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Stomach Content Analyses of Fishes from Tuktoyaktuk Harbour, N.W.T., 1981

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1991

Canadian Data Report of
Fisheries and Aquatic Sciences
No. 853

Fisheries and Oceans
Pêches et Océans

Canada

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This is the 63rd Data Report

from the Central and Arctic Region, Winnipeg

PREFACE

This study was funded by the Northern Oil and Gas Action Program (NOGAP), through the Department of Fisheries and Oceans, Central and Arctic Region. It was one of a series of projects executed under NOGAP B.2, to provide background data for assessing the implications of hydrocarbon development and production on critical estuarine and marine habitats of the Canadian Arctic Coastal Shelf. This document constitutes NOGAP Report B2.43.

Cat. no. FS97-13/853E ISSN 0706-6465

Correct citation for this publication is:

Lacho, G. 1991. Stomach content analyses of fishes from Tuktoyaktuk Harbour, N.W.T., 1981. Can. Data Rep. Fish. Aquat. Sci. 853: iv + 10 p.

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ABSTRACT

Lacho, G. 1991. Stomach content analyses of fishes from Tuktoyaktuk Harbour, N.W.T., 1981. Can. Data Rep. Fish. Aquat. Sci. 853: iv + 10 p.

The stomach contents of selected fish species sampled from catches in Tuktoyaktuk Harbour N.W.T. as outlined in Hopky and Ratynski (1983) were analyzed. Fish species included Arctic cisco, Coregonus autumnalis (Pallas); least cisco, C. sardinella Valenciennes ; broad whitefish, Coregonus nasus (Pallas) ; lake whitefish, C. clupeaformis (Mitchill); inconnu, Stenodus leucichthys (Güldenstadt); rainbow smelt, Osmerus mordax (Mitchill); Pacific herring, Clupea harengus Valenciennes; saffron cod, Eleginus gracilus (Tilesius); Arctic flounder, Liopsetta glacialis (Pallas); starry flounder, Platichthys stellatus (Pallas); blackline prickleback, Acantholumpenus mackayi (Gilbert); eelpout, Lycodes jugoricus Knipowitsch and slender eelblenny, Lumpenus fabricii (Vallenciennes). This report summarizes the results of food item analyses of stomachs from the above fish species caught during late June to early September, 1981.

Key words: fish; stomach contents; Tuktoyaktuk Harbour; Arctic cisco; least cisco; broad whitefish; lake whitefish; inconnu; rainbow smelt; Pacific herring; saffron cod; Arctic flounder; starry flounder; blackline prickleback; eelpout; slender eelblenny; food; stomach.

RÉSUMÉ

Lacho, G. 1991. Stomach content analyses of fishes from Tuktoyaktuk Harbour, N.W.T., 1981 . Can. Data Rep. Fish. Aquat. Sci. 853: iv + 10 p.

On a analysé le contenu stomacal de poissons d'espèces choisies échantillonnés parmi des prises effectuées à Tuktoyaktuk Harbour, T.N.-O., et décrites dans Hopky et Ratynski (1983). Les espèces choisies ont été le cisco arctique, *Coregonus autumnalis* (Pallas), le cisco sardinelle, *C. sardinella* Valenciennes, le corégone tschir *C. nasus* (Pallas), le grand corégone, *C. clupeaformis* (Mitchill), l'inconnu, *Stenodus leucichthys* (Güldenstadt), l'éperlan arc-en-ciel, *Osmerus mordax* (Mitchill), le hareng du Pacifique, *Clupea harengus* Valenciennes, le navaga jaune, *Eleginus gracilus* (Tilesius), la plie arctique, *Liopsetta glacialis* (Pallas), la plie étoilée, *Platichthys stellatus* (Pallas), le terrassier à six lignes, *Acantholumpenus mackayi* (Gilbert), la lotte, *Lycodes jugoricus* Knipowitsch, et la lompénie élancée, *Lumpenus fabricii* (Valenciennes). Le présent rapport fait la synthèse des analyses sur la nourriture présente dans l'estomac de ces espèces de poisson capturées de la fin juin au début septembre 1981.

Mots-clés: poisson; contenu stomacal; Tuktoyaktuk Harbour; cisco arctique; cisco sardinelle; corégone tschir; grand corégone; inconnu; éperlan arc-en-ciel; hareng du Pacifique; navaga jaune; plie arctique; plie étoilée; terrassier à six lignes; lotte; lompérie élancée; nourriture; estomac.

INTRODUCTION

In response to increasing oil and gas exploration in the Beaufort Sea, the Department of Fisheries and Oceans undertook a study of fish resources in Tuktoyaktuk Harbour, N.W.T. (Hopky and Ratynski 1983). That study was an effort to acquire a greater understanding of fish species which might be impacted by industrial development.

This report summarizes the analyses of stomachs from thirteen fish species obtained in gillnet, trapnet and otter trawl catches during the Hopky and Ratynski (1983) study over the period late June to early September, 1981.

MATERIAL AND METHODS

The study area (Fig.1) and the methods used for collection of the thirteen fish species (Table 1) were as described in Hopky and Ratynski (1983).

