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Stomach contents of the Atlantic wolffish, *Anarhichas lupus*, from the Northwest Atlantic

by

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Abstract

Stomach contents of Atlantic wolffish (Anarhichas lupus), collected in the Northwest Atlantic from West Greenland to the Scotian Shelf, were examined by volume and by occurrence. Invertebrates made up 85% of the food and fish 15%. The most important invertebrates in order were: molluscs, especially whelks and Iceland scallops; echinoderms, particularly brittle stars and sea urchins; and crustacea, mainly crabs. Redfish formed the predominant fish food. Molluscs increased and echinoderms usually decreased in importance from the smaller to the larger wolffish.

Introduction

The food of Anarhichas lupus was studied for the Labrador-Newfoundland region by Albikovskaya (1983), and off Iceland by Pálsson (1983). Notes on the food of this species were recorded by Verrill (1871), Smith (1889, 1890, 1891, 1892), Scott (1902, 1903), Gill (1911), Bigelow and Schroeder (1953), Barsukov (1959), Jónsson (1982), and others.

Materials and Methods

Stomach contents of 103 Atlantic wolffish were examined in the field for volumes of various food items. Classification was limited in detail to species or groups readily identified in the field without further detailed investigation. Volumetric measurements of the different food items in the stomachs were made by displacement of water in a graduated cylinder. An additional 44 stomachs containing food were examined qualitatively. The numbers of Atlantic wolffish stomachs containing food, by length range from

various NAFO divisions, are listed on Table 1, and the localities from which Atlantic wolffish were sampled in wolffish studies generally are shown in Templeman (MS 1984). The wolffish were measured as greatest total length with the mouth closed.

Results

Of the 103 Atlantic wolffish stomachs examined for food volume, in this paper, 31% contained food (Table 2). It was apparent that bottom invertebrates formed the main food with whelks 22%, Iceland scallops 12%, crabs 12%, hermit crabs 11% and brittle stars 16%. Invertebrates made up 85% of the food. Redfish with 12% was the main item of the 15% fish food.

In qualitative examination of 76 stomachs containing food (Table 3), invertebrates were again predominant with whelks in 46%, scallops in 12%, sea urchins in 30%, hermit crabs in 20%, other crabs in 13% and brittle stars in 20% of the stomachs. Redfish were present in 9% of the stomachs.

Sea urchins and whelk shells in the stomachs were often crushed and some whelks were recorded without their shells. Molluscs, especially whelks and Iceland scallops, increased and echinoderms usually decreased in importance from the smaller to the larger fish. Fish were more plentiful as food in the larger than in the smaller length ranges.

Discussion

The stomach contents of the Atlantic wolffish from the various authors previously quoted, and especially from Pálsson (1983), Albikovskaya (1983) and Jónsson (1982) consisted mainly of benthic invertebrates with only a small amount of fish. The benthic invertebrate food consisted chiefly of echinoderms, especially ophiuroids, molluscs, especially gastropods, and crustacea, mainly crabs and hermit crabs. The predominance of these varieties of food and of their species depended on their abundance in the locality where the wolffish lived.

The results presented in this paper were generally similar to those of previous studies, but with molluscs, especially gastropods, predominant followed by echinodermata, especially ophiuroids and sea urchins, and crustacea, mainly crabs and hermit crabs.

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Table 1. Numbers of stomachs containing food in samples from three length ranges of Atlantic wolffish from the Northwest Atlantic .

Area	NAFO Divisions	Quantity (Table 2) 30-59 cm	60-89 cm	90-127 cm	Occurrence (Table 3) 30-59 cm	60-89 cm	90-127 cm
West Greenland	1B	1	-	-	1	-	-
East Newfoundland	3KL	3	2	-	12	10	-
Flemish Cap	3M	-	1	-	-	1	-
Grand Bank south	3NO	1	1	3	8	3	6
St. Pierre Bank and vicinity	3Ps	1	11	5	3	15	12
Gulf of St. Lawrence	4R	-	-	-	-	2	-
Scotian Shelf	4VWX	-	2	1	-	2	1
Total		6	17	9	24	33	19

Table 2. Stomach contents of Atlantic wolffish from the Northwest Atlantic in percentages of total stomach contents for each length range. (The percentages are additive vertically but not horizontally.)

