

Temporal variations in the feeding habits and trophic levels of three deep-sea demersal fishes from the western Mediterranean Sea, based on stomach contents and stable isotope analyses

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Supplement 1. Dietary composition in terms of %W (percentage contribution by weight) and %IRI (index of relative importance) of *Hoplostethus mediterraneus*, *Hymenocephalus italicus* and *Nezumia aequalis* from August 2003 to June 2004

Table S1. Dietary composition of *H. mediterraneus* from August 2003 to June 2004. %W: percentage contribution by weight; %IRI by index of relative importance. Unid. = unidentified

Taxon	August03		September03		November03		February04		April04		June04	
	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI
POLYCHAETA	-	-	0.16	0.02	-	-	-	-	-	-	-	-
CRUSTACEA												
Isopoda												
<i>Natatolana borealis</i>	83.17	97.50	95.97	98.80	92.35	98.66	17.15	16.45	-	-	48.82	85.48
Amphipoda												
<i>Acidostoma sarsi</i>	-	-	0.04	0.01	-	-	-	-	-	-	-	-
<i>Epimeria parasitica</i>	-	-	-	-	-	-	-	-	-	-	1.40	0.60
<i>Monoculodes</i> sp.	-	-	-	-	-	-	-	-	-	-	0.05	0.40
<i>Nicippe tumida</i>	-	-	0.04	0.01	-	-	2.34	0.90	-	-	-	-
<i>Podoprion mediterraneus</i>	0.04	0.01	0.40	0.07	0.51	0.05	-	-	-	-	-	-
<i>Rhacotropis rostrata</i>	0.12	0.04	0.04	0.01	-	-	-	-	3.38	1.73	-	-
<i>Tmetonix similis</i>	0.07	0.01	-	-	-	-	-	-	-	-	-	-
<i>Tryphosites alleni</i>	0.13	0.01	0.14	0.02	0.65	0.19	-	-	-	-	-	-
<i>Tryphosites longipes</i>	1.38	0.66	0.79	0.37	1.09	0.36	17.18	37.42	-	-	1.47	2.81
<i>Tryphosites</i> sp.	0.41	0.48	0.05	0.01	0.93	0.10	6.82	13.81	65.82	61.58	0.22	0.43
<i>Trischizostoma nicaense</i>	0.33	0.05	-	-	-	-	-	-	-	-	-	-
Lyssianassidae	0.17	0.09	0.09	0.11	0.01	0.04	0.88	0.64	-	-	-	-
Unid. Gammaridea	0.16	0.01	0.29	0.13	2.62	0.32	-	-	-	-	-	-
Mysidacea												
<i>Boreomysis arctica</i>	1.33	0.53	0.92	0.39	1.01	0.21	20.38	23.98	12.40	14.27	0.26	1.66
<i>Mysideis parva</i>	0.06	0.04	-	-	-	-	-	-	-	-	0.01	0.40
<i>Parapseudomma calloplura</i>	0.04	0.01	-	-	-	-	-	-	-	-	-	-
Unid. Mysidacea	0.10	0.11	-	-	-	-	-	-	-	-	-	-
Decapoda												
<i>Pasiphaea</i> sp.	-	-	1.07	0.04	-	-	-	-	-	-	-	-
<i>Plesionika martia</i>	-	-	-	-	-	-	-	-	-	-	47.56	7.38
<i>Sergestes arcticus</i>	0.01	0.03	-	-	-	-	-	-	-	-	-	-
Sergestidae	-	-	-	-	-	-	-	-	-	-	0.04	0.40
Unid. Natantia	-	-	-	-	-	-	-	-	-	-	0.18	0.42
Cumacea												
<i>Campylaspis verrucosa</i>	0.01	0.01	-	-	-	-	-	-	-	-	-	-
Copepoda	0.01	0.01	-	-	-	-	-	-	-	-	-	-
Unid. Crustacea	0.08	0.01	-	-	-	-	-	-	10.24	11.43	-	-

PISCES

<i>Lampanyctus crocodilus</i>	11.84	0.27	-	-	-	-	-	-	-	-	-	-
Myctophidae	0.43	0.02	-	-	-	-	35.24	6.79	-	-	-	-
Unid. Fish	0.01	0.08	-	-	0.82	0.06	-	-	8.21	10.99	-	-
OTHERS												
Digested material	0.10	0.01	-	-	-	-	-	-	-	-	-	-
gelatinous	0.08	0.01	-	-	-	-	-	-	-	-	-	-

