NET ZOOPLANKTON OF THE OPEN WATERS OF THE NORTHERN ADRIATIC (1984-1988)

Davor LUČIĆ, Vladimir ONOFRI and Adam BENOVIĆ
Biological Institute, P. O. Box 39, Dubrovnik, Yugoslavia

Abstract

The data on temporal and spatial distribution of total net zooplankton presented in this paper are based on long term investigations (1984-1988) performed in the framework of the programme of the Yoint Yugoslav-Italian Commision for Pollution Monitoring and Protection of the Adriatic Sea and the Coast. Investigations were carried out at nine stations of the study area covering the northernmost part of the open Adriatic waters up to the connecting line Pula — Rimini. Higher average total zooplankton and dry weight values were found and the decrease in number of species of copepods, hydromedusae and the appendicularians was noted.

Izvod

MREŽNI ZOOPLANKTON OTVORENIH VODA SJEVERNOG JADRANA (1984-1988)

Na temelju višegodišnjih istraživanja (1984-1988) u okviru programa »Mješovite jugoslavenske-talijanske komisije za zaštitu Jadranskog mora i obalnog područja od zagađenja«, prikazani su rezultati vrmenske i prostorne raspodjele ukupnog mrežnog zooplanktona. Na devet postaja obuhvaćeno je krajnje sjeverno područje otvorenih voda Jadrana, do spojnice Pula — Rimini. Nađene su veće prosječne vrijednosti ukupnog zooplanktona i suhe

tvari u zapadnom području osim za skupinu filopoda i kaloričke vrijednosti. Ustanovljeno je smanjenje broja vrsta kopepoda, hidromeduza i apendikularija.

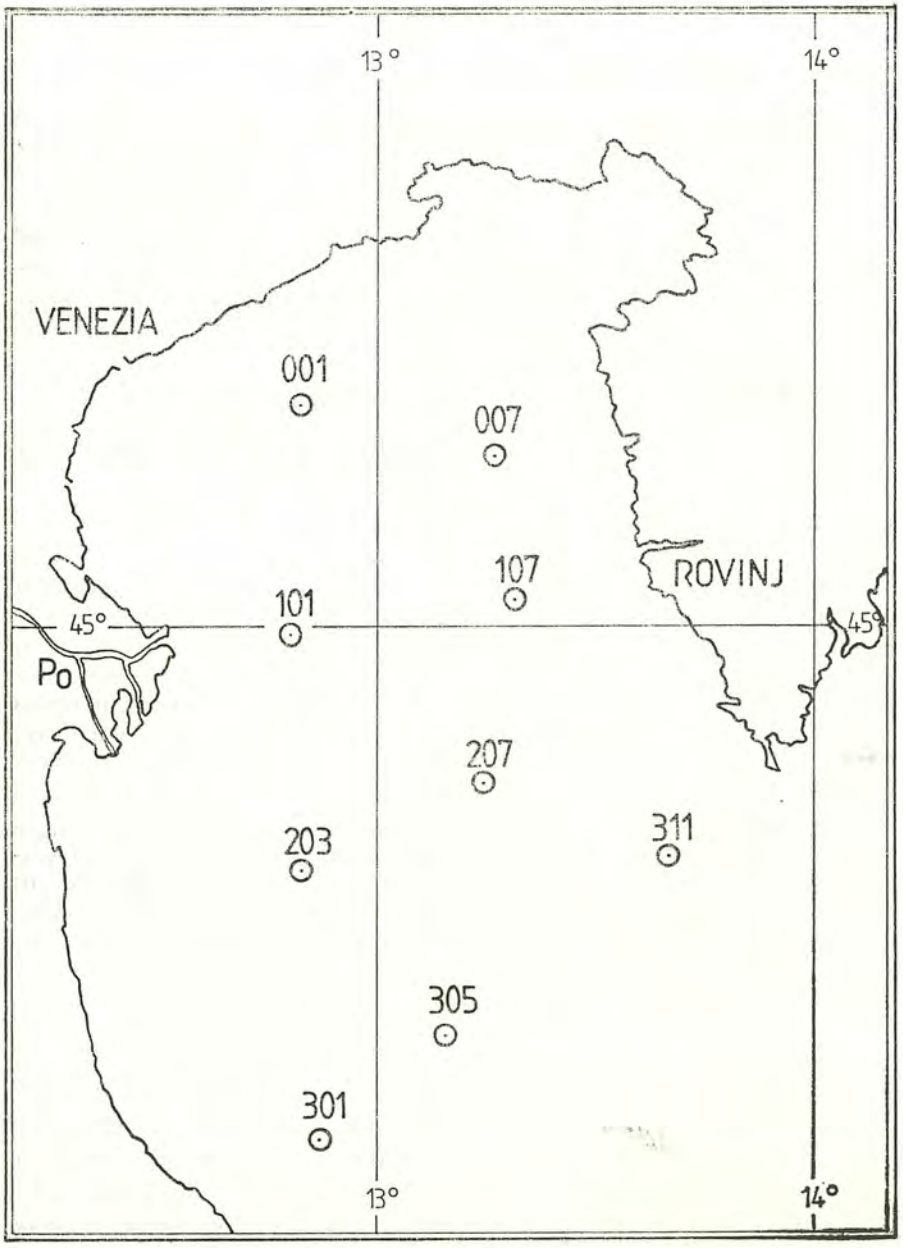
INTRODUCTION

From the middle of the last century onwards, there have been a number of papers on the Northern Adriatic plankton (Fonda - Umani e Specchi, 1979). These papers deal mostly with some of the zooplankton groups in certain coastal areas. Only a few authors have investigated the open waters of the Northern Adriatic, e. g. Štirn (1969); Hure e Scotto di Carlo (1969); Hure et al. (1980).

This paper presents total net zooplankton quantity and biomass data collected during the cruises of the research vessel »Vila Velebita« in the Northern Adriatic within the framework of a general programme of a joint Italian-Yugoslav Commission for Pollution Monitoring and Protection of the Adriatic.

MATERIAL AND METHODS

The plankton material was collected during 9 cruises along four transects of the Northern Adriatic (Fig. 1) with a 250 μm mesh netting Nansen net, 80 cm in diameter, by vertical tows from the bottom to the surface in December, 1984, August, 1985, May and June 1986, December, 1986, June 1987, August 1987, May 1988 and October, 1988. The samples were fixed and preserved with 2.5% neutral formaldehyde. Subsamples of 1/16-th or 1/32-th of the original sample volume were analysed with a stereomicroscope. For species determination entire samples were examined depending on the plankton density in the samples. The samples for biomass determination were washed with tap water in preparation for weighing half of each sample. They were dried at 60-100°C until constant weight was obtained (minimum 24 h), and then they were combusted in an electic muffle furnace equipped with sensitive temperature control at 500-800°C (see: Lovegrove, 1966; Benović, 1979) to obtain ash-free dry weight. An H-10 T and AK Mettler electrobalcance were used to obtain the weights. The biomass has been calculated in mg m^3 of dry or ash-free dry weight. (DW, AFVW). The caloric content per unit DW of zooplankton was determined using the equation of Platt et al. (1969).



RASPORED POSTAJA

Fig. 1. Study area with location of stations
Sl. 1. Istraživano područje i položaj postaja

RESULTS

Cruise I: December 1984

Numerical values found for total net zooplankton (Tab. 1) were considerably high for winter season. A maximum of 1764 ind. m^{-3} was found at station 101, whereas a minimum of 273 ind. m^{-3} at station 311. Higher quantites were noted at the station closer to the western coast. Dominant were copepods that formed as much as 69% of the total zoplankton, but only 29 copepod species were collected. The majority of copepod population was made up of *Paracalanus parvus, Ctenocalanus vanus, Acartia clausi* and the species of the genus *Oithona*.

