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Offshore Fleet Directs Fishing Effort on the Iceland Scallop

by

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Abstract

The highly mobile Canadian offshore fleet has a decided preference for the sea or giant scallop. The species is widely distributed along the Atlantic seaboard. Depletion of its numbers beginning in 1979, particularly on Georges Bank, resulted in widespread reductions of catch per unit of effort and depressed overall landings. By 1981 many offshore vessels were moving away from more traditional grounds into areas only infrequently fished, including St. Pierre Bank to the south of Newfoundland. This resulted in record removals (717 t meat) from the area in 1982. Landings in the second year of the intense fishery receded to 594 t. St. Pierre Bank is unique in that two species of scallops occur, frequently on the same beds. Fishing effort during 1982 and 1983 was directed at sea scallops confined to fairly restricted areas within the 30 fm isobath. Iceland scallops contributed to the bycatch with most boats discarding them. They were culled heavily by the few boats retaining them and only the large ones (> 80 mm) shucked for meats. In 1984, further reductions in the aggregations of sea scallops in the face of continued demand and attractive prices encouraged many vessels on St. Pierre Bank to direct effort on the Iceland scallop. About 80% (by numbers) of removals (413 t meats, provisional) from this area in 1984 are estimated to have come from this species, once considered a nuisance bycatch. Culling practices have also been revised to retain most of what is caught.

Résumé

La flotte de pêche hauturière canadienne très mobile a montré une préférence pour le pétoncle géant. Cette espèce est répandue tout le long du littoral atlantique. La diminution de son abondance qui a commencé en 1979, surtout sur le banc de George, a entraîné une baisse généralisée de la prise par unité d'effort et une diminution des débarquements globaux. En 1981, de nombreux navires hauturiers quittaient les zones de pêche plus traditionnelles pour des zones où la pêche est moins fréquente, y compris le banc de St-Pierre au sud de Terre-Neuve. Il en a résulté des prises records (717 t de chairs) dans cette région en 1982. Au cours de la deuxième année, les débarquements attribuables à la pêche intense ont baissé à 594 t. Le banc de St. Pierre est unique du fait que deux espèces de pétoncles y habitent, partageant souvent les mêmes bancs. En 1982 et 1983, l'effort de pêche était dirigé contre les pétoncles géants confinés dans les zones assez restreintes de l'isobathe de 30 brasses. La plupart des navires rejetaient le pétoncle d'Islande qui faisait partie de la prise accidentelle. Les quelques navires faisaient une sélection très rigoureuse et seuls les spécimens les plus grands (> 80 mm) étaient retenus. En 1984, d'autres réductions dans les concentrations de pétoncles géants consécutives à une demande soutenue et à des prix attrayants ont encouragé de nombreux navires du banc de St-Pierre à diriger leur effort sur le pétoncle d'Islande. On a estimé qu'environ 80 % (en nombres) des débarquements (413 t de chairs, chiffre provisoire) provenant de cette région en 1984 étaient constitués à cette espèce considérée auparavant comme une prise accidentelle tout à fait inutile. Les critères de sélection ont également été assouplis de façon à conserver la plus grande partie de la prise.

Introduction

An intense scallop fishery developed on St. Pierre Bank in 1982. As in previous fishing pulses these opportunistic excursions by Maritimes-based vessels were directed primarily at the sea scallop, the larger of the two species occurring on this offshore bank (Naidu et al. 1983, 1984). With few exceptions the Iceland scallop was considered by the majority of participants to be a nuisance bycatch species. They were heavily culled by the few boats retaining them and only the larger ones (> 80 mm, Naidu 1984) retained for shucking. Crews were generally loathe to shucking such great numbers of scallops to procure a unit weight of meat compared to the larger variety. Reduced sea scallop production from more traditional areas (e.g. Georges Bank) as well its depleted numbers on St. Pierre Bank, combined with lucrative prices for scallops in general, forced many vessels into exploiting the Iceland scallop in 1984. As the Meat-count Regulation developed specifically for sea scallops was not easily applied to a mixed species fishery and met with increasing resistance, the Regulation was temporarily lifted between 15 October and 31 December 1984. This paper summarizes the weight composition of the meats landed through the 1984 fishing season, estimates contribution by species, and documents the effect of the suspension of the meat-count requirement on the weight composition of meats landed. It also examines an allegation that meat counts during the period of open fishing might have exceeded 130/500 g.