Stomachs were fixed and stored in 4% formalin and subsequently dissected. With the aid of a stereo dissecting microscope, the contents were identified and separated into taxonomic groups and counted. Food items which could not be properly identified and enumerated due to advanced stages of digestion are reported as digested remains or if discernible as fish, as fish remains. Plant material is simply reported as plant remains. Unidentified fish refer to whole fish which are not identified to any taxon.

Mean lengths and weights of fishes and the range of values encountered are reported only for those fishes whose stomach contents were analyzed.

RESULTS

ARCTIC CISCO

Forty-two Arctic cisco were sampled for stomach contents with 12 food types being identified. Digested remains occurred in 39 fish while the most frequently identifiable food item was Polychaeta which was present in 28 stomachs. Copepods were the most numerous with 22,672 organisms present in 16 stomachs. Figure 2 depicts counts of food items and frequency of occurrence.

The mean fork length and weight of Arctic cisco sampled was 285 mm and 359 g respectively. Fork length ranged from 113 mm to 405 mm and weight from 11 to 850 g.

LEAST CISCO

Four different food items in addition to digested remains and plant remains were identified from 26 least cisco stomachs. The most frequently occurring food item was Mysidacea present in 12 stomachs. The most numerous item was Copepoda which accounted for 21,787 organisms. Food item counts and frequency of occurrence are shown in Fig. 2.

The mean fork length and weight of least cisco sampled was 197 mm and 91 g respectively. Fork length ranged from 82 to 310 mm and weight from 4 to 280 g.

BROAD WHITEFISH

Twenty-three broad whitefish were analyzed. Copepods were the most abundant food item (n = 3,050). Mysids, which were found in five fish, were the most frequently occurring. All broad whitefish contained some type of food in their stomachs. The data are summarized in Fig. 3.

Mean fork length and weight were 133 mm and 98 g respectively. Length ranged from 65 to 428 mm and weight from 2 to 1100 g.

LAKE WHITEFISH

Twenty-four lake whitefish were sampled. All lake whitefish contained digested remains in their stomachs in addition to other food types. Mysids were the most frequently occurring and copepods the most numerous food item (n = 4,394). Lake whitefish stomach analysis is summarized in Fig. 3.

Mean fork length was 178 mm (range 103-318 mm) and mean weight was 88 g (range 10-385 g).

INCONNU

Eleven of the 14 stomachs sampled contained unidentified fish. In addition to fish remains and digested remains, Mysidacea were identified from inconnu stomachs. Figure 4 summarizes the stomach analyses.

Fork length ranged from 158 to 510 mm (mean 369 mm) and weight from 27 to 1210 g (mean 582 g).

RAINBOW SMELT

Mysids were predominant in terms of both abundance and frequency of occurrence in the diet of rain-

bow smelt. Figure 4 summarizes the stomach contents for these fish.

Eighteen rainbow smelt were sampled with a mean fork length of 219 mm (range 80-263 mm) and a mean weight of 84 g (range 3-135 g).

PACIFIC HERRING

Copepods were the most frequently occurring, being found in 23 stomachs and accounted for the largest number of identifiable food items (n = 83,115). Figure 5 describes stomach content analysis for Pacific herring.

Thirty-four Pacific herring were sampled with a mean fork length and weight of 258 mm and 227 g respectively. Fork length and weight ranged from 145 to 328 mm and 28 to 415 g respectively.

SAFFRON COD

The stomach contents of 47 saffron cod were examined. Mysidacea was the most numerous and most frequently occurring identifiable food item. Figure 5 illustrates the abundance of various items in the stomachs analyzed.

Mean total length was 233 mm (range 85-430 mm) and mean weight was 149 g (range 4-725 g).

ARCTIC FLOUNDER

Twenty-four Arctic flounder stomachs were analyzed. Twenty of these contained digested remains. Polychaetes were the most frequently occurring as well as the most numerous identifiable food item in the stomachs. These occurred in 12 fish for an overall count of 427 organisms. The analysis of Arctic flounder stomach contents is summarized in Fig. 6.

Mean weight was 255 g (range 34-620 g) and mean total length was 248 mm (range 134-335 mm).

STARRY FLOUNDER

The most frequently occurring identifiable food item was Isopoda. These occurred in seven of the 19 stomachs sampled for an overall count of 54 organisms. Although occurring in only two fish, mysids were the most numerous food item (n = 1771) present (Fig. 6).

Mean total length and weight were 278 mm and 270 g respectively. Length ranged from 227 to 346 mm. Weight ranged from 155 to 545 g.

BLACKLINE PRICKLEBACK

Blackline prickleback stomachs (n = 55) contained a variety of items with amphipods, polychaetes and oligochaetes being the most common (Fig. 7).

Mean weight was 99 g (range 5-205 g) and mean total length was 341 mm (range 130-486 mm).

EELPOUT

The stomach contents of 14 eelpout were examined. Polychaetes were the most numerous identifiable food item (n = 50) occurring in eight fish (Fig. 7).