Minimum biomass values do not agree with maximum zooplankton values (Tab. 1). At station 007, 21.13 mg m^{-3} dry weight of a high caloric value was recorded. Minimum biomass values were found at the station 311 (4.63 mg^{-3} dry weight).

Cruise II: August 1985

Relatively high net zooplankton values recorded during this cruise were markedly high at the stations closer to the eastern coast, with a maximum of 3094 ind. m^{-3} being recorded at the station 207 and the minimum of 388 ind. m^{-3} at the station 305 (Tab. 2). Philopods dominated the catches with 66%. Especially numerous was *Penilia avirostris*. As many as 34 copepod species were collected, but their quantitative values were not high. Doliolides were important constituent of the catches.

If compared to the total zooplankton values, biomass values were relatively low (Tab. 2). The dry weight of 5.75 mg m^{-3} was registered at the station 007, and the lowest at the station 207 (2.09 mg m^{-3}) where zooplanktoners were most abundant. A relative contribution of organic matter and the caloric values was low.

Cruise III: May-June 1986

Maximum total zooplankton values did not exceed 3325 ind. m^{-3} (station 301), wheres lowest values recorded were 666 ind. m^{-3} at the station 007. With 60% of the total zooplankton, copepods were dominant, especially at the station closer to the western coast and at the stations at the extreme south of the study area (Tab. 3). Quantitatively most important species was *Acartia clausi* (44% of all copepods). Numerically important were *Paracalanus parvus, Ctenocalanus vanus, Centropages typicus, Temora longicornis*, and the species of the genus *Oithona*. Of other groups, higher numerical values of the philopod *Podon intermedius*, apen-

dicularians and doliolids were recorded only at the station located to the south of the study area.

Biomass values were relatively low (Tab. 3) with a maximum of 4.92 mg m^{-3} of the dry weight noted at the station 301, and the minimum of 0.91 mg m^{-3} at the station 001. However relative organic matter as well as caloric values were relatively high.

Cruise IV: December 1986

Rather low net zooplankton values found during this cruise were considerably lower than those registered during the December 1984 cruise (Tab. 4). The maximum of 363 ind. m^{-3} was noted at the station 301, whereas a minimum of only 31 ind. m^{-3} was recorded at the station 305. Copepods dominated forming 66% of total zooplankton. Of 37 species found, *Acartia clausi* predominated. Numerically important was also *Paracalanus parvus.*

Biomass values were in agreement with total zooplankton values (Tab. 4). Highest dry weight value recorded was 2.88 mg m^{-3}, and the lowest of 0.39 mg m^{-3}. Organic matter and caloric values were low.

Cruise V: June 1987

For this part of the year, unusually low net zooplankton values were found (Tab. 5). A maximum of 819 ind. m^{-3} was recorded at the station 301, and a minimum of 52 ind. m^{-3} at the station 001. Copepods dominated and formed 85% of the total zooplankton with the most numerous species being *Paracalanus parvus, Ctenocalanus typicus, Acartia clausi* and *Oithona helgolandica.*

High biomass values were not in agreement with maximum and minimum total zooplankton values (Tab. 5). At the station 203, 12.48 mg m^{-3} of the dry weight was recorded, whereas at the station 207, 1.95 mg m^{-3}. Considerable fluctuations were observed in organic matter and caloric values, vith higher values being found at the stations with high dry weight.

Cruise: VI: August 1987

High net zooplankton values were mainly due to high philopod nembers (59%), with *Penilia avirostris* and *Evadne tregestina* (Tab. 6) being especially numerous. A maximum of 4113 ind. m^{-3} was found at the station 101, and the minimum of 1242 ind. m^{-3} at the station 305. Copepods registered during this cruise were more abundant than in the August 1985 cruise. *Paracalanus parvus, Centropages kroyeri, Temora longicornis* and *Acartia clausi* were abudantly found. Numerically important were appendicularians and the doliolids.

Maximum dry weight values of 10.07 mg m^{-3} were noted at the station 101, and the minimum of 2.99 mg m^{-3} at the station 305. Low organic matter values were recorded (Tab. 6).

Cruise VII: May 1988

Nearly at all the stations high net zooplankton values were registered (Tab. 7), with a maximum of 5493 ind. m^{-3} being found at the station 101 and the minimum of 793 ind. m^{-3} at the station 305. With 67% copepods dominated the total zooplankton. Especially numerous were *Paracalanus parvus, Centropages kroyeri, Temora longicornis, Acartia clausi, Oithona plumifera.* The appendicularian species *Oikopleura dioica* and the echinoderm larvae were found in high numbers.

If compared to high net zooplankton values, dry weight values were low (Tab. 7). A maximum of 7.66 mg m^{-3} was noted at the station 101 whereas 1.15 mg m^{-3} at the station 305. Organic matter and caloric values were high.

Cruise VIII: October 1988

High philopod numbers, relatively low copepod densities and markedly high echinoderm larvae quantities were noted during this cruise (Tab. 8). At all the stations, echinoderm larvae constitued 61% of the total zooplankton with markedly high values being recorded at the station 101 were out of 16 887 ind. m^{-3} of the zooplanktoners, 14 756 ind. mg^{-3} were echinoderm larvae. The lowest net zooplankton quantities were found at the station 311 1307 ind. m^{-3}). High philopod numbers were mainly due to high quantities of the species *Penilia avirostris, Evadne spinifera, Evadne tergestina* and *Podon polyphemoides.* Of copepods, *Paracalanus parvus* and *Acartia clausi* were numerous. Whereas at some of the stations, *Oncaea media* species were abundant.

Biomass values were high, but of lower quality (Tab. 8). At the station 001, 20.06 mg m^{-3} of dry weight was recorded with only 7.75 mg m^{-3} of organic matter and of a caloric value of 4662 J mg m^{-3}. At other stations biomass quality values were higher.

DISCUSSION

The study area is located at the most north-westerly part of the Adriatic Sea where the depths do not exceed 45 m. It is a markedly neritic area (Štirn, 1969), with a considerable fresh water influx, mainly from the river Po. Qualitative zooplankton composition in such an area is usually poor. Major part of the total net zooplankton is comprised of only a few species.

Throughout the investigations, numerically important were the copepods *Paracalanus parvus*, *Ctenocalanus vanus*, *Temora longicornis* and *Acartia clausi*. The philopods *Penilia avirostris* and *Evadne tergestina* were also abundant in the warmer season. In September 1987 and especially in October 1988 echinoderm larvae were markedly abundant, particularly at the station 001 (Tab. 8). The net zooplankton population composition was represented by only a small number of species. Hure (1969) found as many as 69 copepod species, wheres during our investigations, only 37 species were found, among which only a few species commonly found in the Middle Adriatic (Hure et al., 1979; Regner, 1985). The paucity of the medusan species was in agreement with the earlier records on the distribution of these organisms in the Northern Adriatic (Benović and Bender, 1987). Data on temporal distribution and quantity of philopods were in agreement with the data obtained by Bender (1984), with the exception that in our data noticeably high numbers of *Podon polyphemoides* were registered throughout 1988. As opposed to the findings by Bender (1984), the average quantity distribution patterns showed a considerable contribution of the philopods to the total zooplankton throughout the eastern part of the Northern Adriatic, which was especially pronounced at the stations 007, 107, 207 (Fig. 2). Fenaux (1972) has found 10 appendicularian species, as it was found by Skaramuca (1984), whereas in our plankton material only four species where found. Similarly to the findings of Fenaux (1972) and Skaramuca (1984), our records also indicated that three species *(Oikopleura dioica, Oikopleura longicauda, Oikopleura fusiformis)* dominated appendicularian fauna with 90%. In addition, seasonal dynamics of the appendicularian population noted during our investigations was in agreement with the observations made by Fenaux (1972) and Skaramuca (1984). Our records differred in a lower average number of the specimens collected, 59 ind. m^{-3}, whereas Fenaux (1972) has registered an average of 67 ind. m^{-3}. Katavić (1976) has found a high abundance of thaliaceans in autumn, whereas during our investigations, high thaliacean numbers were recorded only at the most northerly stations in May-June 1986 and August 1987.