	Aug	Sep	Nov	Feb	Apr	Jun						
Vacuity index (%V)	18.92	33.33	35.71	45.45	0.00	36.36						
Mean fullness	0.007	0.006	0.010	0.001	0.026	0.004						
Mean No. of prey	7.49	7.16	3.25	3.36	1.50	2.18						
Mean prey weight (g)	0.30	0.28	0.11	0.07	0.08	0.11						
Diversity (<i>H'</i>)	1.09	0.63	0.77	1.59	1.10	1.31						

Table S2. Dietary composition of *H. italicus* from August 2003 to June 2004. %W: percentage contribution by weight; %IRI: percentage contribution by index of relative importance. Unid. = unidentified

<i>Taxon</i>	August 03		September 03		November 03		February 04		April 04		June 04	
	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI
POLYCHAETA												
Nephtyidae	0.86	0.25	3.33	0.59	0.80	0.50	-	-	0.76	0.13	1.65	0.85
Unid. Polychaeta	0.03	0.05	-	-	-	-	0.33	0.44	-	-	-	-
CRUSTACEA												
Isopoda												
<i>Gnathia</i> larvae	-	-	1.94	0.43	-	-	0.46	0.13	-	-	-	-
<i>Eurydice grimaldi</i>	-	-	-	-	-	-	0.46	0.13	-	-	-	-
<i>Ilyarachna longicornis</i>	0.64	0.23	1.94	0.43	-	-	-	-	-	-	-	-
<i>Munnupsurus atlanticus</i>	-	-	0.81	0.30	2.45	1.19	-	-	8.18	3.48	5.14	5.84
<i>Natatolana borealis</i>	-	-	5.61	2.53	8.03	2.90	21.69	15.77	36.05	33.34	-	-
Amphipoda Gammaridea												
<i>Acidostoma sarsi</i>	-	-	-	-	0.21	0.05	-	-	-	-	-	-
<i>Andaniexis mimonectes</i>	1.55	2.34	0.38	0.25	1.06	1.72	1.88	3.13	1.86	1.09	2.63	3.57
<i>Bruzelia tipica</i>	-	-	-	-	-	-	0.27	0.12	-	-	-	-
<i>Maera schmidtii</i>	3.73	0.21	-	-	-	-	-	-	-	-	-	-
<i>Monoculodes acutipes</i>	-	-	0.47	0.26	-	-	-	-	-	-	-	-
<i>Orchomenella nana</i>	0.06	0.05	0.38	0.25	-	-	1.97	0.24	-	-	-	-
<i>Pardalisca</i> sp.	-	-	-	-	-	-	-	-	0.09	0.08	-	-
<i>Rhacotropis caeca</i>	-	-	-	-	-	-	-	-	2.27	0.23	-	-
<i>Rhacotropis grimaldi</i>	0.47	0.06	-	-	1.07	0.10	-	-	-	-	-	-
<i>Rhacotropis rostrata</i>	-	-	-	-	1.63	0.26	-	-	-	-	-	-
<i>Rhacotropis</i> sp.	-	-	-	-	-	-	0.82	0.16	-	-	2.40	0.37
<i>Syrrhoe affinis</i>	-	-	-	-	-	-	-	-	0.75	0.13	-	-
<i>Triphosites longipes</i>	6.51	1.84	-	-	-	-	-	-	-	-	4.16	0.54
<i>Triphosites alleni</i>	0.62	0.07	-	-	-	-	-	-	-	-	-	-
<i>Triphosites</i> sp.	-	-	-	-	3.14	0.88	1.39	0.20	3.17	0.29	-	-
Lyssianassidae	0.26	0.06	-	-	-	-	-	-	-	-	-	-
Stegocephalidae	-	-	0.38	0.25	-	-	-	-	-	-	-	-
Unid. Gammaridea	0.41	0.45	5.89	3.90	3.98	3.02	6.11	1.29	2.64	1.98	2.68	0.39
Amphipoda Hyperidea												
<i>Anchilomera blossevillei</i>	-	-	0.09	0.22	-	-	-	-	-	-	-	-
Copepoda	1.49	4.79	12.47	20.17	3.29	6.40	1.36	6.46	8.28	28.71	3.77	18.44
Mysidacea												
<i>Boreomysis arctica</i>	67.81	80.98	32.20	29.84	45.06	47.34	48.78	66.39	23.90	18.00	49.08	38.26
<i>Calyptoma puritani</i>	3.69	1.70	-	-	1.59	0.42	-	-	-	-	-	-
<i>Dactylamblyops</i> sp.	-	-	-	-	-	-	-	-	-	-	0.83	0.21
<i>Mysideis parva</i>	-	-	12.17	7.31	-	-	0.65	0.15	-	-	-	-
<i>Parapseudomma calloplura</i>	4.57	1.13	-	-	1.37	0.39	-	-	1.84	0.20	5.72	1.91
Unid. Mysidacea	3.53	0.86	7.90	15.32	5.63	5.07	2.32	3.29	5.75	10.60	9.19	18.85