Materials and Methods

Scallop catches from St. Pierre Bank are normally discharged at Maritime ports (Bridgewater, Liverpool, Yarmouth, etc.). Samplers were dispatched to various locations to undertake individual meat weight determinations. Composition (anecdotal) of samples was noted. In some instances meats were brought back to the laboratory for processing. Weight determinations were completed within 24 hr of arrival. Weights to the nearest tenth of a gram were determined separately for muscle-on and muscle-off. Subsamples provided requisite data to facilitate transformations from "muscle-off" to "muscle-on". Individual meat-weight data allow the determination of proportions below and above minimum critical weights at varying meat count levels (Naidu 1984).

Average meat weight (g) for a given count is given by the formula:

$$\bar{x} = \frac{454}{\text{Number of meats/lb}} \quad (1 \text{ lb} = 454 \text{ g})$$

At a 45 count/lb, for example, individual scallop meats under 10.1 g would theoretically fail to meet the critical weight requirement and thus contribute to the number of small (undersized) scallops in any given sample. Conversely, individual meats in excess of 10.2 g would clearly be within the meat-count stipulation.

Percent contributions (weights and numbers) above and below minimum critical weights necessary for a 39 and 45 count/500 g were examined. The

results were compared with a broader data base (unpublished) collected during research vessel surveys.

Results

Five offshore vessels fishing St. Pierre Bank were sampled in 1984. Proportions muscle-on (catch and quick fractions) to muscle-off (quick only) in the landed catch were highly variable (Table 1). Individual meat-weight frequency distributions in 1984 (Fig. 1) are tabulated separately for two levels of meat count prior to and after the lifting of the meat-count Regulation for St. Pierre Bank (Tables 1 and 2). Percent contributions by weights and numbers, bracketed by critical weights at each level, were tabulated for meats as landed and for muscle-on. Muscle-off weights were adjusted upwards to muscle-on by a factor in the range of 1.0835 to 1.0955, depending on the computed relationship between the two for any given boat at the time of landing. As in previous years boats utilizing both scallop species (albeit the one preferentially to the other) continue to shuck, bag and land meats together. One of the boats (Tables 1 and 2, Boat C) had alleged that crews had in fact attempted species separation. But a plot of individual meat-weight frequency distribution (Fig. 2) indicated this to be only partly true.

During the 1984 fishing season, prior to the temporary lifting of the meat-count Regulation, only 22% by numbers or 44% by weight of the sampled catch on the average met the stipulated meat-count requirement (45/500 g). Sampling the catch after the lifting of the Regulation was admittedly weak with only one sample taken. Comprising of 1292 meats this sample indicated that some 39% by numbers and 53% by weight would have conformed (were it still in effect) to the stipulated meat count (45/500 g). This is a higher proportion than was the case when the Regulation was being enforced.

Species separation was attempted on the basis of sampled frequency distributions of individual commercial meat weights. Meat weights transformed from research shell-height frequencies (Fig. 3), allowing for losses in meat yield through manual shucking (Naidu 1985), permitted comparisons between available meat-weight distributions with those from the commercial catch. Comparison of commercial meat-weight frequencies in the context of what was available on the fishing grounds supports the contention that the majority of meats landed was drawn from the smaller Iceland scallop. While a meat yield of 12.9 g or greater may be expected from Iceland scallops with an average shell height exceeding 95 mm, animals from this size group made up only 2.07% of aggregate population on St. Pierre Bank. Similarly, a meat yield in the range of 11.1 to 12.8 g may be realized from sea scallops averaging between 94 and 99 mm, a size range conspicuous by its absence on St. Pierre Bank in 1984 (2.3% of aggregate). We may conclude therefore that the vast majority of meats landed each weighing less than 11.1 g (83%) was drawn from Iceland scallops and conversely that the majority of scallop meats exceeding 11.2 g (17%) was primarily sea scallops.

