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Stomach Content Analysis of Marine Benthic Fish from Arctic Canada

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by

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ABSTRACT

Atkinson, E. G. and J. A. Percy. 1991. Stomach content analysis of marine benthic fish from Arctic Canada. Can. Data Rep. Fish. Aquat. Sci. 840: 34 p.

Tabulations are provided of the diets of 12 species of demersal marine fish from various locations in the Canadian Arctic, comprising a grand total of 267 prey species, mainly invertebrates. The total number of prey species taken by a single fish species ranged from 9 to 91, and the mean number per stomach from 2.0 to 9.4. The most important prey were Crustacea, most frequently epibenthic or planktonic species; Polychaeta, mainly the larger species; and Mollusca, notably the cropped siphons of *Macoma calcarea*. Generally, only a few species comprised the bulk of the food. Most of the fish had a predominantly benthic or epibenthic diet, a notable exception being *Triglops pingeli* which ate zooplankton almost exclusively at the three sites from which it was collected. To a lesser extent, *Triglops murrayi*, *Icelus spatula* and *Liparis gibbus* also fed planktonically.

Key Words: demersal fish, diet, feeding, zoobenthos, zooplankton, invertebrates, Arctic Canada

RÉSUMÉ

Atkinson, E. G. and J. A. Percy. 1991. Stomach content analysis of marine benthic fish from Arctic Canada. Can. Data Rep. Fish. Aquat. Sci. 840: 34 p.

Des compilations sont produites des régimes alimentaires de 12 espèces de poissons marins démersaux de divers endroits de l'Arctique canadien, qui sont composés, toutes espèces confondues, de 267 espèces de proie, surtout des invertébrés. Le nombre total de proies par espèce de poisson variait de 9 à 91, et le nombre moyen par estomac, de 2,0 à 9,4. Les proies les plus importantes étaient des crustacés, le plus souvent des espèces épibenthiques ou planctoniques; des polychètes, surtout les plus grosses espèces; et des mollusques, notamment *Macoma calcarea* dont les poissons consomment les siphons. De façon générale, la plus grande partie du régime alimentaire des individus n'était composée que d'un petit nombre d'espèces de proie. La plupart des poissons se nourrissait principalement d'organismes benthiques ou épibenthiques; *Triglops pingeli*, dont on a observé qu'il se nourrissait presque exclusivement de plancton aux trois sites où il a été échantillonné, constitue à cet égard une exception notable. *Triglops murrayi*, *Icelus spatula* et *Liparis gibbus* se nourrissaient aussi de plancton, mais dans une moindre mesure.

Mots clés: poissons démersaux, régime alimentaire, nutrition, zoobenthos, zooplancton, invertébrés, Arctique canadien.

INTRODUCTION

Although most demersal marine fish in the Arctic are small, commercially unimportant species, they are ecologically significant in northern marine food webs. They form a large part of the diets of the thick-billed murre and black guillemot, and are consistently taken by Atlantic cod, Arctic char, anadromous brook trout, ringed and bearded seals, beluga and narwhal. Despite this, little information is available about the diets of Arctic benthic fish in general, and from Canadian waters in particular. This report presents detailed tabulations of the stomach contents of twelve species of demersal marine fish collected in Canadian Arctic waters during the course of various fisheries and benthic investigations by the Arctic Biological Station. Many of these are known to be important prey for birds, mammals and pelagic and anadromous fish.

MATERIALS AND METHODS

The collection sites are grouped in two general areas: in the eastern Arctic, sites C, D-G, K and L are located in coastal waters of southeast Baffin Island; in the western Arctic sites A, B, and H-J are in coastal areas of the southeast Beaufort Sea (Table 1). Specimens were collected from near shore to depths of 90m by trawl, gill net and dredge, during the day in July and August between 1963 and 1979 (Table 2). Collections were preserved in 10% formalin which was later replaced with

70% ethanol. Sex was determined and total length was measured to the nearest millimeter. The stomachs were removed, opened, and the contents rinsed into vials with 70% ethanol. They were subsequently sorted, identified to species when possible, enumerated, dried to constant weight at 105°C, and weighed to the nearest 0.01 mg. The empty stomach and the remainder of the fish were similarly dried and weighed.

For each food species of each population of fish, the following were calculated: a) percent of total dry weight of stomach contents, b) percent of total number of all prey eaten, c) percent frequency of occurrence in stomachs containing food. To facilitate comparisons, these values have been combined as an Index of Relative Importance: $IRI = [(a + b) c] 100$, which has a maximum value of 200. This is a modification of an index reviewed by Hyslop (1980).

Tables 3 to 10 are tabulations of the stomach contents of the fish populations studied. For ease of comparison, each table presents the results for all species from a single location. The data include both sexes and all lengths; most samples included almost equal numbers of both sexes and a range of sizes up to typical adult length. The initial values for each major food taxon (eg. ANNELIDA: Polychaeta) represent all prey species within that taxon, for each fish species. Minor discrepancies ($\pm 0.3\%$) arise in the summations of percent total dry weight and percent total number due to rounding.

ACKNOWLEDGEMENTS

We thank Shirley Leach for identifying the fish used in the study; Phil Riebel for the primary processing of samples; Ali Mohammed for identifying the amphipods and copepods; and Ross Harland and Jack Fife for assistance in analysis of the data. E.H. Grainger's suggestions for improvements in the presentation and Dora Godard's patience and care in typing the manuscript are greatly appreciated. All are present or former associates at the Arctic Biological Station.

REFERENCES

- HYSLOP, E.J. 1980. Stomach contents analysis - A review of methods and their application. J. Fish Biol. 17:411-429.

Table 1. Location and collection data for fish populations used in the study

Site	N. Lat.	W. Long.	Depth m	Gear
A	69°25.6'	125°40.5'	26	trawl
B	69°49.7'	123°05.5'	81	trawl
C	63°12'	68°11'	55	trawl
D*	62°48'	65°36'	90	trawl
E*	62°40'	65°33'	27	trawl
F*	62°36'	65°18'	55	trawl
G	63°09'	68°05'	52	trawl
H*	69°32.8'	134°00'	shore	gill net
I*	69°32.6'	133°52.3'	shore	gill net
J*	69°35.1'	134°06'	shore	gill net
K	63°18.6'	64°08.2'	31	dredge
L	63°19.1'	64°10.2'	shore	gill net

* Samples taken from Sites D, E, and F and from H, I, and J were combined and are subsequently referred to as coming from Sites D-F and H-J, respectively.

Table 2. Sample size and length data for fish populations available for stomach content analysis

Species	Site	Sample size	Length mm		No. stomachs with food (N)
			Mean	Range	
<i>Aspidophoroides olriki</i>	B	19	49	38-62	19
	C	19	51	38-85	19
<i>Gymnelus viridis</i>	D-F	9	176	75-238	7
<i>Gymnocanthus tricuspis</i>	A	153	50	36-112	151
	K	36	83	37-119	36
<i>Icelus bicornis</i>	G	65	57	44-94	64
<i>Icelus spatula</i>	C	14	69	46-105	14
	K	17	38	26-58	17
<i>Liopsetta glacialis</i>	H-J	23	247	120-304	23
<i>Liparis gibbus</i>	D-F	10	110	62-136	10
<i>Lumpenus fabricii</i>	A	53	99	59-178	53
<i>Lycodes polaris</i>	C	76	68	39-181	70
<i>Myoxocephalus scorpius</i>	L	23	223	156-310	23
<i>Triglops murrayi</i>	C	52	75	53-100	48
<i>Triglops pingeli</i>	A	21	72	57-100	19
	D-F	40	77	61-156	40
	G	64	83	59-121	63

