9.3703 ±0.0190	10.2490 ±0.0275	9.2650 ±0.0130	10.6147 ±0.0757	10.4877 ±0.0420
Lipids	0.2096 ±0.0104	0.1707 ±0.0255	0.1437 ±0.0553	0.2035 ±0.0209	0.3016 ±0.0673	0.2795 ±0.0270
Carbohydrates	0.5080 ±0.0001	0.4667 ±0.0080	0.4334 ±0.0040	0.8120 ±0.0094	0.8180 ±0.0053	0.3220 ±0.0069

Components	Laboratory (in dry weight level percentage)			Field (in dry weight level percentage)		
	Mantle	Non-Mantle	Total	Mantle	Non-Mantle	Total
Proteins	72.1493	73.7819	80.0703	68.6296	73.2048	65.9604
Lipids	1.5642	1.3440	1.1226	1.5074	2.0800	1.7577
Carbohydrates	3.7910	3.6748	3.3859	6.0148	5.6414	2.0252

Table 5 - Comparison in biochemical compositions between laboratory specimens and field specimens of Mytilus viridis

Components	Student's t - test		
	mantle	non-mantle	total
Total solid	t = 1.1442	t = 10.3211	t = 51.4096
Proteins	t = -11.9583	t = 27.5920	t = 0.2604
Lipids	t = -0.3567	t = 3.1446	t = 3.8254
Carbohydrates	t = 56.2963	t = 46.8400	t = -24.2174

Table 6 - t - values in Student's t test which applied to determine the differences in mean value between the laboratory specimens and the field specimens.

t-value from the table of t :-

$$t = 0.05 \text{ (d.f. = 1)} = 12.71$$

The results were concluded as followed

2.1 Total solid

Comparison between the total solid and the water content in laboratory specimens and in field specimens were shown in Figure 13, and Figure 14. Total solids in both specimens were approximately the same in the mantle and the non-mantle tissue. There was a significant difference in the total solid in the total tissue at 5% level of significance. Total solid was lower in laboratory specimens.

2.2 Protein content

Histograms showing the protein content in laboratory specimens and in field specimens were shown in figure 15. The t-test value for the non-mantle tissue was greater than the t-value from the table. That means there was significant variation in the protein content found in the laboratory specimens and in the field specimens at 5% level of significance. This was not true for the mantle and total tissues because the proteins in both specimens were approximately the same.

2.3 Lipid content

The lipid contents in laboratory specimens and field specimens showed no significant differences at 5% level of significance as shown in Figure 16.

2.4 Carbohydrate content

There were significant differences in carbohydrate contents found in various tissues in both field and laboratory specimens at 5% level of significance. Histograms showing this comparison were shown in Figure 17. The carbohydrates in field specimens tended to be higher than those in the laboratory, exclusive of the carbohydrates in total tissue.

3. Biological Analyses in Field Specimens

3.1 Reproductive state

The results were shown in Table 7, given in gonad condition index. The mussels of smaller size (1.0-1.5 cm) found in October 1974 mostly fell into stage 0 in the gonad developmental stage. The mantle was thick and no gametes were observable. The gonad condition index increased toward the month of September when most of the specimen were in stage 3 and stage 4 recently spent stage. Comparing the gonad condition index data to those of the biochemical composition data, it could be concluded that the protein component and the carbohydrate component seemed to correlate with the changes in gonad condition index. As the gonad condition index increased, the protein component and the carbohydrate component in various tissues also increased with very few exceptions. At the beginning of the rainy season, the carbohydrates reached the maximum value. They

Months	No.of animals in different stages of gonad development					Gonad Condition Index
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	
Oct.1974	10	-	-	-	-	0
Nov.1974	2	8	-	-	-	0.8
Dec.1974	-	8	-	-	-	1.1
Jan.1975	-	8	2	-	-	1.2
Feb.1975	-	7	3	-	-	1.3
Mar.1975	-	7	2	1	-	1.4
Apr.1975	-	6	1	3	-	1.7
May 1975	-	1	9	-	-	1.9
Jun.1975	-	2	3	4	1	2.4
July1975	-	1	4	4	1	2.5
Aug.1975	-	-	3	5	2	2.9
Sept.1975	-	-	-	5	5	3.5

Table 7 - Seasonal variations in gonad condition index of Mytilus viridis

decreased toward the end of the season in September. This was the opposite to the gonad condition index. It increased and reached its maximal value in September. Profiles showing seasonal variations in biochemical composition in relation to the gonad condition index in the mantle, non-mantle and total tissue were in Figure 18,19,20 respectively.

3.2 Nutritional state

The degree of fullness of stomach and relative abundance (%) of food in stomach contents were given in Table 8. The stomachs were mostly in the full class. Detritus and a wide variety of live planktonic organisms; diatoms and dinoflagellates were usually ingested by the mussel. Care was taken to differentiate diatoms in the stomach content into two groups: the centrics diatom and pennates diatom. Identification of each species has not been done. Examples of centrics diatom found in the stomach contents were Coscinodiscus, Chaetoceros. The pennates diatom that were common in the stomach contents were Navicula and Nitzchia. Dinoflagellates such as Prorocentrum were also distinguished. Only these three important groups were counted in the stomach contents and the relative abundance in percentage of these three groups were calculated. Centrics diatoms were found most abundant in all stomach contents, while the dinoflagellates were the least abundant. The nutritional state in the stomach of this mussel could not clearly be related to the biochemical composition.

Months	Relative abundance(1%) of plankton in stomach contents			Class representing Degree of fullness			
	Centrics diatom	Pennates diatom	Dinoflagellates	Empty	Little	Moderate	full
Oct.1974	57.14	42.86	-	-	-	-	10
Nov.1974	63.64	36.36	-	-	-	-	10
Dec.1974	57.14	28.57	14.29	-	-	3	7
Jan.1975	33.33	67.67	-	-	1	3	6
Feb.1975	57.14	42.86	-	-	-	4	6
Mar.1975	33.33	33.33	33.33	-	1	-	9
Apr.1975	55.17	34.48	10.34	-	-	2	8
May 1975	79.17	8.33	12.50	-	-	2	8
Jun.1975	62.50	31.25	6.25	1	-	1	8
July1975	38.46	53.85	7.69	-	-	1	9
Aug.1975	33.33	55.56	11.11	-	-	2	8
Sept.1975	46.67	40.00	13.33	-	-	3	7

