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for vann- og avløpsteknisk
samarbeid i indre Oslofjord

Statlig program for
forurensningsovervåkning

Rapport nr. 621/95

Overvåkning av forurensnings-situasjonen i indre Oslofjord

Effekter av forurensning og dypvannsutskiftning på faunaen langs bunnen av Oslofjorden basert på materiale samlet siden 1952

(Effects of pollution and deepwater exchange on the fauna along the bottom of Oslofjorden, Norway, based on material collected since 1952)

Del II
Referanser, tabeller, figurer og english summary

TA-1257/1995

Biologisk institutt, Universitetet i Oslo

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Ekstrakt:

Til innsamling av dyr like over bunnen (hyperbenthos) er det i ca. 40 år benyttet en lukkbar, finmasket (0.5mm) hov montert i en slede. Litt av det øverste, løse bunnsedimentet og mange slags dyr som er knyttet til dette, havner også i håven. Redskapet har en distansemåler. Prøver tatt på forskjellige lokaliteter viser markante forskjeller, og det samme kan være tilfelle for prøver tatt til forskjellig tid på samme sted. Materialet viser en kraftig forringelse av faunaen innover fjorden, som hovedsakelig kan tilskrives oksygenmangel. Denne har hatt akkumulert effekt på sediment og fauna. Utslipp av kloakk fra VEAS hadde lokalt uheldig innflytelse på faunaen i 1982-85. Med tilsynelatende utgangspunkt i Gråøyrenna i 1984 har 3 rekearter senere vist bemerkelsesverdig øket antall. Overføringen av kloakk fra Bunnefjordområdet har ikke gitt tilstrekkelig avlastning av dette. Yngel av komersiell reke samt en mindre rekeart ble funnet i stort antall i Gråøyrennen fra 1984 og ble noe senere også funnet lengere innover. Muddereke ble etter mange år først funnet rikelig i 1992 i Gråøyrenna, men synes ikke å akseptere forholdene lengre inne. Bunnsledeprøver viser meget større utslag av miljøforskjeller og - forandringer enn tilsvarende prøver tatt med grabb eller skrape.

4 emneord, norske

1. Forurensningsovervåking
2. Oslofjorden
3. Hyperbenthos-benthos
4. Dypvannsutskiftning

4 emneord, engelske

1. Pollution monitoring
2. Oslofjorden
3. Hyperbenthos-benthos
4. Deepwater exchange

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EFFEKTER AV FORURENSNING OG DYPVANNSUTSKIFTNING PÅ FAUNAEN LANGS BUNNEN AV OSLOFJORDEN BASERT PÅ MATERIALE SAMLET SIDEN 1952

(EFFECTS OF POLLUTION AND DEEPWATER EXCHANGE ON THE FAUNA ALONG THE BOTTOM OF OSLOFJORDEN, NORWAY, BASED ON MATERIAL COLLECTED SINCE 1952)

av

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og

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DEL II

REFERANSER, TABELLER, FIGURER, ENGLISH SUMMARY

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GRUPPER	ARTER/TAXA	E53	E59	E60	E61	E73	E81	E85	E86	E87	E88	E89	E90
Foraminifera	Uidentifisert	1504	2949	5847	41	1587	15735	20437	2377	4762	4065	220	23568
Coelenterata	Tesserogastria musculosa	505	357	8770	1253	284	265	10	9	16	435	138	586
	Aglantha digitale	2	0	0	0	0	0	0	0	0	0	0	0
Chaetognatha	Sagitta elegans	296	127	1266	560	58	0	42	77	14	36	8	21
	Eukrohnia hamata	1818	900	175	33	0	51	80	137	115	25	347	21
Polychaeta	Syllis sp.	0	0	0	0	82	22	3	0	0	0	0	0
	Nereimyra punctata	0	0	0	0	14	22	17	0	5	8	6	0
	Ophiodromus flexuosus	0	0	0	0	0	0	7	0	0	0	0	4
	Antinoella sarsi	0	0	0	0	10	7	83	0	0	45	19	357
	Harmothoe spp.	0	0	0	0	0	0	0	0	0	0	0	0
	Leanira tetragona	0	0	0	0	0	22	49	17	33	6	2	39
	Pholoe minuta	7	17	39	20	34	54	135	23	11	11	17	50
	Phyllodocidae	0	0	0	0	10	0	21	0	0	6	6	4
	Nephtys spp.	1	0	1	0	0	0	0	0	0	0	0	0
	Lumbrineris spp.	13	16	19	0	58	0	49	0	0	8	2	0
	Sphaerodorum gracilis	20	47	19	20	101	338	101	14	22	6	21	14
	Spionidae	3	14	0	10	53	37	14	0	49	11	13	7
	Chaetozone setosa	0	0	0	0	0	110	35	3	0	14	2	11
	Flabelligeridae	0	8	0	0	112	0	0	0	0	6	0	89
	Scalibregmidae	0	0	0	0	0	7	0	0	0	0	0	0
	Opheliidae	3	1	0	0	5	15	0	0	0	20	0	21
	Capitella capitata	0	0	0	0	0	0	0	0	0	0	0	0
	Ampharete baltica	0	0	0	0	0	0	0	0	0	0	0	0
	Ampharete falcata	0	0	0	0	0	0	0	0	0	0	0	0
	Amphicteis gunneri	0	0	0	0	0	0	0	0	0	0	0	0
	Ampharete sp.	0	0	0	0	0	404	628	0	0	281	117	243
	Melinna cristata	0	0	0	0	0	0	0	0	3	0	0	0
	Eupolymnia spp.	0	0	0	0	0	0	0	0	0	0	0	0
	Pista cristata	0	0	0	0	0	0	0	0	0	0	0	0
	Pectinaria spp.	0	0	0	0	0	0	0	0	0	3	0	0
	Thelepus spp.	0	0	0	0	0	15	0	0	0	0	0	0
	Trichobranchus spp.	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellides stroemi	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	15	3	3	5	6	0	0
	Sabellidae spp.	0	0	0	0	0	0	14	0	3	0	0	11
	Uidentifisert	23	10	12	89	82	7	28	103	93	0	61	57
	Hesionidae	9	13	2	0	0	0	0	0	0	0	0	0
	Aphroditidae unidentified	13	8	0	4	0	0	0	0	0	0	0	0
	Glyceridae	5	0	1	10	0	0	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	10	7	0	0	0	0	0	0
Ostracoda	Philomedes brenda	6	0	0	0	0	74	212	6	0	3	0	0
	Philomedes lilljeborgi	50	3	2	10	5	51	431	26	19	17	0	25
	Conchoecia elegans	403	191	6664	0	0	29	14	57	52	31	356	36
	Conchoecia borealis	0	0	41	0	0	44	80	0	0	0	4	0
	Conchoecia obtusata	70	0	643	0	0	0	52	6	11	6	0	0
	Cytherella abyssorum	3	3	1	3	0	0	0	0	3	0	0	0
	Macrocypris minna	68	18	2	10	0	37	42	26	77	160	0	11
	Macrocypria angusta	73	13	6	6	0	44	135	89	8	118	0	104
	Elofsonella concinna	0	1	0	0	0	0	0	3	3	17	0	7
	Eucytheridea punctillata	11	54	175	30	0	0	10	0	0	14	0	7
	Echinocythereis echinata	135	26	136	20	0	279	427	257	79	56	0	100
	Cythereis dunelmensis	0	0	0	0	0	15	0	0	0	0	0	0
	Hemicythere latimarginata	3	1	0	0	0	0	0	0	0	0	0	0
	Cythereis spp.	1	0	0	0	0	0	0	6	0	6	0	0
	Cytheropteron alatum	0	0	0	0	10	515	7	0	0	0	0	514
	Cythereis jonesi	0	0	0	0	10	15	0	0	0	0	0	0
	Cytherella abyssorum	1	1	1	1	0	0	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	2145	830	857	156	0	0	20	126	93	37	172	0
	Calanus helgolandicus	0	0	0	0	0	0	17	108	16	48	97	0
	Calanus hyperboreus	6896	1487	350	11	0	0	77	163	82	0	21	0
	Calanus sp. juv.	0	0	0	0	865	15	10	86	181	53	182	304
	Pseudocalanus elongatus	16	1	0	0	0	0	0	3	3	0	4	0
	Bradyidius bradyi	0	9	0	11	0	0	3	0	0	0	0	0
	Chiridius armatus	45	19	128	3	19	59	42	138	11	11	49	121
	Euchaeta norvegica	44	38	44	5	10	7	0	37	33	6	38	4
	Xanthocalanus fallax	0	2	0	4	0	0	79	183	14	11	11	68
	Xanthocalanus propinquus	0	13	0	20	0	74	156	69	19	22	21	46
	Xanthocalanus sp.	0	5	0	10	0	0	0	31	3	3	0	0
	Scolecithricella minor	2	0	97	0	0	0	0	0	3	0	0	0
	Diaixis hibernica	8	4	6	1	0	0	0	0	0	0	0	0
	Parastephos pallidus	13	7	1	1	0	0	30	0	3	0	4	4
	Tharybis macrophthalma	0	0	1	188	0	51	0	3	3	34	2	18
	Centropages hamatus	26	3	0	0	0	0	0	0	19	0	13	0
	Centropages typicus	0	0	0	0	0	0	0	0	0	0	64	11
	Temora longicornis	0	1	0	0	0	0	0	0	11	0	0	4
	Metridia longa	672	356	1266	98	38	162	70	346	49	76	161	68
	Metridia lucens	77	3	58	0	14	0	0	0	0	3	8	7

GRUPPER	ARTER/TAXA	E53	E59	E60	E61	E73	E81	E85	E86	E87	E88	E89	E90
	Pleuromamma robusta	0	0	0	0	0	0	0	0	0	0	0	0
	Heterorhabdus norvegicus	89	19	2727	0	0	0	62	131	0	6	2	0
	Unidentified copepodites	7	0	0	0	0	0	0	0	0	0	0	25
	Harpacticoida	11	27	0	26	0	59	28	0	0	0	0	0
	Scottula inaequicornis	1	6	2	0	0	0	0	0	0	0	0	0
	Anomoclausia indrehusae	0	0	0	0	0	0	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	9	33	39	22	0	59	56	86	36	17	30	11
	Erythrops serrata	0	0	0	0	0	0	0	0	0	25	36	32
	Amblyops abbreviata	39	48	34	8	48	66	34	80	49	20	36	54
	Mysideis insignis	1	0	0	0	0	7	0	0	0	0	0	14
	Mysidopsis didelphys	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea	Leucon acutirostris	2	0	8	0	0	103	107	0	0	14	28	4
	Leucon nasicus	0	8	0	0	0	15	10	0	0	3	0	0
	Leucon sp.	140	7	6	3	14	0	90	57	16	76	13	118
	Eudorella emarginata	5	10	6	10	14	59	45	3	0	0	6	0
	Campylaspis rubicunda	34	1	0	0	0	7	10	0	0	0	0	11
	Campylaspis costata	24	3	2	1	5	51	14	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0	0	3	0	3	2	0
	Campylaspis sp	41	8	0	0	0	37	31	0	0	0	0	14
	Diastylis lucifera	0	1	0	0	0	0	0	0	0	0	0	0
	Diastylis tumida	1	0	0	0	0	0	0	0	0	0	0	4
	Diastylis cornuta	11	3	0	0	0	0	0	0	0	0	0	0
	Diastylis echinata	0	0	0	0	0	0	3	0	0	0	0	0
	Diastyloides serrata	194	62	220	68	0	522	2017	212	72	435	282	843
	Diastyloides biplicata	0	2	0	0	5	59	3	3	0	0	0	11
	Leptostylis longimana	0	4	1	98	91	132	733	108	217	188	131	996
	Eudorella truncatula	1	1	1	1	0	103	0	0	0	0	0	0
Tanaidacea	Tanaidacea	86	38	115	49	14	191	240	66	33	25	13	68
Isopoda	Ianira maculosa	4	0	0	0	5	0	6	11	0	0	0	0
	Pleurogonium inerme	0	31	6	0	0	0	0	0	0	0	0	0
	Macrostylis spinifera	0	1	6	3	14	15	0	0	0	3	4	0
	Ischnosoma bispinosum	0	0	0	0	0	0	10	0	0	0	4	0
	Desmosoma lineare	6	0	0	0	0	0	0	3	0	3	0	0
	Desmosoma armatum	0	1	0	0	0	37	3	0	0	3	0	7
	Desmosoma laterale	0	1	0	0	0	15	17	0	5	0	6	0
	Desmosoma sp.	0	0	0	0	0	44	0	0	0	0	0	4
	Munna sp.	0	0	0	0	14	0	0	0	0	0	0	0
	Echinopleura aculeata	51	7	0	0	0	51	14	0	0	6	8	21
	Munnopsis typica	12	1	2	4	19	0	59	92	3	17	53	114
	Eurycope cornuta	17	16	2	15	19	287	142	83	38	76	6	86
	Eurycope phalangium	0	0	0	0	10	426	198	60	19	79	15	146
	Eurycope sp.	9	0	0	0	29	184	66	0	0	0	13	0
	Ilyarachna longicornis	67	14	50	19	44	257	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	0	0	0	0	0	0	0	0	5	0	0	0
	Lysianassidae	1	0	11	19	14	22	14	0	3	17	44	4
	Tryphosa hörringi	0	0	0	0	0	22	0	0	0	0	0	0
	Tryphosites longipes	0	0	0	0	0	0	0	0	0	0	0	0
	Harpinia crenulata	1	0	0	0	0	0	42	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0	10	0	0	0	0	0
	Phoxocephalidae unident.	5	3	6	13	24	81	0	3	11	11	8	7
	Ampelisca spp.	0	0	0	0	0	0	0	0	0	0	0	0
	Stegocephalus inflatus	0	1	0	0	0	7	0	2	5	8	0	0
	Stegocephalus sp.	0	0	0	0	5	15	3	37	8	0	13	4
	Andaniexis abyssi	1	2	6	3	0	0	7	0	0	9	0	0
	Andaniopsis nordlandica	36	38	331	164	10	29	0	0	0	6	2	0
	Amphilochidae	0	0	0	0	0	0	17	3	0	0	6	4
	Astyra abyssi	0	1	0	0	0	0	0	0	0	0	0	7
	Stenothoidae	0	0	1	0	0	0	0	0	0	0	0	0
	Oediceridae	0	0	0	0	10	51	17	3	3	0	0	11
	Perioculodes longimanus	0	1	0	3	0	7	0	0	0	0	6	0
	Synchelidium haplocheles	0	0	0	0	10	37	38	0	8	17	2	4
	Synchelidium tenuimanum	1	0	0	0	0	44	0	0	0	8	2	21
	Synchelidium intermedium	0	0	0	0	10	7	0	0	0	6	6	11
	Synchelidium sp.	14	1	0	10	0	103	0	0	0	0	0	0
	Westwoodilla caecula	9	1	4	2	0	29	0	0	0	0	0	0
	Bathymedon longimanus	7	6	4	1	0	0	3	0	0	3	2	0
	Bathymedon saussurei	1	1	2	0	0	206	0	0	0	6	6	7
	Bruzelia spp.	4	0	0	1	0	44	0	0	0	6	0	11
	Halice abyssi	5	14	12	5	0	0	3	11	3	20	19	4
	Rhachotropis macropus	32	12	22	83	5	66	163	377	205	98	309	104
	Rhachotropis leucophthalma	0	0	0	10	0	0	0	0	0	3	0	0
	Apherusa bispinosa	0	0	0	0	0	7	0	0	0	0	0	0
	Apherusa sp.	0	0	0	0	0	0	3	0	0	0	0	0
	Melphidippa borealis	0	0	6	0	0	44	0	0	0	0	0	0
	Eriopisa elongata	0	0	0	0	0	7	0	0	11	3	0	7
	Cheirocratus intermedius	0	0	0	0	0	0	0	0	0	0	0	0
	Cheirocratus sundewalli	0	0	0	0	0	0	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	E53	E59	E60	E61	E73	E81	E85	E86	E87	E88	E89	E90
	Cheirocratus sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Gammaridae	0	0	0	0	0	0	3	0	0	0	0	0
	Photidae	0	0	0	0	0	0	0	0	0	0	0	0
	Podoceropsis sophiae	0	0	0	0	0	0	3	0	0	0	0	0
	Corophium bonelli	0	0	0	0	5	0	0	0	0	3	0	0
	Arrhis phyllonyx	1	14	78	16	0	81	0	0	0	0	0	0
	Monoculodes packardi	21	5	0	2	0	7	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	10	0	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	7	0	0	0	0	0	0
	Halirages fulvocinctus	10	3	122	0	0	0	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	0	0	0	0	0	0	0	0	0	0	0	0
	Thysanoessa raschi	0	1	0	0	14	0	0	0	0	0	0	0
	Thysanoessa inermis	0	0	0	0	19	0	0	0	0	0	0	0
Decapoda	Crangon allmani	0	0	0	0	0	0	0	0	0	0	0	0
	Pontophilus norvegicus	16	38	36	29	10	6	60	2	0	7	13	0
	Spirontocaris lilljeborgi	1	2	0	3	0	1	1	1	1	1	1	1
	Lebbeus polaris	0	2	2	0	0	17	20	18	19	7	4	6
	Pandalus borealis	1	3	1	4	0	0	0	2	0	0	0	0
	Pandalus propinquus	1	5	3	6	0	0	0	5	2	1	0	1
	Pandalus borealis juv	1	0	0	0	0	0	10	0	0	0	0	0
	Pandalina profunda	0	1	0	0	0	0	4	1	1	0	0	0
	Pasiphaea tarda	1	0	0	1	0	1	0	0	1	1	0	0
	Pandalus montagui	0	0	0	0	0	0	0	0	0	0	0	0
Mollusca	Nudibranchiata	0	0	0	0	0	0	0	0	0	0	0	0
	Delectopecten vitreus	0	0	0	0	0	0	3	0	0	0	0	4
	Pseudamussium septemradiatum	3	1	0	1	0	5	14	23	0	0	2	18
	Abra nitida	0	0	0	0	0	0	708	0	0	1548	81	325
	Thyasira sp.	0	0	0	0	0	1463	705	0	0	143	25	239
	Bivalvia unident	489	799	1414	928	0	456	28	466	230	14	11	200
Echinodermata	Asteroida (larvae)	0	0	0	0	0	0	0	6	0	0	0	0
	Ophiuroidea	9	3	0	20	0	22	0	0	3	0	0	46
	Echinoidea	0	1	0	0	0	0	0	0	0	0	0	0
	Holothuroidea	1	0	0	0	0	0	1	1	0	0	0	0
Tunicata	Ascidia	0	1	0	0	0	0	1	0	0	0	4	0
Pisces	Myxine glutinosa	0	0	1	0	0	0	1	1	1	1	2	0
	Lycenchelys sarsi	1	5	1	0	0	0	0	1	0	0	0	0
	Rhinonemus cimbrius	0	0	0	0	0	0	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	G53	G59	G60	G61	G73	G81	G82	G84	G85	G86	G87	G88	G89	G90
Foraminifera	Uidentifisert	126	162	10	0	978	2210	564	2509	2933	853	671	14	1373	197
Coelenterata	Tesserogastria musculosa	261	2804	4	0	1246	48	14	400	0	53	120	150	40	1730
	Aglantha digitale	12	415	0	0	0	0	0	0	0	0	0	42	0	0
Chaetognatha	Sagitta elegans	21	193	41	244	0	67	14	429	310	171	75	44	165	409
	Eukrohnia hamata	21	3	6	0	0	0	0	29	0	4	0	32	6	0
Polychaeta	Syllis sp.	0	0	0	0	0	27	101	23	28	8	0	0	3	0
	Nereimyra punctata	0	0	0	0	11	40	23	206	13	15	6	0	9	0
	Ophiodromus flexuosus	0	0	0	0	0	11	23	6	0	0	0	0	6	0
	Antinoella sarsi	0	0	0	0	37	8	0	57	500	770	139	19	28	88
	Harmothoe spp.	0	0	0	0	0	0	0	0	0	23	0	0	0	0
	Leanira tetragona	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pholoe minuta	68	25	10	7	33	954	335	314	313	91	45	0	12	22
	Phyllodocidae	2	0	0	0	0	22	37	0	10	0	3	0	0	0
	Nephtys spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lumbrineris spp.	0	3	0	0	71	3	5	34	200	0	0	2	37	15
	Sphaerodorum gracilis	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Spionidae	0	4	0	0	45	288	119	137	185	45	19	2	58	452
	Chaetozone setosa	0	0	0	0	71	54	151	74	98	8	6	0	15	22
	Flabelligeridae	26	5	2	4	71	38	11	6	43	0	0	5	95	80
	Scalibregmidae	0	0	0	0	0	24	32	154	0	0	3	0	0	0
	Opheliidae	7	0	0	0	0	13	14	0	13	19	0	0	0	7
	Capitella capitata	0	0	0	0	0	0	5	0	0	49	0	0	0	0
	Ampharete baltica	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Ampharete falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amphicteis gunneri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ampharete sp.	0	0	0	0	0	30	5	40	913	0	0	2	6	22
	Melinna cristata	0	0	0	0	0	0	18	0	0	4	0	0	0	7
	Eupolymnia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pista cristata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pectinaria spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thelepus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trichobranchus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellides stroemi	0	0	0	0	0	5	5	0	0	0	0	0	0	15
	Terebellidae sp.	0	0	0	0	26	0	14	17	3	0	6	0	0	0
	Sabellidae spp.	0	0	0	0	7	46	0	0	10	0	0	0	3	7
	Uidentifisert	14	15	19	2	11	40	4	74	23	68	52	0	73	94
	Hesionidae	8	3	0	2	0	0	0	0	0	0	0	0	0	0
	Aphroditidae unidentified	12	8	6	7	0	0	14	0	0	0	0	0	0	0
	Glyceridae	2	2	0	0	7	0	5	0	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	0	0	1367	0	0	0	0	0	0	0
Ostracoda	Philomedes brenda	0	0	0	0	0	3	0	0	0	0	0	0	0	0
	Philomedes lilljeborgi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Conchoecia elegans	22	0	0	0	0	0	0	0	3	0	0	0	0	0
	Conchoecia borealis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Conchoecia obtusata	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Macrocypris minna	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Macrocypria angusta	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Elofsonella concinna	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eucytheridea punctillata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Echinocythereis echinata	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cythereis dunelmensis	0	0	0	0	0	0	0	0	5	0	3	0	0	0
	Hemicythere latimarginata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cythereis spp.	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Cytheropteron alatum	0	0	0	0	0	0	0	0	10	4	71	0	3	15
	Cythereis jonesi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	403	510	1772	17	0	0	0	0	46	94	16	30	208	0
	Calanus helgolandicus	0	0	0	0	0	0	0	0	21	61	10	2	388	0
	Calanus hyperboreus	58	15	4	0	0	0	0	0	26	682	55	9	15	0
	Calanus sp. juv.	0	0	0	0	417	27	69	195	13	42	62	14	502	1029
	Pseudocalanus elongatus	52	83	33	0	0	0	5	0	5	15	6	0	0	0
	Bradyidius bradyi	7	41	179	53	11	11	9	0	3	0	3	0	3	0
	Chiridius armatus	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Euchaeta norvegica	50	17	49	1	0	0	14	0	6	19	13	12	6	15
	Xanthocalanus fallax	7	76	1	3	37	0	0	0	0	0	0	0	0	0
	Xanthocalanus propinquus	2	193	19	0	0	0	0	0	0	0	0	0	0	0
	Xanthocalanus sp.	0	1	0	2	0	0	0	0	0	0	0	0	0	0
	Scolecithricella minor	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diaixis hibernica	16	100	0	10	0	0	0	0	0	0	0	0	0	0
	Parastephos pallidus	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Tharybis macrophthalma	0	1	0	4	0	0	0	0	0	0	0	0	0	0
	Centropages hamatus	128	6	13	0	0	3	84	11	0	0	0	7	6	59
	Centropages typicus	0	1	0	0	0	0	0	0	0	0	0	0	83	22
	Temora longicornis	11	3	10	0	0	0	5	17	6	0	0	0	0	161
	Metridia longa	272	143	187	8	7	5	37	6	0	37	13	14	0	0
	Metridia lucens	16	1	0	1	0	0	0	0	0	0	0	0	0	7

GRUPPER	ARTER/TAXA	G53	G59	G60	G61	G73	G81	G82	G84	G85	G86	G87	G88	G89	G90
	Pleuromamma robusta	0	0	0	0	0	0	5	0	0	0	0	0	0	0
	Heterorhabdus norvegicus	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Unidentified copepodites	0	8	0	0	0	0	0	0	0	0	0	0	0	0
	Harpacticoida	11	55	0	2	0	3	0	0	0	8	3	2	0	0
	Scottula inaequicornis	8	18	0	7	0	0	0	0	0	0	0	0	0	0
	Anomoclausia indrehusae	1	7	0	0	0	0	0	0	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	0	0	0	0	63	0	0	0	0	0	0	0	15	0
	Erythrops serrata	9	1	0	0	0	339	32	177	478	258	288	162	450	248
	Amblyops abbreviata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mysideis insignis	1	10	0	0	0	0	0	0	0	0	0	0	0	0
	Mysidopsis didelphys	0	0	0	0	0	0	0	0	0	0	0	0	0	29
Cumacea	Leucon acutirostris	0	0	4	0	70	0	0	0	0	0	12	2	0	0
	Leucon nasicus	4	31	4	29	0	65	0	126	143	72	39	5	18	0
	Leucon sp.	5	1	0	0	7	301	41	457	970	406	185	0	187	0
	Eudorella emarginata	1	14	3	0	0	19	60	251	579	72	32	2	34	7
	Campylaspis rubicunda	1	2	7	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis sp	0	4	0	0	0	0	0	0	0	0	0	0	0	0
	Diastylis lucifera	1	1	0	0	0	8	0	29	71	80	45	0	15	0
	Diastylis tumida	1	0	0	0	0	16	0	0	0	27	9	0	0	0
	Diastylis cornuta	0	0	0	0	0	0	0	6	0	0	0	0	0	0
	Diastylis echinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diastyloides serrata	9	24	13	7	26	616	73	131	243	103	35	2	37	0
	Diastyloides biplicata	0	1	0	0	0	0	0	6	5	4	0	0	0	0
	Leptostylis longimana	12	2	1	0	11	19	0	6	0	0	0	0	0	0
	Eudorella truncatula	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanaidacea	Tanaidacea	1	1	0	1	0	11	0	0	0	0	0	0	0	0
Isopoda	Ianira maculosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pleurogonium inerme	0	0	0	0	0	0	0	0	0	0	3	0	0	0
	Macrostylis spinifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ischnosoma bispinosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma armatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma laterale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Munna sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Echinopleura aculeata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Munnopsis typica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurycope cornuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurycope phalangium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurycope sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ilyarachna longicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	2	0	0	0	0	0	0	0	0	0	0	5	0	0
	Lysianassidae	1	1	2	4	7	0	0	0	3	4	0	0	0	0
	Tryphosa hörringi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tryphosites longipes	0	0	0	0	0	75	5	0	5	0	0	0	0	15
	Harpinia crenulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae unident.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ampelisca spp.	0	0	0	0	0	3	0	0	0	0	0	0	0	0
	Stegocephalus inflatus	1	3	0	2	0	0	0	0	0	0	0	0	0	0
	Stegocephalus sp.	0	0	0	0	0	13	0	0	0	0	0	0	0	0
	Andaniexis abyssi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Andaniopsis nordlandica	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Amphilochidae	0	1	0	1	7	272	5	29	100	45	49	0	12	15
	Astyra abyssi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Stenothoidae	0	0	0	0	0	0	0	0	54	0	0	0	0	0
	Oediceridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Perioculodes longimanus	2	7	2	1	0	3	0	0	11	0	0	0	37	22
	Synchelidium haplocheles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium tenuimanum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium intermedium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Westwoodilla caecula	8	20	6	8	0	73	9	6	73	4	0	7	40	7
	Bathymedon longimanus	4	1	0	0	0	5	0	6	8	4	39	14	46	15
	Bathymedon saussurei	0	0	0	0	0	0	0	0	3	0	0	0	0	0
	Bruzelia spp.	2	1	2	0	0	0	0	0	0	0	0	0	0	0
	Halice abyssi	0	0	0	0	0	0	0	0	0	0	0	2	0	0
	Rhachotropis macropus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rhachotropis leucophthalma	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Apherusa bispinosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Apherusa sp.	0	0	0	0	0	5	0	0	0	0	0	0	0	0
	Melphidippa borealis	2	1	0	0	0	62	0	0	0	0	0	0	0	15
	Eriopisa elongata	0	0	0	0	0	0	0	0	6	0	0	4	0	0
	Cheirocratus intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cheirocratus sundewalli	0	0	0	0	0	0	0	6	0	0	0	0	0	0

Gråøyrenna

GRUPPER	ARTER/TAXA	G53	G59	G60	G61	G73	G81	G82	G84	G85	G86	G87	G88	G89	G90
	Cheirocratus sp.	0	0	0	0	0	0	0	6	0	0	0	0	0	0
	Gammaridae	0	0	0	0	0	0	0	6	3	0	0	0	0	0
	Photidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Podoceropsis sophiae	0	0	0	0	0	5	0	0	0	0	0	0	0	0
	Corophium bonelli	2	1	1	0	0	5	5	11	0	0	3	2	12	0
	Arrhis phyllonyx	79	69	21	39	0	3	0	0	0	0	0	0	0	0
	Monoculodes packardi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Halirages fulvocinctus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	0	1	0	5	0	1	0	11	0	0	0	1	0	0
	Thysanoessa raschi	0	0	0	2	0	261	0	6	0	0	0	0	0	7
	Thysanoessa inermis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decapoda	Crangon allmani	1	16	8	4	4	2	0	3	14	14	23	4	10	15
	Pontophilus norvegicus	13	16	51		4	3	0	6	2	2	5	1	1	9
	Spirontocaris lilljeborgi	0	5	1	1	0	2	0	0	4	2	1	1	3	9
	Lebbeus polaris	0	0	0	0	0	1	0	1	1	0	0	0	1	0
	Pandalus borealis	1	1	0	4	0	0	0	0	1	2	0	0	0	0
	Pandalus propinquus	0	1	0	0	0	0	0	0	12	0	0	0	0	0
	Pandalus borealis juv	1	1	0	0	0	0	0	206	188	19	0	42	38	197
	Pandalina profunda	3	1	0	30	4	27	1	86	40	224	108	7	125	547
	Pasiphaea tarda	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pandalus montagui	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Mollusca	Nudibranchiata	1	0	0	0	70	0	0	0	0	0	0	0	0	0
	Delectopecten vitreus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pseudamussium septemradiatum	2	0	1	1	0	0	0	0	0	0	0	0	0	0
	Abra nitida	0	0	0	0	0	0	0	0	560	0	0	2	0	0
	Thyasira sp	0	0	0	0	0	0	161	34	80	0	0	12	3	0
	Bivalvia unident	6	3	8	0	0	108	73	80	18	42	246	0	9	0
Echinodermata	Asteroida (larvae)	81	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ophiuroidea	4	3	6	0	19	0	0	40	45	425	246	5	34	0
	Echinoidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Holothuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tunicata	Ascidia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pisces	Myxine glutinosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lycenchelys sarsi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rhinonemus cimrius	0	0	0	0	0	0	0	0	1	0	0	0	0	0

GRUPPER	ARTER/TAXA	SD81	SD82	SD83	SD84	SD85	SD86	SD87	SD88	SD89
Foraminifera	Uidentifisert	154	3005	352	5522	14415	197	375	1065	1256
Coelenterata	Tesserogastria musculosa	10	5	245	0	0	2	179	92	0
	Aglantha digitale	0	0	0	0	0	0	0	21	0
Chaetognatha	Sagitta elegans	41	159	667	13	51	165	22	64	76
	Eukrohnia hamata	0	16	63	38	21	8	0	14	3
Polychaeta	Syllis sp.	5	330	6	50	34	4	0	7	0
	Nereimyra punctata	10	181	6	138	51	30	10	43	53
	Ophiodromus flexuosus	8	22	0	0	59	0	0	0	0
	Antinoella sarsi	5	5	0	0	386	61	36	248	17
	Harmothoe spp.	0	0	0	0	25	8	0	4	0
	Leanira tetragona	0	0	0	0	0	0	0	0	0
	Pholoe minuta	549	3736	239	2296	3242	224	26	174	435
	Phyllodocidae	8	66	0	6	8	0	2	35	8
	Nephtys spp.	0	0	0	0	0	0	0	0	0
	Lumbrineris spp.	5	681	13	25	51	0	0	43	79
	Sphaerodorum gracilis	0	0	0	0	0	0	0	0	0
	Spionidae	67	346	25	119	21	17	2	653	919
	Chaetozone setosa	23	154	0	264	64	0	12	18	8
	Flabelligeridae	13	0	0	69	30	2	0	71	0
	Scalibregmidae	0	27	0	748	2	1	0	4	0
	Opheliidae	3	44	0	0	8	4	0	0	8
	Capitella capitata	0	0	0	82	0	0	0	0	0
	Ampharete baltica	0	0	0	0	0	0	0	0	0
	Ampharete falcata	0	0	0	0	13	0	0	0	0
	Amphicteis gunneri	0	16	0	0	0	0	0	0	0
	Ampharete sp.	18	44	0	629	1792	0	0	71	14
	Melinna cristata	0	5	0	0	0	0	0	4	0
	Eupolymnia spp.	0	0	0	0	0	0	0	0	0
	Pista cristata	0	0	0	0	0	0	0	0	0
	Pectinaria spp.	0	0	0	0	0	0	0	4	0
	Thelepus spp.	0	0	0	0	0	0	0	0	0
	Trichobranchus spp.	0	0	0	0	0	0	0	0	0
	Terebellides stroemi	0	27	0	0	0	0	0	14	0
	Terebellidae sp.	5	93	0	0	34	6	28	0	45
	Sabellidae spp.	3	11	0	126	85	6	0	0	3
	Uidentifisert	8	720	0	220	8	70	43	99	34
	Hesionidae	0	0	0	0	0	0	0	0	0
	Aphroditidae unidentified	0	0	0	0	0	0	0	0	0
	Glyceridae	3	22	0	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	0	0	0	0	0
Ostracoda	Philomedes brenda	3	11	0	0	38	8	0	7	11
	Philomedes lilljeborgi	0	0	0	0	0	0	0	0	0
	Conchoecia elegans	0	0	0	0	0	0	0	0	0
	Conchoecia borealis	0	0	0	0	0	0	0	0	0
	Conchoecia obtusata	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0
	Macrocypris minna	0	0	0	0	0	0	0	0	0
	Macrocypria angusta	0	0	0	0	0	0	0	0	0
	Elofsonella concinna	0	0	0	0	0	0	0	0	0
	Eucytheridea punctillata	0	0	0	0	0	0	0	0	0
	Echinocythereis echinata	0	0	0	0	4	0	0	0	0
	Cythereis dunelmensis	0	0	0	0	17	0	0	0	0
	Hemicythere latimarginata	0	0	0	0	0	0	0	0	0
	Cythereis spp.	0	5	0	0	0	0	0	0	0
	Cytheropteron alatum	0	5	0	0	4	0	0	4	11
	Cythereis jonesi	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	0	0	0	0	72	110	48	46	84
	Calanus helgolandicus	0	0	0	0	68	15	0	4	56
	Calanus hyperboreus	0	0	0	0	8	80	0	0	8
	Calanus sp. juv.	508	302	1308	38	4	0	0	11	222
	Pseudocalanus elongatus	5	5	6	0	0	0	0	0	0
	Bradyidius bradyi	0	0	13	0	4	2	0	7	0
	Chiridius armatus	0	0	6	0	0	0	0	0	0
	Euchaeta norvegica	0	0	25	0	0	2	2	7	11
	Xanthocalanus fallax	0	0	0	0	0	0	0	0	0
	Xanthocalanus propinquus	0	0	0	0	0	0	0	0	0
	Xanthocalanus sp.	0	0	0	0	0	0	0	0	0
	Scolecithricella minor	0	0	0	0	0	0	0	0	0
	Diaixis hibernica	0	0	0	0	0	0	0	0	0
	Parastephos pallidus	0	0	0	0	0	0	0	0	0
	Tharybis macrophthalma	0	0	0	0	0	0	0	0	0
	Centropages hamatus	3	0	0	0	4	0	0	0	6
	Centropages typicus	0	0	0	0	0	0	0	0	978
	Temora longicornis	0	5	0	0	0	0	0	0	0
	Metridia longa	38	473	13	0	0	21	0	11	11
	Metridia lucens	0	0	0	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	SD81	SD82	SD83	SD84	SD85	SD86	SD87	SD88	SD89
	Pleuromamma robusta	0	0	0	0	0	0	0	0	0
	Heterorhabdus norvegicus	0	0	6	0	4	2	0	0	0
	Unidentified copepodites	0	0	0	0	0	0	0	0	0
	Harpacticoida	0	0	0	0	0	2	2	11	0
	Scottula inaequicornis	0	0	0	0	0	0	0	0	0
	Anomoclausia indrehusae	0	0	0	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	0	0	0	0	0	0	0	0	0
	Erythrops serrata	33	253	50	6	0	0	22	305	73
	Amblyops abbreviata	0	0	0	0	0	0	0	0	0
	Mysideis insignis	0	0	0	0	0	0	0	0	0
	Mysidopsis didelphys	0	0	0	0	0	0	0	0	0
Cumacea	Leucon acutirostris	3	0	0	0	0	0	0	7	0
	Leucon nasicus	3	0	0	0	0	0	2	4	0
	Leucon sp.	10	55	0	0	0	2	7	36	8
	Eudorella emarginata	0	0	0	0	0	0	5	14	14
	Campylaspis rubicunda	0	0	0	0	0	0	0	0	0
	Campylaspis costata	0	0	0	0	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0	0	0	0
	Campylaspis sp	0	0	0	0	0	0	0	0	0
	Diastylis lucifera	15	242	0	6	0	0	0	0	0
	Diastylis tumida	3	5	0	6	25	2	2	7	0
	Diastylis cornuta	3	11	0	0	0	0	0	4	0
	Diastylis echinata	0	0	0	0	0	4	0	0	0
	Diastyloides serrata	105	148	214	0	0	4	33	163	132
	Diastyloides biplicata	5	0	0	0	0	0	0	0	22
	Leptostylis longimana	0	0	0	0	0	0	0	0	0
	Eudorella truncatula	0	0	0	0	0	0	0	0	0
Tanaidacea	Tanaidacea	0	0	0	0	0	0	0	0	0
Isopoda	Ianira maculosa	0	0	0	0	0	0	0	0	0
	Pleurogonium inerme	0	0	0	0	0	0	0	0	0
	Macrostylis spinifera	0	0	0	0	0	0	0	0	0
	Ischnosoma bispinosum	0	0	0	0	0	0	0	0	0
	Desmosoma lineare	0	0	0	0	0	0	0	0	0
	Desmosoma armatum	0	0	0	0	0	0	0	0	0
	Desmosoma laterale	0	0	0	0	0	0	0	0	0
	Desmosoma sp.	0	0	0	0	0	0	0	0	0
	Munna sp.	0	0	0	0	0	0	0	0	0
	Echinopleura aculeata	0	0	0	0	0	0	0	0	0
	Munnopsis typica	0	0	0	0	0	0	0	0	0
	Eurycope cornuta	0	0	0	0	0	0	0	0	0
	Eurycope phalangium	0	0	0	0	0	0	0	0	0
	Eurycope sp.	0	0	0	0	0	0	0	0	0
	Ilyarachna longicornis	0	0	0	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	0	0	0	0	0	0	0	0	0
	Lysianassidae	0	0	0	0	0	0	0	0	0
	Tryphosa hörringi	0	0	0	0	0	0	0	0	0
	Tryphosites longipes	8	38	0	0	8	0	0	28	17
	Harpinia crenulata	0	0	0	0	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0	0	0	0
	Phoxocephalidae unident.	0	0	0	0	0	0	0	0	0
	Ampelisca spp.	0	0	0	0	0	0	0	0	0
	Stegocephalus inflatus	0	0	0	0	0	0	0	0	0
	Stegocephalus sp	0	0	0	0	0	0	0	0	0
	Andaniexis abyssi	0	0	0	0	0	0	0	0	0
	Andaniopsis nordlandica	0	0	0	0	0	0	0	0	0
	Amphilochidae	41	5	0	0	21	4	10	32	28
	Astyra abyssi	0	0	0	0	0	0	0	0	0
	Stenothoidae	0	0	0	0	0	0	0	0	0
	Oediceridae	0	0	0	0	0	0	0	0	0
	Perioculodes longimanus	0	0	0	0	0	0	0	0	0
	Synchelidium haplocheles	0	0	0	0	0	0	0	0	0
	Synchelidium tenuimanum	0	0	0	0	0	0	0	0	0
	Synchelidium intermedium	0	0	0	0	0	0	0	0	0
	Synchelidium sp.	0	0	0	0	0	0	0	0	0
	Westwoodilla caecula	0	0	0	6	0	0	0	11	0
	Bathymedon longimanus	0	0	0	0	0	0	0	0	0
	Bathymedon saussurei	0	0	0	0	0	0	0	0	0
	Bruzelia spp.	0	0	0	0	0	0	0	0	0
	Halice abyssi	0	0	0	0	0	0	0	0	0
	Rhachotropis macropus	0	0	0	0	0	0	0	0	0
	Rhachotropis leucophthalma	0	0	0	0	0	0	0	0	0
	Apherusa bispinosa	0	0	0	0	0	2	0	0	0
	Apherusa sp.	0	0	0	0	0	2	0	0	0
	Melphidippa borealis	0	0	6	0	0	0	0	0	0
	Eriopisa elongata	0	0	0	0	0	0	0	0	0
	Cheirocratus intermedius	3	0	0	0	0	2	0	0	0
	Cheirocratus sundewalli	0	0	0	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	SD81	SD82	SD83	SD84	SD85	SD86	SD87	SD88	SD89
	Cheirocratus sp.	0	0	0	0	0	0	0	0	0
	Gammaridae	0	0	0	0	4	0	0	0	25
	Photidae	3	0	0	0	0	2	0	11	6
	Podoceropsis sophiae	0	0	0	0	0	0	0	0	0
	Corophium bonelli	0	0	0	0	0	0	2	4	0
	Arrhis phyllonyx	0	0	0	0	0	0	0	0	0
	Monoculodes packardi	0	0	0	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	0	0	0	0
	Halirages fulvocinctus	0	0	0	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	5	1	6	1	0	6	8	7	84
	Thysanoessa raschi	13	0	1	3	0	1	1	0	45
	Thysanoessa inermis	0	0	0	0	1	1	0	0	0
Decapoda	Crangon allmani	3	0	0	0	0	2	2	1	19
	Pontophilus norvegicus	0	0	0	0	0	1	1	1	1
	Spirontocaris lilljeborgi	0	0	1	0	0	2	2	0	10
	Lebbeus polaris	0	0	0	0	0	0	0	0	2
	Pandalus borealis	0	0	3	0	0	1	1	1	0
	Pandalus propinquus	0	0	0	0	1	1	0	0	1
	Pandalus borealis juv	0	1	0	2	7	1	0	48	6
	Pandalina profunda	5	2	0	0	1	20	53	4	8
	Pasiphaea tarda	0	0	0	0	0	0	0	0	0
	Pandalus montagui	0	0	0	0	0	0	0	0	0
Mollusca	Nudibranchiata	0	0	0	0	0	0	0	0	0
	Delectopecten vitreus	0	0	0	0	4	0	0	1	11
	Pseudamussium septemradiatum	3	0	1	0	0	2	4	3	0
	Abra nitida	0	0	0	0	8	0	0	69	28
	Thyasira sp.	21	99	0	38	93	0	0	28	87
	Bivalvia unident	77	440	13	0	102	8	0	14	0
Echinodermata	Asteroida (larvae)	0	0	0	0	0	0	0	0	0
	Ophiuroidea	3	0	6	44	30	108	34	124	160
	Echinoidea	0	0	0	0	0	0	0	0	0
	Holothuroidea	0	0	0	0	0	0	0	0	0
Tunicata	Ascidia	0	0	0	4	17	2	0	1	1
Pisces	Myxine glutinosa	0	0	0	0	0	0	0	0	0
	Lycenchelys sarsi	0	0	0	0	0	0	0	0	0
	Rhinonemus cimbrius	0	0	0	0	0	1	1	1	0

GRUPPER	ARTER/TAXA	VH81	VH82	VH83	VH84	VH85	VH86	VH87	VH88	VH89	VH90
Foraminifera	Uidentifisert	603	17210	8816	4439	4665	5092	2127	2905	596	3103
Coelenterata	Tesserogastria musculosa	0	62	977	1	0	0	11	0	65	0
	Aglantha digitale	0	0	0	0	0	0	0	0	0	0
Chaetognatha	Sagitta elegans	43	123	230	83	51	188	104	52	151	80
	Eukrohnia hamata	4	25	34	0	0	0	0	0	5	11
Polychaeta	Syllis sp.	26	111	0	0	604	54	7	104	0	11
	Nereimyra punctata	103	185	34	0	51	77	33	300	39	46
	Ophiodromus flexuosus	13	12	34	0	25	3	0	0	5	0
	Antinoella sarsi	4	12	46	19	76	71	19	439	16	74
	Harmothoe spp.	0	0	0	0	0	36	19	0	0	0
	Leanira tetragona	0	0	0	0	0	0	0	0	0	0
	Pholoe minuta	4483	4975	4598	13	4670	539	598	1409	133	417
	Phyllodocidae	0	4	46	0	0	0	26	12	3	11
	Nephtys spp.	4	0	0	0	0	0	0	0	0	0
	Lumbrineris spp.	13	0	11	0	5	0	7	427	34	91
	Sphaerodorum gracilis	0	0	0	0	0	0	0	0	0	0
	Spionidae	991	222	126	936	254	250	15	346	188	400
	Chaetozone setosa	73	309	23	13	360	173	119	641	8	69
	Flabelligeridae	0	0	11	57	0	15	0	40	23	23
	Scalibregmidae	4	62	23	3134	437	42	19	12	0	23
	Opheliidae	13	12	23	13	10	0	0	6	0	0
	Capitella capitata	0	0	989	873	0	0	52	0	0	0
	Ampharete baltica	0	0	0	0	5	0	0	64	0	0
	Ampharete falcata	0	0	0	0	0	0	0	40	0	0
	Amphicteis gunneri	0	12	0	0	0	15	0	52	0	6
	Ampharete sp.	69	62	57	726	76	6	6	479	34	137
	Melinna cristata	0	49	0	0	0	13	82	35	3	6
	Eupolymnia spp.	0	0	0	0	5	0	0	12	0	0
	Pista cristata	0	0	0	0	15	0	0	23	0	0
	Pectinaria spp.	0	0	0	6	15	0	0	0	0	0
	Thelepus spp.	0	0	0	0	0	0	0	0	0	0
	Trichobranchus spp.	0	0	0	0	0	0	0	5	0	0
	Terebellides stroemi	0	37	0	0	0	0	0	6	0	6
	Terebellidae sp.	99	12	0	153	457	167	26	312	8	40
	Sabellidae spp.	129	12	0	516	721	152	11	92	13	46
	Uidentifisert	9	617	345	25	102	74	453	29	21	126
	Hesionidae	0	0	0	0	0	0	0	0	0	0
	Aphroditidae unidentified	0	0	0	0	0	0	0	0	0	0
	Glyceridae	0	0	0	0	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	0	0	0	0	0	0
Ostracoda	Philomedes brenda	0	0	23	0	20	3	4	17	3	11
	Philomedes lilljeborgi	0	0	0	0	0	0	0	0	0	0
	Conchoecia elegans	0	0	0	0	0	0	0	0	0	0
	Conchoecia borealis	0	0	0	0	0	0	0	0	0	0
	Conchoecia obtusata	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0
	Macrocypris minna	0	0	0	0	0	0	0	0	0	0
	Macrocypria angusta	0	0	0	0	0	0	0	0	0	0
	Elofsonella concinna	0	0	0	0	0	0	0	0	0	0
	Eucytheridea punctillata	0	0	0	0	0	0	0	0	0	0
	Echinocythereis echinata	0	0	0	0	0	0	0	0	0	0
	Cythereis dunelmensis	0	12	11	0	0	0	0	0	0	0
	Hemicythere latimarginata	0	0	0	0	0	0	0	0	0	0
	Cythereis spp.	0	0	0	0	0	0	0	6	0	0
	Cytheropteron alatum	0	0	0	0	0	0	4	0	0	0
	Cythereis jonesi	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	0	0	0	0	10	42	4	58	131	0
	Calanus helgolandicus	0	0	0	0	0	3	4	18	172	0
	Calanus hyperboreus	0	0	0	0	0	158	0	0	0	0
	Calanus sp. juv.	22	383	207	32	0	15	163	0	83	811
	Pseudocalanus elongatus	0	37	11	0	0	0	0	0	0	0
	Bradyidius bradyi	0	0	0	0	10	3	0	0	3	0
	Chiridius armatus	0	0	0	0	0	0	0	0	0	0
	Euchaeta norvegica	0	0	23	0	0	3	19	6	0	0
	Xanthocalanus fallax	0	0	0	0	0	0	0	0	0	0
	Xanthocalanus propinquus	0	0	0	0	0	0	0	0	0	0
	Xanthocalanus sp.	0	0	0	0	0	0	0	0	0	0
	Scolecithricella minor	0	0	0	0	0	0	0	0	0	0
	Diaixis hibernica	0	0	0	0	0	0	0	0	0	0
	Parastephos pallidus	4	0	0	0	0	0	0	0	0	0
	Tharybis macrophthalma	0	0	0	0	0	0	0	0	0	0
	Centropages hamatus	9	0	0	6	0	0	0	6	3	0
	Centropages typicus	13	0	0	0	0	0	0	0	191	0
	Temora longicornis	0	12	0	0	5	0	0	0	3	0
	Metridia longa	13	333	126	0	35	84	37	18	3	40
	Metridia lucens	0	0	0	0	0	0	0	0	3	6

GRUPPER	ARTER/TAXA	VH81	VH82	VH83	VH84	VH85	VH86	VH87	VH88	VH89	VH90
	Pleuromamma robusta	0	0	0	0	0	0	0	0	0	0
	Heterorhabdus norvegicus	0	0	0	0	0	0	0	0	5	0
	Unidentified copepodites	0	0	0	0	0	0	0	0	0	0
	Harpacticoida	0	0	0	0	5	3	0	6	3	6
	Scottula inaequicornis	0	0	0	0	0	0	0	0	0	0
	Anomoclausia indrehusae	0	0	0	0	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	0	0	0	0	0	0	0	0	0	0
	Erythrops serrata	0	0	1	0	0	0	0	0	55	29
	Amblyops abbreviata	0	0	0	0	0	0	0	0	0	0
	Mysideis insignis	0	0	0	0	0	0	0	0	0	0
	Mysidopsis didelphys	0	0	0	0	0	0	0	0	0	0
Cumacea	Leucon acutirostris	0	0	0	0	0	0	0	0	0	0
	Leucon nasicus	0	0	0	0	0	0	0	0	0	0
	Leucon sp.	0	0	0	0	0	0	0	0	0	0
	Eudorella emarginata	0	0	0	0	0	0	0	0	0	0
	Campylaspis rubicunda	0	0	0	0	0	0	0	0	0	0
	Campylaspis costata	0	0	0	0	0	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0	0	0	0	0
	Campylaspis sp	0	0	0	0	0	0	0	0	0	0
	Diastylis lucifera	0	0	563	0	10	0	0	0	0	0
	Diastylis tumida	4	0	0	6	0	0	4	6	0	0
	Diastylis cornuta	0	0	0	0	0	0	0	0	0	0
	Diastylis echinata	0	0	0	0	5	0	0	0	0	0
	Diastyloides serrata	22	148	103	0	0	0	4	0	5	6
	Diastyloides biplicata	9	12	0	0	0	0	4	0	3	6
	Leptostylis longimana	0	0	0	0	0	0	0	0	0	0
	Eudorella truncatula	0	0	0	0	0	0	0	0	0	0
Tanaidacea	Tanaidacea	0	0	0	0	0	0	0	0	0	0
Isopoda	Ianira maculosa	0	0	0	0	0	0	0	0	0	0
	Pleurogonium inerme	0	0	0	0	0	0	0	0	0	0
	Macrostylis spinifera	0	0	0	0	0	0	0	0	0	0
	Ischnosoma bispinosum	0	0	0	0	0	0	0	0	0	0
	Desmosoma lineare	0	0	0	0	0	0	0	0	0	0
	Desmosoma armatum	0	0	0	0	0	0	0	0	0	0
	Desmosoma laterale	0	0	0	0	0	0	0	0	0	0
	Desmosoma sp.	0	0	0	0	0	0	0	0	0	0
	Munna sp.	0	0	0	0	0	0	0	0	0	0
	Echinopleura aculeata	0	0	0	0	0	0	0	0	0	0
	Munnopsis typica	0	0	0	0	0	0	0	0	0	0
	Eurycope cornuta	0	0	0	0	0	0	0	0	0	0
	Eurycope phalangium	0	0	0	0	0	0	0	0	0	0
	Eurycope sp.	0	0	0	0	0	0	0	0	0	0
	Ilyarachna longicornis	0	0	0	0	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	0	0	0	0	0	0	0	0	0	0
	Lysianassidae	0	0	0	0	0	0	0	0	0	0
	Tryphosa hörringi	0	0	0	0	0	0	0	0	0	0
	Tryphosites longipes	4	12	11	0	0	0	0	0	5	17
	Harpinia crenulata	0	0	0	0	0	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae unident.	0	0	0	0	0	0	0	0	0	0
	Ampelisca spp.	0	0	0	0	0	0	0	0	0	0
	Stegocephalus inflatus	0	0	0	0	0	0	0	0	0	0
	Stegocephalus sp.	0	0	0	0	0	0	0	0	0	0
	Andaniexis abyssi	0	0	0	0	0	0	0	0	0	0
	Andaniopsis nordlandica	0	0	0	0	0	0	0	0	0	0
	Amphilochidae	226	37	34	0	5	0	0	23	23	57
	Astyra abyssi	0	0	0	0	0	0	0	0	0	0
	Stenothoidae	0	0	0	0	0	0	0	0	0	0
	Oediceridae	0	0	0	0	0	0	0	0	0	0
	Perioculodes longimanus	0	0	0	0	0	0	0	0	0	0
	Synchelidium haplocheles	0	0	0	0	0	0	0	0	0	0
	Synchelidium tenuimanum	0	0	0	0	0	0	0	0	0	0
	Synchelidium intermedium	0	0	0	0	0	0	0	0	0	0
	Synchelidium sp.	0	0	0	0	0	0	0	0	0	0
	Westwoodilla caecula	0	0	0	0	0	0	0	0	0	0
	Bathymedon longimanus	0	0	0	0	0	0	0	0	0	0
	Bathymedon saussurei	0	0	0	0	0	0	0	0	0	0
	Bruzelia spp.	0	0	0	0	0	0	0	0	0	0
	Halice abyssi	0	0	0	0	0	0	0	0	0	0
	Rhachotropis macropus	0	0	0	0	0	0	0	0	0	0
	Rhachotropis leucophthalma	0	0	0	0	0	0	0	0	0	0
	Apherusa bispinosa	0	0	0	0	0	6	0	0	0	0
	Apherusa sp.	0	0	0	0	0	0	0	0	0	0
	Melphidippa borealis	0	0	0	0	0	0	0	0	0	0
	Eriopisa elongata	0	0	0	0	0	0	0	0	0	0
	Cheirocratus intermedius	0	0	0	0	0	0	0	0	0	6
	Cheirocratus sundewalli	0	0	0	0	0	0	0	0	0	6

GRUPPER	ARTER/TAXA	VH81	VH82	VH83	VH84	VH85	VH86	VH87	VH88	VH89	VH90
	Cheirocratus sp.	0	37	0	0	0	0	0	0	0	29
	Gammaridae	0	0	0	0	0	0	0	0	0	0
	Photidae	0	0	0	0	0	0	0	0	0	6
	Podoceropsis sophiae	0	0	0	0	0	3	11	12	0	0
	Corophium bonelli	4	0	0	6	0	12	0	0	0	0
	Arrhis phyllonyx	0	0	0	0	0	0	0	0	0	0
	Monoculodes packardi	0	0	0	0	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	0	0	0	0	0
	Halirages fulvocinctus	0	0	0	0	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	3	17	0	10	4	15	8	20	3	6
	Thysanoessa raschi	3	0	3	14	0	0	2	0	0	0
	Thysanoessa inermis	4	0	0	1	0	0	2	0	0	0
Decapoda	Crangon allmani	0	1	0	0	0	0	1	2	2	1
	Pontophilus norvegicus	0	0	0	0	0	0	1	0	1	0
	Spirontocaris lilljeborgi	0	0	0	0	0	0	0	0	2	1
	Lebbeus polaris	0	0	0	0	0	0	0	1	1	0
	Pandalus borealis	0	0	0	0	0	0	1	0	0	0
	Pandalus propinquus	0	0	0	0	0	0	0	0	0	0
	Pandalus borealis juv	0	0	0	4	0	0	0	16	7	29
	Pandalina profunda	8	0	0	0	0	9	5	0	12	74
	Pasiphaea tarda	0	0	0	0	0	0	0	0	0	0
	Pandalus montagui	0	0	0	0	0	0	0	0	0	0
Mollusca	Nudibranchiata	0	0	0	1	15	9	0	0	0	0
	Delectopecten vitreus	0	0	0	0	0	0	0	40	0	6
	Pseudamussium septemradiatum	28	23	2	0	15	60	16	14	1	12
	Abra nitida	0	0	0	0	86	0	0	219	3	29
	Thyasira sp.	22	395	0	0	462	0	0	254	34	29
	Bivalvia unident	26	358	149	32	25	83	24	52	0	0
Echinodermata	Asteroida (larvae)	0	0	0	0	0	0	0	0	0	0
	Ophiuroidea	0	12	0	62	86	51	163	69	18	51
	Echinoidea	0	0	0	0	0	0	0	0	0	0
	Holothuroidea	0	0	0	0	0	0	0	0	0	0
Tunicata	Ascidia	17	2	0	20	365	24	11	27	4	6
Pisces	Myxine glutinosa	0	0	0	0	0	0	0	0	0	0
	Lycenchelys sarsi	0	0	0	0	0	0	0	0	0	0
	Rhinonemus cimbrius	0	0	0	0	0	0	0	0	1	0

GRUPPER	ARTER/TAXA	ST73	ST81	ST82	ST83	ST84	ST85	ST86	ST87	ST88	ST89	ST90
Foraminifera	Uidentifisert	1639	574	13144	5430	4284	9369	1716	402	335	1178	2095
Coelenterata	Tesserogastria musculosa	0	0	0	0	0	0	0	0	0	7	0
	Aglantha digitale	0	0	0	0	0	0	0	0	0	0	0
Chaetognatha	Sagitta elegans	0	37	21	316	157	78	470	350	57	152	289
	Eukrohnia hamata	0	7	0	0	10	20	27	0	0	7	11
Polychaeta	Syllis sp.	0	2	113	63	15	336	18	16	20	3	0
	Nereimyra punctata	24	6	165	44	25	16	48	72	74	62	11
	Ophiodromus flexuosus	30	2	10	0	0	4	0	0	0	48	21
	Antinoella sarsi	0	0	10	6	25	160	24	4	548	48	16
	Harmothoe spp.	0	0	0	0	0	4	24	52	12	7	0
	Leanira tetragona	0	0	0	0	0	0	0	0	0	0	0
	Pholoe minuta	0	237	4103	3386	15	1270	132	299	531	1205	305
	Phyllodocidae	0	4	134	32	0	4	3	1	0	0	0
	Nephtys spp.	0	0	0	0	0	0	0	0	0	0	5
	Lumbrineris spp.	0	0	0	32	15	0	24	0	110	48	26
	Sphaerodorum gracilis	0	0	0	0	0	0	0	0	0	0	0
	Spionidae	6	531	670	253	614	25	9	0	397	820	521
	Chaetozone setosa	96	21	206	13	10	61	12	0	57	7	21
	Flabelligeridae	0	0	21	0	46	70	15	0	20	62	11
	Scalibregmidae	0	0	186	6	3751	205	27	8	16	14	0
	Opheliidae	0	0	155	0	76	0	0	0	0	3	0
	Capitella capitata	0	0	268	0	325	0	3	4	0	0	11
	Ampharete baltica	0	0	0	0	0	0	0	0	0	0	0
	Ampharete falcata	0	0	0	0	0	0	0	0	0	0	0
	Amphicteis gunneri	0	0	0	0	0	0	0	0	0	0	5
	Ampharete sp.	0	6	21	13	127	74	0	0	16	0	105
	Melinna cristata	0	0	0	0	0	0	3	20	16	0	0
	Eupolymnia spp.	0	0	0	0	0	0	0	0	12	3	0
	Pista cristata	0	0	0	0	5	0	0	0	16	0	0
	Pectinaria spp.	0	0	0	0	0	0	0	0	0	0	0
	Thelepus spp.	0	0	0	0	0	0	0	0	37	0	0
	Trichobranchus spp.	0	0	0	0	0	0	0	0	0	0	0
	Terebellides stroemi	0	0	0	6	0	4	0	0	0	0	0
	Terebellidae sp.	0	9	155	82	0	234	99	121	33	28	0
	Sabellidae spp.	0	4	21	44	548	115	105	44	16	7	32
	Uidentifisert	18	4	959	101	10	139	96	203	37	21	105
	Hesionidae	0	0	0	0	0	0	0	0	0	0	0
	Aphroditidae unidentified	0	0	0	0	0	0	0	0	0	0	0
	Glyceridae	0	0	21	6	0	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	Philomedes brenda	0	0	0	0	0	4	0	4	0	10	5
	Philomedes lilljeborgi	0	0	0	0	0	0	0	0	0	0	0
	Conchoecia elegans	0	0	0	0	0	0	0	0	0	0	0
	Conchoecia borealis	0	0	0	0	0	0	0	0	0	0	0
	Conchoecia obtusata	0	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0	0
	Macrocypris minna	0	0	0	0	0	0	0	0	0	0	0
	Macrocypria angusta	0	0	0	0	0	0	0	0	0	0	0
	Elofsonella concinna	0	0	0	0	0	0	0	0	0	0	0
	Eucytheridea punctillata	0	0	0	0	0	0	0	0	0	0	0
	Echinocythereis echinata	0	0	0	0	5	0	0	0	0	0	0
	Cythereis dunelmensis	0	0	21	0	5	0	1	0	0	3	5
	Hemicythere latimarginata	0	0	0	0	0	0	0	0	0	0	0
	Cythereis spp.	0	0	0	0	0	0	0	0	4	0	0
	Cytheropteron alatum	0	0	0	0	0	0	0	0	0	21	0
	Cythereis jonesi	0	0	0	0	0	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	0	0	10	0	0	28	75	0	0	110	0
	Calanus helgolandicus	0	0	0	0	0	0	12	426	8	83	0
	Calanus hyperboreus	0	0	0	0	0	0	181	0	0	0	0
	Calanus sp. juv.	645	123	0	329	25	0	51	0	8	110	495
	Pseudocalanus elongatus	0	0	0	0	0	0	1	0	0	0	0
	Bradyidius bradyi	0	0	0	0	0	4	3	0	0	7	5
	Chiridius armatus	0	0	0	0	0	0	0	0	0	0	0
	Euchaeta norvegica	0	9	0	25	0	0	12	20	0	3	0
	Xanthocalanus fallax	0	0	0	0	0	0	0	0	0	0	0
	Xanthocalanus propinquus	0	0	0	0	0	0	0	0	0	0	0
	Xanthocalanus sp	0	0	0	0	0	0	0	0	0	0	0
	Scolecithricella minor	0	0	0	0	0	0	0	0	0	0	0
	Diaixis hibernica	0	0	0	0	0	0	0	0	0	0	0
	Parastephos pallidus	0	0	0	0	0	0	0	0	0	0	0
	Tharybis macrophthalma	0	0	0	0	0	0	0	0	0	0	0
	Centropages hamatus	0	0	0	0	0	0	0	0	0	0	0
	Centropages typicus	0	0	0	0	0	0	0	0	4	138	32
	Temora longicornis	0	0	0	0	0	0	0	0	0	0	0
	Metridia longa	0	2	31	76	5	74	75	60	28	0	11
	Metridia lucens	0	0	0	0	0	0	3	0	0	0	0