Table 3. Food species consumed by Gt) *Gymnocanthus tricuspis* (N=151), Lf) *Lumpenus fabricii* (N=53), Tp) *Triglops pingeli* (N=19) collected at Site A, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	Gt	23.7	12.0	73.5	26
	Lf	56.2	30.9	100.0	87
	Tp	2.8	3.2	15.8	1
<i>Ampharete acutifrons</i>	Gt	0.0	0.1	0.7	0
	Lf	1.7	0.6	5.7	0
<i>Antinoella</i> sp.	Lf	1.4	0.5	15.1	0
<i>Apistobranchus tullbergi</i>	Gt	0.1	0.1	1.3	0
<i>Brada granosa</i>	Lf	0.1	0.1	1.9	0
<i>Chone</i> sp.	Gt	0.1	0.3	3.3	0
	Lf	0.1	0.1	3.8	0
<i>Diplocirrus longisetosus</i>	Gt	5.6	2.6	29.1	1
	Lf	21.9	2.3	58.5	14
<i>Eteone longa</i>	Gt	0.2	0.2	2.0	0
<i>Euchone papillosa</i>	Gt	0.0	0.1	0.7	0
	Lf	0.7	1.0	9.4	0
<i>Exogone naidina</i>	Lf	0.1	0.6	13.2	0
<i>Gattyana cirrosa</i>	Gt	2.1	1.2	13.2	0
	Lf	0.0	0.1	1.9	0
<i>Harmothoe imbricata</i>	Tp	2.7	1.1	5.3	0
<i>Harmothoe</i> sp.	Gt	0.9	0.1	0.7	0
<i>Laonice cirrata</i>	Gt	0.1	0.1	0.7	0
<i>Lumbrineris</i> sp.	Gt	2.3	1.3	3.3	0
	Lf	0.8	0.3	7.5	0
<i>Melaenus loveni</i>	Gt	1.5	0.1	0.7	0
<i>Micronephthys minuta</i>	Gt	1.4	2.8	27.8	1
	Lf	11.9	21.3	86.8	29
	Tp	0.1	1.1	5.3	0
<i>Parahesion</i> sp.	Gt	0.4	0.5	4.6	0
	Lf	0.1	0.1	3.8	0
<i>Pholoe minuta</i>	Gt	0.1	0.4	4.0	0
	Lf	1.9	1.3	30.2	1
<i>Scoloplos armiger</i>	Gt	0.3	0.2	2.0	0
	Lf	2.7	1.1	18.9	1
<i>Sabellides octocirrata</i>	Gt	0.0	0.1	0.7	0
	Lf	1.7	0.1	1.9	0
<i>Stauronereis caecus</i>	Gt	0.4	1.2	6.6	0
	Lf	0.5	0.9	11.3	0
<i>Terebellides stroemi</i>	Gt	6.2	0.4	4.6	0
	Lf	0.1	0.1	1.9	0
<i>Tharyx acutus</i>	Lf	0.0	0.1	1.9	0
<i>Trichobranchus glacialis</i>	Gt	0.9	0.1	1.3	0
	Lf	9.8	0.3	9.4	1

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta					
polychaete (unidentified)	Gt	1.1	0.4	4.0	0
	Lf	0.3	0.1	1.9	0
	Tp	0.1	1.1	5.3	0
ARTHROPODA: Crustacea (all)					
	Gt	65.8	63.5	96.7	125
	Lf	26.4	38.4	96.2	62
	Tp	94.6	88.3	89.5	164
Crustacea: Amphipoda (all)					
	Gt	47.5	47.7	90.7	86
	Lf	21.5	16.3	84.9	32
	Tp	38.0	57.0	89.5	85
<i>Acanthostepheia behringiensis</i>	Gt	0.1	0.1	0.7	0
<i>Acanthostepheia malmgreni</i>	Gt	0.7	0.1	1.3	0
<i>Aceroides l. latipes</i>	Gt	0.5	0.8	2.6	0
	Lf	0.3	0.4	5.7	0
<i>Ampelisca eschrichti</i>	Gt	1.3	0.1	0.7	0
<i>Anonyx nugax</i>	Gt	0.1	0.1	0.7	0
	Lf	0.0	0.1	1.9	0
<i>Arrhinopsis longicornis</i>	Gt	0.0	0.1	0.7	0
<i>Arrhis phyllonyx</i>	Gt	0.3	0.1	0.7	0
<i>Bathymedon obtusifrons</i>	Gt	0.0	0.1	0.7	0
<i>Byblis gaimardi</i>	Gt	0.3	0.2	2.6	0
	Lf	0.2	0.1	1.9	0
	Tp	1.2	2.2	5.3	0
<i>Caprella linearis</i>	Gt	0.0	0.1	0.7	0
	Tp	0.1	1.1	5.3	0
<i>Corophium clarencense</i>	Gt	0.0	0.1	1.3	0
	Lf	0.1	0.2	5.7	0
<i>Dyopodos porrectus</i>	Gt	0.4	1.4	12.6	0
	Tp	0.6	5.4	10.5	1
<i>Goesia depressa</i>	Gt	0.3	0.1	1.3	0
<i>Guernea nordenskioldi</i>	Lf	0.1	0.2	3.8	0
<i>Ischyrocerus anguipes</i>	Lf	0.1	0.3	3.8	0
	Tp	0.6	12.9	21.1	3
<i>Ischyrocerus latipes</i>	Gt	1.2	0.1	1.3	0
	Tp	2.0	1.1	5.3	0
<i>Ischyrocerus megachier</i>	Tp	15.7	6.5	15.8	4
<i>Ischyrocerus megalops</i>	Lf	0.0	0.2	1.9	0
<i>Ischyrocerus nanoides</i>	Gt	0.0	0.1	0.7	0
<i>Maera loveni</i>	Gt	3.1	0.2	2.0	0
<i>Melita dentata</i>	Gt	0.5	0.2	2.0	0
	Lf	0.6	0.2	5.7	0
	Tp	0.1	1.1	5.3	0
<i>Melita quadrispinosa</i>	Lf	1.3	0.1	1.9	0

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Amphipoda					
<i>Metopa bruzelii</i>	Gt	0.0	0.1	0.7	0
	Lf	0.0	0.3	1.9	0
	Tp	0.1	4.3	5.3	0
<i>Metopa invalida</i>	Tp	0.1	2.2	10.5	0
<i>Metopa robusta</i>	Gt	0.0	0.5	2.0	0
<i>Metopa sinuata</i>	Tp	0.1	1.1	5.3	0
<i>Metopella longimana</i>	Gt	0.1	1.1	8.6	0
	Lf	0.0	0.1	1.9	0
<i>Monoculodes intermedius</i>	Gt	0.3	0.1	0.7	0
<i>Monoculodes longirostris</i>	Gt	0.0	0.1	0.7	0
<i>Monoculodes schneideri</i>	Gt	0.0	0.1	0.7	0
<i>Monoculodes vibei</i>	Gt	0.0	0.1	0.7	0
<i>Onisimus litoralis</i>	Tp	0.7	2.5	5.3	0
<i>Orchomene minuta</i>	Gt	0.2	0.3	4.0	0
	Lf	0.0	0.1	1.9	0
<i>Paradulichia typica</i>	Gt	0.0	0.2	1.3	0
	Tp	0.4	1.1	5.3	0
<i>Parapleustes assimilis</i>	Lf	0.0	0.1	3.8	0
<i>Photis tenuicornis</i>	Lf	0.0	0.3	3.8	0
<i>Pleustes panopla</i>	Gt	0.0	0.1	1.3	0
<i>Pontoporeia femorata</i>	Gt	2.4	0.9	7.3	0
	Lf	3.1	1.0	15.1	1
<i>Protomedea fasciata</i>	Gt	30.8	38.5	81.5	56
	Lf	14.8	11.1	67.9	18
	Tp	1.9	3.2	10.5	1
<i>Protomedea grandimana</i>	Gt	0.3	0.1	0.7	0
	Lf	0.4	0.1	1.9	0
<i>Westwoodilla brevicealcar</i>	Gt	0.1	0.8	6.6	0
	Lf	0.4	1.3	20.8	0
	Tp	0.1	1.1	5.3	0
<i>Westwoodilla megalops</i> amphipod (unidentified)	Gt	0.0	0.1	0.7	0
	Gt	3.9	1.2	8.6	0
	Lf	0.1	0.3	3.8	0
	Tp	13.7	11.8	42.1	11
Crustacea: Cirripedia (all)					
	Gt	0.0	0.1	1.3	0
	Lf	0.0	0.1	1.9	0
	Tp	-	-	-	-
<i>Balanus crenatus</i>	Lf	0.0	0.1	1.9	0
<i>Balanus</i> sp.	Gt	0.0	0.1	1.3	0

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Copepoda (all)	Gt	0.5	1.0	7.3	0
	Lf	0.3	6.6	50.9	4
	Tp	0.9	17.2	21.1	4
<i>Amonardia arctica</i>	Lf	0.0	0.1	1.9	0
<i>Bradya typica</i>	Gt	0.0	0.2	2.0	0
	Lf	0.1	1.9	26.4	1
<i>Calanus glacialis</i>	Gt	0.0	0.1	1.3	0
<i>Calanus hyperboreus</i>	Gt	0.3	0.2	2.0	0
	Lf	0.0	0.1	1.9	0
	Tp	0.7	2.2	10.5	0
<i>Cyclopina gracilis</i>	Lf	0.0	0.1	1.9	0
<i>Cyclopina schneideri</i>	Gt	0.0	0.1	0.7	0
	Lf	0.0	0.1	1.9	0
<i>Dactylopodia</i> sp.	Lf	0.0	0.1	1.9	0
<i>Danielssenia steffanssoni</i>	Lf	0.1	1.0	18.9	0
<i>Diarthrodes</i> sp.	Lf	0.0	0.4	3.8	0
<i>Euryte longicauda</i>	Gt	0.0	0.1	0.7	0
<i>Eurytemora herdmani</i>	Lf	0.0	0.1	1.9	0
<i>Halectinosoma finmarchicum</i>	Lf	0.0	0.1	1.9	0
<i>Halectinosoma neglectum</i>	Lf	0.0	0.1	1.9	0
<i>Halectinosoma sarsi</i>	Lf	0.0	0.3	5.7	0
<i>Harpacticus superflexus</i>	Gt	0.0	0.1	1.3	0
	Lf	0.0	0.6	13.2	0
<i>Harpacticus uniremis</i>	Gt	0.0	0.1	0.7	0
<i>Laophonte elongata</i>	Lf	0.0	0.1	1.9	0
<i>Limnocalanus macrurus</i>	Lf	0.0	0.1	1.9	0
<i>Robertsonia tenuis</i>	Lf	0.0	0.2	3.8	0
<i>Pseudomolgus leptostylis</i>	Tp	0.0	1.2	5.3	0
<i>Stenhelia arctica</i>	Gt	0.0	0.1	0.7	0
	Lf	0.0	0.4	9.4	0
<i>Stenhelia</i> sp.	Lf	0.0	0.7	11.3	0
<i>Tisbe furcata</i>	Lf	0.0	0.2	5.7	0
	Tp	0.2	14.0	15.8	2
copepod (unidentified)	Gt	0.1	0.1	0.7	0
	Lf	0.0	0.3	1.9	0
Crustacea: Cumacea (all)	Gt	17.8	14.1	63.6	20
	Lf	2.9	2.6	47.2	3
	Tp	1.2	3.2	5.3	0
<i>Brachydiastylis resima</i>	Lf	0.6	0.4	7.5	0
<i>Diastylis goodsiri</i>	Gt	0.2	0.1	0.7	0
<i>Diastylis rathkei</i>	Gt	2.9	1.5	14.6	1
	Lf	0.3	0.4	11.3	0
<i>Diastylis</i> sp.	Lf	0.2	0.2	5.7	0
<i>Eudorella emarginata</i>	Gt	0.1	0.1	0.7	0
<i>Eudorella truncatula</i>	Lf	0.3	0.1	1.9	0