Table 8 Seasonal variations in nutritional state in Mytilus viridis

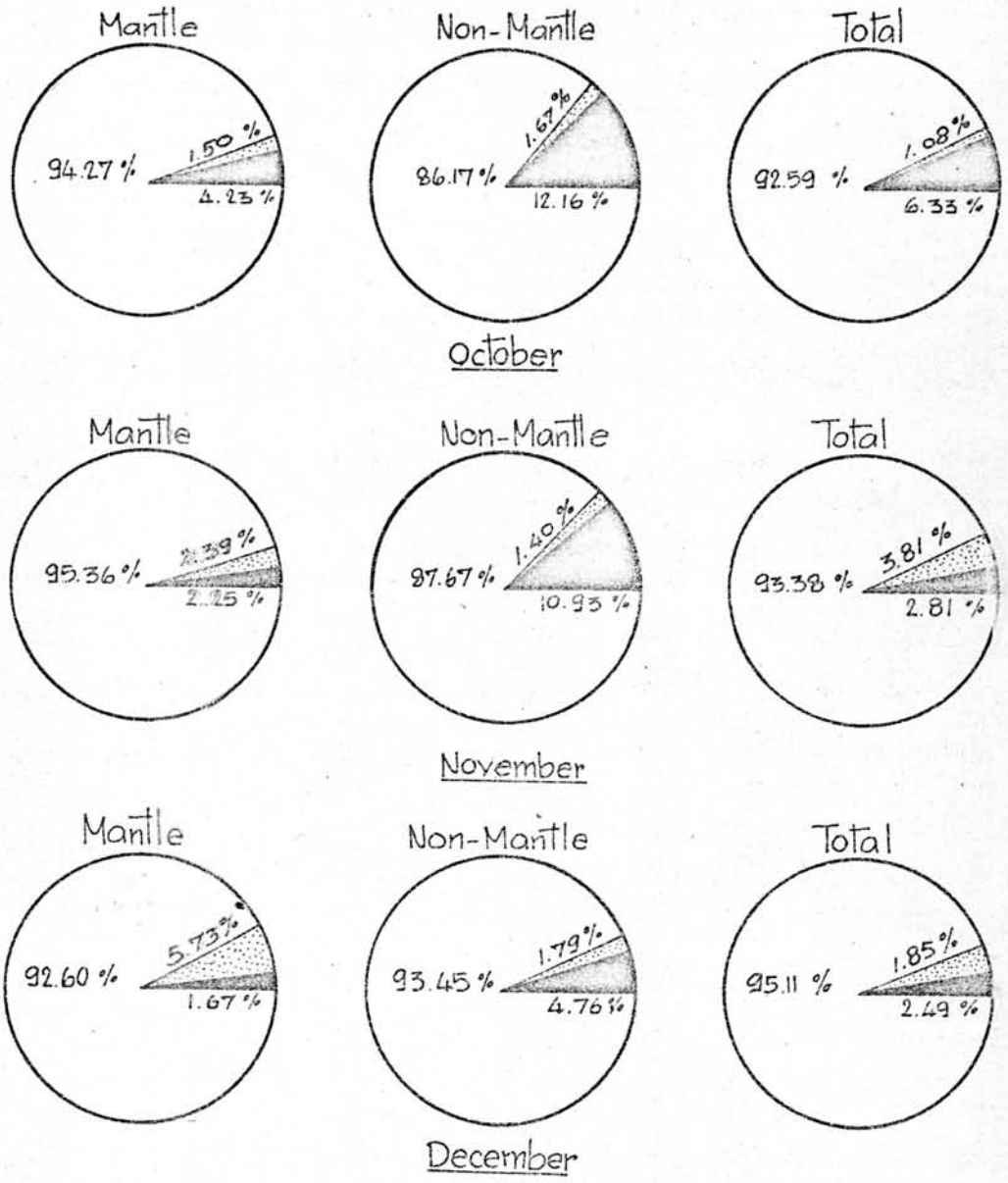
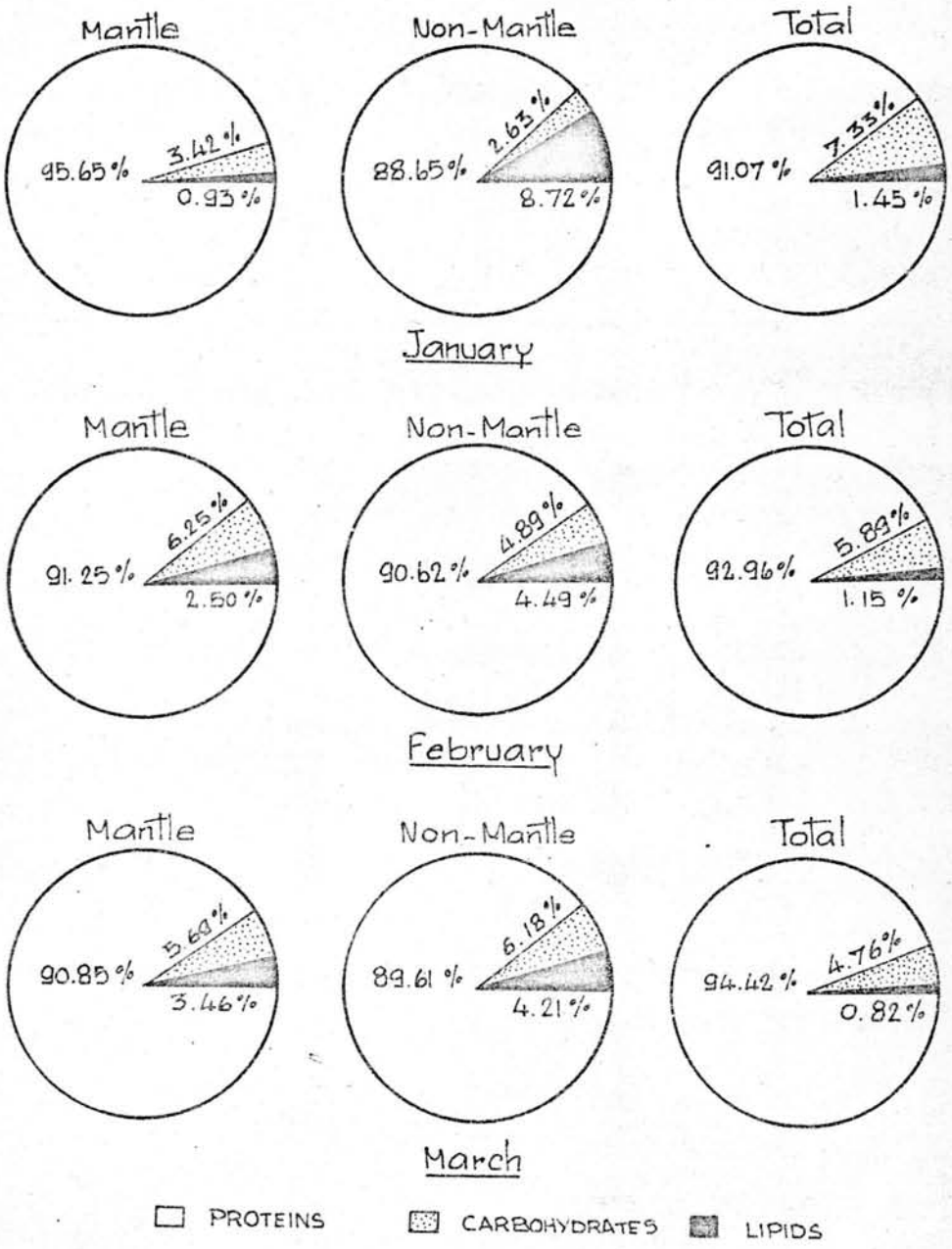
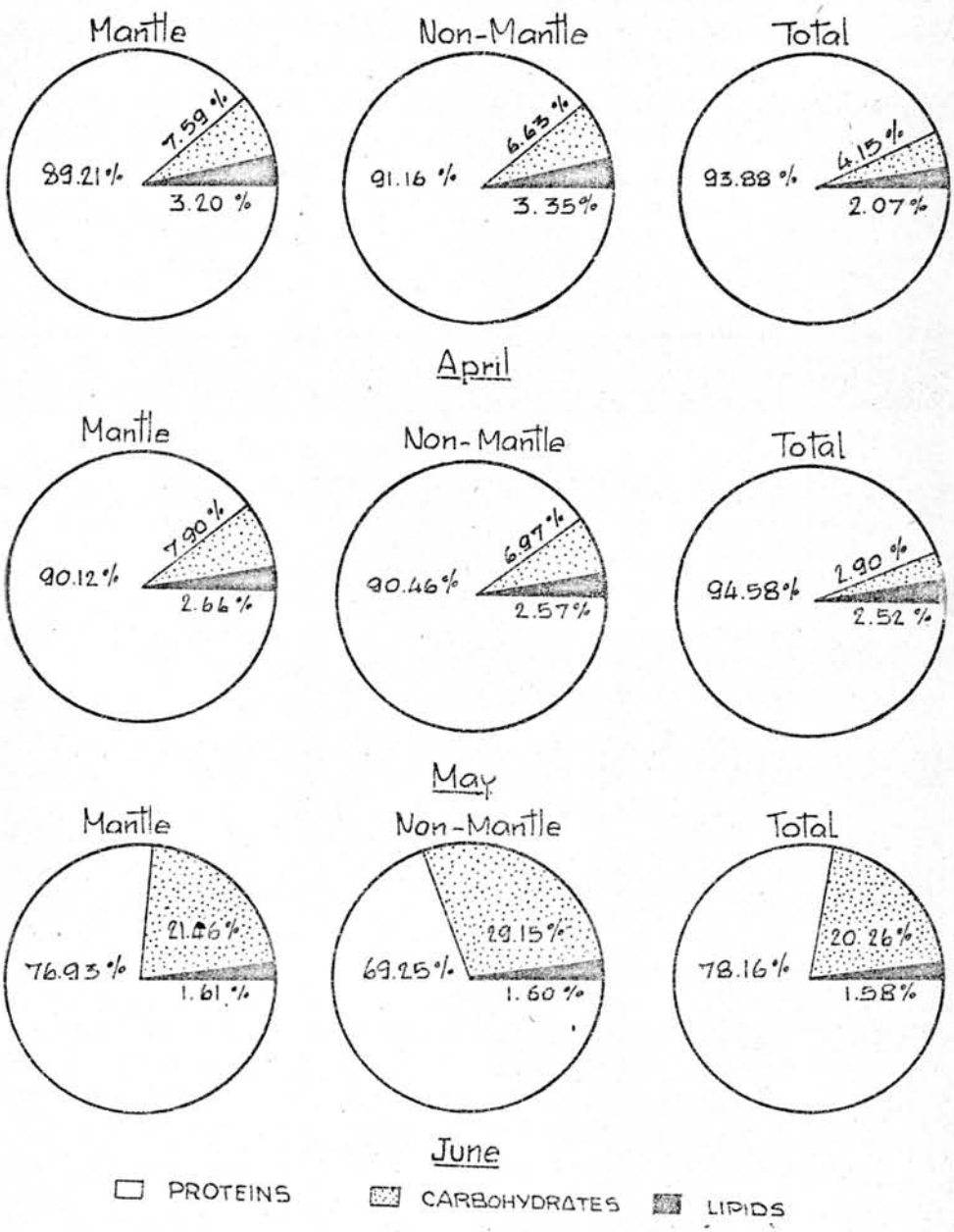
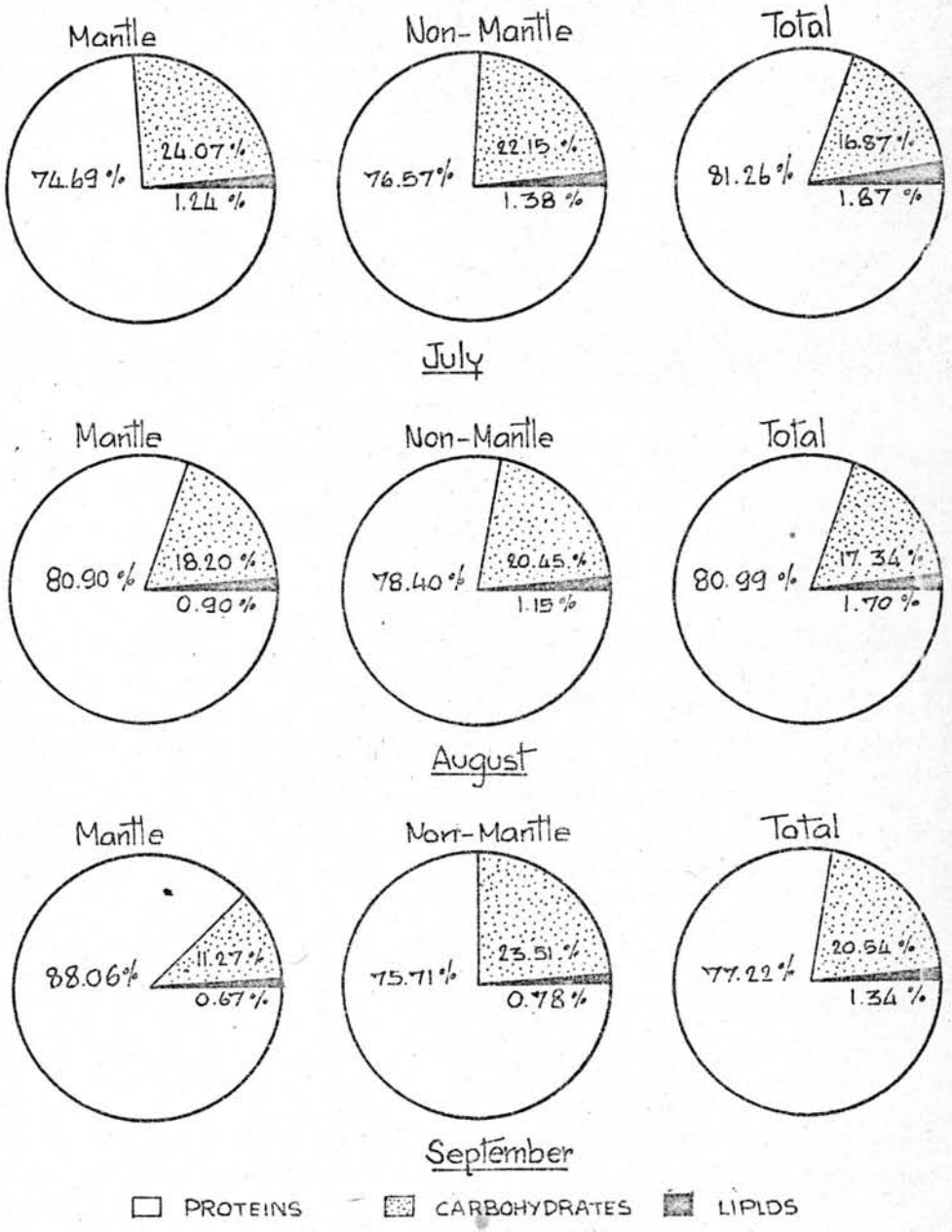


Fig 2. Monthly variations in biochemical composition profile in mussel Mytilus viridis

□ PROTEINS ▨ CARBOHYDRATES ■ LIPIDS


Mantle
95.65 %
3.42 %
0.93 %
Non-Mantle
88.65 %
2.63 %
8.72 %
Total
91.07 %
7.33 %
1.45 %
January
Mantle
91.25 %
6.25 %
2.50 %
Non-Mantle
90.62 %
4.89 %
4.49 %
Total
92.96 %
5.89 %
1.15 %
February
Mantle
90.85 %
5.69 %
3.46 %
Non-Mantle
89.61 %
6.18 %
4.21 %
Total
94.42 %
4.76 %
0.82 %
March
PROTEINS
CARBOHYDRATES
LIPIDS


Mantle
Non-Mantle
Total
89.21%
7.59%
3.20%
91.16%
6.63%
3.35%
93.88%
4.15%
2.07%
April
Mantle
Non-Mantle
Total
90.12%
7.90%
2.66%
90.46%
6.97%
2.57%
94.58%
2.90%
2.52%
May
Mantle
Non-Mantle
Total
76.93%
21.46%
1.61%
69.25%
29.15%
1.60%
78.16%
20.26%
1.58%
June
PROTEINS
CARBOHYDRATES
LIPIDS


Mantle
74.69 %
24.07 %
1.24 %
Non-Mantle
76.57%
22.15 %
1.38 %
Total
81.26 %
16.87 %
1.87 %
July
Mantle
80.90 %
18.20 %
0.90 %
Non-Mantle
78.40 %
20.45 %
1.15 %
Total
80.99 %
17.34 %
1.70 %
August
Mantle
88.06%
11.27 %
0.67 %
Non-Mantle
75.71 %
23.51 %
0.78 %
Total
77.22 %
20.54 %
1.34 %
September
PROTEINS
CARBOHYDRATES
LIPIDS