GRUPPER	ARTER/TAXA	ST73	ST81	ST82	ST83	ST84	ST85	ST86	ST87	ST88	ST89	ST90
	Pleuromamma robusta	0	0	0	13	0	0	3	0	0	0	0
	Heterorhabdus norvegicus	0	0	0	0	0	0	0	0	0	0	0
	Unidentified copepodites	0	0	0	0	0	0	0	0	0	0	0
	Harpacticoida	0	0	0	0	0	0	3	0	12	10	0
	Scottula inaequicornis	0	0	0	0	0	0	0	0	0	0	0
	Anomoclausia indrehusae	0	0	0	0	0	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	0	0	0	0	0	0	0	0	0	0	0
	Erythrops serrata	0	0	0	0	0	0	0	0	0	116	5
	Amblyops abbreviata	0	0	0	0	0	0	0	0	0	0	0
	Mysideis insignis	0	0	0	0	0	0	0	0	0	0	0
	Mysidopsis didelphys	0	0	0	0	0	0	0	0	0	0	0
Cumacea	Leucon acutirostris	0	0	0	0	0	0	0	0	0	0	0
	Leucon nasicus	0	0	0	0	0	0	0	0	0	0	0
	Leucon sp.	0	0	0	0	0	0	0	0	0	0	0
	Eudorella emarginata	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis rubicunda	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis costata	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0	0	0	0	0	0
	Campylaspis sp	0	0	0	0	0	0	0	0	0	0	0
	Diastylis lucifera	0	0	0	6	5	0	0	0	0	0	0
	Diastylis tumida	0	0	0	0	0	0	0	0	0	0	0
	Diastylis cornuta	0	0	0	0	0	0	0	0	0	0	0
	Diastylis echinata	0	0	0	0	0	0	0	0	0	0	0
	Diastyloides serrata	0	0	0	0	0	0	0	0	0	0	0
	Diastyloides biplicata	0	0	0	0	0	0	0	0	0	0	0
	Leptostylis longimana	0	0	0	0	0	0	0	0	0	3	0
	Eudorella truncatula	0	0	0	0	0	0	0	0	0	3	0
Tanaidacea	Tanaidacea	0	0	0	0	0	4	0	0	0	0	0
Isopoda	Ianira maculosa	0	0	0	0	0	0	0	0	0	0	0
	Pleurogonium inerme	0	0	0	0	0	0	0	0	0	0	0
	Macrostylis spinifera	0	0	0	0	0	0	0	0	0	0	0
	Ischnosoma bispinosum	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma lineare	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma armatum	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma laterale	0	0	0	0	0	0	0	0	0	0	0
	Desmosoma sp.	0	0	0	0	0	0	0	0	0	0	0
	Munna sp.	0	0	0	0	0	0	0	0	0	0	0
	Echinopleura aculeata	0	0	0	0	0	0	0	0	0	0	0
	Munnopsis typica	0	0	0	0	0	0	0	0	0	0	0
	Eurycope cornuta	0	0	0	0	0	0	0	0	0	0	0
	Eurycope phalangium	0	0	0	0	0	0	0	0	0	0	0
	Eurycope sp.	0	0	0	0	0	0	0	0	0	0	0
	Ilyarachna longicornis	0	0	0	0	0	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	0	0	0	0	0	0	0	0	0	0	0
	Lysianassidae	0	0	0	0	0	0	0	0	0	0	0
	Tryphosa hörringi	0	0	0	0	0	0	0	0	0	0	0
	Tryphosites longipes	0	0	0	0	0	0	0	0	0	38	26
	Harpinia crenulata	0	0	0	0	0	0	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae unident.	0	0	0	0	0	0	0	0	0	0	0
	Ampelisca spp.	0	0	0	0	0	0	0	0	0	0	0
	Stegocephalus inflatus	0	0	0	0	0	0	0	0	0	0	0
	Stegocephalus sp.	0	0	0	0	0	0	0	0	0	0	0
	Andaniexis abyssi	0	0	0	0	0	0	0	0	0	0	0
	Andaniopsis nordlandica	0	0	0	0	0	0	0	0	0	0	0
	Amphilochidae	0	0	27	38	0	0	0	12	12	186	37
	Astyra abyssi	0	0	0	0	0	0	0	0	0	0	0
	Stenothoidae	0	0	0	0	0	0	0	0	0	0	0
	Oediceridae	0	0	0	0	0	0	0	0	0	0	0
	Perioculodes longimanus	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium haplocheles	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium tenuimanum	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium intermedium	0	0	0	0	0	0	0	0	0	0	0
	Synchelidium sp.	0	0	0	0	0	0	0	0	0	0	0
	Westwoodilla caecula	0	0	0	0	0	0	0	0	0	0	0
	Bathymedon longimanus	0	0	0	0	0	0	0	0	0	0	0
	Bathymedon saussurei	0	0	0	0	0	0	0	0	0	0	0
	Bruzelia spp.	0	0	0	0	0	0	0	0	0	0	0
	Halice abyssi	0	0	0	0	0	0	0	0	0	0	0
	Rhachotropis macropus	0	0	0	0	0	0	0	0	0	0	0
	Rhachotropis leucophthalma	0	0	0	0	0	0	0	0	0	0	0
	Apherusa bispinosa	0	0	10	6	0	8	9	8	4	0	0
	Apherusa sp.	0	0	0	0	0	0	0	0	0	0	0
	Melphidippa borealis	0	0	0	0	0	0	0	0	0	0	0
	Eriopisa elongata	0	0	0	0	0	0	0	0	0	0	0
	Cheirocratus intermedius	0	0	0	0	0	0	0	0	0	0	0
	Cheirocratus sundewalli	0	0	0	0	0	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	ST73	ST81	ST82	ST83	ST84	ST85	ST86	ST87	ST88	ST89	ST90
	Cheirocratus sp.	0	0	0	0	0	0	0	0	0	0	0
	Gammaridae	0	0	0	0	0	0	0	0	0	0	0
	Photidae	0	0	0	6	0	0	0	0	0	0	0
	Podoceropsis sophiae	0	0	0	0	0	0	0	8	0	17	0
	Corophium bonelli	0	0	0	0	0	0	0	0	0	0	0
	Arrhis phyllonyx	0	0	0	0	0	0	0	0	0	0	0
	Monoculodes packardi	0	0	0	0	0	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	0	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	0	0	0	0	0	0
	Halirages fulvocinctus	0	0	0	0	0	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	0	4	4	25	11	0	30	96	50	0	10
	Thysanoessa raschi	0	2	1	209	2	0	6	2	0	0	0
	Thysanoessa inermis	1	1	1	0	0	0	0	0	1	0	0
Decapoda	Crangon allmani	0	0	0	0	0	0	0	0	1	1	1
	Pontophilus norvegicus	0	0	0	0	0	0	1	0	0	0	0
	Spirontocaris lilljeborgi	0	0	0	0	0	0	0	1	0	0	0
	Lebbeus polaris	0	0	0	0	0	0	0	0	0	0	1
	Pandalus borealis	0	0	0	1	0	1	1	0	0	0	1
	Pandalus propinquus	0	0	0	0	0	0	0	0	0	0	0
	Pandalus borealis juv	0	0	0	1	1	0	3	0	15	12	5
	Pandalina profunda	0	0	2	0	0	1	5	12	2	8	6
	Pasiphaea tarda	0	0	0	0	0	0	0	0	0	0	0
	Pandalus montagui	0	0	0	0	0	0	0	0	0	0	0
Mollusca	Nudibranchiata	0	0	0	0	5	0	15	1	25	0	0
	Delectopecten vitreus	0	0	0	0	0	0	0	0	11	3	5
	Pseudamussium septemradiatum	0	3	19	6	0	8	45	73	13	17	7
	Abra nitida	0	0	0	13	10	53	0	0	0	7	11
	Thyasira sp.	0	0	1289	95	36	143	0	0	0	0	26
	Bivalvia unident	0	17	258	316	76	74	54	43	143	14	0
Echinodermata	Asteroida (larvae)	0	0	0	0	0	0	3	0	0	0	0
	Ophiuroidea	0	0	0	6	5	20	48	43	4	65	5
	Echinoidea	0	0	0	0	0	0	0	0	0	0	0
	Holothuroidea	0	0	0	0	0	0	0	0	0	0	0
Tunicata	Ascidia	0	0	3	4	4	215	18	29	4	14	9
Pisces	Myxine glutinosa	0	0	0	0	0	0	0	0	0	0	0
	Lycenchelys sarsi	0	0	0	0	0	0	0	0	0	0	0
	Rhinonemus cimbrius	0	0	0	0	0	0	0	0	0	0	1

Svartskog

GRUPPER	ARTER/TAXA	SS85	SS86	SS87	SS88	SS89	SS90
Foraminifera	Uidentifisert	36	71	0	9	13	30
Coelenterata	Tesserogastria musculosa	0	0	0	0	0	0
	Aglantha digitale	0	0	0	0	0	0
Chaetognatha	Sagitta elegans	4	6	0	6	4	0
	Eukrohnia hamata	0	3	0	0	0	0
Polychaeta	Syllis sp.	0	0	1	0	0	0
	Nereimyra punctata	0	42	0	0	0	0
	Ophiodromus flexuosus	0	0	0	0	0	0
	Antinoella sarsi	0	0	1	0	0	0
	Harmothoe spp.	0	0	0	0	0	0
	Leanira tetragona	0	0	0	0	0	0
	Pholoe minuta	0	3	0	0	0	0
	Phyllodocidae	0	0	0	0	0	0
	Nephtys spp.	0	0	0	4	0	0
	Lumbrineris spp.	44	0	0	0	0	0
	Sphaerodorum gracilis	0	0	0	0	0	0
	Spionidae	0	13	1	0	0	0
	Chaetozone setosa	0	0	0	0	0	0
	Flabelligeridae	0	0	0	0	0	0
	Scalibregmidae	0	0	0	0	0	0
	Ophelidae	0	0	0	0	0	0
	Capitella capitata	347	1017	1	0	0	0
	Ampharete baltica	0	0	0	0	0	0
	Ampharete falcata	0	0	0	0	0	0
	Amphicteis gunneri	0	0	0	0	0	0
	Ampharete sp.	0	0	0	0	0	0
	Melinna cristata	0	0	0	0	0	0
	Eupolymnia spp.	0	0	0	0	0	0
	Pista cristata	0	0	0	0	0	0
	Pectinaria spp.	0	0	0	0	0	0
	Thelepus spp.	0	0	0	0	0	0
	Trichobranchus spp.	0	0	0	0	0	0
	Terebellides stroemi	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0
	Sabellidae spp.	0	0	0	0	0	0
	Uidentifisert	0	10	0	0	4	0
	Hesionidae	0	0	0	0	0	0
	Aphroditidae unidentified	0	0	0	0	0	0
	Glyceridae	0	0	0	0	0	0
	Heteromastus sp.	0	0	0	0	0	0
Ostracoda	Philomedes brenda	0	0	0	0	0	0
	Philomedes lilljeborgi	0	0	0	0	0	0
	Conchoecia elegans	0	0	0	0	0	0
	Conchoecia borealis	0	0	0	0	0	0
	Conchoecia obtusata	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0
	Macrocypris minna	0	0	0	0	0	0
	Macrocypria angusta	4	0	0	0	0	0
	Elofsonella concinna	0	0	0	0	0	0
	Eucytheridea punctillata	0	0	0	0	0	0
	Echinocythereis echinata	0	0	0	0	0	0
	Cythereis dunelmensis	0	0	0	0	0	0
	Hemicythere latimarginata	0	0	0	0	0	0
	Cythereis spp.	0	0	0	0	0	0
	Cytheropteron alatum	0	0	0	0	0	0
	Cythereis jonesi	0	0	0	0	0	0
	Cytherella abyssorum	0	0	0	0	0	0
Copepoda	Calanus finmarchicus	4	13	17	0	122	0
	Calanus helgolandicus	28	16	0	6	161	0
	Calanus hyperboreus	0	0	0	0	0	0
	Calanus sp. juv.	0	32	0	3	256	1015
	Pseudocalanus elongatus	0	3	0	0	4	0
	Bradyidius bradyi	0	0	0	0	0	0
	Chiridius armatus	0	0	0	0	0	0
	Euchaeta norvegica	4	6	0	0	0	0
	Xanthocalanus fallax	0	0	0	0	0	0
	Xanthocalanus propinquus	0	0	0	0	0	0
	Xanthocalanus sp.	0	0	0	0	0	0
	Scolecithricella minor	0	6	0	0	0	0
	Diaixis hibernica	0	0	0	0	0	0
	Parastephos pallidus	0	0	0	0	0	0
	Tharybis macrophthalma	0	0	0	0	0	0
	Centropages hamatus	4	0	1	15	0	0
	Centropages typicus	0	0	0	15	83	61
	Temora longicornis	0	0	0	6	178	15
	Metridia longa	16	116	1	9	0	0
	Metridia lucens	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	SS85	SS86	SS87	SS88	SS89	SS90
	Pleuromamma robusta	0	0	0	0	0	0
	Heterorhabdus norvegicus	0	0	0	0	0	0
	Unidentified copepodites	0	0	0	0	0	0
	Harpacticoida	0	0	0	0	0	0
	Scottula inaequicornis	0	0	0	0	0	0
	Anomoclausia indrehusae	0	0	0	0	0	0
Mysidacea	Boreomysis arctica	0	0	0	0	0	0
	Erythrops serrata	0	0	0	0	0	0
	Amblyops abbreviata	0	0	0	0	0	0
	Mysideis insignis	0	0	0	0	0	0
	Mysidopsis didelphys	0	0	0	0	0	0
Cumacea	Leucon acutirostris	0	0	0	0	0	0
	Leucon nasicus	0	0	0	0	0	0
	Leucon sp.	0	0	0	0	0	0
	Eudorella emarginata	0	0	0	0	0	0
	Campylaspis rubicunda	0	0	0	0	0	0
	Campylaspis costata	0	0	0	0	0	0
	Campylaspis glabra	0	0	0	0	0	0
	Campylaspis sp	0	0	0	0	0	0
	Diastylis lucifera	0	0	0	0	0	0
	Diastylis tumida	0	0	0	0	0	0
	Diastylis cornuta	0	0	0	0	0	0
	Diastylis echinata	0	0	0	0	0	0
	Diastyloides serrata	0	0	0	0	0	0
	Diastyloides biplicata	0	0	0	0	0	0
	Leptostylis longimana	0	0	0	0	0	0
	Eudorella truncatula	0	0	0	0	0	0
Tanaidacea	Tanaidacea	0	0	0	0	0	0
Isopoda	Ianira maculosa	0	0	0	0	0	0
	Pleurogonium inerme	0	0	0	0	0	0
	Macrostylis spinifera	0	0	0	0	0	0
	Ischnosoma bispinosum	0	0	0	0	0	0
	Desmosoma lineare	0	0	0	0	0	0
	Desmosoma armatum	0	0	0	0	0	0
	Desmosoma laterale	0	0	0	0	0	0
	Desmosoma sp.	0	0	0	0	0	0
	Munna sp.	0	0	0	0	0	0
	Echinopleura aculeata	0	0	0	0	0	0
	Munnopsis typica	1	0	0	0	0	0
	Eurycope cornuta	0	0	0	0	0	0
	Eurycope phalangium	0	0	0	0	0	0
	Eurycope sp.	0	0	0	0	0	0
	Ilyarachna longicornis	0	0	0	0	0	0
Amphipoda	Themisto abyssorum	0	0	0	0	0	0
	Lysianassidae	0	0	0	0	0	0
	Tryphosa hörringi	0	0	0	0	0	0
	Tryphosites longipes	0	0	0	0	0	0
	Harpinia crenulata	0	0	0	0	0	0
	Harpinia pectinata	0	0	0	0	0	0
	Phoxocephalidae unident.	0	0	0	0	0	0
	Ampelisca spp.	0	0	0	0	0	0
	Stegocephalus inflatus	0	0	0	0	0	0
	Stegocephalus sp.	0	0	0	0	0	0
	Andaniexis abyssi	0	0	0	0	0	0
	Andaniopsis nordlandica	0	0	0	0	0	0
	Amphilochidae	0	0	0	0	0	0
	Astyra abyssi	0	0	0	0	0	0
	Stenothoidae	0	0	0	0	0	0
	Oediceridae	0	0	0	0	0	0
	Perioculodes longimanus	0	0	0	0	0	0
	Synchelidium haplocheles	0	0	0	0	0	0
	Synchelidium tenuimanum	0	0	0	0	0	0
	Synchelidium intermedium	0	0	0	0	0	0
	Synchelidium sp.	0	0	0	0	0	0
	Westwoodilla caecula	0	0	0	0	0	0
	Bathymedon longimanus	0	0	0	0	0	0
	Bathymedon saussurei	0	0	0	0	0	0
	Bruzelia spp.	0	0	0	0	0	0
	Halice abyssi	0	0	0	0	0	0
	Rhachotropis macropus	0	0	0	0	0	0
	Rhachotropis leucophthalma	0	0	0	0	0	0
	Apherusa bispinosa	0	0	0	0	0	0
	Apherusa sp.	0	0	0	0	0	0
	Melphidippa borealis	0	0	0	0	0	0
	Eriopisa elongata	0	0	0	0	0	0
	Cheirocratus intermedius	0	0	0	0	0	0
	Cheirocratus sundewalli	0	0	0	0	0	0

GRUPPER	ARTER/TAXA	SS85	SS86	SS87	SS88	SS89	SS90
	Cheirocratus sp.	0	0	0	0	0	0
	Gammaridae	0	0	0	0	0	0
	Photidae	0	0	0	0	0	0
	Podoceropsis sophiae	0	0	0	0	0	0
	Corophium bonelli	0	0	0	3	0	0
	Arrhis phyllonyx	0	0	0	0	0	0
	Monoculodes packardi	0	0	0	0	0	0
	Monoculodes tenuirostratis	0	0	0	0	0	0
	Halicreion longicaudatus	0	0	0	0	0	0
	Halirages fulvocinctus	0	0	0	0	0	0
Euphausiacea	Meganyctiphanes norvegica	0	0	2	0	4	0
	Thysanoessa raschi	0	0	0	0	0	0
	Thysanoessa inermis	0	0	0	0	0	0
Decapoda	Crangon allmani	0	0	0	0	0	0
	Pontophilus norvegicus	0	0	0	0	0	0
	Spirontocaris lilljeborgi	0	0	0	0	0	0
	Lebbeus polaris	0	0	0	0	0	0
	Pandalus borealis	0	0	0	0	0	0
	Pandalus propinquus	0	0	0	0	0	0
	Pandalus borealis juv	0	0	0	0	0	0
	Pandalina profunda	0	0	0	0	0	0
	Pasiphaea tarda	0	0	0	0	0	0
	Pandalus montagui	0	0	0	0	0	0
Mollusca	Nudibranchiata	0	0	0	0	0	0
	Delectopecten vitreus	0	0	0	0	0	0
	Pseudamussium septemradiatum	0	0	0	0	0	0
	Abra nitida	0	0	0	0	0	0
	Thyasira sp.	0	0	0	0	0	0
	Bivalvia unident	0	0	2	0	0	0
Echinodermata	Asteroida (larvae)	0	0	0	0	0	0
	Ophiuroidea	0	0	0	0	0	0
	Echinoidea	0	0	0	0	0	0
	Holothuroidea	0	0	0	0	0	0
Tunicata	Ascidia	0	0	0	0	0	0
Pisces	Myxine glutinosa	0	0	0	0	0	0
	Lycenchelys sarsi	0	0	0	0	0	0
	Rhinonemus cimbrius	0	0	0	0	0	0

GRUPPE	KOMPONENT	AUTOR	ANMERKNING
Coelenterata	*Tesserogastria musculosa*	BEYER	
	Aglantha digitale	(O. F. MÜLLER)	
Chaetognatha	*Sagitta elegans*	VERRILL	
	Eukrohnia hamata	(MÖBIUS)	
	Spadella cephaloptera	(BUSH)	
Polychaeta	Aphroditidae	MALMGREN	
	Harmothoë	KINBERG	
	Antinoëlla sarsi	(KINBERG)	
	Pholoë minuta	(FABRICIUS)	
	Leanira tetragona	ÖRSTED	
	Phyllodocidae	WILLIAMS	
	Hesionidae	MALMGREN	
	Nereimyra punctata	(O. F. MÜLLER)	
	Ophiodromus flexuosus	(DELLE CHIAJE)	
	Syllidae	GRUBE	
	Nepthys	CUVIER	
	Sphaerodorum gracilis	(RATHKE)	Inkl. *S. flavum* ÖRSTED, kfr. FAUCHALD (1974).
	Glyceridae	GRUBE	
	Lumbrineris	BLAINVILLE	
	Spionidae	GRUBE	
	Polydora ciliata	(JOHNSTON)	
	Spiophanes kröyeri	GRUBE	
	Chaetozone setosa	MALMGREN	
	Flabelligeridae	SAINT-JOSEPH	
	Scalibregma inflatum	RATHKE	
	Polyphysia crassa	ÖRSTED	
	Opheliidae	MALMGREN	
	Capitella capitata	(FABRICIUS)	
	Heteromastus	MCINTOSH	
	Pectinaria	SAVIGNY	
	Melinna cristata	(M. SARS)	
	Ampharete falcata	ELIASON	
	Ampharete baltica	ELIASON	
	Amphicteis gunneri	(M. SARS)	
	Terebellidae	MALMGREN	
	Pista cristata	(O. F. MÜLLER)	
	Eupolymnia	VERRILL	
	Thelepus	LEUCKART	
	Trichobranchus	MALMGREN	
	Terebellides stroemi	M. SARS	
	Sabellidae	MALMGREN	
Ostracoda	*Philomedes brenda*	(BAIRD)	Syn.: *P. globosus* (Lilljeborg).
	Philomedes lilljeborgi	(G. O. SARS)	
	Conchoecia elegans	G. O. SARS	
	Conchoecia borealis	G. O. SARS	
	Conchoecia obtusata	G. O. SARS	
	Cytherella abyssorum	G. O. SARS	
	Macrocypris minna	(BAIRD)	
	Macrocypria angusta	(G. O. SARS)	
	Eucytheridea punctillata	(BRADY)	

GRUPPE	KOMPONENT	AUTOR	ANMERKNING
	Hemicythere latimarginata	(SPEYER)	
	Echinocythereis echinata	(G. O. SARS)	
	Cythereis dunelmensis	NORMAN	
	Cythereis jonesi	(BAIRD)	
	Elofsonella concinna	(JONES)	
	Cytheropteron alatum	G. O. SARS	
Copepoda	*Calanus finmarchicus*	(GUNNERUS)	
	Calanus helgolandicus	(CLAUS)	
	Calanus hyperboreus	KRÖYER	
	Pseudocalanus elongatus	BOECK	
	Chiridius armatus	(BOECK)	
	Bradyidius bradyi	(G. O. SARS)	
	Euchaeta norvegica	BOECK	
	Xanthocalanus fallax	G. O. SARS	
	Xanthocalanus propinquus	G. O. SARS	
	Scolecithricella minor	(BRADY)	
	Diaixis hibernica	(A. SCOTT)	
	Parastephos pallidus	G. O. SARS	
	Tharybis macrophthalma	G. O. SARS	
	Centropages typicus	KRÖYER	
	Centropages hamatus	(LILLJEBORG)	
	Temora longicornis	(MÜLLER)	
	Metridia longa	(LUBBOCK)	
	Metridia lucens	BOECK	
	Pleuromamma robusta	(DAHL)	
	Heterorhabdus norvegicus	(BOECK)	
	Scottula inaequicornis	G. O. SARS	
	Anomoclausia indrehusae	GOTTO	
Mysidacea	*Boreomysis arctica*	(KRÖYER)	
	Erythrops serrata	G. O. SARS	
	Amblyops abbreviata	(M. SARS)	
	Mysideis insignis	G. O. SARS	
	Mysidopsis didelphys	(NORMAN)	
Cumacea	*Leucon nasicus*	(KRÖYER)	
	Leucon acutirostris	G. O. SARS	
	Eudorella emarginata	(KRÖYER)	
	Eudorella truncatula	BATE	
	Diastylis cornuta	(BOECK)	
	Diastylis lucifera	(KRÖYER)	
	Diastylis tumida	(LILLJEBORG)	
	Diastylis echinata	BATE	
	Diastyloides serrata	(G. O. SARS)	
	Diastyloides biplicata	(G. O. SARS)	
	Leptostylis longimana	(G. O. SARS)	
	Campylaspis rubicunda	(LILLJEBORG)	
	Campylaspis glabra	G. O. SARS	
	Campylaspis costata	G. O. SARS	
Isopoda	*Ianira maculosa*	LEACH	
	Munna	BOECK	
	Pleurogonium inerme	G. O. SARS	

GRUPPE	KOMPONENT	AUTOR	ANMEKNING
	Macrostylis spinifera	G. O. SARS	
	Ischnosoma bispinosum	G. O. SARS	
	Desmosoma lineare	G. O. SARS	
	Desmosoma laterale	(G. O. SARS)	
	Desmosoma armatum	G. O. SARS	
	Echinopleura aculeata	(G. O. SARS)	
	Munnopsis typica	M. SARS	
	Ilyarachna longicornis	(G. O. SARS)	
	Eurycope cornuta	G. O. SARS	
	Eurycope phalangium	G. O. SARS	
Amphipoda	*Themisto abyssorum*	(BOECK)	
	Lysianassidae	DANA	
	Tryphosa hörringi	BOECK	
	Tryphosites longipes	(BATE)	
	Phoxocephalidae	G. O. SARS	
	Harpinia pectinata	G. O. SARS	
	Harpinia crenulata	BOECK	
	Ampelisca	KRÖYER	
	Stegocephalus inflatus	KRÖYER	
	Andaniexis abyssi	(BOECK)	
	Andaniopsis nordlandica	(BOECK)	
	Amphilochidae	G. O. SARS	
	Astyra abyssi	BOECK	
	Stenothoidae	STEBBING	
	Oediceridae	G. O. SARS	
	Monoculodes packardi	BOECK	
	Monoculodes tenuirostratis	BOECK	
	Perioculodes longimanus	BATE & WESTWOOD	
	Synchelidium haplocheles	(GRUBE)	= *S. brevicarpum* i SARS (1895), kfr. STEPHENSEN (1928).
	Synchelidium tenuimanum	NORMAN	= *S. haplocheles* i SARS (1895), kfr. STEPHENSEN (1928).
	Synchelidium intermedium	G. O. SARS	
	Halicreion longicaudatus	BOECK	
	Westwoodilla caecula	(BATE)	
	Bathymedon longimanus	(BOECK)	
	Bathymedon saussurei	(BOECK)	
	Arrhis phyllonyx	(M. SARS)	
	Bruzelia	BOECK	
	Halice abyssi	BOECK	
	Rhachotropis macropus	G. O. SARS	
	Rhachotropis leucophthalma	G. O. SARS	
	Halirages fulvocinctus	(M. SARS)	
	Apherusa bispinosa	(BATE)	
	Gammaridae	LEACH	
	Melphidippa borealis	BOECK	
	Eriopisa elongata	(BRUZELIUS)	
	Cheirocratus sundewalli	(RATHKE)	
	Cheirocratus intermedius	G. O. SARS	
	Photidae	BOECK	
	Podoceropsis sophiae	BOECK	
	Corophium bonelli	G. O. SARS	(MILNE-EDWARDS ?), kfr. STEPHENSEN (1928).

GRUPPE	KOMPONENT	AUTOR	ANMERKNING
Euphausiacea	*Meganyctiphanes norvegica*	(M. SARS)	
	Thysanoessa raschi	(M. SARS)	
	Tysanoessa inermis	(KRÖYER)	
Decapoda	*Pasiphaea tarda*	KRÖYER	
	Spirontocaris lilljeborgi	(DANIELSSEN)	
	Lebbeus polaris	(SABINE)	
	Pandalus borealis	KRÖYER	
	Pandalus propinquus	G. O. SARS	
	Pandalus montagui	LEACH	
	Pandalina profunda	HOLTHUIS	
	Crangon allmani	KINAHAN	
	Pontophilus norvegicus	(M. SARS)	
	Macropipus holsatus	(FABRICIUS)	
Nudibranchia	*Coryphella verrucosa*	(M. SARS)	
Bivalvia	*Pseudamussium septemradiatum*	(MÜLLER)	
	Delectopecten vitreus var. *abyssorum*	(M. SARS)	
	Thyasira	(LEACH) LAMARCK	
	Abra nitida	(MÜLLER)	
Ophiuroidea	*Ophiura sarsi*	LÜTKEN	
Pisces	*Myxine glutinosa*	L.	
	Rhinonemus cimbrius	(L.)	

Tekniske data for de aktuelle prøver. Lokalitet: E l l e (Im). Dyp: Ca. 195 m.
Data for 1974 og 1975 er basert på FRITZVOLD (1981).

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 23	1953	17/6	11.45	608	0,90	
B 31	"	18/6	13.15	462	0,83	
B 36	"	19/6	11.10	260	0,51	
B 37	"	"	12.30	350	0,67	
Σ B 23–37				1680		
B 62	1959	4/6	12.45	1096	1,32	
B 69	"	5/6	12.10	901	1,27	
Σ B 62–69				1997		
B 80	1960	25/4	12.45	873	0,88	
B 112	1961	13/2	12.00	516	0,76	
B167	1962	10/11	11.25	2177	0,78	
B 178	1963	30/1	10.10	1591	0,86	
B 434	1971	4/11	12.00	1532	0,47	
B 471	1973	5/12	12.40	1063	1,15	
DB 3 - 10	1974	16/12	00.25-	8434	0,8-1,4 Gj.sn.=	
8 prøver			21.25		1,12 (S.D.=0,21)	
DB 19 - 27	1975	16-17/6	00.20-	9700	0,7-1,4 Gj.sn.=	
9 prøver			21.40		1,17 (S.D.=0,21)	
B 501	1981	10/8	13.00	693	0,30	Overfl.strøm snudde.
B 531	1982	1/7	15.15	1110	1,20	
B 548	1983	19/4	16.15	779	0,84	
B 552	"	26/10	12.10	761	0,85	
B 568	1984	8/8	12.00	1019	1,10	
B 602	1985	10/7	16.45	735	0,80	
B 638	1986	26/6	20.50	893	0,95	
B 655	1987	21/8	16.00	931	1,00	
B 667	1988	25/8	15.10	908	0,89	
B 671	1989	21/8	15.35	1205	1,30	
B 680	1990	16/8	12.00	712	0,74	
B 688	1992	1/9	10.30	1034	1,05	
B 700	1993	25/8	11.05	561	0,60	

Tekniske data for de aktuelle prøver. Lokalitet: G r å ø y r e n n a (Gk). Dyp: Ca. 110 m.
Data for 1971 og 1972 er fra GJERMUNDSEN (1974). Data for mai 1973 er basert på HESTHAGEN & GJERMUNDSEN (1978) og data for desember 1974 og juni 1975 er basert på FRITZVOLD (1981).

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 24	1953	17/6	14.30	469	0,76	
B 25	"	"	15.35	275	0,42	Dyp 108 - 90 m
B 26	"	"	22.00	478	0,74	
B 28	"	18/6	09.15	866	0,98	
B 29	"	"	10.20	366	0,55	
B 30	"	"	11.15	542	0,84	
Σ B 24–30				2796		
B 44	1959	2/6	11.30	617	0,67	
B 45	"	"	13.15	839	1,29	
B 53	"	3/6	12.50	509	0,87	
B 54	"	"	14.00	572	0,93	
Σ B 44–54				2537		

Tekniske data for Gråøyrenna, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 76	1960	22/4	16.30	814	1,30	Nesten intet mudder.
B 107	"	12/12	14.25	715	1,10	
B 117	1961	14/2	13.40	698	1,08	Nesten intet mudder.
B 122	1962	8/1	12.15	610	0,99	
B 129	"	13/2	14.35	1826	1,00	
B 160	"	4/10	17.15	2297	0,82	
B 170	"	17/12	13.40	1926	0,69	
B 177	1963	29/1	12.50	1423	0,77	
B 190	"	4/5	10.55	1444	0,78	
B 417	1970	27/11	15.30	798	0,86	
B 435	1971	5/11	11.40	741	0,60	
B 455	1972	6/9	20.50	716	0,77	
B 456	"	"	21.55	766	0,83	
B 457 - 70 14 prøver	1973	21-22/5	12.40-22.20	10261	0,4-1,4. Gj.sn.= 0,88 (S.D.=0,26)	
B 472	1973	5/12	14.55	778	0,87	
DB 11 - 18 8 prøver	1974	19/12	00.25-21.20	7210	0,9-1,3. Gj.sn. = 1,11 (S.D.=0,15)	
DB 28 - 36 9 prøver	1975	19-20/6	00,10-22.05	9302	0,7-1,7. Gj.sn.= 1,12 (S.D.=0,30)	
B 502	1981	10/8	14.55	1900	1,00	
B 530	1982	1/7	13.45	1100	1,19	Noe av prøven tapt.
B 547	1983	19/4	13.20	1000	1,08	Fanget også på opptur.
B 556	1984	10/1	15.10	960	1,04	
B 569	"	8/8	14.30	893	0,96	
B 603	1985	10/7	18.50	1019	1,10	
B 632	1986	25/6	12.30	673	0,73	
B 651	1987	19/8	18.20	787	0,85	
B 659	1988	23/8	11.10	1100	1,19	For lite sediment
B 672	1989	22/8	14.45	834	0,90	
B 683	1990	17/8	13.05	700	0,76	
B 689	1992	1/9	12.55	555	0,55	
B 699	1993	25/8	10.25	870	0,94	

Tekniske data for de aktuelle prøver. Lokalitet: Langårrenna (Fk). Dyp: 115 - 120 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 546	1983	19/4	12.15	1111	1,20	
B 557	1984	11/1	10.55	791	0,85	
B 571	"	9/8	09.20	736	0,78	Mest på ujevn bunn.

Tekniske data for de aktuelle prøver. Lokalitet: Sprodypet (Fl). Dyp: Ca. 160 - ca. 170 m. Data for 1971 er fra GJERMUNDSEN (1974).

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 159	1962	4/10	15.10	661	0,93	Sleden satte seg fast.
B 172	"	18/12	15.10	487	0,44	

Tekniske data for Sprodypet, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 179	1963	30/1	13.00	1147	0,86	
B 186	1963	20/3	11.50	1077	0,78	
B 193	"	6/5	16.55	979	1,02	
B 436	1971	5/11	13.30	705	0,62	
B 473	1973	6/12	14.15	1049	1,17	
B 506	1981	11/8	12.35	1759	0,95	
B 534	1982	2/7	15.20	561	0,91	160 - 125 m dyp.
B 545	1983	19/4	11.10	1204	1,30	
B 558	1984	11/1	13.15	655	0,71	
B 570	"	8/8	16.55	448	0,41	Til dels for nær land.
B 599	1985	9/7	18.50	982	1,10	158 - 149 m dyp.
B 631	1986	25/6	10.50	875	0,94	
B 650	1987	19/8	16.40	523	0,55	144 - 164 m dyp.
B 668	1988	26/8	09.15	1018	1,10	
B 698	1993	24/8	14.00	787	0,85	

Tekniske data for de aktuelle prøver. Lokalitet: Ytre Støadyp (El_2). Dyp: Ca. 145 m

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 544	1983	13/4	15.00	701	0,76	
B 576	1984	10/8	10.15	442	0,48	145 - 107 m. Masse grus og mudder i prøven.

Tekniske data for de aktuelle prøver. Lokalitet: Blåmagen (El_1). Dyp: Ca. 120 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 543	1983	13/4	13.55	656	0,71	
B 577	1984	10/8	11.30	559	0,50	

Tekniske data for de aktuelle prøver. Lokalitet: Svartedypet (Ek). Dyp: Ca. 100 m

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 130	1962	13/2	17.30	1816	0,98	
B 158	"	4/10	12.45	1540	0,91	Lite mudder i prøven.
B 176	1963	29/1	10.00	1098	0.85	
B 432	1971	3/11	15.05	1302	1,28	Lite mudder i prøven.
B 507	1981	11/8	15.05	1990	1,10	90 - 80 m dyp.
B 524	1982	30/6	11.00	926	1,00	
B 541	1983	13/4	11.05	813	0,88	Lite mudder i prøven.
B 553	"	27/10	11.00	796	0,86	Store gravende polychaeter.
B 572	1984	9/8	11.15	810	0,87	
B 596	1985	9/7	14.00	600	0,65	
B 628	1986	24/6	13.05	1205	1,30	
B 641	1987	17/8	14.05	1068	1,15	

Tekniske data for Svartedypet, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 658	1988	22/8	15.20	719	0,78	
B 673	1989	22/8	16.45	906	0,98	
B 690	1992	1/9	14.35	828	0,87	
B 697	1993	24/8	12.35	406	0,44	

Tekniske data for de aktuelle prøver. Lokalitet: Vesthullet (Ej). Dyp: Ca. 105 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 510	1981	12/8	10.40	1183	0,70	Ekstra meget mudder i prøven.
B 525	1982	30/6	12.20	415	0,45	
B 542	1983	13/4	12.10	443	0,48	
B 554	"	27/10	12.25	592	0,64	Grå vannhenter synlig til 14 m dyp. Store gravende polychaeter
B 561	1984	31/1	14.20	950	1,10	Mørkt mudder, løv og gress.
B 573	"	9/8	12.30	800	0,84	Kom inn mot bakken. Rykk i slepewiren. Mørkebrunt mudder.
B 595	1985	9/7	12.50	503	0,5	Stor mengde ascidier.
B 627	1986	24/6	11.50	856	0,84	
B 640	1987	17/8	12.35	687	0,74	
B 657	1988	22/8	12.20	442	0,48	Måtte snu p.g.a. oppgrunning. Ekstra meget mudder i prøv.
B 674	1989	22/8	18.50	979	1,00	Bunnen ikke så bløt som den har vært i senere år.
B 682	1990	17/8	11.35	893	0,96	
B 687	1992	31/8	15.50	898	0,99	Meget kraftig ekko (krill?) fra 70 m til bunn.
B 696	1993	24/8	11.30	400	0,43	Meget mudder, som er mørkere enn ved Steilene.

Tekniske data for de aktuelle prøver. Lokalitet: Steilene (Dk). Dyp: Ca. 100 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmekninger
B 13	1952	14/6	09.05	1074	0,87	
B 124	1962	8/1	19.20	608	0,82	Intet dagslys.
B 133	"	14/2	16.25	1559	1,01	
B 134	"	20/3	11.40	2099	1,06	
B 149	"	3/5	18.15	1498	0,81	
B 151	"	13/7	19.20	1596	0,86	Var litt innpå Morragrunnen, ca. 70 m dyp

Tekniske data for Steilene, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 152	"	21/8	11.20	1559	0,84	
B 157	1962	4/10	10.55	1305	0,70	Litt for langt øst med stein midt i draget.
B 164	"	9/11	11.55	2156	1,09	Lite mudder.
B 173	"	19/12	09.35	1509	0,81	
B 181	1963	31/1	11.50	1632	0,88	
B 184	"	19/3	11.25	1467	0,79	
B 194	"	7/5	09.55	1025	0,71	Satte seg fast i noe som ikke ga ekko.
B 199	"	18/6	10.35	1191	0,74	
B 207	"	10/7	14.10	1166	0,73	Lite mudder.
B 211	"	5/8	11.05	1553	0,84	Litt for langt over mot Morragrunnen.
B 224	"	3/9	16.35	2170	1,17	
B 234	"	27/11	11.40	1340	1,09	
B 243	1964	24/1	13.20	990	0,80	
B 249	"	12/3	11.25	1188	0,96	
B 257	"	27/4	18.25	849	0,92	
B 262	"	3/7	11.35	786	0,82	
B 270	"	1/9	14.55	874	0,94	Ikke helt lukket. Kom opp sidelengs.
B 278	"	12/11	10.55	812	0,88	
B 284	1965	2/2	10.10	587	0,59	Grunnere til slutt.
B 290	"	31/3	15.50	747	0,81	
B 302	"	25/6	16.00	1028	1,15	
B 306	"	27/8	15.25	705	0,76	
B 410	1970	28/4	12.00	930	0,35	Med kamera.
B 412	"	5/5	12,00	638	0,35	Med kamera.
B 421	"	4/12	14.35	759	0,61	
B 424	1971	19/8	15.00	1173	0,81	Med kamera.
B 431	"	2/11	12.10	759	0,63	Har dradd inn i bakken. 20 l mudder!
B 474	1973	6/12	16.40	846	0,90	
B 483	1976	7/1	15.10	825	0,91	
B 511	1981	12/8	13.03	2730	1,61	Kjørte seg til slutt fast i Morragrunnen.
B 523	1982	29/6	14.20	493	0,53	
B 540	1983	7/4	14.10	809	0,87	
B 555	"	27/10	13.55	760	0,82	
B 560	1984	31/1	12.10	771	0,83	Ingen levende dyr å se!
B 574	"	9/8	14.25	1005	1,09	Litt napping i wiren. Dyp 104 - 75 m !
B 594	1985	9/7	11.35	573	0,62	Var borti skråningen. Tallrike ascidier.
B 626	1986	24/6	10.30	847	0,90	
B 639	1987	17/8	11.00	884	0,95	
B 656	1988	22/8	09.55	624	0,67	
B 675	1989	23/8	09.25	741	0,80	
B 681	1990	17/8	10.10	971	0,90	
B 691	1992	4/9	15.50	487	0,48	Var for langt vest, på ujevn bunn for det meste.
B 695	1993	24/8	10.00	456	0,49	

Tekniske data for de aktuelle prøver. Lokalitet: Gåsøyrenna (Cl). Dyp: Ca. 70 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 156	1962	4/10	08.45	1281	0,69	Ujevn og hard bunn.
B 163	"	31/10	11.45	174		Bommen brakk. Ingen lukking.
B 174	"	19/12	13.10	1167	0,64	Tørnet i steinrøys.
B 185	1963	19/3	13.20	1212	0,65	
B 195	"	7/5	11.30	848	0,69	
B 198	"	17/6	17.40	2040	1,10	
B 206	"	10/7	12.30	1455	0,79	
B 216	"	6/8	13.50	1304	0,70	
B 223	"	3/9	15.00	1712	0,97	
B 233	"	27/11	10.35	807	0,87	
B 242	1964	24/1	12.15	475	1,03	Sleden kjørte seg fast.
B 248	"	12/3	10.00	740	0,60	Sleden gikk ujevnt.
B 256	"	27/4	17.15	714	0,72	Bare halvt lukket. Meget grus og stein.
B 263	"	3/7	12.45	567	0,61	
B 269	"	1/9	13.55	567	0,92	
B 277	"	12/11	09.50	857	0,93	
B 283	1965	1/2	15.15	552	0,60	
B 295	"	1/4	14.55	814	0,88	
B 303	"	25/6	18.00	645	0,99	
B 307	"	27/8	16.30	769	0,83	
B 430	1971	1/11	10.30	799	0,63	
B 475	1973	7/12	11.05	1028	1,11	

Tekniske data for de aktuelle prøver. Lokalitet: Lysakerfjorden (Bn). Dyp: Ca. 80 - ca. 70 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 162	1962	31/10	10.20	1229	0,90	
B 175	"	19/12	16.00	1859	1,00	
B 180	1963	31/1	09.30	1641	0,89	
B 183	"	18/3	14.55	1549	0,84	
B 189	"	3/5	15.00	Ca. 1370 m*	*	*) Vind på strøm-måleren.
B 197	"	17/6	15.45	1772	1,25	
B 205	"	9/7	10.05	1661	0,90	Sleden sto fast noen sekunder midtveis.
B 219	"	7/8	13.55	1737	0,99	
B 222	"	3/9	13.10	1383	1,09	Grunnere ved lukking
B 232	"	27/11	09.10	1082	0,88	
B 241	1964	24/1	10.55	652	0,53	
B 247	"	10/3	16.05	988	0,80	
B 255	"	27/4	16.00	817	0,88	
B 264	"	3/7	14.05	547	0,59	
B 268	"	1/9	12.50	499	0,81	
B 274	"	10/11	14.50	923	1,00	
B 282	1965	1/2	14.00	491	0,53	
B 294	"	1/4	13.35	976	1,05	
B 299	"	24/6	14.35	886	0,96	
B 311	"	30/8	15.15	902	0,97	

Tekniske data for Lysakerfjorden, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 429	1971	29/10	15.05	1112	0,80	
B 476	1973	7/12	12.20	1032	1,11	Svært mørkt mudder. Død brisling, døde (opake) krill, ingen levende dyr.

Tekniske data for de aktuelle prøver. Lokalitet: Helviktangen (Cp). Dyp: Ca. 85 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 182	1963	18/3	12.55	1381	0,73	
B 240	1964	24/1	09,35	1186	0,96	For lite mudder.
B 246	"	10/3	14.50	1147	0,93	
B 254	"	27/4	14.55	877	0,95	
B 256	"	3/7	15.15	893	0,96	
B 267	"	1/9	11.15	551	0,89	Kom opp åpen.
B 273	"	10/11	13.45	816	0,88	
B 281	1965	1/2	12.50	928	0,94	For lite mudder.
B 293	"	1/4	12.30	1055	1,14	
B 298	"	24/6	13.30	1034	1,12	Fanget noe på nedtur.
B 310	"	30/8	16.15	666	0,72	
B 428	1971	29/10	12.35	710	0,77	Lite mudder.
B 477	1973	7/12	13.45	926	1,00	Svart mudder. Døde (opake) krill. Ingen dyr observert i bevegelse. Rustne partier på sleden blitt svarte.

Tekniske data for de aktuelle prøver. Lokalitet: Kirkevikbanken (Dp). Dyp: Ca. 85 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 188	1963	3/5	12.25	1481	1,04	80 - 120m dyp. Noe tapt ved vasking.
B 196	"	17/6	13.45	1643	0,89	85 - 120 m dyp.
B 217	"	7/8	11.05	581	0,75	Fanget noe på nedtur.
B 221	"	3/9	11.45	364	0,69	Ujevn bunn. Bratt motbakke på slutten.
B 231	"	26/11	15.45	530	0,82	
B 237	1964	15/1	13.40	193	0,57	Sleden kjørte seg fast.
B 245	"	10/3	13.30	410	0,66	Bratt motbakke på slutten.
B 253	"	27/4	13.50	444	0,85	Motbakke på slutten.
B 261	"	3/7	09.30	282	0,76	
B 266	"	1/9	09.55	354	0,64	Svart mudder.
B 272	"	10/11	12.45	384	0,83	
B 280	1965	1/2	11.40	298	0,88	Ingen lukking. Fanget også på turen opp.
B 292	1965	1/4	11.25	535	0,94	For lite mudder.
B 297	"	24/6	12.25	440	0,71	Fanget noe på nedtur.

Tekniske data for Kirkevikbanken, fortsatt.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 309	1965	30/8	15.00	674	0,84	

B 188 og B 196 ble tatt sønnenfor, de øvrige nordenfor Husanberget.

Tekniske data for de aktuelle prøver. Lokalitet: Svartskog (Ep). Dyp: 150 - 155 m.

Prøve nr.	År	Dato	Tid (ca.)	Trekklengde m	Slepehastighet Knop	Anmerkninger
B 218	1963	7/8	12.10	497	0,80	
B 220	"	3/9	10.35	259	0,52	Lite mudder. Ikke råttent.
B 230	"	26/11	14.10	892	0,85	
B 236	1964	15/1	12.20	1188	0,96	Luktet H_2S. Meget løv
B 244	"	10/3	12.10	1089	0,88	
B 252	"	27/4	12.45	378	0,58	
B 271	"	10/11	11.40	848	0,92	
B 279	1965	1/2	10.35	851	0,89	
B 291	"	1/4	10.15	766	0,86	
B 296	"	24/6	11.15	871	0,94	Lite mudder.
B 308	"	30/8	13.40	703	0,76	Mudder svært slimet. Dyrene livløse.
B 427	1971	29/10	11.00	856	0,82	
B 478	1973	7/12	14.55	932	1,01	Wire svart.
B 514	1981	13/8	09.50	494	0,90	Svart mudder.
B 518	1982	28/6	12.15	442	0,50	Suppeaktig, svart, stinkende sediment.
B 535	1983	22/3	11.35	788	0,85	
B 589	1985	8/7	11.15	833	0,90	Sediment suppeatig, svart og tynnt, men uten lukt av H_2S.
B 623	1986	23/6	12.20	790	0,80	
B 645	1987	18/8	13.25	815	0,88	Sediment suppeaktig, svart og tynnt, men uten lukt av H_2S. Løv. Levende bittesmå planktoncopepoder .
B 662	1988	24/8	10.35	876	0,89	Sediment suppeaktig, svart og tynnt. Intet synlig livstegn i planktonprøve fra 150 - 103 m dyp.
B 677	1989	23/8	13.30	605	0,67	Et snes levende *Oncaea* (eller *Oithona*) i planktonprøve fra 149 - 101 m dyp.
B 678	1990	15/8	11.40	336	0,7	Bunnsledenettet fullt av svart suppe. Ikke lukket. Ytterst lite zooplankton i prøve fra 148 - 101 m dyp.

FIGURLISTE

Fig. 28 Som Fig. 22 for juli 1985.
Fig. 29 " " " " juni 1986.
Fig. 30 " " " " august 1987.
Fig. 31 " " " " " 1988.
Fig. 32 " " " " " 1989.
Fig. 33 " " " " " 1990.
Fig. 34 Antall individer/100 m^3 av polychaetene *Pholoë minuta, Antinoëlla sarsi, Nereimyra punctata, Polydora ciliata, Capitella capitata* og *Gyptis rosea* samt Nudibranchiata i oktober-november 1971 på lokalitetene som navngitt for Fig. 22.
Fig. 35 Antall individer/100 m^3 av polychaetene *Pholoë minuta, Ampharete* sp., *Antinoëlla sarsi, Chaetozone* sp., Scalibregmidae, Spionidae, *Nereimyra punctata* og *Capitella capitata* på utvalgte lokaliteter fra Elle til Svartskog i desember 1973.
Fig. 36 Som Fig. 35 i august 1981.
Fig. 37 " " " i juni 1982.
Fig. 38 " " " i april 1983.
Fig. 39 " " " i august 1984.
Fig. 40 " " " i juli 1985.
Fig. 41 " " " i juni 1986.
Fig. 42 " " " i august 1987.
Fig. 43 " " " i " 1988.
Fig. 44 " " " i " 1989.
Fig. 45 " " " i " 1990.
Fig. 46A Antall taxa samt trekklengder for prøver fra Elle og Gråøyrenna 1953 - 1990.
Fig. 46B Antall individer/100 m^3 totalt og derav foraminiferer i de samme prøver.
Fig. 47A Som Fig. 46A for Svartedypet, Vesthullet og Steilene 1973 - 1990.
Fig. 47B " " 46B " " " " " " " "
Fig. 48 Diversitet ved Elle i august 1987, 1988, 1989 og 1990.
Fig. 49 " i Gråøyrenna i juni 1953, juni1959, april 1960 og februar 1961.
Fig. 50 " i " i desember 1973, august 1981, juli 1985 og juni 1986.
Fig. 51 " i " i august 1987, 1988, 1989 og 1990.
Fig. 52 " i Svartedypet i august 1981, juni 1982, april 1983 og august 1984.
Fig. 53 " i " i juli 1985, juni 1986, august 1987, 1988 og 1989.
Fig. 54 " i Vesthullet i august 1981, juni 1982, april 1983 og august 1984.
Fig. 55 " i " i juli 1985, juni 1986 og august 1987.
Fig. 56 " i " i august 1988, 1989 og 1990.
Fig. 57 " ved Steilene i august 1981, juni 1982 og april 1983.
Fig. 58 " " " i " 1984, juli 1985, juni 1986 og august 1987.
Fig. 59 " " " i " 1988, 1989 og 1990.
Fig. 60 " " Svartskog i juli 1985, juni 1986 og august 1987.
Fig. 61 Antall individer/100 m^3 av *Macrocypris minna, Macrocypria angusta, Rhachotropis macropus, Ilyarachna longicornis, Andaniopsis nordlandica* og *Arrhis phyllonyx* ved Elle 1953 - 1990.
Fig. 62 Antall individer/100 m^3 av *Xanthocalanus fallax* og *Xanthocalanus propinquus* ved Elle og i Gråøyrenna 1953 - 1990.
Fig. 63 Antall individer/100 m^3 av *Eudorella emarginata* og *Erythrops serrata* ved Elle og i Gråøyrenna 1953 - 1990.
Fig. 64 Antall individer/100 m^3 av *Bathymedon longimanus*, Ophiuroidea, *Diastylis lucifera, Diastyloides serrata, Arrhis phyllonyx* og *Metridia longa* i Gråøyrenna 1953 - 1990.

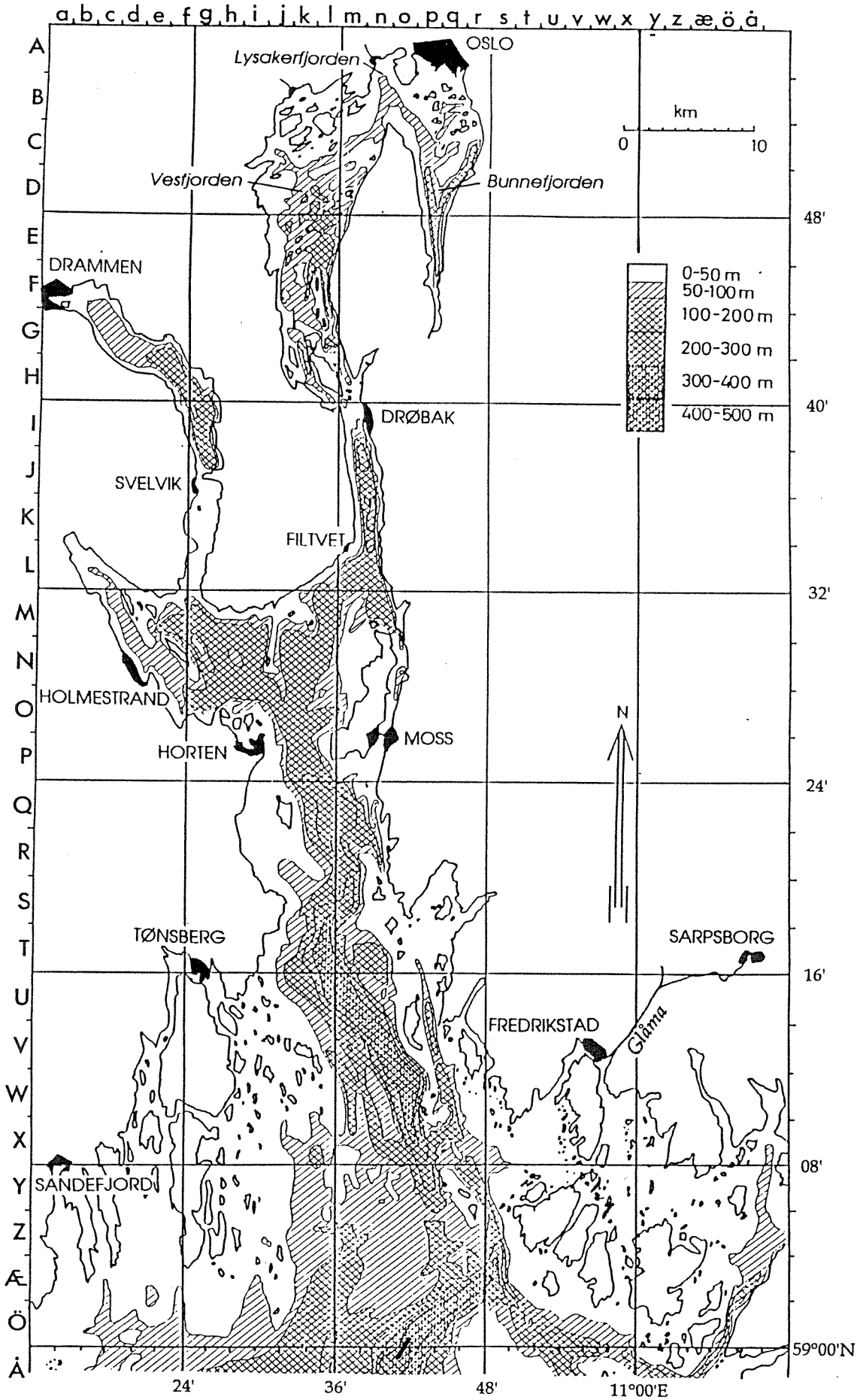


Fig. 1. Kart over Oslofjorden med dybdekoter. Skrått merke på 59°00'N viser slededrag ved Torbjørnsskjær.

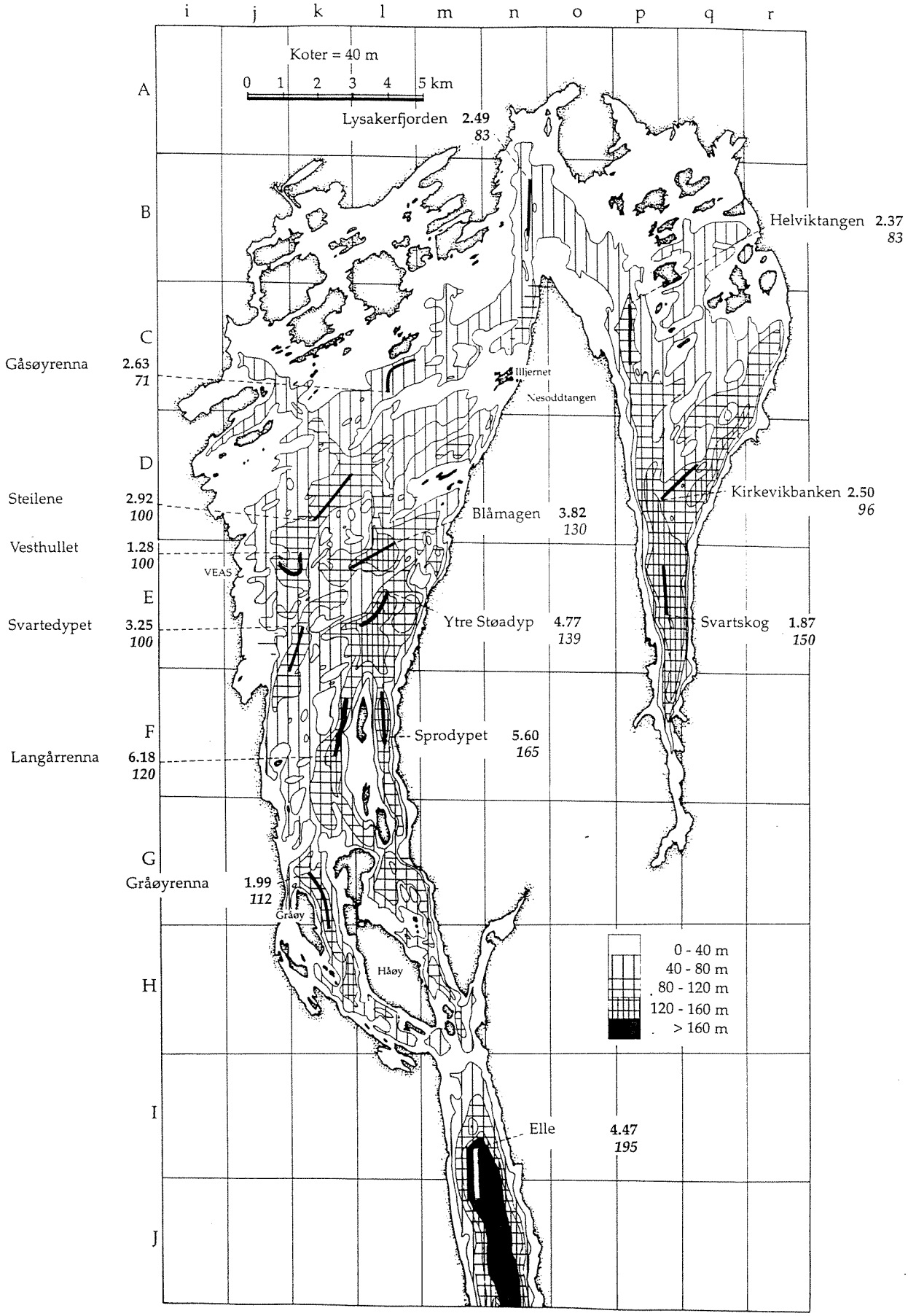


Fig. 2. Forenklet topografisk kart med slededrag og beliggenheten av VEAS kloakkrenseanlegg (Ej). Til høyre for lokalitetsnavnene er angitt vannets oksygeninnhold (ml/l) 7.-10 januar 1986 1 m over bunnen i dyp (m) som angitt nedenfor.