Mean total length and weight were 253 mm (range 118-521 mm) and 150 g (range 7-880 g) respectively.

SLENDER EELBLENNY

Polychaetes were the predominant food item in 22 of the 26 fish sampled (Fig. 7).

Mean total length and weight were 253 mm (range 118-521 mm) and 150 g (range 7-880 g) respectively.

ACKNOWLEDGEMENTS

Mr. M. Lawrence initiated this study and G. Hopky and R. Ratynski designed and implemented the field work, which provided the data for this report. Thanks to G. Baker, B. Haglund and F. Madrid for sorting and identifying stomach contents. B. Glassey, M. Keast, E. Kleiber and T. Maddaford assisted with data entry and compilation. B. Hyman and C. Moreno prepared the manuscript for publication.

M. Bergmann, B. Fallis and E. Jessop reviewed the report.

REFERENCES

HOPKY, G.E., and R.A. RATYNSKI. 1983. Relative abundance, spatial and temporal distribution, age and growth of fishes in Tuktoyaktuk Harbour, N.W.T., 28 June to 5 September, 1981. Can. Manuscr. Rep. Fish. Aquat. Sci. 1713: v + 71 p.

Table 1. Fish species sampled for stomach contents from Tuktoyaktuk Harbour, 1981[1]

Common Name	Latin Name	Total number of stomachs sampled
Starry Flounder	*Platicthys stellatus* (Pallas)	19
Arctic Flounder	*Liopsetta glacialis* (Pallas)	24
Pacific Herring	*Clupea harengus* Valenciennes	34
Rainbow Smelt	*Osmerus mordax* (Mitchill)	18
Saffron Cod	*Eleginus gracilis* (Tilesius)	47
Arctic Cisco	*Coregonus autumnalis* (Pallas)	42
Least Cisco	*C. sardinella Valenciennes*	26
Lake Whitefish	*C. clupeaformis* (Mitchill)	24
Broad Whitefish	*C. nasus* (Pallas)	23
Inconnu	*Stenodus leucichthys* (Güldenstadt)	14
Eelpout (or Shulupaoluk)	*Lycodes jugoricus Knipowitsch*	14
Slender Eelblenny	*Lumpenus fabricii* (Valenciennes)	26
Blackline Prickleback	*Acantholumpenus mackayi* (Gilbert)	55

[1] Abbreviated list from Hopky and Ratynski (1983)