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Cumacea					
<i>Lamprops fuscata</i>	Gt	0.3	0.7	6.6	0
	Lf	0.1	0.2	5.7	0
<i>Leptostylis ampullacea</i>	Lf	0.3	0.1	1.9	0
<i>Leptostylis</i> sp.	Gt	12.0	8.0	35.8	7
	Lf	0.3	0.1	3.8	0
	Tp	1.2	3.2	5.3	0
<i>Leucon fulvus</i>	Gt	0.0	0.1	0.7	0
<i>Leucon nasica</i>	Gt	0.7	0.5	5.3	0
	Lf	0.4	0.3	3.8	0
<i>Leucon nasicooides</i>	Gt	1.2	2.0	14.6	0
	Lf	0.4	0.6	15.1	0
<i>Leucon</i> sp.	Gt	0.3	1.2	9.3	0
	Lf	0.1	0.3	7.5	0
Crustacea: Decapoda (all)					
	Gt	-	-	-	-
	Lf	-	-	-	-
	Tp	0.6	1.2	5.3	0
decapod (unidentified)	Tp	0.6	1.2	5.3	0
Crustacea: Isopoda (all)					
	Gt	0.0	0.1	1.3	0
	Lf	1.0	6.4	37.7	3
	Tp	-	-	-	-
<i>Eugerda globiceps</i>	Lf	1.0	6.3	37.8	3
<i>Munna</i> sp.	Gt	0.0	0.1	0.7	0
<i>Pleurogonium spinosissimum</i>	Gt	0.0	0.1	0.7	0
isopod (unidentified)	Lf	0.0	0.1	1.9	0
Crustacea: Mysidacea (all)					
	Gt	0.0	0.1	1.3	0
	Lf	-	-	-	-
	Tp	53.9	9.7	31.6	20
<i>Mysis oculata</i>	Gt	0.0	0.1	1.3	0
<i>Mysis relicta</i>	Tp	53.9	9.7	31.6	20
Crustacea: Ostracoda (all)					
	Gt	0.0	0.1	1.3	0
	Lf	0.1	0.5	13.2	0
	Tp	-	-	-	-
<i>Cythereis</i> sp.	Lf	0.0	0.1	3.8	0
<i>Cytheridea papillosa</i>	Gt	0.0	0.1	0.7	0
	Lf	0.1	0.3	5.7	0
<i>Paracytherois arcuata</i>	Lf	0.0	0.1	1.9	0
ostracod (unidentified)	Gt	0.0	0.1	0.7	0
	Lf	0.0	0.1	1.9	0

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Tanaidacea (all)	Gt	0.0	0.3	3.3	0
	Lf	0.6	5.9	58.5	4
	Tp	-	-	-	-
<i>Leptognathia</i> sp.	Gt	0.0	0.1	0.7	0
	Lf	0.0	0.4	7.5	0
<i>Pseudotanais forcipatus</i>	Lf	0.1	0.9	9.4	0
<i>Typhlotanais finmarchicus</i>	Gt	0.0	0.2	2.6	0
	Lf	0.5	4.4	54.7	3
CHORDATA: Ascidiacea (all)	Gt	0.3	1.1	6.0	0
	Lf	0.7	2.4	3.8	0
	Tp	0.4	3.2	10.5	0
<i>Aplidium glabrum</i>	Gt	0.0	0.1	1.3	0
<i>Rhizomolgula globularis</i> ascidian (unidentified)	Gt	0.0	0.1	1.3	0
	Gt	0.3	0.9	3.3	0
	Lf	0.7	2.4	3.8	0
	Tp	0.4	3.2	10.5	0
CHORDATA: Osteichthyes (all)	Gt	-	-	-	-
	Lf	-	-	-	-
	Tp	1.8	2.2	5.3	0
fish (unidentified)	Tp	1.8	2.2	5.3	0
COELENTERATA: Anthozoa (all)	Gt	-	-	-	-
	Lf	0.9	0.1	1.9	0
	Tp	-	-	-	-
anthozoan (unidentified)	Lf	0.9	0.1	1.9	0
MOLLUSCA: Gastropoda (all)	Gt	2.7	0.1	1.3	0
	Lf	0.4	0.3	7.5	0
	Tp	-	-	-	-
<i>Cylichna alba</i>	Lf	0.2	0.1	1.9	0
<i>Retusa obtusa</i>	Lf	0.2	0.3	7.5	0
gastropod (unidentified)	Gt	2.7	0.1	1.3	0
MOLLUSCA: Pelecypoda (all)	Gt	7.3	23.0	63.6	19
	Lf	14.2	18.5	83.0	27
	Tp	0.3	3.2	15.8	1
<i>Macoma calcarea</i>	Gt	7.3	22.8	63.6	19
	Lf	13.4	18.1	83.0	26
	Tp	0.3	3.2	15.8	1
<i>Hiatella arctica</i>	Gt	0.0	0.1	1.3	0
<i>Yoldia hyperborea</i>	Gt	0.0	0.1	0.7	0
	Lf	0.9	0.4	7.5	0

Table 3. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
NEMATODA (all)	Gt	0.0	0.1	0.7	0
	Lf	0.8	9.0	77.4	7
	Tp	-	-	-	-
nematode (unidentified)	Gt	0.0	0.1	0.7	0
	Lf	0.8	9.0	75.5	7
PRIAPULIDA (all)	Gt	-	-	-	-
	Lf	0.3	0.1	1.9	0
	Tp	-	-	-	-
<i>Priapulus caudatus</i>	Lf	0.3	0.1	1.9	0

Table 4. Food species consumed by *Aspidophoroides olriki* (N=19) collected at Site B, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	0.8	1.8	21.1	1
<i>Cirratulus cirratus</i>	0.3	0.5	5.3	0
<i>Parahesionia</i> sp.	0.5	0.9	10.5	0
polychaete (unidentified)	0.1	0.5	5.3	0
ARTHROPODA: Crustacea (all)	7.2	18.2	63.2	16
Crustacea: Amphipoda (all)	3.9	8.1	52.6	6
<i>Caprella linearis</i>	0.2	0.5	5.3	0
<i>Metopella longimana</i>	0.0	0.5	5.3	0
<i>Paradulichia typica</i>	2.4	3.2	26.3	1
<i>Photis tenuicornis</i>	0.3	1.4	10.5	0
<i>Stenopleustes pulchellus</i>	0.0	0.5	5.3	0
<i>Westwoodilla megalops</i>	0.5	0.5	5.3	0
amphipod (unidentified)	0.5	1.8	15.8	0
Crustacea: Copepoda (all)	0.1	1.4	15.8	0
<i>Bradya typica</i>	0.0	0.5	5.3	0
<i>Euryte longicauda</i>	0.0	0.5	5.3	0
<i>Tisbe furcata</i>	0.0	0.5	5.3	0
Crustacea: Cumacea (all)	0.2	0.5	5.3	0
<i>Leucon</i> sp.	0.2	0.5	5.3	0
Crustacea: Isopoda (all)	2.2	4.5	31.6	2
<i>Eugerdia globiceps</i>	0.3	0.9	10.5	0
<i>Eurycope mutica</i>	1.2	2.3	10.5	0
<i>Munna kroyeri</i>	0.6	1.4	10.5	0
Crustacea: Ostracoda (all)	0.9	3.2	10.5	0
<i>Cythereis</i> sp.	0.2	0.5	5.3	0
<i>Macrocythere simplex</i>	0.7	2.7	10.5	0
MOLLUSCA: Pelecypoda (all)	92.0	80.6	94.7	163
<i>Macoma calcarea</i>	91.8	80.2	94.7	163
<i>Yoldia hyperborea</i>	0.2	0.5	5.3	0