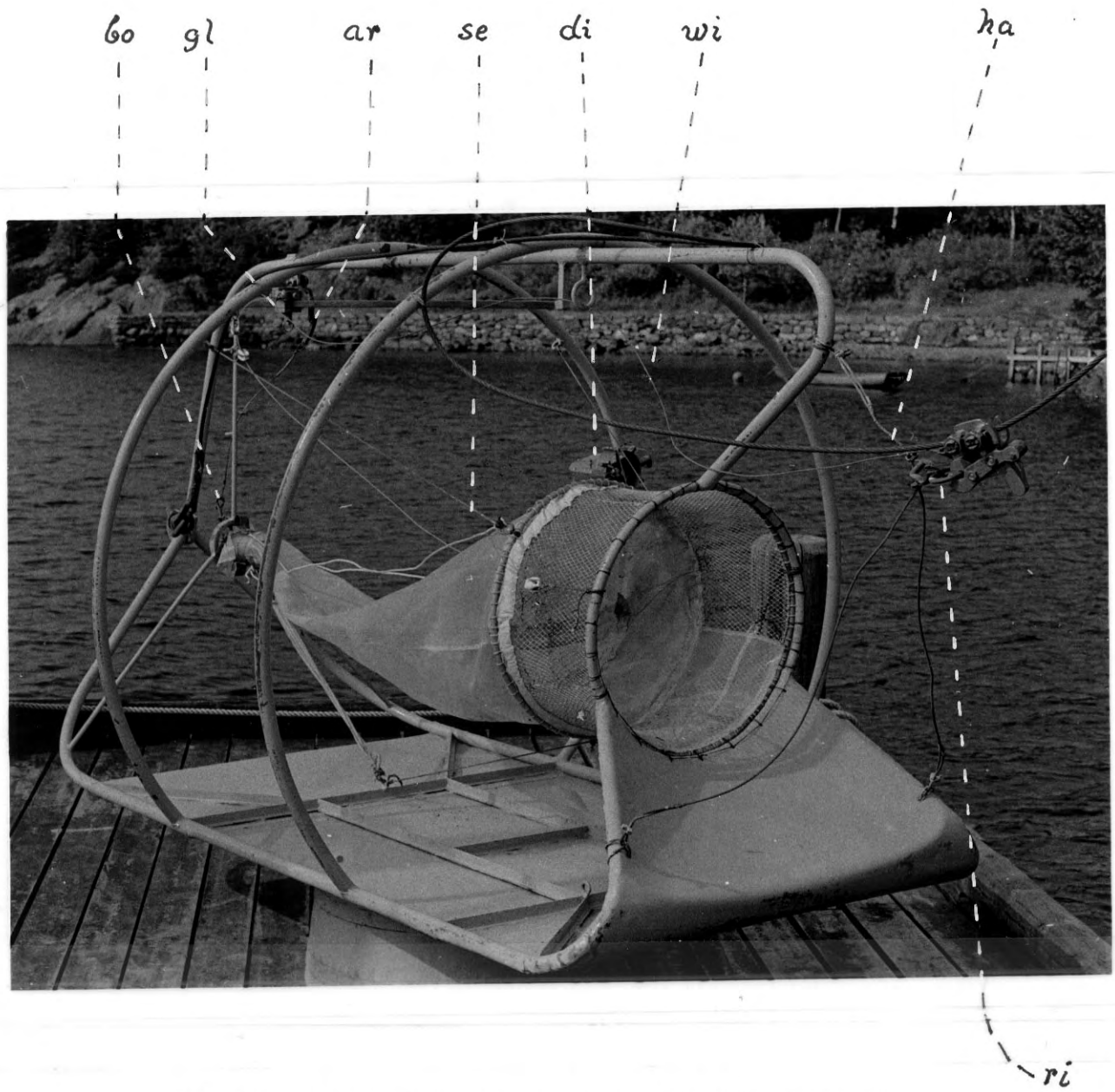


Fig. 3. Beyers bunnslede. Fig. 3. Beyer's epibenthic closing net.

bo = bolt som holder spannet på plass. *gl* = glider som, når den dras fremover, løfter armen *ar*, som da frigjør spannet, og videre strammer senene *se*, som snurper hovens innvendige kalv sammen. *di* = distansemåler. *wi* = wire som drar glideren fremover når ringen *ri* i hanefoten *ha* er frigjort ved hjelp av slippelodd fra fartøyet eller sprengt løs fra hanefoten hvis sleden har kjørt seg fast.

bo = pin holding the bucket in place. *gl* = sliding mechanism, which, when it is pulled forward causes the lever (*ar*) to pull out the pin and thus release the bucket. At the same time the diaphragm peripherally attached between the cylindrical and conical parts of the net is throttled by the nylon guts (*se*) which are attached to the sliding mechanism. *di* = flow meter. *wi* = wire which pulls the sliding mechanism forward when the ring (*ri*) attached with spun-yarn to the bridle (*ha*) is released by a messenger or torn away from the bridle if the gear has become stuck. The sliding mechanism becomes locked in its foremost position and the wire (wi) then released from it. The pull in the towing warp is then transferred to the back end of the frame, whereby the gear is turned. The propeller of the flow meter cannot rotate backward.

Fig. 4. Fotografi av fangst fra drag i dypet ved Torbjørnsskjær (Åo), august 1987; del A. Den øvrige del av samme prøve (del B) er vist i Fig. 5. Dyp = 465 m. Slept distanse = 1240 m. Fotokarets bredde = 15 cm.

Fig. 5. Fotografi av fangst fra drag i dypet ved Torbjørnsskjær (Åo), august 1987; del B. Den øvrige del av samme prøve (del A) er vist i Fig. 4. Dyp = 465 m. Slept distanse = 1240 m. Fotokarets bredde = 15 cm.

Fig. 6. Fotografi av fangst fra drag i dypet ved Elle (Im), august 1988.
Dyp = 200 m. Slept distanse = 908 m. Fotokarets bredde = 15 cm.
Oksygeninnhold 1 m over bunnen: 5,06 ml/l.

Fig. 7. Fotografi av fangst fra drag i dypet ved Steilene (Dk), august 1988.
Dyp = 100 m. Slept distanse = 624 m. Fotokarets bredde = 15 cm.
Oksygeninnhold 1 m over bunnen: 3,10 ml/l.

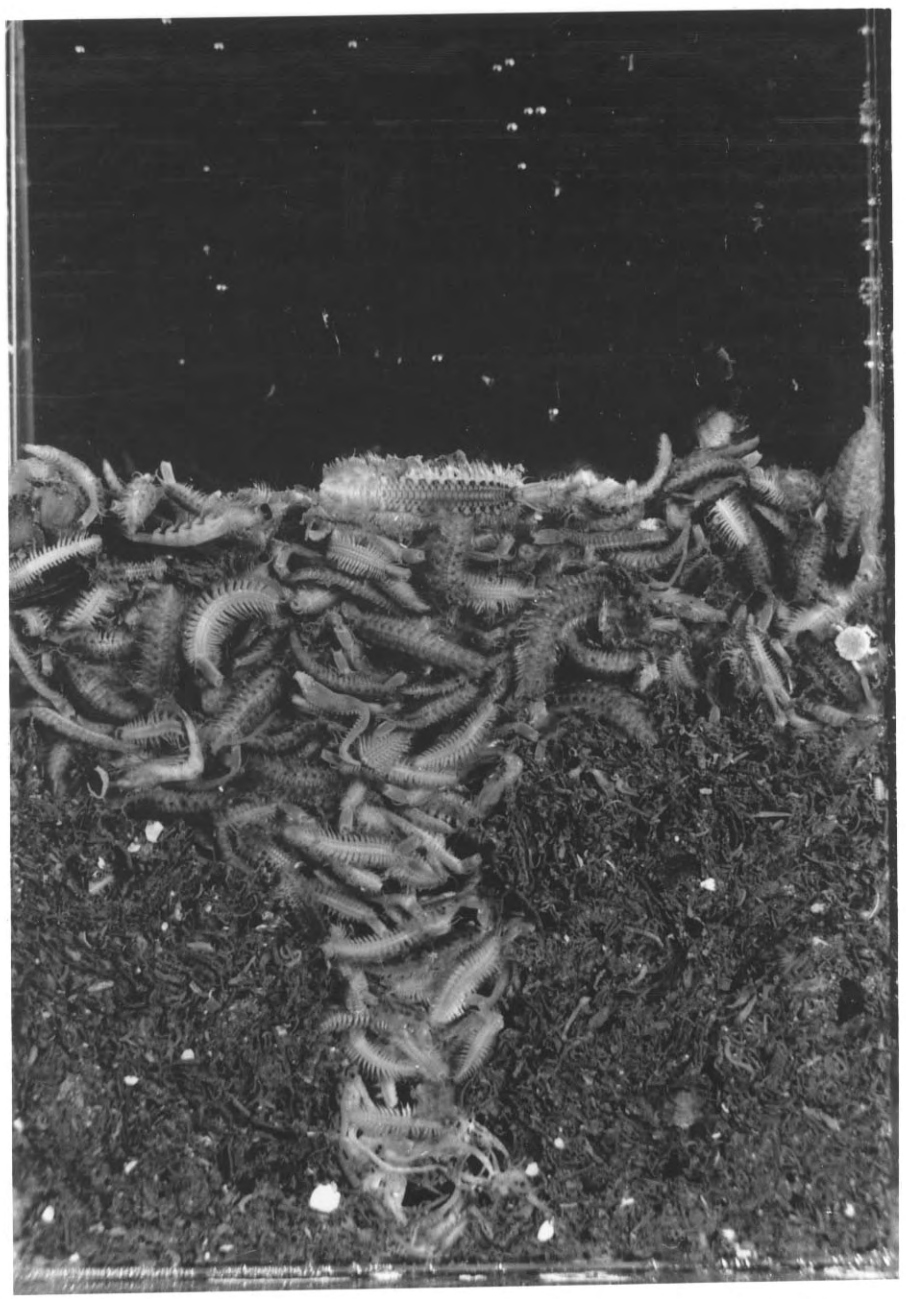


Fig. 8. Fotografi av fangst fra drag i Lysakerfjorden (Bn), august 1988.
Dyp = ca. 80 m. Slept distanse = 1200 m. Fotokarets bredde = 15 cm.
Oksygeninnhold 1 m over bunnen: 1,52 ml/l.

Fig. 9. Fotografi av fangst fra dypet ved Svartskog (Ep), august 1988.
Dyp = 155 m. Slept distanse = 376 m. Fotokarets bredde = 15 cm.
Oksygeninnhold 1 m over bunnen: 0,00 ml/l.

Fig. 10. Fotografi av fangster fra drag ved Elle (Im), Gråøy (Gk), Spro (Fl) og Steilene (Dk), desember 1973. Glassenes diameter = 11 cm og 10,5 cm. Kfr. Fig. 66B.

Fig. 11. Fotografi av fangster fra Gåsøyrenna (Cl), Lysakerfjorden (Bn), dypet ved Helviktangen (Cp) og ved Svartskog (Ep), desember 1973. Glassenes diameter = 10,5 cm.

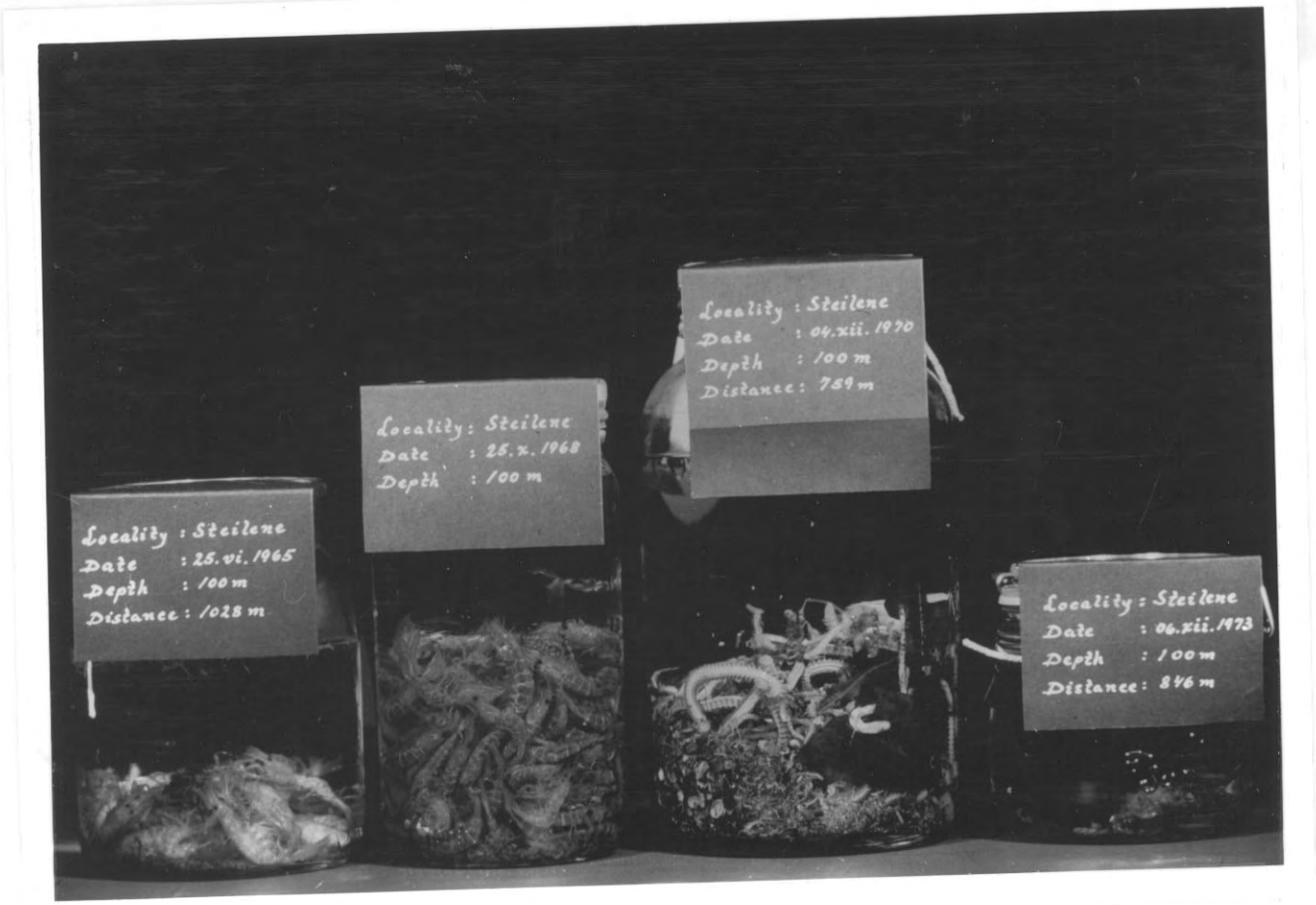


Fig. 12. Fotografi av fangster i dypet ved Steilene (Dk), juni 1965, oktober 1968, desember 1970 og desember 1973. Glassenes diameter = 11 cm, 9,5 cm, 12 cm og 10,5 cm.

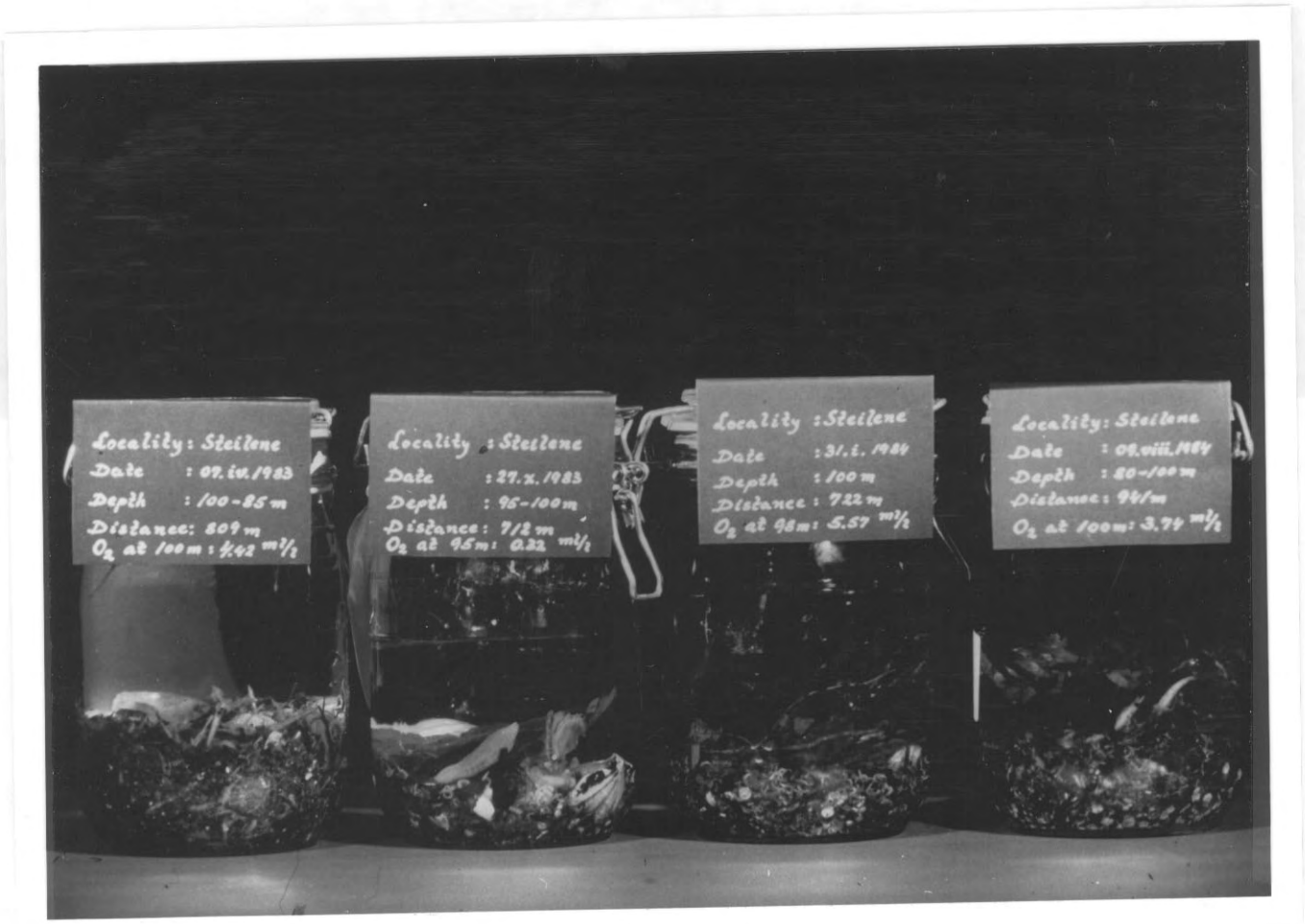


Fig. 13. Fotografi av fangster fra dypet ved Steilene (dk), april 1983, oktober 1983, januar 1984 og august 1984, med angitt oksygeninnhold i vannet nær bunnen. (Oksygenverdien for oktober 1983 = 0,32 ml/l.) Glassenes diameter = 10,5 cm.

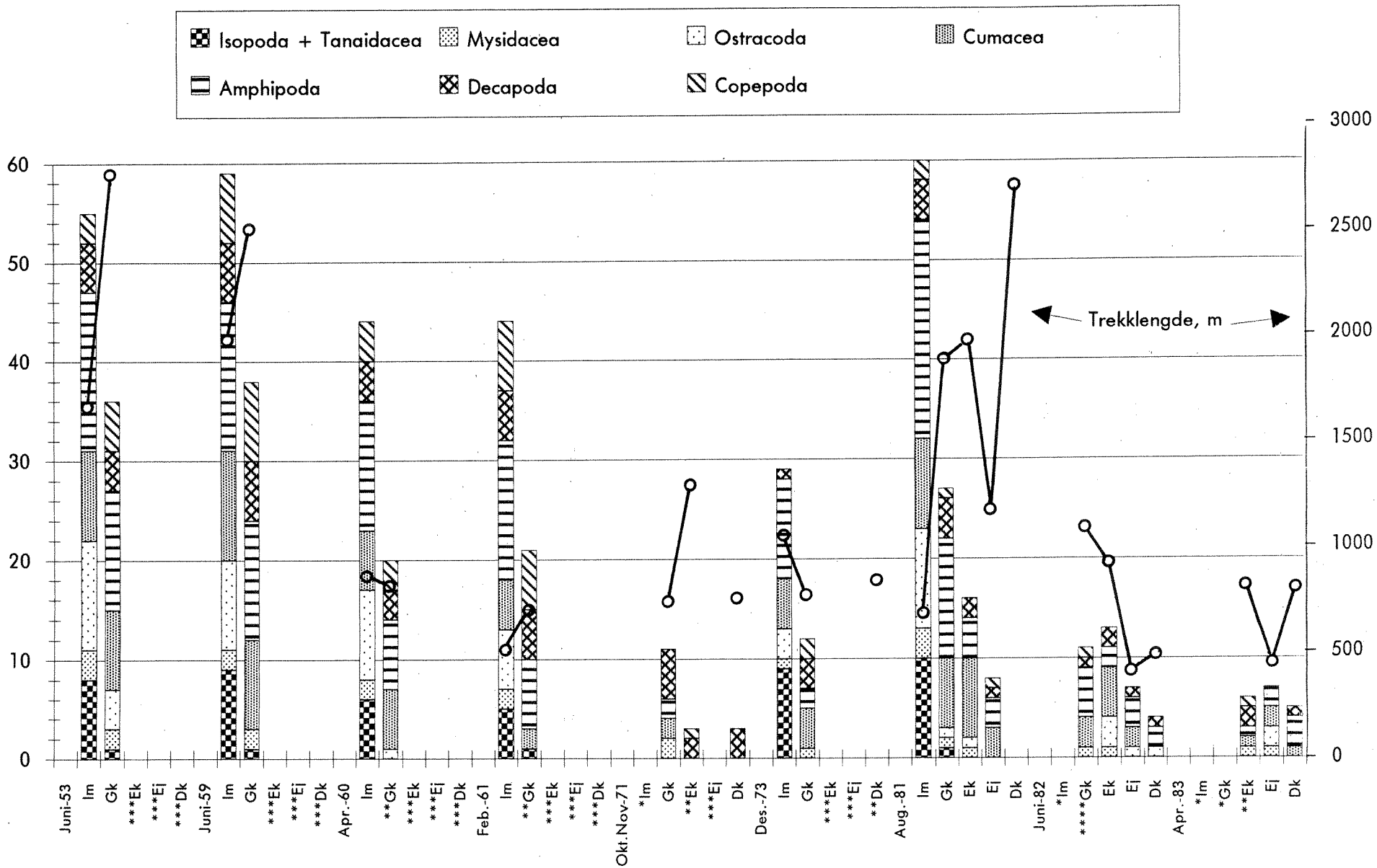


Fig. 14. Antall taxa i krepsdyrgrupper fra Elle (Im) til Steilene (Dk). Copepoda: Bare de bunnlevende Calanoida. * = Ikke anlysert. ** = Lite sediment. *** = Ingen prøve. **** = Ufullstendig prøve.

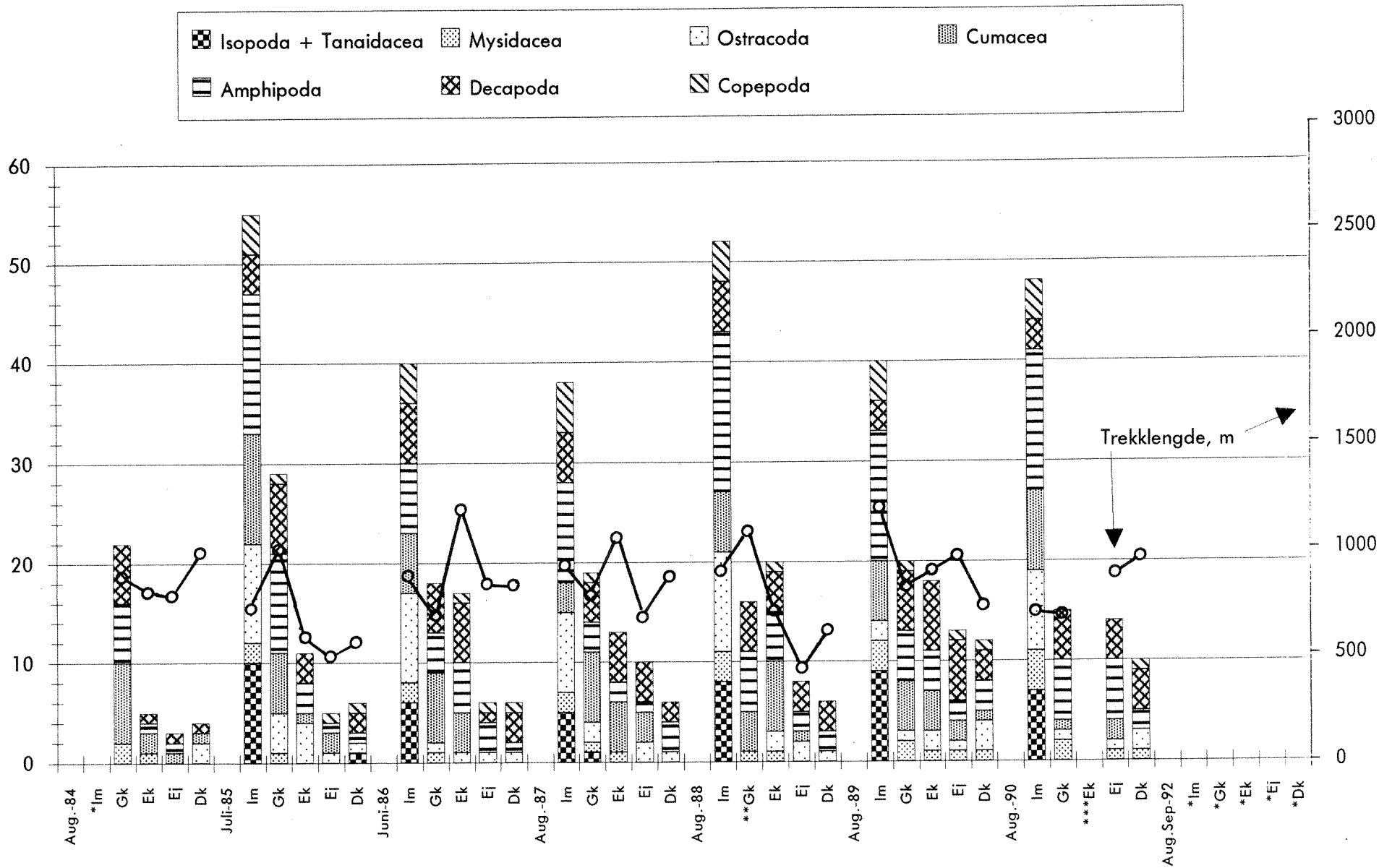


Fig. 15. Antall taxa i krepsdyrgrupper fra Elle (Im) til Steilene (Dk). Copepoda: Bare de bunnlevende Calanoida. * = Ikke analysert. ** = Lite sediment. *** = Ingen prøve.

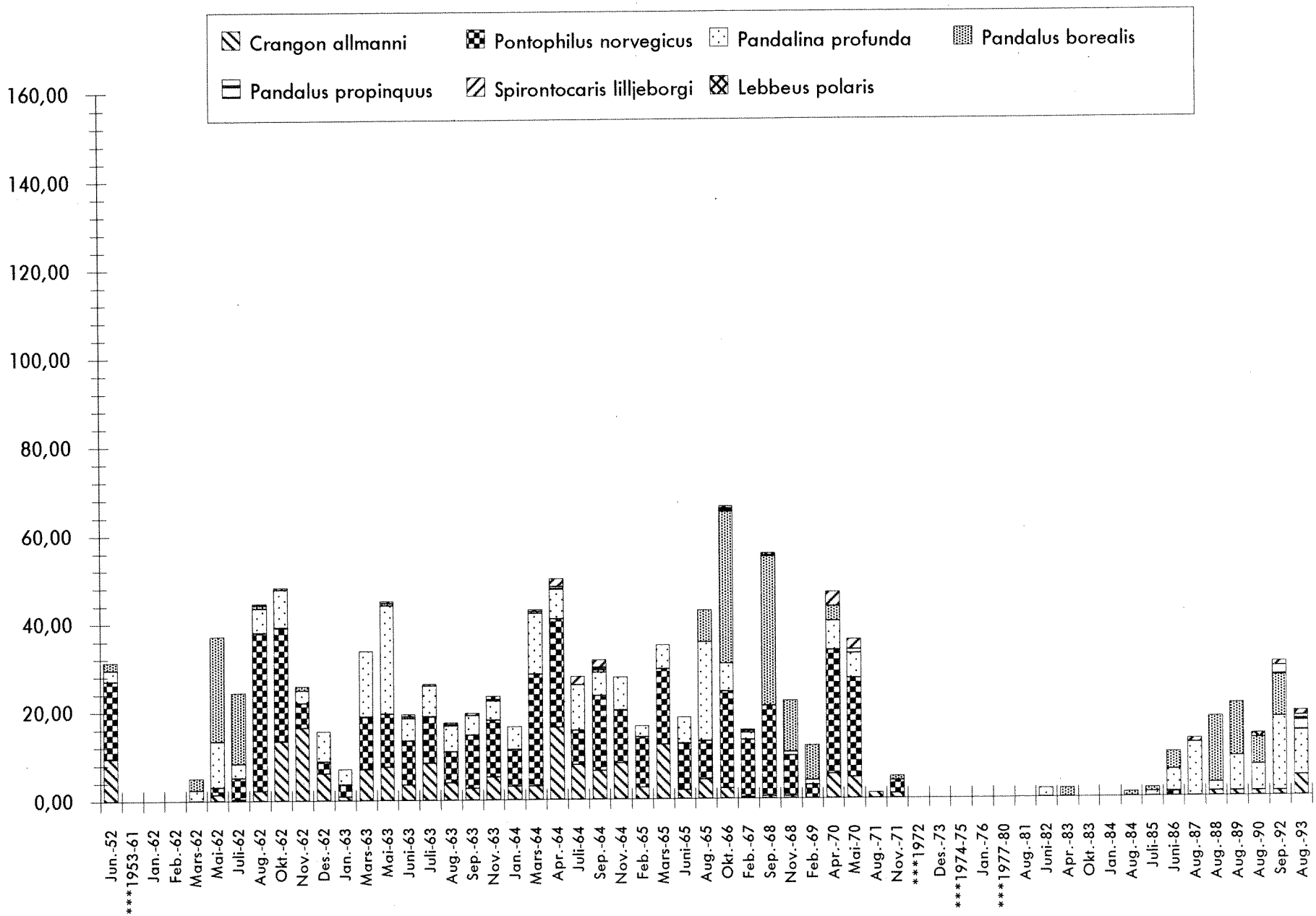


Fig. 16. Antall individer/100 m3 av de vanligste rekene ved Steilene (Dk). *** = Ingen prøve. 1966-69 = Minimumsverdier da slepedistansen ikke er godt nok kjent.

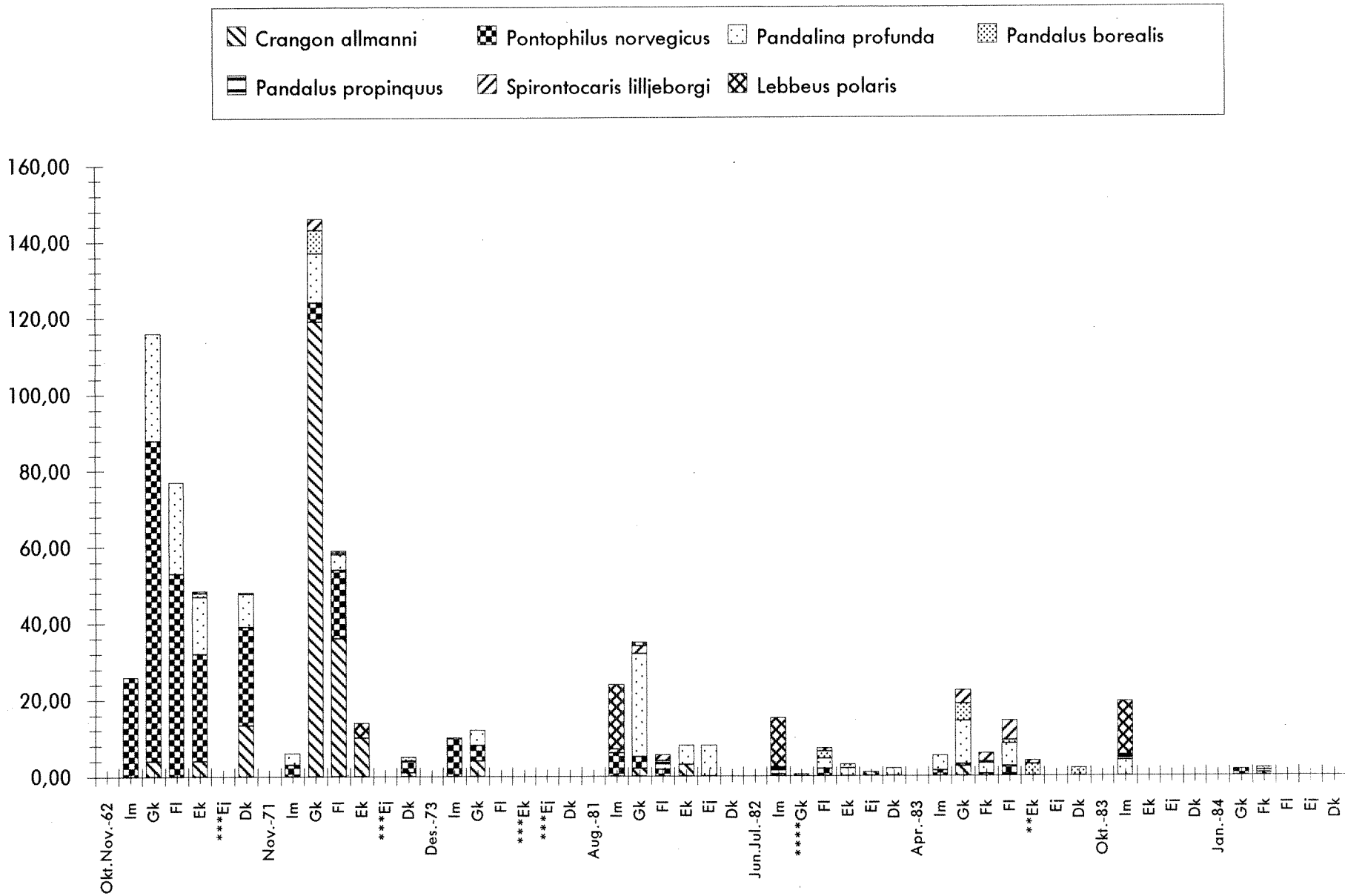


Fig. 17. Ind./100 m3 av de vanligste rekene fra Elle (Im) til Steilene (Dk). Verdier utenfor Dk i 1962 og alle i 1971 fra GJERMUNDSEN (1974).
*** = Ingen prøve. ** = Lite sediment. **** = Ufullstendig prøve.

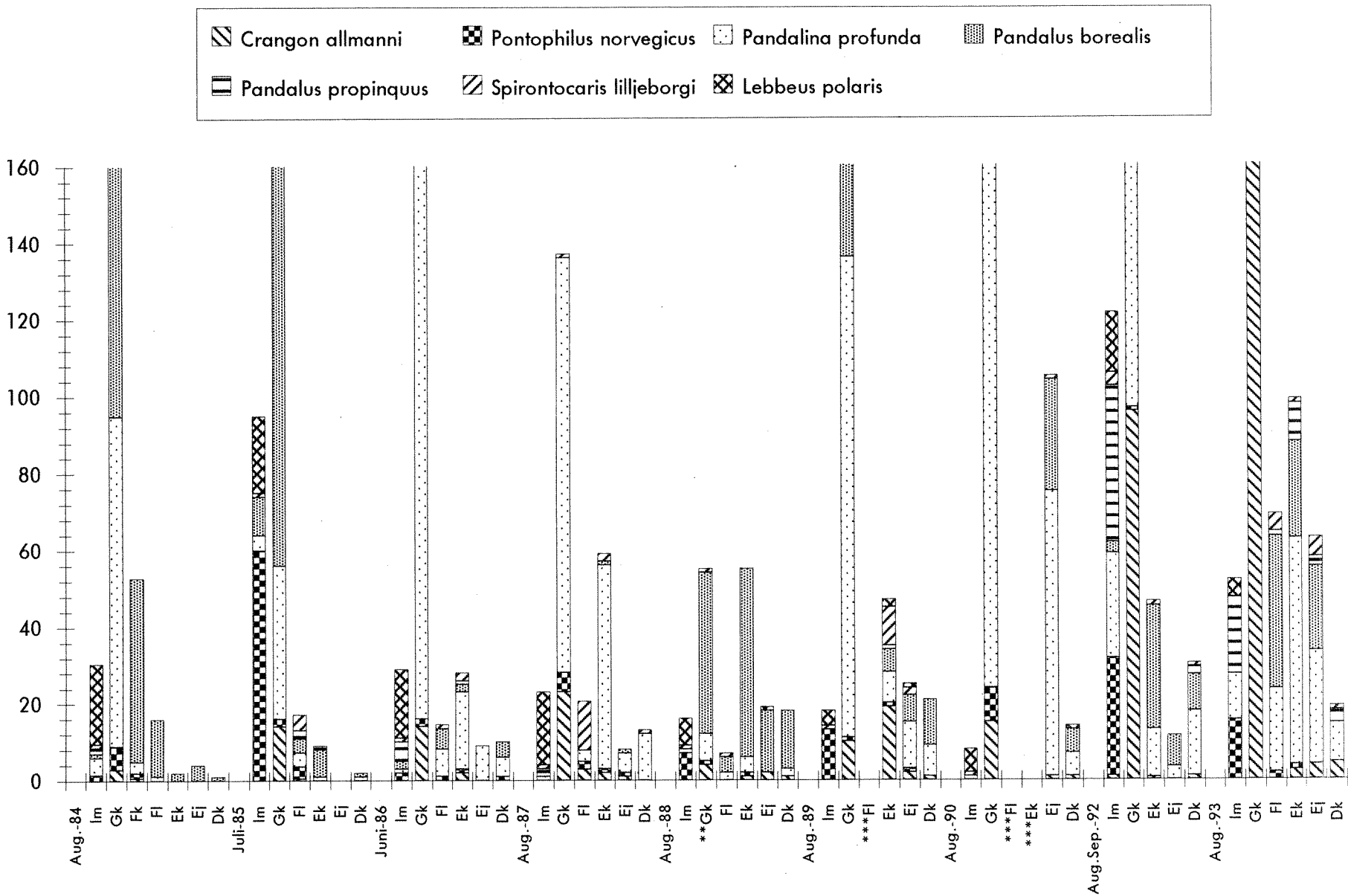


Fig. 18A. Antall individer/100 m3 av de vanligste rekeartene i observasjonsserier fra Elle (Im) ved Drøbak til Steilene (Dk). ** = Lite sediment. *** = Ingen prøve.

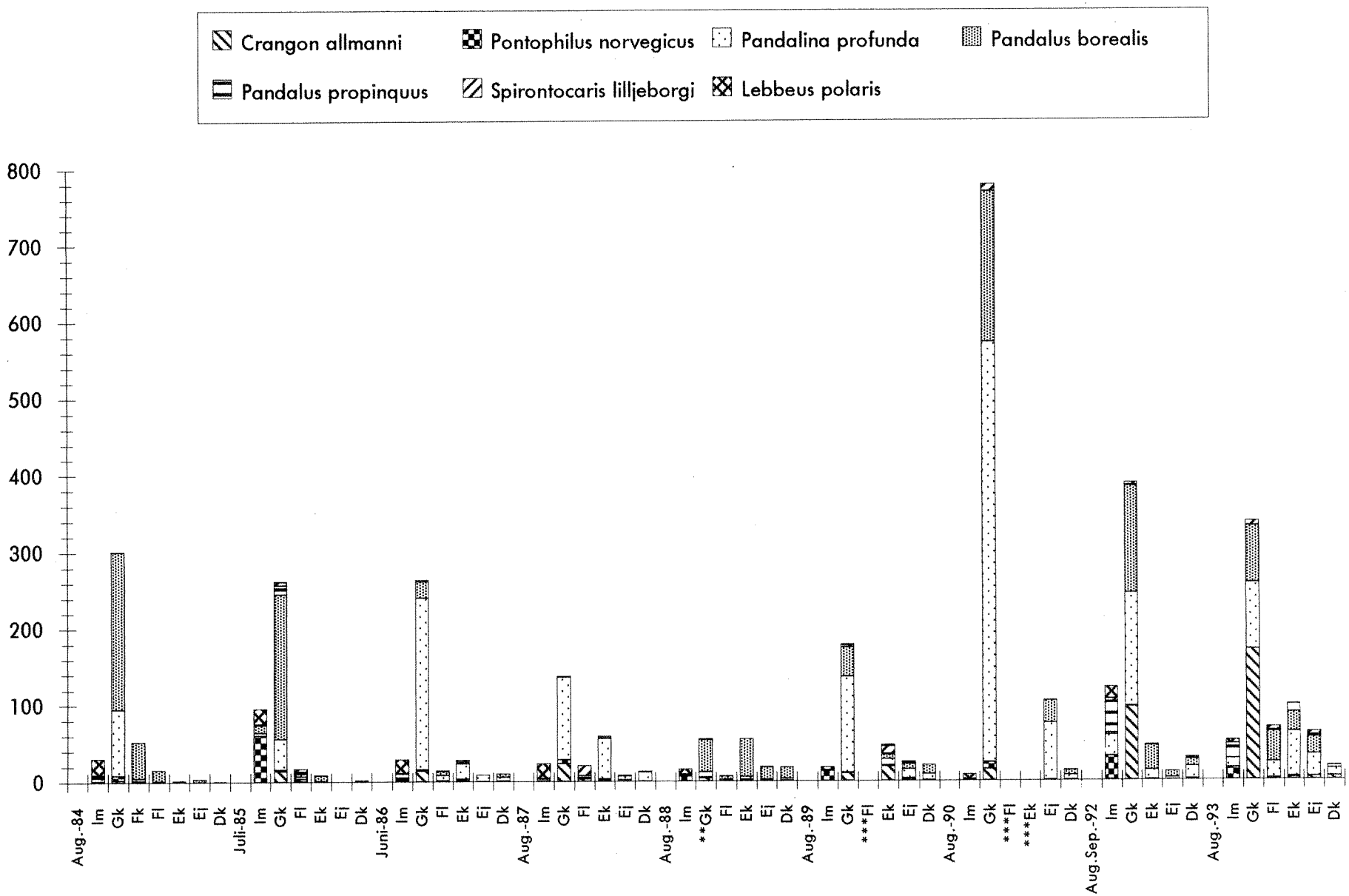


Fig. 18B. Samme som Fig. 18A, men i mindre målestokk for å få alt med.

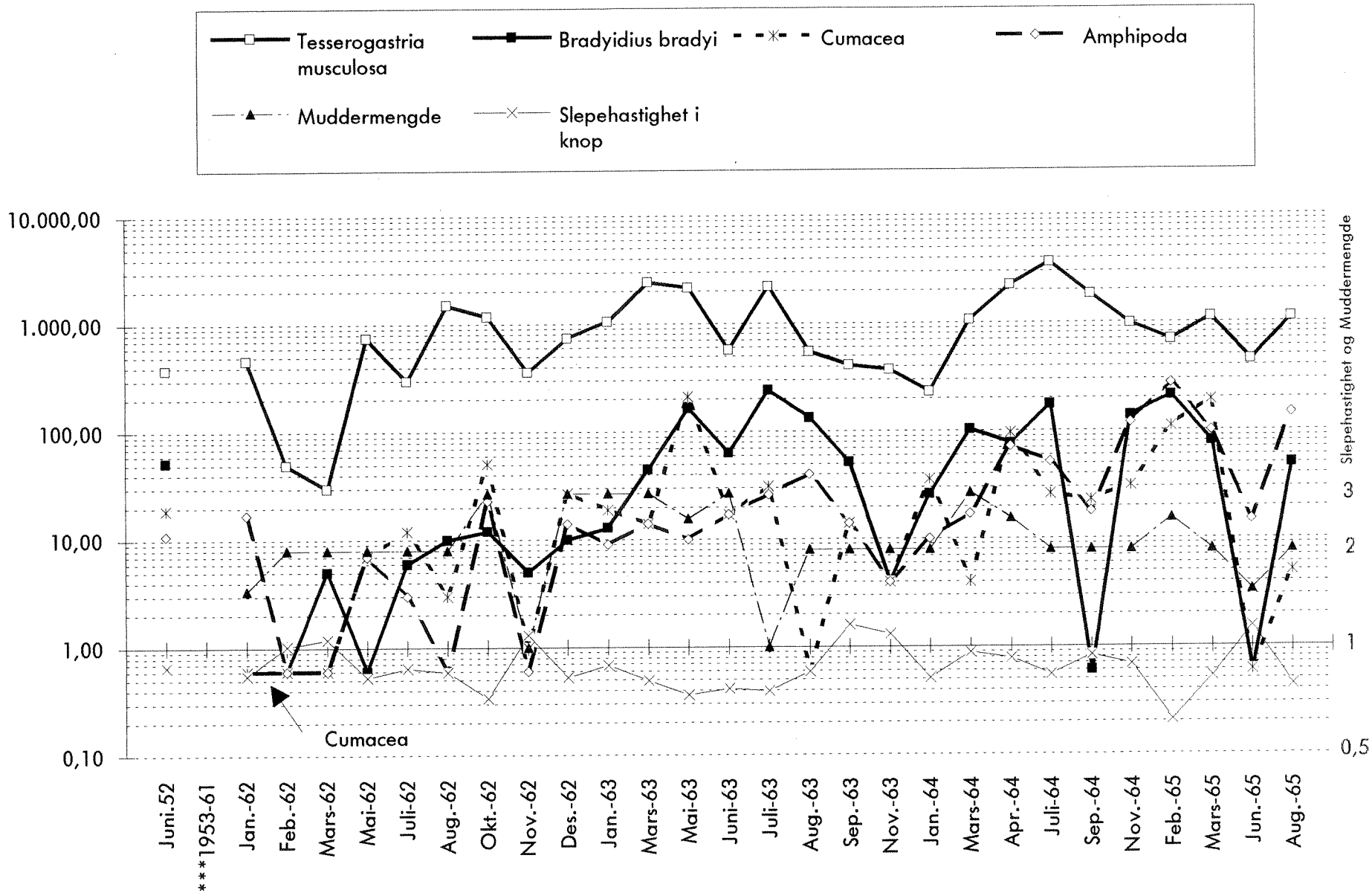


Fig. 19. Individer/100 m3 ved Steilene (Dk). 0,60 = Ingen funnet. *** = Ingen prøve. Skala for slepehastighet og muddermengde til høyre. Data fra Beyer og Versvik (1968).

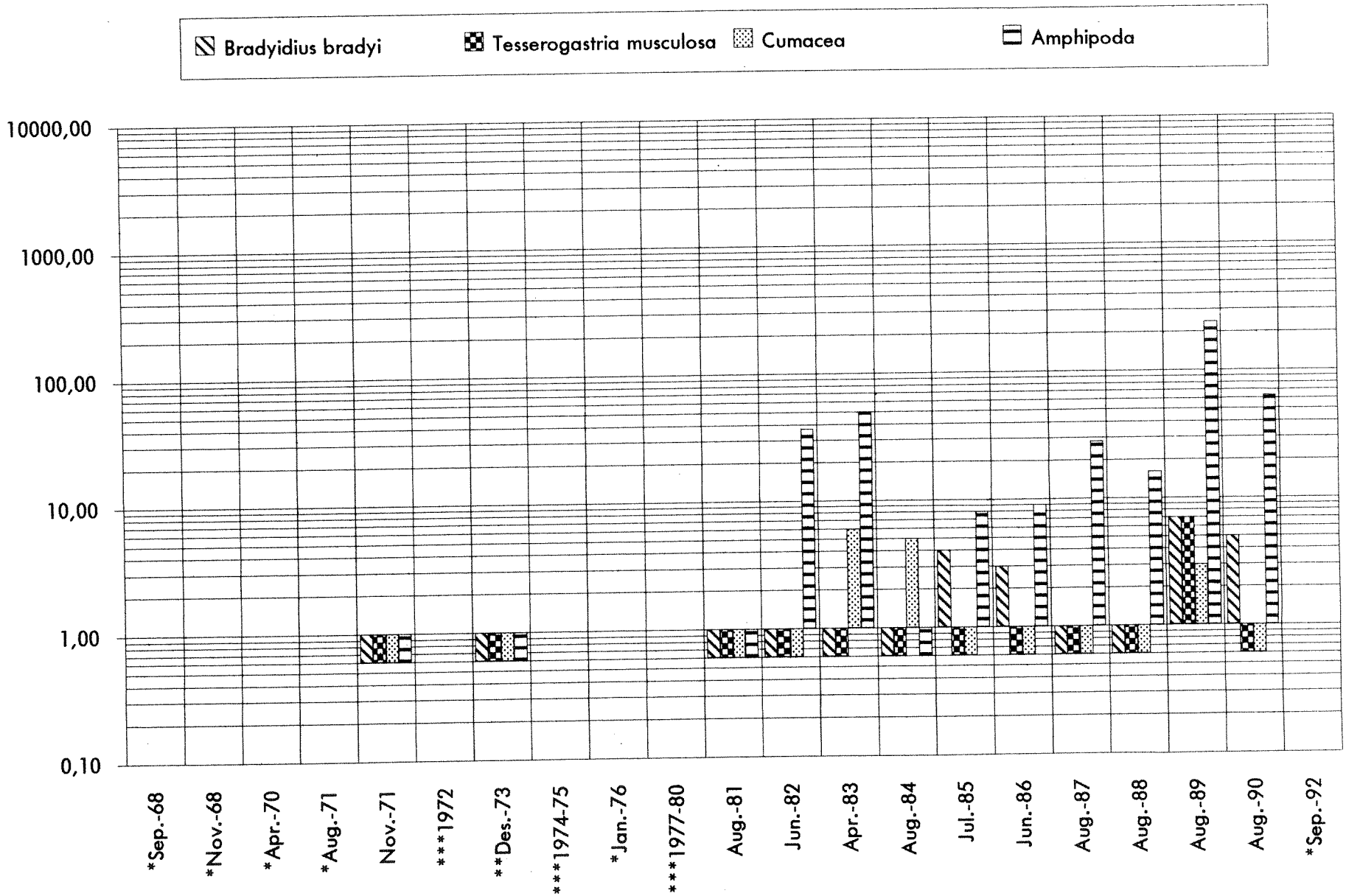


Fig. 20. Antall individer/100 m3 ved Steilene, Dk. 0,60 = Ingen funnet. * = Ikke anlysert. *** = Ingen prøve. ** = Lite sediment.

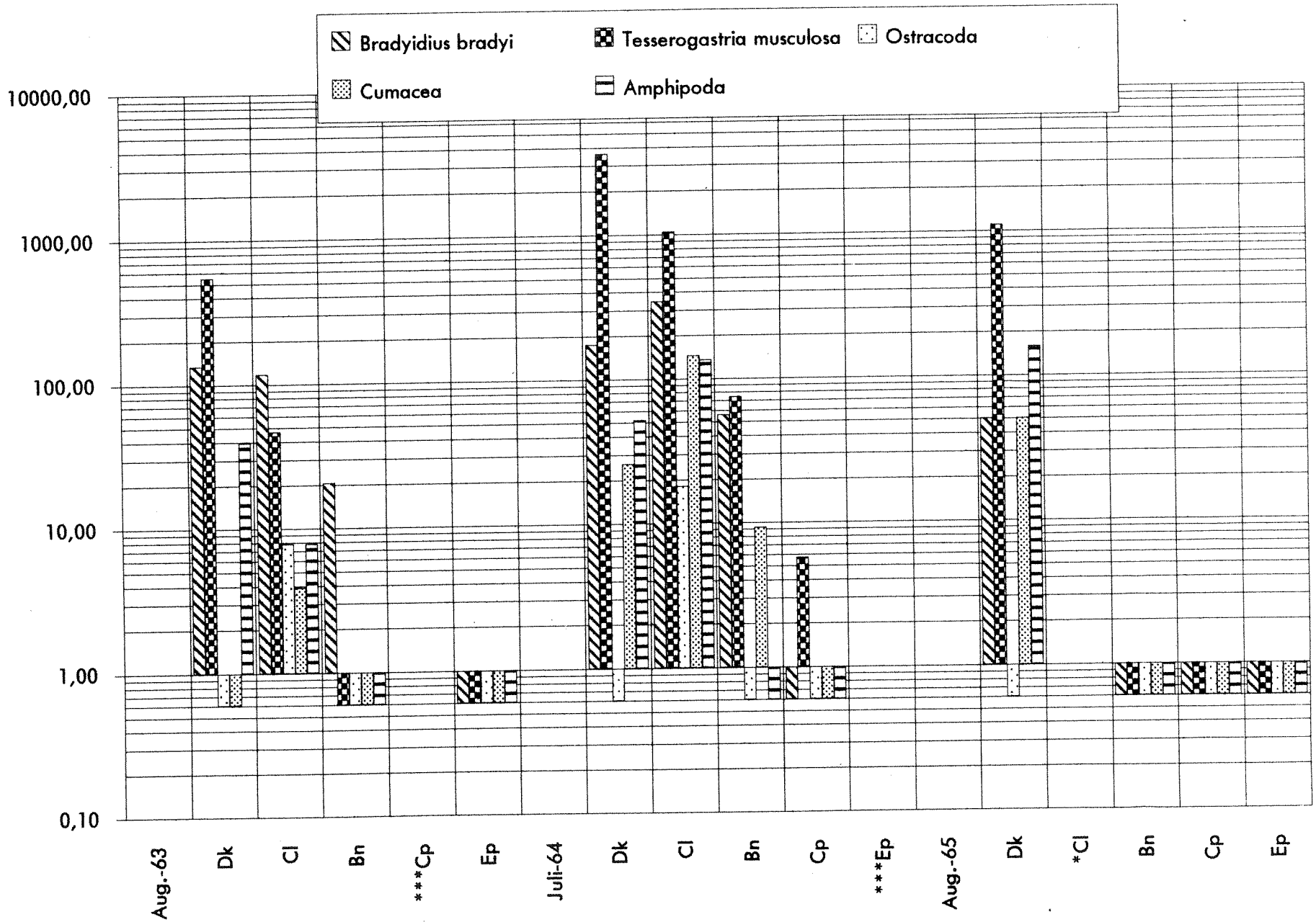


Fig. 21. Antall individer/100 m3 i serier fra Steilene (Dk) til Svartskog (Ep) i Bunnefjorden. 0,60 = Ingen funnet. *** = Ingen prøve. * = Ikke analysert.

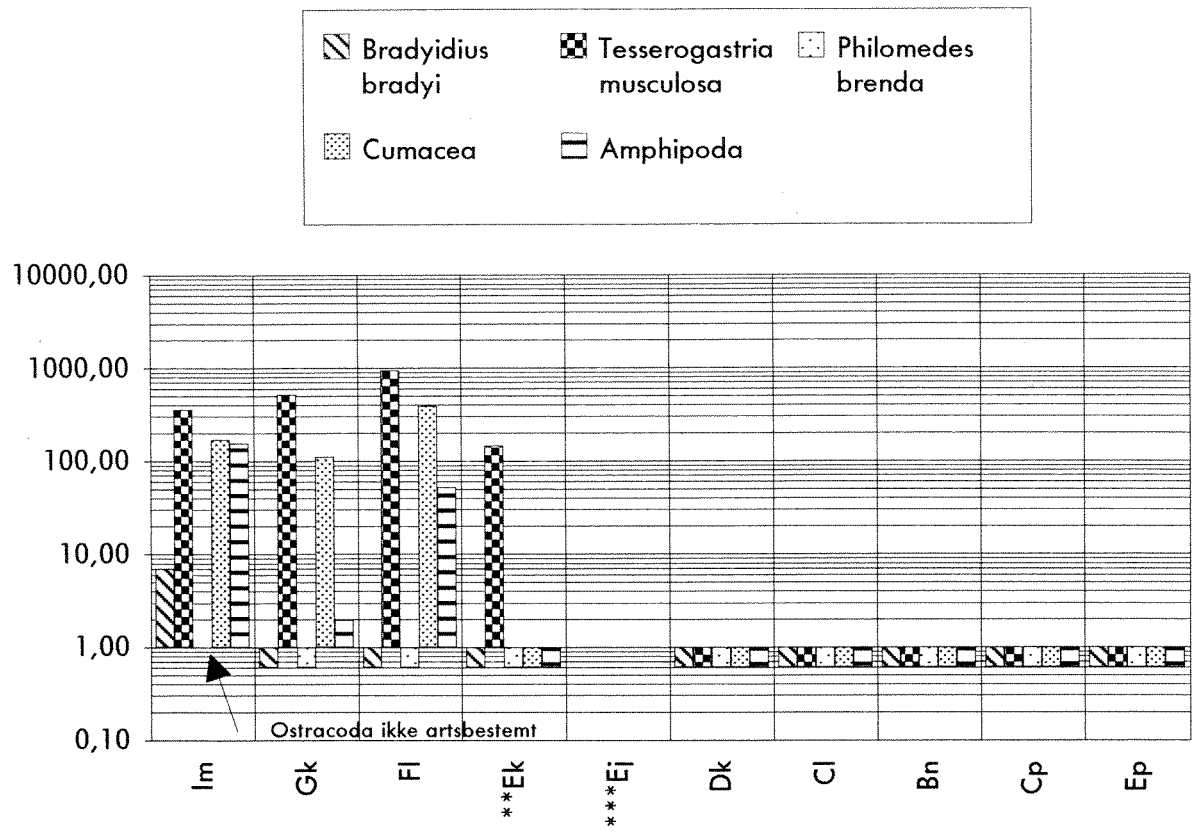


Fig. 22. Ind./100 m3 Okt.-Nov. 1971 fra Elle (Im) til Svartskog (Ep). Data fra GJERMUNDSEN (1974).

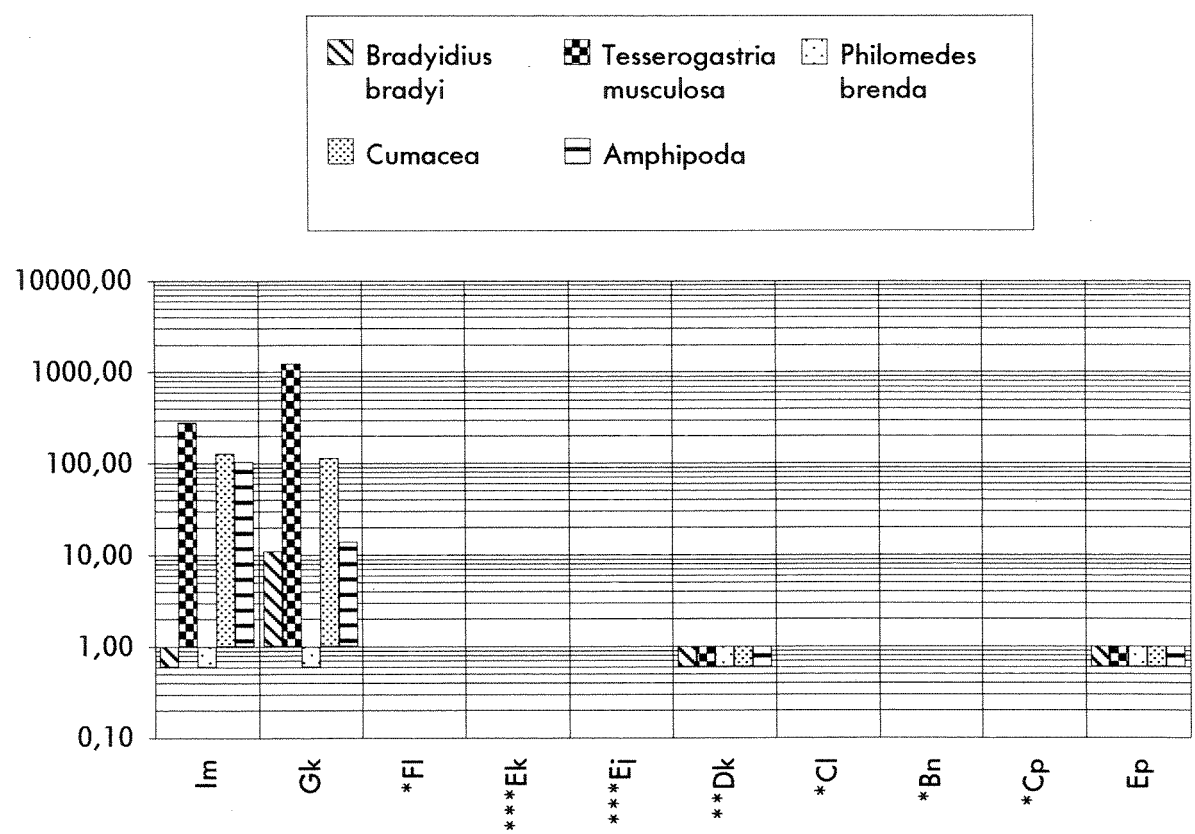


Fig. 23. Ind./100 m3 Desember 1973 fra Elle (Im) ved Drøbak til Svartskog (Ep) i Bunnefjorden.

Fig. 22 og 23: 0,60 = Ingen funnet. * = Ikke analysert. ** = Lite sediment. *** = Ingen prøve.

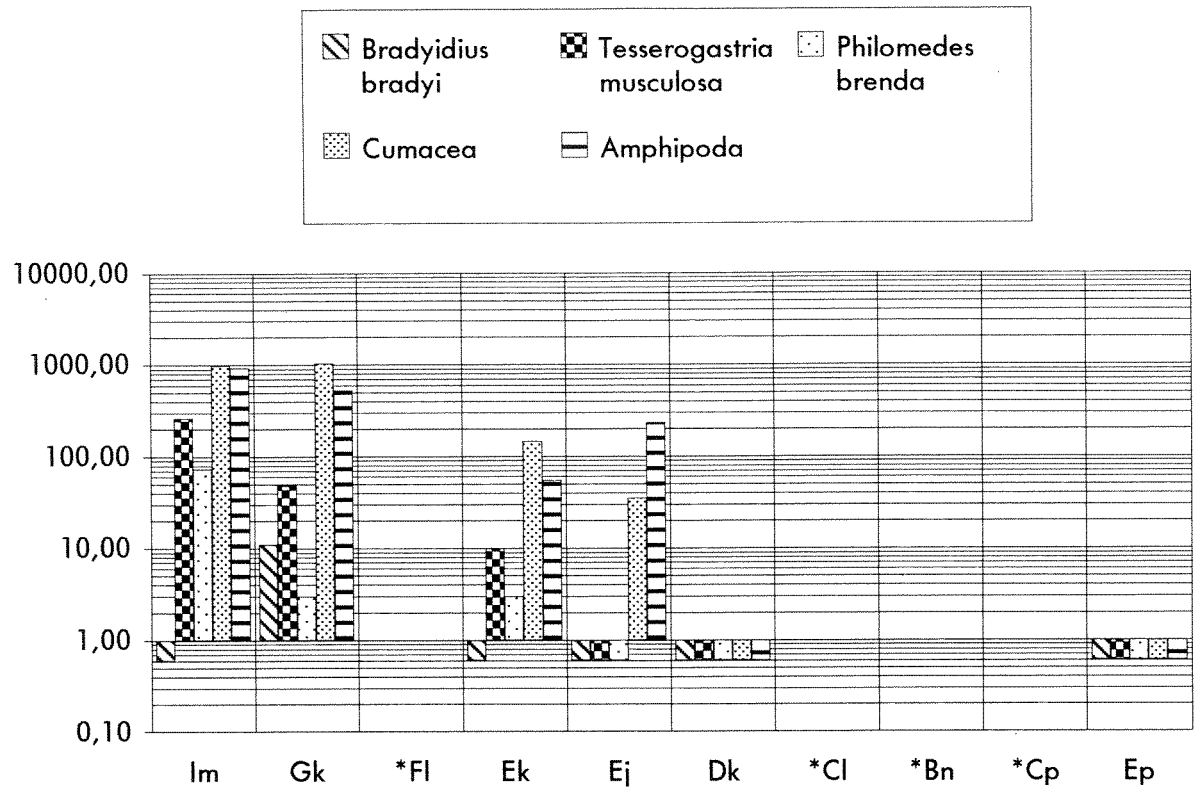


Fig. 24. Ind./100 m3 August 1981 fra Elle (Im) til Svartskog. 0,60 = Ingen funnet * = Ikke analysert.