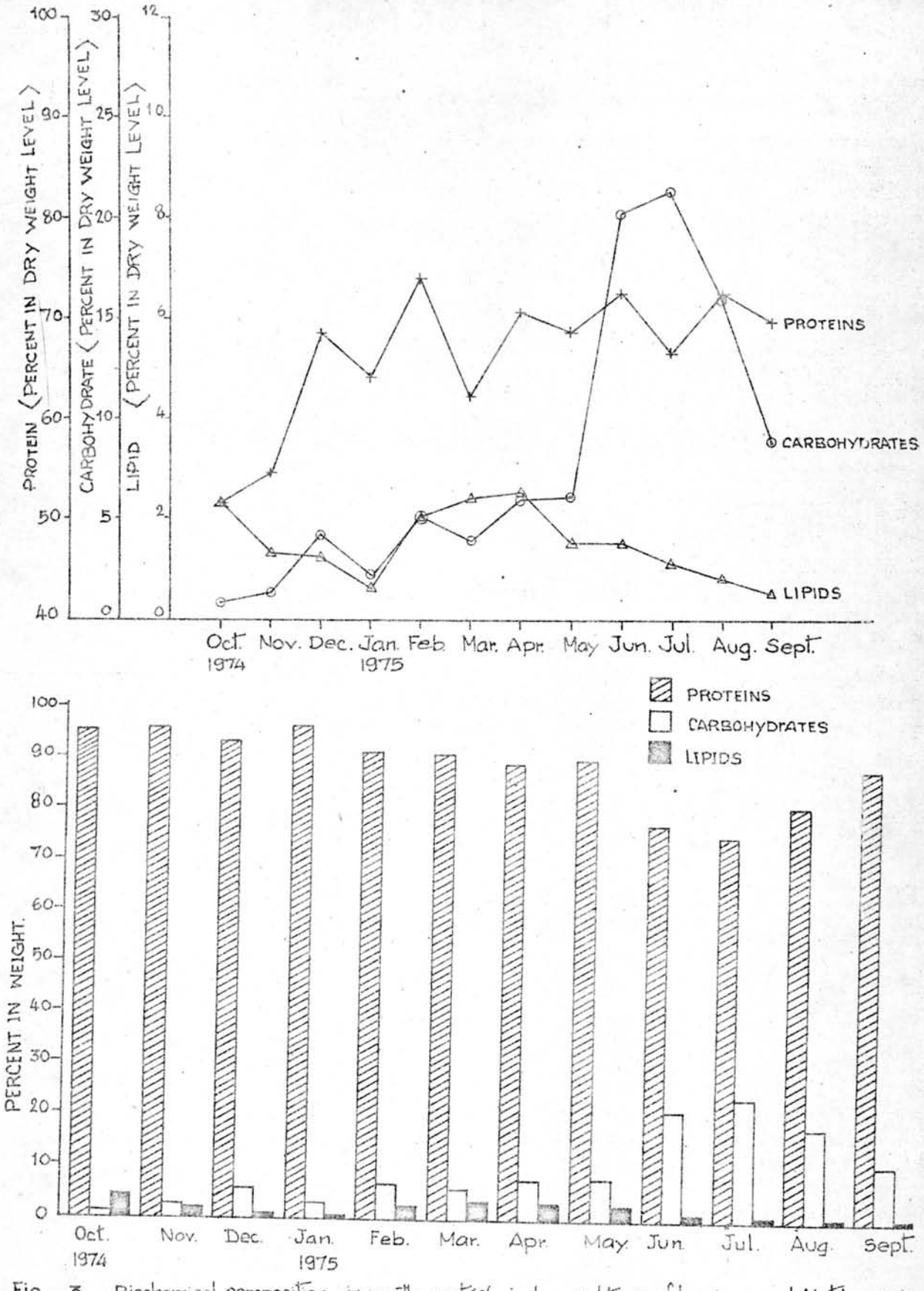
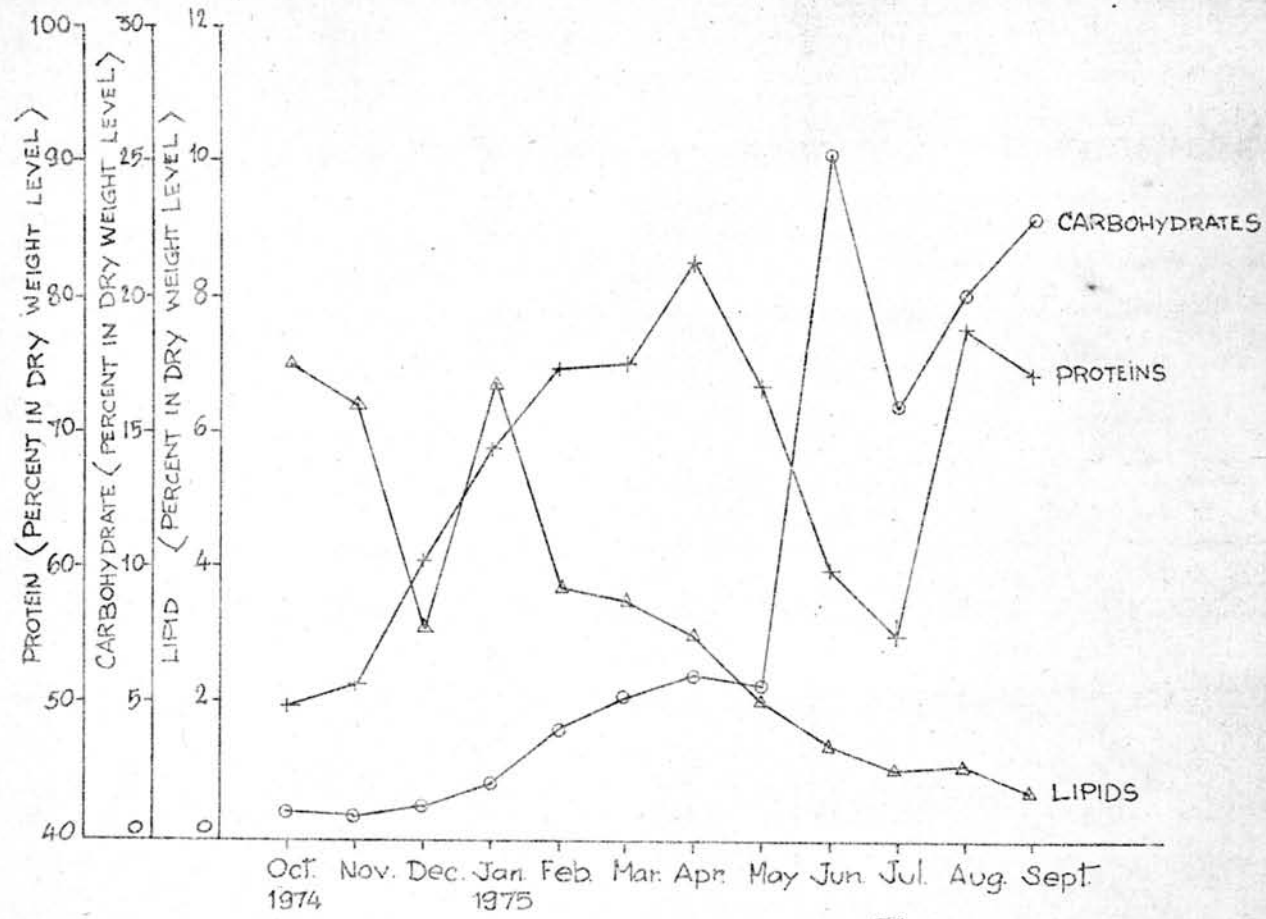


Fig 3 Biochemical composition in mantle part (% in dry weight) profiles in mussel Mytilus viridis



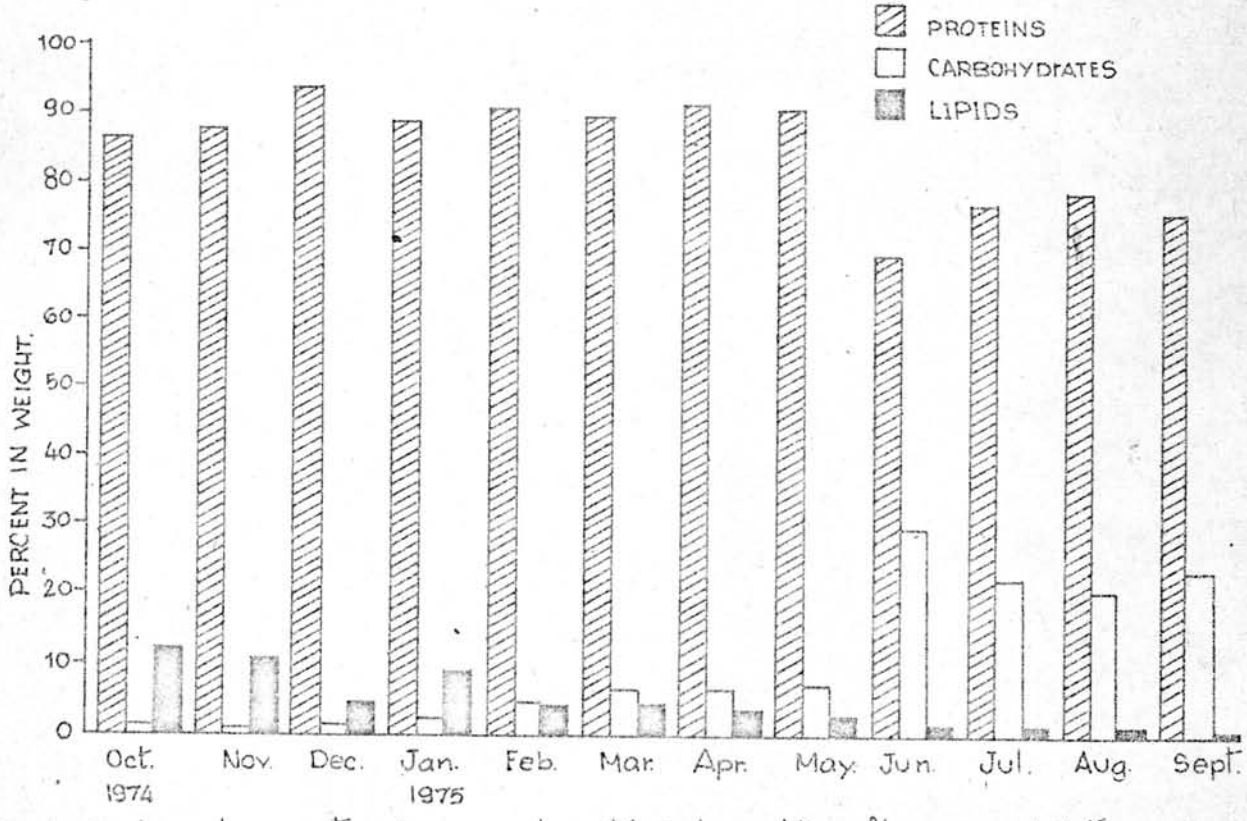
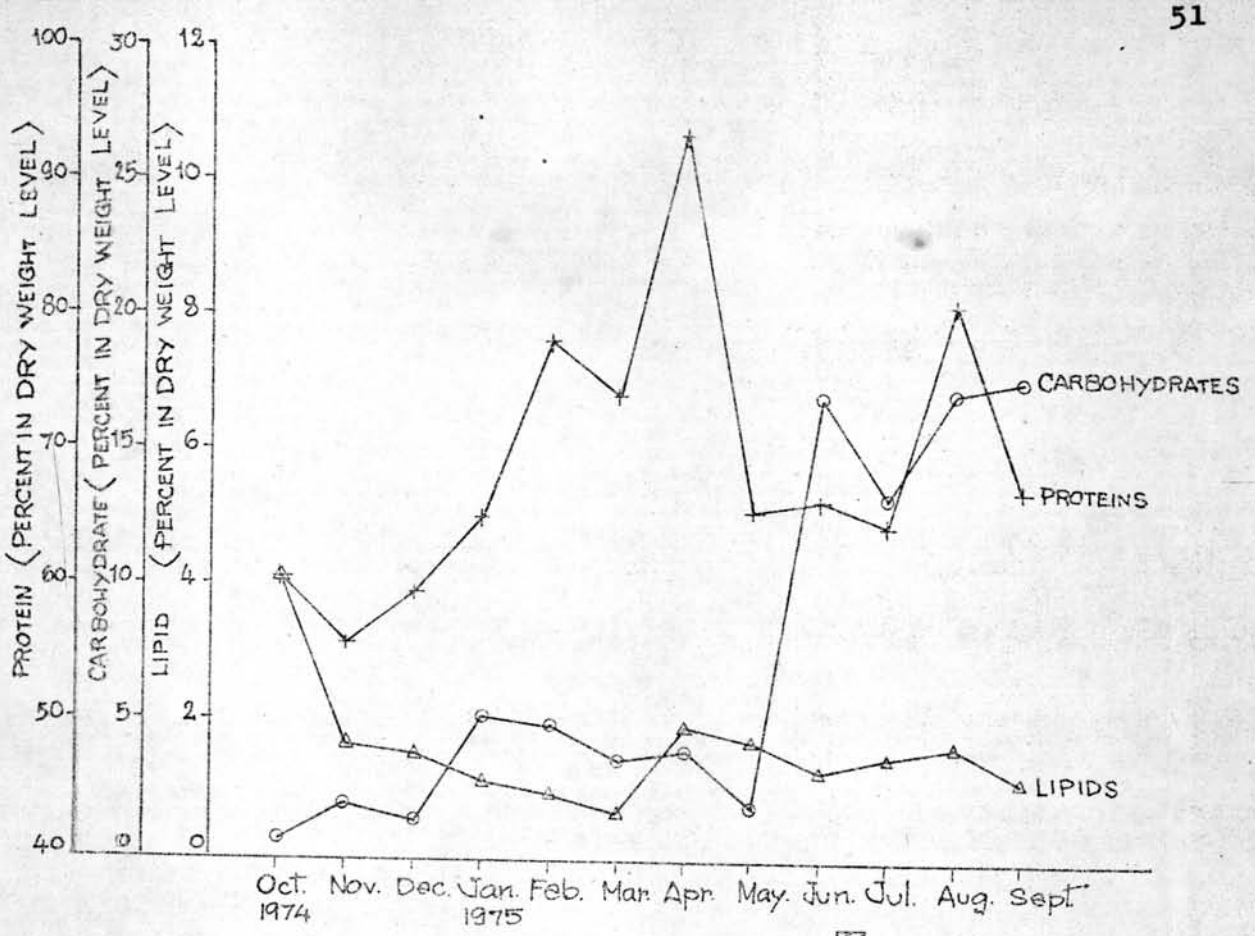