Table 5. Food species consumed by Ao) *Aspidophoroides olriki* (N=19), Is) *Icelus spatula* (N=14), Lp) *Lycodes polaris* (N=70) and Tm) *Triglops murrayi* (N=48) collected at Site C, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	Ao	0.4	0.5	5.3	0
	Is	10.0	3.6	28.6	4
	Lp	6.9	5.0	38.6	5
	Tm	4.3	0.5	8.3	0
<i>Antinoella</i> sp.	Is	10.0	3.6	28.6	4
	Lp	0.2	0.2	1.4	0
<i>Artacama proboscidea</i>	Tm	4.1	0.3	4.2	0
<i>Asabellides</i> sp.	Lp	0.4	0.5	2.9	0
<i>Chone</i> sp.	Lp	0.8	0.8	5.7	0
<i>Diplocirrus longisetosus</i>	Lp	0.2	0.2	1.4	0
<i>Parahesion</i> sp.	Lp	3.2	2.0	17.1	1
<i>Sphaerosyllis erinaceus</i>	Ao	0.4	0.5	5.3	0
polychaete (unidentified)	Lp	2.2	1.3	11.4	0
	Tm	0.1	0.3	4.2	0
ARTHROPODA: Crustacea (all)	Ao	74.4	74.6	100.0	149
	Is	89.9	94.5	100.0	184
	Lp	33.7	65.3	98.6	98
	Tm	93.5	92.6	100.0	186
Crustacea: Amphipoda (all)	Ao	59.5	63.7	100.0	123
	Is	33.8	31.5	57.1	37
	Lp	21.2	5.9	30.0	8
	Tm	5.8	4.0	41.7	4
<i>Anonyx nugax</i>	Ao	0.5	0.5	5.3	0
	Lp	10.8	0.7	2.9	0
	Tm	0.0	0.1	2.1	0
<i>Apherusa glacialis</i>	Ao	0.3	0.5	5.3	0
<i>Arrhinopsis longicornis</i>	Lp	0.9	0.5	4.3	0
<i>Byblis gaimardi</i>	Ao	0.1	1.0	10.5	0
<i>Dyopodos porrectus</i>	Ao	19.1	17.2	42.1	15
	Is	0.2	2.7	14.3	0
	Lp	1.1	0.5	4.3	0
	Tm	1.6	1.2	16.7	0
<i>Gitanopsis bispinosa</i>	Ao	0.0	0.5	5.3	0
<i>Ischyrocerus anguipes</i>	Ao	0.3	1.0	10.5	0
<i>Ischyrocerus megalops</i>	Tm	0.1	0.1	2.1	0
<i>Maera loveni</i>	Is	22.3	4.5	21.4	6
<i>Melita dentata</i>	Is	0.3	0.9	7.1	0
	Lp	0.5	0.2	1.4	0
<i>Metopa bruzelii</i>	Lp	0.0	0.2	1.4	0

Table 5. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Amphipoda					
<i>Metopa glacialis</i>	Ao	1.1	1.0	10.5	0
	Is	0.0	0.9	7.1	0
<i>Metopa robusta</i>	Lp	0.0	0.2	1.4	0
<i>Metopella longimana</i>	Ao	0.3	1.0	10.5	0
	Is	0.0	1.8	7.1	0
<i>Metopella nasuta</i>	Ao	0.3	1.5	15.8	0
<i>Monoculodes intermedius</i>	Is	0.3	2.7	14.3	0
	Lp	0.1	1.2	5.7	0
<i>Monoculodes latimanus</i>	Is	0.2	0.9	7.1	0
<i>Paradulichia typica</i>	Ao	37.0	39.2	84.2	64
	Is	0.7	8.1	28.6	3
	Lp	1.6	0.8	5.7	0
	Tm	0.6	0.9	10.4	0
<i>Parapleustes assimilis</i>	Tm	0.0	0.1	2.1	0
<i>Pardalisca cuspidata</i>	Is	2.1	0.9	7.1	0
	Tm	0.0	0.1	2.1	0
<i>Paroediceros lynceus</i>	Is	1.7	2.7	14.3	1
	Lp	0.2	0.3	2.9	0
<i>Pleustes media</i>	Is	2.6	1.8	7.1	0
<i>Rhachotropis inflata</i>	Is	2.9	2.7	14.3	1
<i>Rhachotropis oculata</i>	Lp	0.0	0.2	1.4	0
<i>Rozinante fragilis</i>	Tm	0.0	0.1	2.1	0
<i>Stenopleustes pulchellus</i>	Ao	0.4	0.5	5.3	0
<i>Syrrhoe crenulata</i>	Is	0.6	0.9	7.1	0
	Lp	2.2	0.5	4.3	0
<i>Themisto libellula</i>	Tm	2.0	0.5	2.1	0
<i>Westwoodilla brevicealcar</i>	Lp	0.0	0.3	2.9	0
amphipod (unidentified)	Lp	3.6	0.3	2.9	0
	Tm	1.5	0.8	12.5	0
Crustacea: Copepoda (all)					
	Ao	0.3	4.4	31.6	1
	Is	0.1	6.3	28.6	2
	Lp	5.7	56.6	75.7	47
	Tm	10.8	79.0	77.1	69
<i>Aetideopsis rostrata</i>	Is	0.1	0.9	7.1	0
	Lp	0.1	0.3	2.9	0
<i>Ameira longipes</i>	Lp	0.1	0.5	4.3	0
<i>Bradya typica</i>	Lp	0.9	13.4	51.4	7
<i>Bradypontius typicus</i>	Lp	0.0	0.2	1.4	0
<i>Calanus glacialis</i>	Is	0.1	1.8	7.1	0
	Tm	5.8	9.5	60.4	9
<i>Calanus hyperboreus</i>	Tm	0.1	0.3	4.2	0
<i>Cyclopina gracilis</i>	Lp	0.0	0.2	1.4	0
<i>Cyclopina longicornis</i>	Lp	0.1	0.8	4.3	0

Table 5. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Copepoda					
<i>Cyclopina schneideri</i>	Lp	0.6	8.4	40.0	4
	Tm	0.0	0.3	4.2	0
<i>Daniellsenia steffansoni</i>	Lp	0.0	0.3	2.9	0
<i>Euryte longicauda</i>	Lp	0.1	0.7	4.3	0
	Tm	0.0	0.1	2.1	0
<i>Halectinosoma neglectum</i>	Lp	0.0	0.3	2.9	0
<i>Halectinosoma sarsi</i>	Lp	0.1	1.7	8.6	0
<i>Harpacticus superflexus</i>	Tm	0.0	0.3	4.2	0
<i>Harpacticus uniremis</i>	Lp	0.2	0.7	5.7	0
	Tm	0.1	0.5	6.3	0
<i>Microcalanus pygmaeus</i>	Lp	0.5	0.5	4.3	0
<i>Oncaea minuta</i>	Lp	0.0	0.2	1.4	0
<i>Parathalestris jacksoni</i>	Tm	0.0	0.3	6.3	0
<i>Pseudocalanus</i> sp.	Lp	0.0	0.2	1.4	0
<i>Pseudophaenna typica</i>	Lp	0.1	0.7	4.3	0
<i>Rhyncothalestris helgolandica</i>	Lp	0.0	0.2	1.4	0
<i>Scutellidium arthuri</i>	Tm	0.0	0.3	4.2	0
<i>Spinocalanus</i> sp.	Lp	0.0	0.2	1.4	0
<i>Stenhelia arctica</i>	Lp	0.1	0.5	4.3	0
<i>Stephos arcticus</i>	Lp	0.0	0.3	2.9	0
<i>Tisbe furcata</i>	Ao	0.3	4.4	31.6	1
	Is	0.0	3.6	28.6	1
	Lp	3.0	25.0	44.3	12
	Tm	4.8	67.4	56.5	41
copepod (unidentified)	Lp	0.2	1.3	1.4	0
Crustacea: Cumacea (all)					
	Ao	3.3	1.5	15.8	1
	Is	0.4	11.7	28.6	3
	Lp	1.7	1.0	8.6	0
	Tm	0.6	1.2	16.7	0
<i>Diastylis scorpioides</i>	Tm	0.0	1.2	16.7	0
<i>Leptostylis ampullacea</i>	Lp	0.7	0.2	1.4	0
<i>Leucon nasicooides</i>	Ao	3.3	1.5	15.8	1
	Is	0.4	11.7	28.6	3
	Lp	0.9	0.7	5.7	0
	Tm	0.6	0.1	14.6	0
<i>Leucon pallidus</i>	Lp	0.1	0.2	1.4	0
Crustacea: Decapoda (all)					
	Ao	-	-	-	-
	Is	-	-	-	-
	Lp	-	-	-	-
	Tm	12.2	2.1	20.8	3
<i>Pandalus borealis</i>	Tm	3.9	0.1	2.1	0
<i>Spirontocaris</i> sp.	Tm	8.3	1.9	18.8	2

