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Continuous Plankton Records: Massachusetts to Cape Sable, N. S.,
and New York to the Gulf Stream, 1982

by

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In 1972, the U.S. National Marine Fisheries Service (NMFS) began a program of cooperation with the Oceanographic Laboratory, Edinburgh, Scotland (now part of the Institute for Marine Environmental Research (IMER)) for the extension of their long-term Continuous Plankton Recorder (CPR) survey (Glover, 1967) into additional areas of the western North Atlantic. This cooperation has led to a modest expansion by NMFS of two monthly sampling routes. The first (Route MC) crosses the Gulf of Maine from the vicinity of Boston, Massachusetts to near Cape Sable, Nova Scotia, and the second (Route MB) extends from near New York City towards Bermuda, into the northern portion of the Gulf Stream. A summary of the sampling of these two routes is given by Jossi et. al. (MS 1982).

A continuous record of plankton along these routes is obtained from a depth of approximately 10 m. This record is divided into samples representing 18.5 km of towing. Examination is made of no less than alternate samples resulting in a sample spacing of ≤ 37 km. The mesh size (225 x 235 μ) is such that medium-to-small phytoplankton are not captured quantitatively. For complete descriptions of the collection and processing methods for CPR samples, consult Colebrook (1960).

This report presents two aspects of the plankton variations along these routes--"total phytoplankton" and total copepods. The units used for "total phytoplankton" are relative units of green (Colebrook and Robinson, 1961) and are obtained by visual comparison of the green or green-brown color of each sample with a set of color standards. These results, although limited in their applications, are indicative of seasonal and annual variations and timing in phytoplankton abundance. The units used for total copepods are numbers per cubic meter. These units are a

departure from those most commonly used for CPR data, but they allow for the sometimes appropriate comparison of these data with those from other sources.

Table 1 lists the monthly mean values for "total phytoplankton" and total copepods over the MC Route during 1982. Spatial variations along the route have not been considered. No towing vessel was available for the January-April period. These values are accompanied by statistics which include anomalies of the 1982 data, as compared to the 1961-1982 means.

Table 2 lists the monthly mean values for "total phytoplankton" and total copepods over the MB Route during 1982. Spatial variations along the route have not been considered. The accompanying statistics do not include anomalies, since the entire time series (1976-1982) has not yet been analyzed.

Tables 3 and 4 list the taxa of phytoplankton and zooplankton, respectively, which were captured along these two routes in 1982.

REFERENCES

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Table 1. Monthly conditions for total copepods and "total phytoplankton" in CPR samples taken at approximately 10 meters depth between the vicinity of Boston, Massachusetts and Cape Sable, Nova Scotia, 1961-1982.

		TOTAL COPEPODS (No./m ³)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Mean					480	688	301	353	316	119	144	47
1982	N					12	12	12	12	12	11	12	12
	Min					182	66	61	138	47	17	19	0
	Max					1282	1870	639	754	1197	340	494	117
	Std					292	622	199	170	313	96	154	49
1961-1982		20	40	41	168	493	379	249	349	311	261	160	87
1982	N	56	49	120	70	139	123	136	131	120	121	112	55
	Min	0	1	0	0	0	1	0	1	1	0	1	0
	Max	107	176	474	2448	2962	2582	1313	1064	1220	2387	684	399
	Std	23	36	77	442	518	472	224	219	264	313	154	79
1982 Anomaly		-	-	-	-	-12	+309	+52	+104	+5	-142	-16	-40

		"TOTAL PHYTOPLANKTON" (relative green)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Mean					0.5	0.8	0.3	0.2	0.3	0.0	0.0	0.0
1982	N					11	12	12	12	12	11	12	12
	Min					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max					1.0	6.5	1.0	1.0	1.0	0.0	0.0	0.0
	Std					0.5	1.9	0.5	0.4	0.5	0.0	0.0	0.0
1961-1982		0.1	0.0	0.4	1.2	0.6	0.4	0.4	0.3	0.3	0.6	0.5	0.2
1982	N	56	36	96	68	126	122	134	119	107	118	89	54
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max	1.0	0.0	6.5	6.5	6.5	6.5	6.5	6.5	2.0	6.5	6.5	2.0
	Std	0.1	0.0	0.9	2.0	1.3	1.0	0.8	0.8	0.5	1.3	1.0	0.5
1982 Anomaly		-	-	-	-	-0.1	+0.4	-0.1	-0.1	-0.1	-0.6	-0.5	-0.2

Table 2. Monthly conditions for total copepods and "total phytoplankton" in CPR samples taken at approximately 10 meters depth along the first 500 kilometers between New York City and Bermuda, 1982.