Phylum	Taxon	Species, type, etc.	Stomach contents, volume (ml) at fish length range (cm) 30-59	60-89	90-127	30-127
Cnidaria	Actiniaria	Sea anemones	-	0.3	-	0.2
Bryozoa	-	Branched	-	0.1	-	0.1
Mollusca	Gastropoda	Whelks	10.7	14.9	31.4	22.1
	Bivalvia	Clams	-	0.1	0.8	0.3
		Chlamys islandicus	-	13.4	10.4	11.7
	Cephalopoda	Octopus	-	2.8	-	1.5
Annelida	Polychaeta	Tube worm	-	0.1	-	0.1
Arthropoda (Crustacea)	Amphipoda	-	0.8	-	-	0.1
	Decapoda	Pagurus sp.	0.4	17.7	3.0	10.7
	(Anomura)	Lithodes maia	5.3	-	-	0.2
	Decapoda	Hyas coarctatus	-	2.4	-	1.3
	(Brachyura)	Unidentified spider crabs	1.0	0.4	-	0.3
		Unidentified crabs	1.8	-	23.1	10.3
Echinodermata	Echinoidea	Strongylocentrotus drobachiensis	-	-	6.6	2.9
		Heart urchin	2.0	0.1	-	0.1
		Unidentified sea urchins	1.0	12.4	-	6.6
	Asteroidea	Ctenodiscus crispatus	9.9	0.9	-	0.8
	Ophiuroidea	Brittle stars	67.2	17.0	11.1	15.8
Chordata (Pisces)	Scorpaenidae	Sebastes sp.	-	14.9	9.4	12.0
	Heterosomata	Hippoglossoides platessoides	-	-	4.3	1.9
		Fish guts	-	2.7	-	1.4
Total invertebrates			100.0	82.4	86.4	84.7
Total fish			0	17.6	13.6	15.3
Number of wolffish with empty stomachs (% of total)			31(84)	34(67)	6(40)	71(69)
Number of wolffish with food in stomachs (% of total)			6(16)	17(33)	9(60)	32(31)
Total volume of stomach contents (ml)			51	949	800	1800

Table 3. Percentages of occurrence of various food items in stomachs of Atlantic wolffish from the Northwest Atlantic in percentages of number of stomachs at each length range containing food.

Phylum	Taxon	Species, type, etc.	Percentages of stomachs at different lengths ranges (cm) in which food items present			
			30-59	60-89	90-127	30-127
Cnidaria	Actiniaria	Sea anemone	-	3.0	-	1.3
Bryozoa	-	Branched	-	3.0	-	1.3
Mollusca	Gastropoda	Whelks	25.0	45.5	73.7	46.1
	Bivalvia	Cyrtodaria siliqua	-	-	5.3	1.3
		Unidentified clams	4.2	3.0	10.5	5.3
		Chlamys islandicus	-	12.1	15.8	9.2
		Unidentified scallop shell	-	3.0	5.3	2.6
	Cephalopoda	Squid	4.2	-	-	1.3
		Octopus	-	3.0	-	1.3
	-	Unidentified molluscs	12.5	-	-	3.9
Annelida	Polychaeta	Tube worm	-	3.0	-	1.3
Arthropoda (Crustacea)	Amphipoda	-	4.2	-	-	1.3
	Decapoda (Anomura)	Pagurus sp.	4.2	15.2	10.5	10.5
		Unidentified hermit crabs	-	12.1	15.8	9.2
		Lithodes maia	4.2	-	-	1.3
	Decapoda (Brachyura)	Hyas coarctatus	-	3.0	-	1.3
		Unidentified spider crabs	8.3	3.0	5.3	5.3
		Unidentified crabs	8.3	3.0	5.3	5.3
	-	Crustacean remants	-	-	5.3	1.3
Echinodermata	Echinoidea	Strongylocentrotus drobachiensis	-	-	5.3	1.3
		Heart urchin	4.2	3.0	-	2.6
		Unidentified sea urchins	54.2	21.2	-	26.3
		Sand dollars	-	3.0	-	1.3
	Asteroidea	Ctenodiscus crispatus	4.2	3.0	-	2.6
		Unidentified starfish	8.3	9.1	-	6.6
	Ophiuroidea	Brittle stars	25.0	18.2	15.8	19.7
Chordata (Pisces)	Scorpaenidae	Sebastes sp.	4.2	15.2	5.3	9.2
	Heterosomata	Hippoglossoides platessoides	-	3.0	-	1.3
	-	Fish guts	-	3.0	-	1.3
Total mumber wolffish stomachs containing food			24	33	19	76