Table 5. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Euphausiacea (all)	Ao	-	-	-	-
	Is	18.1	4.5	35.7	8
	Lp	4.1	0.2	1.4	0
	Tm	57.3	4.0	39.6	24
<i>Thysanoessa inermis</i>	Is	18.1	4.5	35.7	8
	Lp	4.1	0.2	1.4	0
	Tm	57.3	4.0	39.6	24
Crustacea: Isopoda (all)	Ao	3.1	2.5	21.1	1
	Is	0.0	0.9	7.1	0
	Lp	0.4	0.8	7.1	0
	Tm	0.0	0.5	8.3	0
<i>Eurycope mutica</i>	Ao	2.7	2.0	15.8	1
	Is	0.0	0.9	7.1	0
	Lp	0.1	0.3	2.9	0
<i>Pleurogonium spinosissimum</i> isopod (unidentified)	Ao	0.4	0.5	5.3	0
	Lp	0.3	0.5	4.3	0
	Tm	0.0	0.5	8.3	0
Crustacea: Mysidacea (all)	Ao	8.2	2.5	15.8	2
	Is	37.5	39.6	71.4	55
	Lp	0.2	0.3	2.9	0
	Tm	6.8	1.8	18.8	2
<i>Erythroops erythrophthalma</i>	Ao	8.2	2.5	15.8	2
	Is	37.5	39.6	71.4	55
	Lp	0.2	0.3	2.9	0
	Tm	6.1	1.0	10.4	1
<i>Mysis oculata</i>	Tm	0.7	0.8	8.3	0
Crustacea: Ostracoda (all)	Ao	-	-	-	-
	Is	-	-	-	-
	Lp	0.4	0.5	2.9	0
	Tm	-	-	-	-
<i>Philomedes globosus</i>	Lp	0.4	0.5	2.9	0
CHAETOGNATHA (all)	Ao	-	-	-	-
	Is	-	-	-	-
	Lp	-	-	-	-
	Tm	0.9	1.0	16.7	0
<i>Sagitta elegans</i>	Tm	0.9	1.0	16.7	0
CHORDATA: Ascidiacea (all)	Ao	-	-	-	-
	Is	-	-	-	-
	Lp	-	-	-	-
	Tm	1.3	5.3	33.3	2
ascidian (unidentified)	Tm	1.3	5.3	33.3	2

Table 5. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
MOLLUSCA: Pelecypoda (all)	Ao	24.4	24.0	84.2	41
	Is	0.1	1.8	14.3	0
	Lp	59.3	29.2	85.7	76
	Tm	0.2	0.5	8.3	0
<i>Macoma calcaria</i>	Ao	24.4	24.0	84.2	41
	Is	0.1	1.8	14.3	0
	Lp	44.2	22.9	82.9	56
	Tm	0.2	0.5	8.3	0
<i>Macoma moesta</i>	Lp	1.7	1.8	14.3	1
<i>Yoldia hyperborea</i>	Lp	5.5	0.3	2.9	0
pelecypod (unidentified)	Lp	7.9	4.2	30.0	4
NEMATODA (all)	Ao	-	-	-	-
	Is	-	-	-	-
	Lp	0.2	0.5	2.9	0
	Tm	-	-	-	-
nematode (unidentified)	Lp	0.2	0.5	2.9	0
PLATYHELMINTHES: Turbellaria (all)	Ao	0.5	0.5	5.3	0
	Is	-	-	-	-
	Lp	-	-	-	-
	Tm	-	-	-	-
turbellarian (unidentified)	Ao	0.5	0.5	5.3	0
SIPUNCULA (all)	Ao	0.2	0.5	5.3	0
	Is	-	-	-	-
	Lp	-	-	-	-
	Tm	-	-	-	-
sipunculan (unidentified)	Ao	0.2	0.5	5.3	0

Table 6. Food species consumed by Gv) *Gymnelis viridis* (N=7), Lg) *Liparis gibbus* (N=10), and Tp) *Triglops pingeli* (N=40) collected at Sites D-F, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	Gv	99.4	72.5	71.4	123
	Lg	23.8	5.4	50.0	15
	Tp	0.0	0.2	2.5	0
<i>Antinoella</i> sp.	Gv	0.1	2.5	14.3	0
<i>Asabellides</i> sp.	Gv	33.0	12.5	28.6	13
<i>Harmothoe imbricata</i>	Gv	57.4	55.0	57.1	64
	Lg	23.8	5.4	50.0	15
<i>Harmothoe oerstedii</i>	Gv	8.8	2.5	14.3	2
<i>Spio</i> sp.	Tp	0.0	0.2	2.5	0
ARTHROPODA: Crustacea (all)	Gv	0.6	17.5	28.6	5
	Lg	66.2	89.7	100.0	156
	Tp	49.6	41.6	85.0	78
Crustacea: Amphipoda (all)	Gv	0.6	15.0	14.3	2
	Lg	44.7	70.1	100.0	115
	Tp	27.9	7.1	62.5	22
<i>Ampelisca eschrichti</i>	Lg	2.2	0.5	10.0	0
	Tp	0.3	0.2	2.5	0
<i>Anonyx laticoxae</i>	Lg	10.9	1.1	10.0	1
<i>Anonyx nugax</i>	Lg	1.9	2.2	30.0	1
<i>Boeckosimus edwardsi</i>	Lg	5.3	6.5	60.0	7
<i>Caprella linearis</i>	Lg	0.1	0.5	10.0	0
<i>Caprella septentrionalis</i>	Lg	9.1	6.5	30.0	5
<i>Dyopodos porrectus</i>	Tp	0.1	0.4	5.0	0
<i>Gitanopsis inermis</i>	Gv	0.0	2.5	14.3	0
<i>Ischyrocerus anguipes</i>	Gv	0.5	10.0	14.3	1
	Lg	10.4	46.2	90.0	51
<i>Melita dentata</i>	Lg	2.4	1.6	20.0	0
<i>Metopa bruzelii</i>	Tp	0.0	1.0	10.0	0
<i>Monoculodes intermedius</i>	Lg	0.1	0.5	10.0	0
<i>Monoculodes latimanus</i>	Lg	0.1	1.1	20.0	0
<i>Monoculodes longirostris</i>	Tp	0.3	0.2	2.5	0
<i>Monoculopsis longicornis</i>	Lg	0.0	0.5	10.0	0
<i>Orchomene minuta</i>	Lg	0.2	0.5	10.0	0
	Tp	0.0	0.2	2.5	0
<i>Parapleustes bicuspis</i>	Gv	0.1	2.5	14.3	0
<i>Paroediceros lynceus</i>	Tp	2.0	0.6	7.5	0
<i>Protomedea fasciata</i>	Tp	0.0	0.2	2.5	0
<i>Protomedea grandimana</i>	Lg	0.1	0.5	10.0	0
<i>Socarnes bidenticulatus</i>	Lg	0.3	0.5	10.0	0

Table 6. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Amphipoda					
<i>Themisto libellula</i>	Lg	1.5	0.5	10.0	0
	Tp	24.6	2.6	27.5	7
<i>Westwoodilla brevicealcar</i>	Tp	0.1	1.0	7.5	0
<i>Westwoodilla megalops</i>	Tp	0.1	0.2	2.5	0
amphipod (unidentified)	Lg	0.1	0.5	10.0	0
	Tp	0.6	0.4	5.0	0
Crustacea: Cirripedia (all)					
	Gv	-	-	-	-
	Lg	0.1	4.9	10.0	1
	Tp	-	-	-	-
<i>Balanus</i> sp. (larvae)	Lg	0.1	4.9	10.0	1
Crustacea: Copepoda (all)					
	Gv	-	-	-	-
	Lg	0.0	1.1	10.0	0
	Tp	3.0	32.1	55.0	19
<i>Bradya typica</i>	Tp	0.0	0.2	2.5	0
<i>Calanus glacialis</i>	Tp	3.0	30.9	55.0	19
<i>Calanus hyperboreus</i>	Tp	0.0	0.2	2.5	0
<i>Pseudocalanus</i> sp.	Tp	0.0	0.4	5.0	0
<i>Thalestris brunnea</i>	Lg	0.0	1.1	10.0	0
<i>Tisbe furcata</i>	Tp	0.0	0.4	2.5	0
Crustacea: Cumacea (all)					
	Gv	-	-	-	-
	Lg	0.1	2.2	30.0	1
	Tp	0.6	0.2	2.5	0
<i>Brachydiastylis resima</i>	Tp	0.6	0.2	2.5	0
<i>Leucon nasicoides</i>	Lg	0.1	1.6	20.0	0
<i>Leucon</i> sp.	Lg	0.0	0.5	10.0	0
Crustacea: Decapoda (all)					
	Gv	-	-	-	-
	Lg	8.1	7.1	50.0	8
	Tp	0.2	0.4	2.5	0
<i>Eualus fabricii</i>	Lg	1.8	1.1	10.0	0
<i>Lebbeus polaris</i>	Lg	0.4	0.5	10.0	0
<i>Sclerocrangon boreas</i>	Lg	5.4	3.8	10.0	1
	Tp	0.2	0.4	2.5	0
decapod (unidentified)	Lg	0.4	1.6	20.0	0
Crustacea: Euphausiacea (all)					
	Gv	-	-	-	-
	Lg	-	-	-	-
	Tp	14.4	1.4	12.5	2
<i>Thysanoessa inermis</i>	Tp	14.4	1.4	12.5	2