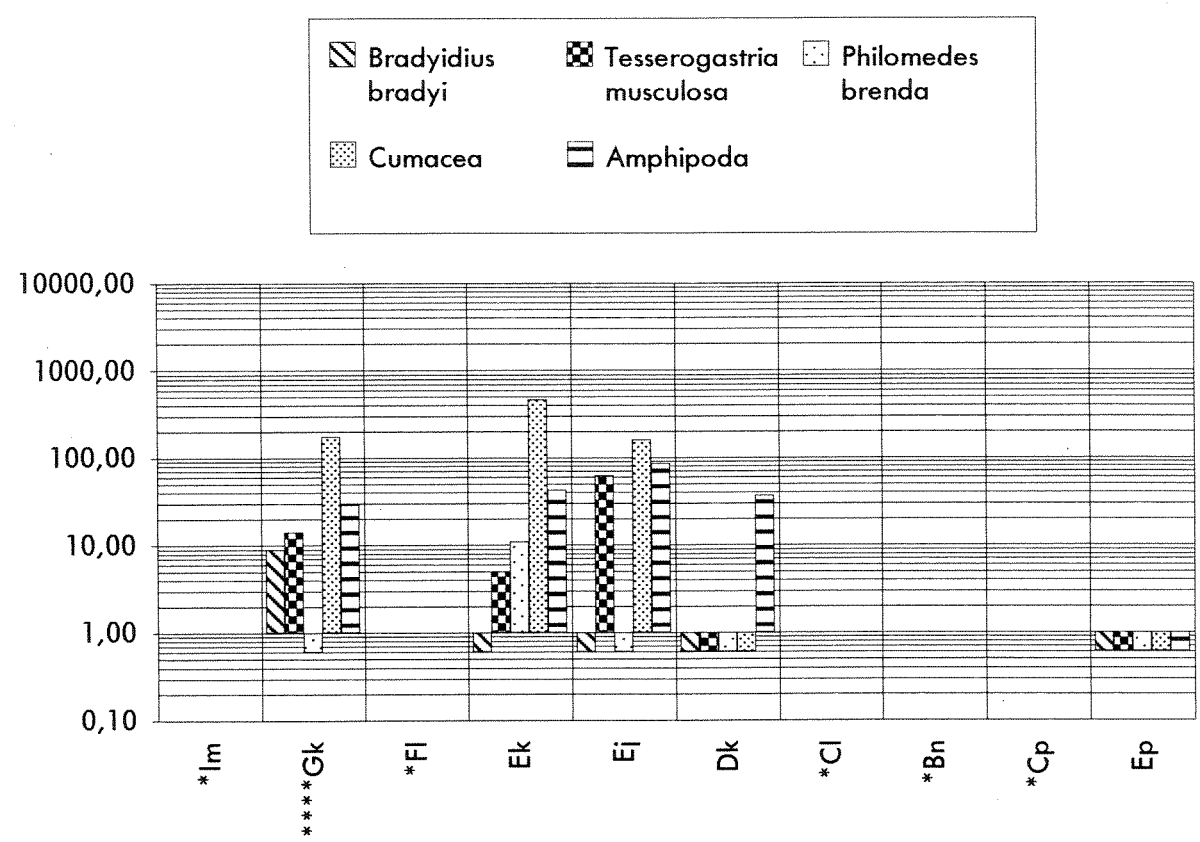


Fig. 25. Ind./100 m3 Juni 1982. 0,60 = Ingen funnet. * = Ikke analysert. **** = Ufullstendig prøve.

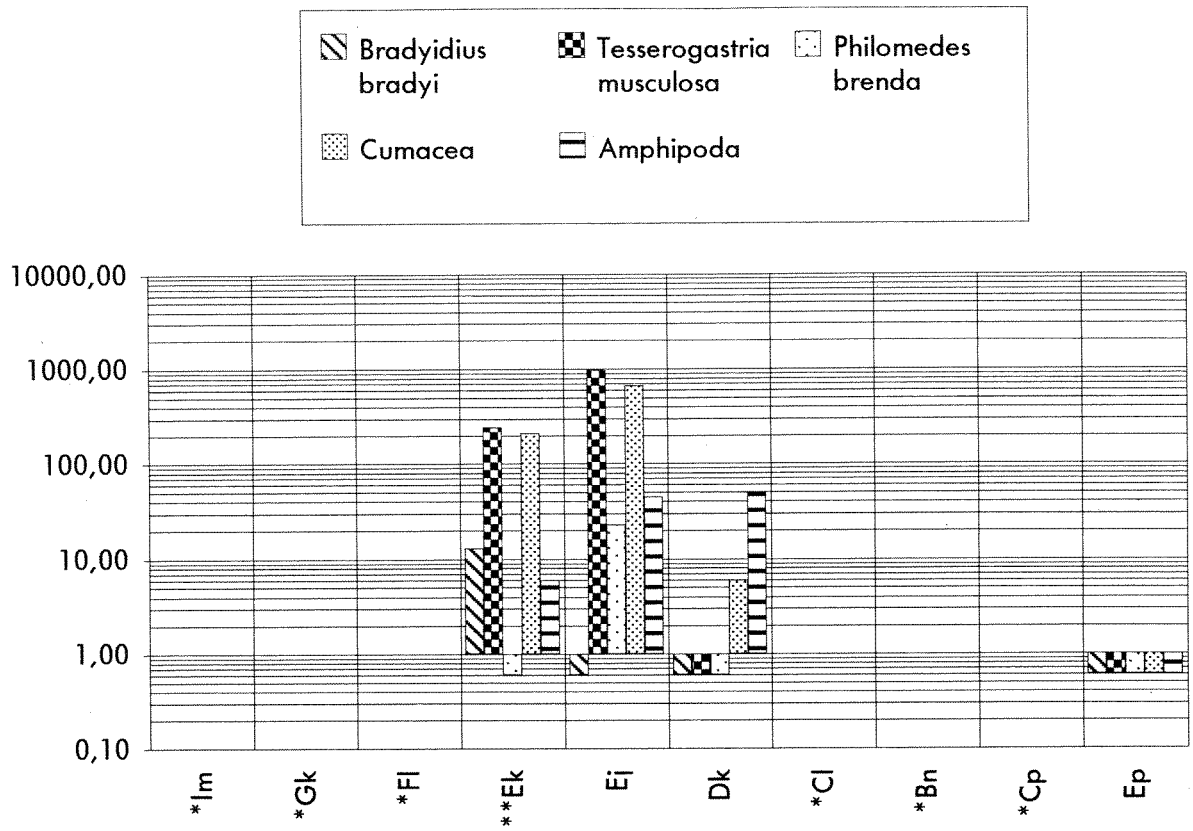


Fig. 26. Ind./100 m3 April 1983 fra Elle (Im) til Svartskog (Ep). ** = Lite sediment.

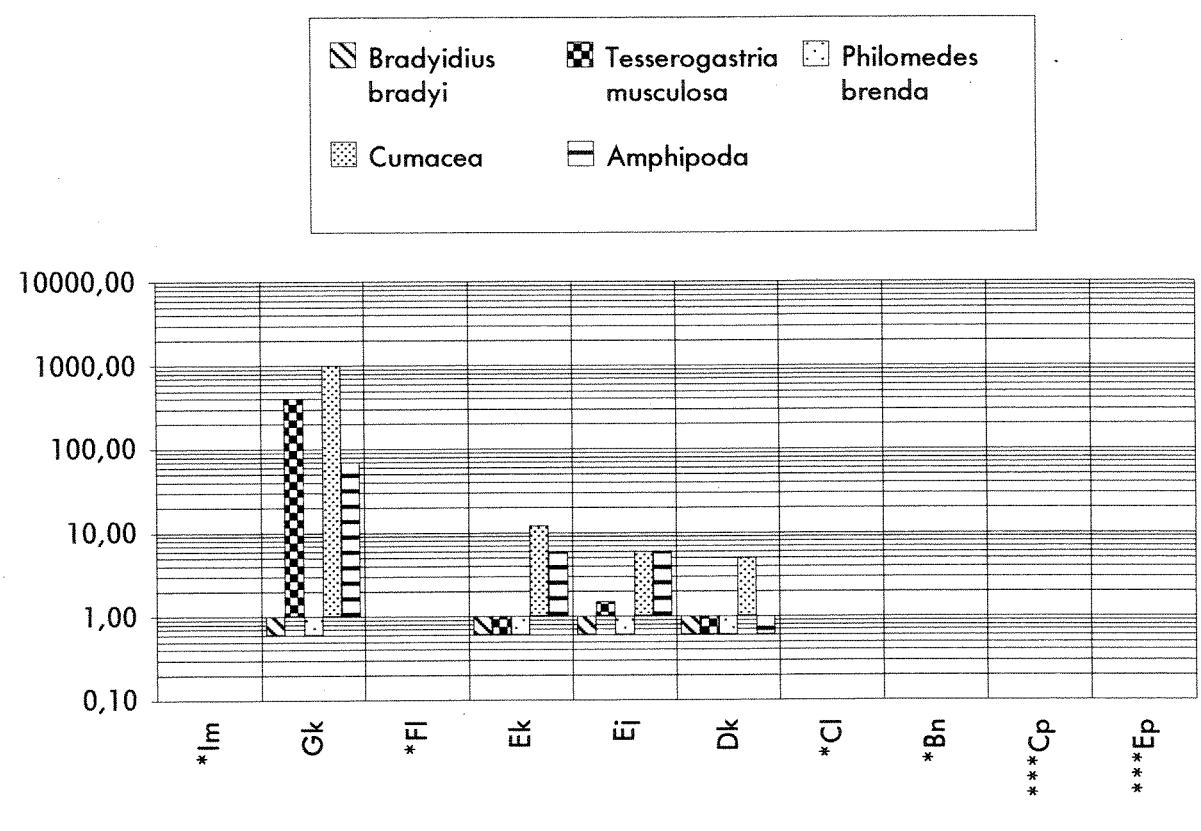


Fig. 27. Ind./100 m3 August 1984. 1 ind. tegnet som 1,5 for å vises. *** = Ingen prøve.

Fig. 26 og Fig. 27: 0,60 = Ingen funnet. * = Ikke analysert.

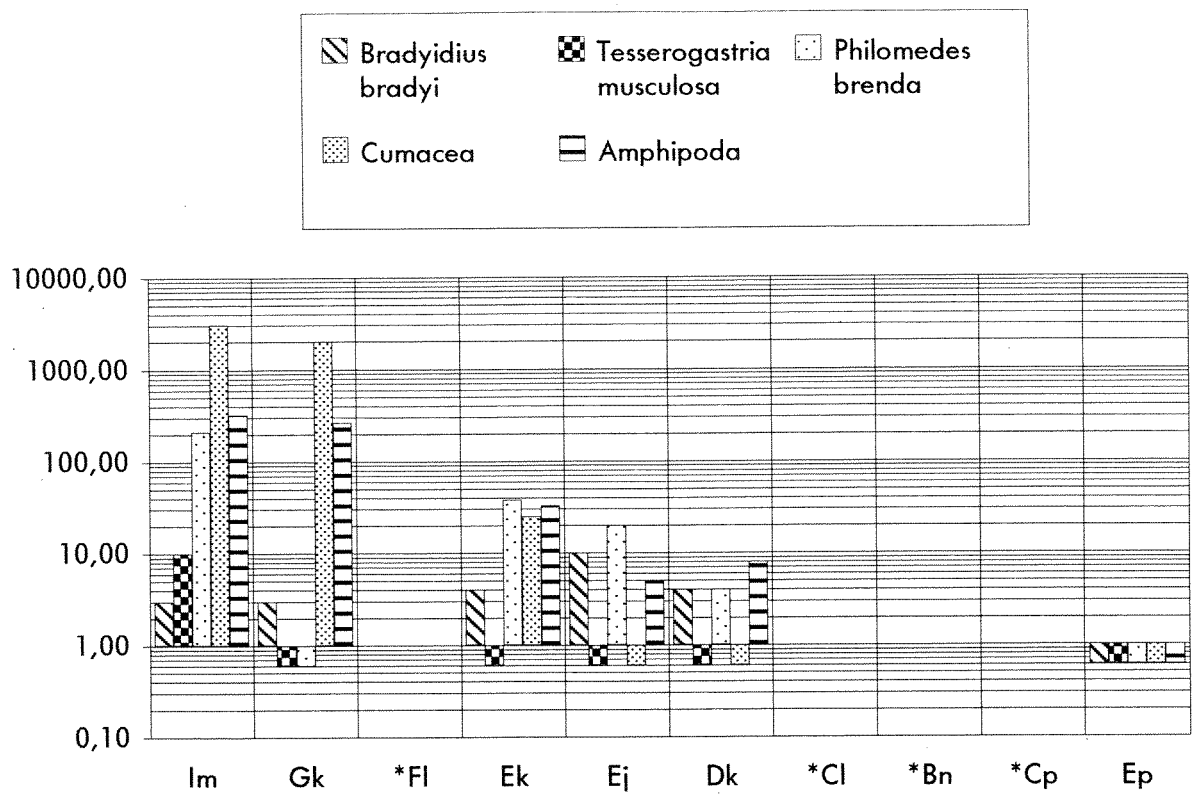


Fig. 28. Ind./100 m3 Juli 1985 fra Elle (Im) til Svartskog (Ep). 0,60 = Ingen funnet. * = Ikke analysert.

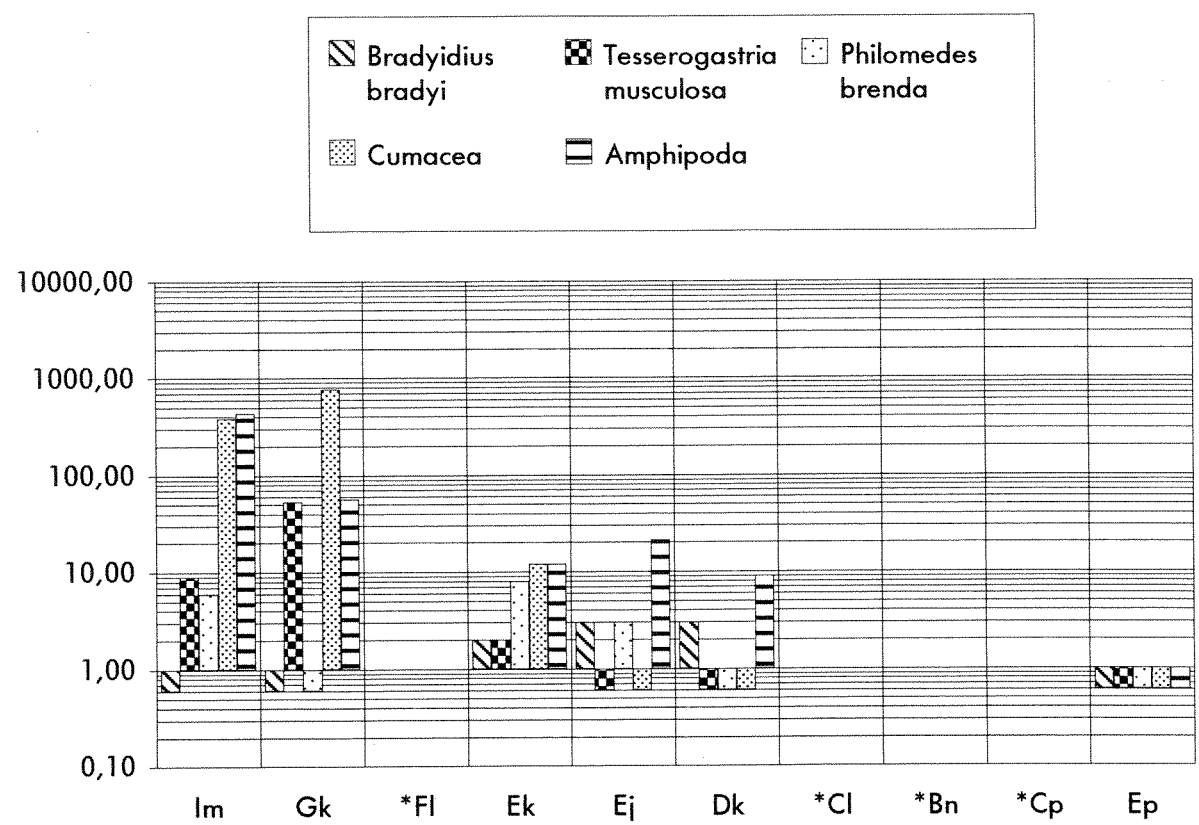


Fig. 29. Ind./100 m3 Juni 1986 fra Elle (Im) til Svartskog (Ep). 0,60 = Ingen funnet. * = Ikke analysert

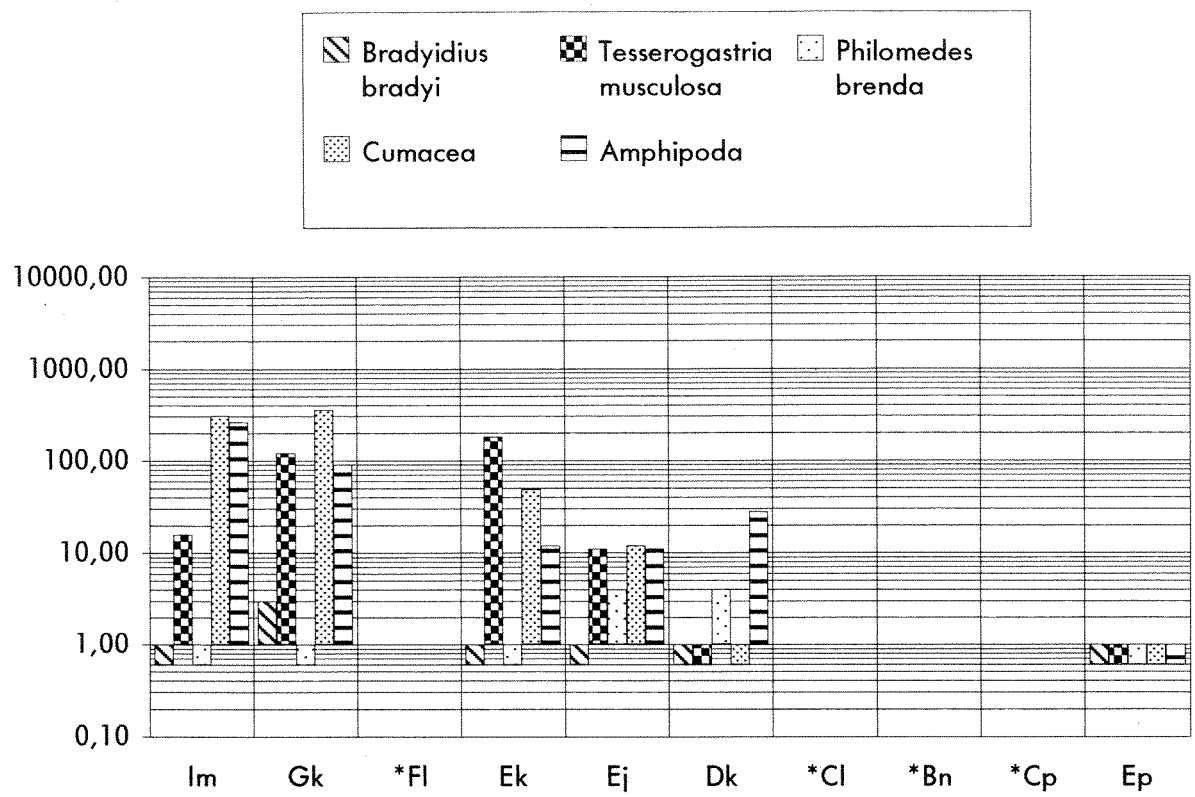


Fig. 30. Ind./100 m3 Aug. 1987 fra Elle (Im) til Svartskog (Ep). 0,60= Ingen funnet. *= Ikke analysert.

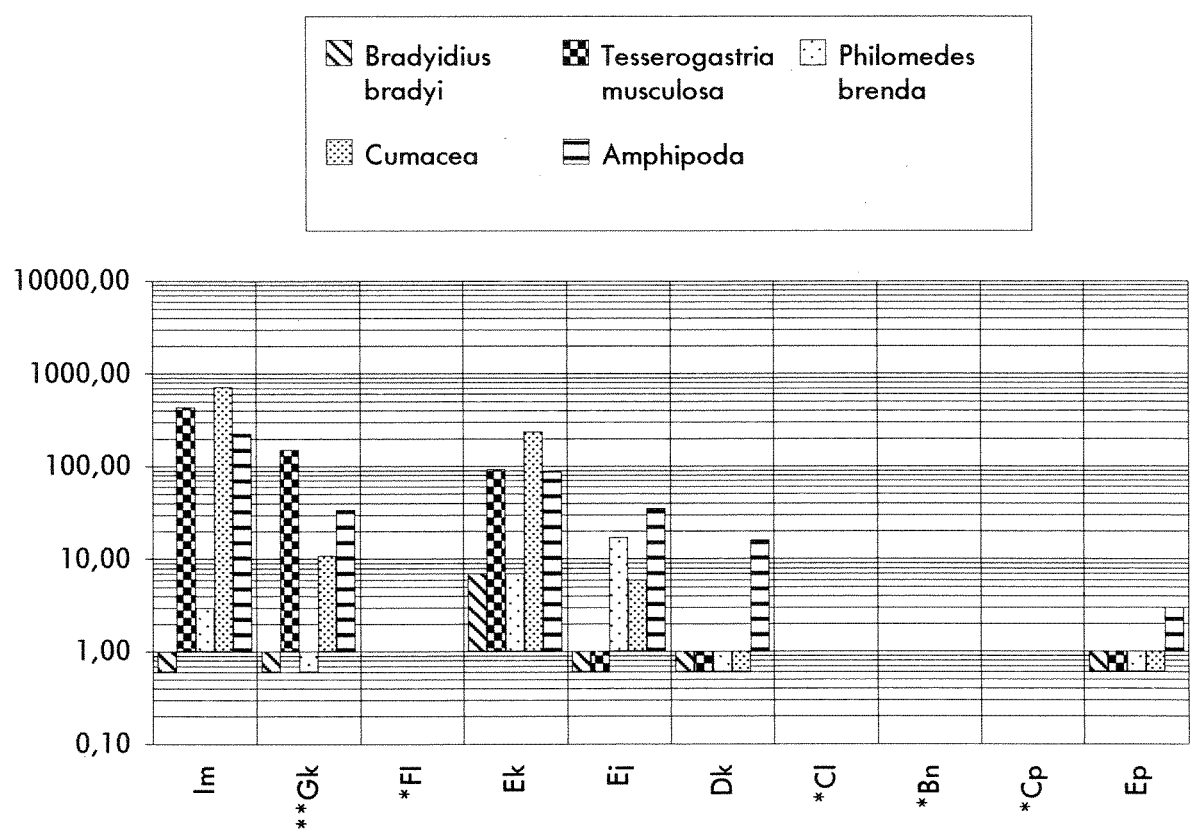


Fig. 31. Ind./100 m3 August 1988. 0,60 = Ingen funnet. * = Ikke analysert. ** = Lite sediment.

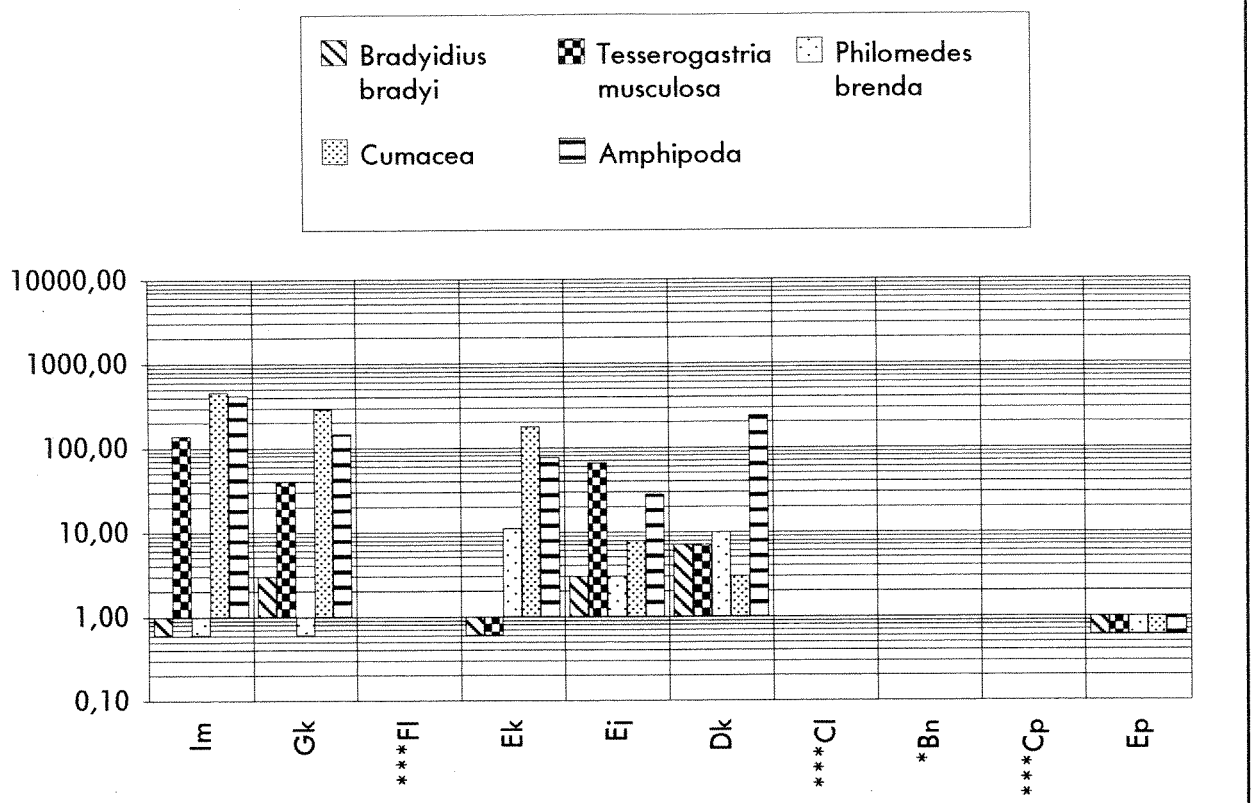


Fig. 32. Ind./100 m3 Aug. 1989 fra Elle (Im) til Svartskog (Ep). 0,60= Ingen funnet. *= Ikke analysert

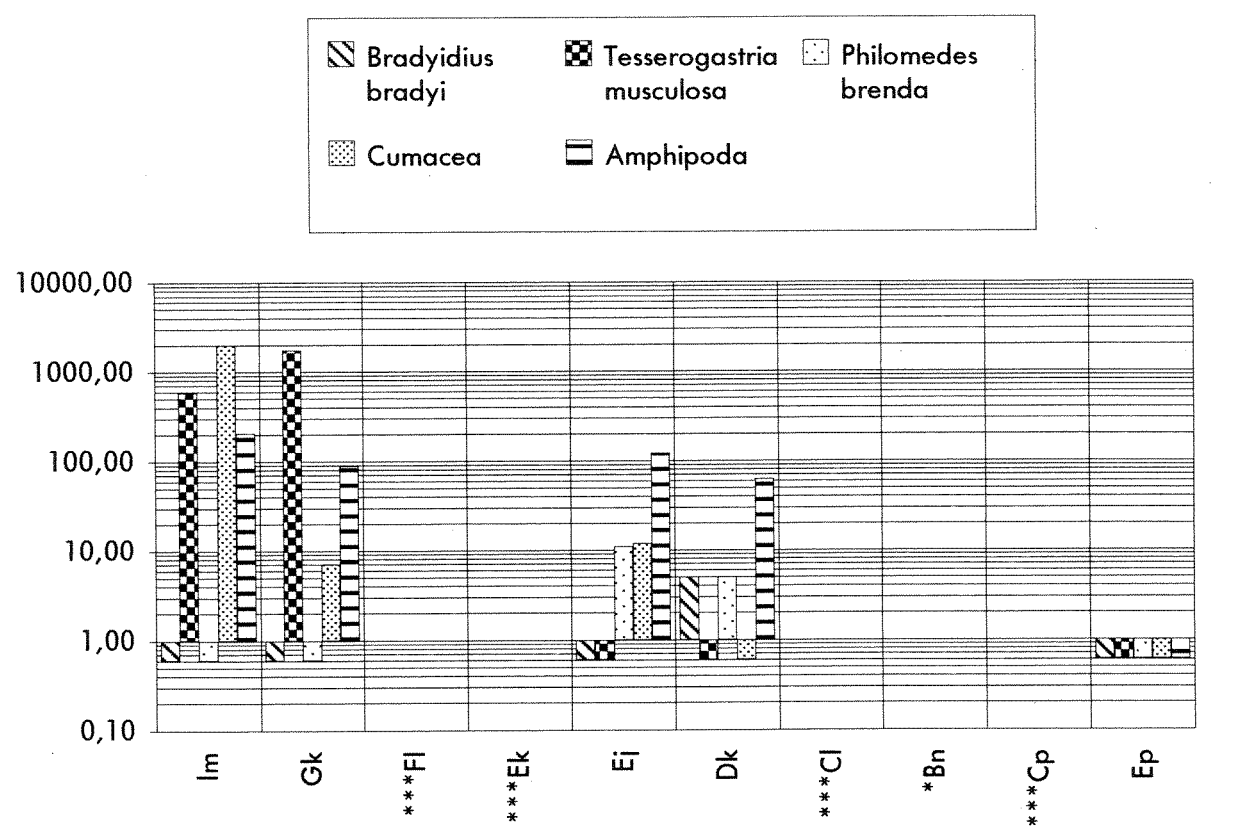


Fig. 33. Ind./100 m3 Aug. 1990 fra Elle (Im) til Svartskog (Ep). 0,60= Ingen funnet. *= Ikke analysert

Fig. 32 og Fig. 33: *** = Ingen prøve.

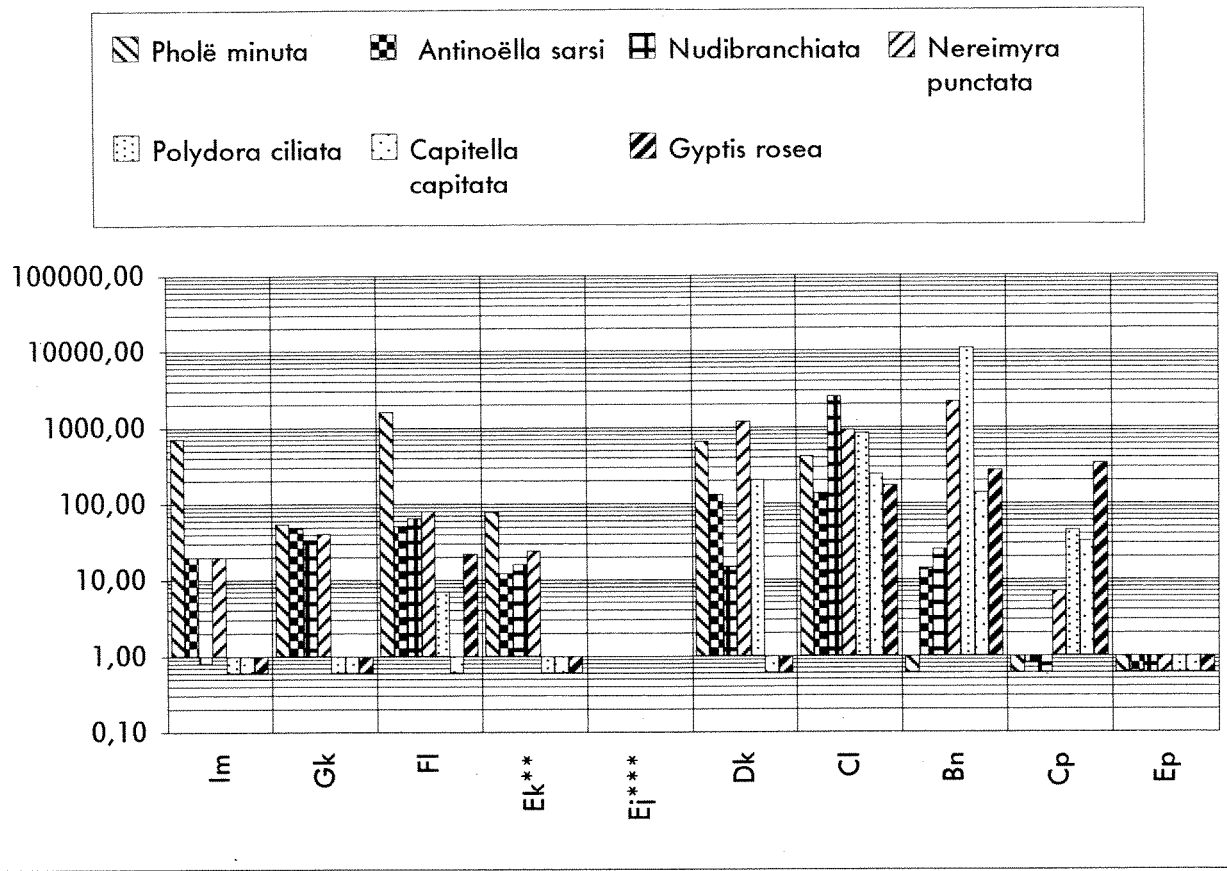


Fig. 34. Ind./100 m3 Okt.-Nov. 1971 fra Elle (Im) til Svartskog (Ep). Data fra GJERMUNDSEN (1974).

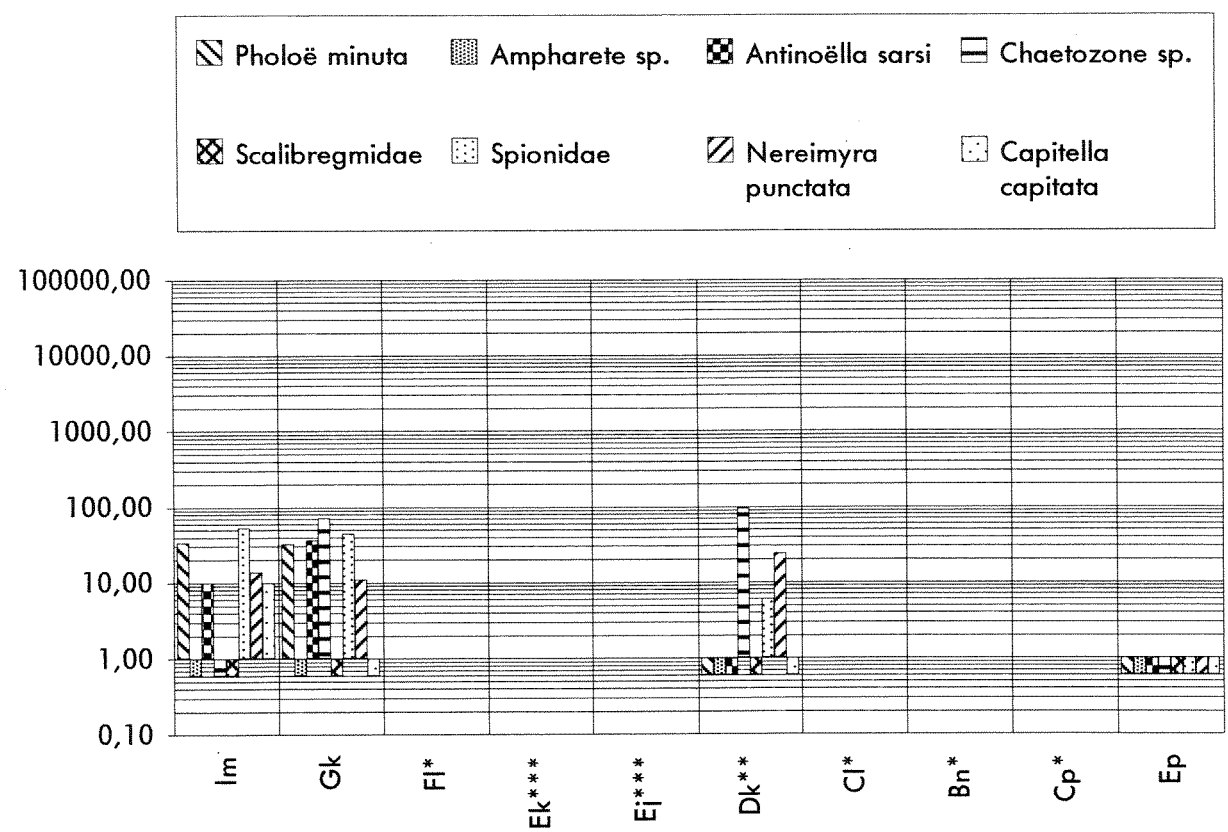
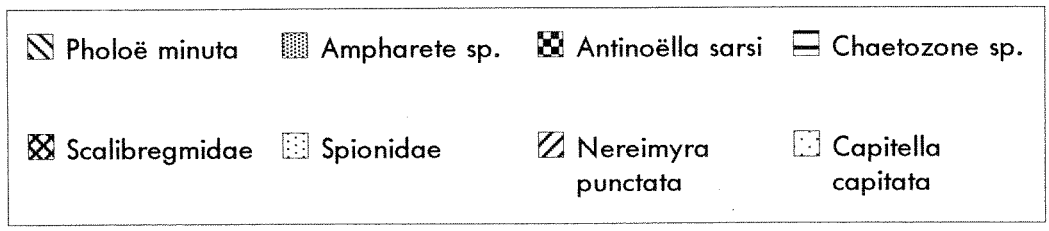


Fig. 35. Ind./100 m3 Desember 1973 fra Elle (Im) ved Drøbak til Svartskog (Ep) i Bunnefjorden.

Fig. 34 og Fig. 35: 0,60 = Ingen funnet. * = Ikke analysert. ** = Lite sediment. *** = Ingen prøve.



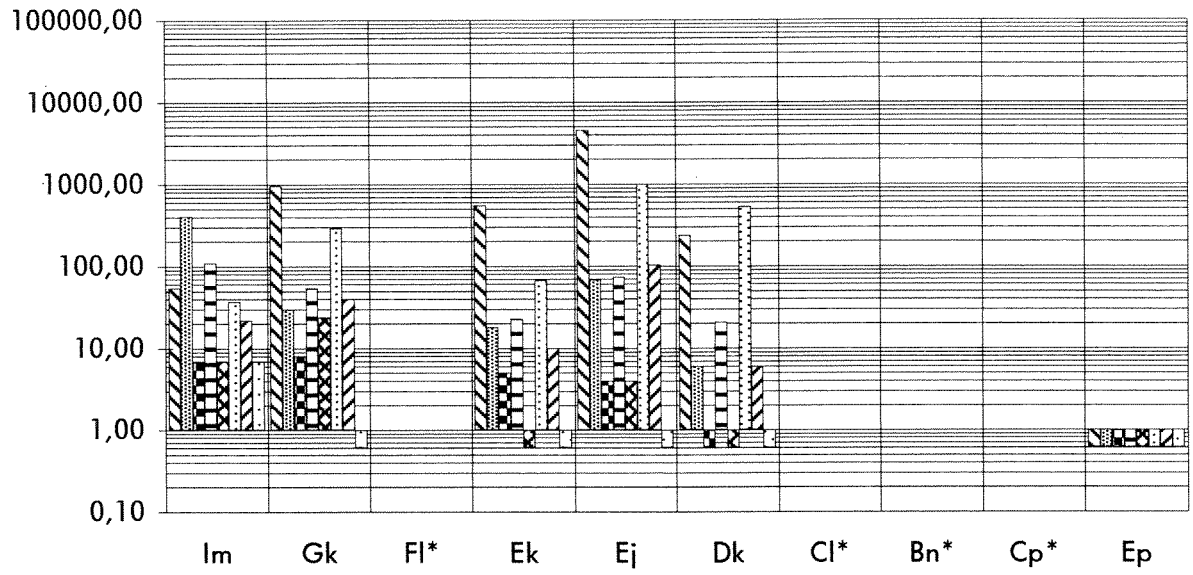
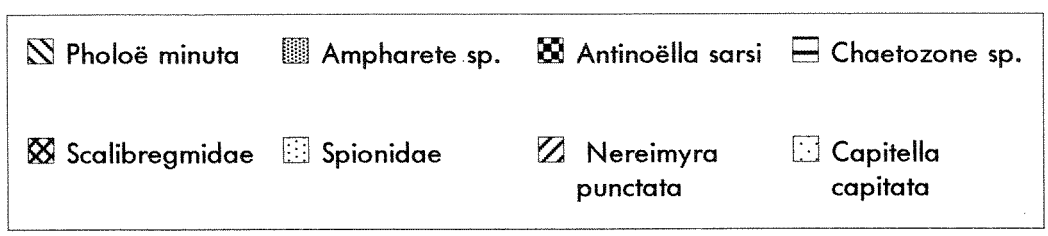


Fig. 36. Ind./100 m3 Aug. 1981 fra Elle (Im) til Svartskog (Ep). 0,60= Ingen funnet. *= Ikke analysert.



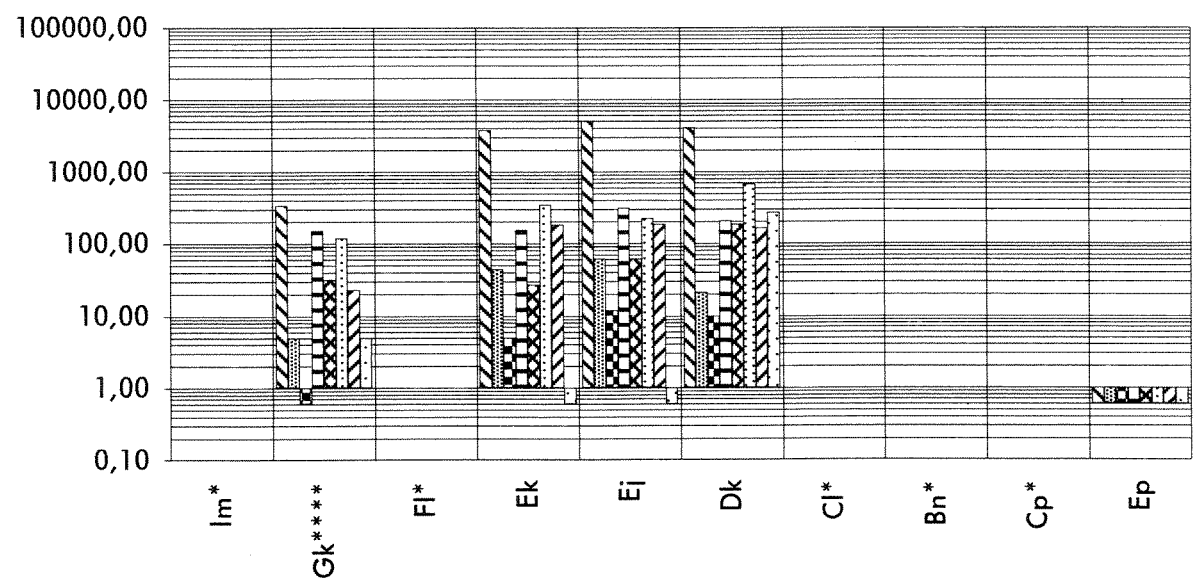


Fig. 37. Ind./100 m3 Juni 1982. 0,60 = Ingen funnet. * = Ikke analysert. **** = Ufullstendig prøve.

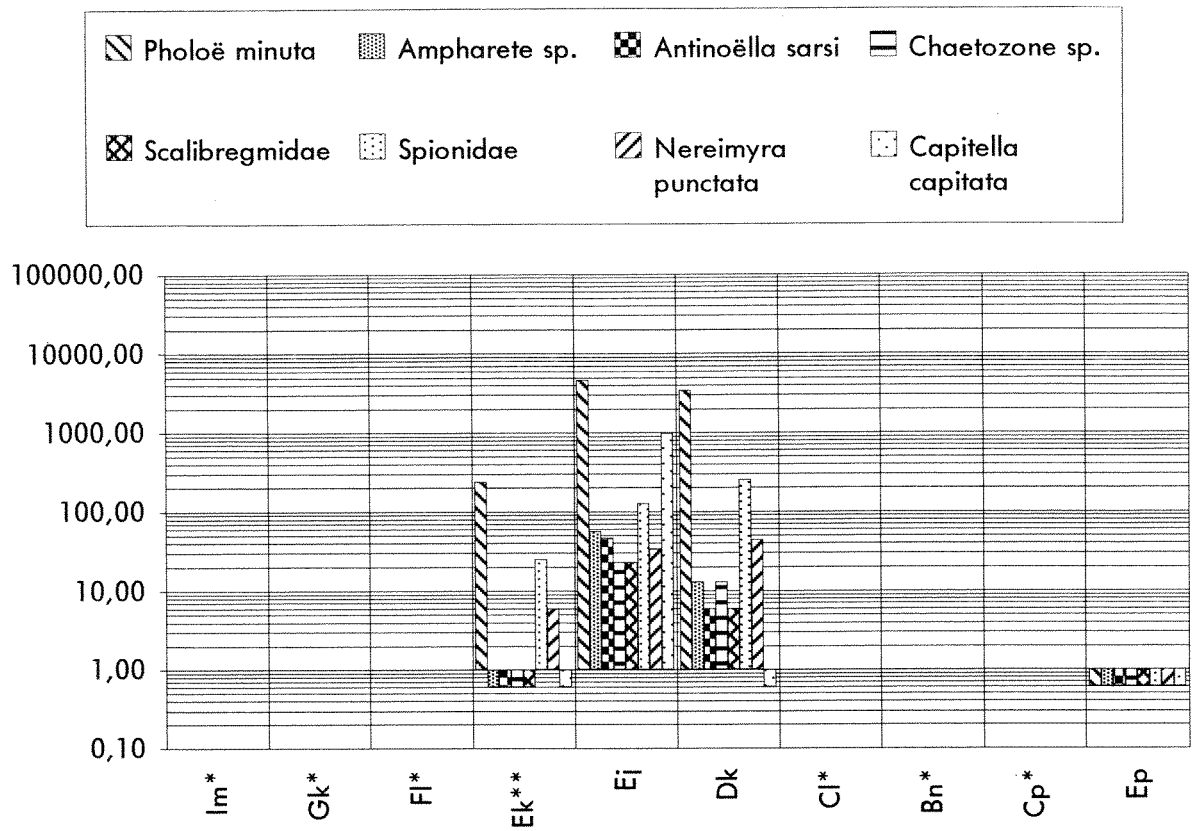


Fig. 38. Ind./100 m3 April 1983 fra Elle (Im) til Svartskog (Ep). 0,60= Ingen funnet. **= Lite sediment

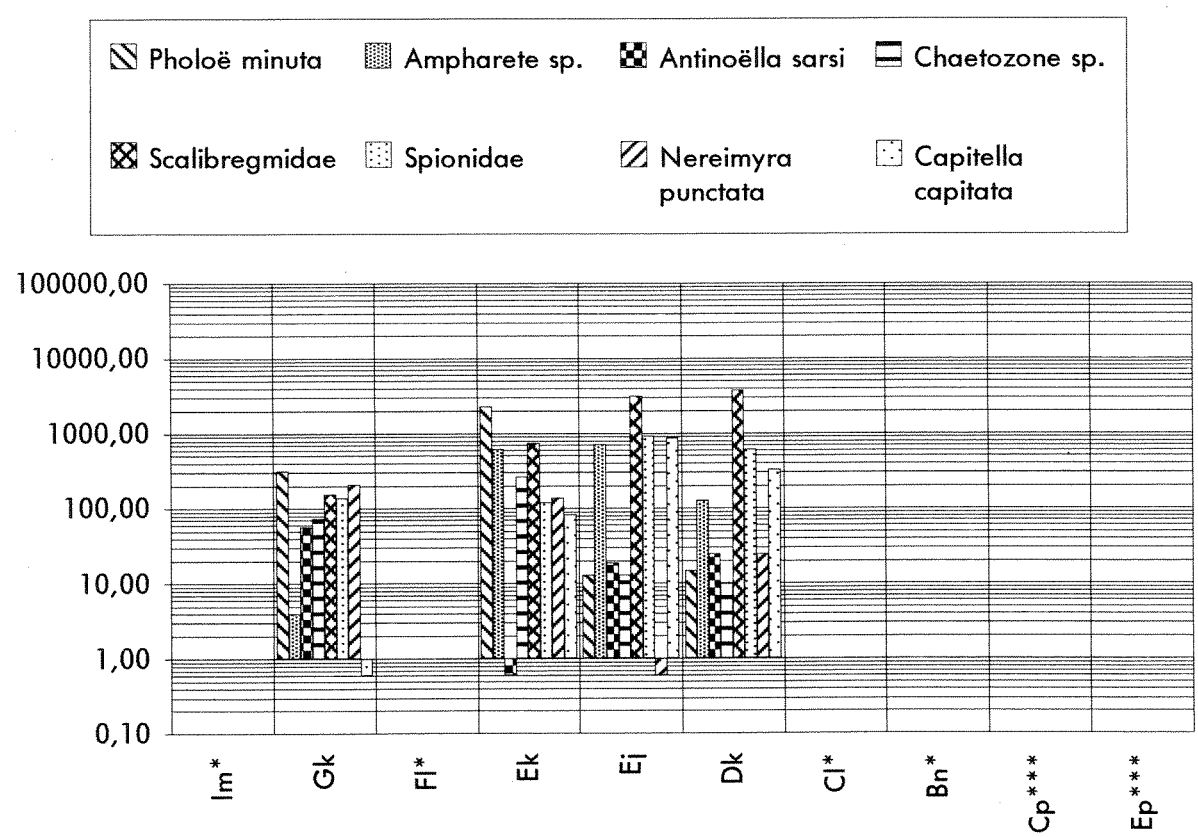


Fig. 39. Ind./100 m3 Aug. 1984 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. ***=Ingen prøve.

Fig. 38 og Fig. 39: * = Ikke analysert.

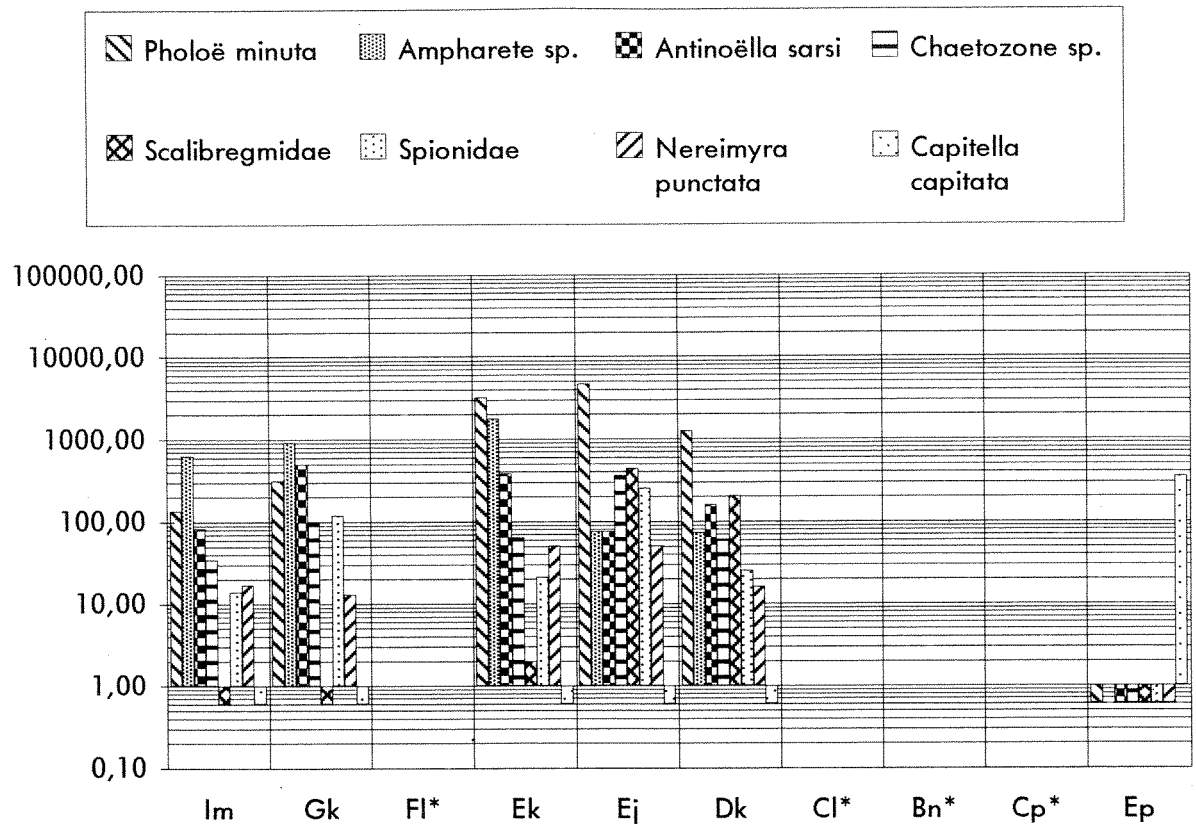


Fig. 40. Ind./100 m3 Juli 1985 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. *=Ikke analysert.

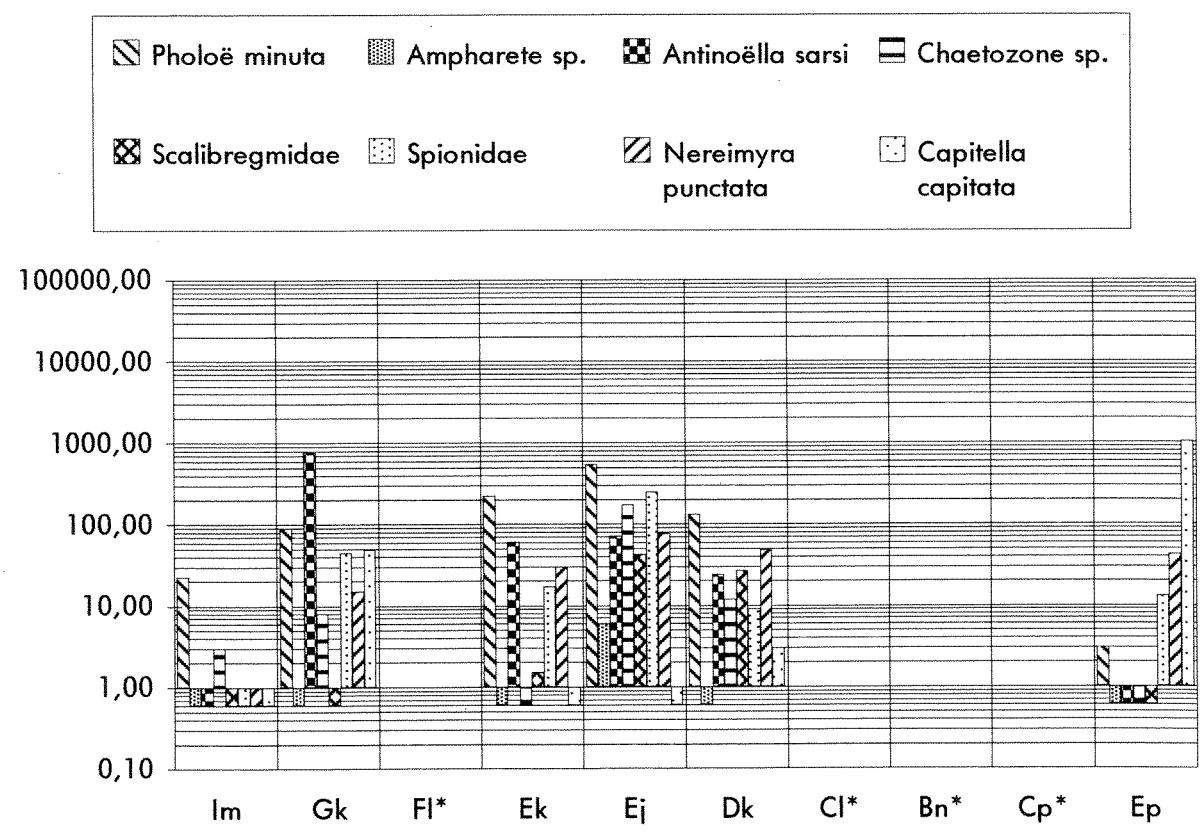


Fig. 41. Ind./100 m3 Juni 1986 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. *=Ikke analysert.

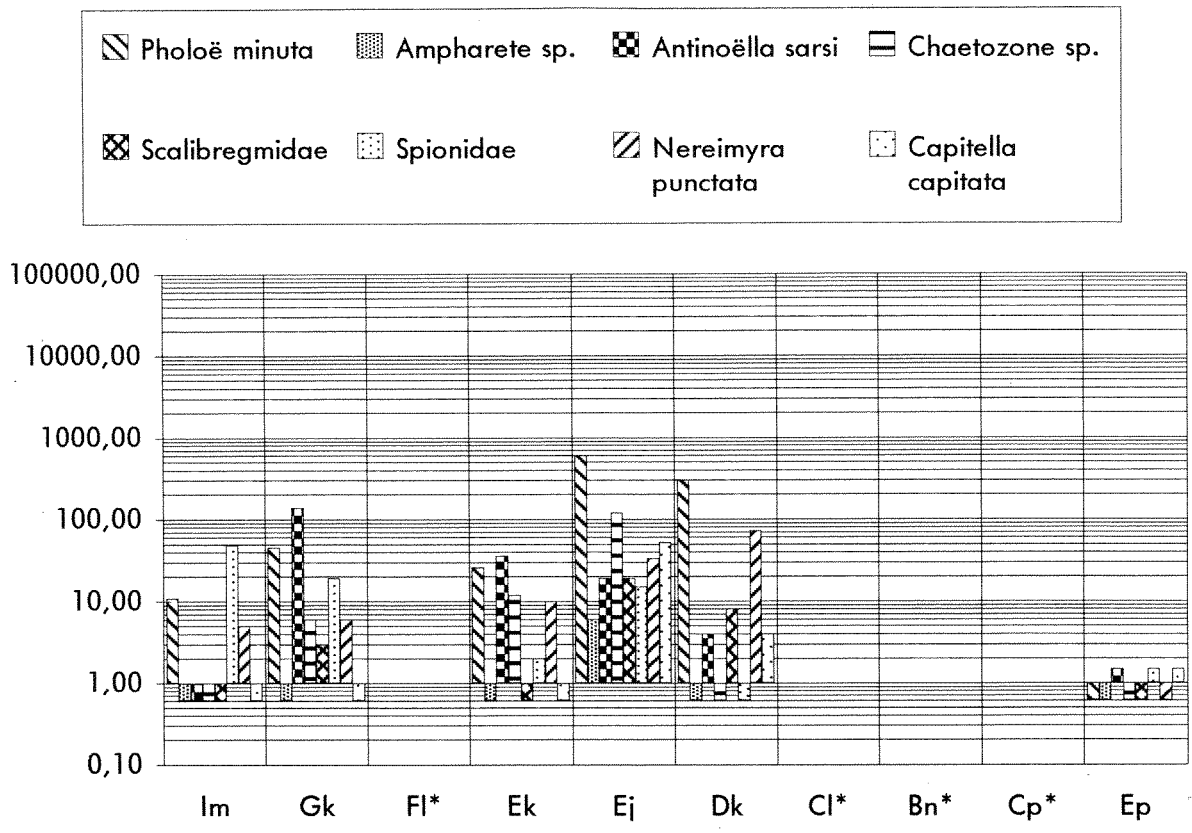


Fig. 42. Ind./100 m3 Aug. 1987. 0,60 = Ingen funnet. Ca. 1 ind./100 m3 tegnet som 1,5 for å vises.

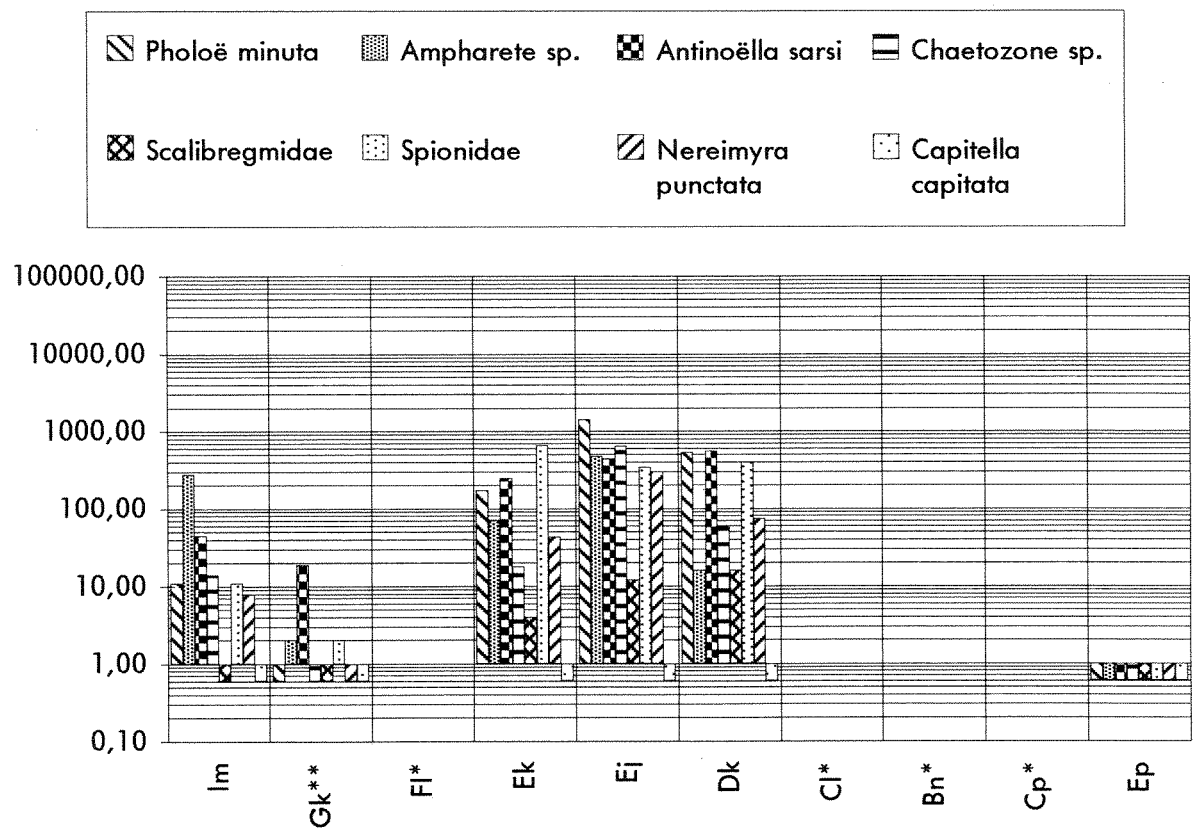


Fig. 43. Ind./100 m3 Aug. 1988 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. **=Lite sediment.

Fig. 42 og Fig. 43: * = Ikke analysert.