A commercial count in excess of 130 meats/500 g may be realized only by catching and shucking Iceland scallops smaller than 65 mm with a yield of less

than 3.73 g (134 count/500 g). Examination of the aggregate meat weight distribution (Fig. 3) shows that less than 13% of the 9368 meats sampled in 1984 came from this category. Indeed only 14% of Iceland scallops in the target area were below 63 mm. The allegation suggesting that vessels were taking in excess of 130 scallops/500 g does not appear to be supported by the weight distribution of meats sampled or the size distribution of scallops on the Bank. In fact some companies had stipulated an average meat count not to exceed 50/lb (55/500 g). This may explain why the meat count in fact dropped during the "open" season. The alarmist view no doubt is related to a meat-count regime normally associated with sea scallops.

Discussion

As early as 1982 it was suggested that the offshore fleet operating on St. Pierre Bank had a decided preference to sea over Iceland scallops and that their depletion may provide the necessary impetus to exploiting the smaller Iceland scallop (Naidu et al. 1983). By 1984 sea scallop numbers had been reduced to such levels that vessels were increasingly forced to target for the underutilized species. Most (53%) of the fishing activity occurred to the northeast of St. Pierre Bank (Division 3Ps, Stratum 314) in an area largely devoid of sea scallops. But several boats continued to "search fish" for the preferred species to the south in a feeble attempt to comply with the meat count at 45/500 g.

Since all scallops in the offshore fishery are shucked at sea and only meats landed, without separation by species, monitoring removals by species becomes extremely difficult. While sea scallop distribution is confined to within the 30 fm isobath, the Iceland scallop has a much broader bathymetric range and is widely distributed in depths ranging from 25 to 100 fm, the better catches coming from 40 to 50 fm (Naidu et al. 1983). They are frequently found on the same beds as the larger sea scallop. Their relative contributions are highly variable both spatially and temporally making species separation in the landed catch difficult. While electrophoretic separation is possible, it is impractical for large numbers of scallop meats. The species separation attempted here for 1984 removals is probably within acceptable limits of tolerance. We hasten to add however that it was possible only because of the wide separation in the sizes of the two species prevailing in the area in 1984 and hence weights of the meats drawn from each. Fresh recruitment of sea scallops which will be caught and shucked as they approach 70-80 mm will eliminate this fortuitous situation in the near future. Significant numbers of prerecruits have been located in this area (unpublished information, Fig. 4 and 5) and will be exploited by the fleet as early as the fall of 1985. Species separation using the methodology used here will then become impossible. Requiring vessels to shuck, bag and land meats separately may be the only available option for accurate monitoring of their removals. This of course presupposes that enforcement is possible from a practical viewpoint and reinforces earlier CAFSAC I&MP Subcommittee advice to develop simple procedures for species discrimination.

While the 39/500 g count was applicable to the offshore fleet the presence on St. Pierre Bank of Iceland scallops permitted a wide tolerance effectively

allowing the fleet to harvest mixed species at 45/500 g. Even with this relaxed management strategy for this area the apparent weakness in the meat-count Regulation is again evident as was reported for 1982 and 1983 (Naidu 1984). The need to modify the present meat count to minimize small meat content is again borne out.

References

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Table 1. Individual scallop meat-weight frequency distributions (by numbers) at two levels of meat counts for St. Pierre Bank, 1984.