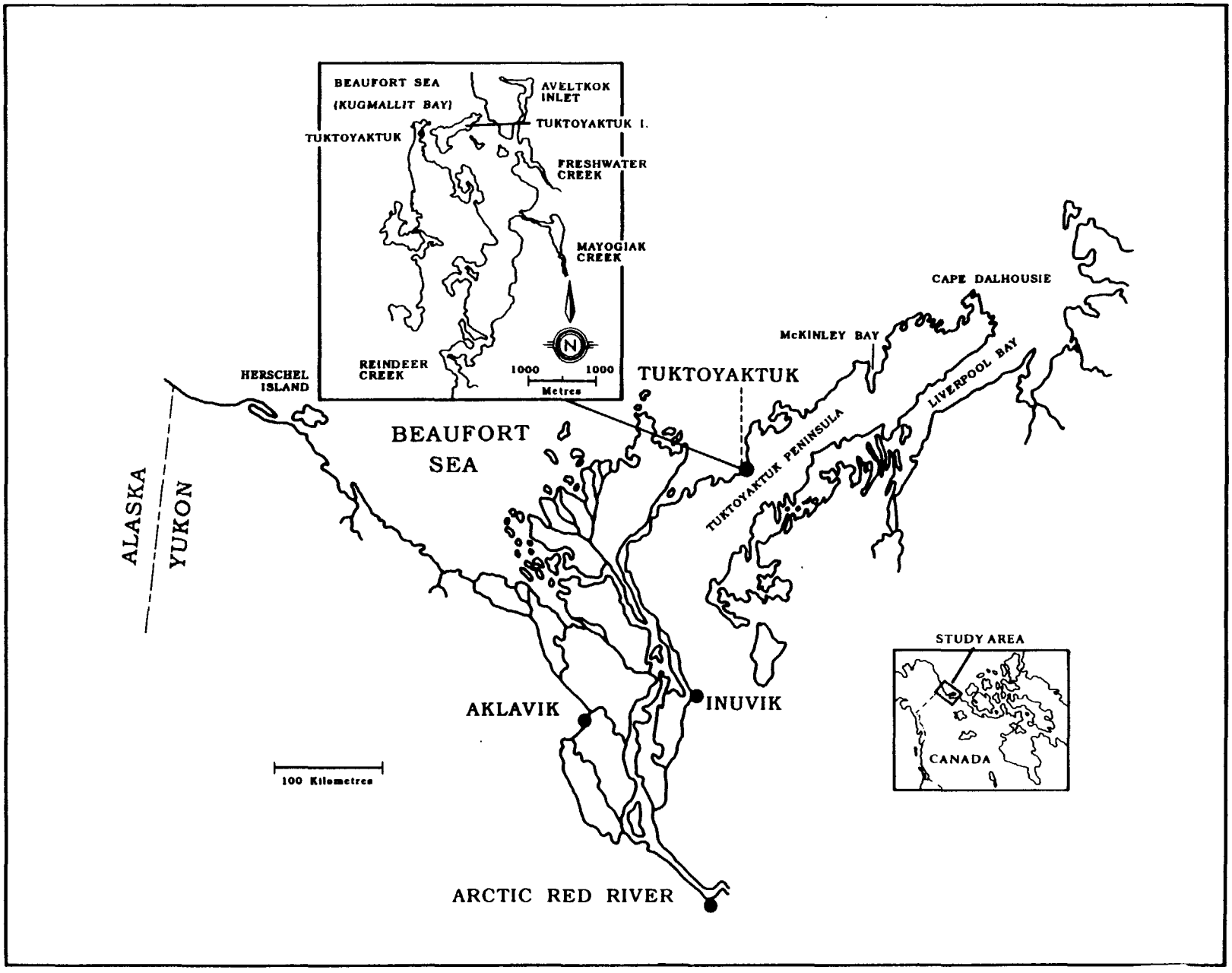

Fig. 1. Location of Tuktoyaktuk Harbour, N.W.T.

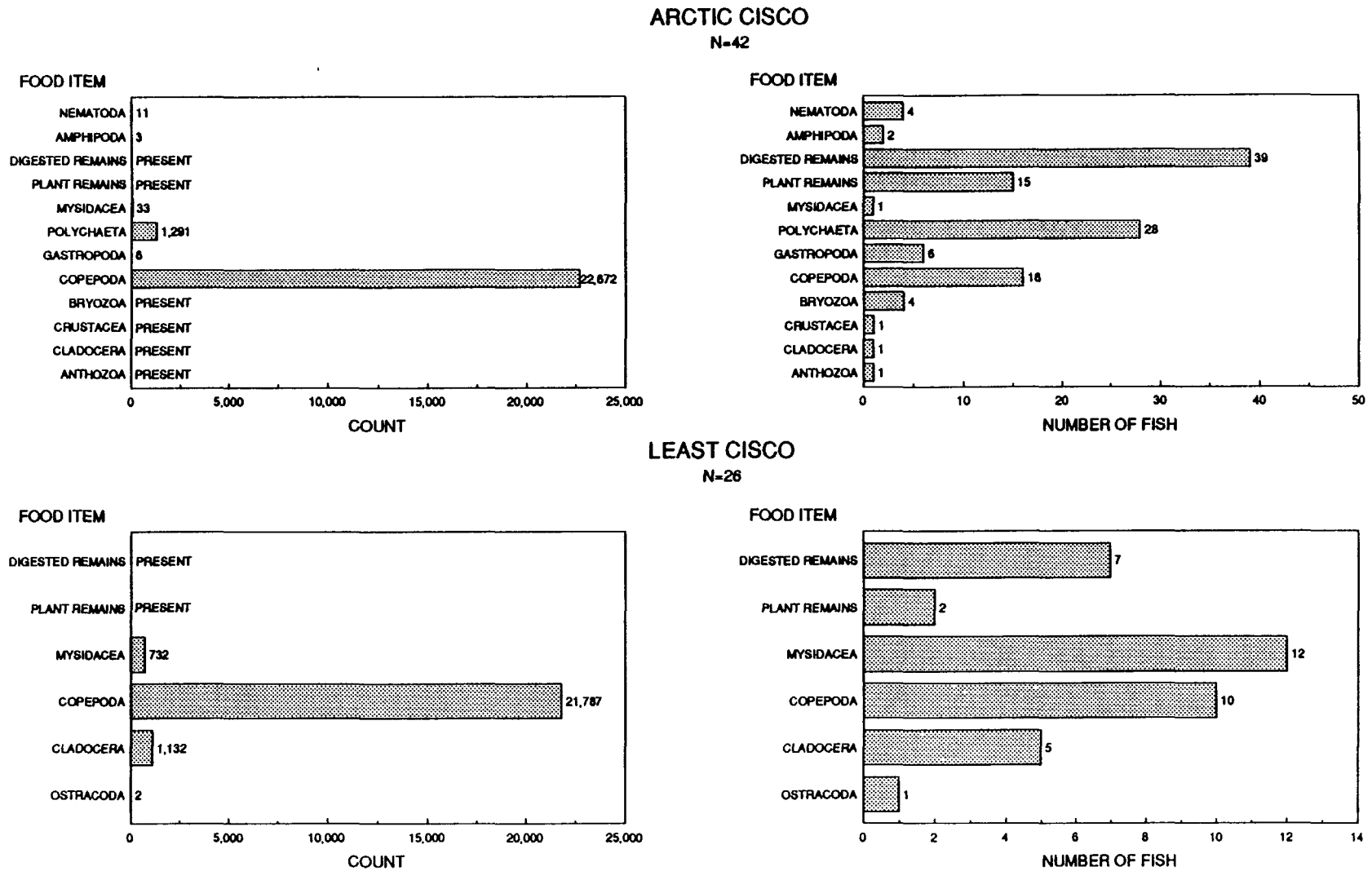

Fig. 2. Counts and occurrence of food items in Arctic cisco and least cisco caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T