Decapoda												
<i>Calocaris macandraye</i>	-	-	-	-	2.56	0.18	-	-	-	-	-	-
<i>Pasiphaea</i> sp.	-	-	-	-	0.60	0.07	-	-	-	-	-	-
Euphausiacea (larvae)	-	-	-	-	0.55	0.07	4.05	0.40	-	-	3.75	1.26
Tanaidacea												
<i>Leptognathia</i> sp.	-	-	0.81	0.30	-	-	-	-	0.21	0.09	-	-
Cumacea												
<i>Platysympus typicus</i>	-	-	-	-	0.27	0.06	-	-	-	-	-	-
Ostracoda												
Unid. Cyprinidae	2.39	2.98	12.85	17.42	14.00	28.45	1.99	0.71	2.07	0.78	5.84	9.36
Unid. Crustacea	-	-	0.38	0.25	1.77	0.14	-	-	-	-	-	-
<i>Taxon</i>	August03		September03		November03		February04		April04		June04	
	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI
CHAETHOGNATA	-	-	-	-	0.45	0.21	-	-	-	-	-	-
MOLLUSCA												
Unid. Cephalopoda	-	-	-	-	-	-	-	-	-	-	0.10	0.14
PISCES												
Scales	1.19	1.91	-	-	0.17	0.26	0.17	0.42	0.16	0.34	-	-
Unid. Fishes	-	-	-	-	-	-	-	-	-	-	-	-
OTHERS												
Digested material	0.17	0.05	-	-	0.81	0.33	1.26	0.58	1.52	0.52	-	-
	Aug	Sep	Nov	Feb	Apr	Jun						
Vacuity index (%V)	26.83	45.16	33.33	32.35	18.52	25.00						
Mean fullness	0.160	0.089	0.098	0.167	0.173	0.183						
Mean No. of prey	3.23	3.35	3.35	3.26	3.91	2.81						
Mean prey weight (g)	0.01	0.01	0.01	0.01	0.01	0.01						
Diversity (<i>H'</i>)	2.46	2.59	2.65	2.25	2.20	2.38						

Table S3. Dietary composition of *N. aequalis* from August 2003 to June 2004. %W: percentage contribution by weight; %IRI: percentage contribution by index of relative importance. Unid. = unidentified, juv. = juvenile

<i>Taxon</i>	August03		September03		November03		February04		April04		June04	
	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI
CTENOPHORA												
<i>Chelophyes appendiculata</i>	-	-	-	-	-	-	0.94	0.09	-	-	-	-
NEMATODA												
Unid. Nematoda	-	-	-	-	0.26	0.05	-	-	-	-	-	-
POLYCHAETA												
Aphroditidae	14.40	14.03	25.30	31.25	23.82	25.53	12.81	6.19	13.98	3.12	5.33	2.35
Eunicidae	2.83	1.90	-	-	5.97	2.07	21.28	24.14	-	-	0.52	0.19
Lumbrineridae	-	-	-	-	-	-	3.85	0.64	9.75	1.05	1.21	0.18
Onuphidae	-	-	-	-	-	-	3.13	0.61	-	-	-	-
Phyllodocidae	1.52	0.50	-	-	-	-	-	-	-	-	-	-
Unid. Polychaeta	2.13	3.07	1.57	1.20	3.16	3.10	4.82	4.62	6.61	3.91	11.85	11.21
CRUSTACEA												
Isopoda												
<i>Natatolana borealis</i>	16.67	9.44	-	-	2.94	1.30	1.81	1.39	2.34	1.42	1.26	0.19
<i>Iliarachna longicornis</i>	1.84	1.52	0.49	0.44	0.37	0.06	0.22	0.16	0.81	0.16	0.50	0.12
<i>Gnathia</i> sp.	1.21	0.44	0.32	0.42	0.93	0.49	0.29	0.17	0.98	0.51	-	-
<i>Mummupus atlanticus</i>	3.21	5.02	12.28	11.67	5.16	24.57	4.41	14.52	13.08	38.56	4.53	21.62
Amphipoda Gammaridea												
<i>Acidostoma sarsi</i>	0.07	0.06	1.69	0.62	-	-	-	-	-	-	-	-
<i>Andaniexis mimonectes</i>	0.85	1.02	1.46	0.22	0.18	0.16	0.40	1.33	1.75	3.91	-	-
<i>Bathymedon longirostris</i>	-	-	-	-	-	-	-	-	0.81	0.16	-	-
<i>Bruzelia typica</i>	0.15	0.07	-	-	1.01	0.27	0.14	0.04	-	-	-	-
<i>Epimeria parasitica</i>	0.53	0.10	-	-	2.91	0.51	0.70	0.08	2.78	1.55	-	-
<i>Eusirus longipes</i>	-	-	-	-	-	-	0.64	0.21	-	-	4.47	1.89
<i>Harpinia</i> sp.	0.03	0.05	0.38	0.42	0.29	0.05	-	-	-	-	-	-