Fig 4 Biochemical composition in non-mantle part (% in dry weight) profiles in mussel Mytilus viridis



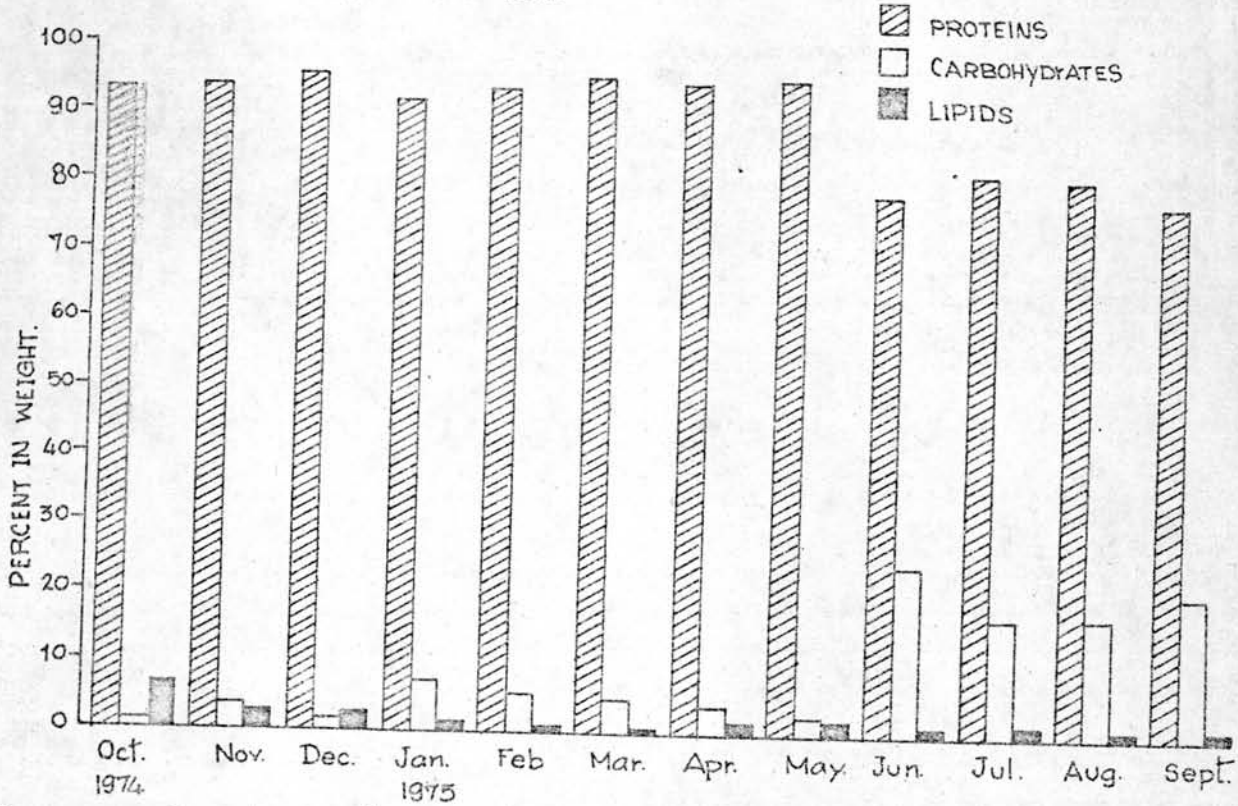


Fig 5 Biochemical composition in total (% in dryweight) profiles in mussel Mytilus viridis

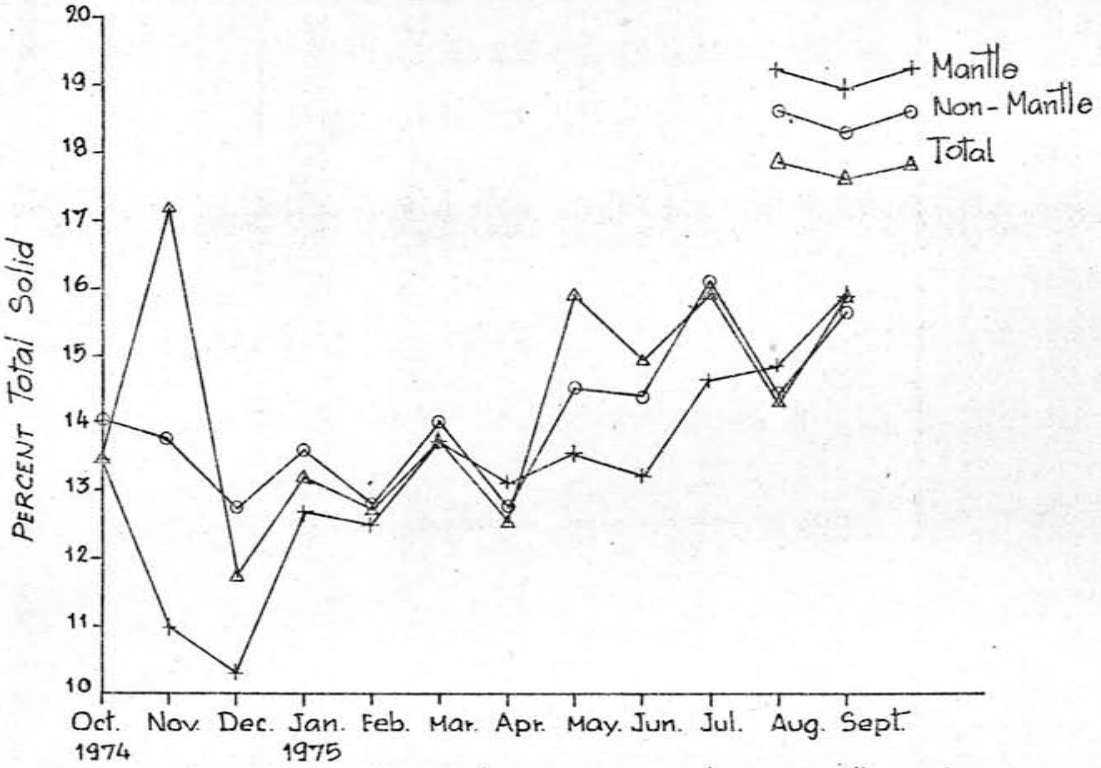


Fig 6 Seasonal variations in total solid in mantle part, non-mantle part and total in mussel Mytilus vividis

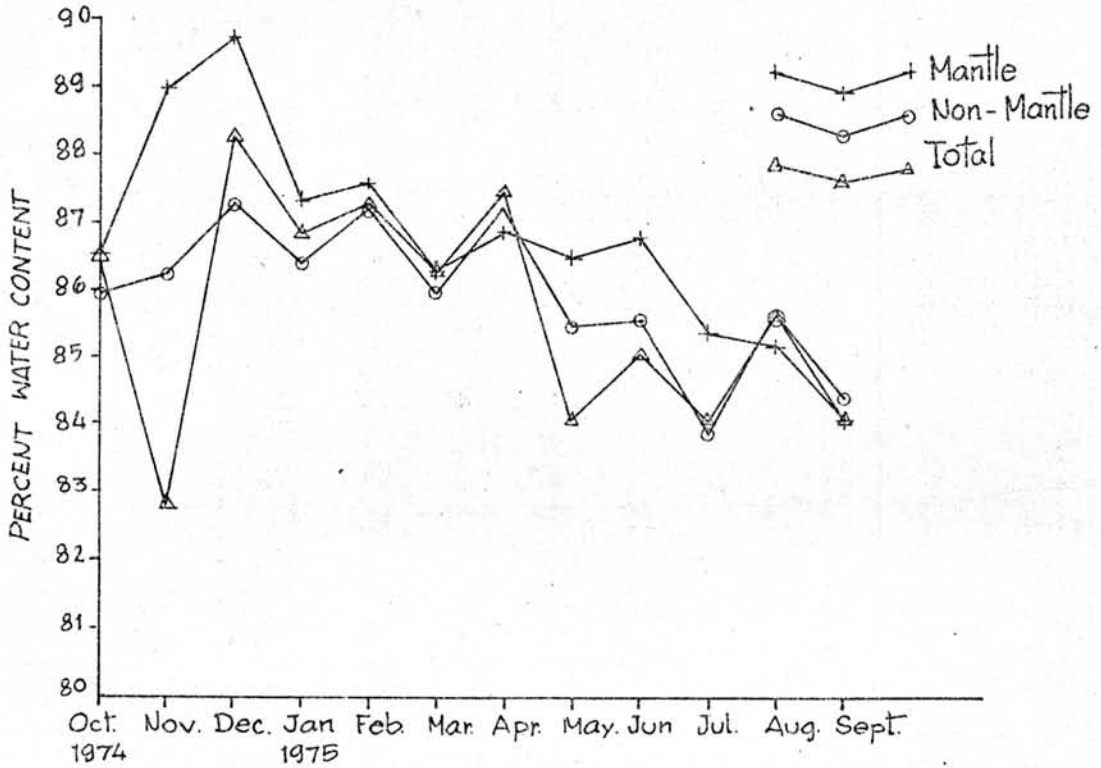


Fig 7 Seasonal variations in water content in mantle part, non-mantle part and Total in mussel Mytilus vividis