Table 6. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI	
Crustacea: Isopoda (all)	Gv	0.0	2.5	14.3	0	
	Lg	11.9	3.8	40.0	6	
	Tp	-	-	-	-	
	<i>Arcturus baffini</i>	Lg	1.7	2.7	20.0	1
	<i>Munna fabricii</i>	Gv	0.0	2.5	14.3	0
	<i>Synidotea marmorata</i>	Lg	10.3	1.1	20.0	2
Crustacea: Mysidacea (all)	Gv	-	-	-	-	
	Lg	1.3	0.5	10.0	0	
	Tp	3.5	0.4	2.5	0	
	<i>Mysis oculata</i>	Lg	1.3	0.5	10.0	0
	Tp	3.5	0.4	2.5	0	
CHAETOGNATHA (all)	Gv	-	-	-	-	
	Lg	-	-	-	-	
	Tp	0.8	0.6	5.0	0	
	<i>Sagitta elegans</i>	Tp	0.8	0.6	5.0	0
CHORDATA: Ascidiacea (all)	Gv	-	-	-	-	
	Lg	-	-	-	-	
	Tp	14.7	40.9	62.5	35	
	ascidian (larvae)	Tp	14.7	40.9	62.5	35
CHORDATA: Osteichthyes (all)	Gv	-	-	-	-	
	Lg	3.5	0.5	10.0	0	
	Tp	-	-	-	-	
	fish (unidentified)	Lg	3.5	0.5	10.0	0
MOLLUSCA: Gastropoda (all)	Gv	-	-	-	-	
	Lg	6.3	3.3	10.0	1	
	Tp	34.7	15.7	37.5	19	
	<i>Spiratella helicina</i>	Lg	6.3	3.3	10.0	1
	Tp	34.7	15.7	37.5	19	
MOLLUSCA: Pelecypoda (all)	Gv	-	-	-	-	
	Lg	-	-	-	-	
	Tp	0.2	1.4	15.0	0	
	<i>Macoma calcarea</i>	Tp	0.1	1.0	10.0	0
	<i>Macoma moesta</i>	Tp	0.0	0.2	2.5	0
	<i>Musculus niger</i>	Tp	0.0	0.2	2.5	0
		Tp	0.0	0.2	2.5	0
NEMATODA (all)	Gv	0.0	10.0	28.6	3	
	Lg	0.0	1.1	10.0	0	
	Tp	-	-	-	-	
	nematode (unidentified)	Gv	0.0	10.0	28.6	3
	Lg	0.0	1.1	10.0	0	

Table 7. Food species consumed by Ib) *Icelus bicornis* (N=64) and Tp) *Triglops pingeli* (N=63) collected at Site G, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	Ib	2.5	3.6	34.4	2
	Tp	7.2	1.8	7.9	1
<i>Ampharete acutifrons</i>	Ib	0.2	0.4	3.1	0
<i>Artacama proboscidea</i>	Tp	1.5	0.4	1.6	0
<i>Asabellides</i> sp.	Ib	0.0	0.1	1.6	0
<i>Enipo gracilis</i>	Ib	0.0	0.1	1.6	0
<i>Flabelligera affinis</i>	Ib	0.2	0.1	1.6	0
<i>Harmothoe imbricata</i>	Ib	0.2	0.1	1.6	0
<i>Leaena abranchiata</i>	Tp	2.3	0.4	1.6	0
<i>Nicomache</i> sp.	Ib	0.1	0.5	6.3	0
<i>Parahesione</i> sp.	Ib	0.0	0.3	3.1	0
<i>Pionosyllis compacta</i>	Ib	0.0	0.1	1.6	0
<i>Polydora quadrilobata</i>	Ib	0.0	0.1	1.6	0
<i>Sabellides octocirrata</i>	Ib	0.0	0.1	1.6	0
<i>Scalibregma inflatum</i>	Tp	3.4	1.1	4.8	0
<i>Syllis fasciata</i>	Ib	0.4	0.4	4.7	0
polychaete (unidentified)	Ib	1.2	1.1	14.1	0
ARTHROPODA: Crustacea (all)	Ib	96.3	89.9	100.0	186
	Tp	82.1	71.1	95.2	146
Crustacea: Amphipoda (all)	Ib	60.6	31.7	90.6	84
	Tp	67.1	31.5	74.6	74
<i>Acanthonotozoma serratum</i>	Ib	0.3	0.3	3.1	0
<i>Aceroides l. latipes</i>	Ib	0.1	0.1	1.6	0
<i>Amphithopsis longicaudata</i>	Ib	0.0	0.1	1.6	0
<i>Andaniella pectinata</i>	Ib	0.0	0.1	1.6	0
	Tp	0.0	0.7	3.2	0
<i>Anonyx nugax</i>	Ib	1.3	1.7	17.2	1
<i>Apherusa megalops</i>	Ib	0.0	0.1	1.6	0
	Tp	0.0	0.4	1.6	0
<i>Arrhinopsis longicornis</i>	Ib	0.0	0.3	3.1	0
<i>Byblis gaimardi</i>	Tp	0.3	0.4	1.6	0
<i>Dyopedos porrectus</i>	Ib	1.3	14.5	71.9	11
	Tp	0.0	1.5	6.3	0
<i>Gammaropsis maculata</i>	Ib	0.0	0.1	1.6	0
<i>Gitanopsis arctica</i>	Ib	0.0	0.1	1.6	0
<i>Haploops laevis</i>	Ib	0.0	0.3	3.1	0
<i>Hyperia galba</i>	Ib	0.3	0.1	1.6	0
<i>Ischyrocerus anguipes</i>	Ib	0.1	0.4	4.7	0
	Tp	0.0	1.1	1.6	0
<i>Ischyrocerus megachier</i>	Ib	0.0	0.1	1.6	0
<i>Ischyrocerus megalops</i>	Ib	0.0	0.1	1.6	0

Table 7. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Amphipoda					
<i>Maera loveni</i>	Ib	48.0	0.1	1.6	1
<i>Metopa bruzelii</i>	Tp	0.0	0.4	1.6	0
<i>Metopa glacialis</i>	Ib	0.0	0.1	1.6	0
<i>Metopa groenlandica</i>	Ib	0.0	0.1	1.6	0
<i>Metopella longimana</i>	Ib	0.0	0.1	1.6	0
<i>Metopella nasuta</i>	Ib	0.0	0.8	7.8	0
<i>Monoculodes intermedius</i>	Ib	0.0	0.4	4.7	0
<i>Monoculodes tuberculatus</i>	Ib	0.1	0.4	3.1	0
	Tp	0.0	0.4	1.6	0
<i>Onisimus litoralis</i>	Tp	1.5	1.1	4.8	0
<i>Orchomene groenlandica</i>	Ib	0.5	0.6	6.3	0
	Tp	0.0	0.4	1.6	0
<i>Orchomene macroserrata</i>	Ib	0.2	1.0	7.8	0
<i>Paradulichia typica</i>	Ib	0.2	2.5	20.3	1
	Tp	0.0	1.5	6.3	0
<i>Parapleustes assimilis</i>	Ib	0.0	0.1	1.6	0
<i>Pardalisca cuspidata</i>	Ib	1.2	0.8	9.4	0
<i>Paroediceros propinquus</i>	Tp	0.0	0.4	1.6	0
<i>Paroediceros lynceus</i>	Ib	1.7	0.6	7.8	0
	Tp	0.3	0.4	1.6	0
<i>Schisturella pulchra</i>	Ib	0.4	0.3	3.1	0
<i>Stenopleustes pulchellus</i>	Ib	0.0	0.1	1.6	0
<i>Syrrhoe crenulata</i>	Ib	0.9	0.9	10.9	0
<i>Themisto libellula</i>	Tp	63.0	19.0	46.0	38
<i>Tryphosella schneideri</i>	Ib	0.3	0.3	1.6	0
<i>Unciola leucopis</i>	Ib	1.3	0.5	6.3	0
<i>Westwoodilla brevicar</i>	Ib	0.1	1.3	12.5	0
	Tp	0.0	0.4	1.6	0
<i>Westwoodilla megalops</i>	Tp	0.0	1.1	4.8	0
amphipod (unidentified)	Ib	2.1	2.3	26.6	1
	Tp	1.7	2.6	11.1	0
Crustacea: Copepoda (all)					
	Ib	2.2	35.8	82.8	31
	Tp	1.9	28.9	54.0	17
<i>Bradypontius groenlandicus</i>	Ib	0.0	0.3	1.6	0
<i>Bradypontius magniceps</i>	Tp	0.0	0.3	1.6	0
<i>Calanus glacialis</i>	Ib	1.0	5.3	40.6	3
	Tp	1.5	11.4	41.3	5
<i>Calanus hyperboreus</i>	Ib	0.7	6.5	40.6	3
	Tp	0.3	1.1	4.8	0
<i>Cervinia synarthra</i>	Ib	0.0	0.4	4.7	0
<i>Harpacticus superflexus</i>	Ib	0.0	0.3	3.1	0
<i>Harpacticus uniremis</i>	Ib	0.0	0.3	3.1	0
	Tp	0.0	5.1	15.9	1