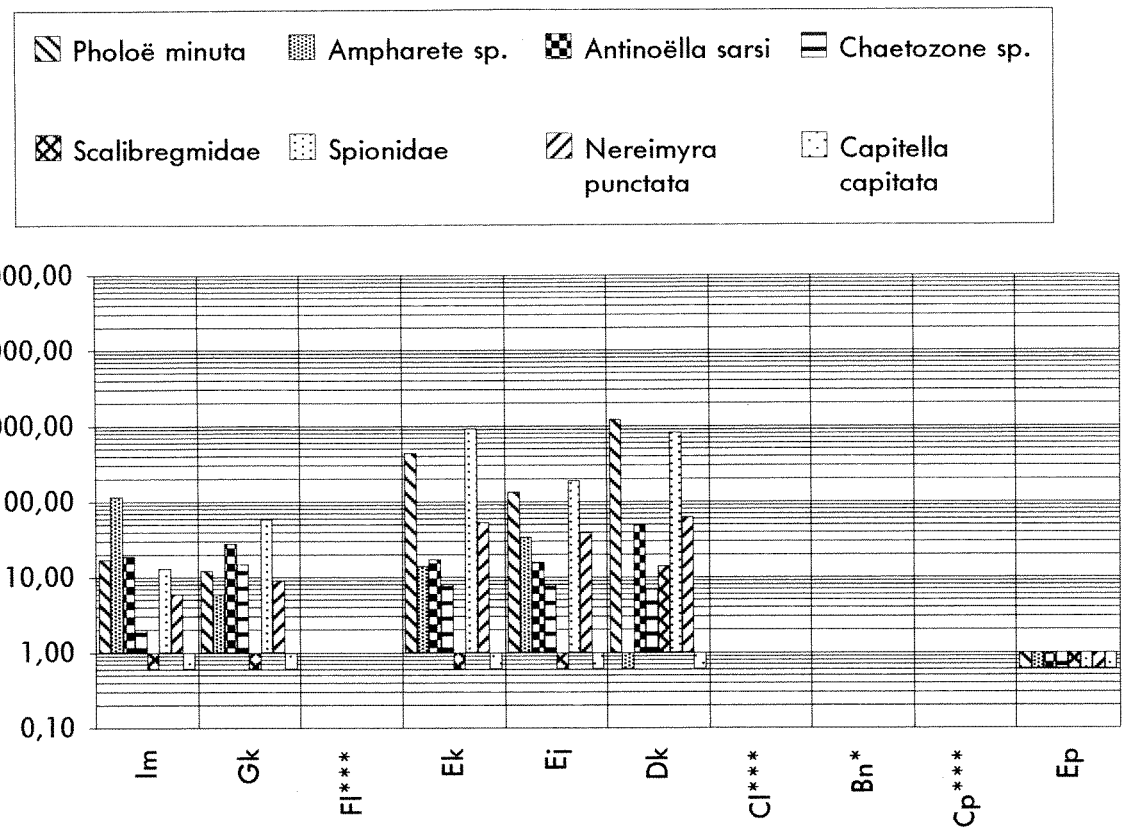


Fig. 44. Ind./100 m3 Aug. 1989 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. *=Ikke analysert.

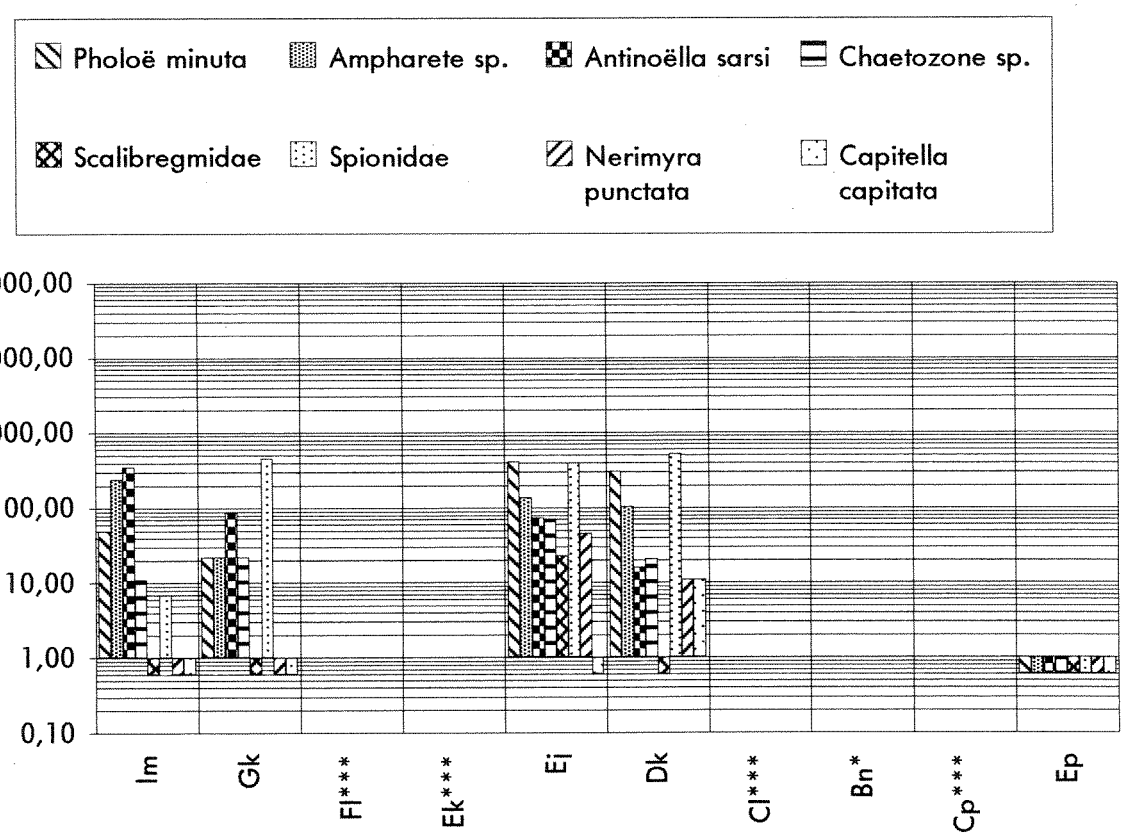


Fig. 45. Ind./100 m3 Aug. 1990 fra Elle (Im) til Svartskog (Ep). 0,60=Ingen funnet. *=Ikke analysert.

Fig. 44 og Fig. 45: *** = Ingen prøve.

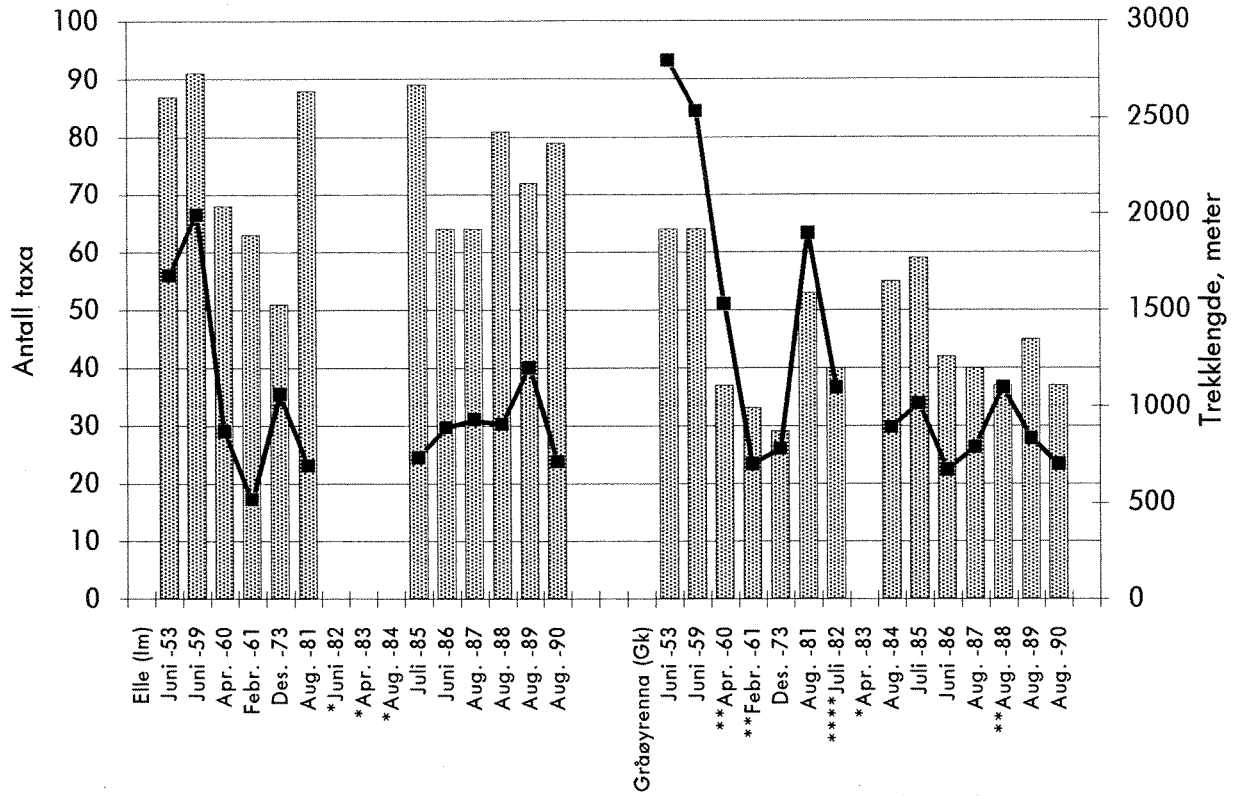


Fig. 46A. Søyler: Antall taxa. Kurve: Trekklengde.

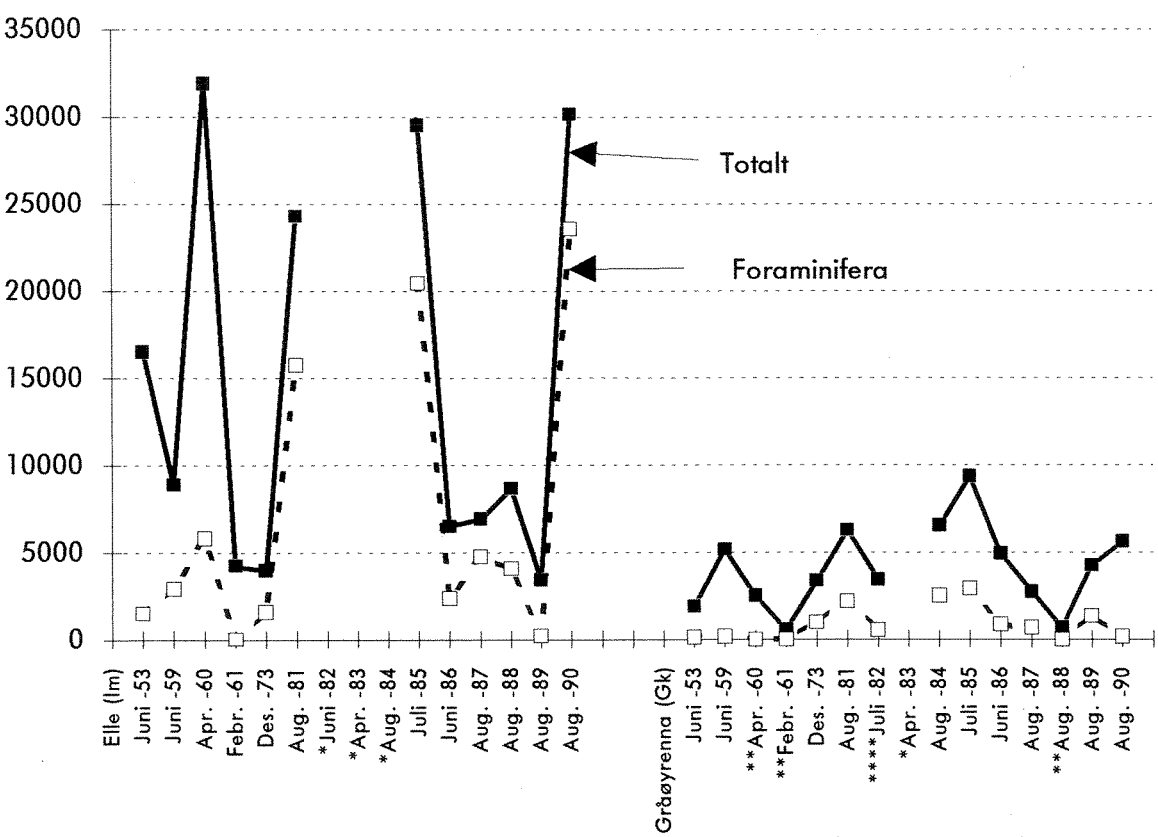


Fig. 46B. Totalt antall individer/100 m3 og derav Foraminifera.

Fig. 46A og Fig. 46B: * = Ikke analysert. ** = Lite sediment. **** = Ufullstendig prøve.

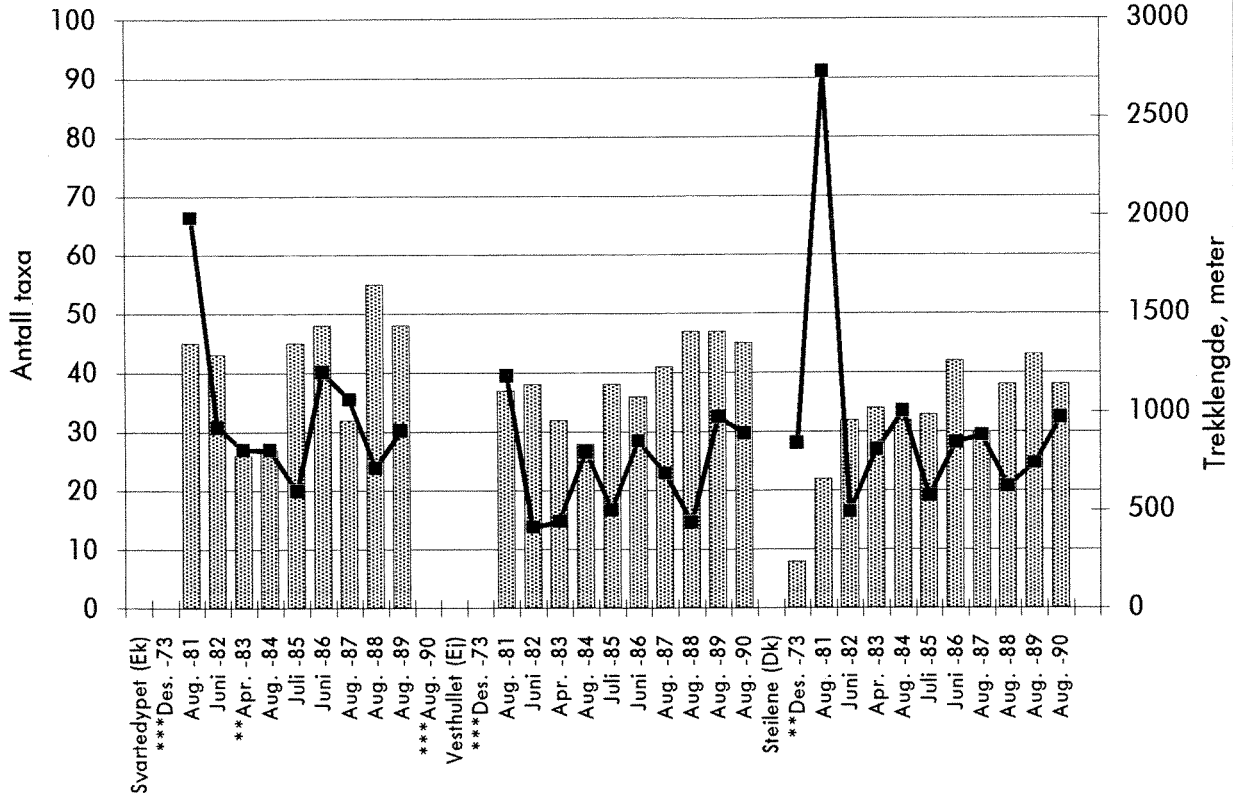


Fig. 47A. Søyler: Antall taxa. Kurve: Trekklengde.

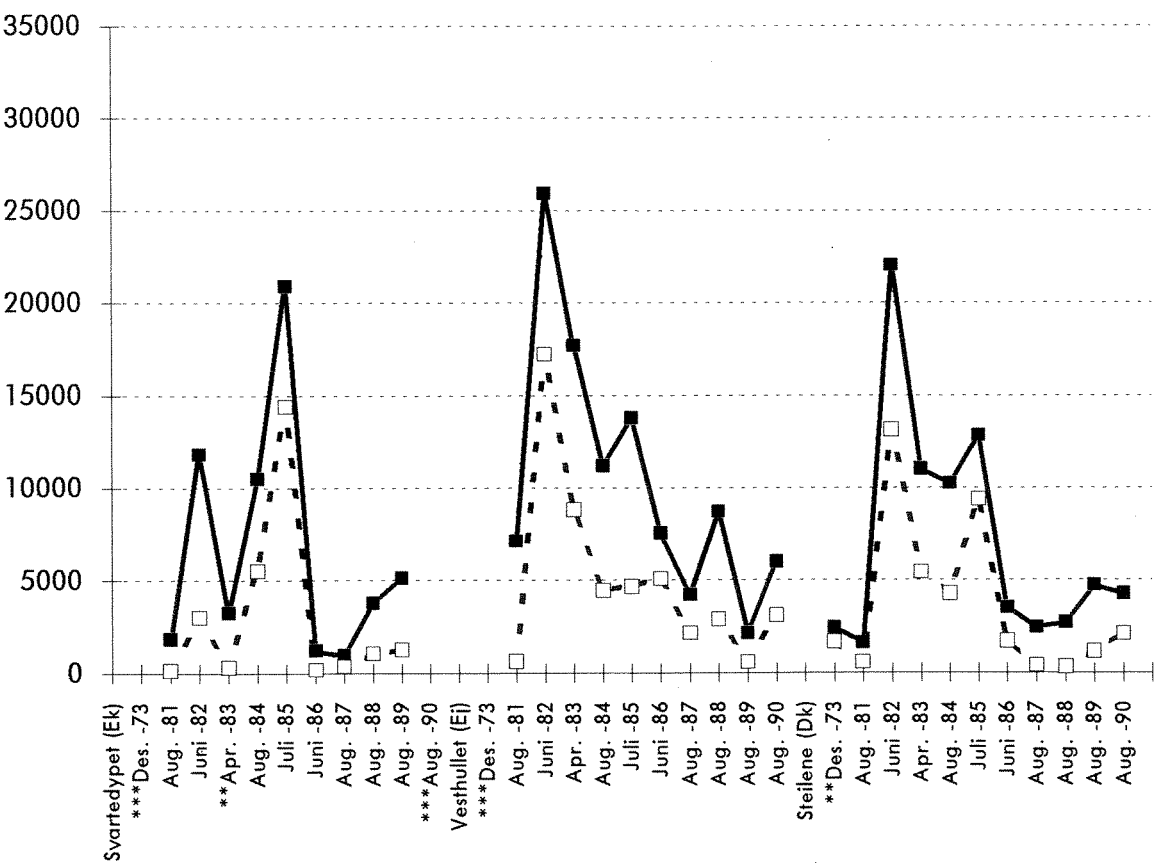


Fig. 47B. Totalt antall individer/100 m3 og derav Foraminifera.

Fig. 47A og Fig. 47B: ** = Lite sediment. *** = Ingen prøve.

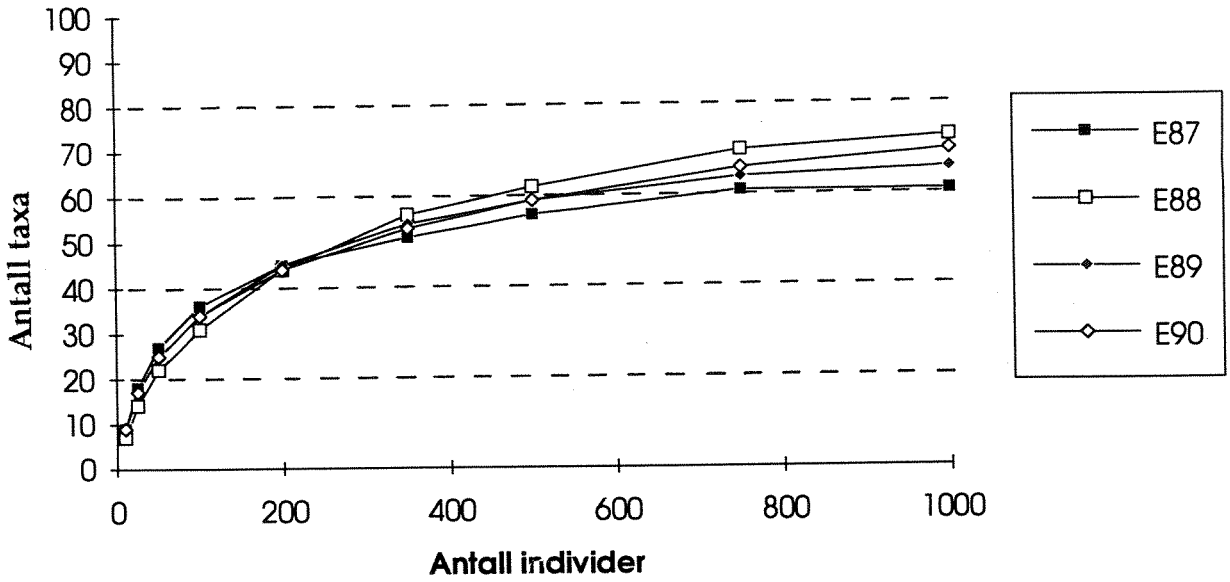


Fig. 48. Diversitet ved Elle i august 1987, august 1988, august 1989 og august 1990.

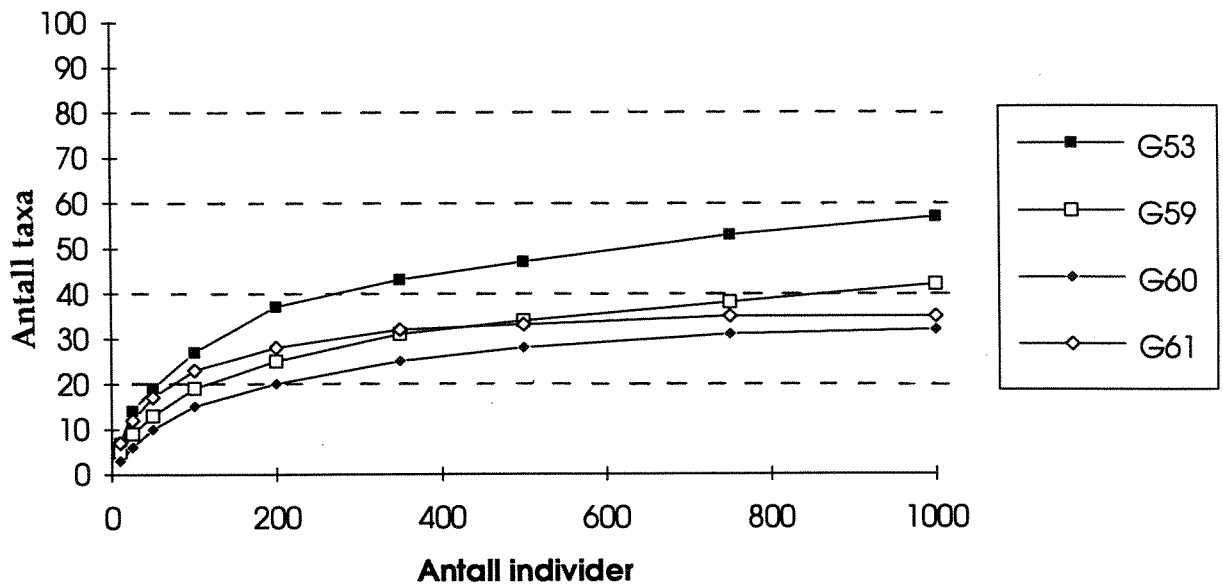


Fig. 49. Diversitet i Gråøyrenna i juni 1953, juni 1959, april 1960 og februar 1961.

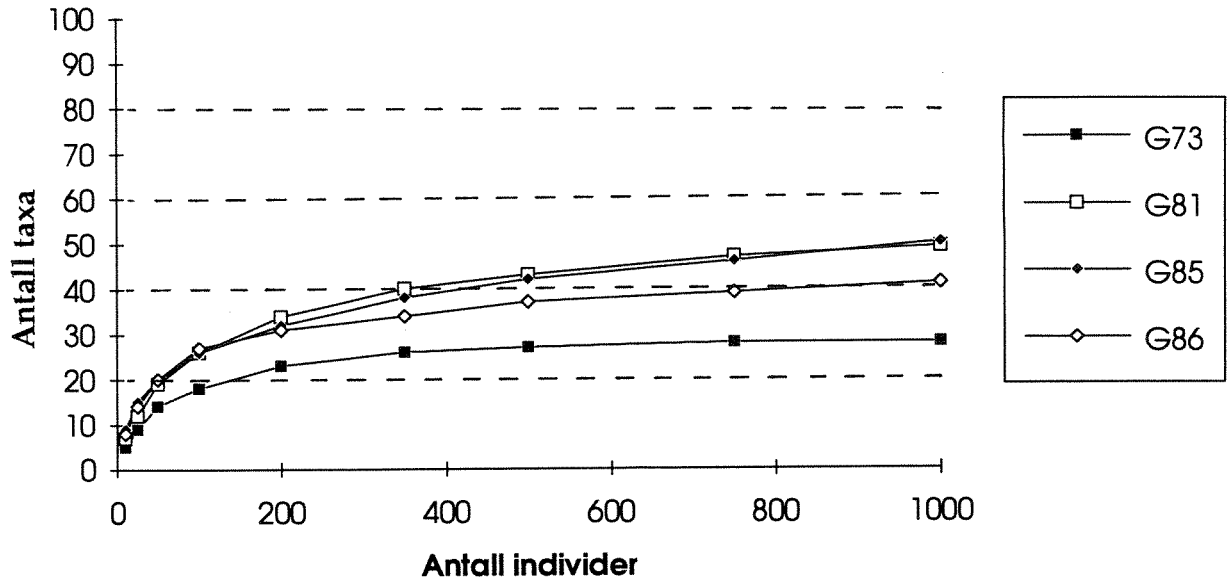


Fig. 50. Diversitet i Gråøyrenna i desember 1973, august 1981, juli 1985 og juni 1986.

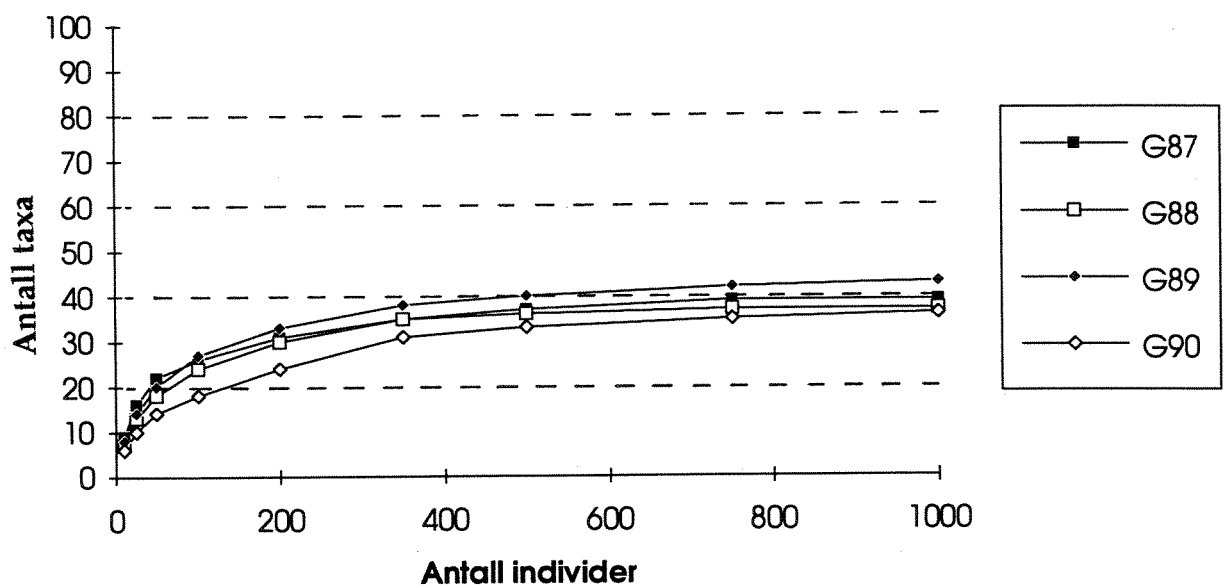


Fig. 51. Diversitet i Gråøyrenna i august 1987, august 1988, august 1989 og august 1990.

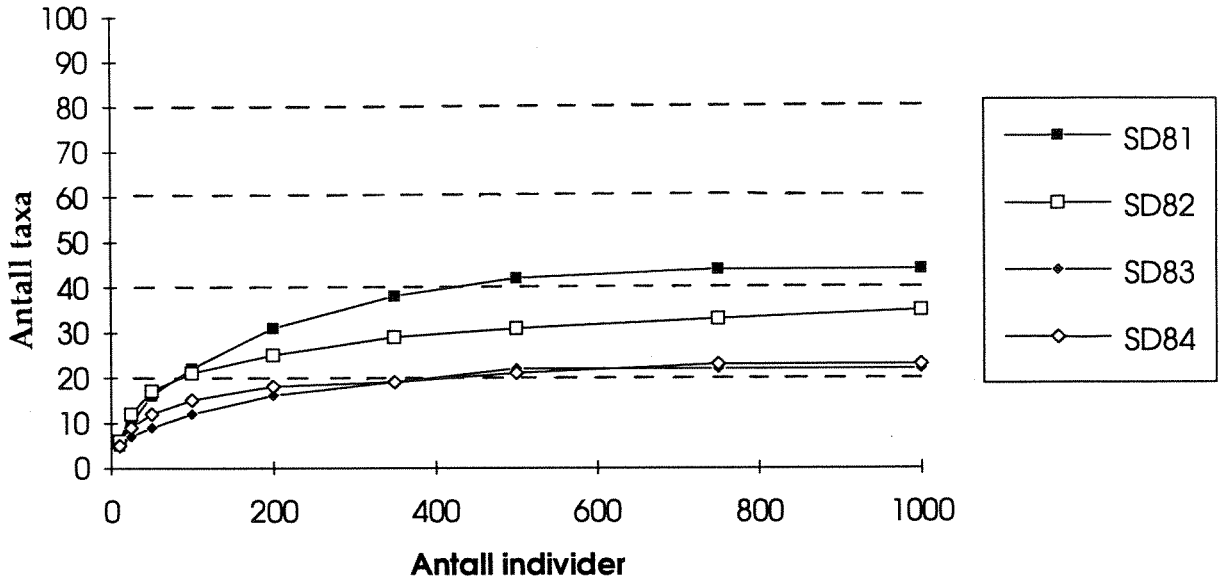


Fig. 52. Diversitet i Svartedypet i august 1981, juni 1982, april 1983 og august 1984.

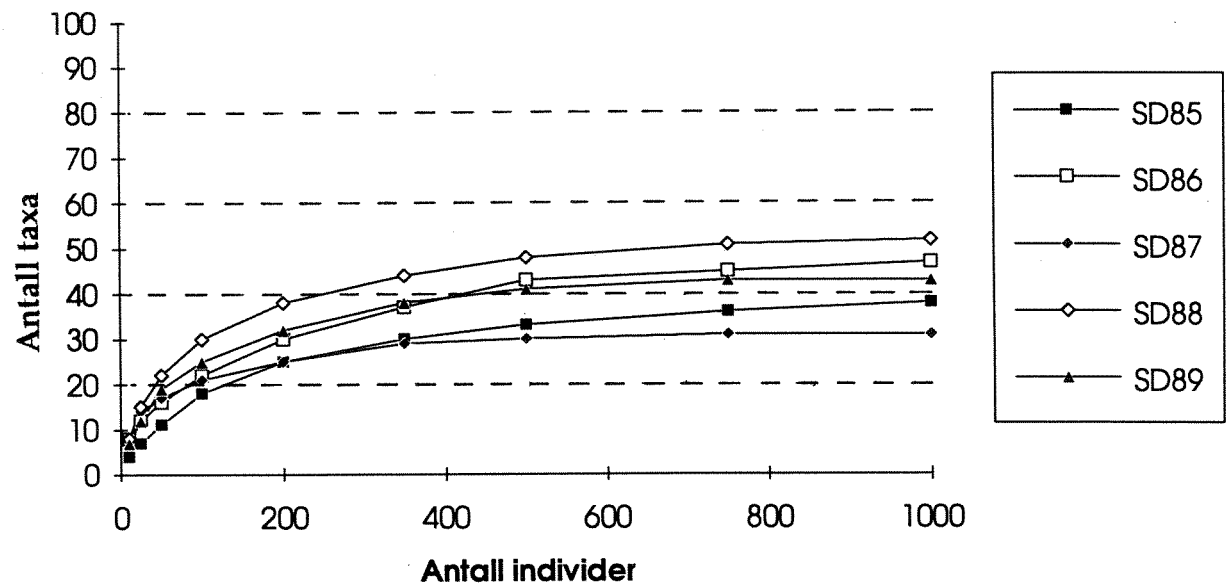


Fig. 53. Diversitet i Svartedypet i juli 1985, juni 1986, august 1987, august 1988 og august 1989.

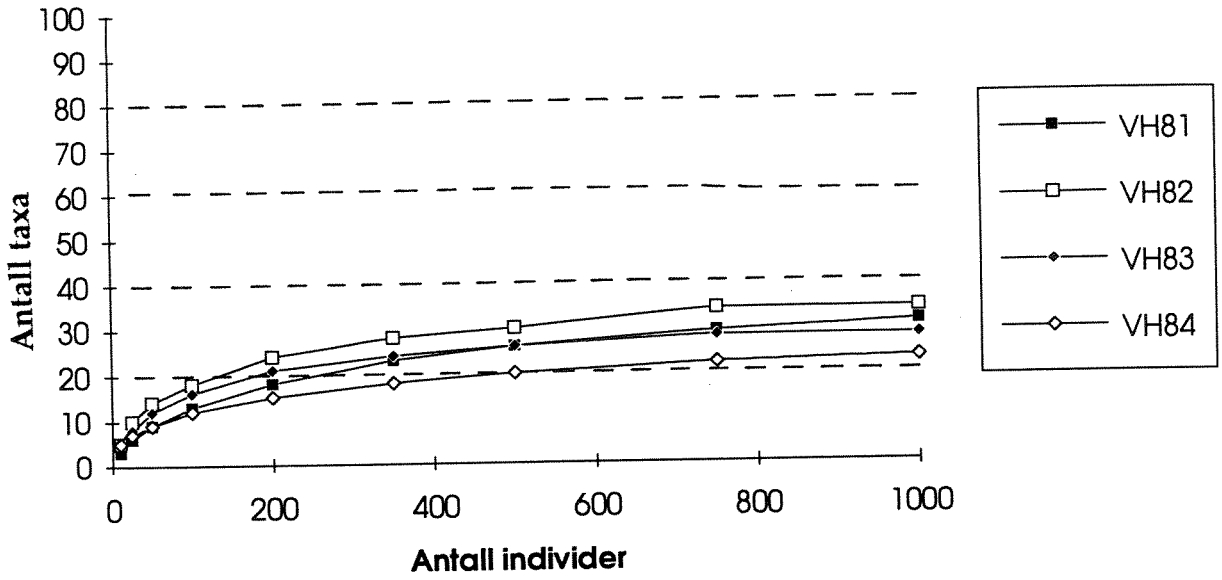


Fig. 54. Diversitet i Vesthullet i august 1981, juni 1982, april 1983 og august 1984.

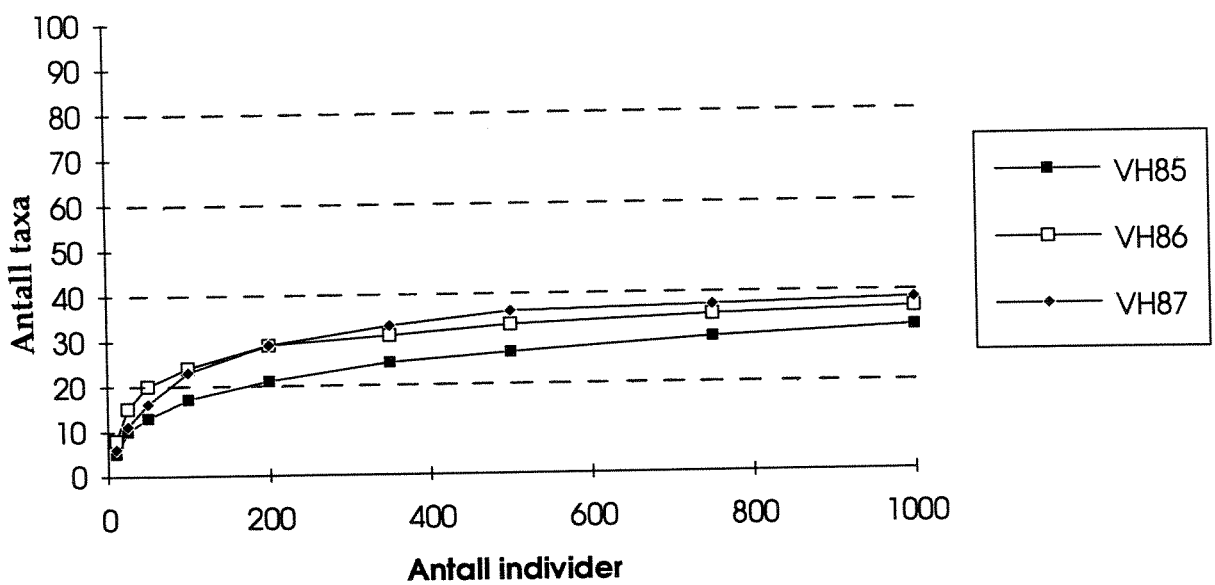


Fig. 55. Diversitet i Vesthullet i juli 1985, juni 1986 og august 1987.

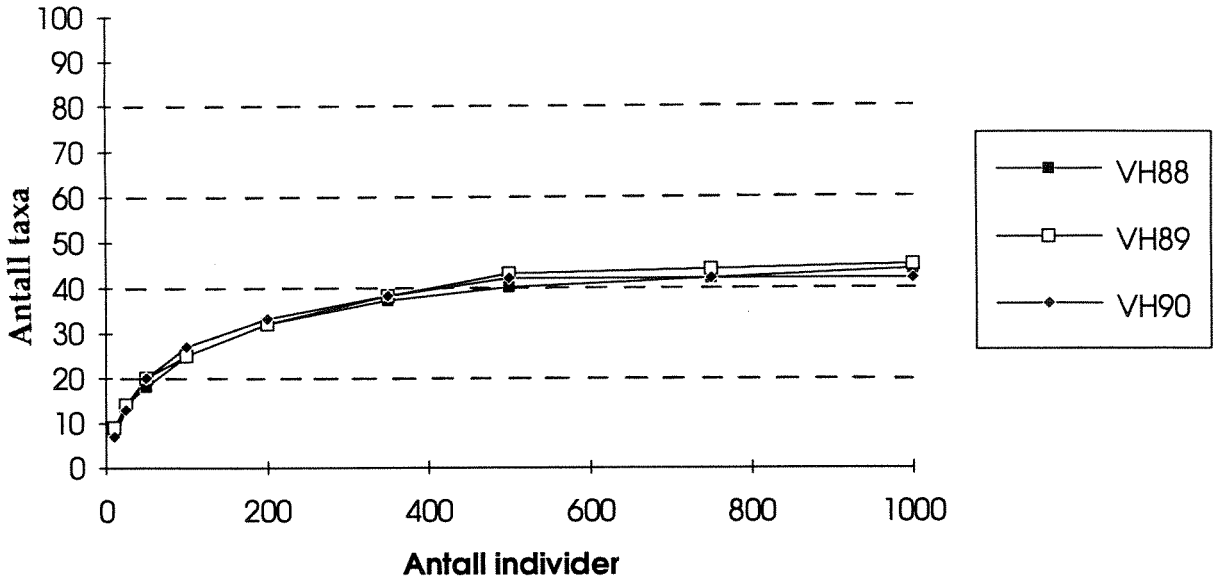


Fig. 56. Diversitet i Vesthullet i august 1988, august 1989 og august 1990.

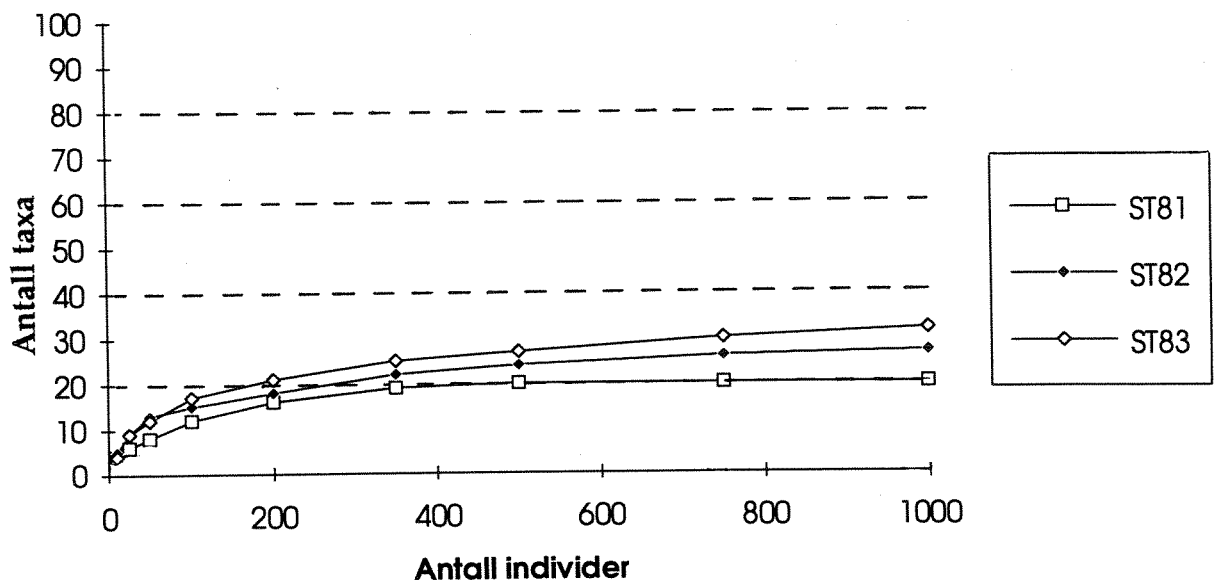


Fig. 57. Diversitet ved Steilene i august 1981, juni 1982 og april 1983.

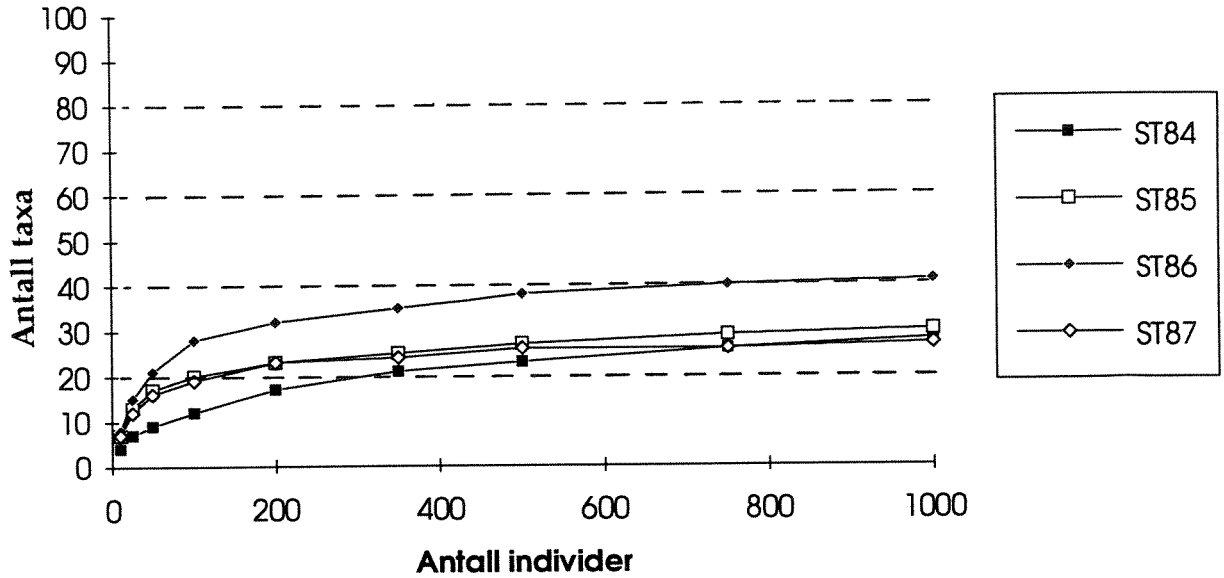


Fig. 58. Diversitet ved Steilene i august 1984, juli 1985, juni 1986 og august 1987.

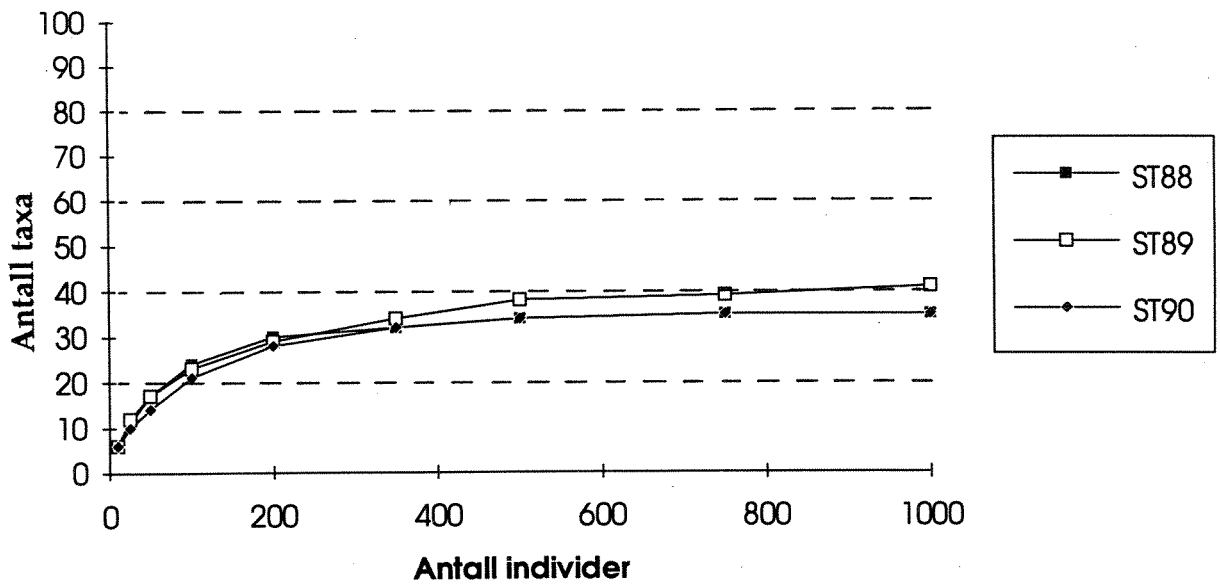


Fig. 59. Diversitet ved Steilene i august 1988, august 1989 og august 1990.

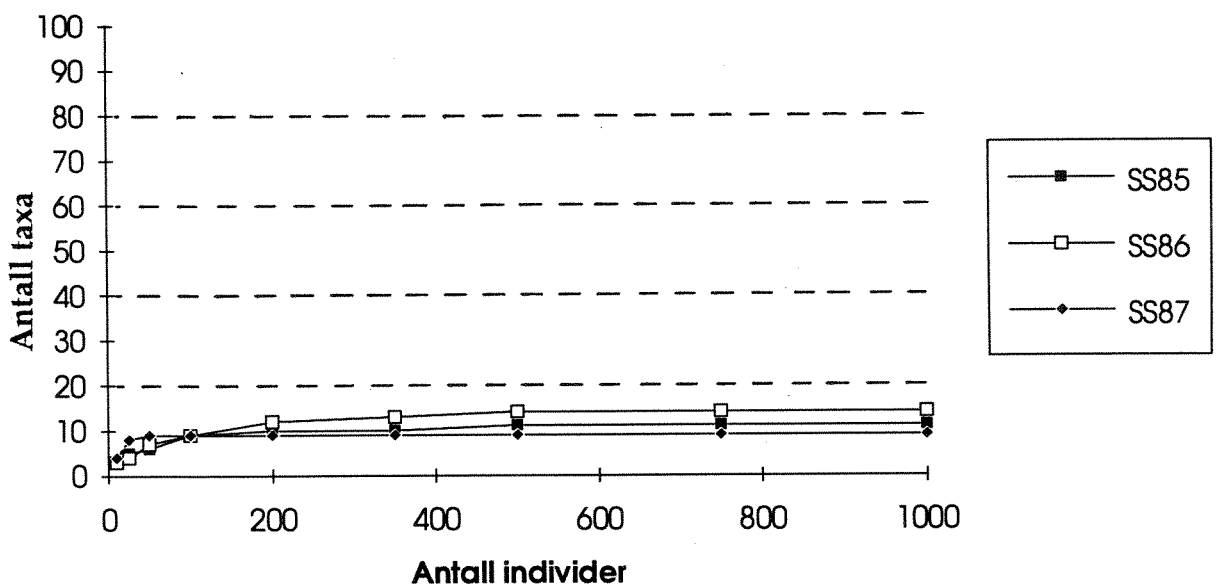


Fig. 60. Diversitet ved Svartskog i juli 1985, juni 1986 og august 1987.

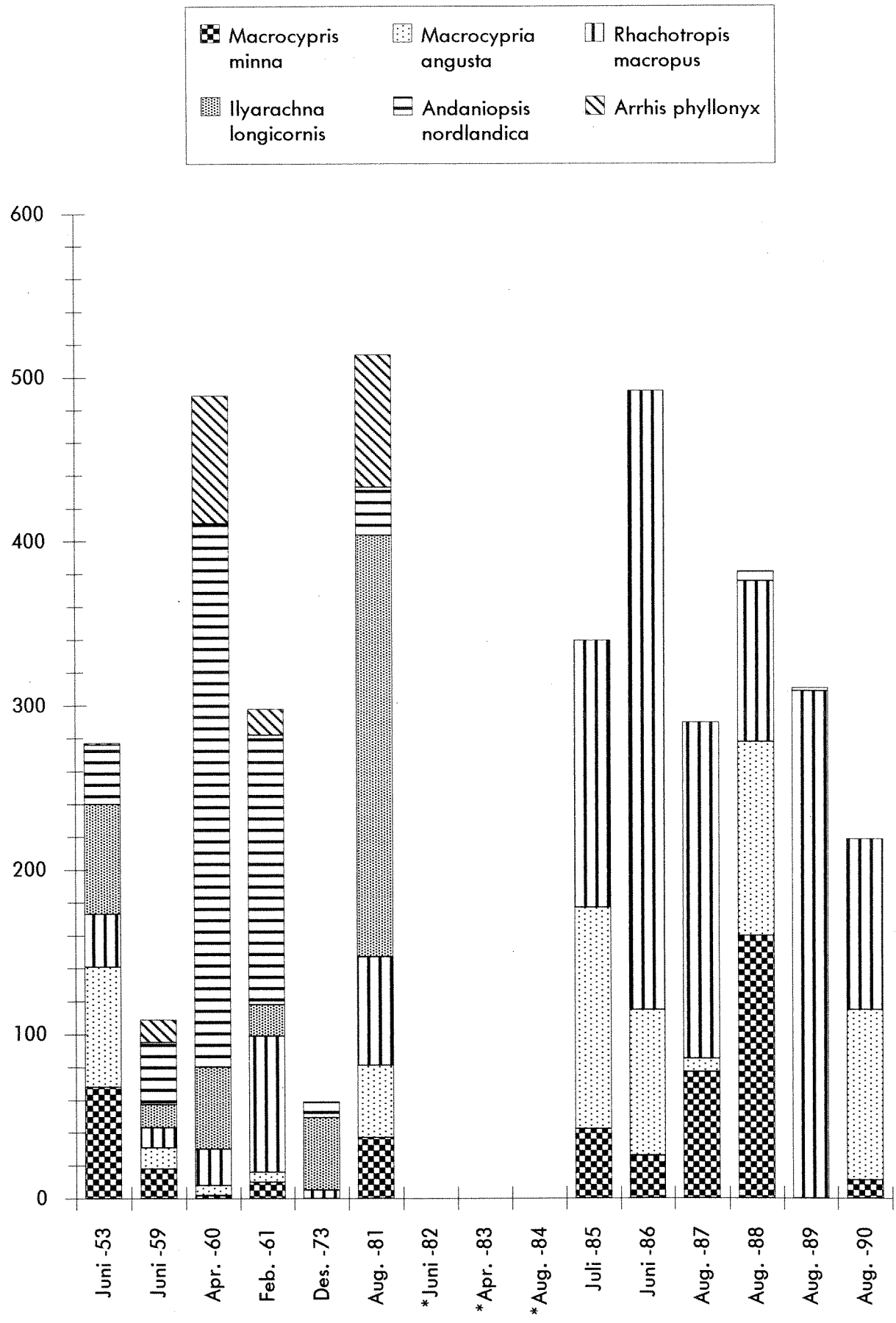


Fig. 61. Individer/100 m3 ved Elle (Im). * = Ikke analysert. Nr. 1 og 2 = Ostracoder. Nr. 3, 5 og 6 = Amphipoder. Nr. 4 = Isopode.

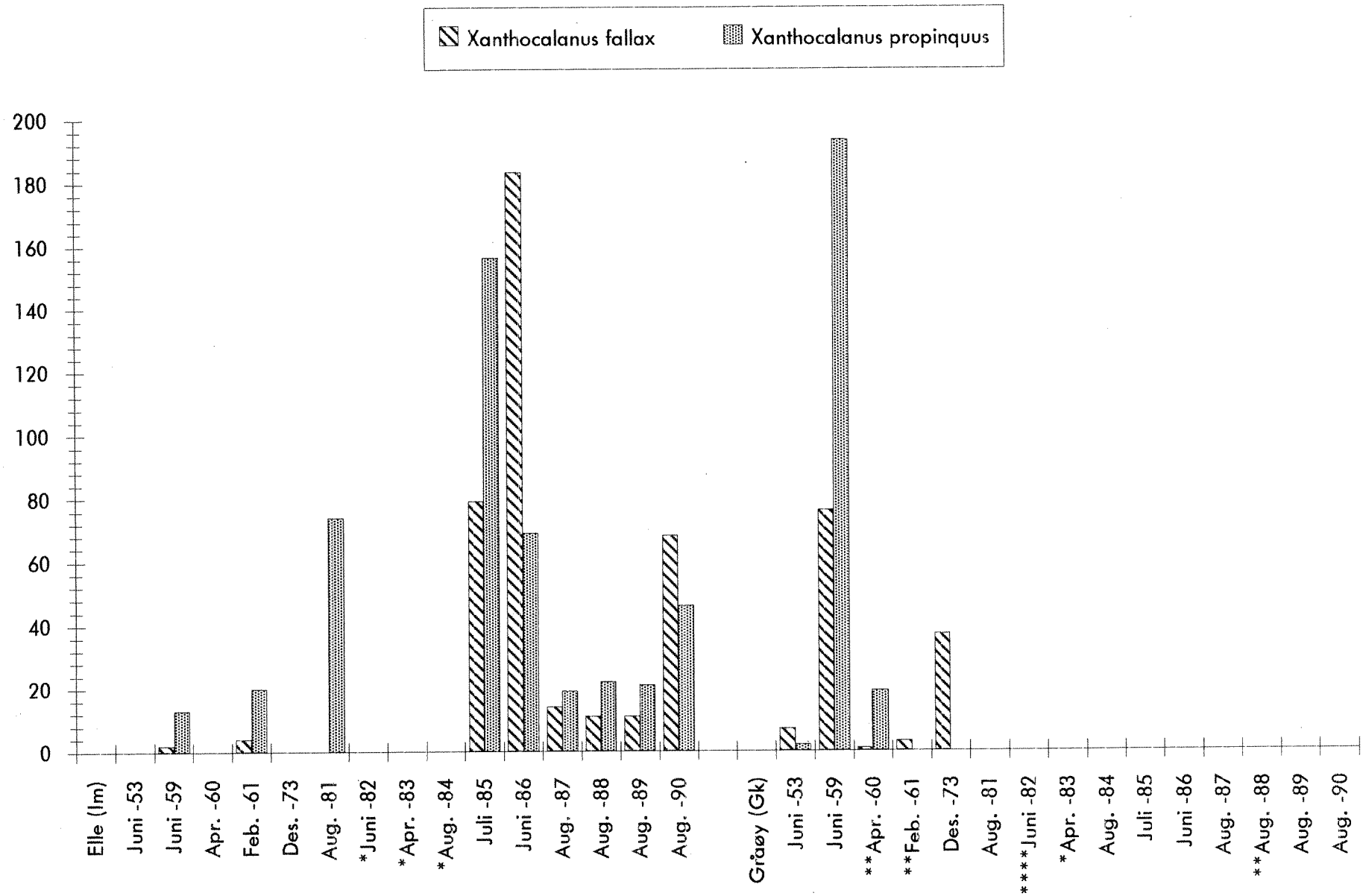


Fig. 62. Antall ind./100 m3 av to benthiske copepoder ved Elle (Im) og i Gråøyrenna (Gk). * = Ikke analysert. ** = Mindre god bunnkontakt. **** = Ufullstendig prøve.

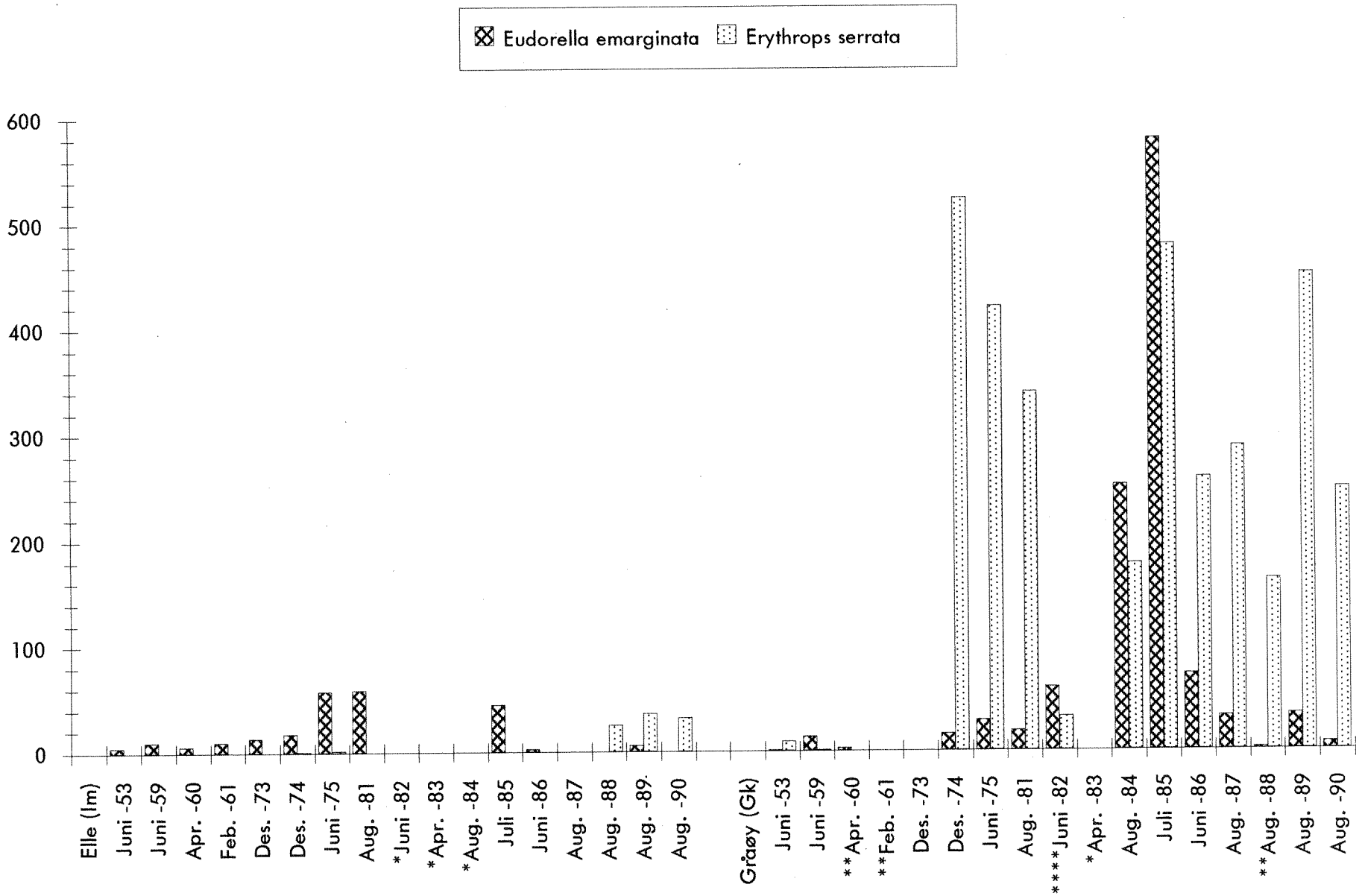


Fig. 63. Ind./100 m3. * = Ikke analysert. ** = Mindre god bunnkontakt. **** = Ufullstendig prøve. 1974 og -75 fra FRITZVOLD (198); gjennomsnitt for 8 (1974) og 9 (1975) prøver fra hver lokalitet.