High total net zooplankton density was recorded only in the warmer months, excepting October 1988. Unusually low values for that part of the year were found in May-June, 1986 and June 1987 (Tab. 3 and 5). The highest average total net zooplankton densities were noted at the most northerly stations and decreased to the south (Fig. 2). Higher densities were also found at the stations nearer the western coast. Other zooplankton groups formed 25% of the total zooplankton, except at the station 001 where an exceptionally high number of echinoderm larvae was found.

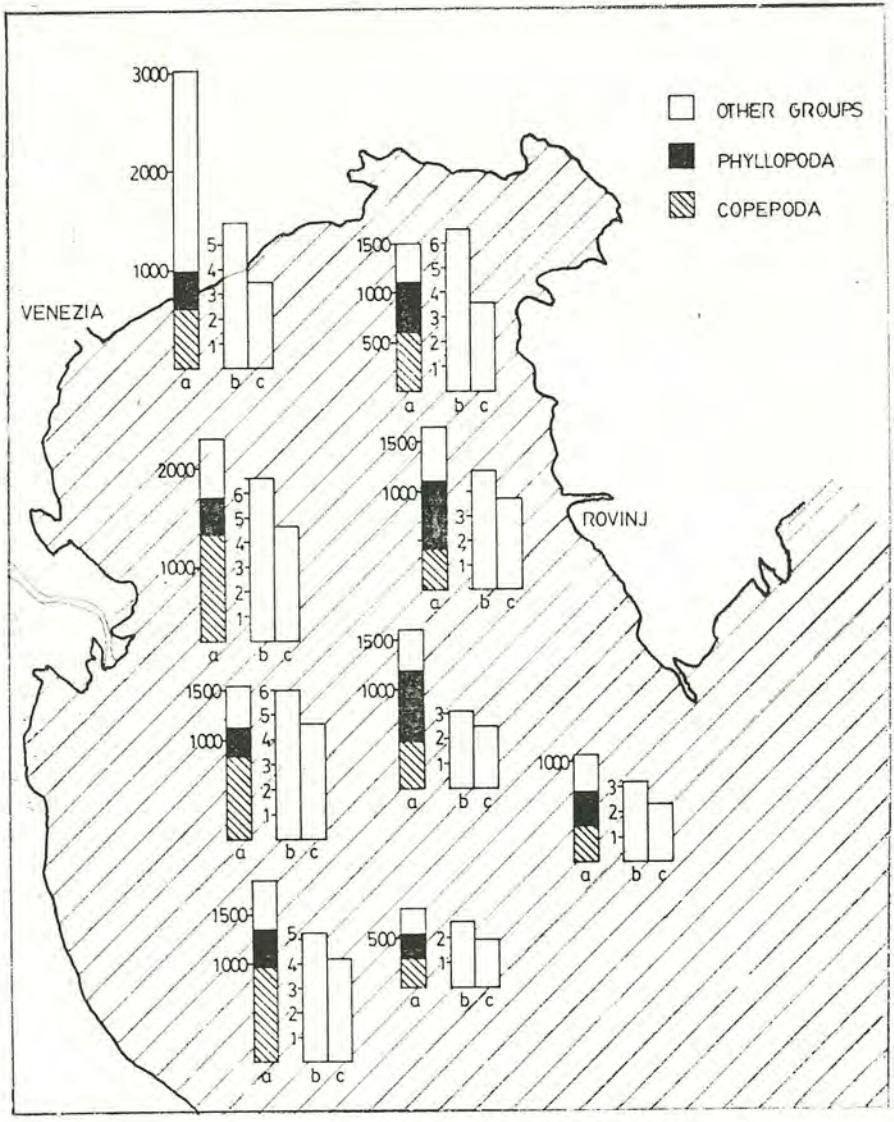


Fig. 2. The average total net zooplankton and biomass in the Northern Adriatic in the period 1984-1988. (a = total net zooplankton, ind m^{-3}; b = dry weight, mg m^{-3}; organic matter, mg m^{-3})

Sl. 2. Prosječna gustoća ukupnog mrežnog zooplanktona i biomase u sjevernom Jadranu u periodu 1984-1988. godine. (a = ukupni mrežni zooplankton, broj jed. m^{-3}; b = količina suhe tvari, mg m^{-3}; količina organske tvari, mg m^{-3})

Biomass values represent well the qualitative zooplankton composition (Benović et al., 1984). The inorganic matter found in the samples may be caused by a higher contribution of inorganic seston or a zooplankton composition of a low caloric value. The dry weight maximum was recorded at the station 007 in December 1984, and the minimum in December 1986 at the station 107 (Tab. 1 and 4). Benović et al. (1984) has found highest dry weight values in the Northern Adriatic only in spring, whereas during our investigations high dry weight values were found in different seasons (Tab. 1-8). Higher average dry weight and organic matter values were determined at the stations closer to the western coast (Fig. 2). The average caloric value of 16.6 J gm^{-3} is in agreement with the results by Benović et al., (1984). Noticeably high caloric values were noted at the south-easterly part of the study area.

CONCLUSIONS

The study area exhibits all the characteristics of a markedly neritic ecosystem with a relatively poor species composition and higher abundance of some zooplankton groups. Throughout the year copepods dominated the total zooplankton, whereas the philopods were dominated in the warmer season.

Some organisms occurred in increased numbers, especially echinoderm larvae, which were most abundant to the north of study area.

The hydreomedusae, copepods and the appendicularians, exhibited a decrease in species number.

As regards the spatial distribution, higher average zooplankton quantities were recorded at the westerly and northernmost stations, excepting philopods.

Biomass distribution shows higher dry weight values in the western part of the area investigated and at the northernmost stations, whereas the caloric values were higher at the south easterly stations.

REFERENCES

Bender, A. (1984): Kladoceri otvorenih voda Jadranskog mora. MSc. Thesis, Zagreb, 181 pp.

Benović, A. (1979): The determination of the ash-free dry weight of net-zooplankton under different temperatures. Rapp. Comm. int. Mer Medit., 25/26(8).

Benović, A., Fonda-Umani, S., Malej, A. and M. Specchi (1984): Net-zooplankton biomass of the Adriatic Sea. Mar. Biol., 79, 209-218.

Benović, A. and A. Bender (1987): Seasonal distribution of medusae in the Adriatic Sea. In: Modern Trends in the Systematic, Ecology and Evolution of Hydroids and Hydromedusae (eds. Bauillon, J. Boero, F., Cicogna, F. and Cornelius, P. F. S.), Oxford University Press, London, 117-131.

Fenaux, R. (1972): Variations Saisonniers des Appendicularies de la Region Nord Adriatique. Mar. Biol., 6, 310-319.

Fonda-Umani, E. e M. Specchi (1979): Primi risultati di una bibliografia sullo zooplancton de'll Adriatico. Nova Thalassia, 3, 49-88.

Hure, J. e B. Scotto di Carlo (1969): Copepodi pelagici de'll Adriatico settentrionale nel periodo gunnaio-decembre. Pubbl. Staz. Zool. Napoli, 37(2), 173-195.

Hure, J., Ianora, A. and B. Scotto di Carlo (1979): Crusies of the Research Vessel »Vila Velebita« in the Kvarner Region of the Adriatic Sea. Thalassia Jugoslav. 15(3/4), 203-216.

Hure, J., Ianora, A. and B. Scotto di Carlo (1980): Spatial and temporal distribution of copepod communities in the Adriatic Sea. J. Plankt. Res., 2(4), 295-0316.