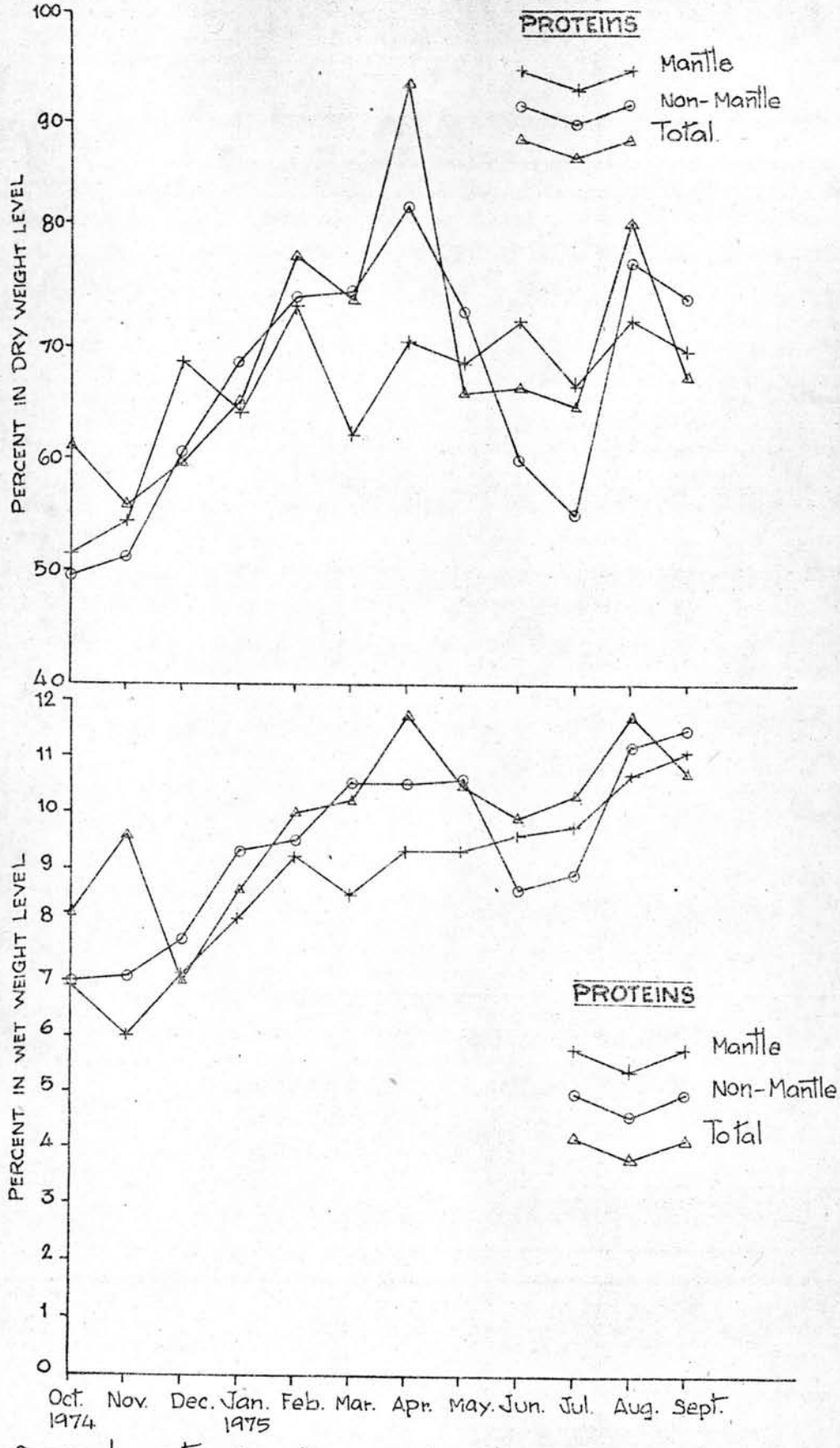


Fig 8 Seasonal variations in proteins in mantle part, non-mantle part and total in mussel Mytilus viridis

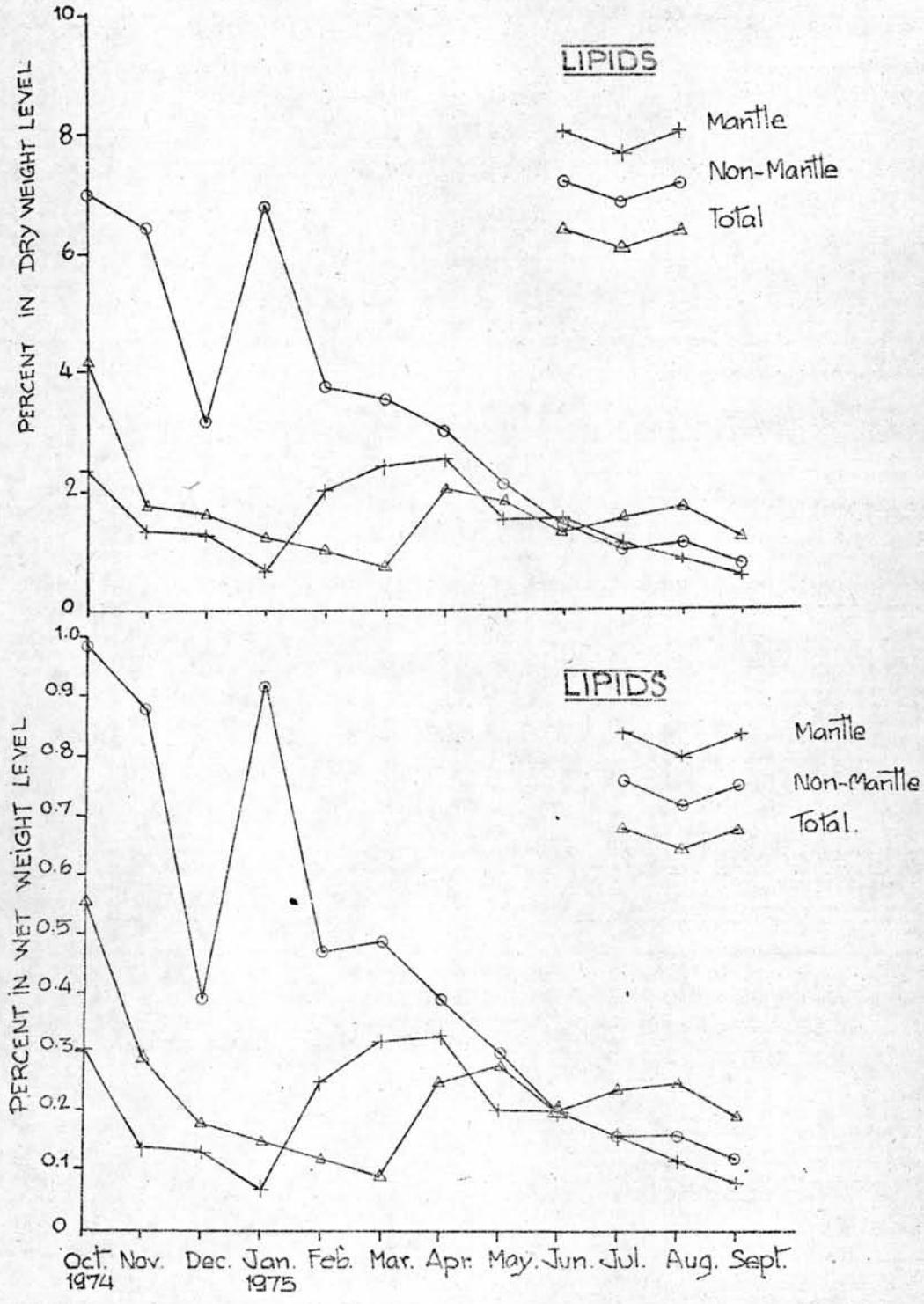


Fig 9 Seasonal variations in lipid in mantle part, non-mantle part and total in mussel *Mytilus viridis*

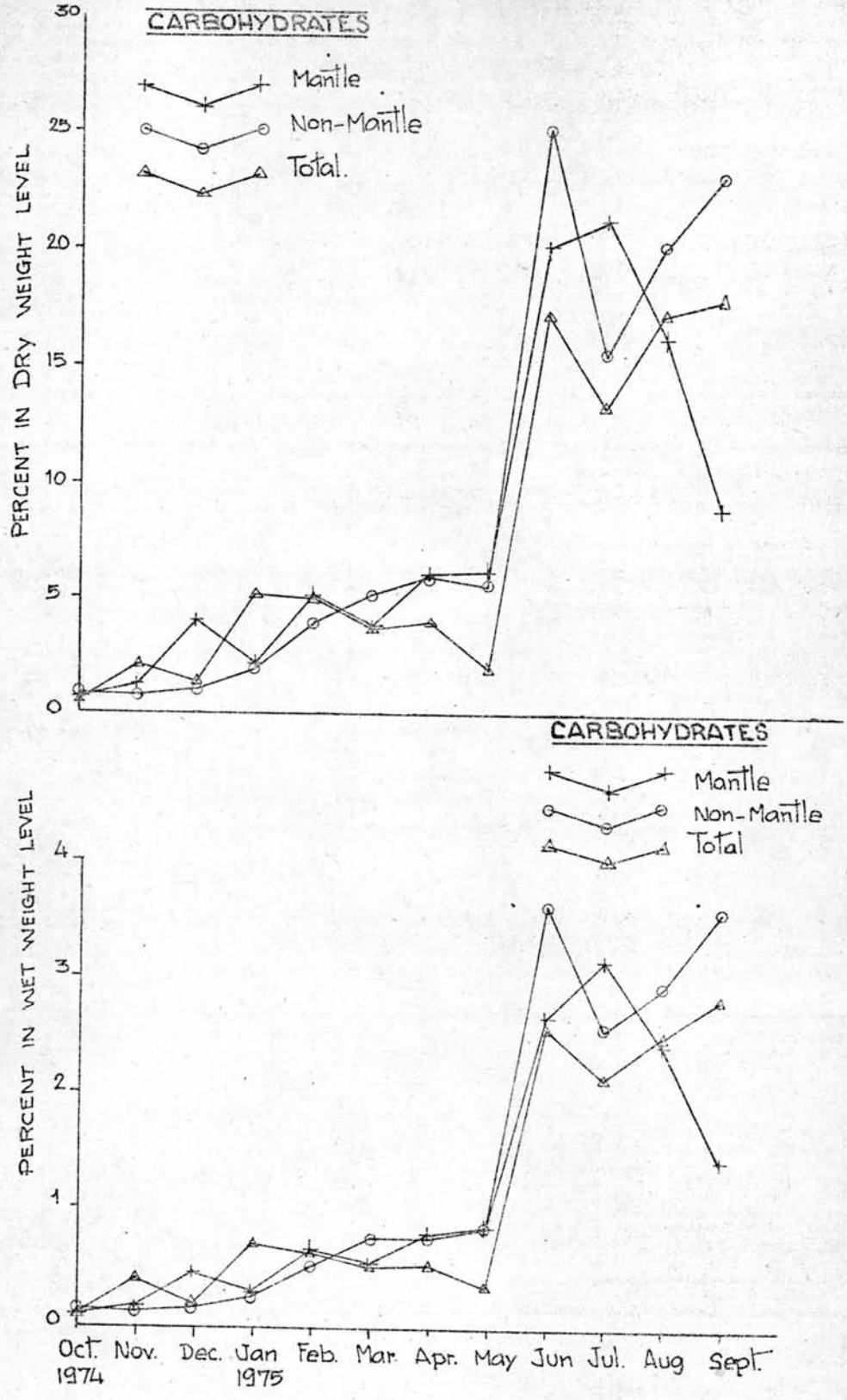


Fig 10 Seasonal variations in carbohydrates mantle part, non-mantle part and Total in mussel Mytilus viridis