Date	Vessel	Meat condition	Conversion factor	N			39/500 g				45/500 g				Notes
				On	Off	Total	≤12.8		≥12.9		≤11.1		≥11.2		
							N	%	N	%	N	%	N	%	
Aug. 12	A	As landed Adjusted	1.0954	1077	813	1890	1811 (95.8) 1791 (94.8)		79 (4.2) 99 (5.2)		1712 (90.6) 1698 (89.8)		178 (9.4) 192 (10.2)	Mixed	
Aug. 12	B	As landed Adjusted	1.0954	957	558	1515	1154 (76.2) 1121 (74.0)		361 (23.8) 394 (26.0)		1072 (70.8) 1048 (69.2)		443 (29.2) 467 (30.8)	Mixed	
Sept. 4	C	As landed Adjusted	1.0955	618	361	979	527 (53.8) 501 (51.2)		452 (46.2) 478 (48.8)		402 (41.1) 381 (39.8)		577 (58.9) 598 (61.1)	Giants only	
Sept. 4	C	As landed Adjusted	1.0921	999	588	1587	1539 (97.0) 1526 (96.2)		48 (3.0) 61 (3.8)		1476 (93.0) 1448 (91.2)		111 (7.0) 139 (8.8)	Icelandics only	
Oct. 10	D	As landed Adjusted	1.0835	1142	751	1893	1604 (84.7) 1586 (83.8)		289 (15.3) 307 (16.2)		1549 (81.8) 1536 (81.1)		344 (18.2) 357 (18.9)	Mixed	
TOTALS (to Oct. 10)		As landed Adjusted		4793	3071	7864	6635 (84.4) 6525 (83.0)		1229 (15.6) 1339 (17.0)		6211 (79.0) 6111 (77.7)		1653 (21.0) 1753 (22.3)		
Nov. 30	E	As landed Adjusted	1.0840	1292	212	1504	1179 (78.4) 1160 (77.1)		325 (21.6) 344 (22.9)		928 (61.7) 917 (61.0)		576 (38.3) 587 (39.0)	Mixed	

Table 2. Individual scallop meat-weight frequency distributions (by weights) at two levels of meat count for St. Pierre Bank, 1984

Date	Vessel	Meat condition	Conversion factor	N			Sample weight (g)	39/500 g				45/500 g				Notes
				On	Off	Total		≤12.8		≥12.9		≤11.1		≥11.2		
								Weight	%	Weight	%	Weight	%	Weight	%	
Aug. 12	A	As landed	1.0954	1077	813	1890	13,899.9	12,638.1 (90.9)	1,261.8 (9.1)	11,596.7 (83.4)	2,303.2 (16.6)	Mixed				
		Adjusted					14,271.5	12,678.5 (88.8)	1,593.0 (11.2)	11,566.8 (81.0)	2,704.7 (19.0)					
Aug. 12	B	As landed	1.0954	957	558	1515	13,723.1	8,007.2 (58.3)	5,715.9 (41.7)	7,115.2 (51.8)	6,607.9 (48.2)	Mixed				
		Adjusted					14,580.4	7,856.0 (53.9)	6,724.4 (46.1)	6,977.8 (47.9)	7,602.6 (52.1)					
Sept. 4	C	As landed	1.0955	618	361	979	17,437.2	4,906.6 (28.1)	12,530.6 (71.9)	3,492.4 (20.0)	13,944.8 (80.0)	Giants only				
		Adjusted					19,430.5	4,845.9 (24.9)	14,584.6 (75.1)	3,410.7 (17.6)	1,601.9 (82.4)					
Sept. 4	C	As landed	1.0921	999	588	1587	9,244.8	8,550.6 (92.5)	694.2 (7.5)	7,804.2 (84.4)	1,440.6 (15.6)	Icelandics only				
		Adjusted					13,960.8	13,260.3 (95.0)	700.5 (5.0)	12,333.5 (88.3)	1,627.3 (11.3)					
Oct. 10	D	As landed	1.0835	1142	751	1893	13,277.6	8,570.3 (64.5)	4,707.3 (35.5)	7,906.9 (59.6)	5,370.7 (40.4)	Mixed				
		Adjusted					13,725.1	8,543.0 (62.2)	5,182.1 (37.8)	7,945.2 (57.9)	5,779.9 (42.1)					
TOTALS (to Oct. 10)		As landed		4793	3071	7864	67,582.6	42,672.8 (63.1)	24,909.8 (36.9)	37,915.4 (56.1)	29,667.2 (43.9)					
		Adjusted					75,968.3	47,183.7 (62.1)	28,784.6 (37.9)	42,234.0 (55.6)	33,734.3 (44.4)					
Nov. 30	E	As landed	1.0840	1292	212	1504	16,324.7	10,795.2 (66.1)	5,529.5 (33.9)	7,787.7 (47.7)	8,537.0 (52.3)	Mixed				
		Adjusted					16,784.8	10,880.5 (64.8)	5,904.0 (35.2)	7,969.6 (47.5)	8,815.2 (52.5)					