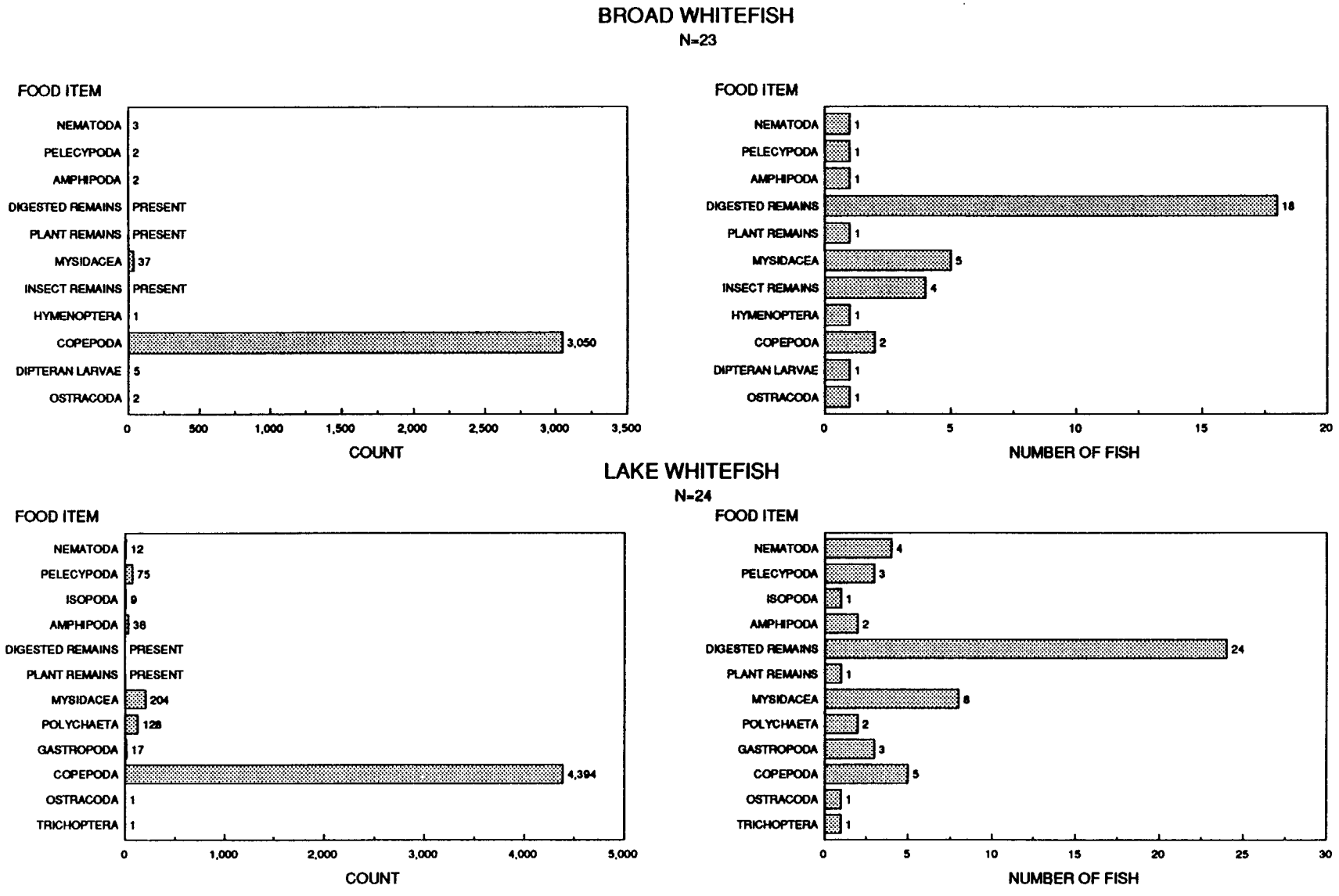

Fig. 3. Counts and occurrence of food items in broad whitefish and lake whitefish caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T.