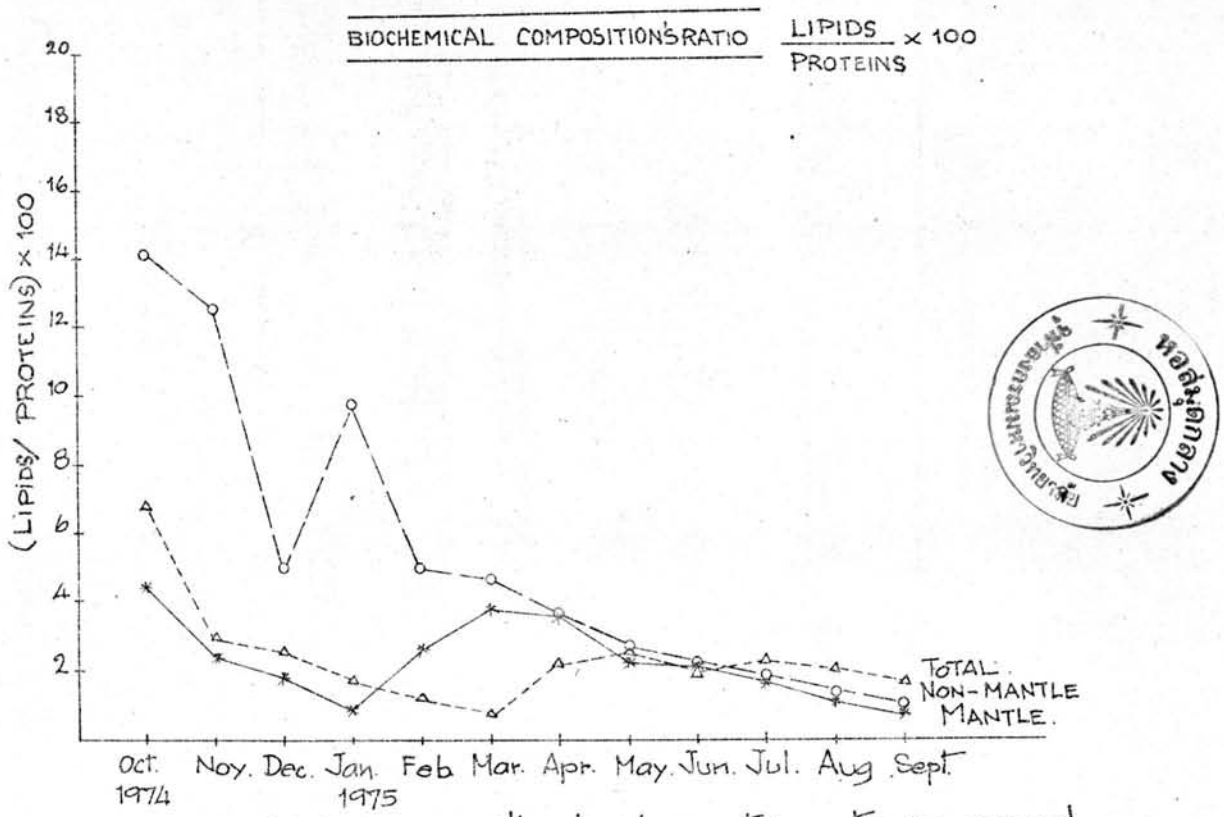


Fig 11 Seasonal changes in the lipids: proteins ratio in mussel Mytilus viridis

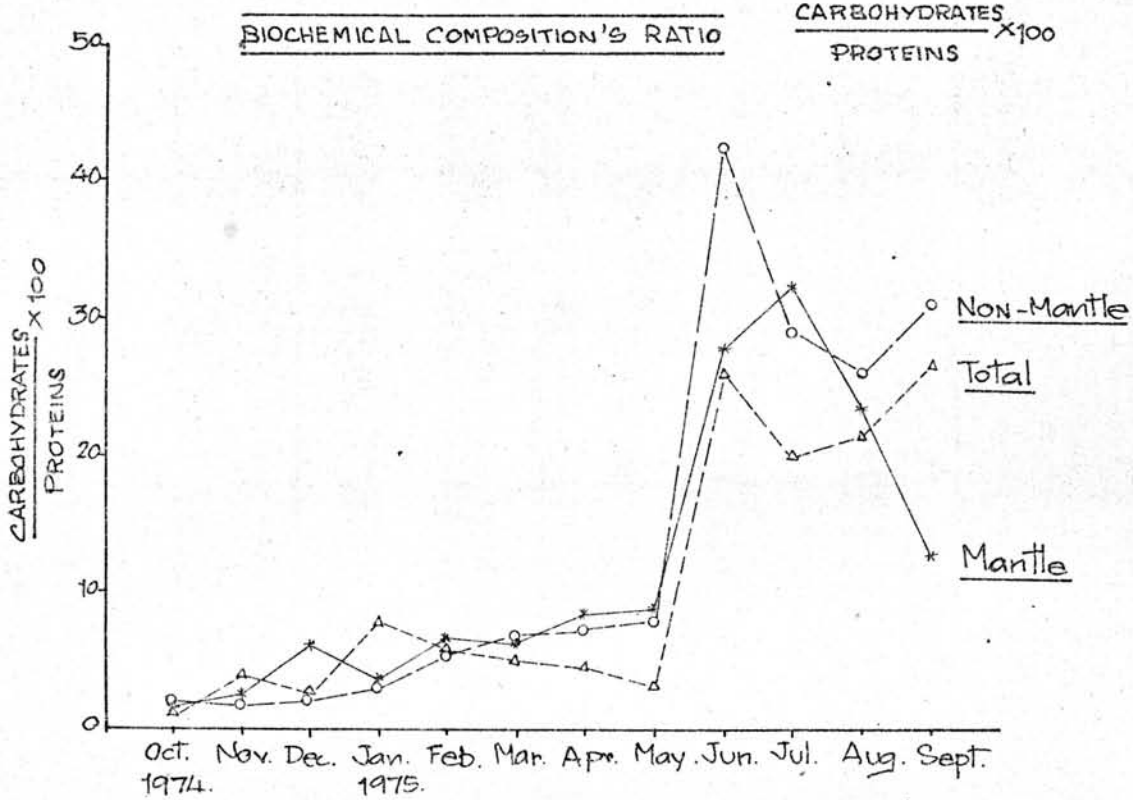


Fig 12 Seasonal changes in the carbohydrates: proteins ratio in mussel Mytilus viridis

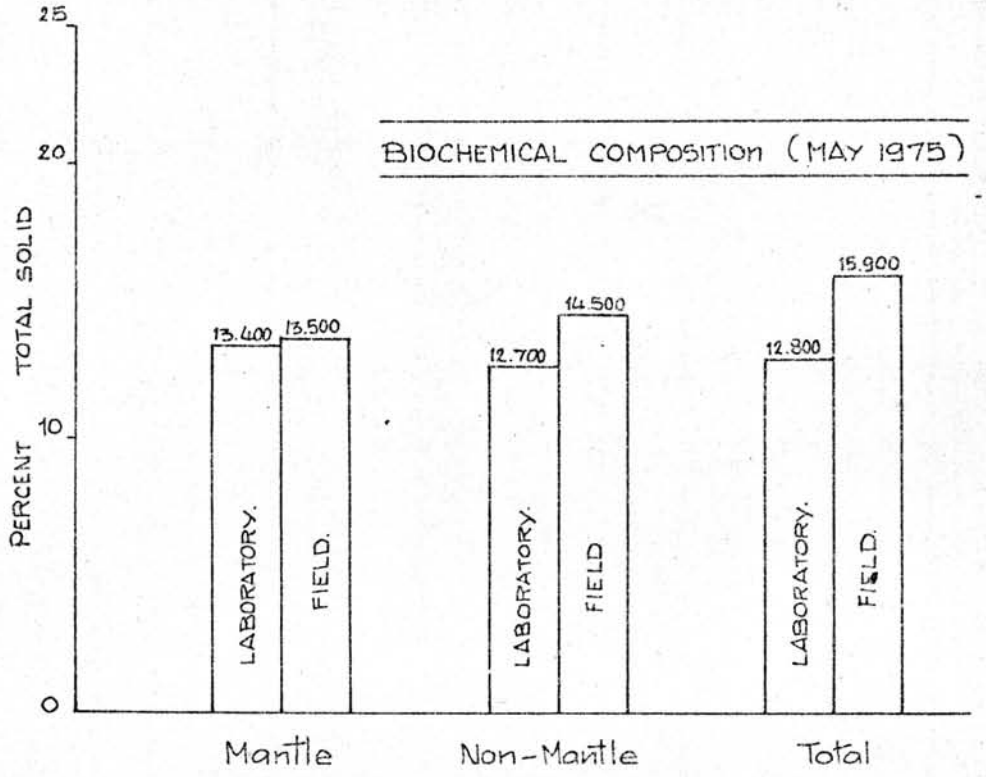


Fig 13 Comparison of total solid in laboratory specimens and in field specimens (Mytilus viridis)

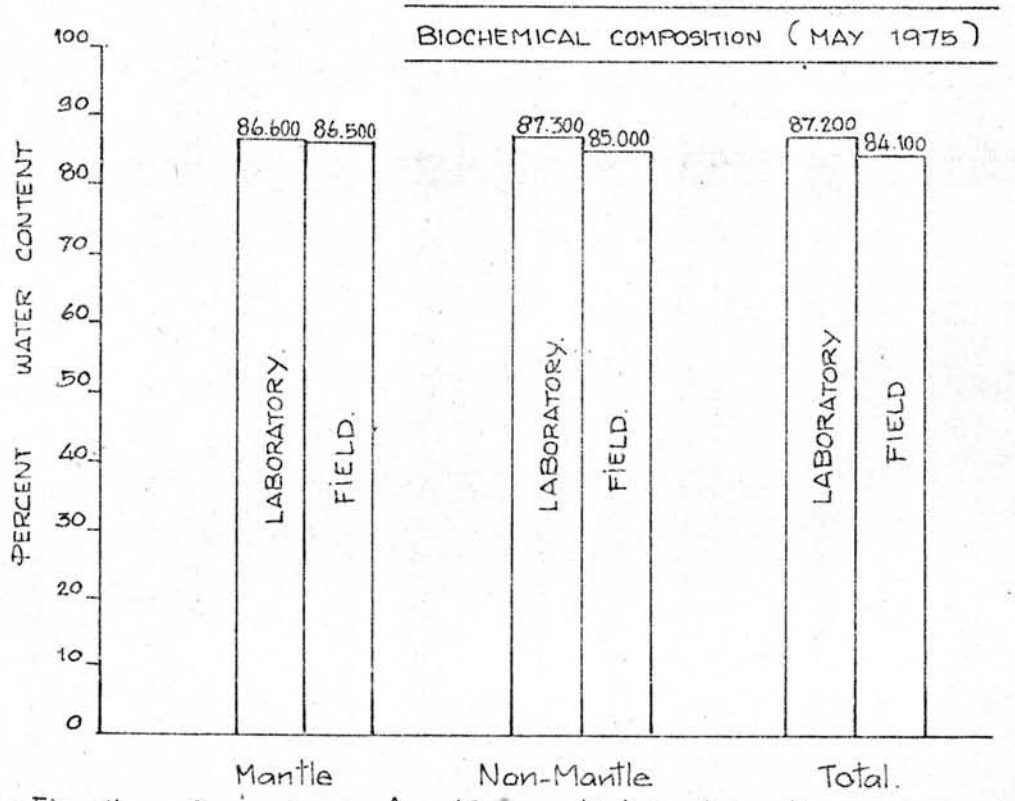
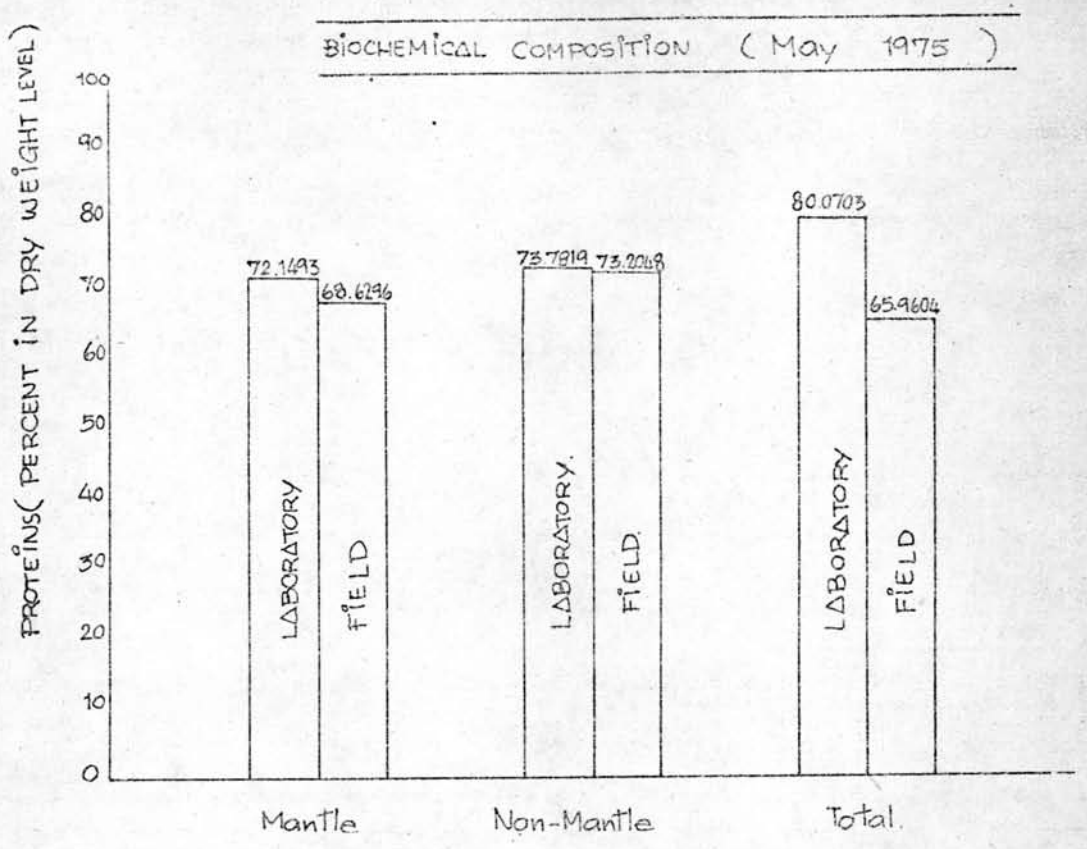