Katović, I. (1976): Kvalitativni i kvantitativni sastav populacije taliacea Jadranskog mora u jeseni 1974. i proljeće 1975. godine. MSc. Thesis, Zagreb, 92 pp.

Lovergrove, T. (1966): The determination of the dry weight of plankton and effect of various factors on the values obtained. In: Some contemporary studies in marine science (ed. H. Barnes), London, Allen and Unwin, 429-467.

Platt, T., Brawn, W. and B. Irwin (1969): Caloric and carbon equivalentes of zooplankton biomass. J. Fish. Res. Bd Can., 26, 2345-2349.

Regner, D. (1985): Seasonal and multiannual dynamics of copepods in the middle Adriatic. Acta Adriat., 26(2), 11-99.

Skaramuca, B. (1983): Kvantitativno i kvalitativno rasprostranjenje populacija apendikularija u otvorenim vodama Jadranskog mora. Acta Adriat., 26(2), 11-99.

Stirn, J. (1969): The North Adriatic pelagial, its oceanological characteristics structure and distribution of the biomass during the year 1965. (In Slovenian, English abstract), Diss. Acad. Sci. Art. Slov., 12(2), 1-92.

MREŽNI ZOOPLANKTON OTVORENIH VODA SJEVERNOG JADRANA (1984-1988)

Davor LUČIĆ, Vladimir ONOFRI i Adam BENOVIĆ

SAŽETAK

Na temelju višegodišnjih istraživanja (1984-1988) u okviru programa »Mješovite talijansko-jugoslavenske komisije za zaštitu Jadranskog mora i obalnog područja od zagađenja« prikazani su rezultati vremenske i prostorne raspodjele ukupnog mrežnog zooplanktona.

Materijal je sakupljen na četiri profila otvorenog dijela sjevernog Jadrana. Uzorkovanje je obavljeno standardnom metodom, mrežom tipa Nansen finoće tkanja 250 μm, promjera 80 cm, vertikalnim potezima od dna do površine.

Područje istraživanja ima sve karakteristike izrazitog neritičkog ekosistema sa relativno malim brojem vrsta hidromeduza, kopepoda i apendikularija, te sa većim brojem primjeraka kod nekih zooplanktonskih skupina. To je posebno istaknuto za ličinke ehinodermata na krajnjim sjevernim postajama tokom 1987. i 1988. godine. Visoke vrijednosti ukupnog mrežnog zooplanktona zabilježene su u toplom dijelu godine, s izuzetkom u okvobru 1988. Neuobičajno niske vrijednosti utvrđene su u svibnju-lipnju 1986. i lipnju 1987. godine. U odnosu na prostornu raspodjqelu veće prosječne količine ukupnog zooplanktona nalaze se u zapadnom području i na krajnjim sjevernim postajama, osim za skupinu filopoda. Raspodjela biomase pokazuje veće vrijednosti suhe tvari također u zapadnom području i na krajnjim sjevernim postajama, dok je kalorička vrijednost veća na jugoistočnom dijelu.

TABLE 1. Qualitative and quantitative composition of net zooplanton and biomass in the open North Adriatic in December 1984. (no. ind. m-3).

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	25-0	20-0	30-0	32-0	34-0	38-0	38-0	48-0	38-0
MEDUSAE		4	4	3	23	12	20		5	14
SIPHONOPHORAE		23	11	29	14	106	19		4	6
PHYLLOPODA										
Penilia avirostris		+	1	1	2	1	2		+	+
Evadne spinifera							+			
Podon polyphemoides							+			
Podon intermedius					1	+	5		+	+
COPEPODA										
Calanus helgolandicus		16	15	6	1	36	1		2	3
Calanus tenuicornis		10	3	1	1	10	3		3	1
Hanocalanus minor									+	
Paracalanus denudatus		4	1	1	5	3	2		1	1
Paracalanus nanus		1		11	1	9	8		3	2
Paracalanus parvus		162	27	359	53	270	116		59	34
Calocalanus contractus		3	3	3	+		3		+	+
Calocalanus styliremis		1	3	5	1	8			1	
Mecynocera clausi					1				+	1
Clausocalanus arcuicornis		1	6		9				+	1
Clausocalanus jobei		3	8	3	18	5	1		4	3
Ctenocalanus vanus		26	29	218	86	172	65		32	73
Euchaeta hebes									+	1
Diaixis pygmoea			1	1	2				3	1
Centropages typicus		86	44	21	3	8	2		14	1
Centropages kroyeri		+	1						+	
Temora stylifera			1							
Temora longicornis		24	4	14	3	28	3		3	3
Candacia giesbrechti		1	3	1	3	+	2		6	3
Acartia clausi		221	24	611	19	285	39		1	3
Oithona helgolandica		20	12	67	24	9	7		10	
Oithona plumifera		64	18	72	28	54	56		34	
Oithona nana		3	1	4	3	2	6		1	
Euterpina acutifrons			2	3	1	4	1		1	+
Oncaea media		5	1	3	3	1	+		3	4
Oncaea mediterranea		+	3		7	1	3		10	4
Sapphirina sp.					+					+
Copilia sp.									+	
Corycaeus sp.		77	16	54	25	20	28		12	7

TABLE 1.continue

Species	Stations	201	007	101	107	203	207	301	305	311
	Depht(m)	25-0	28-0	30-0	32-0	34-0	38-0	38-0	48-0	38-0
OSTRACODA			+	1	1				5	7
PTEROPODA		1	1		2	2	6		5	5
CHAETOGNATHA										
Sagitta minima		9	3	10	19	3	11		15	9
Sagitta setosa		+		3	9	+	3		4	5
Sagitta inflata			10	21	20	7	4		22	14
APPENDICULARIA										
Oikopleura dioica		+								
Oikopleura longicauda		2	1		8	3	17		4	5
Oikopleura fusiformis		2	1		7	2	11		7	+
Fritillaria pellucida		+				1	20		6	5
DOLIOLIDA			+		4	3	2		9	7
LARVAE										
Bivalvia		11	10	48	7	28	31		18	6
Polychaeta			1	+	+	+	3		1	4
Copepoda		306	101	168	55	196	116		42	32
Decapoda		7	13	22	5	12	9		8	3
Echinida			1		3	1	6		4	5
Jaja ribe			5	+	3	2	2		4	+
Pisces				+		+	+		+	+
COPEPODA		728	226	1458	297	925	346		203	146
PHYLLOPODA			1	1	3	1	7			
OTHER GROUPS		365	162	305	180	378	287		113	127
TOTAL		1093	389	1764	480	1304	640		316	273
DRY WEIGHT (mg m-3)		8.27	21.13	9.43	5.88	13.15	5.86		5.6	4.63
ASH (mg m-3)		1.67	3.75	2.22	1.04	2.95	1.45		1.67	1.55
ORGANIC MATTER (mg m-3)		6.6	17.38	7.21	4.84	10.2	4.41		3.93	3.08
ORGANIC MATTER (%)		79.8	82.3	76.5	82.3	77.6	75.3		77.2	66.5
CALORIC CONTENT (J/g DW)		17622	18173	16852	18173	17114	16561		15255	14236

Tabl. 1. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u prosincu 1984. (broj jed. m^{-3})

TABLE 2. Qualitative and quantitative composition of net zooplanton and biomass in the open North Adriatic in August 1985. (no. ind. m-3).