Table 7. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Copepoda					
<i>Jaschnovia tolli</i>	Ib	0.0	0.5	1.6	0
<i>Pseudocalanus</i> sp.	Ib	0.0	0.1	1.6	0
	Tp	0.0	0.3	1.6	0
<i>Pseudophaenna typica</i>	Ib	0.0	0.8	4.7	0
<i>Thalestris brunnea</i>	Tp	0.0	1.5	3.2	0
<i>Tisbe furcata</i>	Ib	0.4	20.9	34.4	7
	Tp	0.1	9.2	15.9	1
<i>Zaus goodsiri</i>	Ib	0.0	0.3	3.1	0
<i>Zaus spinatus</i>	Ib	0.0	0.1	1.6	0
Crustacea: Cumacea (all)					
	Ib	0.3	2.2	21.9	1
	Tp	0.3	5.1	17.5	1
<i>Diastylis scorpioides</i>	Ib	0.1	0.1	1.6	0
<i>Diastylis</i> sp.	Ib	0.1	0.3	3.1	0
	Tp	0.0	0.4	1.6	0
<i>Eudorella emarginata</i>	Tp	0.0	0.4	1.6	0
<i>Eudorella</i> sp.	Ib	0.0	0.1	1.6	0
<i>Leptostylis ampullacea</i>	Ib	0.1	0.1	1.6	0
<i>Leucon fulvus</i>	Ib	0.0	0.1	1.6	0
	Tp	0.0	1.1	3.2	0
<i>Leucon nasicooides</i>	Ib	0.1	0.5	4.7	0
	Tp	0.2	2.2	7.9	0
<i>Leucon pallidus</i>	Ib	0.0	0.1	1.6	0
<i>Leucon</i> sp.	Ib	0.0	0.4	4.7	0
	Tp	0.0	1.1	4.8	0
<i>Petalosarsia declivis</i>	Ib	0.0	0.1	1.6	0
cumacean (unidentified)	Ib	0.0	0.3	3.1	0
Crustacea: Decapoda (all)					
	Ib	0.7	0.1	1.6	0
	Tp	-	-	-	-
<i>Sclerocrangon boreas</i>	Ib	0.7	0.1	1.6	0
Crustacea: Euphausiacea (all)					
	Ib	-	-	-	-
	Tp	12.4	4.0	15.9	3
<i>Thysanoessa inermis</i>	Tp	12.4	4.0	15.9	3
Crustacea: Isopoda (all)					
	Ib	31.3	19.3	71.9	36
	Tp	-	-	-	-
<i>Arcturus baffini</i>	Ib	28.8	4.2	10.9	4
<i>Desmosoma lineare</i>	Ib	0.0	0.1	1.6	0
<i>Eurycope mutica</i>	Ib	0.1	2.2	20.3	0
<i>Janira tricornis</i>	Ib	0.1	0.3	3.1	0
<i>Munna fabricii</i>	Ib	0.0	0.3	3.1	0
<i>Munna kroyeri</i>	Ib	0.2	1.8	12.5	0

Table 7. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Isopoda					
<i>Munna limicola</i>	Ib	0.1	0.8	9.4	0
<i>Munna</i> sp.	Ib	0.1	0.5	6.3	0
<i>Munnopsis typica</i>	Ib	1.2	0.3	3.1	0
<i>Pleurogonium spinosissimum</i>	Ib	0.7	9.0	40.6	0
isopod (unidentified)	Ib	0.0	0.1	1.6	0
Crustacea: Mysidacea (all)					
	Ib	-	-	-	-
	Tp	0.8	1.5	4.8	0
<i>Erythroops erythrophthalma</i>	Tp	0.2	0.4	1.6	0
<i>Mysis oculata</i>	Tp	0.6	1.1	3.2	0
Crustacea: Nebaliacea (all)					
	Ib	1.2	0.1	1.6	0
	Tp	-	-	-	-
<i>Nebalia</i> sp.	Ib	1.2	0.1	1.6	0
Crustacea: Ostracoda (all)					
	Ib	0.0	0.3	3.1	0
	Tp	-	-	-	-
<i>Philomedes globosus</i>	Ib	0.0	0.1	1.6	0
ostracod (unidentified)	Ib	0.0	0.1	1.6	0
Crustacea: Tanaidacea (all)					
	Ib	0.0	0.4	3.1	0
	Tp	-	-	-	-
<i>Cryptocope arctica</i>	Ib	0.0	0.4	3.1	0
CHAETOGNATHA (all)					
	Ib	0.4	0.1	1.6	0
	Tp	5.3	6.6	27.0	3
<i>Sagitta elegans</i>	Ib	0.4	0.1	1.6	0
	Tp	5.3	6.6	27.0	3
CHORDATA: Ascidiacea (all)					
	Ib	0.1	1.1	14.1	0
	Tp	0.6	19.0	38.1	7
ascidian (larvae)	Ib	0.1	1.1	14.1	0
	Tp	0.6	19.0	38.1	7
CHORDATA: Osteichthyes (all)					
	Ib	-	-	-	-
	Tp	4.2	0.7	3.2	0
<i>Myoxocephalus scorpioides</i>	Tp	2.4	0.4	1.6	0
fish (unidentified)	Tp	1.9	0.4	1.6	0
MOLLUSCA: Gastropoda (all)					
	Ib	0.1	0.3	3.1	0
	Tp	-	-	-	-
<i>Cingula arenaria</i>	Ib	0.1	0.3	3.1	0

Table 7. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
MOLLUSCA: Pelecypoda (all)	Ib	0.5	4.7	42.2	2
	Tp	0.0	0.8	3.2	0
<i>Macoma calcarea</i>	Ib	0.4	4.3	40.6	2
	Tp	0.0	0.8	3.2	0
pelecypod (unidentified)	Ib	0.0	0.4	1.6	0
PORIFERA (all)	Ib	0.0	0.1	1.6	0
	Tp	-	-	-	-
<i>Tetilla sibirica</i>	Ib	0.0	0.1	1.6	0

Table 8. Food species consumed by *Liopsetta glacialis* (N=23) collected at Sites H-J, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	61.3	49.8	91.3	101
<i>Ampharete vega</i>	61.3	49.8	91.3	101
ARTHROPODA: Crustacea (all)	0.9	5.6	78.3	5
Crustacea: Amphipoda (all)	0.3	3.7	69.6	3
<i>Acanthostepheia malmgreni</i>	0.0	0.0	4.3	0
<i>Aceroides l. latipes</i>	0.0	0.5	30.4	0
<i>Boeckosimus affinis</i>	0.1	0.6	21.7	0
<i>Gammarus oceanicus</i>	0.1	0.4	17.4	0
<i>Onisimus litoralis</i>	0.0	0.1	8.7	0
<i>Paroediceros lynceus</i>	0.0	0.1	8.7	0
<i>Pontoporeia affinis</i>	0.0	0.2	17.4	0
<i>Pontoporeia femorata</i>	0.1	1.9	52.2	1
Crustacea: Cumacea (all)	0.1	1.2	34.8	0
<i>Diastylis sulcata</i>	0.1	1.2	34.8	0
Crustacea: Isopoda (all)	0.5	0.6	43.5	1
<i>Mesidotea entomon</i>	0.5	0.6	43.5	1
Crustacea: Mysidacea (all)	0.0	0.0	4.3	0
<i>Mysis relicta</i>	0.0	0.0	4.3	0
Crustacea: Ostracoda (all)	0.0	0.0	4.3	0
<i>Cythereis</i> sp.	0.0	0.0	4.3	0
CHORDATA: Ascidiacea (all)	31.5	13.8	69.6	32
<i>Rhizomolgula globularis</i>	31.5	13.8	69.6	32
MOLLUSCA: Pelecypoda (all)	6.2	22.5	91.3	26
<i>Cyrtodaria kurriana</i>	1.2	2.3	47.8	2
<i>Macoma balthica</i>	4.8	19.3	82.6	20
<i>Yoldiella intermedia</i>	0.2	0.9	56.5	1
NEMATODA (all)	0.1	8.3	52.2	4
nematode (unidentified)	0.1	8.3	52.2	4
PRIAPULIDA (all)	0.1	0.1	17.4	0
<i>Halicryptus spinulosus</i>	0.1	0.1	17.4	0