Fig 14 Comparison of water content in laboratory specimens and in field specimens (Mytilus viridis)



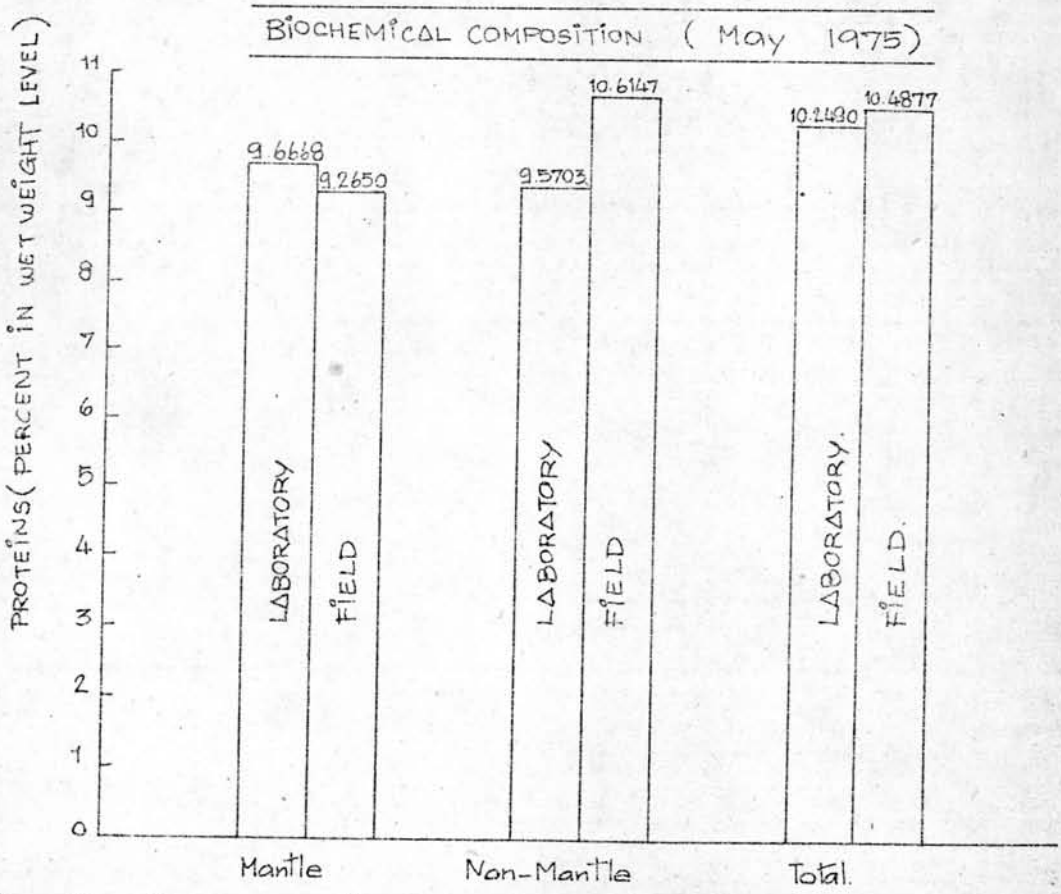


Fig 15 Comparison of protein content in laboratory specimens and in field specimens (Mytilus viridis)

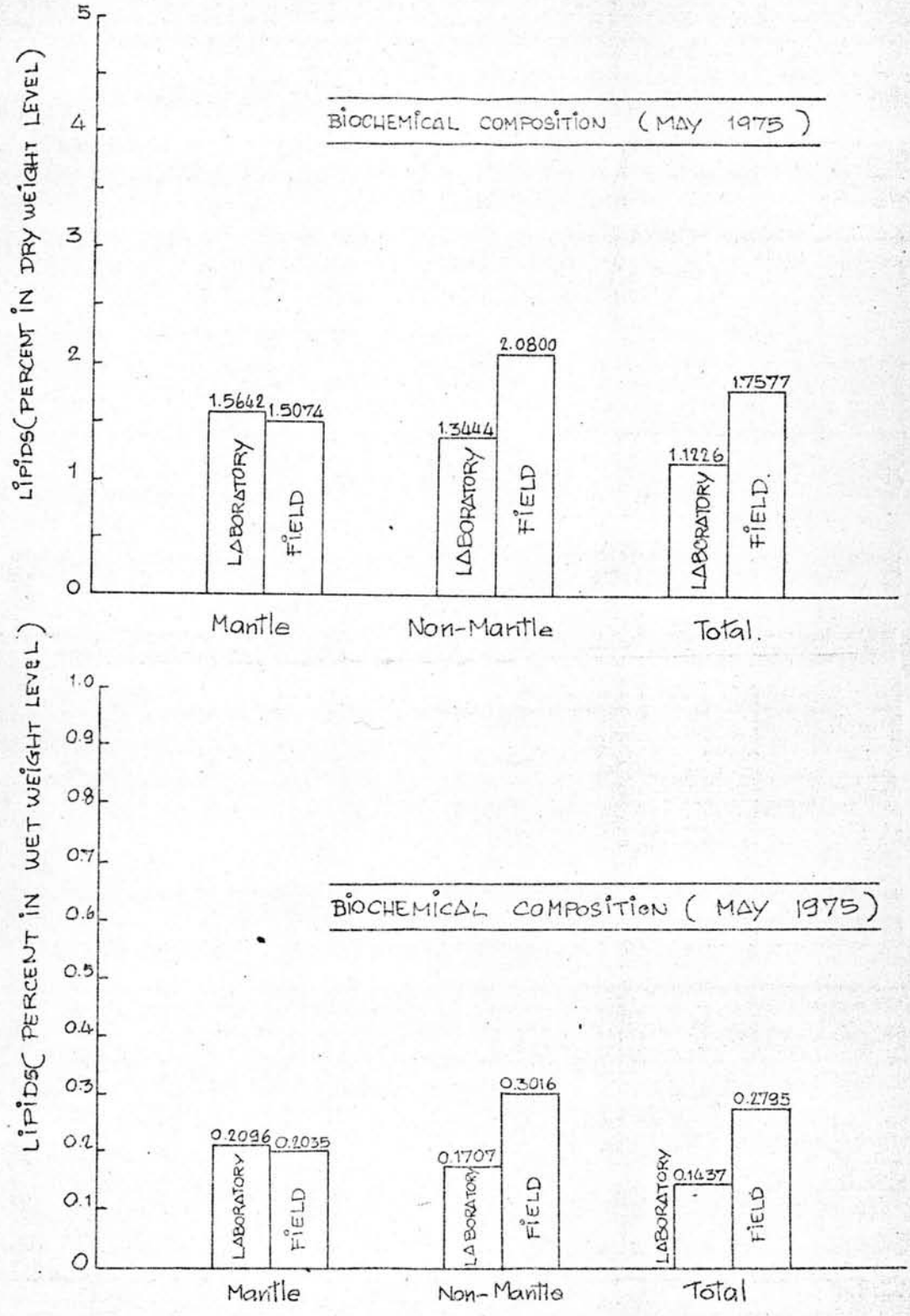
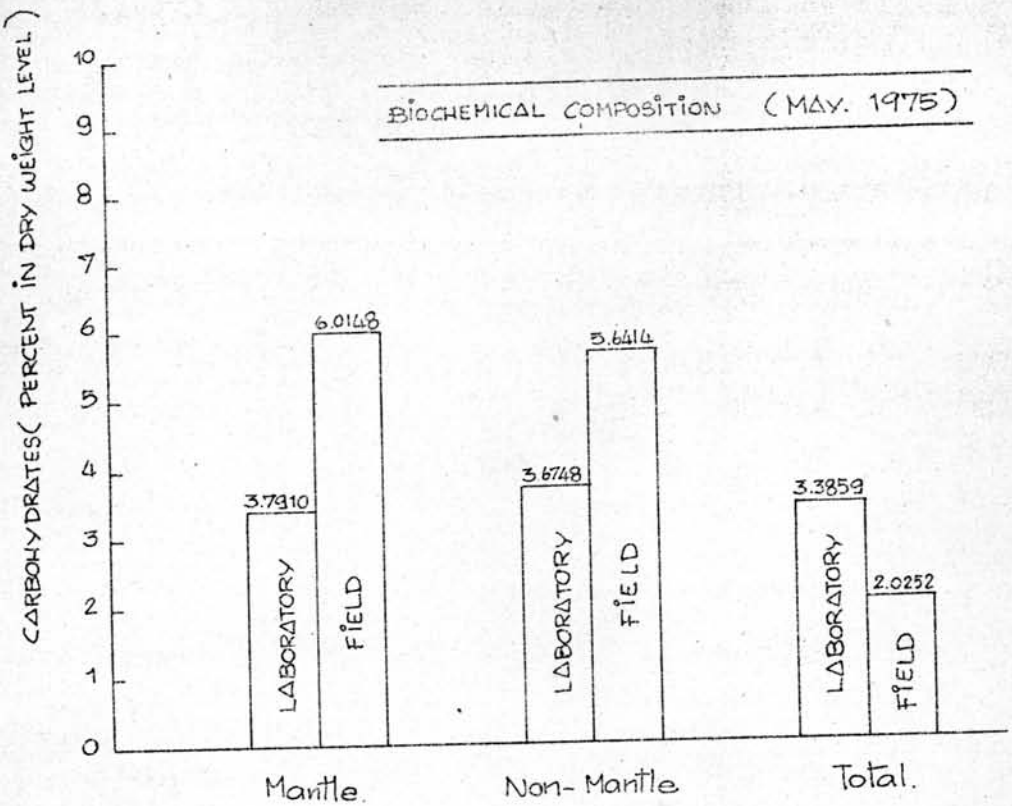


Fig 16 Comparison of lipid content in laboratory specimens and in field specimens (Mytilus viridis)



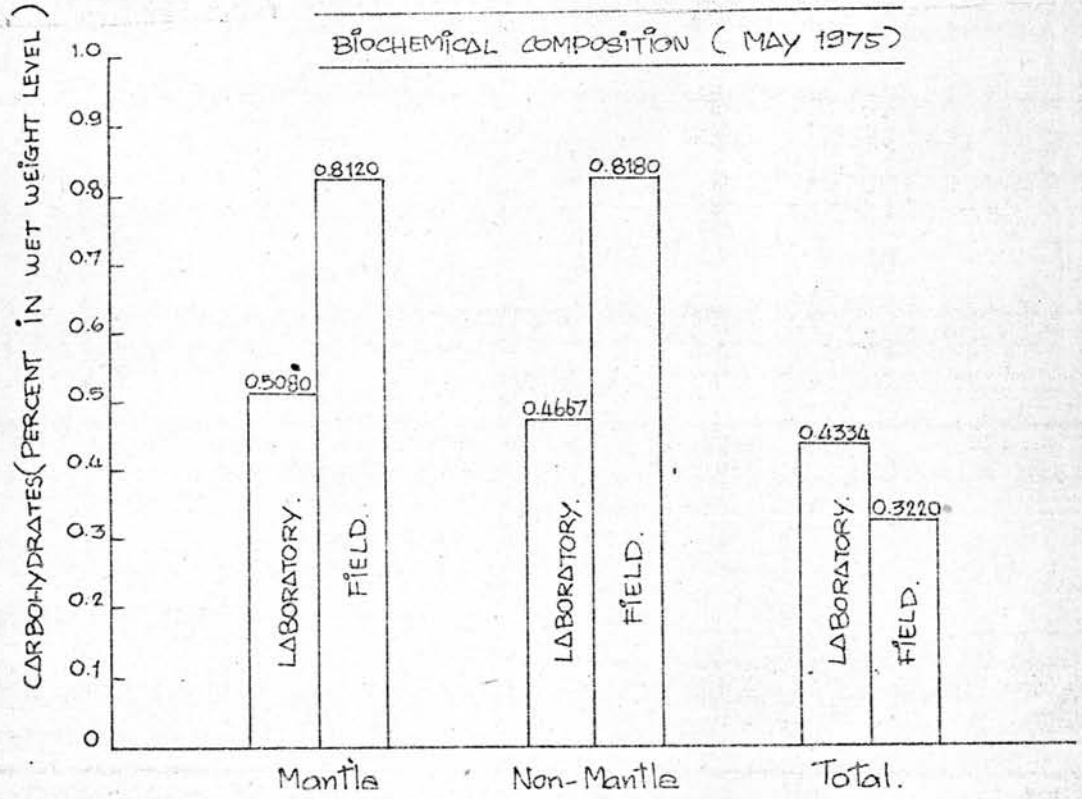


Fig 17 Comparison of carbohydrate content in laboratory specimens and in field specimens (Mytilus viridis)