Species	Depht(m) Stations	25-0 001	20-0 007	30-0 101	32-0 107	34-0 203	38-0 207	38-0 301	48-0 305	38-0 311
MEDUSAE		+	11	+	3	3	+	1	+	+
SIPHONOPHORAE		7	29	8	12	19	77	+	3	2
PHYLLOPODA										
Penilia avirostris		211	982	171	303	137	2584	121	166	594
Evadne nordmani			2		2	2	7	1		
Evadne spinifera		8	3	34	12	24	146	19	9	17
Evadne tergestina		58	301	33	46	37	320	27	10	10
Podon intermedius		3	19	2	6	12	37	1	1	2
COPEPODA										
Calanus helgolandicus		1	1	2	1	3		3	2	2
Calanus tenuicornis		10	51	12	20	5	14	19	4	5
Paracalanus denudatus			2						+	1
Paracalanus nanus									+	
Paracalanus parvus		11	156	13	16	50	27	33	12	30
Calocalanus pavo			+			2	+		+	
Calocalanus contractus			1	1						
Calocalanus stylifemis			1	+		1	2	+	+	1
Ischnocalanus plumulosus						1				
Clausocalanus arcuicornis		1	8	1	3	+	2	3	1	3
Clausocalanus jobei		11	5				4	4	2	2
Clausocalanus furcatus			6	1	1		1	1	1	1
Ctenocalanus vanus		8	2	6	7	2	20	10	14	9
Pseudocalanus elongatus		2	3	2			+	6	+	
Euchaeta hebes									+	
Dizixis pygaoea		+	+	1		+	+	1	1	
Centropages typicus		9	18	6	8	3	4	10	1	5
Centropages kroyeri		+	1	+	1	2				
Temora stylifera		2	36	10	33	7	13	8	4	17
Temora longicornis		20	85	20	26	41	2	15	2	6
Candacia armata								1	1	4
Labidocera wollostoni							+			
Acartia clausi		17	53	16	14	17	6	3	5	13
Oithona helgolandica		17	39	9	11	5	15	6	4	9
Oithona plumifera		4	15	4	9	8	22	5	13	22
Oithona nana		4	11	1	4	7	4	1	+	3
Euterpina acutifrons		2	9	1	3	11	2	2	1	1
Clytemnestra rostrata						1		+	+	+
Oncaea media		2	26	1	6	1	6	4	13	10
Oncaea mediterranea		+	1		+		+		1	1
Sapphirina sp.			3					1	1	
Copilia sp.			+		+		1		+	
Corycaeus sp.			1	1		1	2	1	2	2
Monstrilla sp.		+					1		+	1

TABLE 2. continue

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	25-0	20-0	30-0	32-0	34-0	38-0	38-0	48-0	38-0
OSTRACODA				+	1	1		1		
PTEROPODA		6		1	2	29	1	3	3	9
CHAETOGNATHA										
Sagitta minima		2	7	3	3	1	10	7	16	14
Sagitta setosa		2	2	1	2	7	+	1	+	
Sagitta inflata			+		2		1	2	3	7
APPENDICULARIA										
Oikopleura dioica		14	60	14	38	52	31	6	7	52
Oikopleura longicauda		3	32	4	8	11	3	3	1	3
Oikopleura fusiformis		+	1	3	1		1	1	1	10
Fritillaria pellucida						1			2	1
BOLIOLIDA		46	69	85	102	61	59	58	72	89
LARVAE										
Bivalvia			51	3	36		7	15	2	11
Polychaeta			1		1	1	+	1		1
Copepoda		12	54	6	5	8	4	5	3	8
Decapoda		2	5	2	1	1	1	2	1	2
Echinida		47	65	18	3	20	8	3	1	3
Jaja ribe		5	3	3	1		1	3	2	2
Pisces		+	1	1	+	1	1	1		2
COPEPODA		121	534	108	163	168	148	137	85	148
PHYLLOPODA		280	1307	240	369	212	3094	169	186	623
OTHER GROUPS		146	391	162	221	216	215	113	117	216
TOTAL		547	2232	500	753	596	3447	419	388	987
DRY WEIGHT (mg m-3)		3.05	5.75	5.18	4.64	4.67	2.09	4.27	2.69	2.64
ASH (mg m-3)		.66	1.63	1.88	1.37	1.27	.35	1.08	.63	.88
ORGANIC MATTER (mg m-3)		2.39	4.12	3.3	3.27	3.4	1.74	3.19	2.06	1.78
ORGANIC MATTER (%)		78.4	71.6	63.7	70.5	72.8	83.2	74.7	76.6	66.9
CALORIC CONTENT (J/g DW)		17301	15624	13427	15335	15935	18365	16414	16877	14151

Tabl. 2. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u kolovozu 1985. (broj jed. m^{-3})

TABLE 3. Qualitative and quantitative composition of net zooplankton and biomass in the open North Adriatic during May and June 1986. (no. ind. m-3).

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht (m)	26-0	26-0	30-0	35-0	36-0	43-0	30-0	48-0	44-0
MEDUSAE										
Sarsia gemmifera			+	+		1		1		
Podocoryne minuta		1	+		+			4	+	
Rhysoaedusa pomponina		1				3	+	2		1
Eutima gegenbauri										2
Eutima gracilis									+	
Obelia spp.						1	2	+		+
Clytia hemisphaerica								4		1
SIPHONOPHORAE										
Muggiaea kochi		3	6	1	2	+	5	10	75	205
PHYLLOPODA										
Penilia avirostris								51	29	32
Evadne nordmani		75		8	12	12	7	6	2	4
Evadne spinifera		3	6		21	2	13	4	16	30
Podon polyphemoides		6	90	29	41	38	105	134		
Podon intermedius		6	2	1	1	1	5	2	3	9
COPEPODA										
Calanus helgolandicus							4	2	12	15
Calanus tenuicornis		5	2	9	14	1	31	10	7	1
Eucalanus attenuatus								1		
Paracalanus denudatus		5		2	5		2	17	1	8
Paracalanus nanus								3		
Paracalanus parvus		209	257	247	97	107	299	134	62	56
Calocalanus contractus					1			+	2	+
Calocalanus stylireais										1
Mecynocera clausi								+		
Clausocalanus arcuicornis		5	2	1	2	+	2	6	4	15
Clausocalanus jobei		+	1	1	4	1	5	13	6	11
Clausocalanus furcatus				1	1		1	15	+	32
Ctenocalanus vanus		54	33	31	171	58	162	68	17	49
Pseudocalanus elongatus		2		1		2	27	3	2	19
Diaixis pygmoea					1	6	2	4	+	4
Centropages typicus		28	39	62	51	73	161	134	70	44
Centropages kroyeri		3	+		+	1				2
Temora longicornis		15	7	90	59	73		107	2	20
Lucicutia flavicornis								3		
Candacia giesbrechti								+	2	15
Labidocera wollostoni										3
Acartia clausi		277	76	155	41	529	665	1738	200	220
Oithona helgolandica		81	48	88	94	95	135	80	55	159
Oithona nana		23	8	116	6	162	41	53	7	25
Oithona plumifera		113	29	87	43	50	137	35	21	92
Euterpina acutifrons		+		1	+	1	3			+
Oncaea media		3	+	5	+	7	9	20	46	44
Oncaea mediterranea									4	
Sapphirina sp.								+		
Corycaeus sp.		2	3	2			+	1	2	1
Monstriella sp.										+