Table 9. Food species consumed by Gt) *Gymnocanthus tricuspis* (N=36) and Is) *Icelus spatula* (N=17) collected at Site K, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	Gt	7.3	0.7	38.9	3
	Is	0.7	1.6	11.8	0
<i>Antinoella</i> sp.	Is	0.5	0.5	5.9	0
<i>Chaetozone setosa</i>	Gt	0.2	0.1	8.3	0
<i>Chone infundibuliformis</i>	Gt	3.1	0.0	2.8	0
<i>Eteone flava</i>	Gt	0.0	0.1	5.6	0
<i>Nereis pelagica</i>	Gt	0.6	0.0	2.8	0
<i>Parahesion</i> sp.	Gt	0.0	0.1	5.6	0
	Is	0.2	1.0	5.9	0
<i>Pionosyllis</i> sp.	Gt	0.0	0.0	2.8	0
<i>Scalibregma inflatum</i>	Gt	0.1	0.1	5.6	0
<i>Spio filicornis</i>	Gt	0.6	0.2	8.3	0
<i>Thelepus cincinnatus</i>	Gt	2.6	0.0	2.8	0
polychaete (unidentified)	Gt	0.0	0.0	2.8	0
ARTHROPODA: Crustacea (all)	Gt	88.9	93.4	100.0	182
	Is	99.0	97.9	94.1	185
Crustacea: Amphipoda (all)	Gt	2.8	1.7	63.9	2
	Is	30.3	27.6	70.6	41
<i>Ampelisca eschrichti</i>	Gt	1.7	0.1	5.6	0
<i>Guernea nordenskioldi</i>	Gt	0.0	0.0	2.8	0
<i>Metopella longimana</i>	Gt	0.0	0.2	16.7	0
	Is	0.9	2.1	17.6	1
<i>Metopella nasuta</i>	Is	1.1	4.7	29.4	2
<i>Monoculodes intermedius</i>	Is	7.1	6.8	35.3	5
<i>Oediceros borealis</i>	Gt	0.1	0.1	2.8	0
	Is	2.0	0.5	5.9	0
<i>Orchomene minuta</i>	Gt	0.1	0.2	8.3	0
<i>Paroediceros lynceus</i>	Gt	0.4	0.2	11.1	0
	Is	0.0	0.5	5.9	0
<i>Pleustes media</i>	Gt	0.0	0.0	2.8	0
	Is	0.3	1.0	11.8	0
<i>Phoxocephalus holboli</i>	Gt	0.0	0.0	2.8	0
<i>Pontoporeia femorata</i>	Gt	0.0	0.0	2.8	0
<i>Rhachotropis aculeata</i>	Is	2.0	0.5	5.9	0
<i>Rhachotropis oculata</i>	Is	12.6	3.1	23.5	4
<i>Westwoodilla brevicar</i>	Gt	0.1	0.4	11.1	0
	Is	2.3	2.6	17.6	1
<i>Westwoodilla megalops</i>	Is	1.4	3.6	23.5	1
amphipod (unidentified)	Gt	0.2	0.4	16.7	0
	Is	0.5	2.1	5.9	0

Table 9. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
Crustacea: Copepoda (all)	Gt	0.6	7.2	19.4	2
	Is	0.2	2.1	23.5	1
<i>Calanus hyperboreus</i>	Gt	0.0	0.1	8.3	0
<i>Cyclopina schneideri</i>	Gt	0.5	6.6	2.8	0
<i>Metridia longa</i>	Gt	0.0	0.1	2.8	0
<i>Robertsonia tenuis</i>	Is	0.0	0.5	5.9	0
<i>Tisbe furcata</i>	Is	0.0	1.0	11.8	0
copepod (unidentified)	Gt	0.0	0.4	8.3	0
	Is	0.2	0.5	5.9	0
Crustacea: Cumacea (all)	Gt	84.6	84.2	94.4	159
	Is	59.3	65.6	88.2	110
<i>Diastylis scorpioides</i>	Gt	0.1	0.1	5.6	0
<i>Diastylis rathkei</i>	Gt	84.3	83.5	88.9	149
	Is	58.8	65.1	82.4	102
<i>Lamrops fuscata</i>	Gt	0.2	0.6	19.4	0
	Is	0.5	0.5	5.9	0
Crustacea: Mysidacea (all)	Gt	0.8	0.1	5.6	0
	Is	9.0	1.0	11.8	1
<i>Mysis oculata</i>	Gt	0.8	0.1	5.6	0
	Is	9.0	1.0	11.8	1
Crustacea: Ostracoda (all)	Gt	0.1	0.2	13.9	0
	Is	0.2	1.6	5.9	0
<i>Cytheridea punctillata</i>	Is	0.2	1.6	5.9	0
<i>Philomedes globosus</i>	Gt	0.1	0.2	13.9	0
CHORDATA: Larvacea (all)	Gt	2.8	5.2	63.9	5
	Is	0.4	0.5	5.9	0
<i>Oikopleura vanhoeffeni</i>	Gt	2.8	5.2	63.9	5
	Is	0.4	0.5	5.9	0
ECHINODERMATA: Ophiuroidea (all)	Gt	0.0	0.0	2.8	0
	Is	-	-	-	-
<i>Stegophiura nodosa</i>	Gt	0.0	0.0	2.8	0
MOLLUSCA: Gastropoda (all)	Gt	0.1	0.1	11.1	0
	Is	-	-	-	-
<i>Alvania cruenta</i>	Gt	0.0	0.0	2.8	0
gastropod (unidentified)	Gt	0.1	0.1	8.3	0

Table 9. Continued

Food species	Fish. sp.	% total dry wt.	% total no.	% freq.	IRI
MOLLUSCA: Pelecypoda (all)	Gt	0.2	0.1	8.3	0
	Is	-	-	-	-
<i>Astarte montagui</i>	Gt	0.2	0.0	2.8	0
<i>Musculus discors</i>	Gt	0.0	0.0	2.8	0
<i>Musculus niger</i>	Gt	0.0	0.0	2.8	0
NEMERTINA (all)	Gt	0.3	0.4	25.0	0
	Is	-	-	-	-
nemertean (unidentified)	Gt	0.3	0.4	25.0	0
miscellaneous	Gt	0.5	-	13.9	0
	Is	-	-	-	-

Table 10. Food species consumed by *Myoxocephalus scorpius* (N=23) collected at Site L, expressed as percent of total dry weight of stomach contents, percent of total number of food items, percent frequency of occurrence, and Index of Relative Importance

Food species	% total dry wt.	% total no.	% freq.	IRI
ANNELIDA: Polychaeta (all)	20.6	11.8	34.8	11
<i>Nereis pelagica</i>	20.6	11.8	34.8	11
ARTHROPODA: Crustacea (all)	34.0	56.7	91.3	83
Crustacea: Amphipoda (all)	2.9	19.9	65.2	15
<i>Anonyx nugax</i>	0.0	0.4	4.3	0
<i>Apherusa megalops</i>	0.0	1.1	4.3	0
<i>Atylus carinatus</i>	0.0	0.7	4.3	0
<i>Gammarus oceanicus</i>	0.5	3.3	13.0	0
<i>Gammarus setosus</i>	2.0	10.3	34.8	4
<i>Gammarus wilkitzkii</i>	0.0	0.4	4.3	0
<i>Orchomene minuta</i>	0.0	0.4	4.3	0
<i>Phoxocephalus holболи</i>	0.0	0.4	4.3	0
<i>Pontogeneia inermis</i>	0.0	0.4	4.3	0
<i>Weyprechtia pinguis</i>	0.2	1.5	17.4	0
amphipod (unidentified)	0.0	1.1	8.7	0
Crustacea: Cumacea (all)	3.2	26.6	13.0	4
<i>Diastylis rathkei</i>	3.2	26.6	13.0	4
Crustacea: Decapoda (all)	28.0	5.9	52.2	18
<i>Lebbeus groenlandicus</i>	12.1	0.4	4.3	1
<i>Lebbeus polaris</i>	6.5	4.8	43.5	5
<i>Sclerocrangon boreas</i>	9.3	0.4	4.3	0
decapod (unidentified)	0.1	0.4	4.3	0
Crustacea: Mysidacea (all)	0.1	4.1	30.4	1
<i>Mysis oculata</i>	0.1	4.1	30.4	1
CHORDATA: Osteichthyes (all)	39.7	7.7	39.1	19
<i>Gymnocanthus tricuspis</i>	1.0	0.4	4.3	0
<i>Icelus bicornis</i>	2.2	0.4	4.3	0
<i>Liparis</i> sp.	0.5	0.4	4.3	0
<i>Myoxocephalus scorpius</i>	1.8	0.7	4.3	0
<i>Myoxocephalus</i> sp.	33.4	5.5	30.4	12
fish (unidentified)	0.8	0.4	4.3	0
MOLLUSCA: Gastropoda (all)	5.5	23.6	47.8	14
<i>Margarites umbilicalis</i>	5.5	23.6	47.8	14
MOLLUSCA: Pelecypoda (all)	0.0	0.4	4.3	0
<i>Musculus niger</i>	0.0	0.4	4.3	0