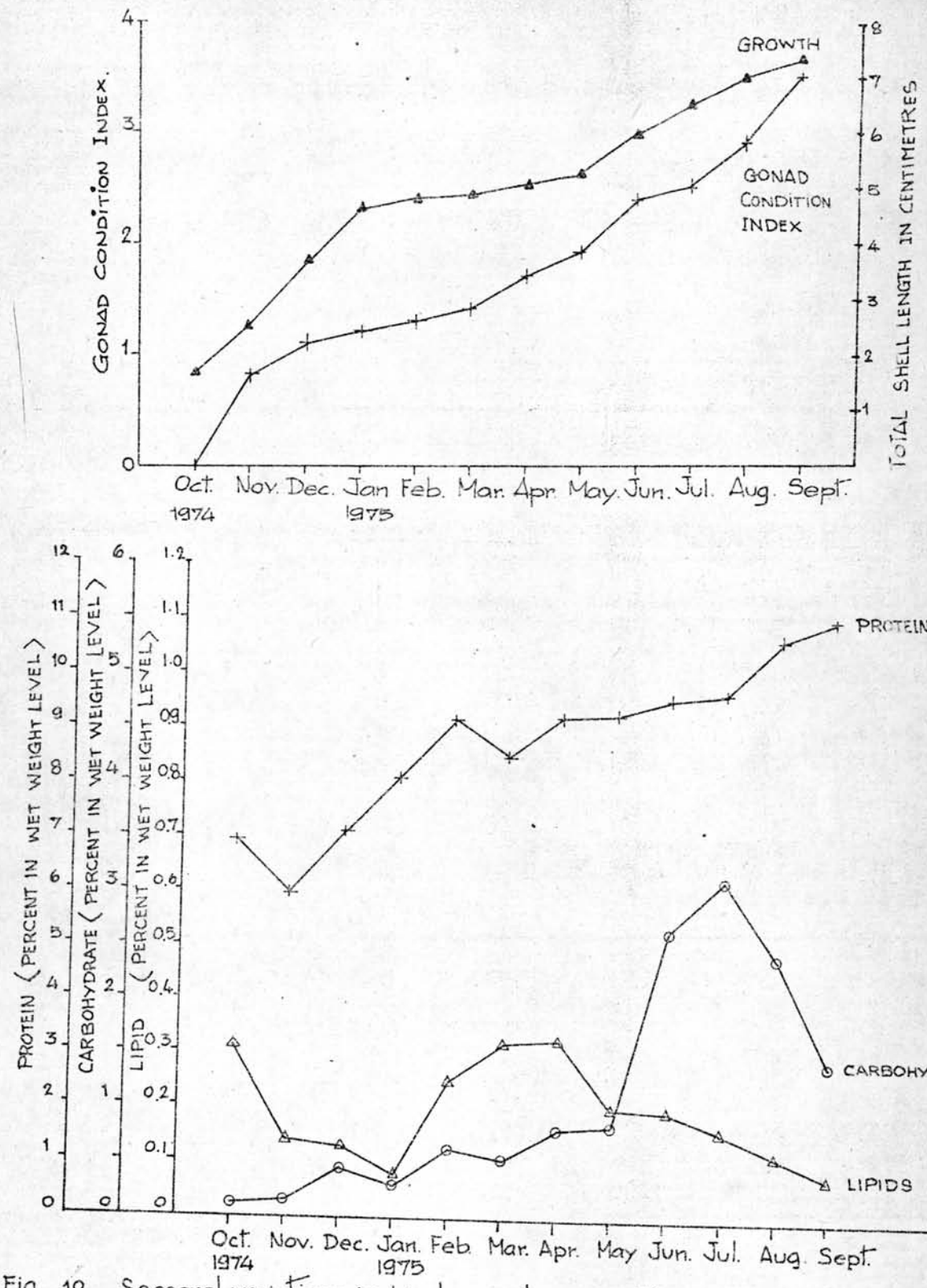


Fig 18 Seasonal variations in biochemical composition in mantle part in mussel Mytilus viridis in relation to the gonad condition index and growth.

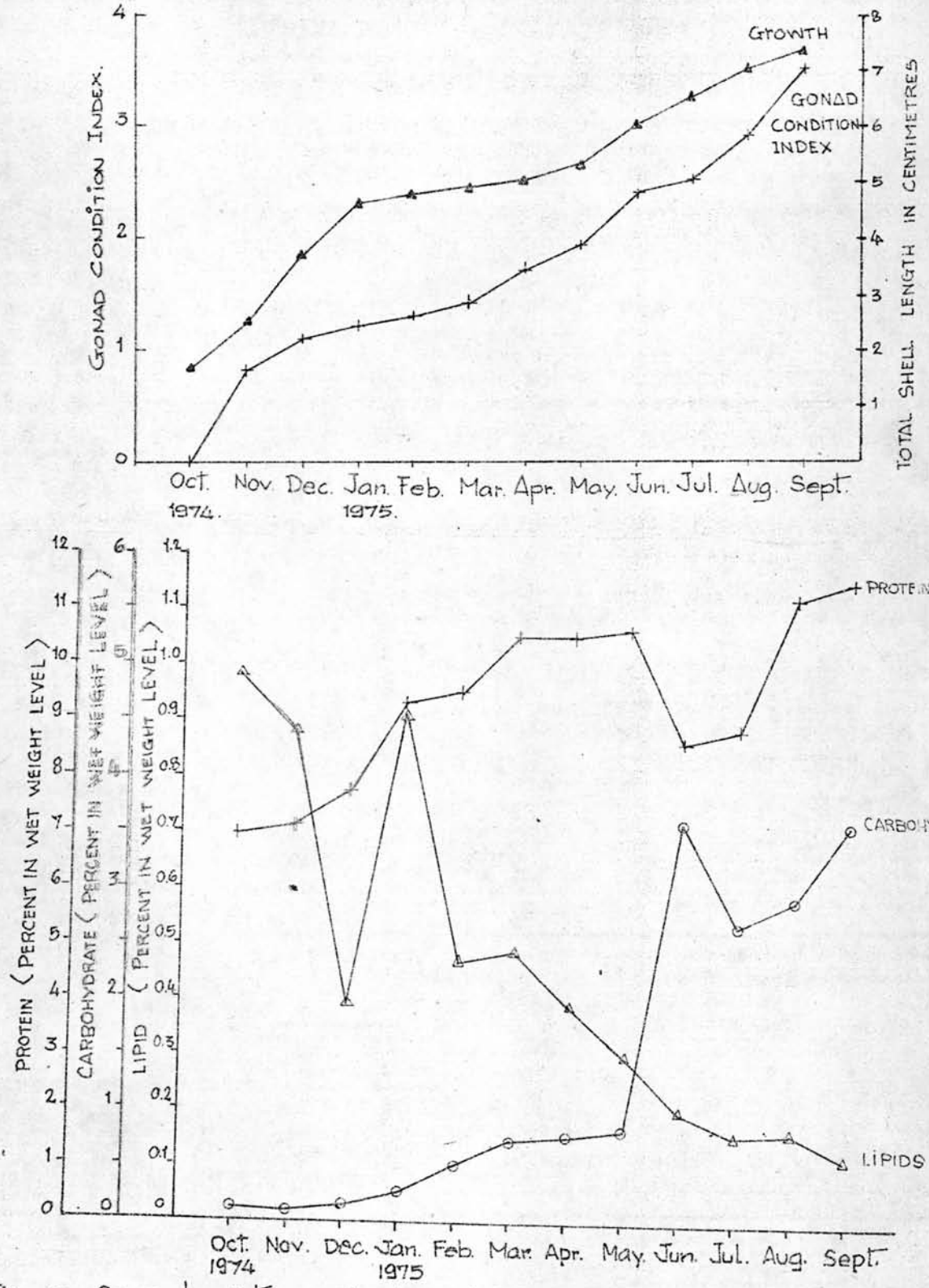


Fig 19 Seasonal variations in biochemical composition in non-mantle part in mussel Mytilus viridis in relation to the gonad condition index and growth.

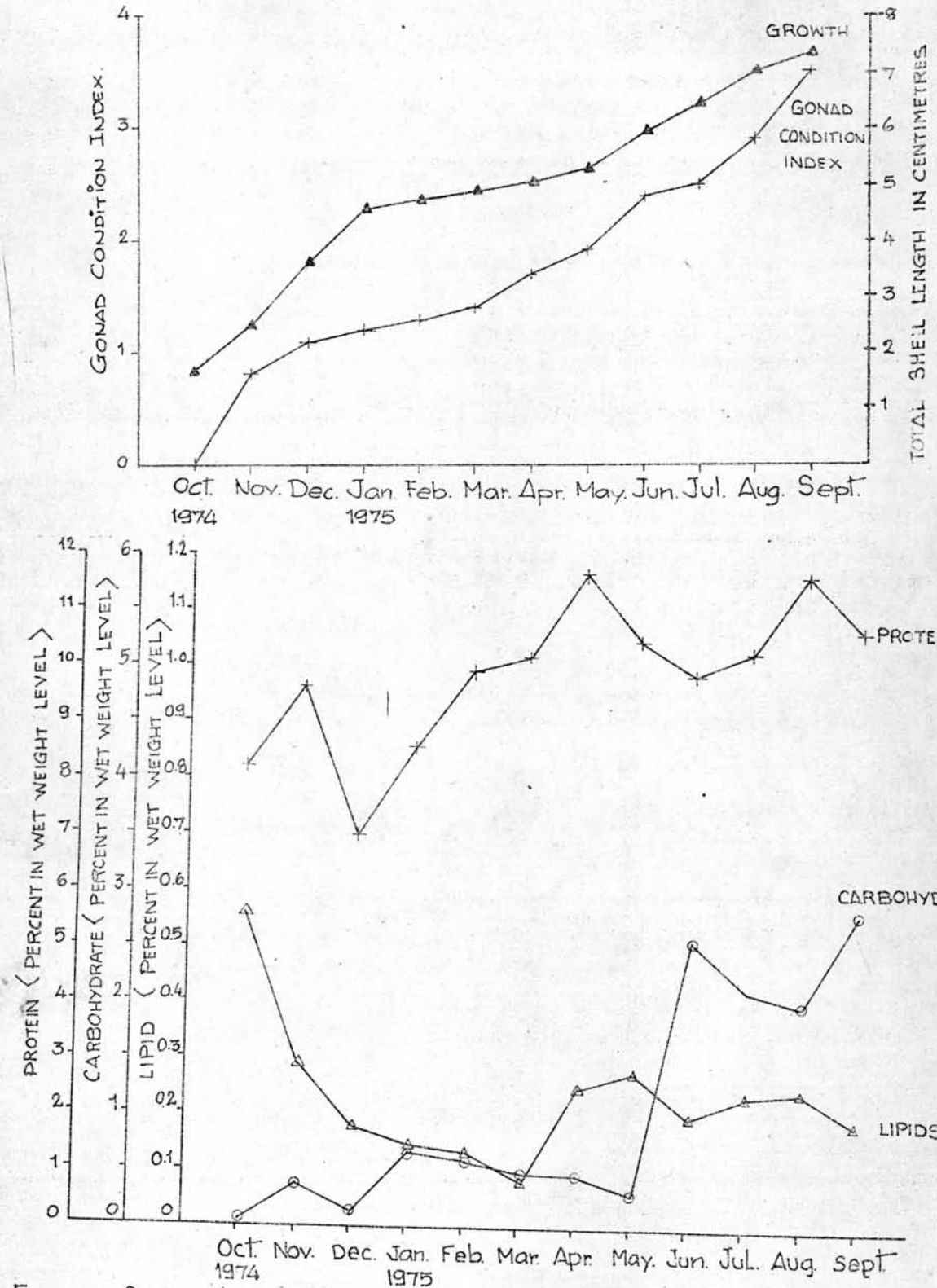


Fig 20 Seasonal variations in biochemical composition in total in mussel Mytilus viridis in relation to the gonad condition index and growth.