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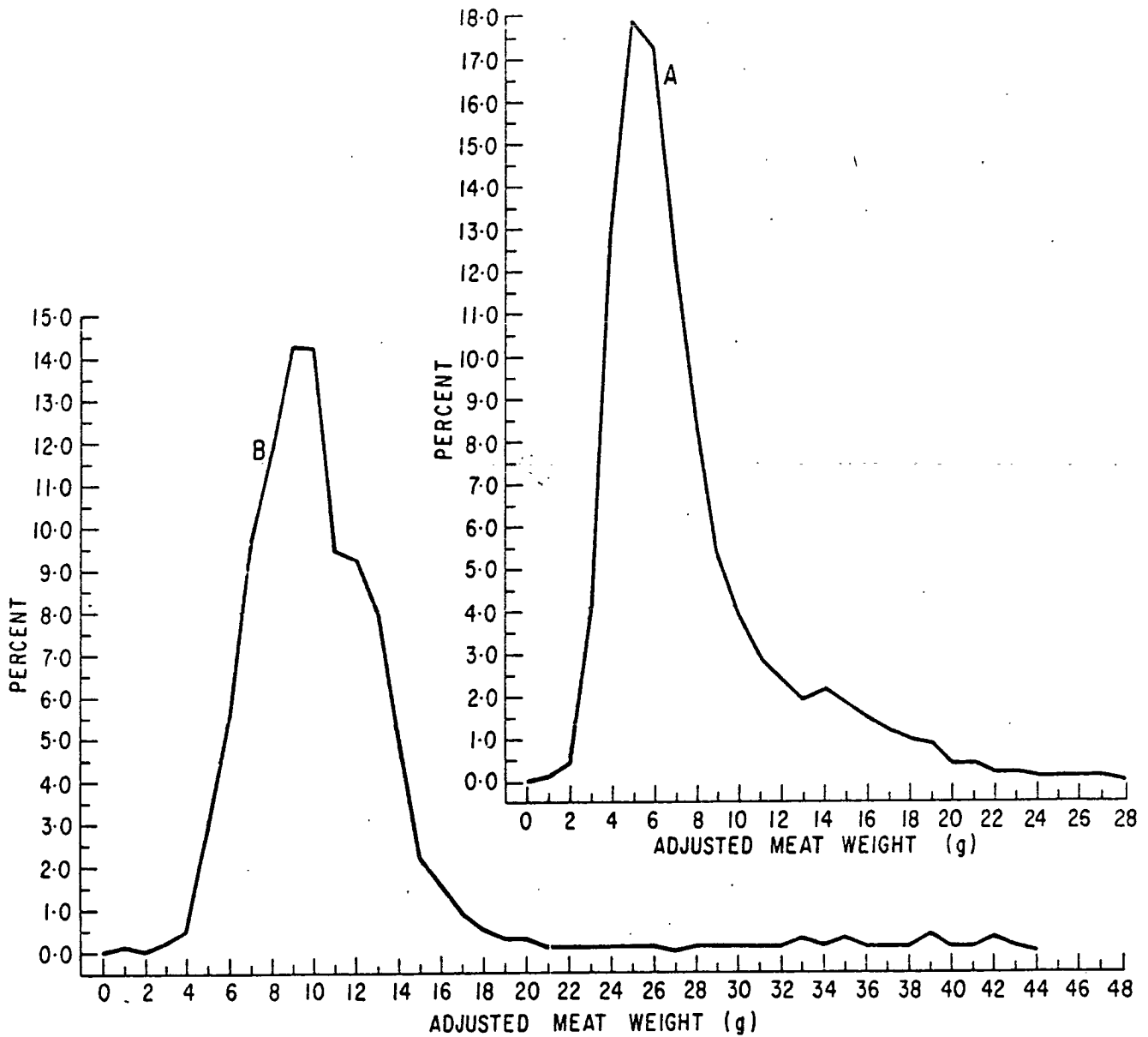


Fig. 1. Mixed meat-weight frequency distributions of landed catch from St. Pierre Bank (A) before and (B) after temporary lifting (October 15-December 31, 1984) of meat-count requirement.