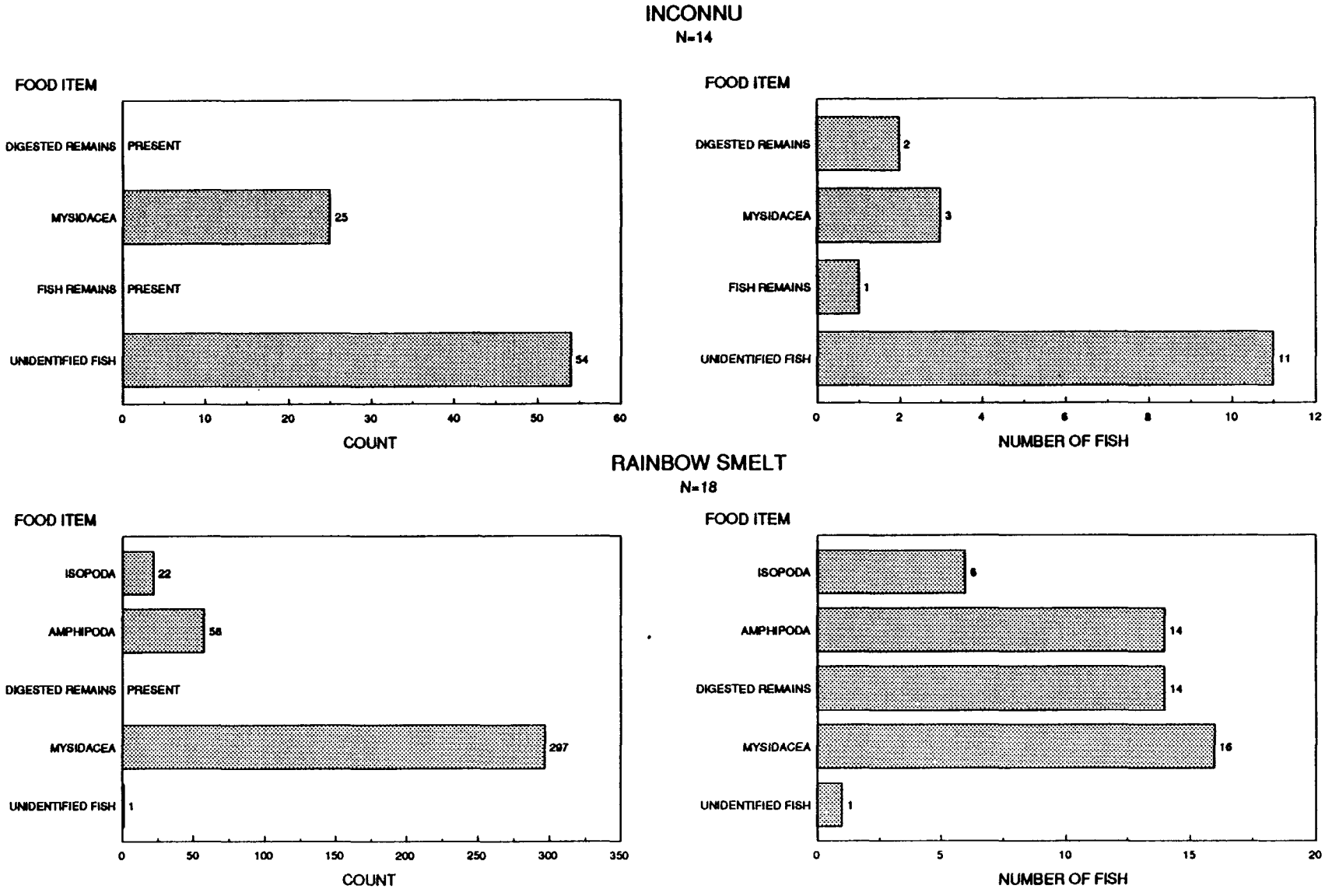

Fig. 4. Counts and occurrence of food items in inconnu and rainbow smelt caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T.