		TOTAL COPEPODS (No./m ³)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Mean	46	84	126	331	1598	354	-	155	114	108	-	54
1982	N	7	7	20	10	15	13	-	13	8	12	-	14
	Min	1	14	0	112	76	15	-	1	14	0	-	1
	Max	169	193	660	552	15967	1255	-	604	288	437	-	167
	Std	67	77	175	179	3992	330	-	201	97	137	-	63

		"TOTAL PHYTOPLANKTON" (relative green)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Mean	0.0	0.8	1.8	0.4	0.6	0.6	-	0.5	0.0	0.4	-	0.0
1982	N	7	12	20	10	15	13	-	13	8	12	-	14
	Min	0.0	0.0	1.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0
	Max	0.0	2.0	3.0	2.0	1.0	2.0	-	3.0	0.0	3.0	-	0.0
	Std	0.0	0.8	0.9	0.7	0.5	0.7	-	1.0	0.0	1.0	-	0.0

Table 3. List of phytoplankton taxa sampled by the Hardy Plankton Recorder along Routes MB and MC during 1982.

Asterionella japonica	Ditylum brightwellii
Asterionella spp.	Hyalochaete spp.
Bacteriastrium spp.	Lauderia borealis
Biddulphia sinensis	Leptocylindrus danicus
Ceratium belone	Nitzschia closterium
Ceratium candelabrum	Nitzschia seriata
Ceratium carriense	Oscillatoria spp.
Ceratium contortum	Peridinium spp.
Ceratium contrarium	Phaeoceros spp.
Ceratium euarquatum	Pleurosigma spp.
Ceratium extensum	Prorocentrum spp.
Ceratium fusus	Rhizosolenia alata alata
Ceratium gallicum	Rhizosolenia alata gracillima
Ceratium hexacanthum	Rhizosolenia alata indica
Ceratium horridum	Rhizosolenia calcar-avis
Ceratium karstenii	Rhizosolenia delicatula
Ceratium kofoidii	Rhizosolenia hebetata semispina
Ceratium lineatum	Rhizosolenia imbricata shrobsolei
Ceratium longipes	Rhizosolenia setigera
Ceratium longirostrum	Rhizosolenia spp.
Ceratium macroceros	Rhizosolenia stolterfothii
Ceratium massiliense	Schroderella delicatula
Ceratium trichoceros	Silicoflagellatae
Ceratium tripos	Skeletonema costatum
Cladophyxis setifera	Stephanophyxis spp.
Cladophyxis spp.	Thalassionema nitzschioides
Coccinodiscus spp.	Thalassiosira spp.
Dactyliosolen antarcticus	Thalassiothrix frauenfeldii
Dinophysis spp.	Thalassiothrix longissima
Dinophysis tripos	

Table 4. List of zooplankton taxa sampled by the Hardy Plankton Recorder along Routes MB and MC during 1982.

Acartia danae	Metridia lucens
Acartia spp.	Metridia spp.
Anomalocera patersoni	Mysidacea
Appendicularia (Larvacea)	Oithona spp.
Brachyura	Oncaea spp.
Bryozoa	Ostracoda
Calanus finmarchicus	Paracalanus or Pseudocalanus
Calanus glacialis	Paracalanus spp.
Calanus helgolandicus	Paracandacia simplex
Calanus minor (Nannocalanus minor)	Penilia spp.
Calanus spp.	Pleuromamma abdominalis
Calocalanus plumulosus	Pleuromamma borealis
Calocalanus spp.	Pleuromamma gracilis
Candacia armata	Pleuromamma spp.
Candacia curta	Podon spp.
Candacia pacydactyla	Pseudocalanus spp.
Candacia simplex	Radiolaria
Candacia spp.	Rhincalanus cornutus
Centropages bradyi	Rhincalanus nasutus
Centropages furcatus	Rhincalanus spp.
Centropages typicus	Sapphirina spp.
Chaetognatha	Scolecithrix bradyi
Cirripedia	Scolecithrix danae
Clausocalanus spp.	Siphonophora
Coelenterata (Cnidaria)	Spiratella retroversa (Limacina retroversa)
Copepoda	stellate bodies
Copilia mirabilis	Stomatopoda
Copilia spp.	Temora longicornia
Corycaeus spp.	Temora styliifera
Decapoda-Arthropoda	Temora turbinata
Eucalanidae	Thaliacea (Salpa)
Eucalanus monachus	Thecosomata (Pteropoda, shelled)
Eucalanus spp.	Tintinnidae
Euchaeta marina	Undinula vulgaris
Euchaeta media	Gammaridea
Euchaeta norvegica (Paraeuchaeta norvegica)	Halithalestris croni
Euchaeta spp.	Harpacticoida
Euchirella rostrata	Hyperiidea
Euphausiacea	Labidocera aestiva
Evadne spp.	Lucifer spp.
Fish	Mecynocera clausi