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**FOOD OF HARP SEALS (*PHOCA GROENLANDICA* ERXLEBEN,
1777), IN ICELANDIC WATERS, IN THE PERIOD OF 1990-1994**

by

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Abstract

In this paper, is published information about food of harp seals (*Phoca groenlandica*) in Icelandic waters. Most of the animals, which were obtained for investigation, have either been entangled in gill-nets of fishers or shot by hunters, in the period of 1990-1994. Majority of the animals are from the North-Cost of Iceland, and most of them were caught in the spring and early summer. Young harp seals; pups and one year olds are dominating in the sample.

The main food item found in the stomachs of harp seals, in Icelandic waters, are the fish-species; sand eels (*Ammodytes*), cod (*Gadus morhua*), capelin (*Mallotus villosus*). Invertebrates such as; *Pandalus sp.*, euphausiids and squid (*Todarodes sagittatus*), are found too. The cods eaten by harp seals are mostly of the age-classes 0 to III.

Introduction

Information about food of harp seals (*Phoca groenlandica*) in Icelandic waters, is rather scarce. This is the only study we are aware of. Most of the animals, which were investigated, have either been entangled in gill-nets of fishers or shot by local hunters, in the period of 1990-94.

Material and methods

Whole animals or samples of the lower jaws, stomachs and sex-organs, were obtained from local fisher and seal-hunters. A total of 72 stomachs was obtained, which of 33 were without food-remains.

Ages of animals were determined by counting of growth-layers in the dentine, of a thin-section (0.5-0.7 mm) of the canine tooth, cut traverse with a low speed saw, just below the enamel cap. Binocular dissecting microscope, with 6X to 50X magnification and transmitted light was used (Bowen et al. 1983; Lawson et al. 1992). Sex of animals was determined by investigating the sex organs of the animals.

Food remains in the stomachs were studied by cutting the stomach open, and washing its content through fine a sieve (0.3 mm mesh-size). Otoliths and bones of fishes and carapaces and shells from invertebrates (beaks from squid), were identified either to species or species groups. Ages of codfish and capelin eaten were read from growth layers in the otoliths, under a binocular dissection microscope with 6X to 50X magnification and light from above.

Results

Feeding activity of harp seals occur throughout the year, in Icelandic waters. The proportion of stomachs without food- and with food-remains, is similar in each month (Table 1).

Far most common in the food, in %-occurrence, are the fish-species; sand eels (*Ammodytes*), cods (*Gadus morhua*), capelin (*Mallotus villosus*) and the shrimp *Pandalus* sp. Next in line are the fishes polar cod (*Boreogadus saida*), saithe (*Pollachius virens*), herring (*Clupea harengus*), haddock (*Melanogrammus aeglefinus*), long rough dab (*Hippoglossoides plasseoides*) and invertebrates like euphausiids, squids (*Todarodes sagittatus*) and amphipods (Figure 1).

Harp seals in Icelandic waters feed mainly on small fish-species and young individuals of bigger sized fish (Table 2). In case of the cod harp seals feed mainly on age-class I (Figure 2).

Discussion

Percentage of occurrence over emphasises small items in the food, so small food items such as amphipods and euphausiids may get to much weight here, and squid to little weight. It is better to use percentage by weight or energy values (Pierce and Boyle 1991). However to obtain such values we need information about the relationships of otoliths and other hard-parts and weights', for the food-species. Such information is still not at hand for fish and invertebrates in Icelandic waters.

It is not the scope of this paper to analyse the food of harp seals in the North-eastern-Atlantic, and any comparison of the diet of harp seal in Icelandic waters with the diet elsewhere in the Atlantic is hardly possible due to small sample size in this study. Collected animals are also dominated by pups and one year olds. It seems however

that, in Icelandic waters, harp seal feed much more on sand eels, than in other parts of the North-Atlantic. There their food is dominated by pelagic crustaceans, polar cod and capelin (Kapel 1994). Their food in Icelandic waters being most similar to the food of harp seals in the off-shore areas of Southwest-Greenland, in summertime (Kapel and Angantyr 1989).

Harp seals' visits to the coast also coincides with the spawning migration of the capelin (*Mallotus villosus*) stock to the coast of Iceland. Capelin is also a very important food of harp seals in Icelandic waters, as is indicated in by this study.