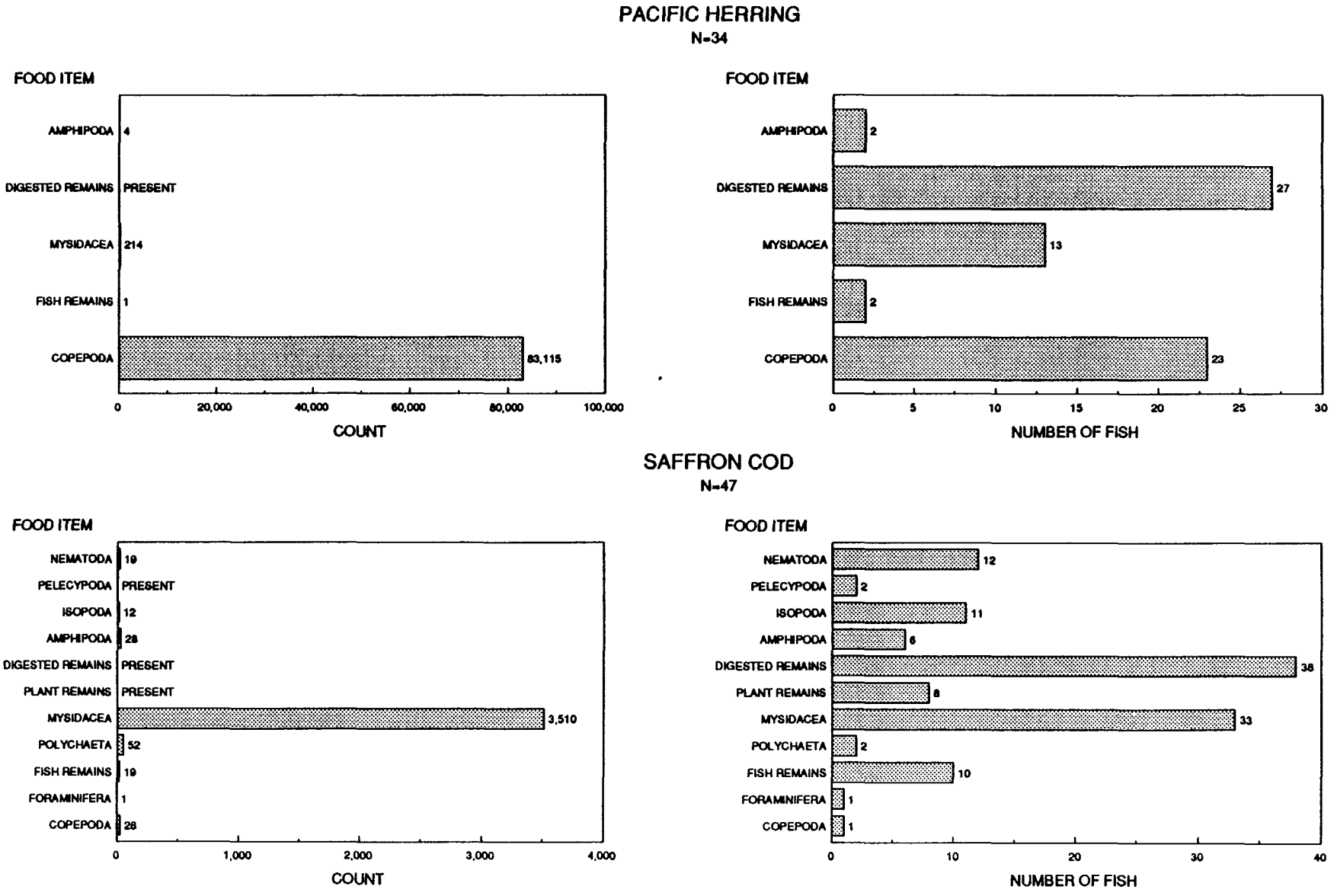

Fig. 5. Counts and occurrence of food items in Pacific herring and saffron cod caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T.