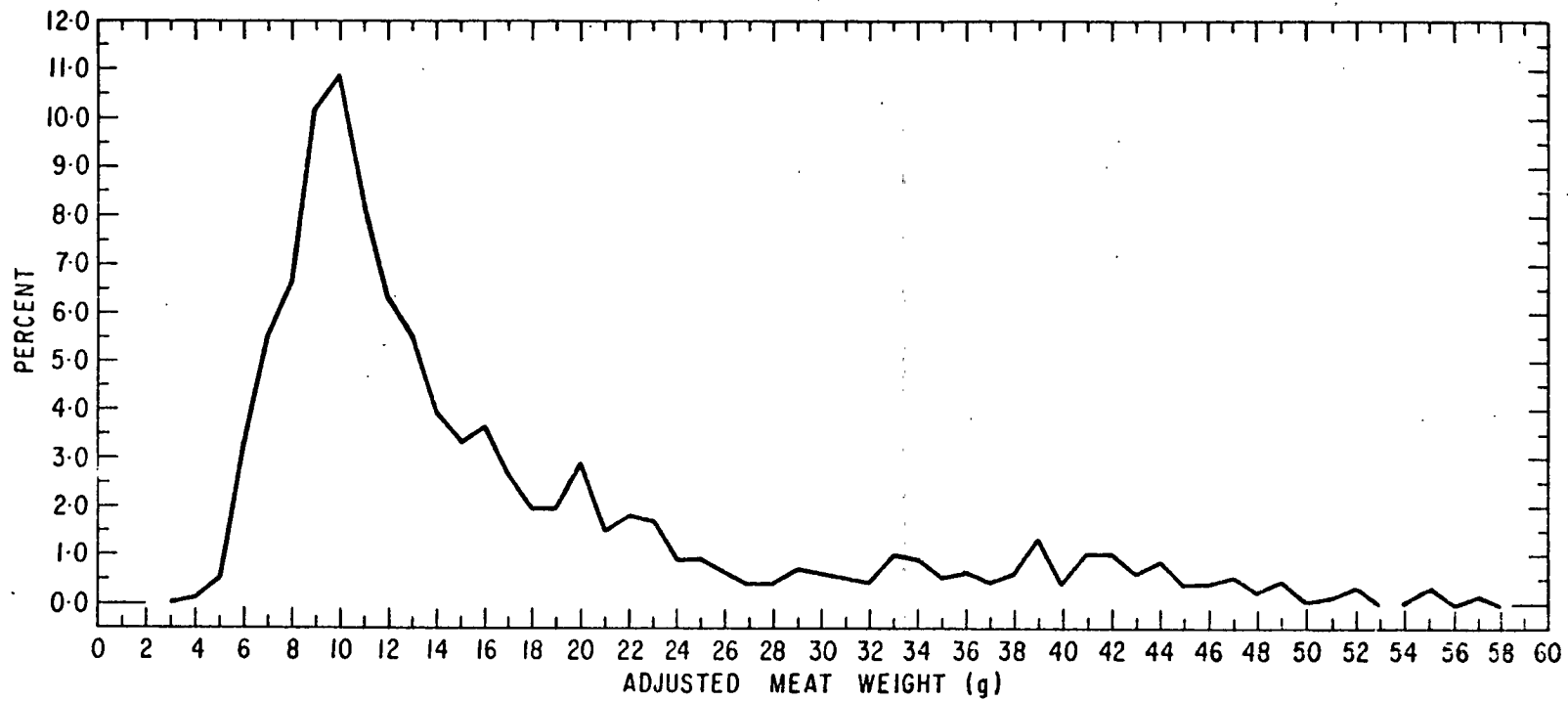


Fig. 2. Meat-weight frequency distribution of a sample (N = 979) alleged to consist of only sea scallops.