<i>Hippomedon bidenattus</i>	0.07	0.06	-	-	-	-	0.56	0.07	-	-	-	-
<i>Lepechinella manco</i>	0.65	0.33	0.32	0.42	-	-	0.16	0.04	0.16	0.10	-	-
<i>Maera schmidti</i>	12.90	19.96	15.80	11.42	5.76	1.51	3.88	1.16	4.59	0.54	1.17	0.18
<i>Monoculodes</i> sp.	-	-	-	-	-	-	0.12	0.04	-	-	-	-
<i>Nicippe tumida</i>	0.25	0.08	-	-	-	-	-	-	-	-	-	-
<i>Orchomenella nana</i>	-	-	-	-	-	-	0.20	0.05	0.55	0.43	0.09	0.08
<i>Pseudotiron bouvieri</i>	-	-	-	-	-	-	-	-	0.16	0.18	-	-
<i>Rhacotropis caeca</i>	0.08	0.06	-	-	0.80	0.24	0.50	0.07	-	-	-	-
<i>Rhacotropis grimaldi</i>	0.45	0.29	-	-	2.64	1.22	0.70	0.22	1.72	1.47	3.41	1.82
<i>Rhacotropis rostrata</i>	2.34	0.33	6.04	7.99	2.91	0.87	0.50	0.07	-	-	-	-
<i>Rhacotropis</i> sp	3.24	2.05	-	-	3.46	3.48	1.78	1.56	3.01	3.49	1.90	1.18
<i>Stegocephaloides christianensis</i>	0.66	0.33	0.25	0.41	2.02	1.20	0.26	0.16	0.32	0.19	0.80	0.44
<i>Syrroe affinis</i>	2.54	2.50	1.19	1.09	2.35	0.18	-	-	1.17	0.20	-	-
<i>Tmetonix similis</i>	-	-	-	-	-	-	0.79	0.08	-	-	-	-
<i>Triphosites longipes</i>	2.17	0.62	3.37	0.87	1.18	0.11	1.13	0.28	2.10	0.29	1.26	0.26
<i>Triphosites allenii</i>	4.08	3.74	-	-	-	-	-	-	-	-	-	-
<i>Triphosites</i> sp.	-	-	3.80	0.93	1.31	0.12	0.69	0.08	-	-	-	-
Unid. Lyssianassidae	0.47	0.61	-	-	-	-	-	-	-	-	-	-
Unid. Oedicerotidae	0.07	0.06	-	-	-	-	-	-	-	-	-	-
Unid. Gammaridea	3.61	12.21	6.47	12.15	5.98	9.51	7.29	18.08	5.04	4.90	2.73	5.03
Amphipoda Hyperidea												
<i>Euprimno macropus</i>	-	-	-	-	0.64	0.11	-	-	-	-	-	-
<i>Phronima sedentaria</i>	-	-	-	-	-	-	0.42	0.06	-	-	-	-
<i>Phrosina semilunata</i>	-	-	1.71	0.25	-	-	-	-	-	-	-	-
Copepoda	1.00	3.56	0.45	0.87	1.53	4.37	0.70	2.71	1.94	2.05	0.59	0.82