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Tables

Table 1. Harp seals (*Phoca groenlandica*), with and without food in their stomachs, in different months of the year. Animals caught in Icelandic waters, in the period 1990-1994.

Months	Stomachs with food-remains	Stomachs without food	Total
January	0	2	2
February	4	2	6
March	4	3	7
April	5	6	11
May	21	17	38
June	2	0	2
July	1	3	4
December	2	0	2
Total	39	33	72

Table 2. Distribution of age-classes, of various fish-species in the food of harp seals (*Phoca groenlandica*), in Icelandic waters. The numbers in the table are original figures; numbers of fish.

<i>Fish-species</i>	Age-classes				
	O	I	II	III	IV
Polar cod	1	0	3	6	0
Capelin	0	17	3	3	0
Cod	5	23	5	5	0
Saithe	0	6	1	1	0
Haddock	1	1	5	1	0

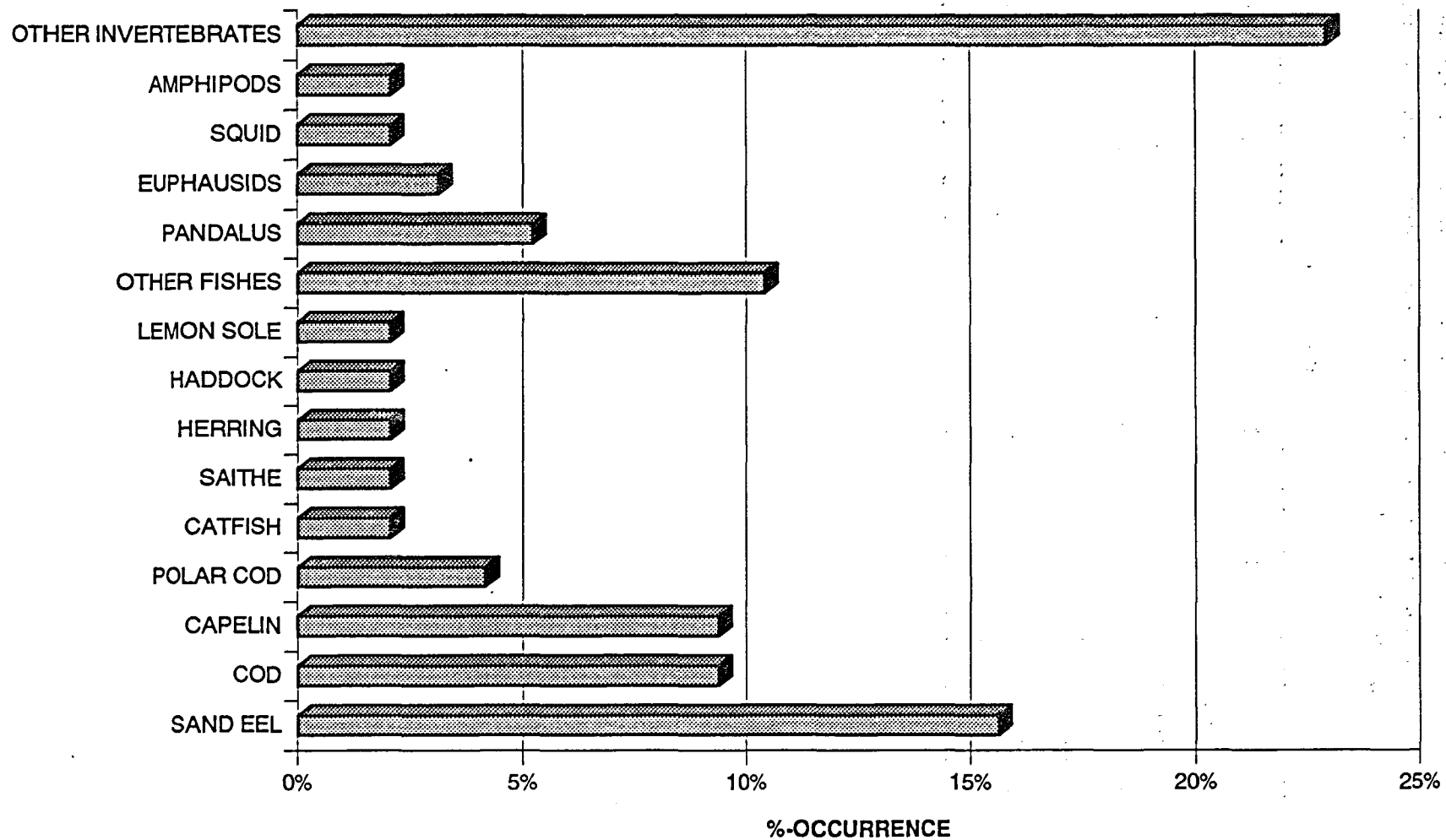


Figure 1. Percentage of occurrence of food-species in the stomachs of harp seals (*Phoca groenlandica*), in Icelandic waters.

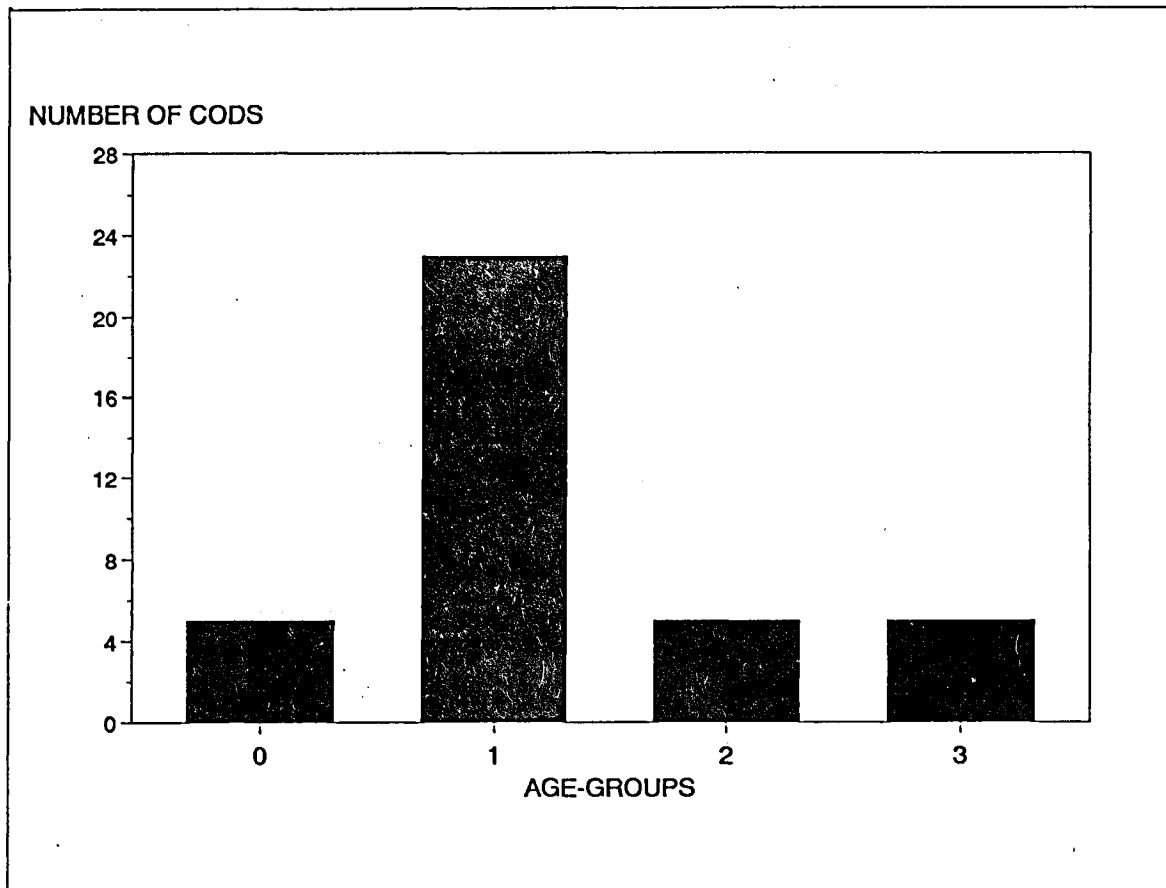


Figure 2. Distribution of the age-groups of cod eaten by harp seals (*Phoca groenlandica*), in Icelandic waters, in the period of 1990-1994.