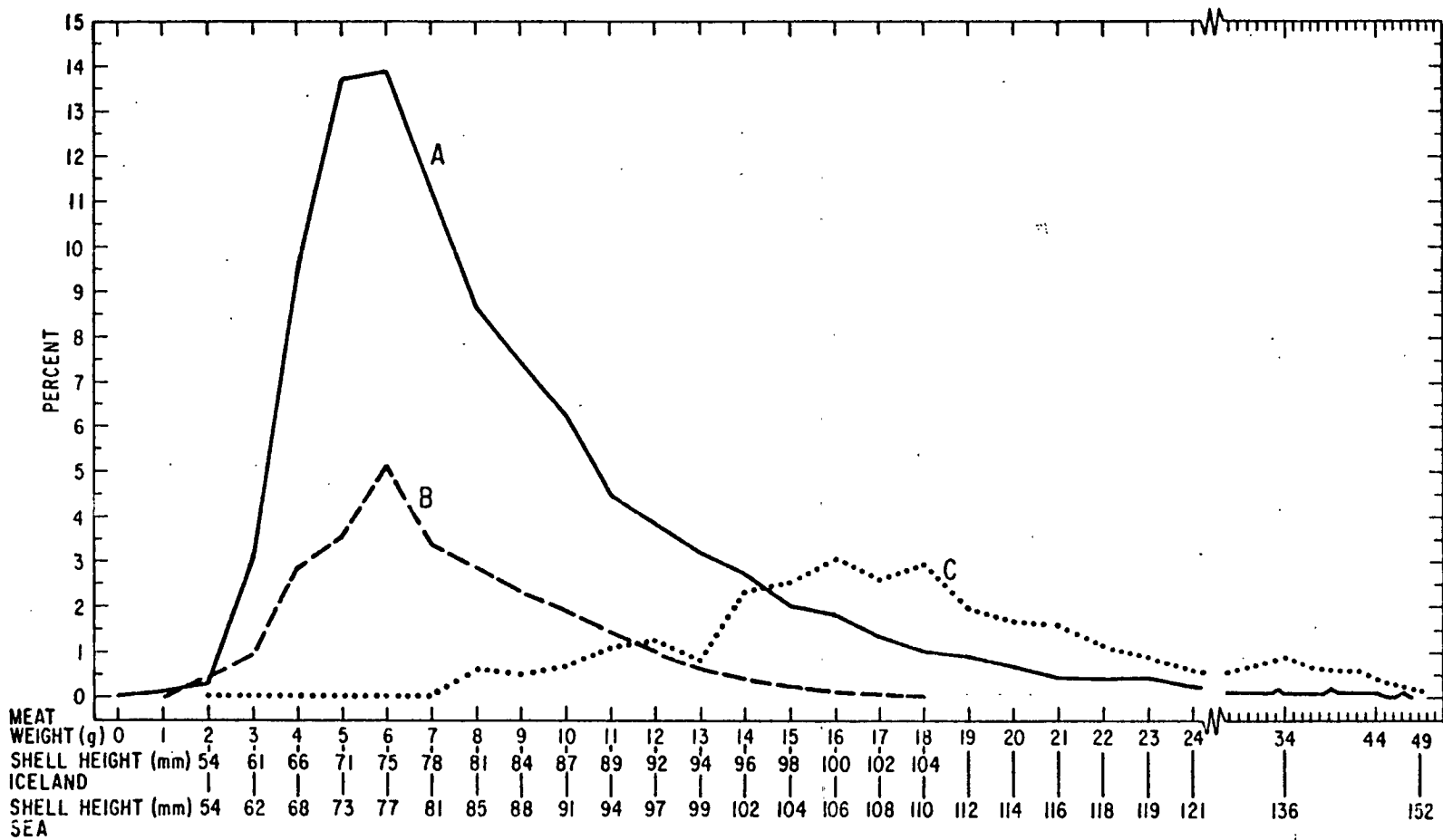


Fig. 3. Aggregate meat-weight distribution in the commercial catch compared to available size and species-specific meat-weight distribution. (A) Commercial (B) Iceland and (C) sea scallop.