<i>Taxon</i>	August03		September03		November03		February04		April04		June04	
	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI	%W	%IRI
Mysidacea												
<i>Boreomysis arctica</i>	2.69	4.32	6.09	10.97	5.31	9.04	4.13	5.66	4.06	2.41	3.68	2.33
<i>Calliptoma puritani</i>	0.01	0.05	-	-	-	-	-	-	1.16	0.20	-	-
<i>Dactylamblyops</i> sp.	0.55	0.93	-	-	0.15	0.04	-	-	0.62	0.14	0.67	0.42
<i>Mysideis parva</i>	0.23	0.53	1.73	3.46	2.41	2.37	2.46	3.18	2.57	3.27	1.01	0.63
<i>Mysidopsis gibbosa</i>	-	-	-	-	0.88	0.16	-	-	0.81	0.16	-	-
<i>Parapseudomma calloplura</i>	1.30	3.22	-	-	3.12	3.06	0.81	2.64	3.18	7.79	5.67	21.19
Unid. Mysidacea	0.79	0.46	-	-	1.82	2.35	1.08	1.79	7.97	16.54	5.94	15.72
Decapoda												
<i>Calocaris macandreae</i>	4.47	0.47	-	-	2.70	0.21	9.97	3.15	-	-	16.00	7.04
<i>Pontocaris lacazei</i>	-	-	-	-	-	-	-	-	-	-	16.12	1.55
<i>Processa</i> sp.	-	-	-	-	1.96	0.16	-	-	-	-	-	-
Pandalidae post larvae	0.25	0.25	-	-	-	-	-	-	-	-	-	-
Unid. Decapoda Natantia	0.44	0.09	-	-	2.75	0.49	0.94	0.09	-	-	-	-
Unid. Axiidae	0.27	0.08	-	-	-	-	-	-	-	-	-	-
Unid. Geryonidae juv	1.96	0.24	-	-	-	-	-	-	-	-	-	-
Unid. Inachinae	-	-	-	-	-	-	-	-	0.55	0.13	-	-
Euphausiacea												
<i>Meganycthiphanes norvegica</i>	-	-	-	-	-	-	-	-	-	-	7.29	0.74
<i>Stylocheiron abbreviatum</i>	0.22	0.25	-	-	-	-	-	-	-	-	-	-
Tanaidacea												
<i>Apseudes spinosus</i>	0.45	0.29	2.53	0.74	0.21	0.05	-	-	1.64	0.24	-	-
<i>Leptognathia</i> sp.	0.14	0.07	-	-	-	-	-	-	-	-	-	-
Unid. Tanaidacea	0.09	0.06	-	-	-	-	-	-	-	-	-	-
Cumacea												
<i>Cyclaspis longicaudata</i>	0.14	0.07	-	-	-	-	-	-	1.53	0.23	-	-
<i>Leucon macrorhinus</i>	-	-	-	-	-	-	0.14	0.04	-	-	-	-
<i>Dyastiloides serrata</i>	-	-	-	-	-	-	-	-	0.77	0.16	-	-
Unid. Cumacea	0.29	0.26	-	-	0.09	0.04	0.09	0.04	-	-	-	-
Ostracoda												
Unid. Cyprinidae	0.86	0.35	3.01	1.13	0.73	0.78	1.27	1.37	-	-	0.83	1.11

Unid. Ostracoda	0.82	0.85	-	-	0.29	0.17	0.52	0.66	-	-	-	-
Unid. Crustacea	-	-	0.22	0.03	-	-	-	-	0.14	0.09	-	-
PISCES												
<i>Cyclotone braueri</i>	-	-	-	-	-	-	0.80	0.08	-	-	-	-
fish remains (bones and scales)	-	-	-	-	-	-	0.54	1.97	-	-	0.61	1.69
OTHER												
Unid. digested material	4.00	3.19	3.54	1.04	-	-	2.15	0.41	0.83	0.48	-	-
	Aug	Sep	Nov	Feb	Apr	Jun						
Vacuity index (%V)	22.22	47.62	37.50	28.99	21.43	15.38						
Mean fullness	0.09	0.06	0.08	0.117	0.09	0.10						
Mean No. of prey	6.78	5.00	7.67	5.97	5.95	6.25						
Mean prey weight (g)	0.04	0.03	0.05	0.05	0.02	0.04						
Diversity (<i>H'</i>)	3.56	2.77	3.15	3.29	2.99	2.78						