TABLE 3. continue

Species	Stations / Depht (m)	001 26-0	007 26-0	101 30-0	107 35-0	203 36-0	207 43-0	301 30-0	305 48-0	311 44-0
OSTRACODA								+	+	
PTEROPODA										
Limacina inflata		6	5	3		2	3	33	7	7
L.trochiformis		3	4	2		1	2	3	15	43
CHAETOGNATHA										
Sagitta minima		1	+		1		+	4	4	15
Sagitta setosa		1	+		+		+	3	4	
APPENDICULARIA										
Oikopleura dioica		54	23	21	29	41	43	144	22	39
Oikopleura longicauda		22	11	2	10	20	9	50	9	39
Oikopleura fusiformis		3						40	+	58
Fritillaria pellucida									2	
DOLIOLIDA						+	+	234	939	928
LARVAE										
Bivalvia		5	4		3	48	16	93	10	6
Veliger		1						3	1	+
Polychaeta		+						16	5	5
Copepoda			5	383	16	30	132	22	9	43
Decapoda		7	2			1		5	3	4
Echinida		7		3	+		2	8	23	189
Ova pisces			1			1	1		1	3
Pisces			2		+		1	2	2	3
COPEPODA		825	505	899	590	1166	1686	2447	522	836
PHYLLOPODA		90	98	38	75	53	130	197	50	75
OTHER GROUPS		118	63	415	61	149	217	681	1130	1596
TOTAL		1033	666	1352	726	1368	2033	3325	1702	2507
DRY WEIGHT (mg m-3)		0.91	1.13	0.99	1.06	1.58	2.95	4.92	2.29	2.61
ASH (mg m-3)		0.04	0.05	0.09	0.05	0.25	0.35	0.09	0.51	0.64
ORGANIC MATTER (mg m-3)		0.87	1.08	0.90	1.01	1.33	2.6	4.83	1.78	1.97
ORGANIC MATTER (%)		95.6	95.6	90.9	95.3	84.1	88.1	98.1	77.7	75.5
CALORIC CONTENT (J/g DW)		20654	20654	19864	20606	18553	19348	21035	17138	16610

Tabl. 3. Kvalitativni i kvantitativni sastav mrežnog zoplanktona i biomase u otvorenim vodama sjevernog Jadrana u svibnju-lipnju 1986. (broj jed. m^{-3})

TABLE 4. Qualitative and quantitative composition of net zooplankton and biomass in the open North Adriatic in December 1966. (no. ind. m-3).

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	25-0	26-0	30-0	33-0	33-0	42-0	30-0	48-0	43-0
MEDUSAE										
Sarsia gemmifera							+	1	+	
Podocoryne minuta							+			
Obelia spp.								+		
Clytia hemisphaerica							+			
Solmaris leucostyla						+	+	+		
SIPHONOPHORAE										
Muggiaea kochi		+		2	+	1		3	+	+
PHYLLOPODA										
Penilia avirostris		+	+		+	+	+	2	+	+
Evadne nordmani		+			4		1	3		
Evadne spinifera		1	+		+	+	+		+	
Evadne tergestina					+		+		+	
Podon polyphemoides		4	1	1	16	2	1	26		
Podon intermedius		+	+	+		+	+	8	+	+
COPEPODA										
Calanus helgolandicus		+						2		
Calanus tenuicornis						1	1	2		
Paracalanus denudatus		3	+	2	+	1	1	4	+	1
Paracalanus nanus		+								
Paracalanus parvus		25	6	10	+	57	17	50	1	9
Calocalanus pavo			1			1	+		+	+
Calocalanus contractus		+				2	1	1		+
Calocalanus styliremis						+	+			+
Ischnocalanus plumulosus		+				+	+			+
Mecynocera clausi							+		+	
Clausocalanus arcuicornis				+	+	2	1	+		
Clausocalanus paululus		2								+
Clausocalanus pergens		1		+			3	+	+	
Clausocalanus jobei		1	1	1	+	5	5	2	+	1
Clausocalanus furcatus		8	5	6	2	18	8	2	1	7
Ctenocalanus vanus		6	3	4	1	6	6	25	2	3
Pseudocalanus elongatus		1	1	+		6				
Euchaeta hebes			+							
Diaixis pygmoea		1	+	2	+	+	+	2	1	2
Centropages typicus		3	1	5	1	5	6	7	1	+
Temora longicornis		15	9	29	2	9	16	26	1	2
Lucicutia flavicornis		2	+	+						
Candacia giesbrechti							+	+		+
Labidocera wollastoni			+				+			
Acartia clausi		15	17	22	5	56	28	215	1	3
Oithona helgolandica		3	3	1	+	10	6	9	1	2
Oithona plumifera			+	+	+	2	7	7	2	1
Oithona nana			+	+		+	+	3		1
Euterpina acutifrons		+			+	2	+	2		1
Clytemnestra rostrata			+	+		+	+	0		
Oncaea media		+				1	+	3	+	+
Oncaea mediterranea						3	1	1	+	+
Sapphirina sp.					+		+			+
Corycaeus clausi							+		+	+
Corycaeus giesbrechti		+		+	+	+	1	+	+	+
Corycaeus ovalis					+					
Monstrilla sp.				+	+		2		+	

TABLE 4. continue

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	25-0	26-0	30-0	33-0	33-0	42-0	30-0	40-0	43-0
OSTRACODA							+			
PTEROPODA										
Limacina inflata			+	+		1	1	6	1	1
L.trochiformis			+			+				+
L.leucoides						+		+		+
Hyalocylis striata						+	1		1	1
Creseis acicula								+		
CHAETOGNATHA										
Sagitta minima		1	+	+		1	1	3	1	1
Sagitta setosa		+				1	+	3		1
Sagitta inflata			+					+		+
APPENDICULARIA										
Oikopleura dioica		10	2		1	2	22	57	2	3
Oikopleura longicauda		5	2			3	5	2		+
Oikopleura fusiformis								2		
Fritillaria pellucida			+			+	7		8	1
DOLIOLIDA									+	
LARVAE										
Bivalvia		13	17	6	1	40	9	45	1	4
Veliger							+			
Polychaeta		+		+		1	1	3		
Copepoda		13	2	2	1	6	4	14	2	2
Decapoda		3	1	4	+	1	2	2	1	
Mizida							+	3		
Echinida			1	+	4		10	2	3	2
Ova pisces		1		1			+			+
Pisces		+								
COPEPODA		86	47	82	11	187	110	363	11	33
PHYLLOPODA		5	1	1	20	2	2	39	0	0
OTHER GROUPS		51	25	15	7	58	67	148	20	14
TOTAL		142	73	98	38	247	179	548	31	49
DRY WEIGHT (mg m-3)		1.32	.54	1.01	.28	1.51	1.47	2.88	.39	.67
ASH (mg m-3)		.36	.11	.24	.06	.44	.68	.79	.06	.28
ORGANIC MATTER (mg m-3)		.96	.43	.77	.22	1.07	.84	2.09	.33	.4[illegible]
ORGANIC MATTER (%)		73.1	79.6	76.2	78.6	70.8	57.1	72.5	84.6	64.2
CALORIC CONTENT (J/g DW)		15978	17567	16772	17339	15406	11379	15850	18647	16567

Tabl. 4. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u prosincu 1986. (broj jed. m^{-3})

TABLE 5. Qualitative and quantitative composition of net zooplankton and biomass in the Open North Adriatic in June 1987. (no. ind. m^{-3}).

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	26-0	26-0	30-0	35-0	36-0	43-0	30-0	48-0	44-0
MEDUSAE										
Sarsia gemmifera									+	
Podocoryne minuta					+	+		1		
Rhysomedusa pomponina								1		
Aglaura hemistoma										1
SIPHONOPHORAE										
Muggiaea kochi					+		+		1	4
PHYLLOPODA										
Evadne nordmani		1		14	53	14	2	31	1	1
Evadne spinifera		1		+	8	+	4		4	25
Podon polyphemoides		3		2	7	6	1	9	+	+
Podon intermedius									+	1
COPEPODA										
Calanus helgolandicus				+		2	+	2	1	2
Paracalanus denudatus						+	+	1	+	+
Paracalanus nanus							+			
Paracalanus parvus		3		14	24	32	10	30	17	56
Calocalanus contractus									+	+
Mecynocera clausi									+	
Clausocalanus arcuicornis						+			1	
Clausocalanus jobei				2	1	3	2	12	1	10
Clausocalanus furcatus				+		3		1	1	4
Ctenocalanus vanus		+		2		2	+	12	+	+
Pseudocalanus elongatus		2		25	6	32	3	42	3	4
Diaixis pygmoea				1					+	+
Centropages typicus		2		27	13	8	12	83	11	23
Centropages kroyeri				1	2	+	+	1	+	3
Centropages violaceus		1		+					+	1
Isias clavipes		1								5
Temora longicornis		8			46		9			
Temora stylifera									+	
Temora sp. juv.				101		130		270	11	5
Labidocera wollostoni							1		+	
Acartia clausi		12		28	40	41	9	247	12	11
Oithona helgolandica		4		29	8	128	2	29	4	11
Oithona plumifera		+		6	7	5	1	16	3	5
Oithona nana		1		2	1	6	+	7	+	+
Euterpina acutifrons				+		+	1	1		+
Oncaea media										+
Oncaea mediterranea						+		1		+
Corycaeus typicus									+	+
Corycaeus brehai										+
Corycaeus giesbrec										+
Monstrilla sp.		1				+	+	1		1