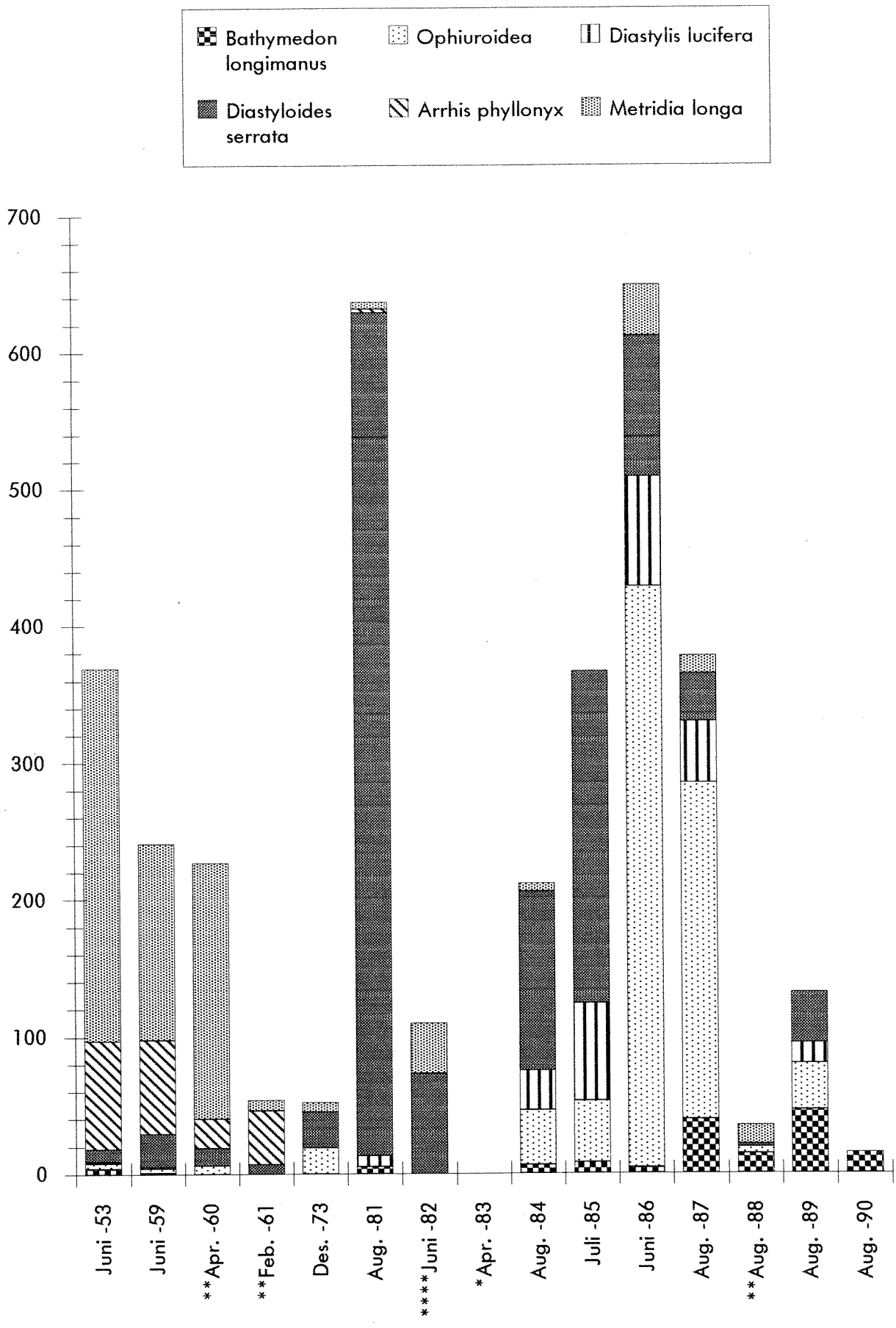


Fig. 64. Individer/100 m3 i Gråøyrenna (Gk). * = Ikke analysert. ** = Dårlig bunnkontakt. **** = Ufullstendig prøve. Nr. 1 og 5 = Amphipoder. Nr. 3 og 4 = Cumacéer. Nr. 6 = Copepode.

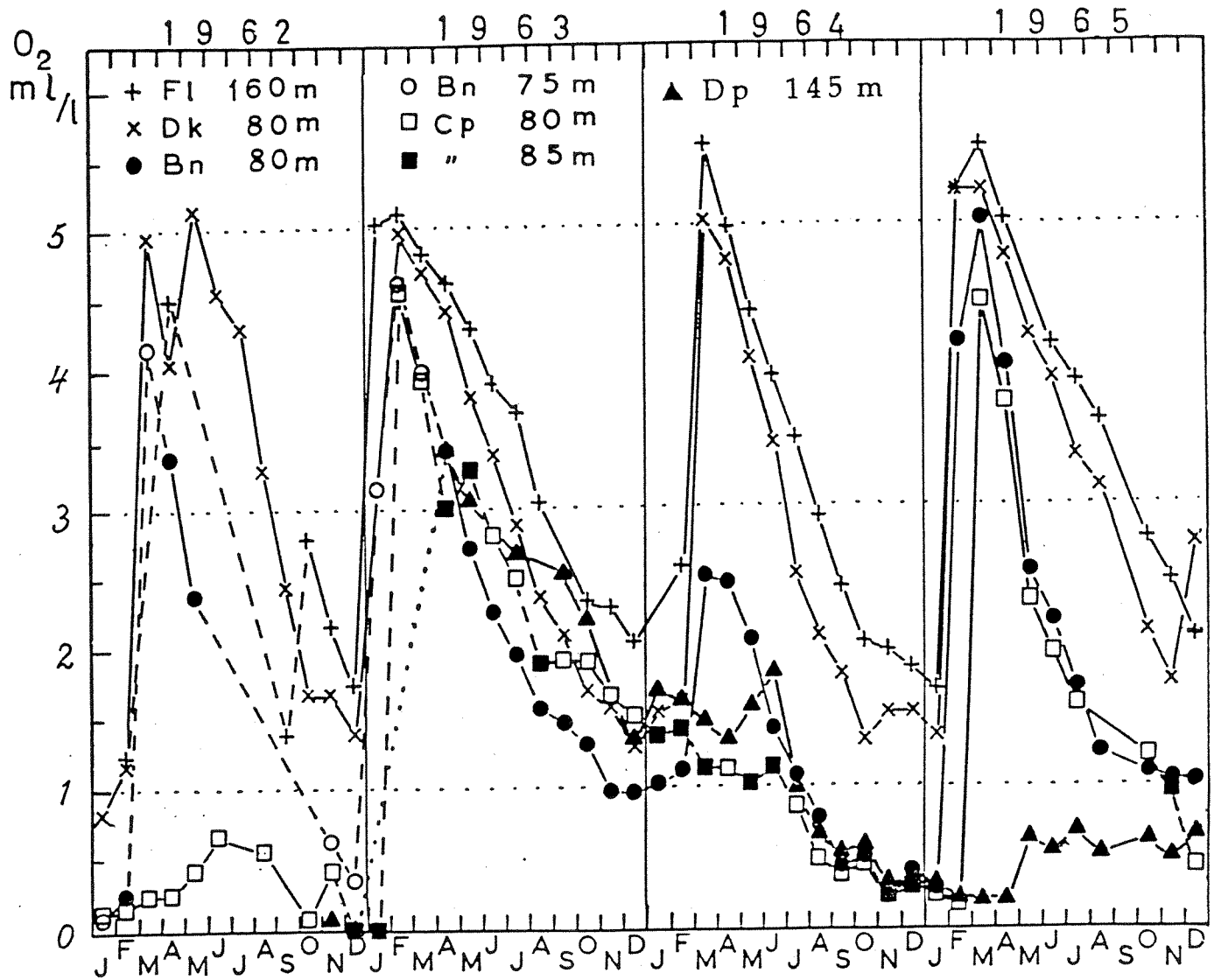


Fig. 65. Oksygeninnhold i vannet nær bunnen ved Spro (Fl), Steilene (Dk), i Lysakerfjorden (Bn), ved Helviktangen og i Bunnefjord-dypet (Dp) 1962-65. (Fra Beyer & Versvik 1968.)

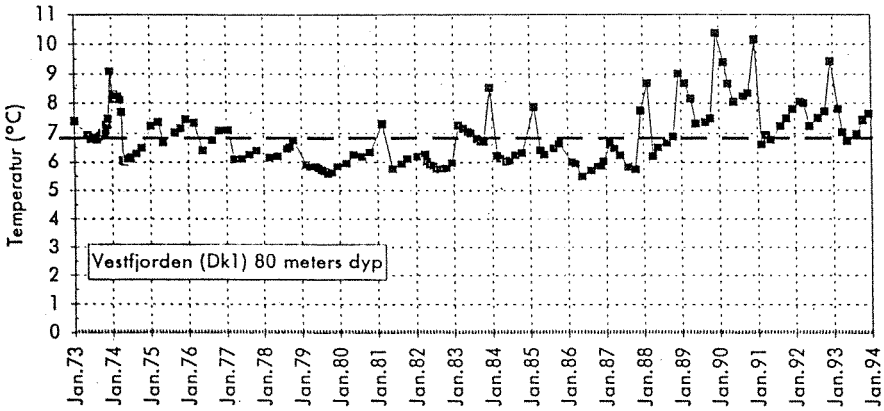


Fig. 66A. Temperaturen i 80 m dyp ved Steilene (Dk) 1973 - 1993. Data fra NIVA.

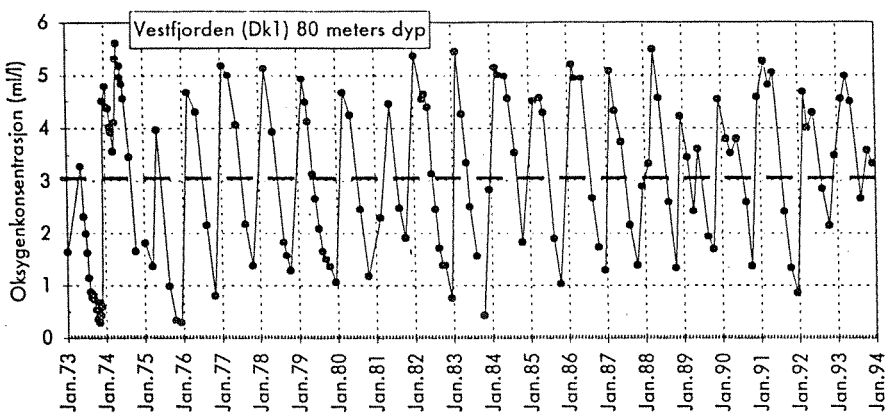


Fig. 66C. Oksygenkonsentrasjonen i 80 m dyp ved Steilene (Dk) 1973 - 1993. Data fra NIVA.

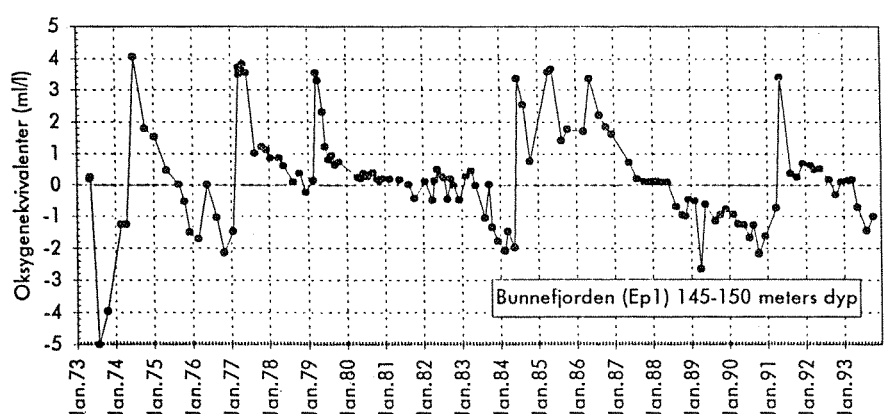


Fig. 66D. Oksygenekvivalenter i dypet ved Svartskog (Ep)
1973 - 1993. Data fra NIVA. Oksygenekvivalent -1 = 2 ml H_2S.

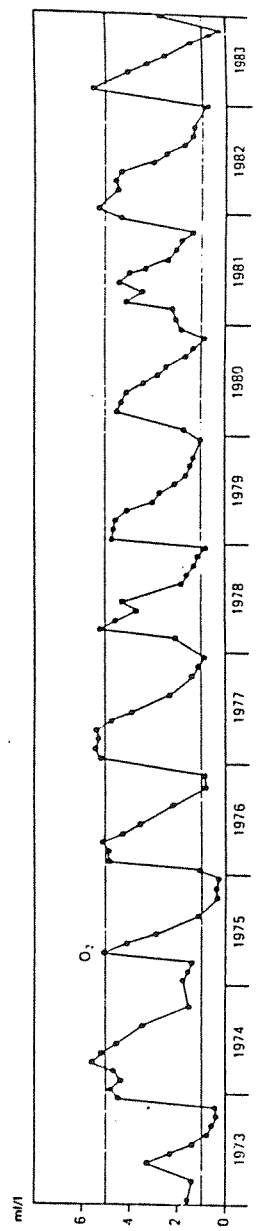


Fig. 66B. Oksygenkonsentrasjonen i 80 m dyp ved Steilene (Dk)
1973-83. (Fra Magnusson, Kirkerud, Källqvist & Pedersen 1984.)

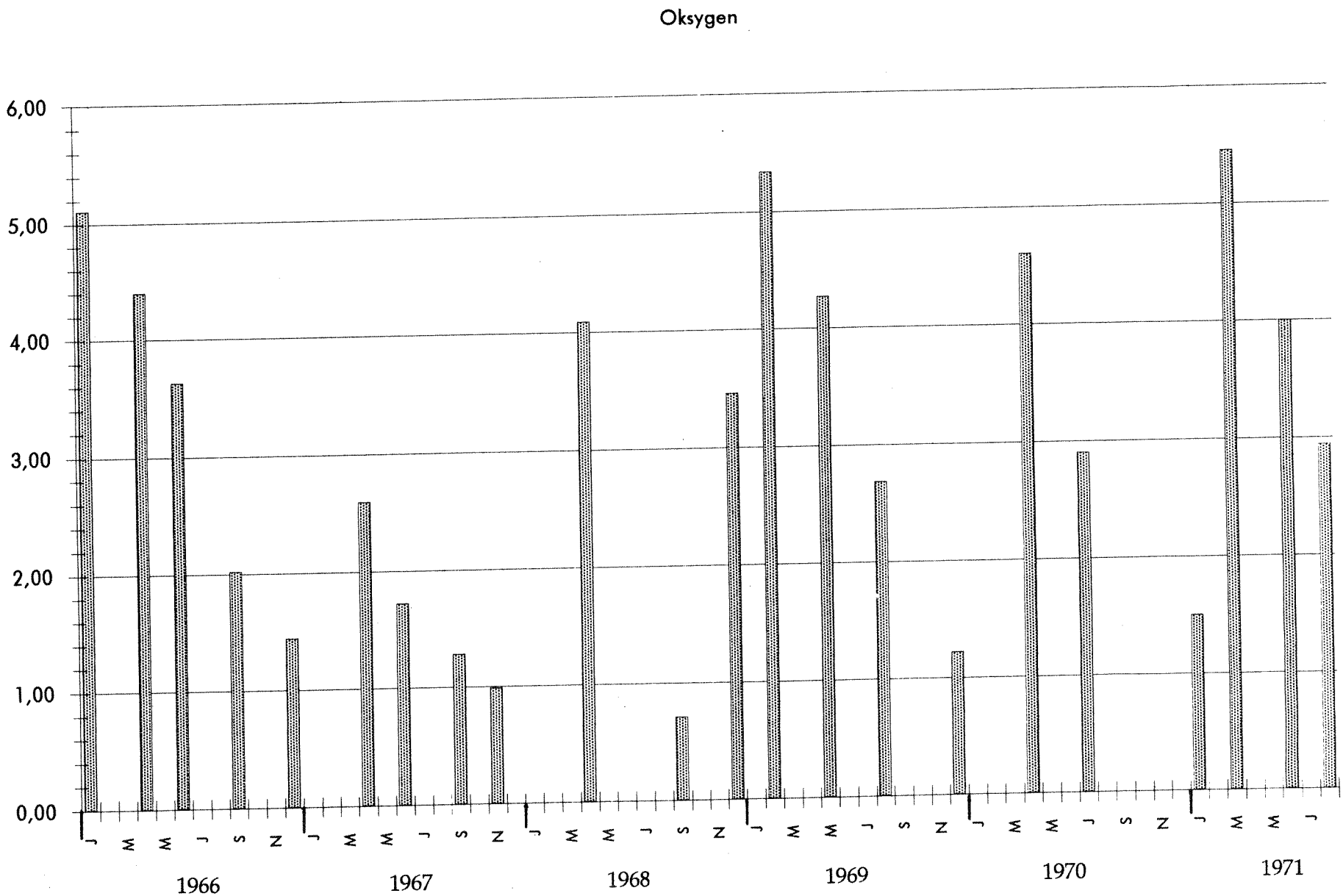


Fig. 67. Oksygen i ml/l i 80 m dyp ved Steilene, Dk, fra NIVA's arkiv. April 1968: Lysakerfjorden (Bn, 80 m) da observasjon fra Dk mangler.

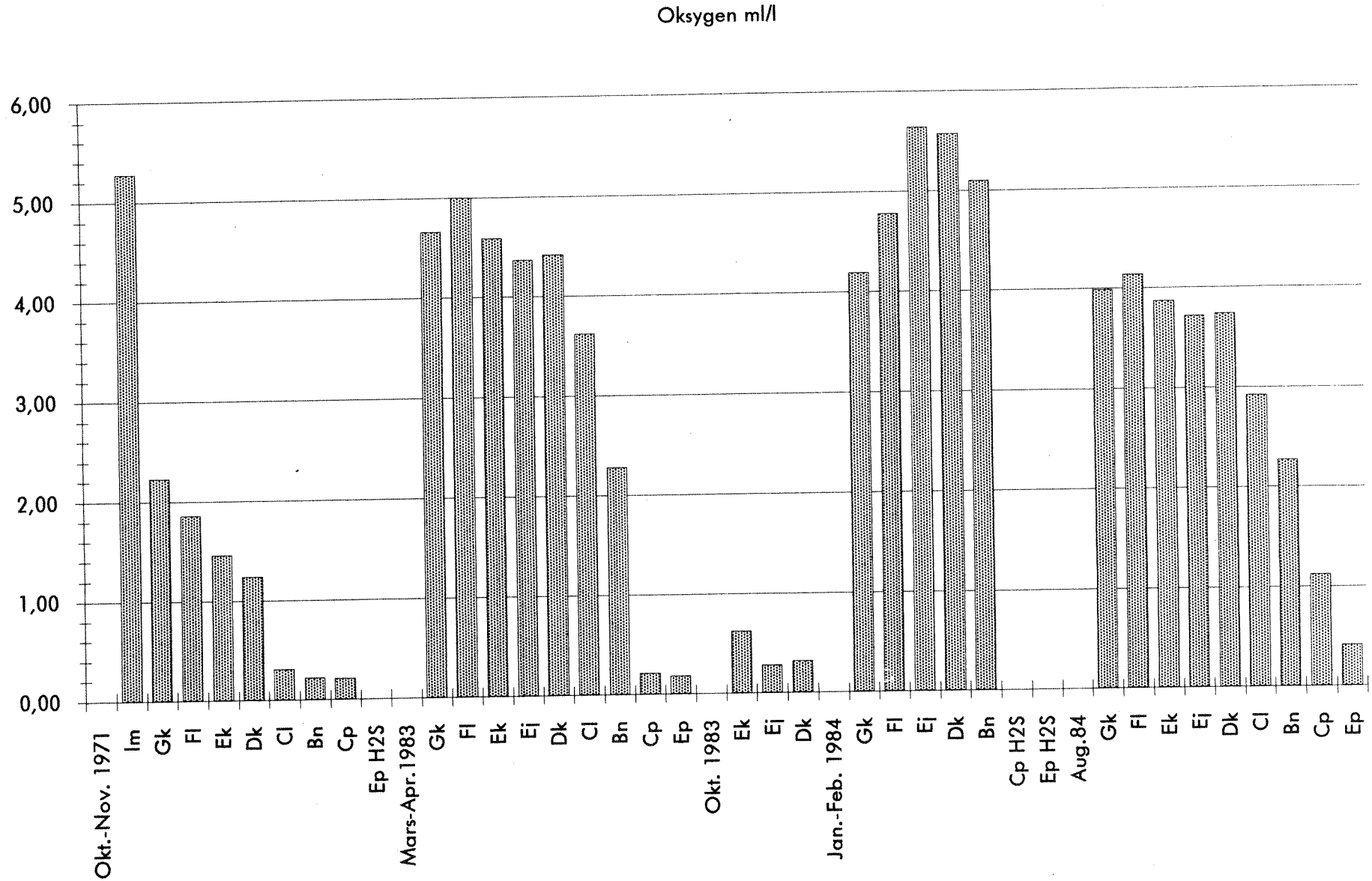


Fig. 68. Oksygen i ml/l 1 m over bunnen i serier fra Elle (Im) ved Drøbak til Svartskog (Ep) i Bunnefjorden. H2S = Hydrogensulfid.

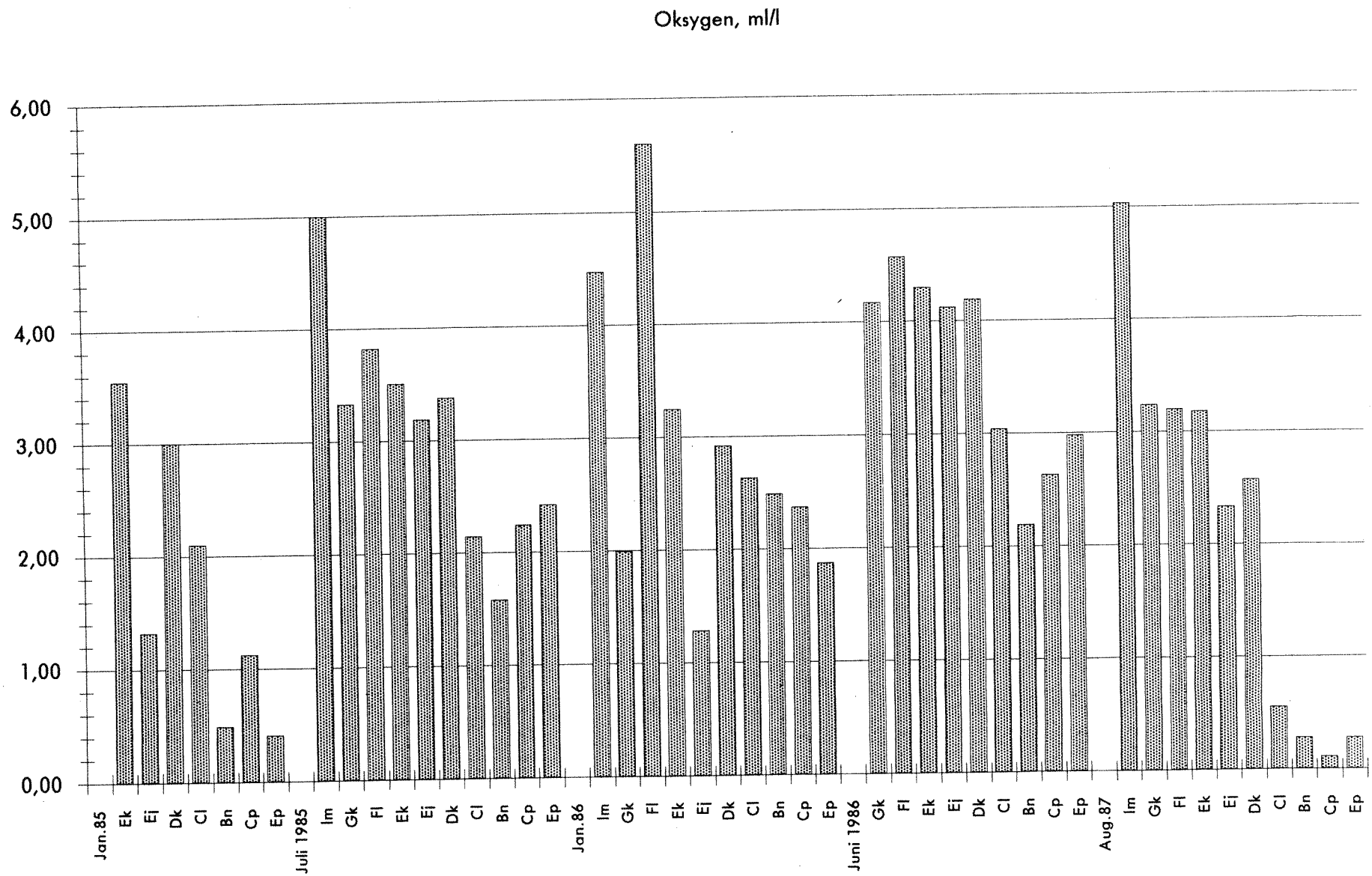


Fig. 69. Oksygen i ml/l 1 m over bunnen i serier fra Elle (Im) ved Drøbak til Svartskog (Ep) i Bunnefjorden.

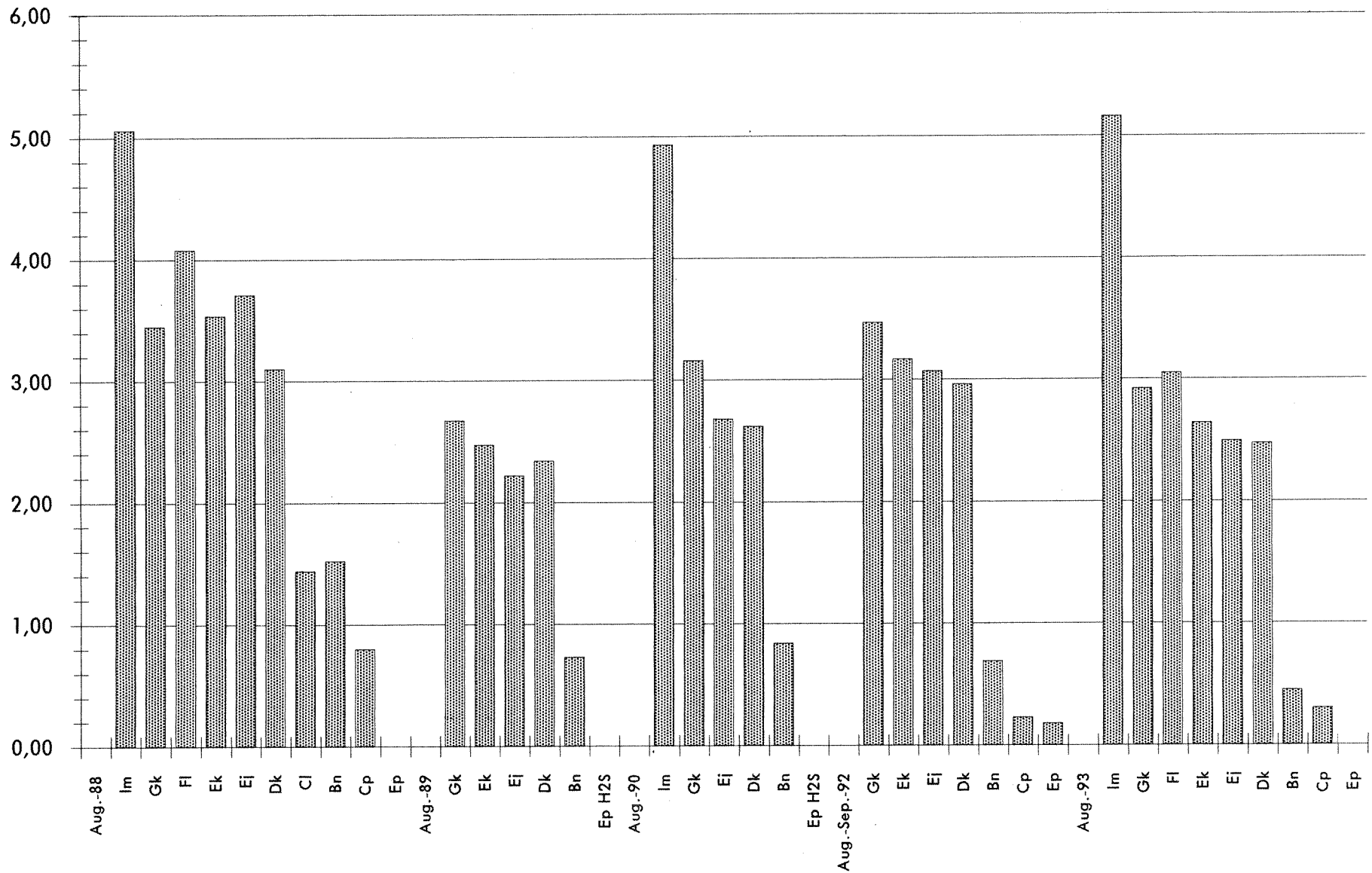


Fig. 70. Oksygen i ml/l 1 m over bunnen i serier fra Elle (Im) ved Drøbak til Svartskog (Ep) i Bunnefjorden. H2S = Hydrogensulfid.

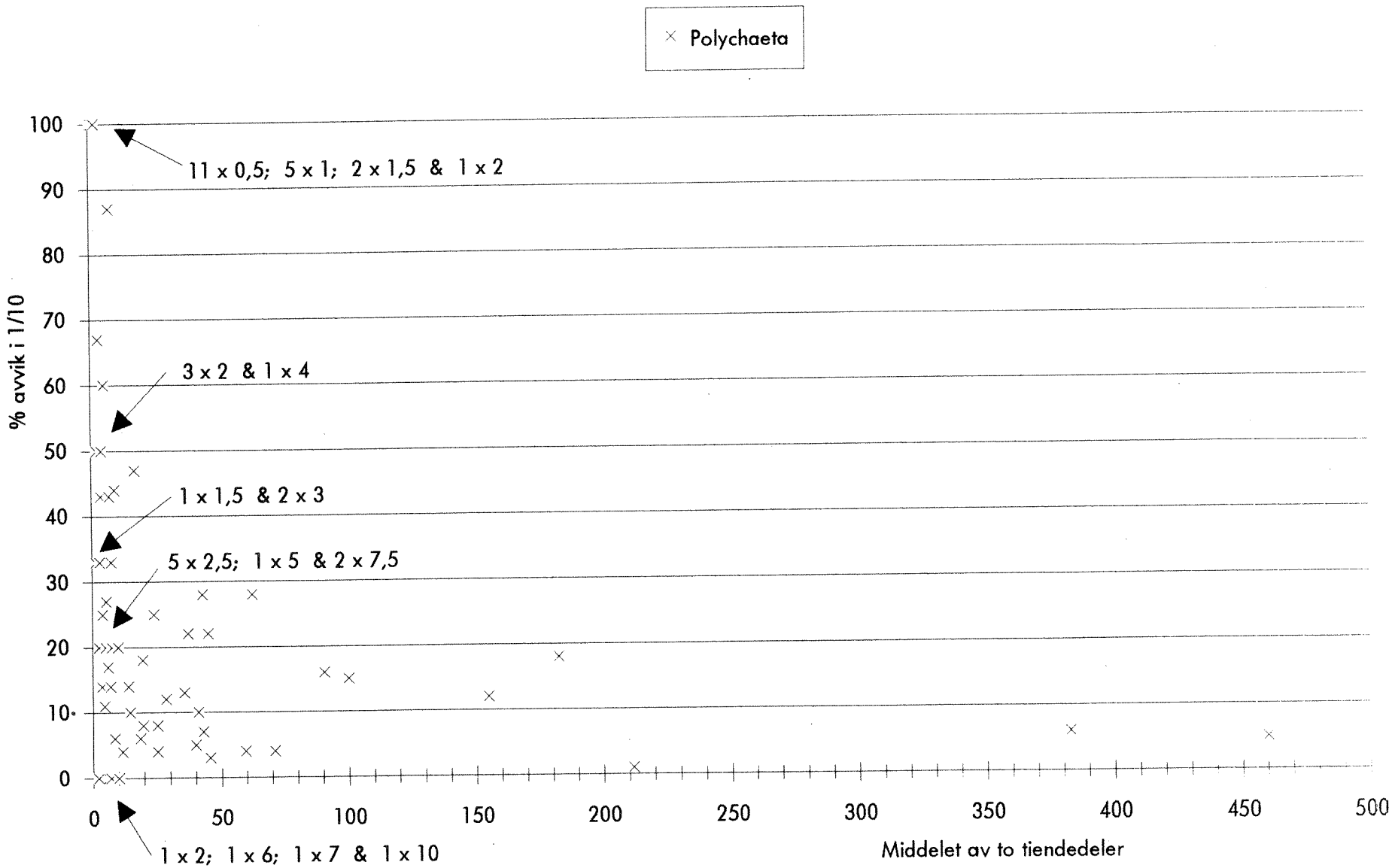


Fig. 71. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

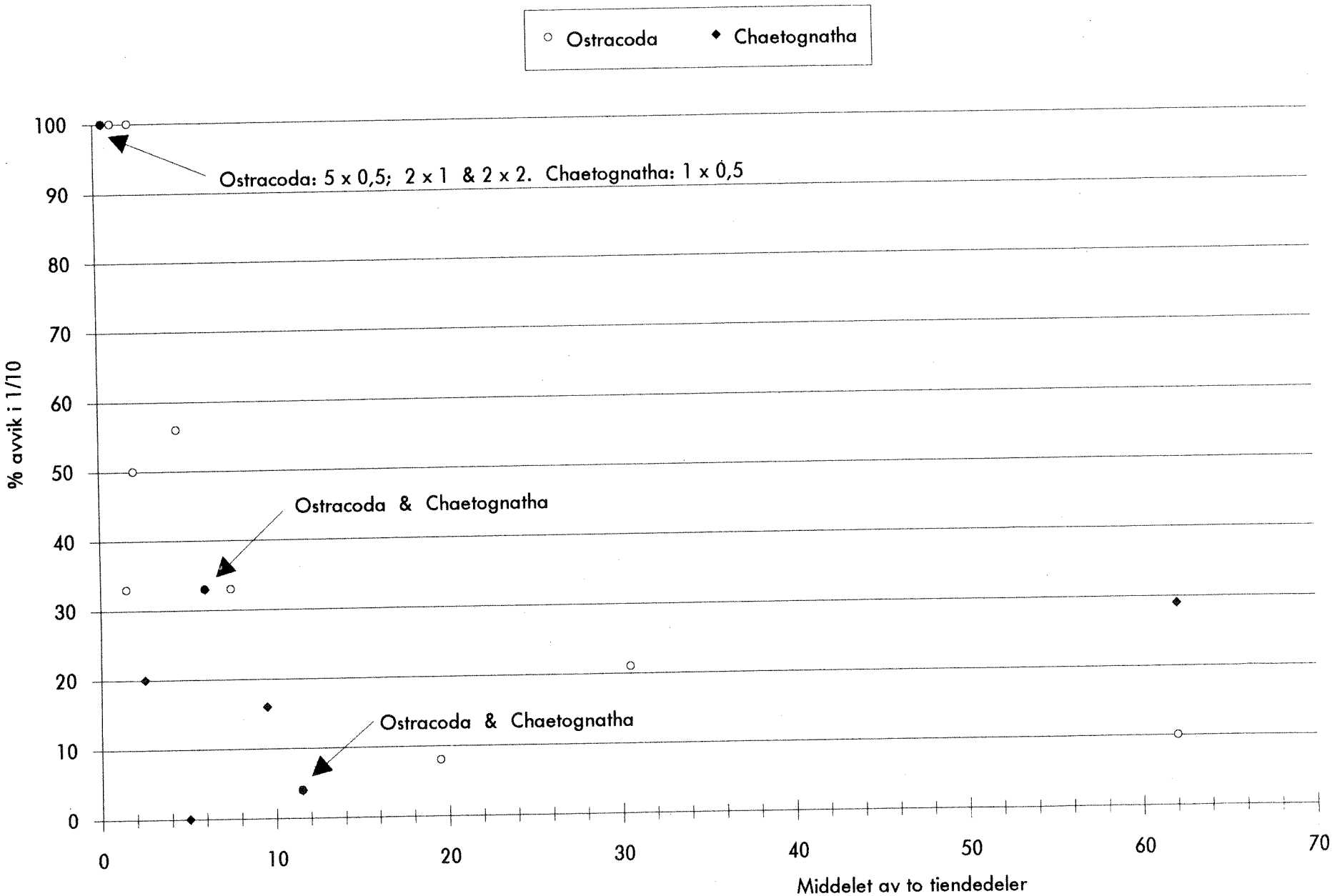


Fig. 72. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

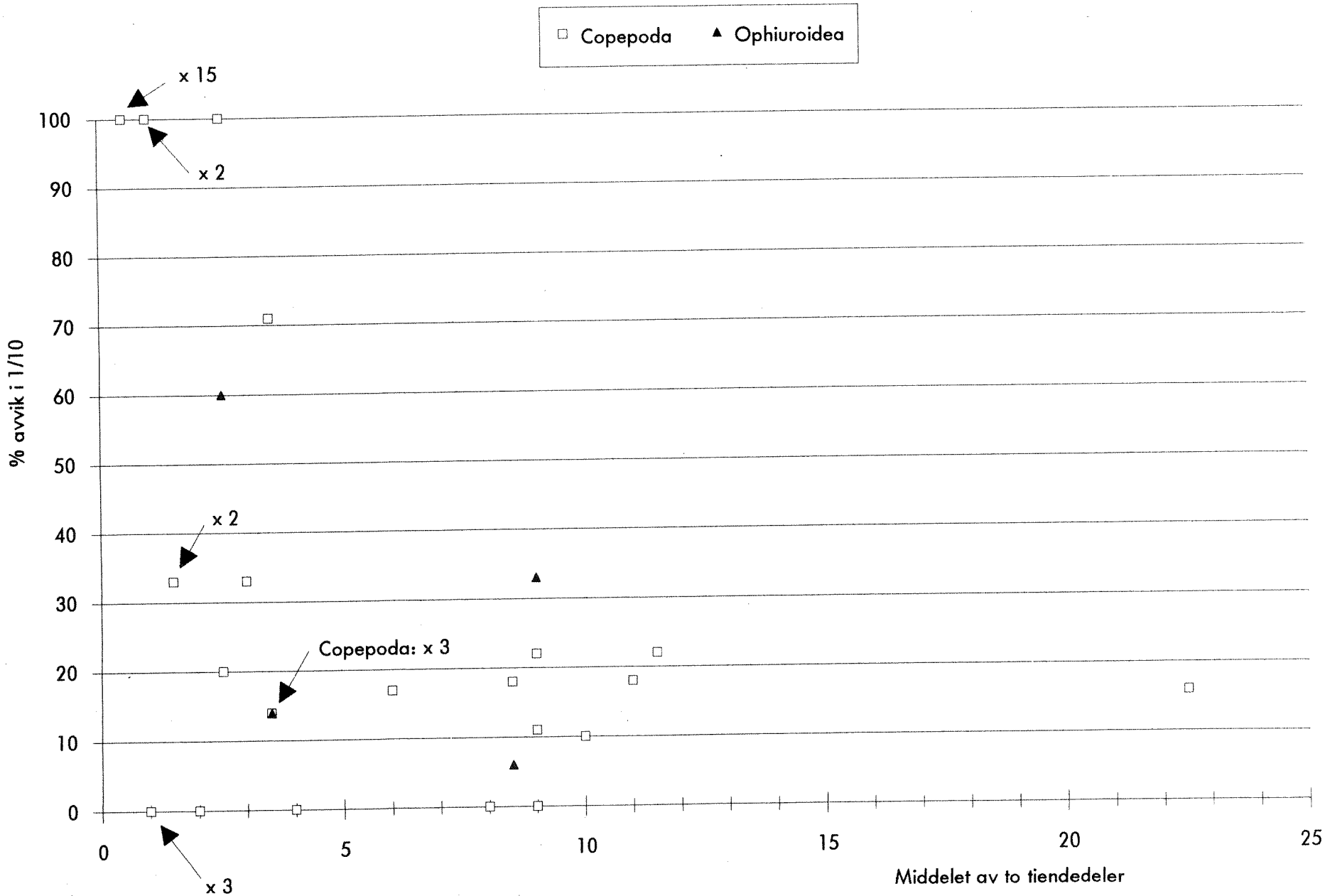


Fig. 73. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

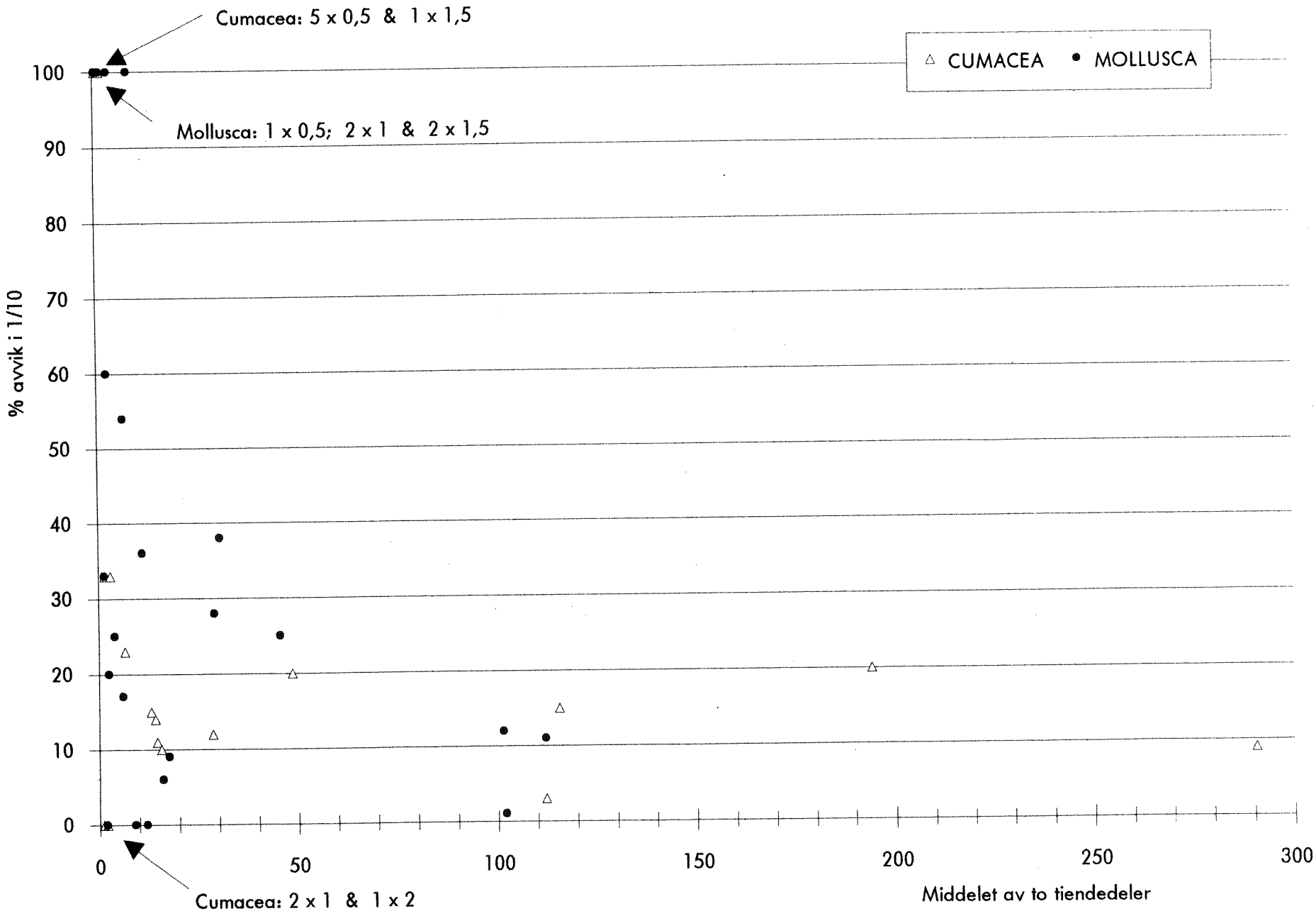


Fig. 74. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

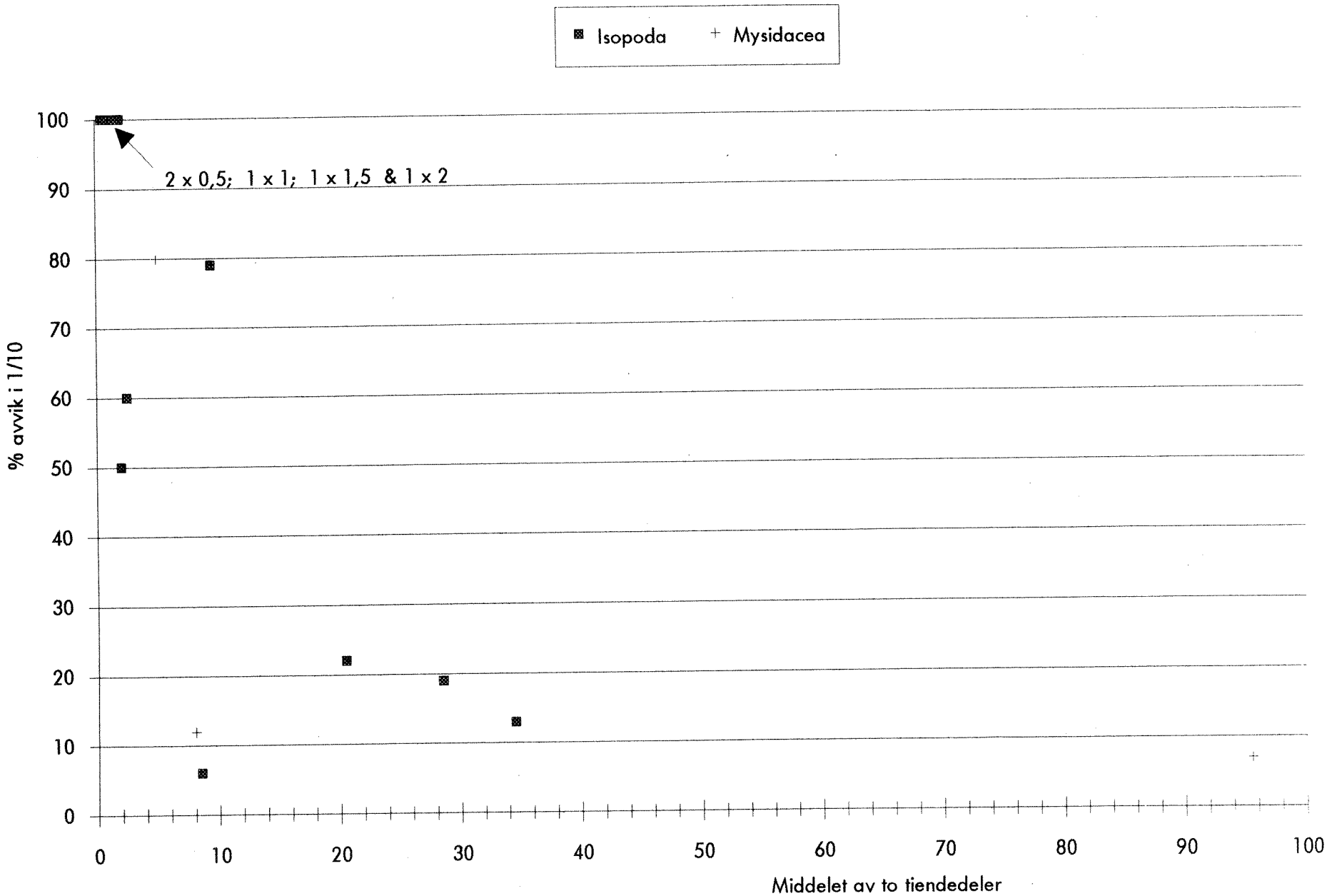


Fig. 75. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

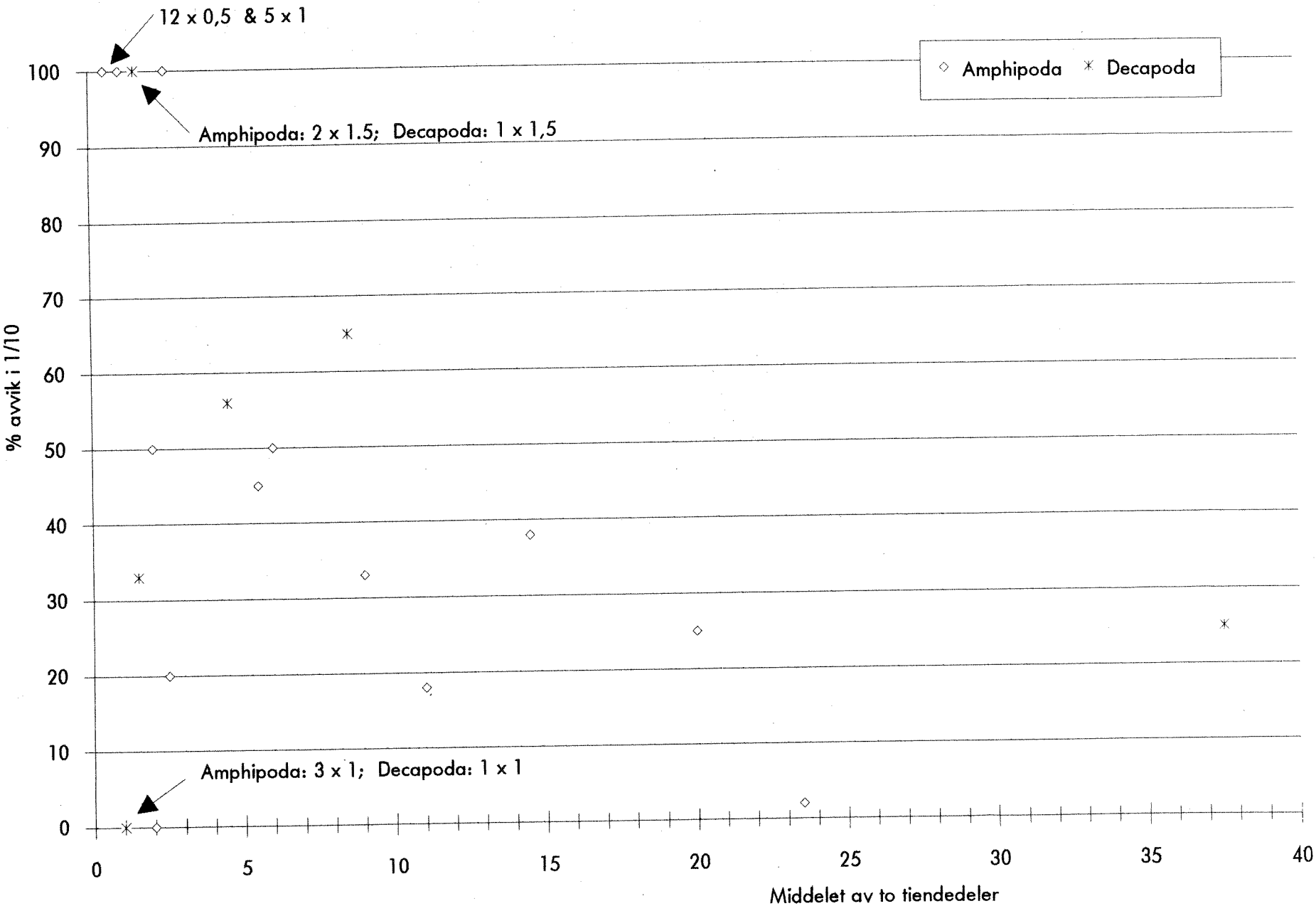


Fig. 76. Middelet av 2/10 i prøvene fra Im, Gk, Ek, Ej, Dk og Ep, Juli 1985 samt avvik fra dette middelet i 1/10 som % av middelet.

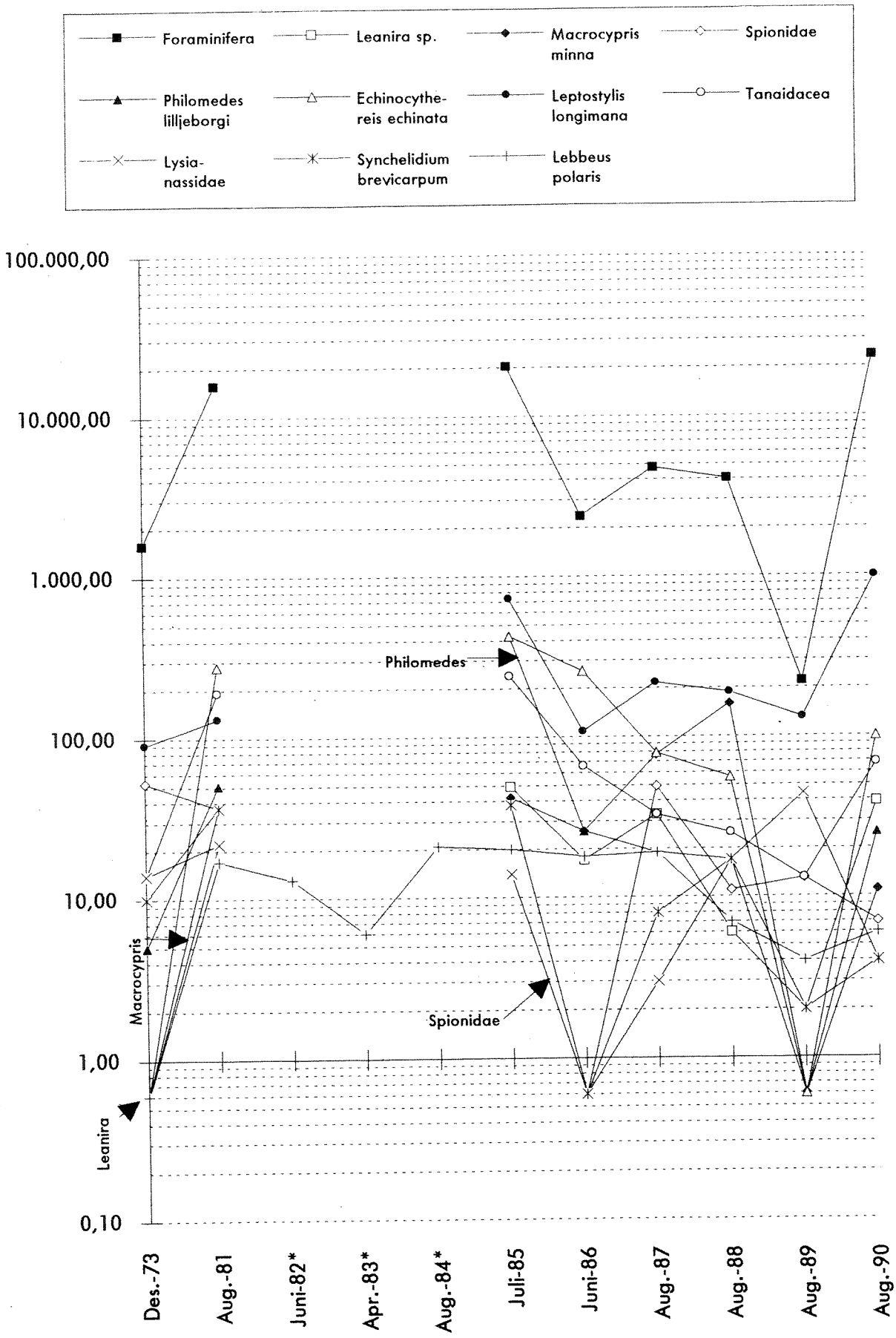


Fig. 77. Individer/100 m3 ved Elle (Im). 0,60 = Ingen funnet. * = Bare delvis analysert.

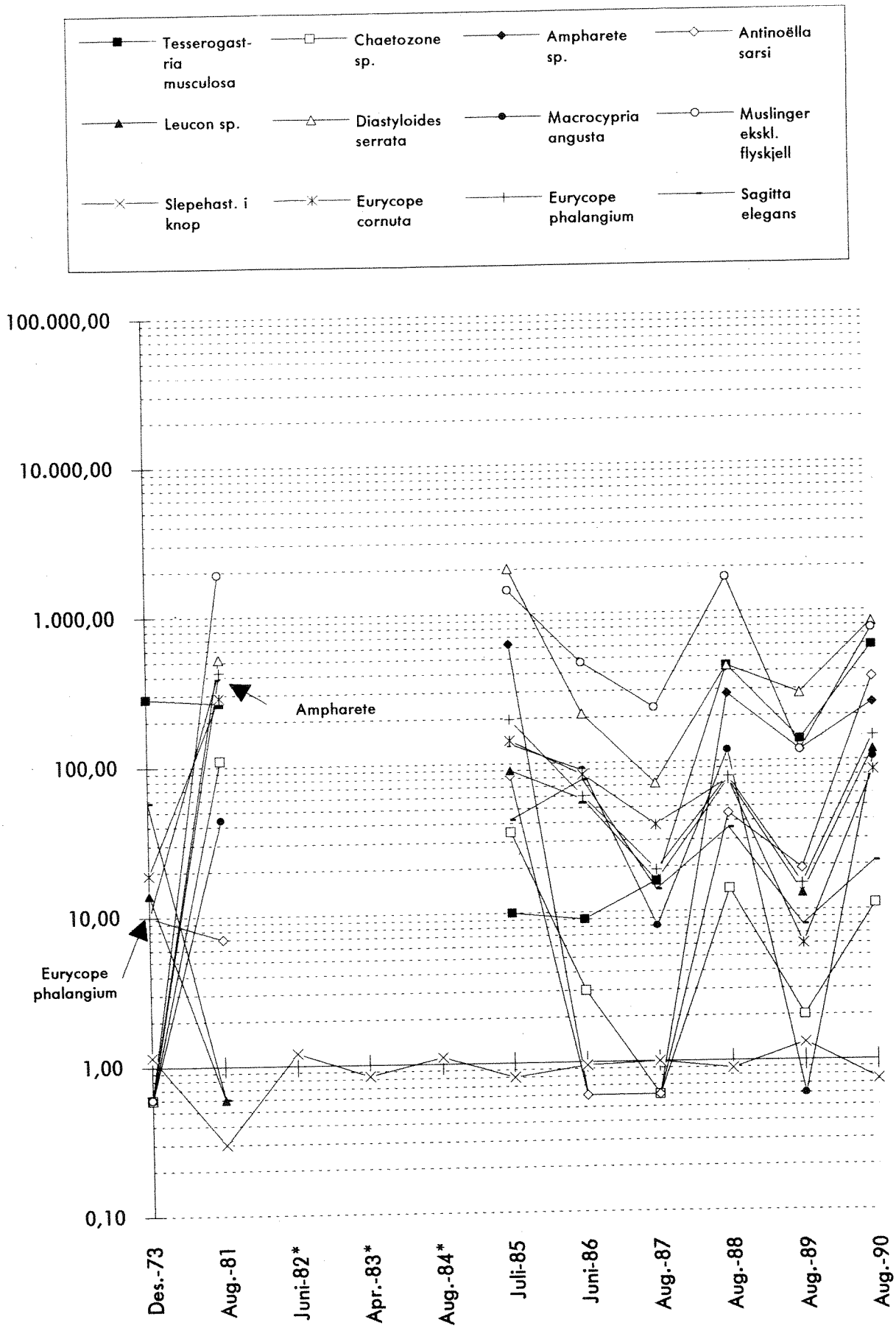


Fig. 78. Individer/100 m3 ved Elle (Im). 0,60 = Ingen funnet. * = Ikke analysert.

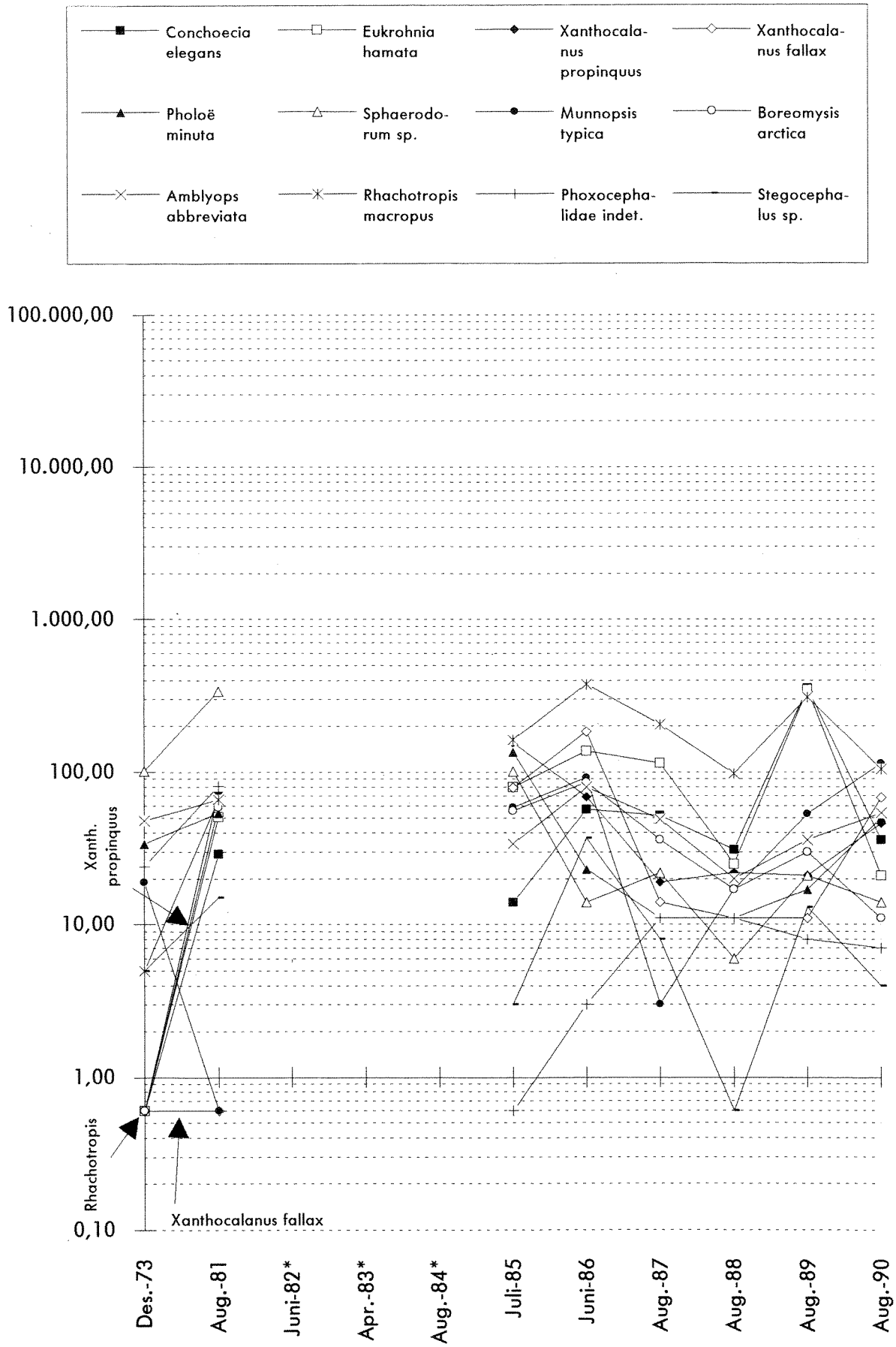


Fig. 79. Individer/100 m3 ved Elle (Im). 0,60 = Ingen funnet. * = Ikke analysert.