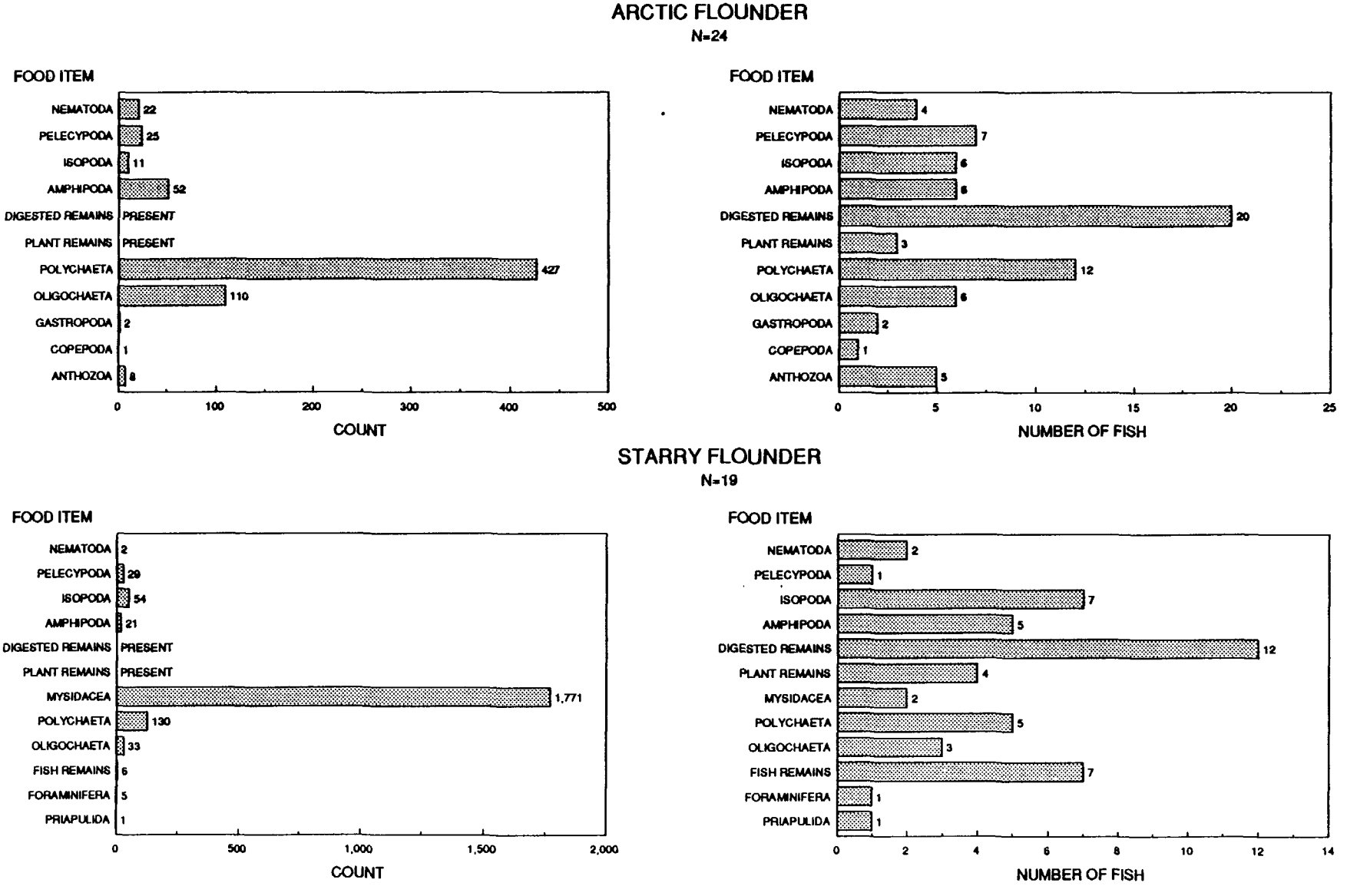

Fig. 6. Counts and occurrence of food items in Arctic flounder and starry flounder caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T.

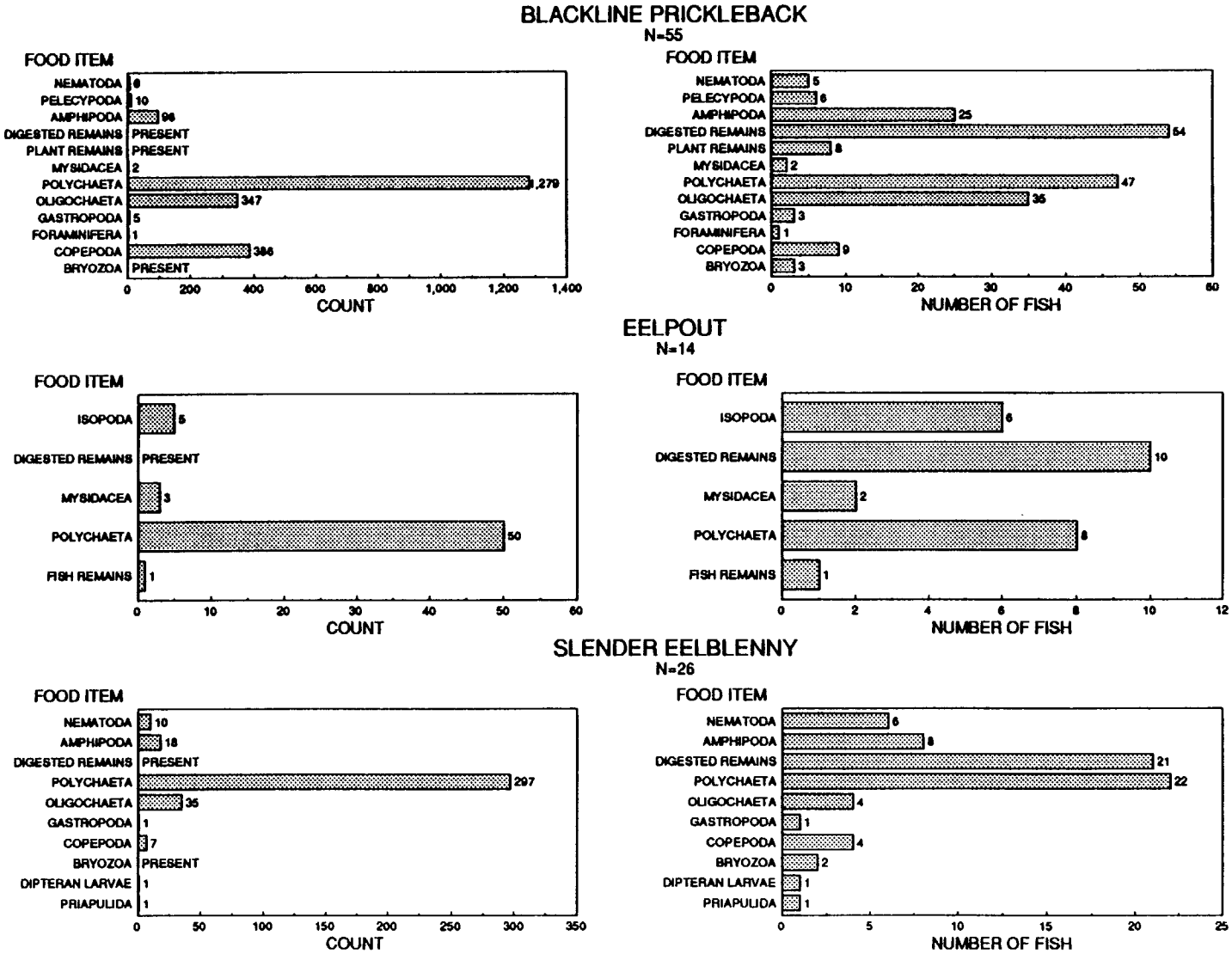

Fig. 7. Counts and occurrence of food items in blackline prickleback, eelpout and slender eelblenny caught from late June to early September, 1981 in Tuktoyaktuk Harbour, N.W.T.