TABLE 5. continue

Species	Stations / Depht(m)	001 26-0	007 26-0	101 30-0	107 35-0	203 36-0	207 43-0	301 30-0	305 48-0	311 44-0
OSTRACODA					+		+			
PTEROPODA		1		3		+	1	5	2	2
CHAETOGNATHA										
Sagitta minima										+
Sagitta setosa					+		+			+
APPENDICULARIA										
Oikopleura dioica		1		11	11	13	2	17	1	1
Oikopleura fusiformis		+		+	+	+			+	
LARVAE										
Bivalvia				2	2	2	+	4	1	1
Veliger		1				+				
Polychaeta				1	1	1				
Copepoda				2	4	3	1	2	1	1
Decapoda		1		+			+			+
Echinida		7		+	1			2		+
Jaja ribe				1	1					
Pisces							+	1	+	
COPEPODA		36		241	148	396	53	756	70	146
PHYLLOPODA		5		16	68	20	7	40	6	27
OTHER GROUPS		11		21	22	21	6	23	8	11
TOTAL		52		278	238	437	66	819	84	185
DRY WEIGHT (mg m-3)		2.44		2.78	3.94	12.48	1.95	8.55	3.51	4.25
ASH (mg m-3)		0.90		1.46	0.88	1.40	0.39	1.38	1.03	0.88
ORGANIC MATTER (mg.m-3)		1.54		1.32	3.06	11.08	1.56	7.17	2.48	3.37
ORGANIC MATTER (%)		63		48	78	89	80	84	71	79
CALORIC CONTENT (J/g m-3)		13219		8262	17205	19518	17667	18532	15467	17439

Tabl. 5. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u lipnju 1987. (broj jed. m^{-3})

TABLE 6. Qualitative and quantitative composition of net zooplankton and biomass in the open North Adriatic in August 1987. (no. ind. m^{-3}).

Species	Stations	001	002	101	107	203	207	301	305	311
	Depth(m)	22-0	25-0	28-0	34-0	32-0	43-0	30-0	44-0	40-0
MEDUSAE										
Sarsia gemmifera						+		+	+	
Podocoryne minuta					+	+		1	+	
Podocorine minima						+		+		1
Aglaura hemistoma			+							+
SIPHONOPHORAE										
Muggiaea kochi		8				11	9	21	11	
PHYLLOPODA										
Penilia avirostris		874	368	343	1468	1200	1000	1013	727	800
Evadne tergestina		262	230	503	181	98	221	104	117	134
Evadne spinifera		52	46	69	113	84	134	51	+	106
Podon polyphemoides				91					5	
COPEPODA										
Calanus helgolandicus		2	2							
Calanus tenuicornis		2	2							
Paracalanus parvus		41	36	266	216	92	67	154	35	48
Clausocalanus jobei		2	2	+						
Clausocalanus furcatus									2	6
Ctenocalanus vanus		2	2	+	4	+				
Pseudocalanus elongatus		2	2	6	+					3
Euchaeta hebes		2	2							
Centropages typicus					6			4		6
Centropages kroyeri		39	36	154	8	10	2	34	4	3
Temora longicornis		2	2	170	124	26	41	94	33	64
Temora stylifera		4	2	+	6	8	24	4	11	45
Pontella mediterra							2			
Labidocera wollostoni					2					
Acartia clausi		20	18	56	188	58	29	17	61	147
Oithona helgolandica		2	2	50	4	22	22	34	11	13
Oithona plumifera		4	2	+	4	10	10	4	13	10
Oithona setigera							2	4		3
Oithona nana		6	6	42	27	8	5	4	11	16
Euterpina acutifrons				6	4		2			
Clytemnestra rostrata						2		2		1
Microsetella gracilis									2	
Oncaea media				14	2	10	10	13	13	2
Corycaeus typicus		2	2							
Corycaeus latus							5		2	3
Corycaeus brehmi									1	1
Corycaeus rostrata		2	2							3
OSTRACODA										
PTEROPODA							1	1		

TABLE 6. continue

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht(m)	22-0	25-0	28-0	34-0	32-0	43-0	30-0	44-0	40-0
CHAETOGNATHA										
Sagitta setosa		1	1	2	2	2	2	4	1	+
APPENDICULARIA										
Oikopleura dioica		11	10	11	9	24	6	30	7	17
Oikopleura longicauda		14	13	251	38	96	192	82	36	165
Oikopleura fusiformis		4	3	11	28	10	13	15	11	11
Fritillaria pellucida										
DOLIOLIDA		7	6	2	38	80	288	53	80	96
LARVAE										
Bivalvia		2				2	2	2	4	
Polychaeta		1				8	+	3		
Decapoda		2				4	1	6	1	
Echinida		48				100	12	64	43	
Ova pisces										
Pisces		1								
COPEPODA		124	120	766	595	246	211	368	199	374
PHYLLOPODA		1188	1044	1006	1762	1382	1355	1168	849	1040
OTHER GROUPS		100	141	2341	161	338	525	283	194	327
TOTAL		1412	1305	4113	2518	1966	2091	1819	1242	1741
DRY WEIGHT (mg m-3)		6.02	5.68	10.07	8.01	6.56	4.00	4.73	2.93	5.05
ASH (mg m-3)		2.22	1.66	3.27	2.46	2.21	1.23	1.91	0.92	1.58
ORGANIC MATTER (mg m-3)		3.80	4.02	6.8	5.54	4.35	2.77	2.82	2.01	3.47
ORGANIC MATTER (%)		63	71	68	69	66	69	60	69	69
CALORIC CONTENT (J mg m-3)		13219.38	15467	14656	14931	14094	14931	12305	14931	14931

Tabl. 6. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u kolovozu 1987. (broj jed. m^{-3})

TABLE 7. Qualitative and quantitative composition of net zooplankton and biomass in the open North Adriatic in May 1988. (no. ind. m-3).