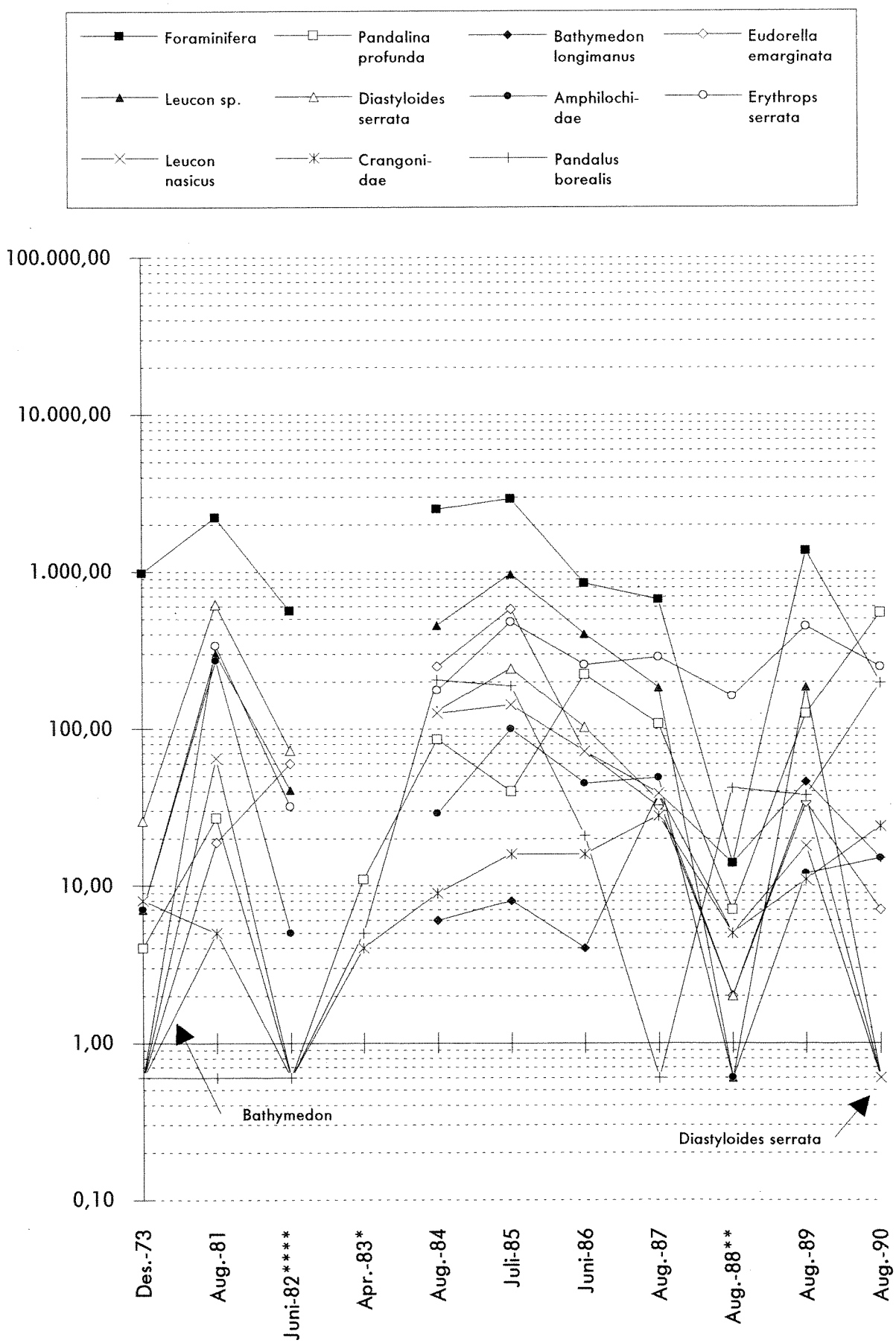


Fig. 80. Individer/100 m3 i Gråøyrenna (Gk). 0,60 = Ingen funnet. * = Bare delvis analysert. ** = Lite sediment. **** = Ufullstendig prøve.

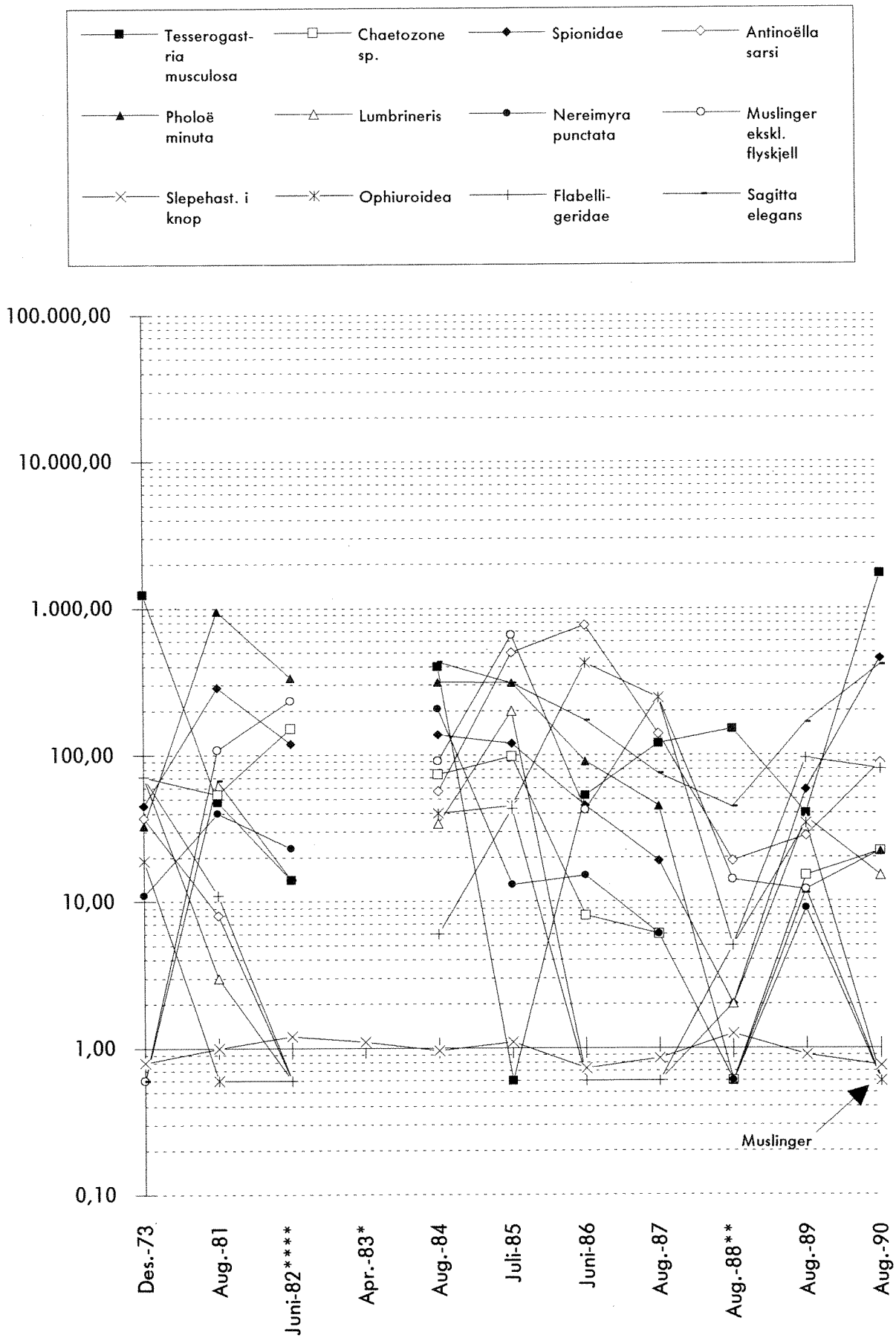


Fig. 81. Individer/100 m3 i Gråøyrenna (Gk). 0,60 = Ingen funnet. * = Ikke analysert. ** = Lite sediment. **** = Ufullstendig prøve.

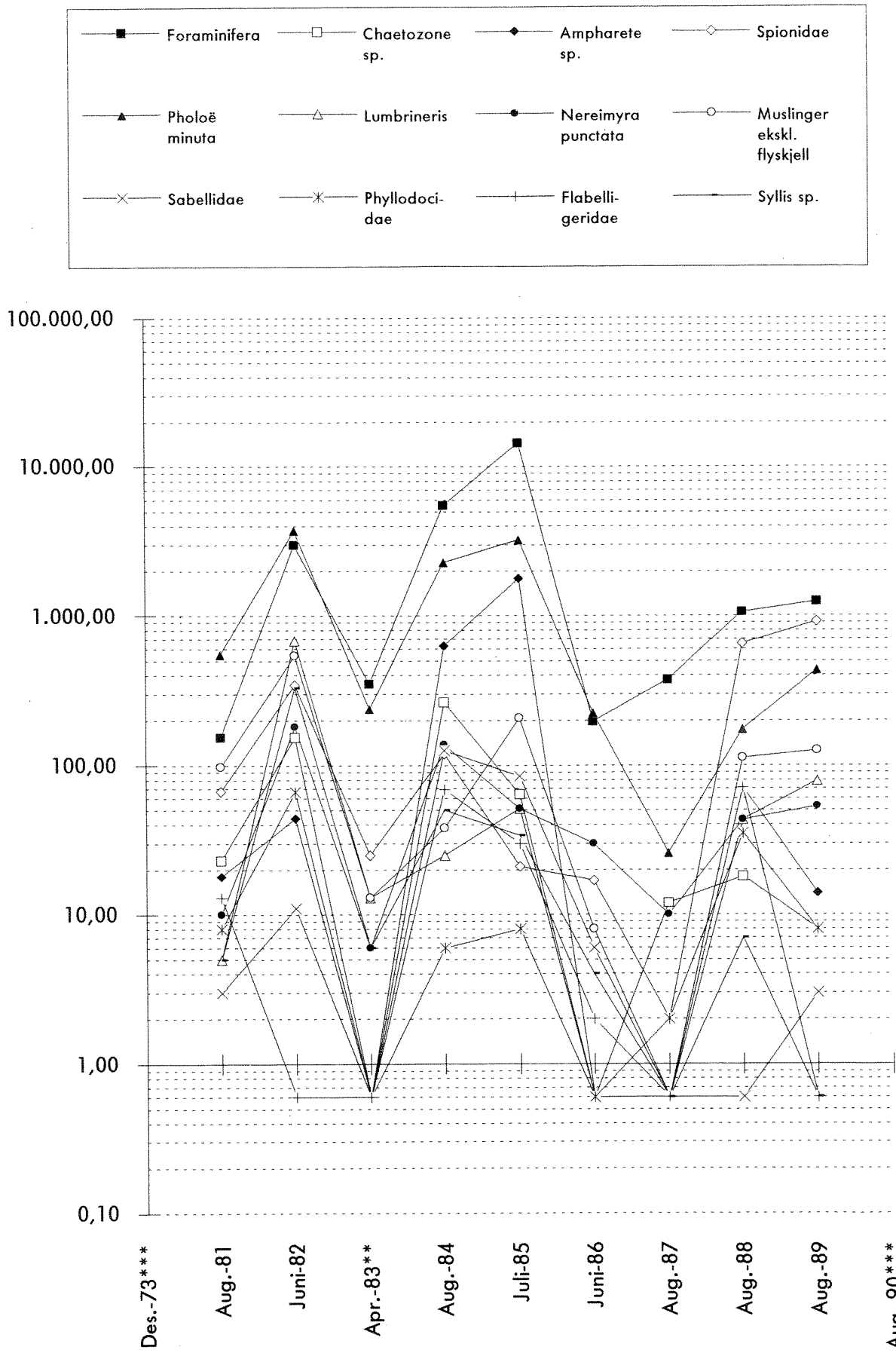


Fig. 82. Individer/100 m3 i Svartedypet (Ek). 0,60 = Ingen funnet. *** = Ingen prøve. ** = Lite sediment.

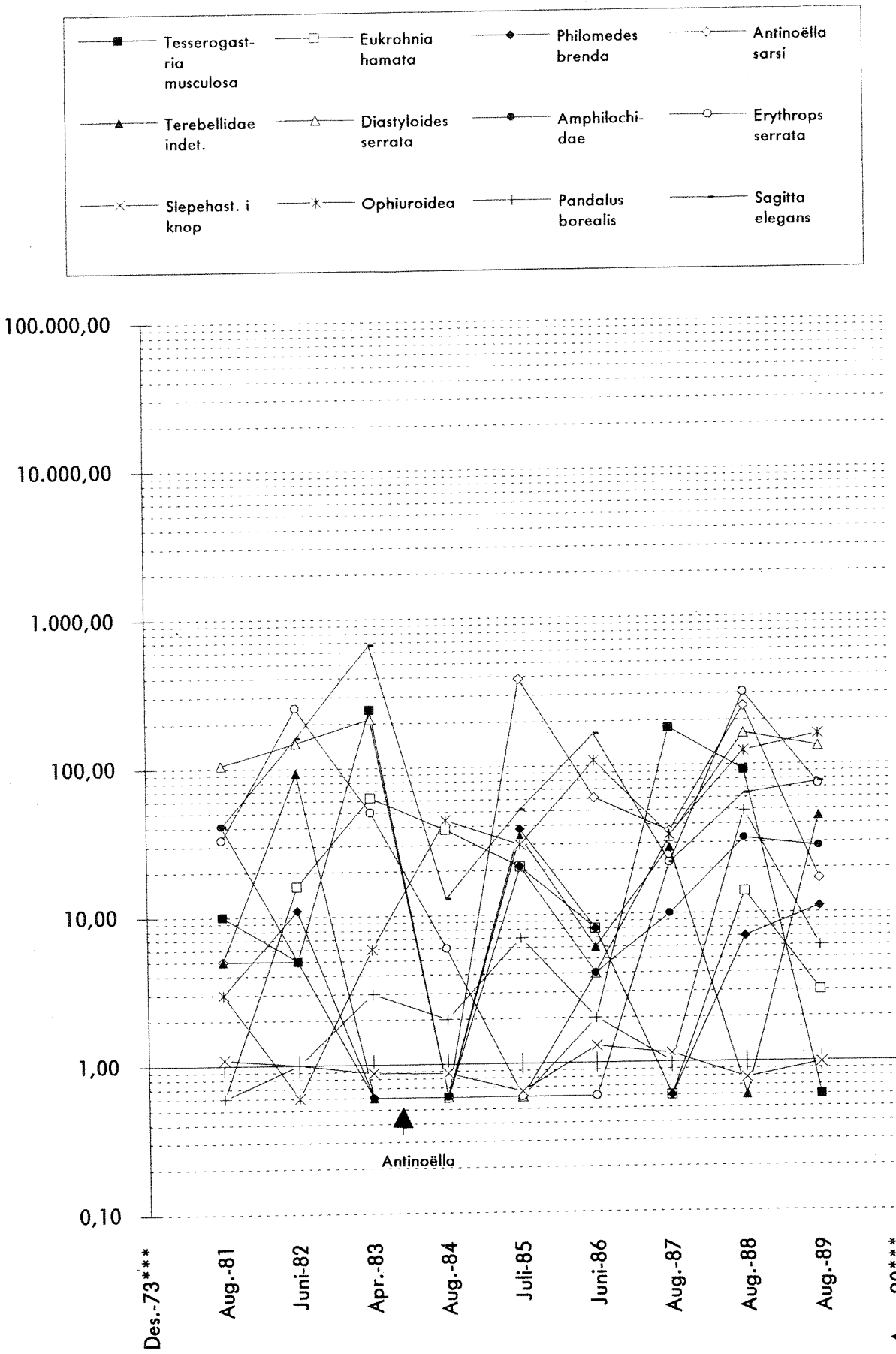


Fig. 83. Individer/100 m3 i Svartedypet (Ek). 0,60 = Ingen funnet. *** = Ingen prøve.

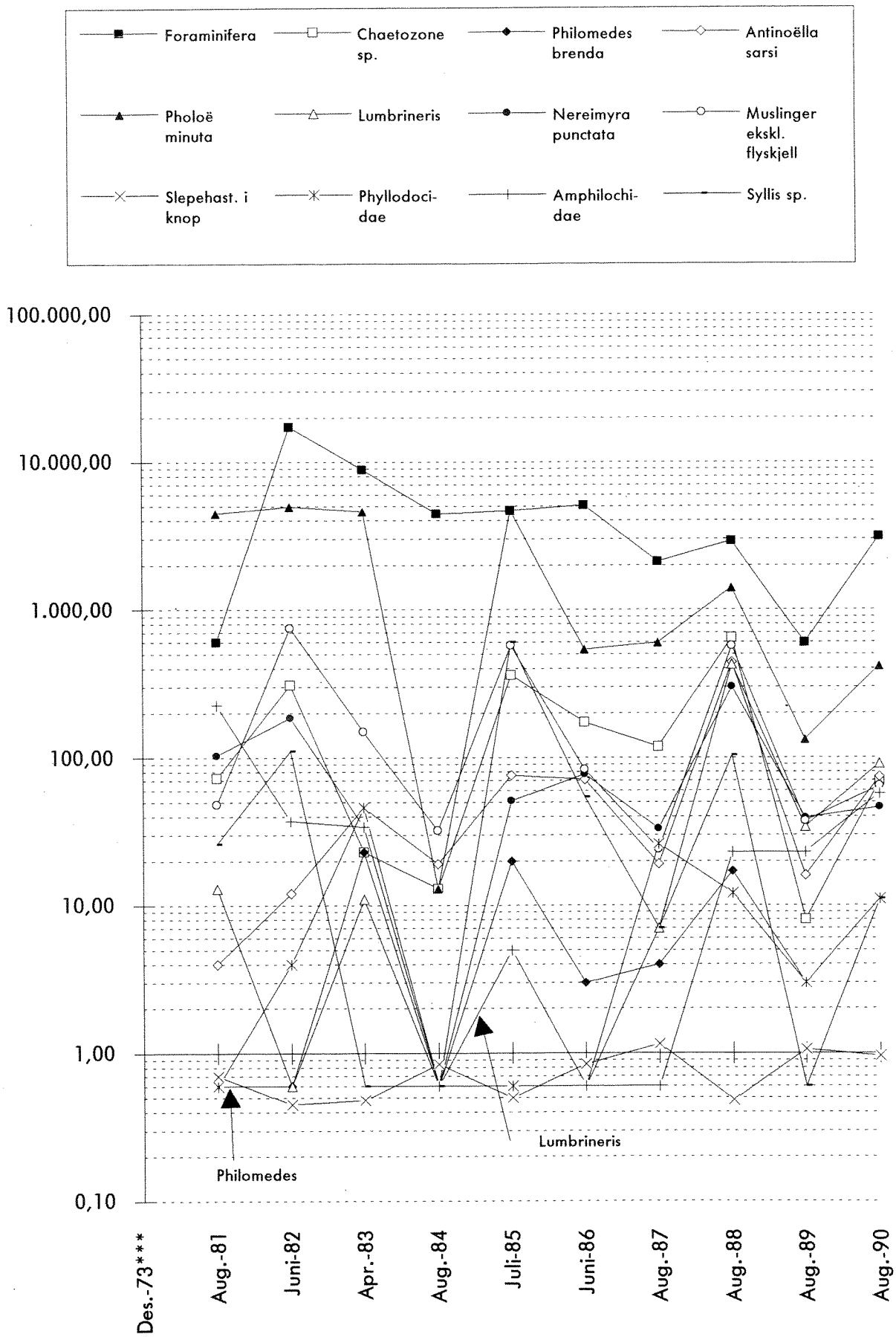


Fig. 84. Individer/100 m3 i Vesthullet (Ej). 0,60 = Ingen funnet. *** = Ingen prøve.

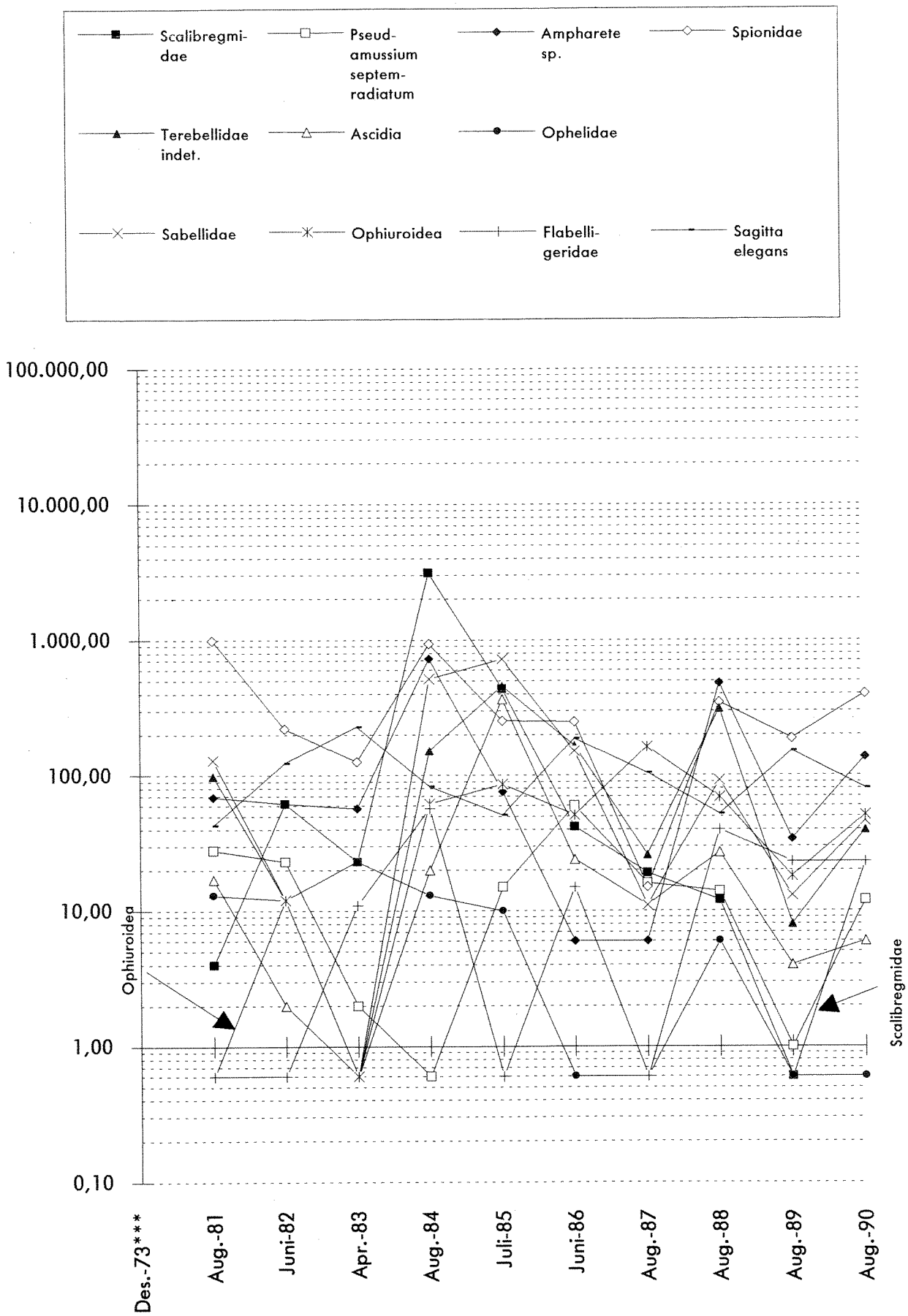


Fig. 85. Individer/100 m3 i Vesthullet (Ej). 0,60 = Ingen funnet. *** = Ingen prøve.

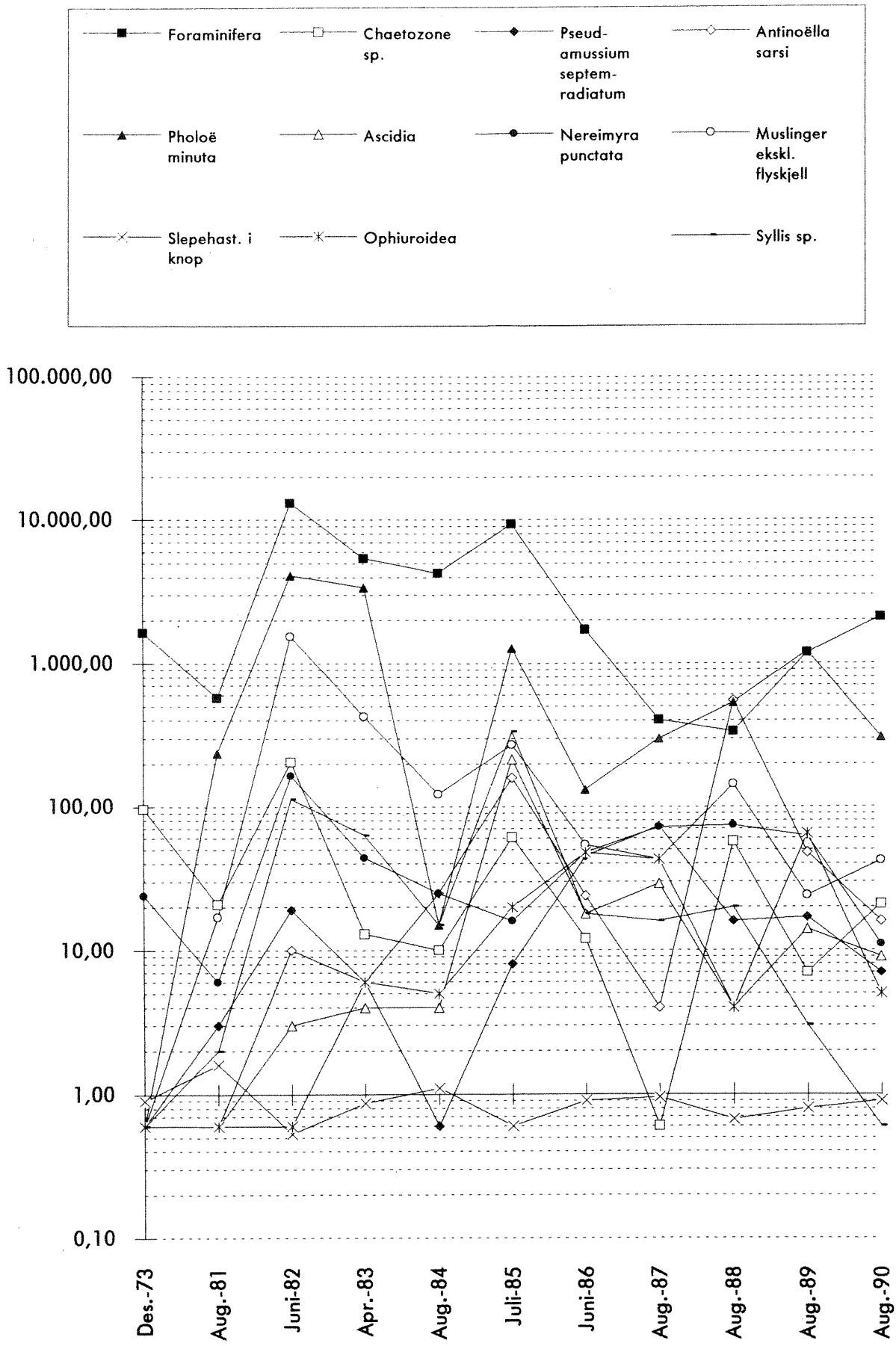


Fig. 86. Individer/100 m3 ved Steilene (Dk). 0,60 = Ingen funnet.

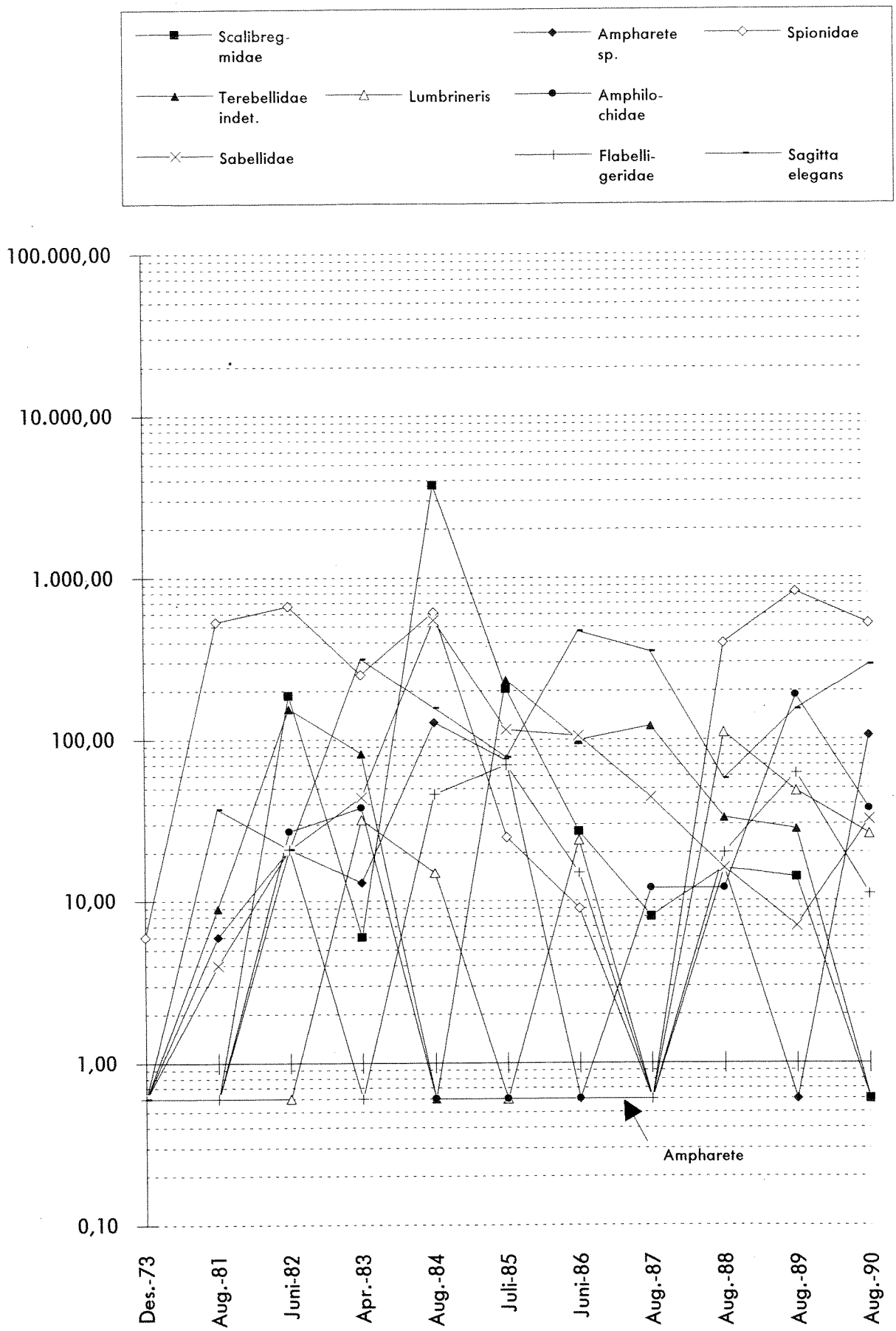


Fig. 87. Individer/100 m3 ved Steielene (Dk). 0,60 = Ingen funnet.

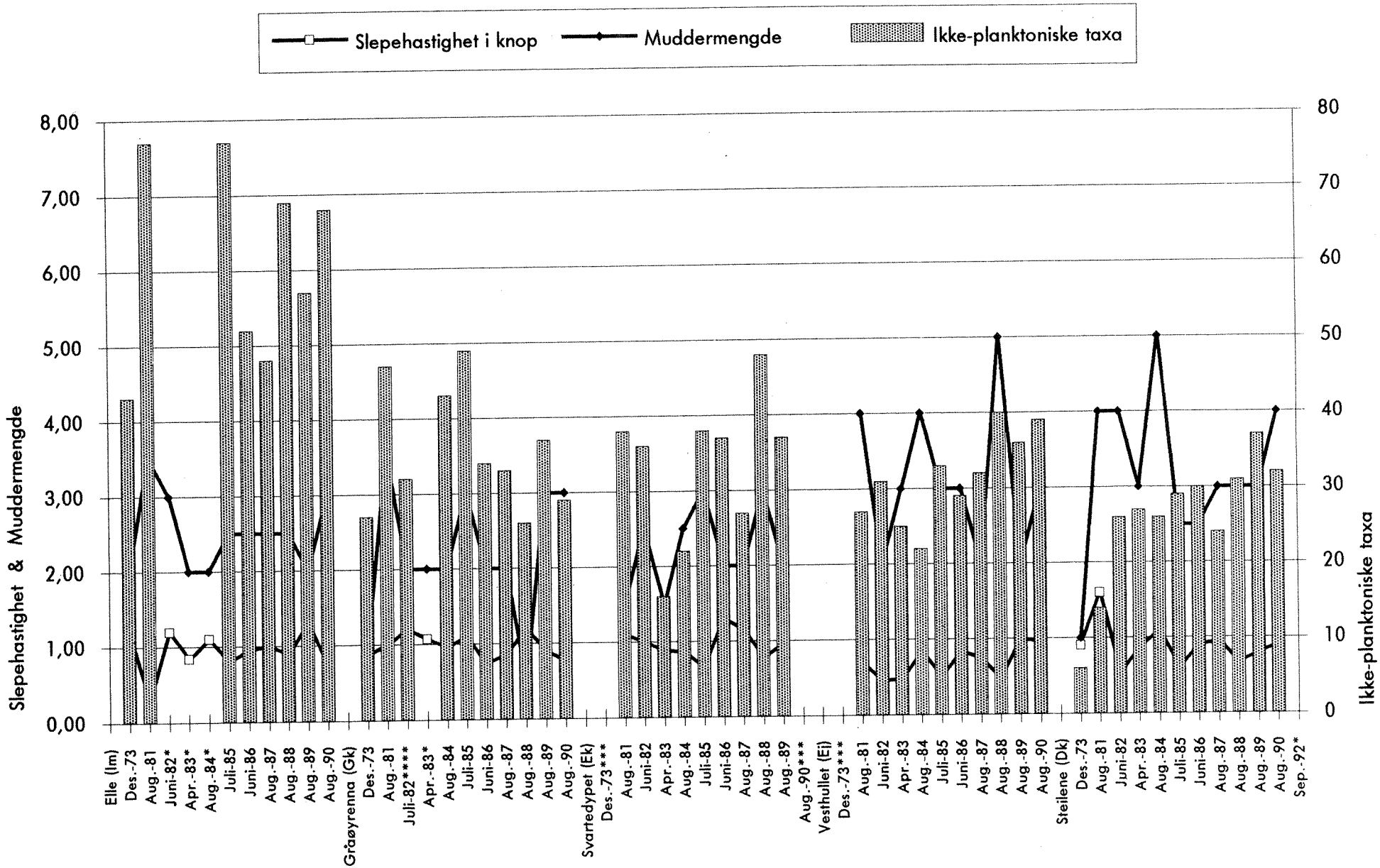


Fig. 88. Slepehastighet, estimert muddermengde samt ikke-planktoniske taxa. * = Ikke analysert. **** = Ufullstendig prøve. *** = Ingen prøve.

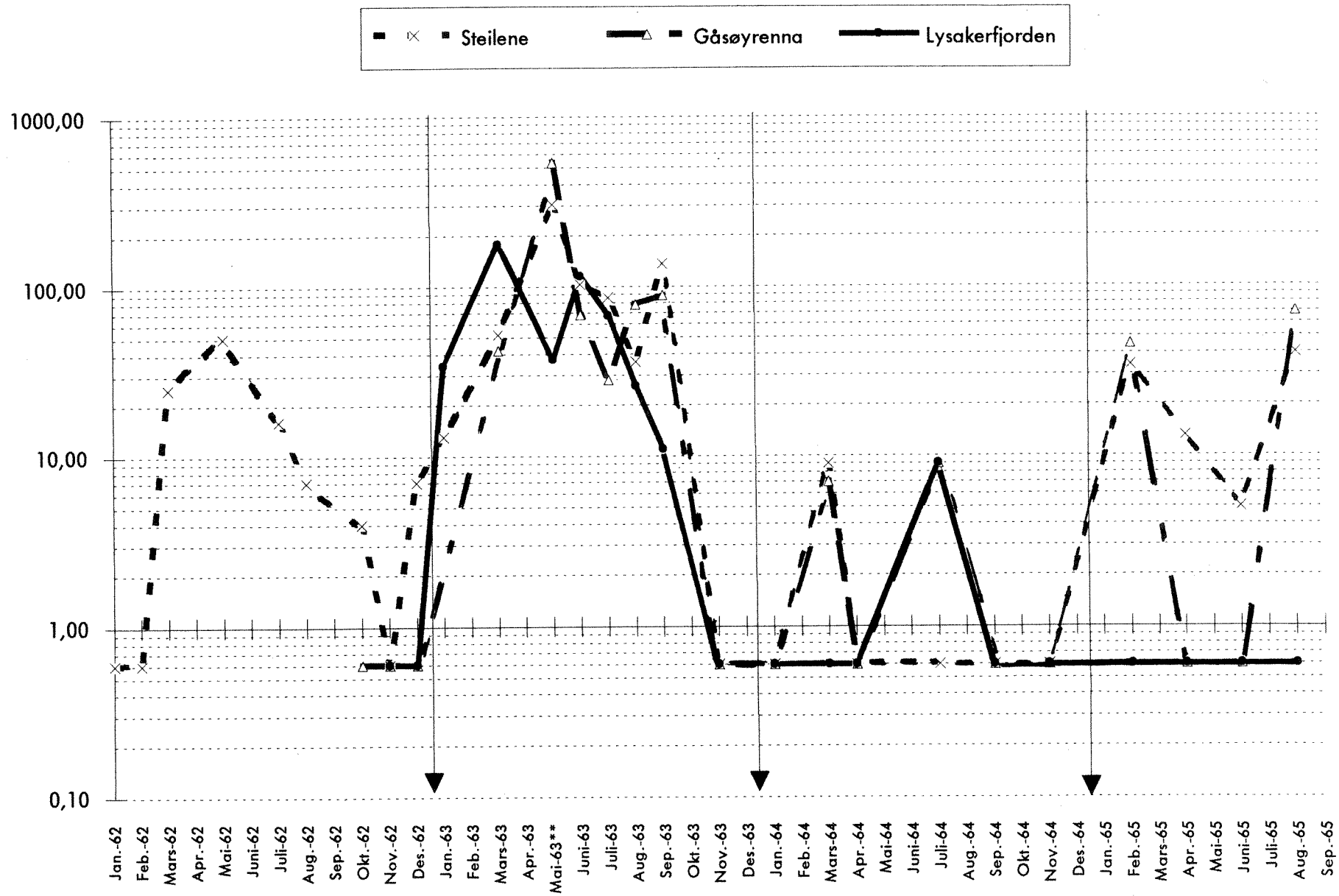


Fig. 89. Ind./100 m3 av Diaixis hibernica. 0,60 = Ingen funnet. ** = Tallet for Lysakerfjorden noe for lite p. g. a. vind i måleren. Data fra Beyer og Versvik (1968).

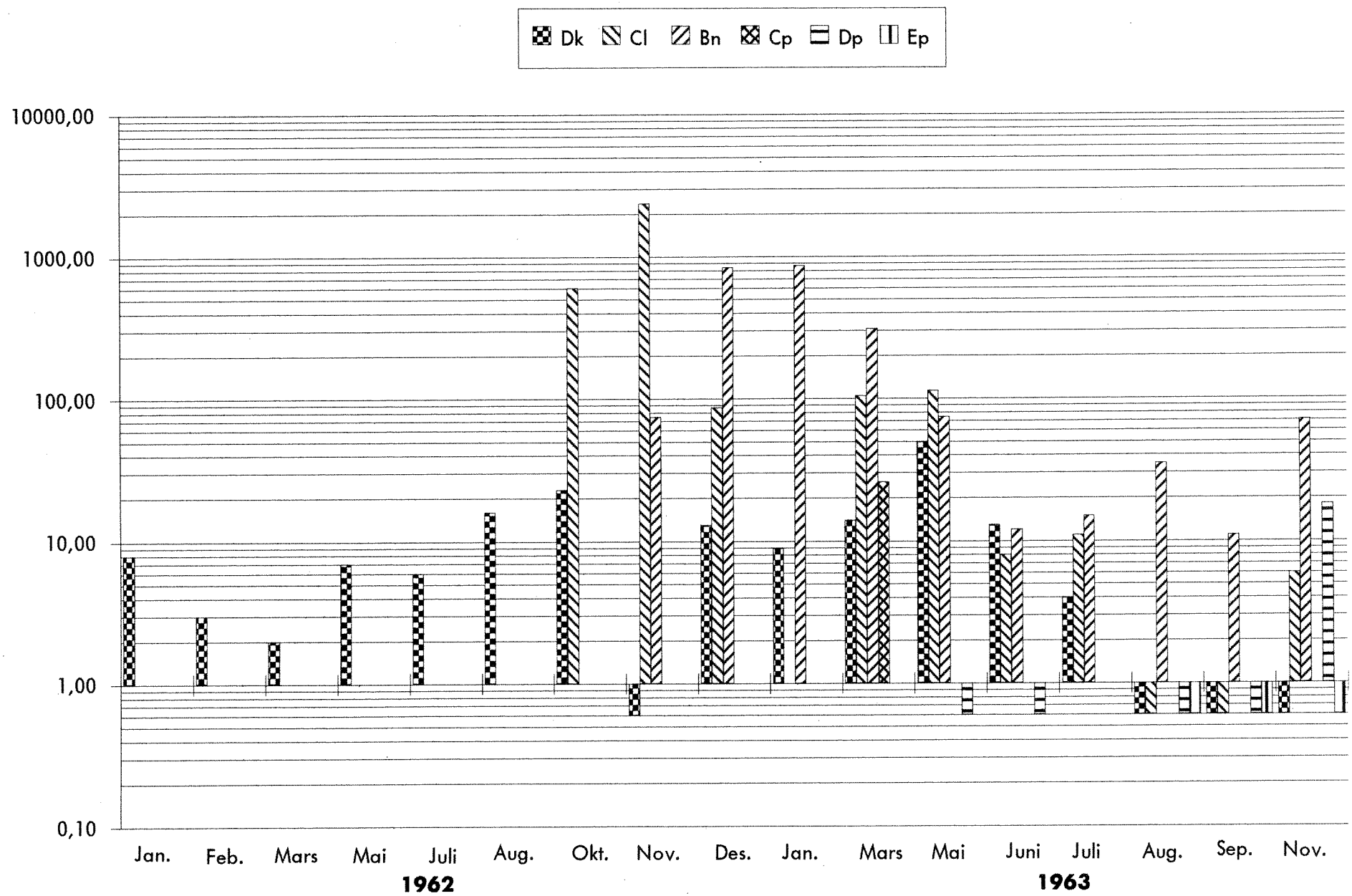


Fig. 90. Nudibranchiata/100 m3 i serier fra Steilene (Dk) i Vestfjorden til Svartskog (Ep) i Bunnefjorden. 0,60 = Ingen funnet. Ingen søyle = Ingen prøve.

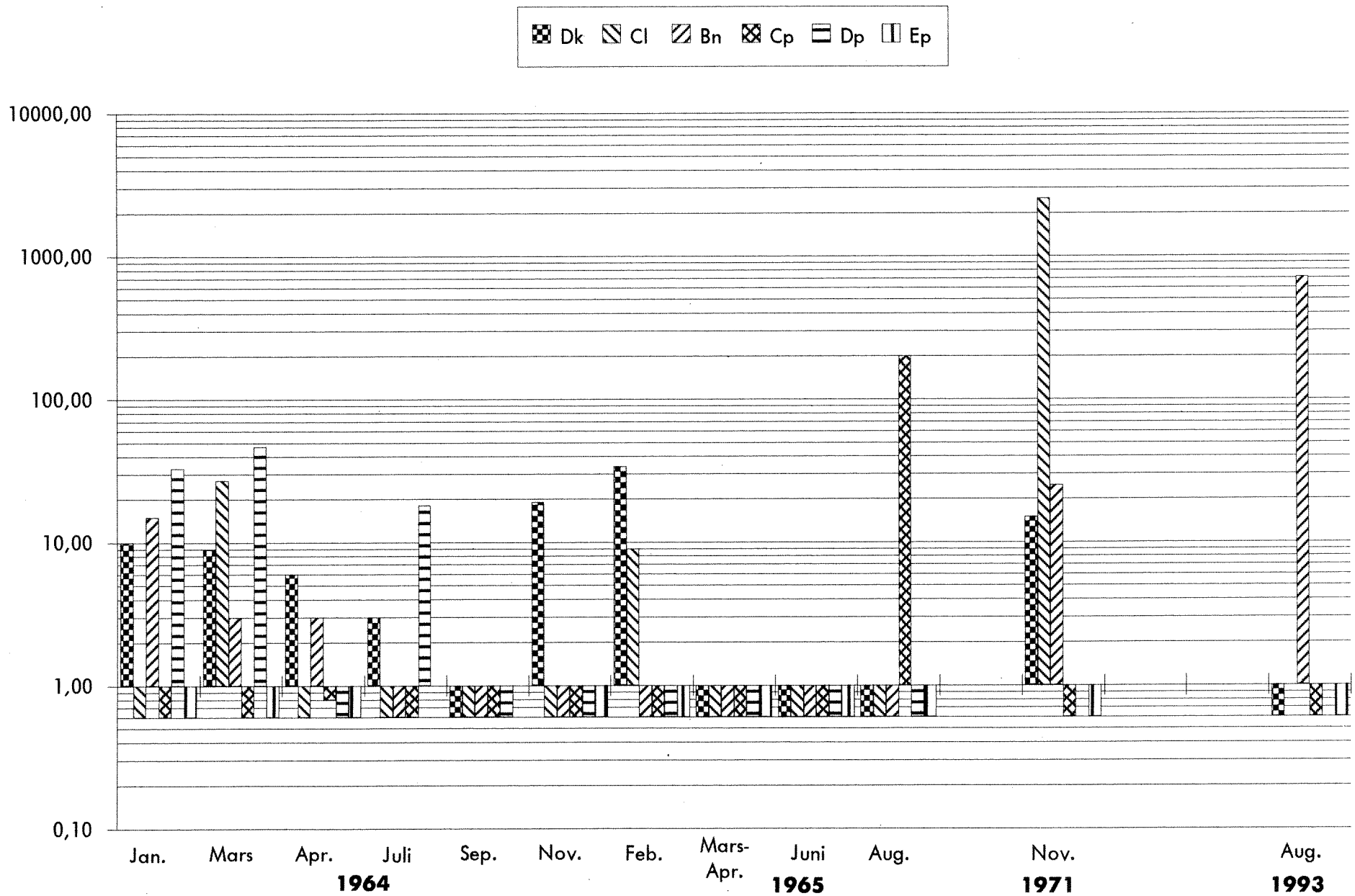


Fig. 91. Nudibranchiata/100 m3 i serier fra Steilene (Dk) i Vestfjorden til Svartskog (Ep) i Bunnefjorden. 0,60 = Ingen funnet. Ingen søyle = Ingen prøve. 1971-data fra GJERMUNDSEN (1974).

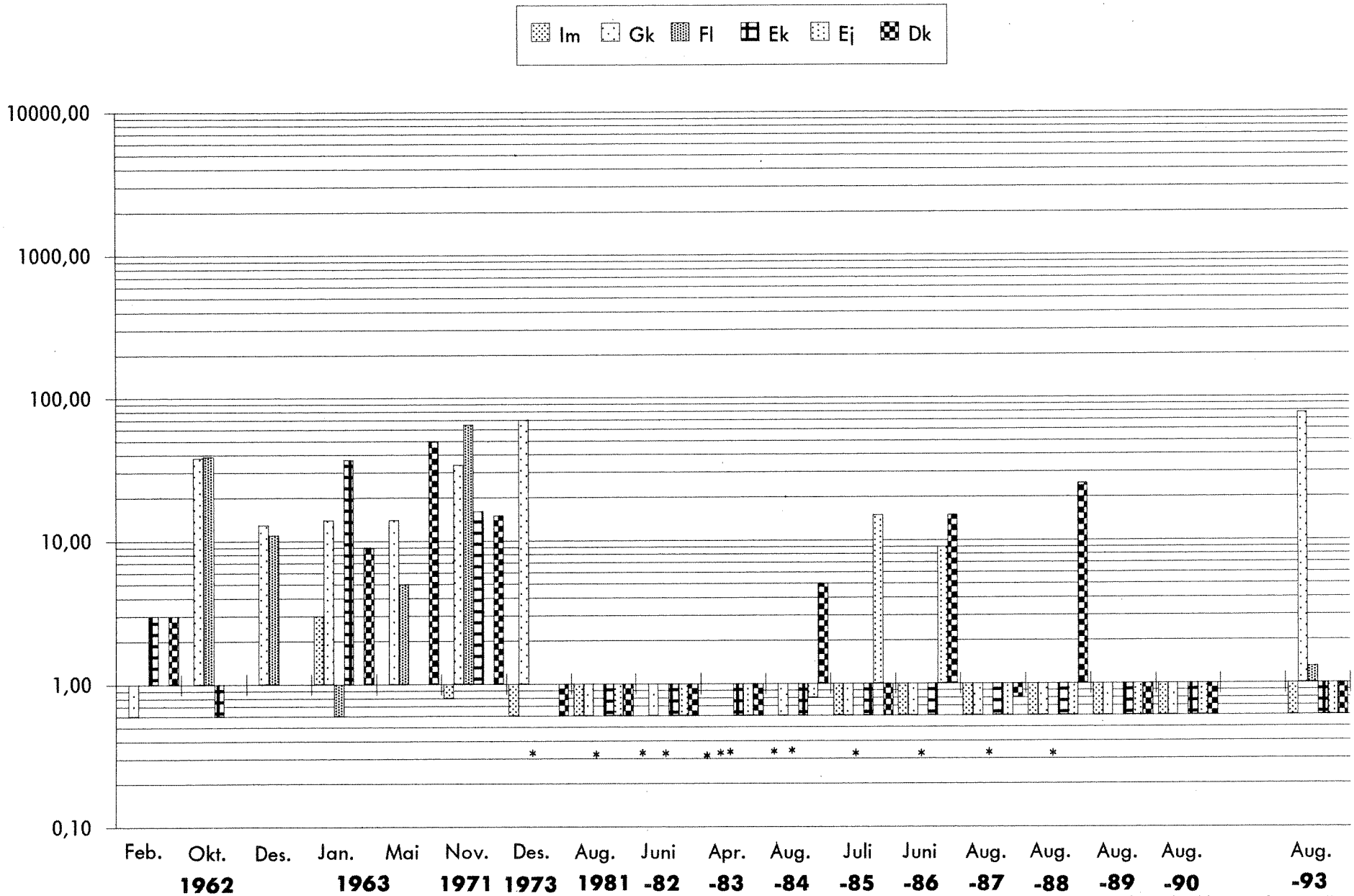


Fig. 92. Nudibranchiata/100 m3 i serier fra Elle (Im) til Steilene (Dk). 0,60 = Ingen funnet. Ingen søyle = Ingen prøve, eller hvis *, ikke analysert. Data for 1962 og 1963 utenfor Steilene samt 1971-data fra GJERMUNDSEN (1974).

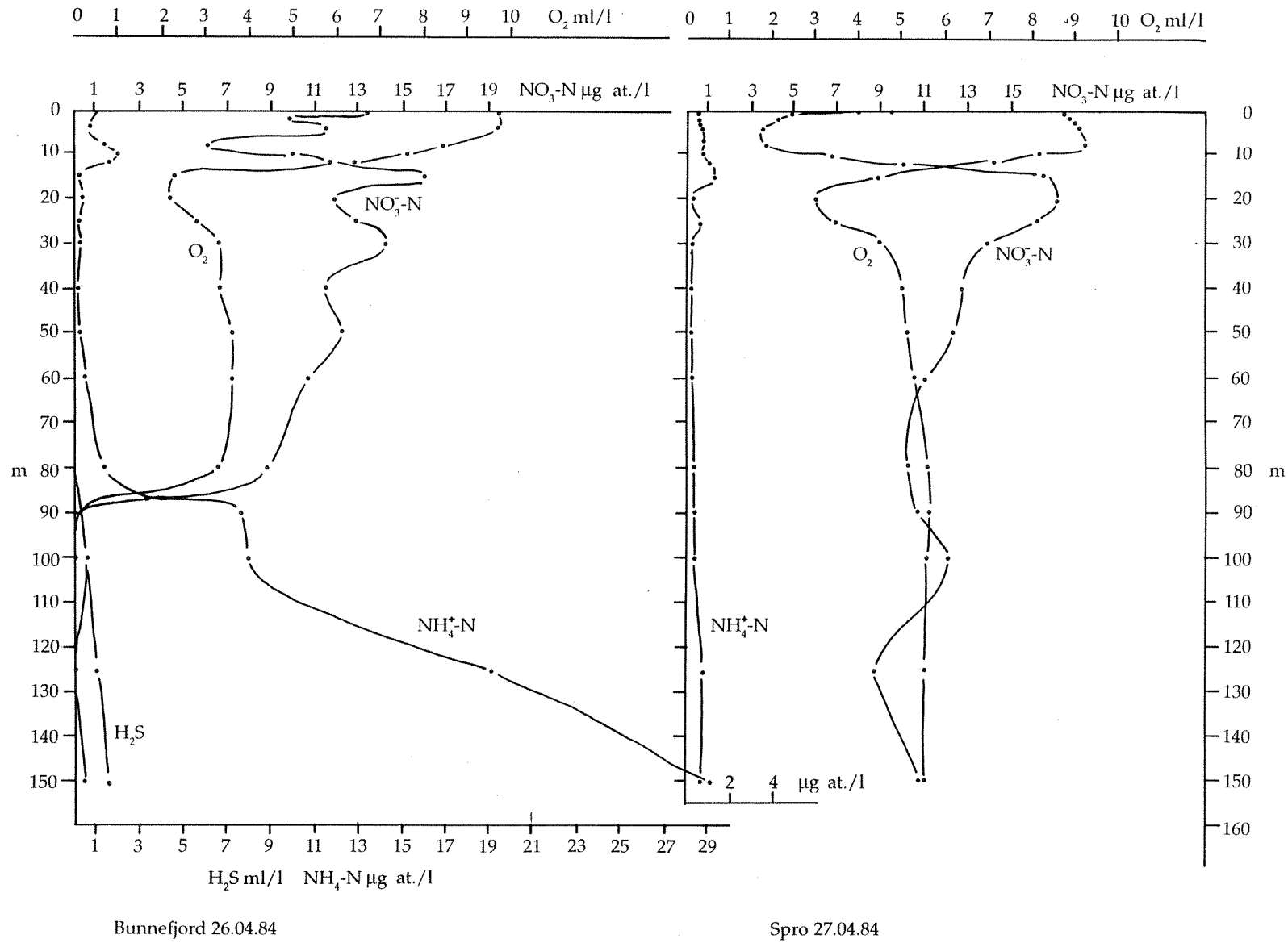


Fig. 93. Vertikalfordeling av oksygen (O_2) samt av nitrat (NO_3^-) og ammonium (NH_4^+) angitt ved den mengde nitrogen (N) som de representerer.

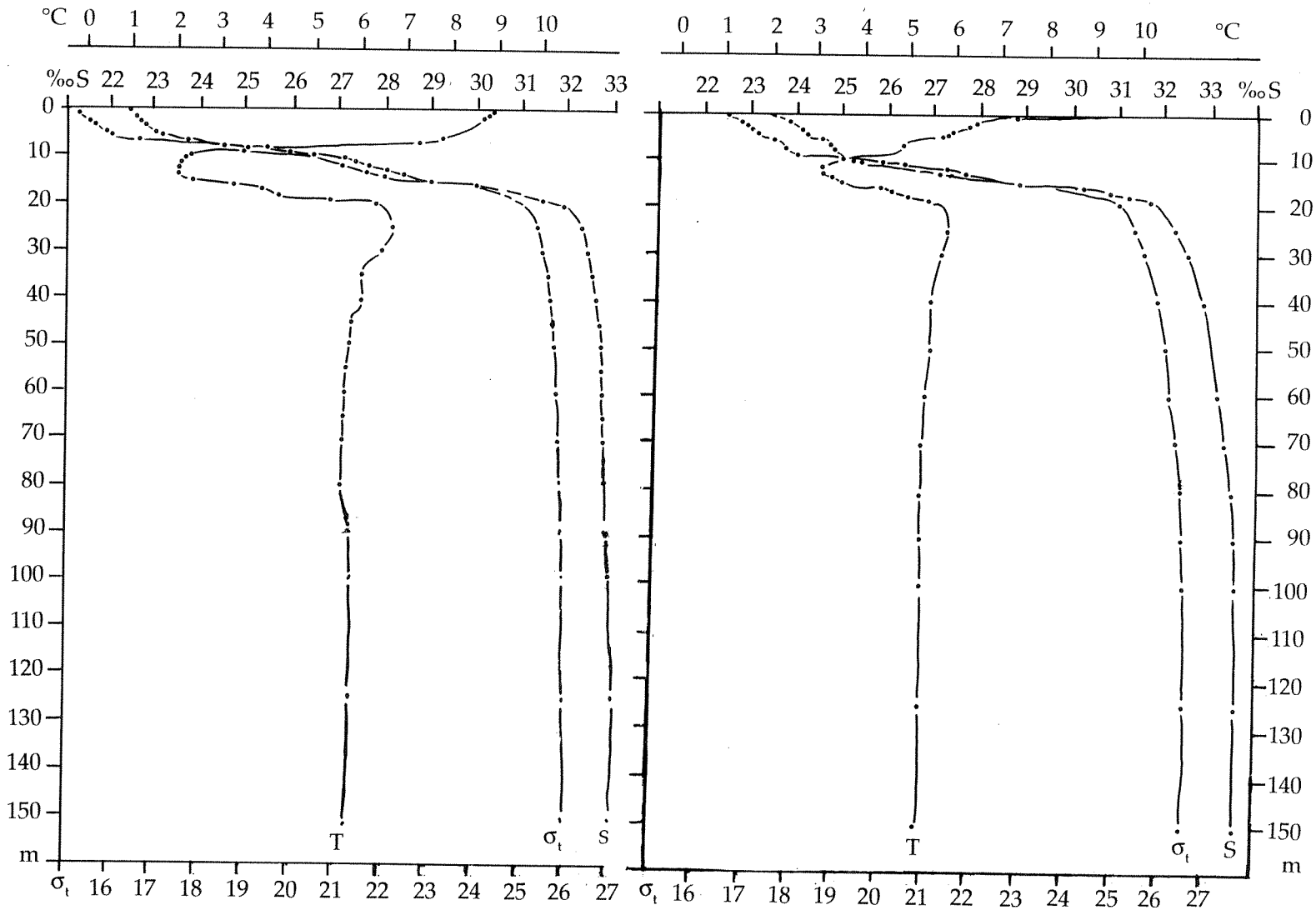


Fig. 94. Vertikalfordeling av temperatur (T), saltholdighet (S) og tetthet (σ_t).

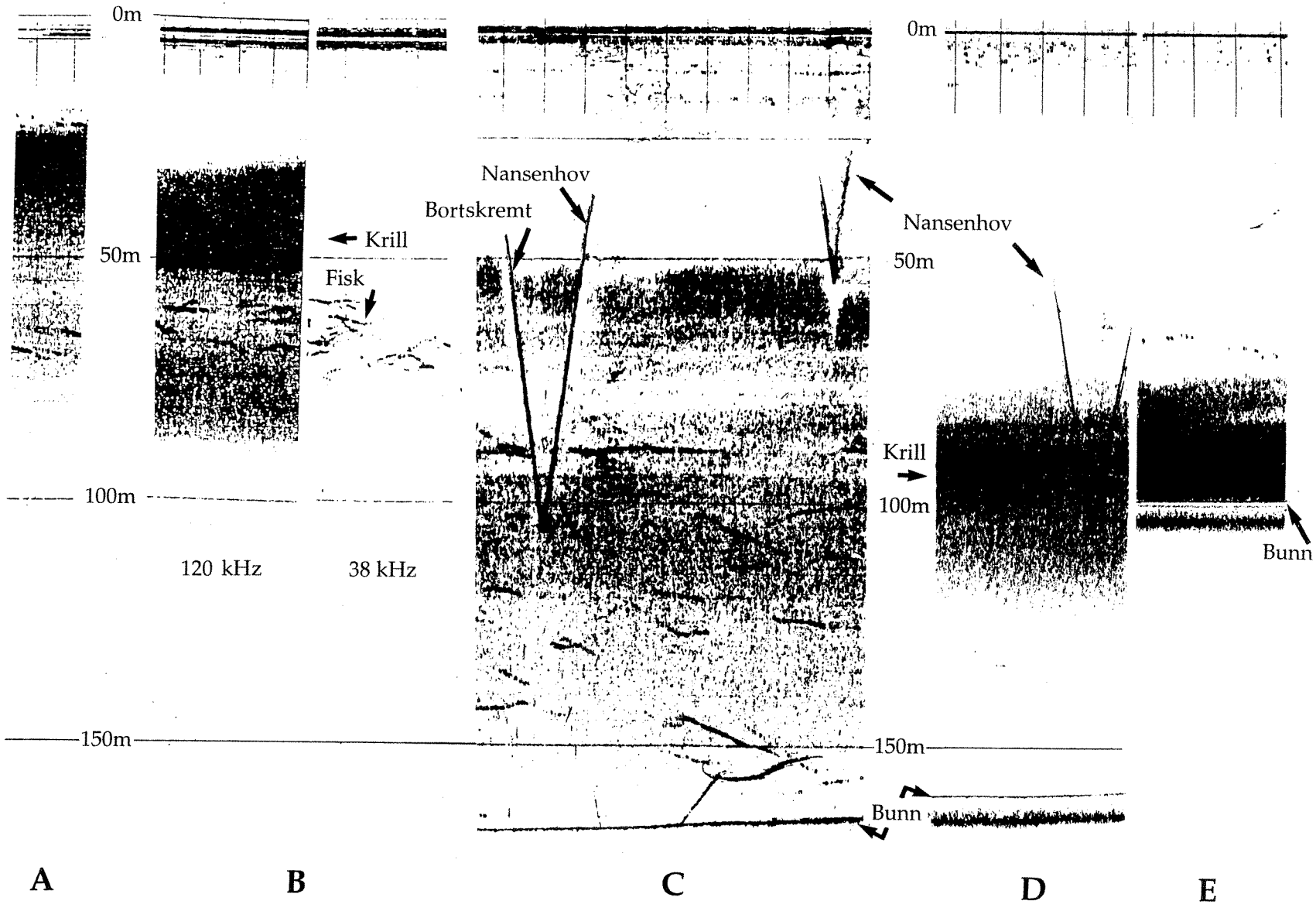


Fig. 95. Ekkogrammer. A og B er fra Bunnefjorden. A: 26.4.1984, kl. 02^{15}; B: 27.4.1984, ca. kl. 08^{45}. C og D er fra Spro. C: 27.4.1984, ca. kl. 16^{40}; D: 19.8.1987, ca. kl. 15^{40}. E er fra Steilene 19.8.1987, ca. kl. 12^{00}. Alle klokkeslett er norsk sommertid. 120 kHz svingerfrekvens ble benyttet ved alle registreringene unntatt høyre halvdel av B, der 38 kHz ble benyttet.