Species	Stations Depht (m)	001 22-0	007 25-0	101 28-0	107 34-0	203 32-0	207 43-0	301 30-0	305 44-0	311 40-0
HEDUSAE										
Sarsia gemmifera					8		6		5	
Podocoryne minuta			9		8		13	17	11	
Podocorine minima		9	18			8	13			
Rhysomedusa pomponina		9							5	
Aglaura hemistoma		18		18				8	5	2
SIPHONOPHORAE										
Muggiaea kochi			18		24		38	17	128	36
PHYLLOPODA										
Penilia avirostris						39	6	8	+	6
Evadne nordmani		28	37	64	32	8	6	8	11	48
Evadne spinifera		+	+	18	+		32	43	187	71
Podon polyphemoides		360	823	631	400	326	646	17	11	77
Podon intermedius				+		8	6		5	6
COPEPODA										
Calanus helgolandicus				18			13		5	12
Calanus tenuicornis		2	2	+	16	8	13		11	6
Paracalanus denudatus				18			6		5	+
Paracalanus parvus		313	274	366	112	279	167	333	112	208
Calocalanus stylirenis		1					6	16	75	6
Calocalanus pavo									16	
Clausocalanus arcuicornis							6		5	
Clausocalanus jobei		9	18	18	32	54	6	43	32	12
Clausocalanus pergens		+		18			6		5	
Clausocalanus furcatus		47	55	165	18	62	6	26	5	+
Ctenocalanus vanus			18	46	+	23	6	8	16	+
Pseudocalanus elongatus						8			11	+
Euchaeta hebes										
Diaixis pygmoea		19	18	18	+	23			+	+
Centropages typicus		9	9	18	8	15	6		11	6
Centropages kroyeri		95	82	46	120	62	102	119	128	95
Centropages violaceus						8				
Isias clavipes						8				
Temora stylifera										6
Temora longicornis		1346	713	1883	160	427	96	845	37	185
Acartia clausi		408	603	2350	240	2451	262	794	101	119
Oithona helgolandica		142	329	448	360	39	96	77	171	137
Oithona nana		9	73	18	32		6		+	+
Oithona plumifera		9	64	18	32	101	38	171	16	36
Oithona setigera						8				
Euterpina acutifrons		19						8		18
Clytemnestra rostrata										
Microsetella gracilis			9					8	5	
Oncaea media			37	18		31		26	16	
Oncaea mediterrane							6			
Corycaeus typicus					8		6			6
Corycaeus latus				27	8		19	8	5	12
Corycaeus brehai					8		6	8	5	12
Corycaeus rostrata					8					6

TABLE 7. continue

Species	Stations / Depht (m)	001 22-0	007 25-0	101 28-0	107 34-0	203 32-0	207 43-0	301 30-0	305 44-0	311 40-0
OSTRACODA						15		8		
PTEROPODA		38	64	46	16	70	32	51	37	77
CHAETOGNATHA										
Sagitta setosa							6		37	30
APPENDICULARIA										
Oikopleura dioica		38	92	46	192	85	103	162	5	119
Oikopleura longicauda		9	9	9	8		6		32	6
Oikopleura fusiformis		+	18	18	8		6		+	6
Fritillaria pellucida			+	9						
THALIACEA									11	
LARVAE										
Bivalvia		28	55	46	+	31		43		12
Polychaeta		2	27			8		17		
Decapoda		30	18	54	8	16	12	25	5	
Echinodermata		47	960	91	448	931	294	384	5	179
Ova pisces			9				6	8	21	
Pisces								8		
PHYLLOPODA		388	860	713	432	381	696	76	216	208
COPEPODA		2429	2304	5493	1162	3607	878	2490	793	880
OTHER GROUPS		228	1297	337	720	1164	525	748	296	467
TOTAL		3045	4461	6543	2314	5152	2099	3314	1305	1555
DRY WEIGHT (mg m-3)		4.88	5.01	7.66	3.03	6.04	2.96	3.46	1.15	2.29
ASH (mg m-3)		0.14	1.02	1.38	0.12	1.11	0.35	0.22	0.09	0.24
ORGANIC MATTER (mg m-3)		4.74	3.99	6.28	2.91	4.93	2.61	3.24	1.06	2.05
ORGANIC MATTER (%)		97.1	79.6	82.1	96.1	81.6	80.1	93.6	92.2	89.5
CALORIC CONTENT (J/g DW)		20888	17576	18106	20176	18021	19448	20329	20091	19610

Tabl. 7. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomase u otvorenim vodama sjevernog Jadrana u svibnju 1988. (broj jed. m^{-3})

TABLE 8. Qualitative and quantitative composition of net zooplankton and biomass in the open North Adriatic in October 1988. (no. ind. m-3).

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht (m)	22-0	25-0	28-0	34-0	32-0	43-0	30-0	44-0	40-0
MEDUSAE										
Sarsia gemmifera				8	+	7				
Podocoryne minuta		10		+	14	7	6	7		
Podocorine minima		82		8	14					
Rhysomedusa pomponina							6		6	
Aglaura hemistoma										6
SIPHONOPHORAE										
Muggiaea kochi		10		24	28	15	19	7	6	12
PHYLLOPODA										
Penilia avirostris		328		361	1863	139	351	602	256	488
Evadne spinifera		+		58	277	7	37	68	387	55
Evadne tergestina		174		140	327	80	87	294		18
Podon polyphemoides		584		314	114	22	19	23	6	
Podon intermedius		10		49	43	+	6	6	6	6
COPEPODA										
Calanus helgolandicus				8	+				6	6
Calanus tenuicornis		+		8	7	+	6	7	6	30
Paracalanus denudatus				+	14		12		6	6
Paracalanus nanus					7				6	6
Paracalanus parvus		13		553	128	37	19	60	45	97
Calocalanus styliremis									3	6
Clausocalanus arcuicornis		10		6	7	+	6	+	51	18
Clausocalanus jobei		31		124	28	+	12	7	23	24
Clausocalanus furcatus				8	12	7	6	15	28	12
Ctenocalanus vanus		+		71	28	15	6	15	23	55
Pseudocalanus elongatus		+		33	14	+	+	7	17	30
Diaixis pygmoea		10		16	+				6	+
Centropages typicus		+		8	+		+	6	+	
Centropages kroyeri		20		16	7	7		+	3	6
Temora longicornis		20		16	+			+	28	12
Candacia giesbrechti									11	6
Acartia clausi		10		388	64	7	6	38	11	6
Oithona helgolandica		20		25	7	7		7	+	
Oithona nana		20		+	+				+	+
Oithona plumifera		10		49	78	15	56	15	45	67
Oithona setigera									6	6
Euterpina acutifrons				8	+				+	
Clytemnestra rostrata		10			14					
Oncaea media		143		173	57	22	37	7	17	12
Saphirina spp.									6	
Corycaeus spp.									11	18

TABLE 8. continue

Species	Stations	001	007	101	107	203	207	301	305	311
	Depht (m)	22-0	25-0	28-0	34-0	32-0	43-0	30-0	44-0	40-0
PTEROPODA										
Limacina spp.		51		33		+	+	+	6	+
CHAETOGNATHA										
Sagitta setosa		31		33	+	7	12	7	17	6
MYSIDACEA										
Acanthomysis spp.		15								
APPENDICULARIA										
Oikopleura dioica		31		91	36	7	6	3	6	6
Oikopleura longicauda		10		49	85	29	37	38	11	6
Oikopleura fusiformis									6	
Fritillaria pellucida				33	28		6	7	23	67
THALIACEA		10		25	242	22	19	38	11	61
LARVAE										
Bivalvia		154		58	50		12	7	+	12
Veliger		20		+	+	4	12	7		
Polychaeta		143		33	7	+		4		
Naupliusi				16	43	7		7	11	12
Decapoda		10			7	+		7	6	
Echinodermata		14746		1404	2489	666	1149	1353	205	128
Ova pisces				16	7	7	6	7	6	
Pisces									6	
PHYLLOPODA		1096		1122	2624	248	480	987	649	567
COPEPODA		419		1514	421	118	167	187	365	424
OTHER GROUPS		15372		1831	3051	1049	1289	1536	326	316
TOTAL		16887		4467	6096	1415	1936	2710	1340	1307
DRY WEIGHT (mg m-3)		20.06		16.37	11.73	4.04	3.82	8.64	3.33	3.59
ASH (mg m-3)		12.31		5.12	2.58	.34	.55	2.56	1.07	.63
ORGANIC MATTER (mg m-3)		7.75		11.25	9.15	3.7	3.27	6.08	2.26	2.96
ORGANIC MATTER (%)		38.6		69	78	91.6	85.5	70.4	68	82.4
CALORIC CONTENT (J/g DW)		4662		14931	17205	19987	18839	15308	14656	18194

Tabl. 8. Kvalitativni i kvantitativni sastav mrežnog zooplanktona i biomasse u otvorenim vodama sjevernog Jadrana u listopadu 1988. (broj jed. m^{-3})