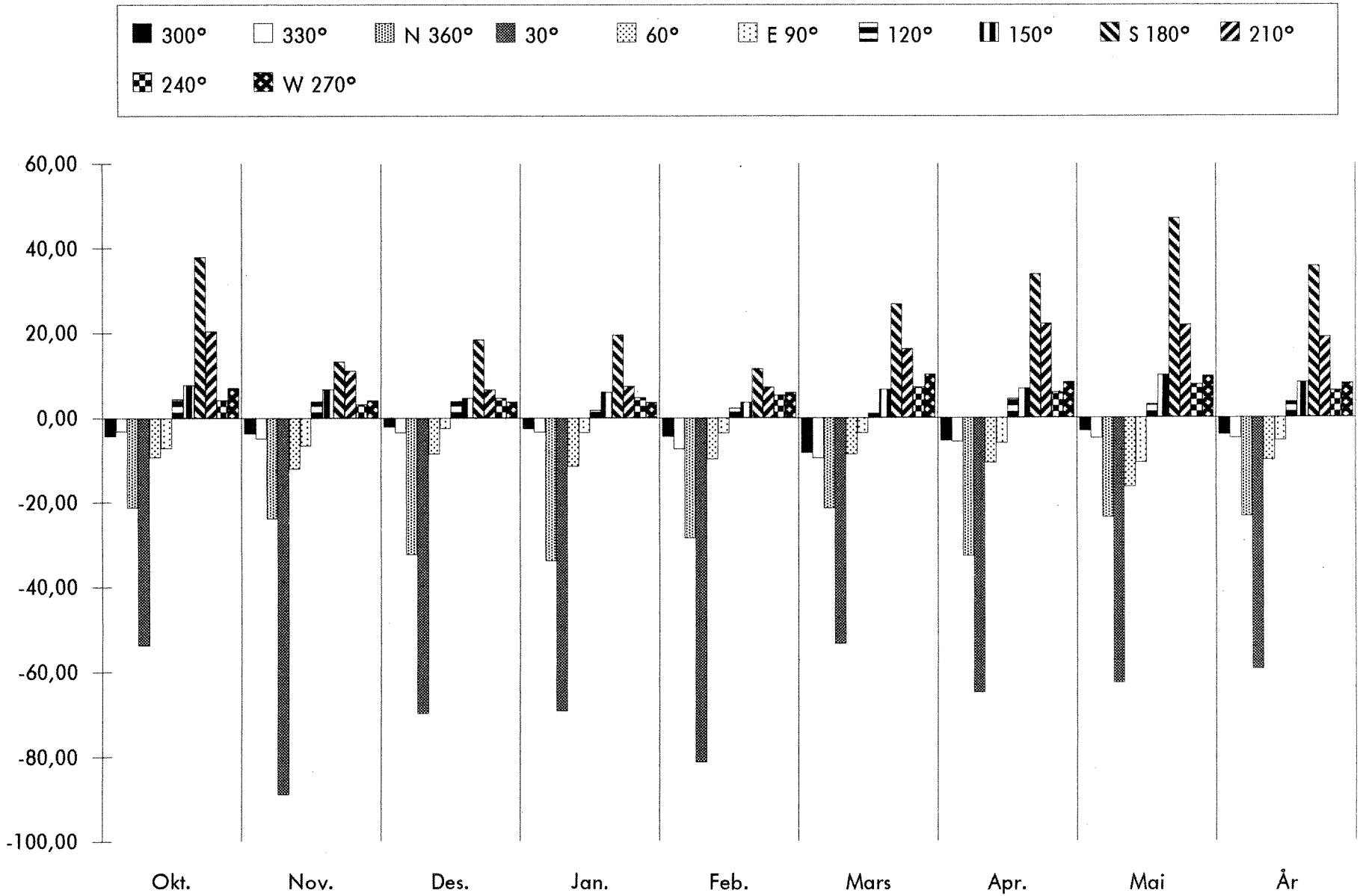


Fig. 96. Vind målt kl.00, 06, 12, 18 GMT på Blindern 1960-69. Produkt av frekvens og styrke i Beaufort. Data fra Meteorologisk Institutt.

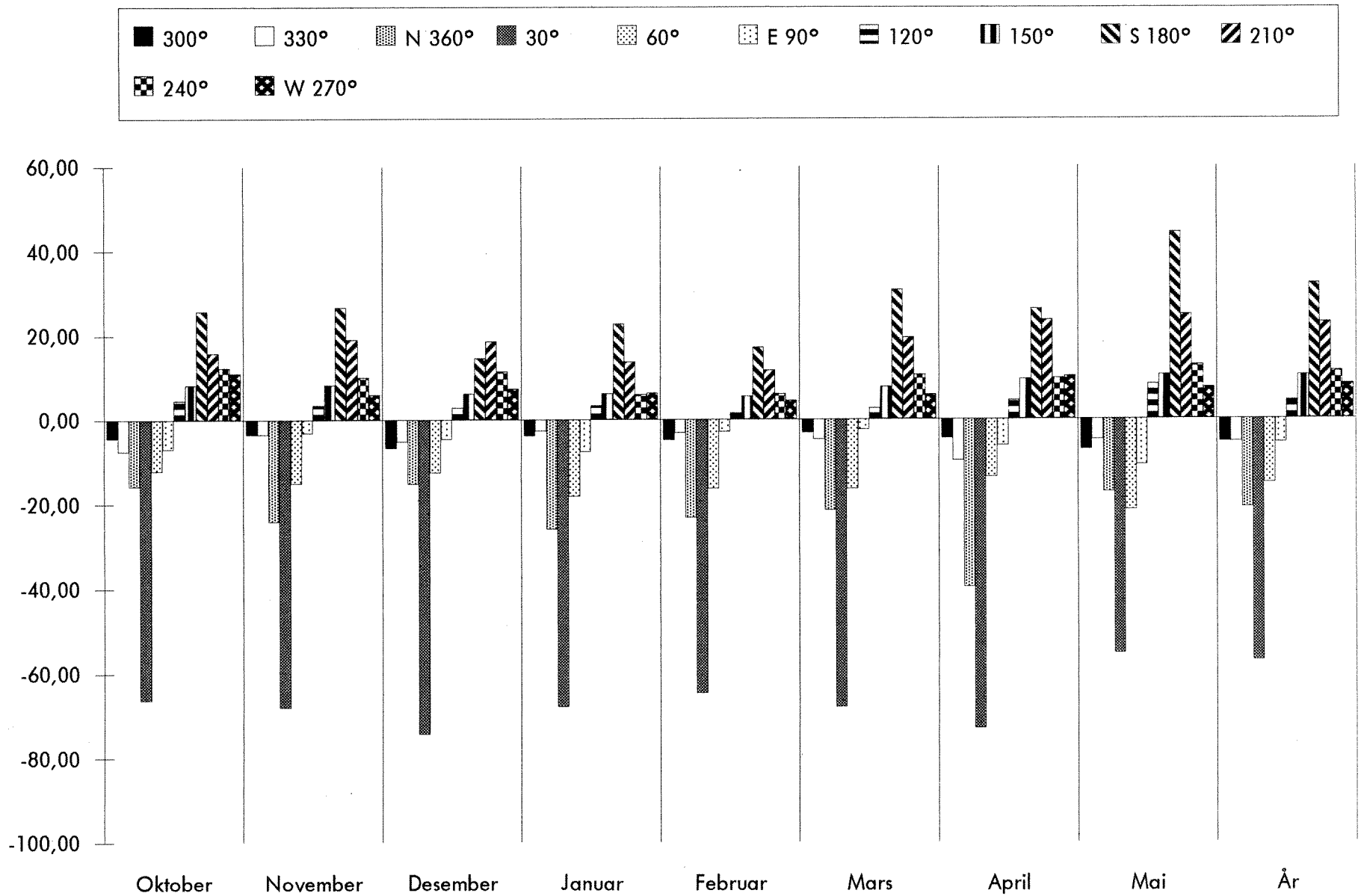


Fig. 97. Vind målt kl. 00, 06, 12, 18 GMT på Blindern 1970-79. Produkt av frekvensprosent og styrke i Beaufort. Data fra Meteorologisk Institutt.

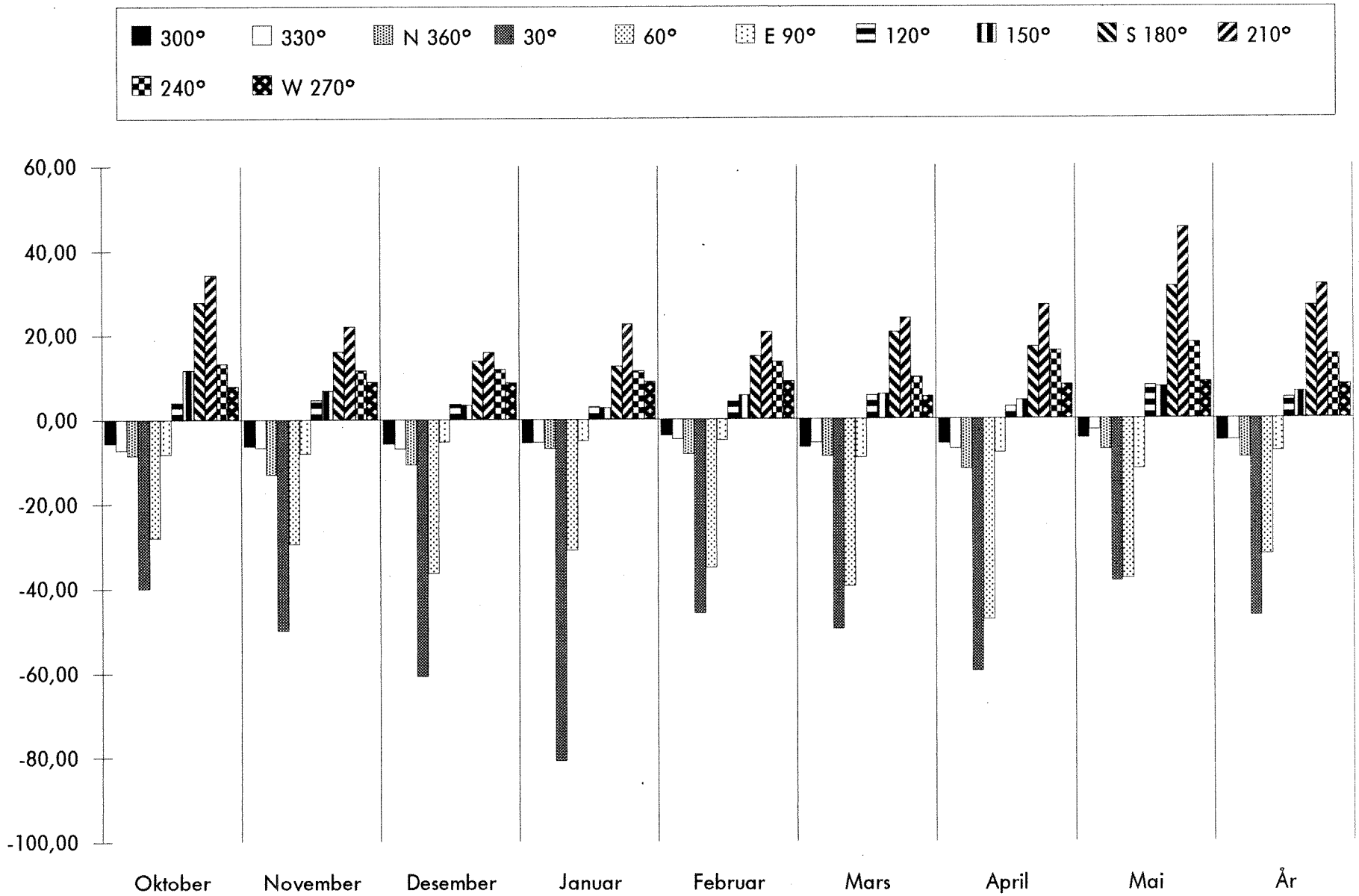


Fig. 98. Vind målt kl. 00, 06, 12, 18 GMT på Blindern 1980-89. Produkt av frekvensprosent og styrke i Beaufort. Data fra Meteorologisk Institutt.

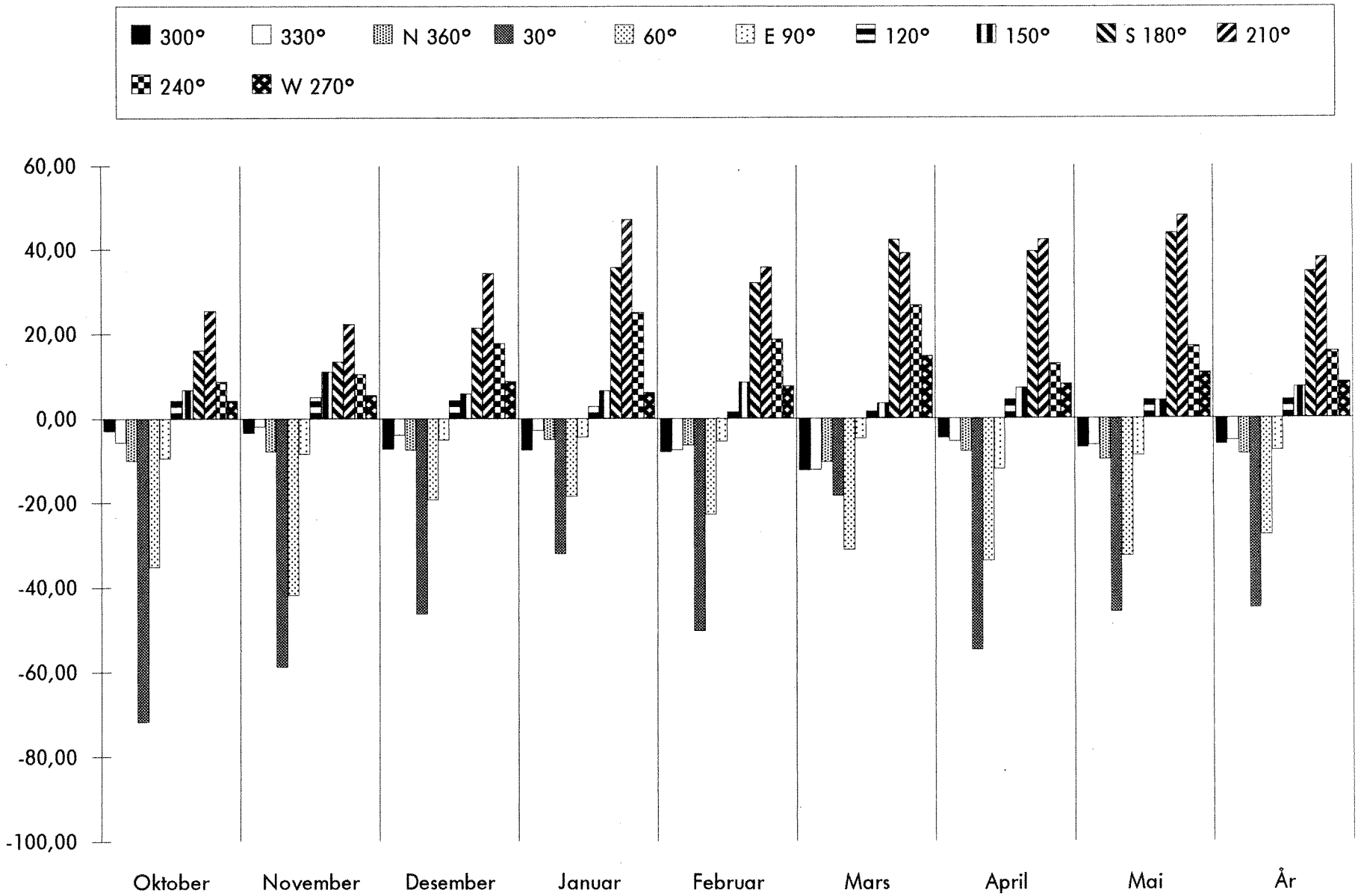


Fig. 99. Vind målt kl. 00, 06, 12, 18 GMT på Blindern 1990-93. Produkt av frekvensprosent og styrke i Beaufort. Data fra Meteorologisk Institutt.

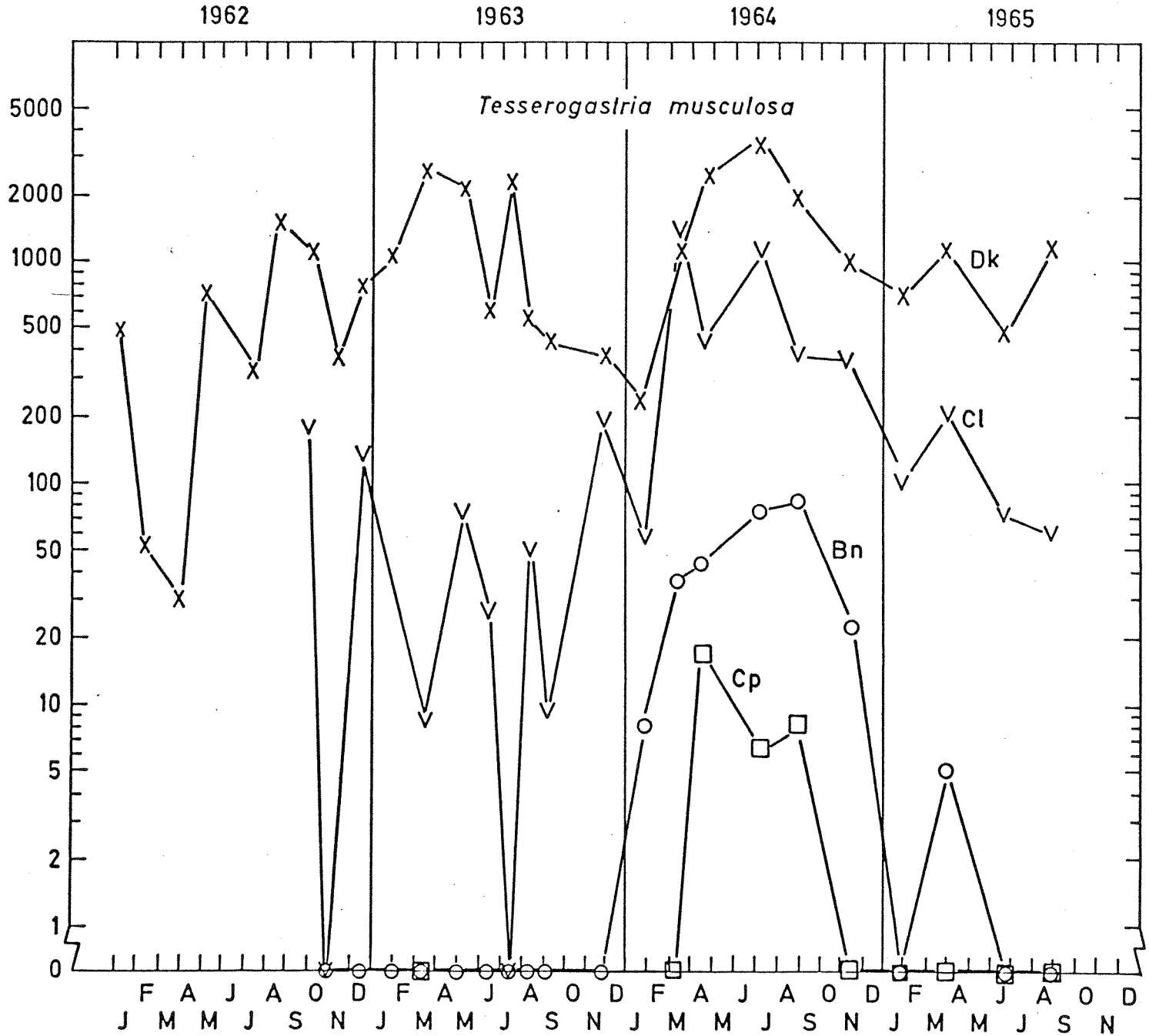


Fig. 100. Individer/100 m^3 ved Steilene (Dk), i Gåsøyrenna (Cl), Lysakerfjorden (Bn) og ved Helviktangen (Cp). Fra Beyer & Versvik 1968.

Fig. 101. Foto tatt med kamera montert på sleden i ca. 80 m dyp nær Storegrunnene ved Steilene (Dk) i april 1970.

Fig. 102. Foto tatt med kamera på sleden i 73 m dyp i Lysakerfjorden (Bn) i oktober 1969.

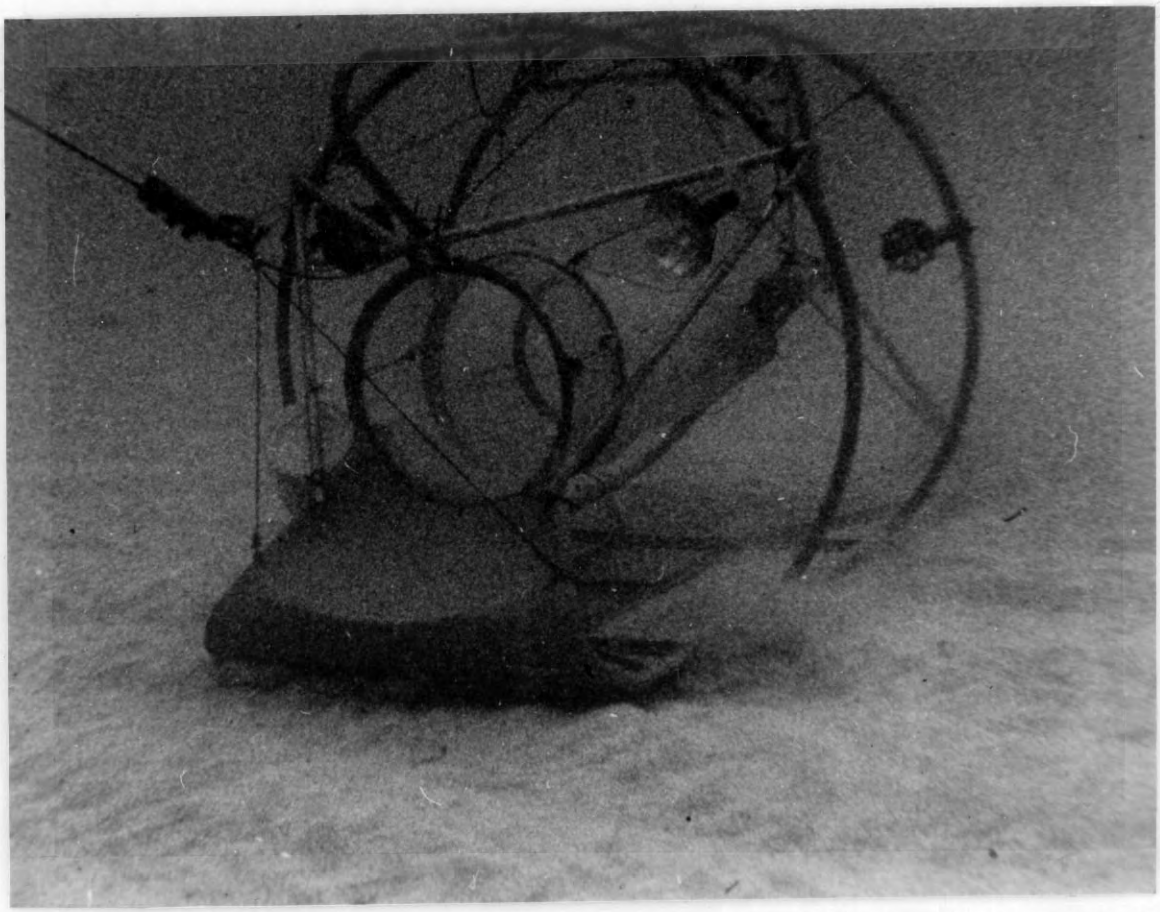


Fig. 103. Bunnsleden med improvisert fotoarrangement på grunt vann (Florida 1961).

Fig. 104. Totale prøver. Samtlige eksemplarer av *Pontophilus norvegicus* fra hver prøve i eget glass på toppen. De store glassenes diameter = 9,5 cm. Kfr. Fig. 16 og Fig. 65.

Fig. 105. Bunnsledefangst fra Gråøyrenna 27/11 - 1970. Dyp: 114 m. Slept distanse: 798 m. Glassets diameter = 12 cm. Merk forskjellen fra faunaen ved Steilene til samme tid, Fig. 12.

ENGLISH SUMMARY

INTRODUCTION. The subject of the present report is variation with time and locality in the fauna in the immediate vicinity of, on, and in the upper layer of the soft bottom of Oslofjorden, and the relations of these variations to pollution and deepwater exchanges. Since pollution effects on the fjord fauna are assumed to be of interest to many local inhabitants without expert knowledge of marine ecology, the Norwegian text has been written as a rather broad introduction to the subject.

TOPOGRAPHY, HYDROGRAPHY AND BIOCHEMICAL PROCESSES
A most important feature of the Oslofjord is its undulating bottom (Figs 1 & 2). Horizontal water movements are to a varying degree hampered by bottom ridges. The most significant of these ridges is the bar just inside Drøbak nearly blocking the western half of the sound and with a sill depth of 19.5 m in the eastern half.

Vertical stirring of the water masses is seriously hampered by a salinity-related density gradient (Fig. 94), which is significant even when the surface water temperature is at a minimum and its salinity has its maximum in late winter.

As only comparatively small amounts of freshwater are emptied into the fjord parts inside Drøbak estuarine circulation is only weakly developed there. The normal tidal range in the area is only 24 cm.

It follows that the considerable amounts of plant nutrients discharged to the fjord are not effectively diluted and cause intensive blooms of planktonic algae, which are the main cause of a pronounced reduction of light penetration. Because of this reduction, photosynthesis, and thus oxygen production, can hardly take place below the density discontinuity layer.

Decomposition of organic matter settling in the calm basins of the fjord inside Drøbak implies a consumption of oxygen which in the deeps nearly always exceeds the limited supply of oxygen.

Surface water is driven out of the fjord by northerly winds, which can lead to a marked lowering of the water level. As a consequence of the constriction of the fjord near Drøbak a pronounced upwelling of heavier water is then taking place just outside the Drøbak bar. This upwelling water will partly join the inflowing compensation current that will sooner or later be caused by pressure forces. Northerly winds are generally prevailing from October-November to April-May (Figs 96, 97, 98; exceptionally mild winters in the early -nineties, Fig. 99). During this season, inflowing water may, after turbulent mixing over the Drøbak bar still be heavy enough to sink to the bottom of the fjord inside.

During stagnation the density of the deepwater trapped in the inner fjord is gradually reduced by influence from above. This favours deepwater exchange. A preceding stay of the deepwater is, however, not an indispensable condition for its replacement, which is most distinctively revealed by a hump in the curve presenting variation with time of its oxygen content (Fig. 66B).

Exchange of the Bunnefjord deepwater is complicated both because of the long distance and many ridges separating it from the outer fjord, and because the surface water is trapped in the Bunnefjord during northerly winds. Several years in succession may pass without deepwater exchange there (Fig. 66D).

The resulting oxygen deficit makes the environment unsuitable for animal life, and organic matter accumulates on the bottom (Fig. 9). To a smaller and varying extent the same phenomena also occur in other localities of the inner fjord.

Although Gråøyrenna (Gk) is the outmost of our inner fjord localities new deepwater arrives late there and in comparatively small proportion due to the surrounding topography (Fig. 2; Fig. 68, Jan.-Feb. 1984). The oxygen loss is, however,

significantly smaller in Gråøyrenna than further in (Fig. 68, Aug. 84) because Gråøyrenna is farther away from big outlets of domestic sewage.

When and where conditions are acceptable for a versatile fauna, organic matter is both metabolized and cut into smaller parts by animals. This makes it increasingly accessible to bacterial decomposition, which in the presence of oxygen is more efficient than under anoxic conditions. It follows that a development towards a toxic and azoic bottom as well as towards a bottom with a rich and productive fauna is **self-propagating**. This can explain the enormous difference we find in the abundance and variety of living animals, respectively dead organic material, in different localities (Figs 4 - 9; Figs 10 - 11; Figs 12 & 105) as well as the dramatic changes with time observed in one and the same locality (Fig. 12; Fig. 16; Fig. 104).

CHARACTER OF THE BOTTOM. Although the bottom of the Inner Oslofjord basins is classified as a silt-clay sediment, it has a top layer which is extremely loose, has a very high water content and is featured by the presence of organic detritus and other organic matter. In the nineteensixties the thickness of this loose layer was often found to be 0.5 cm - 1 cm where the bottom was passably healthy, but in some places only 1 - 2 mm. With oxygen insufficiency the thickness of the loose layer can increase to 1 dm and more.

Partly in and mostly just below the loose layer we find - if there is a fauna or was one not too long ago - faecal pellets which in some places are so abundant as to completely dominate the structure of the sediment in a layer 1 - 3 inches thick. Most of the pellets have a length of about ½ mm. Below, this layer gradually merges into the far more fine-grained, homogenous and compact clayey substance.

Our field experience indicated that the bottom of all the inner fjord had become much softer in the early nineteeneighties than it used to be.

METHODS. The framework and the plate of the gear used for collecting animals (Fig. 3) should preferably be made of acid resisting steel covered with a dark paint. All the mechanisms are made by Bergen Nautik AS, 50 Isdalstø, Norway.

The cylindrical part of the net is partly covered by a fine-meshed bib, which prevents small animals that have been skimmed off the bottom from falling through the coarse net. We have been using 0.5 mm mesh material in bib, diaphragm, conical part of net and bucket end cover.

The excentric position of the releasing mechanism makes the gear self-righting, and the water directly in front of the net is not disturbed by its presence. Fig. 101 and many other photographs show that the advancing sledge is not preceded by a wave disturbing the loose sediment, a small amount of which is scraped off and slides up along the sloping front of the gear. Occasionally crossing mud waves on the bottom (e. g. formed by otter boards, Fig. 102), the gear cannot work that smoothly.

Suitable length of the towing warp will depend on its weight. If the warp is too short or the towing velocity is too great the front of the gear may be lifted off the bottom and animals closely connected with the latter be missed. The amount of mud in the sample is estimated on board according to a coarse scale. Although most of them are small enough to pass through the meshes of our net the number of Foraminifera caught is used as a rough measure of the gear-bottom contact, and the relation between catches of Foraminifera and other fauna components indicates the connection between the latter and the substrate (Figs 77 - 87).

In order to facilitate comparison of the samples we relate the numbers of specimens found in each sample to the amount of water that would have passed through the net during the respective tow if the flow was completely unobstructed, and we use

100 m^3 as a standard. Due to both flow reduction and animal avoidance of the gear all our estimates are smaller than the actual numbers in the field.

Our gear catches a much smaller fraction of the animals which are deeply rooted or hidden in the sediment than of those living detached in and on its uppermost layer and just above it. The reason why we have preferred to use the epibenthic net is that sampling of hyperbenthos too small for commercial trawls long has been a badly neglected enterprice. This is particularly unfortunate because the animals that our gear samples more efficiently than grab and dredge are closely related to fisheries, both directly (shrimp trawling) and as fish food, nutritious as they are, not being protected by thick calcium carbonate shells and not being hidden in the sediment.

Extensive experience gained both by others and by ourselves leave no doubt that variations and differences in our bottom net catches reflect corresponding variations and differences in the fauna. It is of particular value to the present studies that an epibenthic net frequently was used in Oslofjorden by G. O. SARS in last century - when pollution was only trifling.

Prior to microscopic examination a sample must be freed from mud. This is done by having the preserved sample in a jar (like jar No 2 in Fig. 12) the glass lid of which is replaced by a piece of 0.5 mm bolting cloth, and laying this jar on a pair of slightly sloping and slowly rotating rollers. A not too strong jet of tap water is directed towards the cloth.

After the bigger ones had been picked out, small animals were counted in 1/10 or 2/10 (occasionally 3/10) of the samples, which were fractioned by means of the apparatus described by WIBORG (1951). The usefulness of this procedure was tested and found satisfactory, other sources of inaccuracy taken into consideration. Only in two of the 258 cases constituting the basis of Figs 71 - 76 a component was found to be missing from one tenth of a sample when more than 5 specimens (7 and 17) were found in the other tenth.

No time was spent on species identification of Foraminifera and Copepoda Harpacticoida because of the great and varying proportion of these small animals that might have got lost through the meshes.

MATERIAL. Sampling in 1981 through 1993 was done with the intention of studying possible effects on the fauna of the sewage discharged from a new sewage purification plant (VEAS, Fig. 2), which after experimental operation in **1982** was in full work from the summer of **1983**. The new sewerage system included transfer of part of the sewage that previously ended in the Bunnefjord and Oslo Harbour regions.

Positions of the sampling localities treated in the present report are shown in Fig. 1 and Fig. 2. All these localities have been, and many still are, used for shrimp (*Pandalus borealis*) trawling. Although the line between chart co-ordinates j and k is crossed by both Svartedypet and Vesthullet we invariably have used Ek to indicate the former and Ej to indicate the latter in order to avoid confusion.

Since we knew from earlier experience that very considerable changes in the local fauna from one year to the other could be caused by merely meteorological differences we have also made use of data previously obtained by means of the same gear from the same area both by others and by ourselves.

Time being a limiting factor the present report is based on analyses of a selected part of the material. In the store there are many irreplaceable samples that can be used to throw light upon special questions and expand our survey regionally. The contents of samples that so far only have been used for studying some selected components are not included in the appendix tables (Del II).

Zooplankton samples have also been taken from many of the localities by means of vertical hauls with a Nansen closing net. (Extensive use of the Nansen net

was made in the fjord sixty years ago, and later it has been used for the sake of comparison.) Zooplankton observations will be the subject of a future report.

At the localities inside Drøbak the oxygen content of the water was observed 1 m and 6 m above the bottom.

THE FAUNA VARIATIONS WITH TIME AND LOCATION that we have found are so great and consistent that inaccuracies and irregularities due to the imperfection of the methods cannot be kept responsible for the main features of these variations.

A sample obtained by means of the epibenthic net from a healthy soft bottom locality, in Norwegian coastal waters at depths at least from 60 to 700 m, is generally dominated by **crustaceans**, as illustrated by the photographs (Figs 4 & 5) of a sample from the mouth of Oslofjorden. This refers to biomass and number of specimens as well as to number of species and larger taxonomic groups. A sample obtained from a locality which is exposed to a heavy load of pollution is - if there are any animals at all - strongly dominated by **polychaetes** and may have a large number of specimens belonging to a small number of species (Fig. 8). With additional strain the numbers of both specimens and species are small, and in the deepest part of Bunnefjorden a complete absence of animals (Fig. 9) has been typical of recent years.

Large numbers, and even the same species, of **mussels** can be obtained from polluted as well as healthy areas (Figs 5, 6 & 7).

The 10 species and larger taxonomic units, excluding Foraminifera, Copepoda Harpacticoida and planktonic species, that were numerically most predominent at various localities are listed in the Tables 8 - 13 (Chapter 8.7). These tables show a gradual change from a dominance of Crustacea by Elle (Tab. 8) to a strong dominance of Polychaeta by Steilene (Tab. 12).

The ratio of these two groups was also subject to variations with time that are of great interest. In **1973** there was a pronounced increase in the number of polychaete taxa both by Elle and in Gråøyrenna (Tabs 8 & 9). The tendency of these polychaetes to reappear on the list was much greater in the Gråøyrenna case, which indicates that the Gråøyrenna bottom had been subject to a stronger influence.

In Svartedypet and Vesthullet (Tabs 10 & 11) the representation of polychaetes increased in **1984**, whereas it was more than great already in **1981** by Steilene (Tab. 12). Coinciding with the increase in the numbers of Scalibregmidae and Spionidae in Vesthullet (Ej) and by Steilene (Dk) in 1984 there was an equally marked decrease in the numbers of the less pollution resistant polychaete *Pholoë minuta* (Fig. 39, cf Fig. 38).

A ranking was also undertaken with the planktonic components included, and their resulting representation appears from Tables 14 & 15. Planktonic components were particularly numerous by Elle and in Gråøyrenna in **1953**, **1959** and **1960**. They were found in much greater concentrations in the vicinity of the bottom than in the water column above, and they were found to be far more abundant along the bottom by Elle than in Gråøyrenna.

It should be noted that Tables 8 - 15 only indicate the relative importance of the various components in each case. Thus, due to the general paucity of the fauna by Steilene in **1981**, *Euchaeta norvegica* obtained ranking number 7 (Table 14) with only 9 specimens per 100 m^3 while *Tesserogastria musculosa* only obtained ranking number 10 with 265 specimens/100 m^3 by Elle (Table 8).

Whereas the total number of taxa in the samples as a rule showed a pronounced correlation to the towed distance by Elle and in Gråøyrenna (Fig. 46A) this was not so at the localities further in (Fig. 47A), which is an indication of a more uniform fauna there. The particularly great variations found in the samples from Elle

(Figs 46A & 46B) are partly due to the absence of ridges that could prevent rapid and extensive supplies of water and animals from outside and probably also due to the fact that because of the wide space we have not towed our gear in exactly the same place each time. The bottom fauna may be influenced by a local variation in current pattern.

In agreement with the far more uniform nature of the pelagic realm than that of the benthic one the number of benthonic species within nearly all taxonomic groups is far greater than the number of planktonic species. As a consequence of this the species diversity curve for a sample obtained by means of an epibenthic net may be misleading if there is a great contribution of planktonic components. As an example can be mentioned the samples taken by Elle in June 1953, in which planktonic components made 76.3 % of the total number of specimens but only 17.2 % of the number of taxa, even though all the planktonic components with one exception (*Calanus finmarchicus* + *C. helgolandicus*) were counted as species whereas benthonic species in many cases were counted jointly. This was particularly the case with the foraminifera, which were all counted as one taxis. The diversity curve for Elle in 1953 (not shown) became lower along the path from 0 to 600 specimens than the SD81 curve in Fig. 52. The diversity curves presented in Fig. 48 are considered to be more suitable to characterize the fauna by Elle as compared to the fauna found at the localities inside the Drøbak bar, cf e. g. Fig. 51.

The scraping of sediment off the bottom can have two opposite effects on the diversity curve. A large number of Foraminifera, as for instance in the August 1990 sample from Elle (Fig. 46B), can - provided that the oxygen conditions in the sediment are satisfactory - be equivalent to a copious sample (Figs 77 & 78) with a high diversity (Fig. 48). A small amount of mud, as in the August 1989 sample from Elle, yielding a small number of Foraminifera (Fig. 46B), can have the same effect (Fig. 48) since the number of specimens can be subject to a stronger reduction than the number of taxa.

In Gråøyrenna highest diversity was found in **1953** (Fig. 49). The low profile of the 1960 curve is due to a strong predominence of *Calanus finmarchicus* and *C. helgolandicus* (counted together), which constituted 70.7 % of the total number of specimens. It was in **1973** that the lowest number of taxa was found by Elle as well as in Gråøyrenna (Fig. 46A), and this is responsible for the lacking rise in the right hand part of the diversity curve (Fig. 50).

The diversity curves from Svartedypet indicate a fauna depreciation **after 1981**. The low profile of the 1983 curve (Fig. 52) can be explained by insufficient gear-bottom contact. But the almost equally low profile of the **1984** curve is one of several symptoms of an impoverished fauna. Later improvements appear from Fig. 53.

The diversity curves from the localities Vesthullet and Steilene show great similarities for the same years, Fig. 54 being similar to Fig. 57, Fig. 55 to Fig. 58 and Fig. 56 to Fig. 59. In Vesthullet the diversity was lowest in **1984**, when it was lower than it was by Steilene, and the same was also true of **1985** and **1986**. Fig. 56 is indicative of a succeeding improvement of the fauna in Vesthullet. By Steilene a very low diversity was found in **1981**. (An even lower diversity was found in the sample from 1973 in which *Calanus* sp. juv. made 78.7 % of the specimens.)

Turning to the fauna components, we see from Figs 14 & 15 an inwards reduction in the number of crustacean species which is quite consistent, with the exception of **1984, 1985** and **1986**, when the fauna was no better in Vesthullet (Ej) than it was by Steilene (Dk). The observed species reduction was not due to (accidental) differences in the distance towed.

The difference between Elle and Gråøyrenna, i. e. outside and inside the Drøbak bar, is particularly conspicuous for the groups Isopoda + Tanaidacea and Ostracoda. Only in a few cases can such a difference be explained by the difference in

depth of the two localities. Many of the soft bottom crustacean species that we only have found outside the Drøbak bar, or not found at all, were found by G. O. SARS at 30 to 50 fathoms depth in the vicinity of Oslo (formerly named Christiania) a hundred years ago and more.

As far as the numbers of specimens of the various shrimp species are concerned, Fig. 16 and Figs 17 & 18 show sparse captures, or none at all, from the Vestfjord localities Svartedypet (Ek), Vesthullet (Ej) and Steilene (Dk) in **1971** and **1973** and also during the whole period **1981 - 1986/87**. In Gråøyrenna (Gk) many shrimps were still found in 1971, but few in **1973** and in the period **1981 through January 1984**. Later there was a remarkable increase in the shrimp fauna, originating in Gråøyrenna. This increase referred in particular to the small *Pandalina profunda* and the 0-group of *Pandalus borealis* (Fig. 16; Figs 18A & 18B), which are not so closely connected to the sediment as the crangonid shrimps. In **1992** and **1993**, however, a noteworthy increase of the *Crangon allmanni* population occurred in Gråøyrenna. Further in this species did not seem fo find the substrate satisfactory.

Figs 22 - 33 show decreasing numbers inwards of some other crustaceans as well as the epibenthic medusa *Tesserogastria musculosa.* A comparison with Fig. 19, Fig. 21 and Fig. 100 reveals that a dramatic reduction had taken place since the nineteen-sixties from Steilene and inwards, in spite of the fact that the deepwater exchange was even better in the nineteeneighties (Fig. 65; Figs 66B, -C, -D; Figs 68, 69 and 70).

From the Tables 4 and 5 (Ch. 8.4.5) it appears that the mysid *Erythrops serrata,* as well as some amphipods and cumaceans had disappeared more or less completely from the Vestfjord localities Svartedypet, Vesthullet and Steilene by August **1984**, and that it took them several years to re-establish a population there, if at all.

Fig. 34 shows that many polychaetes, as opposed to the crustaceans, were found in increasing numbers inwards with maxima somewhere between Steilene (Dk) and Svartskog (Ep). *Pholoë minuta* had, however, a clearly different pattern of distribution. It evidently has a smaller tolerance of pollution than the others.

In connection with the repeated deepwater renewals in Bunnefjorden (Fig. 66D) some polychaetes had settled by Svartskog (Ep) in **1985** and **1986** (Figs 40 & 41). But for the rest there was not much to be found there (Figs 21 - 39; Figs 42 - 45). Samples and underwater video observations from the Helviktangen deep (Cp) give evidence of very miserable conditions even there. The transfer of sewage to VEAS had evidently not brought a sufficient relief to Bunnefjorden.

INDICATOR SPECIES. The most famous of all marine pollution indicators, the polychaete *Capitella capitata,* was the only benthonic animal that was found in considerable number in our innermost locality Svartskog (Ep) in Bunnefjorden. In Vesthullet (Ej) it occurred in considerable numbers in **1983** and **1984** (Figs 38 & 39), and in Svartedypet (Ek) it was only found in 1984.

Scalibregma inflatum (Scalibregmidae) also appeared to be a useful pollution indicator showing a distinct maximum of abundance in Svartedypet, Vesthullet and by Steilene in **1984** (Figs 38, 39 & 40, cf VEAS sewage discharge started in 1982-83).

The fact that nudibranchs, probably practically all of them belonging to the species *Coryphella verrucosa,* were found in greatest numbers (Figs 90 & 91) in Gåsøyrenna (Cl) and Lysakerfjorden (Bn), i. e. rather near Oslo, deluded BEYER (1968) into considering them, together with the polychaete families Spionidae and Hesionidae, characteristic of a heavily polluted bottom. We now think that the occurrence and absence of this nudibranch on the soft bottom is mainly determined by depth and distance from the slope, irrespective of pollution.

The Trachymedusa *Tesserogastria musculosa* seems to be indifferent to light. It normally stands or walks very slowly on the bottom and clings to the substrate if scared (HESTHAGEN 1971). It has never been found in plankton hauls, not even in vertical hauls starting with the weight on a bottom rich in *Tesserogastria*. In accordance with its light weight and its occurrence on the very top of the loose sediment layer *Tesserogastria* is easily caught in our epibenthic net. Being formerly found regularly in large numbers by Steilene (Fig. 100) the absence of *Tesserogastria* from this locality and its variable occurrence even further out in recent years is considered a reliable indication that conditions are not as they ought to be.

The calanoid copepod *Bradyidius bradyi* is also closely connected with the soft bottom. The very considerable and systematic variations of its occurrence and abundance (Table 3) show that this is another excellent indicator of the acceptability of the environment. *Bradyidius* appears to be somewhat more sensitive to pollution than *Tesserogastria*. Its scanty occurrence by Elle is due to its preference for moderate depths.

Since *Erythrops serrata* has been found at much greater depth elsewhere, depth is supposedly not responsible for the genereal absence of this mysid from Elle (Fig. 63). The great variation in abundance of *Erythrops* in Gråøyrenna (Gk) in 1971 - 1975 (Table 4) agrees with the simultaneous variation in the number of *Bradyidius* (Table 3). Later *Erythrops* has been by far the most successful of the two. A hypothetic explanation of this is that *Erythrops* with its extraordinarily long legs is better qualified to cope with the increasing softness of the substrate, which is also supposed to be the cause of the marked increase in abundance of *Erythrops* in Gråøyrenna and perhaps also of its appearance by Elle in the most recent years (Fig. 63).

Like *Erythrops* the cumacean *Diastyloides serrata* was few in number in Gråøyrenna in the nineteensixties and occurred in very much greater abundance thereafter (Fig. 64). In the nineteeneighties the location of its maximum abundance was even shifted from Gråøyrenna to Elle (Table 5).

A corresponding outwards shifting of maximum abundance is shown by the calanoid copepods *Xanthocalanus fallax* and *X. propinquus* (Fig. 62).

In 1953 and 1959 the amphipod *Arrhis phyllonyx* was found in greater abundance in Gråøyrenna (Fig. 64) than by Elle (Fig. 61). The same was also clearly the case in December 1974 and in June 1975 (FRITZVOLD 1981). In 1981 the ratio was opposite, and later this species has not been found in our samples from any of these two localities.

When the bottom by Steilene in 1962 became repopulated by *Pontophilus norvegicus* (Fig. 16) these were not a new generation that had been brought there as planktonic larvae by inflowing water, but they were one-year-old and older specimens (Fig. 104) which had migrated to the place on their own.

As can be seen from Fig. 17 and Table 2, *Pontophilus norvegicus* was far more abundant than *Crangon allmanni* in the inner fjord **prior to 1970**, whereas the ratio later has been the other way round. The reason(?s) for this change should be sought through experiments. Both these species do well in aquaria.

The coldwater planktonic copepod *Calanus hyperboreus* has in our latitude a pronounced preference for depths greater than those found in the Inner Oslofjord, where it as a rule is only scantily represented. In the depths of the outer fjord it can be found in great abundance. In springtime young copepodites can be found in the upper 20 m outside Drøbak and become transported across the sill. In the inner fjord it then becomes a good indicator of the water transport, as in the year 1986 (Table 14, Ch. 8.7). Several months after the influx it was found in very much greater number in Gråøyrenna than in the other localities of the inner fjord, in spite of the more awkward

access to Gråøyrenna. We interpret this as a result of better possibility for survival in Gråøyrenna, and this is corroborated by its greater frequency of occurrence there.

CAUSES OF THE OBSERVED FAUNA VARIATIONS

The frequent observations in the nineteensixties show a clear correlation between the oxygen content of the water near the bottom (Fig. 65) and the fauna, with a reasonable response delay in the latter (Figs 16, 104, 19 & 100).

We do not have sufficient hydrographic or other data to explain the collapse in the fauna observed by Steilene in 1970 (Figs 16 & 12); but we do know that there was an extremely pronounced oxygen minimum in the density discontinuity layer which caused death of trapped fish. The importance of the distance from Oslo, and maybe also a protective effect of the ridge north of Gråøyrenna, is demonstrated by the rich fauna found in Gråøyrenna (Fig. 105) when it was depreciated by Steilene. It cannot be excluded that some of the animals found in Gråøyrenna were refugees from deserted areas further in. The fact that our observations from 1971 to 1993 show a significantly better fauna in Gråøyrenna than in Svartedypet (Figs 14, 15, 17, 18 & 22 - 33) although the oxygen conditions were hardly much better in the former locality (Figs 68 - 70) also indicates that Svartedypet is exposed to an unfavourable influence from the north which asserted itself also before the sewage was transferred to VEAS.

The reduced states of the fauna of Inner Oslofjord in October-November 1971 and December 1973 (Figs 14, 16, 10 & 11) are in agreement with the oxygen observations (Figs 68 & 66B). It was, however, surprising to find a distinct fauna depreciation in 1973 also by Elle, where a critically low oxygen content could not have occurred. A number of crustacean species had disappeared (Fig. 14) and the same was also true of the planktonic *Eukrohnia hamata*, which was found there on every other occasion. A hypothetic explanation is that sinking particles with a repulsive odour from the outflowing polluted water had scared the animals away. The disappearance of the animals is thus not supposed to be due to lethality, but to a chemoreceptory response (cf COOK & BOYD 1965).

In spite of the fact that, according to Fig. 66B, there was no year with particularly low oxygen content of the deepwater in the period 1976 - 1981 the fauna had still not recovered by 1981 (Fig. 16), and the big deepwater renewals that took place in 1982 and 1984 (Figs 66B & C, Fig. 68) did not bring fauna improvements like those we had in the nineteensixties (Fgs 16, 100 & 104). Our explanation is that the increased discharge of sewage and repeated occurrence of oxygen shortage (1971, 1973, 1975) had accumulating effects in the sediment in the form of increased oxygen deficit and a looser consistency. There are reasons to believe that these changes were accompanied by repulsive odour. Moreover, the distances for the animals to migrate back had gradually increased, and the fauna reserves in adjacent areas had decreased.

The lacking recovery of the fauna in 1984 was certainly influenced by the poor oxygen conditions in the autumn of 1983 (Figs 66B & 68). Still there were changes in the fauna in Svartedypet and Vesthullet in 1982 - 1986 that are considered effects of the sewage discharge from VEAS. By means of underwater video an extraordinary abundance of particles were in October 1987 observed suspended in the water in the neighbourhood of the sewage outlet. That particle abundance had become a habitual phenomenon of the area was evident from the very dense population of the suspension feeding *Metridium senile* on the structures connected to the discharge pipe. *Metridium* was previously rare in that area. An abundance of *Ciona intestinalis* was also observed.

There are several indications that the improved sewage treatment and the consequent eutrophication reduction in recent years have introduced some improvements of the soft bottom fauna in Vestfjorden.

On the background of KONIECZNY's survey (1994) it can safely be concluded that the differences and changes in the fauna that we have observed were not caused by heavy metals, PCB, DDT or other organic toxicants in the sediment. Of our localities Elle, Gråøyrenna, Svartedypet, Vesthullet and Steilene it was the last one which had the poorest fauna and Elle by far the richest one. In Table 17 we have arranged an extract showing concentrations found in "our" localities of the toxicants considered to be of greatest concern. We see that the state of the sediment by Steilene was not inferior to that by Elle with respect to these toxicants. The reason is that by far the greater part of the toxicants are precipitated nearer the shore. Gråøyrenna is, however, considered to be in a danger zone because of its short distance from a basin where very large amounts of industrial wastes are discharged.

COMPARISONS WITH OTHER INVESTIGATIONS

Results obtained by HESTHAGEN (1971), GJERMUNDSEN (1974), HESTHAGEN & GJERMUNDSEN (1978) and FRITZVOLD (1981) using Beyer's epibenthic net in Oslofjorden fit nicely in between our own observations, and the present study has indeed derived great advantage from those reports.

In accordance with PETERSEN (1915) the fauna in our locality Torbjørnsskjær (Åo, 465 m depth) in the fjord mouth should undoubtedly represent an *Amphilepis - Pecten* community. According to THORSON (1968) this is a very poor community. This does not at all agree with our experience (cf Figs 4 & 5). Because of the pronounced increase of diluted pollution the fauna can be assumed to have become richer here than it was in 1914 (PETERSEN 1915, St. Kr. 350 - 410 m), like ROSENBERG & al. (1987) found to be the case in several other localities in the surroundings. The main reason for the discrepancy must, however, be the difference in sampling methods used, as anticipated by PETERSEN.

During their comparative studies of the catching ability of various sampling gear BRATTEGARD & HØISÆTER (1973) found that a large number of the epibenthonic medusa *Tesserogastria* was caught by Beyer's epibenthic net but none with a van Veen grab and some other gear. Nor has *Tesserogastria* been reported from the many samples taken in Oslofjorden by means of a Petersen grab, a Day grab or a dredge. These facts lend strong support to the view held by several authors that the uppermost layer of sediment as well as animals occurring in, on and next to it, are pushed away by the wave preceding a descending grab. The topmost loose sediment and small animals that are connected with it may also easily pass through the meshes of most dredges. These features and the far more limited digging behaviour of our gear are obvious reasons for the very considerable differences we see between our epibenthic net samples and samples obtained by means of grabs and dredges.

The shock wave preceding the Day grab used by ASCHAN & SKULLERUD (1990) seems the most likely reason why the tiny errant polychaete *Pholoë minuta* was extremely rare in their samples from Svartedypet, Vesthullet and Steilene in 1985 where and when we caught it in thousands. It may also be the reason why the very motile polychaete *Antinoëlla sarsi* is not even on the species lists of ASCHAN & SKULLERUD although we found it in all our samples from Vesthullet and nearly all our samples from Svartedypet and Steilene. The varying occurrence of the corpulent and sedentary Scalibregmidae in ASCHAN & SKULLERUD's (1990) material is, on the other hand, in very good agreement with our observations.

Using the same Petersen grab on as far as possible exactly the same spots as BROCH (1936) in 1933-34, STÅLESEN (1964) found that the fauna on the inside of the Drøbak bar in 1962 was clearly more marked by pollution than the fauna on the outside. STÅLESEN's data also indicate increased influence of pollution on both sides of the bar (cf BEYER 1967 a). Many of the sampling spots used by BROCH and

STÅLESEN are located in "our" localities Gråøyrenna and Elle, and STÅLESEN's observations are in very good agreement with our results.

The same can not be said about the results obtained by MIRZA & GRAY (1981), who used a dredge. On the basis of both log-normal distribution and factor analysis they concluded that the areas inside the Drøbak bar and south of the E/F boundary (in the present Fig. 2) as well as the area outside the Drøbak bar were unpolluted. One explanation of this serious discrepancy is probably that BROCH (1936), STÅLESEN (1962) and we have compared the bottoms of the various basins, whereas MIRZA & GRAY (1981) used random sampling. Unfortunately all their sampling stations on both sides of Håøy seem to have become located way up on the slope or on a shoal.

Moreover, the northern part of Vestfjorden was characterized by MIRZA & GRAY (1981) as slightly polluted ("Zone 2") whereas epibenthic samples for a long time have demonstrated a pronounced fauna reduction in this area.

Animals which in accordance with their mode of living and/or morphology cannot or do not leave the place when conditions are deteriorating have also developed a physiological capacity to tolerate reduced qualities of the environment, as for instance low oxygen concentration. As an example be mentioned the thick-shelled mussel *Arctica islandica,* which is too heavy to be collected in our epibenthic net. During an oxygen crisis in Lübecker Bay this was the only surviving macrobenthos species (SCHULZ 1969). For the same species THEEDE (1973) found a LT_{50} of 1400 hours in water with oxygen concentration < 0.15 ml/l and a temperature of 10° C. ROSENBERG & al. (1987) found that *Arctica islandica* was the predominating component in their grab samples from the fjord mouth (77 m depth, 49.5 % of the biomass) as well as by Steilene (100 m depth, 65.5 % of the biomass). Thus recording the local distribution of this species does not seem suitable for distinguishing different states of pollution influence. The same also applies to the small mussel *Thyasira flexuosa.*

In general, animals that cannot avoid being captured by a grab are also less sensitive to pollution than the more motile epibenthic species and hyperbenthos. With some exceptions the former group is dominated by polychaetes and mussels - as far as macrobenthos is concerned - and the latter by crustaceans. Because of these relations epibenthic net samples are by far better suited to demonstrate early pollution effects on the fauna and effects of moderate pollution influence than grab samples.

In 1994 COSTELLO & READ compiled data according to which crustaceans are far more sensitive to sewage sludge than both fish, molluscs and polychaetes over short time periods. The 96 h LC_{50} averages ranged from 20 % wet volume of sludge in seawater for polychaetes to 0.0003 % for shrimp larvae.

RECOMMENDATIONS

Because of the extensive damage that has been done to the soft bottoms of the inner Oslofjord and the poor state that is still found in the innermost parts, and because of the many incalculable pollution sources and the great variability and unpredictability of the meteorological conditions, which can be crucial, it is recommended that the efforts to improve the sewage treatment is continued.

It is also recommended to keep an eye on the development through taking samples of the fauna. Epibenthic net and shrimp trawls are best suited to give information on fauna components that do not have great pollution tolerance.

The existing knowledge represents an excellent basis and give rise to experiments testing the preferences, tolerances and aversion of some indicator species for various qualities of water and sediment including odour and suspended particles. Experimental studies concerning relations between species, i. e. competition and predation are also of great interest.

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G e n e r a l : * = Not analyzed. ** = Particularly small quantity of mud in the sample. *** = No sample. **** = Incomplete sample due to imperfect closing. In figures with logarithmic scale 0,60 means 0. (Im), (Dk) etc. = Chart coordinates according to Fig. 1 & Fig. 2.

Fig. 22 Numbers of specimens/100 m^3 of *Bradyidius bradyi, Tesserogastria musculosa,* the ostracod *Philomedes brenda,* Cumacea and Amphipoda by Elle (Im), in Gråøyrenna (Gk), by Spro (Fl), in Svartedypet (Ek), Vesthullet (Ej) and the same localities as in Fig. 21 in October-November 1971. Benthic ostracods found by Elle were not identified to species (no column). In the other samples no ostracods were found.
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Fig. 25 " " " " " " June 1982.
Fig. 26 " " " " " " April 1983.
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Fig. 55 " " " " July 1985, June 1986 and August 1987.
Fig. 56 " " " " August 1988, 1989 and 1990.
Fig. 57 " by Steilene in August 1981, June 1982 and April 1983.
Fig. 58 " " " " " 1984, July 1985, June 1986 and August 1987.
Fig. 59 " " " " " 1988, 1989 and 1990.
Fig. 60 " " Svartskog in July 1985, June 1986 and August 1987.
Fig. 61 Numbers of specimens/100 m^3 of *Macrocypris minna, Macrocypria angusta, Rhacotropis macropus, Ilyarachna longicornis, Andaniopsis nordlandica* and *Arrhis phyllonyx* by Elle 1953 1990.

Fig. 62 Numbers of specimens/100 m^3 of *Xanthocalanus fallax* and *X. propinquus* by Elle and in Gråøyrenna 1953 - 1990.
Fig. 63 Numbers of specimens/100 m^3 of *Eudorella emarginata* and *Erythrops serrata* by Elle and in Gråøyrenna 1953 - 1990.
Fig. 64 Numbers of specimens/100 m^3 of *Bathymedon longimanus*, Ophiuroidea, *Diastylis lucifera, Diastyloides serrata, Arrhis phyllonyx* and *Metridia longa* in Gråøyrenna 1953 - 1990.
Fig. 65 Oxygen concentrations in the deeps by Spro (Fl), Steilene (Dk), in Lysakerfjorden (Bn), by Helviktangen (Cp) and in Bunnefjorden (Dp) 1962-65.
Fig. 66A Temperature at 80 m depth by Steilene 1973-93.
Fig. 66B Oxygen concentration at 80 m depth by Steilene 1973-83.
Fig. 66C " " " " " " " " 1973-93.
Fig. 66D " equivalents at 125 m depth by Svartskog (Ep) 1973-90.
Fig. 67 Oxygen concentration at 80 m depth by Steilene 1966-71. April 1968: from 80 m depth in Lysakerfjorden (Bn) instead, since no observation from the Steilene station was available.
Fig. 68 Oxygen concentration 1 m above the bottom in series from Elle (Im) to Svartskog (Ep) in October-November 1971, March-April 1983, October 1983, January-February 1984 and August 1984.
Fig. 69 Same as Fig. 68 in January and July 1985, January and June 1986 and August 1987.
Fig. 70 " " " " " August 1988, 1989, 1990, August-September 1992 and " 1993.
Fig. 71 Counting test of samples from the localities Im, Gk, Ek, Ej, Dk and Ep in July 1985. Abscissa: Mean of 2/10. Ordinate: Deviation in 1/10 as % of the mean of 2/10. Polychaeta.
Fig. 72 Same as Fig. 71. Ostracoda & Chaetognatha.
Fig. 73 " " " " Copepoda & Ophiuroidea.
Fig. 74 " " " " Cumacea & Mollusca.
Fig. 75 " " " " Isopoda & Mysidacea.
Fig. 76 " " " " Amphipoda & Decapoda.
Fig. 77 - 87: Numbers of specimens/100 m^3 of the commonest fauna components.
Fig. 77 Elle 1973 - 1990.
Fig. 78 " " - "
Fig. 79 " " - "
Fig. 80 Gråøyrenna 1973 - 1990.
Fig. 81 " " "
Fig. 82 Svartedypet 1981 - 1989.
Fig. 83 " " "
Fig. 84 Vesthullet 1981 - 1990.
Fig. 85 " " "
Fig. 86 Steilene 1973 - 1990.
Fig. 87 " " "
Fig. 88 Towing velocity in knots and estimated quantity of mud, left hand scale. Non-planktonic taxa, right hand scale.
Fig. 89 Numbers of specimens/100 m^3 of *Diaixis hibernica* by Steilene (Dk), in Gåsøyrenna (Cl) and Lysakerfjorden (Bn).
Fig. 90 Numbers of specimens/100 m^3 of Nudibranchiata by Steilene (Dk), in Gåsøyrenna (Cl), Lysakerfjorden (Bn), by Helviktangen (Cp), at Kirkevikbanken (Dp) and by Svartskog (Ep) in 1962-63. No column = No sample.
Fig. 91 Same as in Fig. 90 for 1964-65, November 1971 and August 1993.

Fig. 92 Numbers of specimens/100 m^3 of Nudibranchiata by Elle (Im), in Gråøyrenna (Gk), by Spro (Fl), in Svartedypet (Ek), Vesthullet (Ej) and by Steilene (Dk) in 1962-63, 1971, 1973 and 1981-93. No column = No sample, or, with *, not analyzed.

Fig. 93 Vertical distribution of oxygen, nitrate and ammonia in Bunnefjorden and by Spro in April 1984.

Fig. 94 Vertical distribution of temperature, salinity and density - as σ_t - on the same occasions as in Fig. 93.

Fig. 95 Echograms from Bunnefjorden and the Spro Deep in April 1984 and from the Spro Deep and by Steilene in August 1987.

Fig. 96-99 Wind recorded at Blindern (Oslo) at 00, 06, 12 and 18 h. G. M. T. plotted as products of frequency and force in Beaufort.

Fig. 96 October - May and the whole year, 1960-69.

Fig. 97 As in Fig. 96. 1970-79.

Fig. 98 " " " " 1980-89.

Fig. 99 " " " " 1990-93.

Fig. 100 Numbers of specimens/100 m^3 of *Tesserogastria musculosa* by Steilene (Dk), in Gåsøyrenna (Cl), Lysakerfjorden (Bn) and by Helviktangen (Cp) 1962-65.

Fig. 101 Photograph of the bottom at about 80 m depth by Steilene. April 1970.

Fig. 102 " " " " " 73 m depth in Lysakerfjorden. October 1969.

Fig. 103 The epibenthic closing net in shallow water with improviced arrangement for photography. (Florida.)

Fig. 104 Fauna restoration by Steilene in 1962.

Fig. 105 Sample taken in Gråøyrenna in November 1970. Depth = 114 m. Towed distance = 798 m. Bottle diameter = 12 cm. Note the difference from the sample taken by Steilene at about the same time and shown in Fig. 12.

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