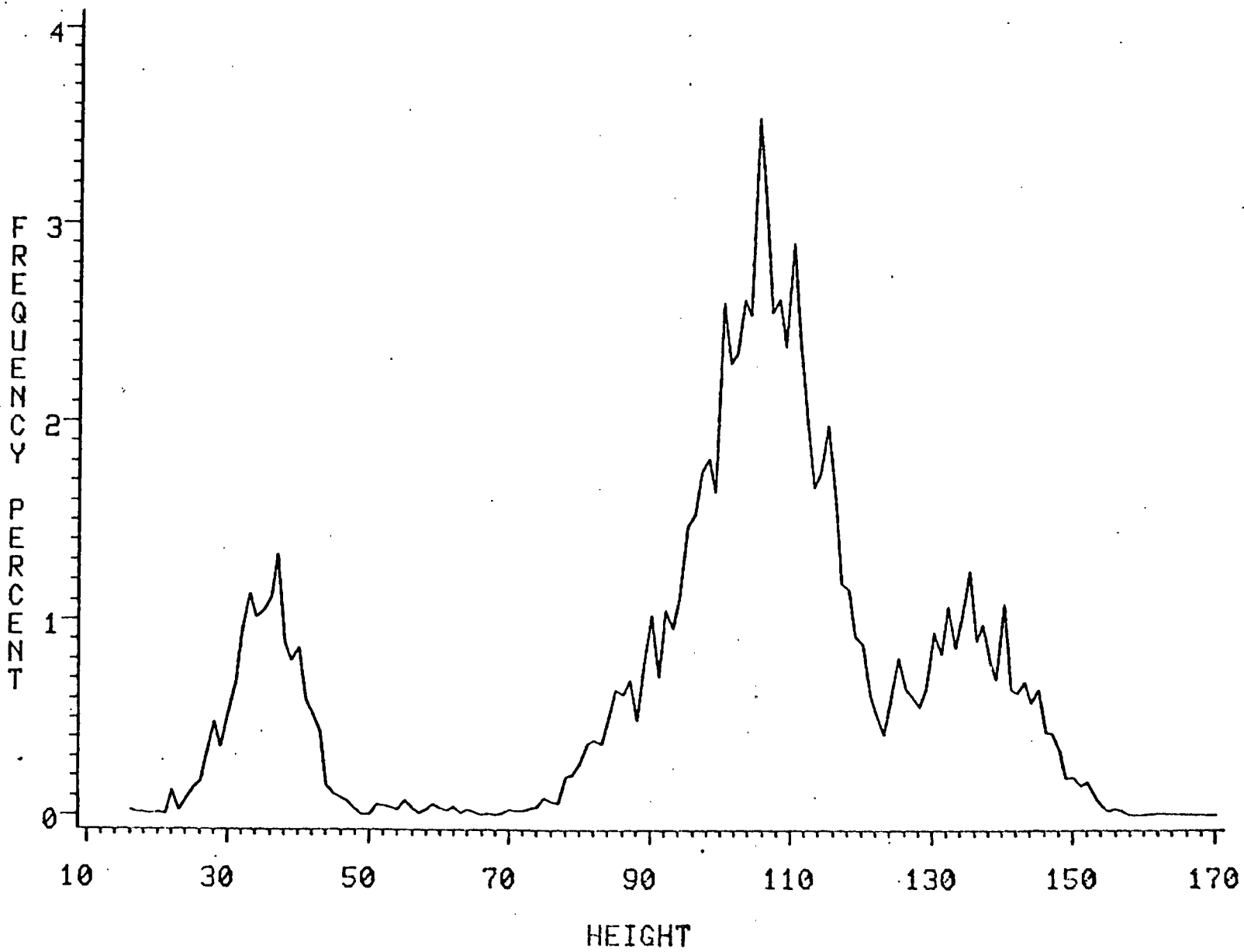


Fig. 4. Shell-height distribution of sea scallops on St. Pierre Bank in September 1984.

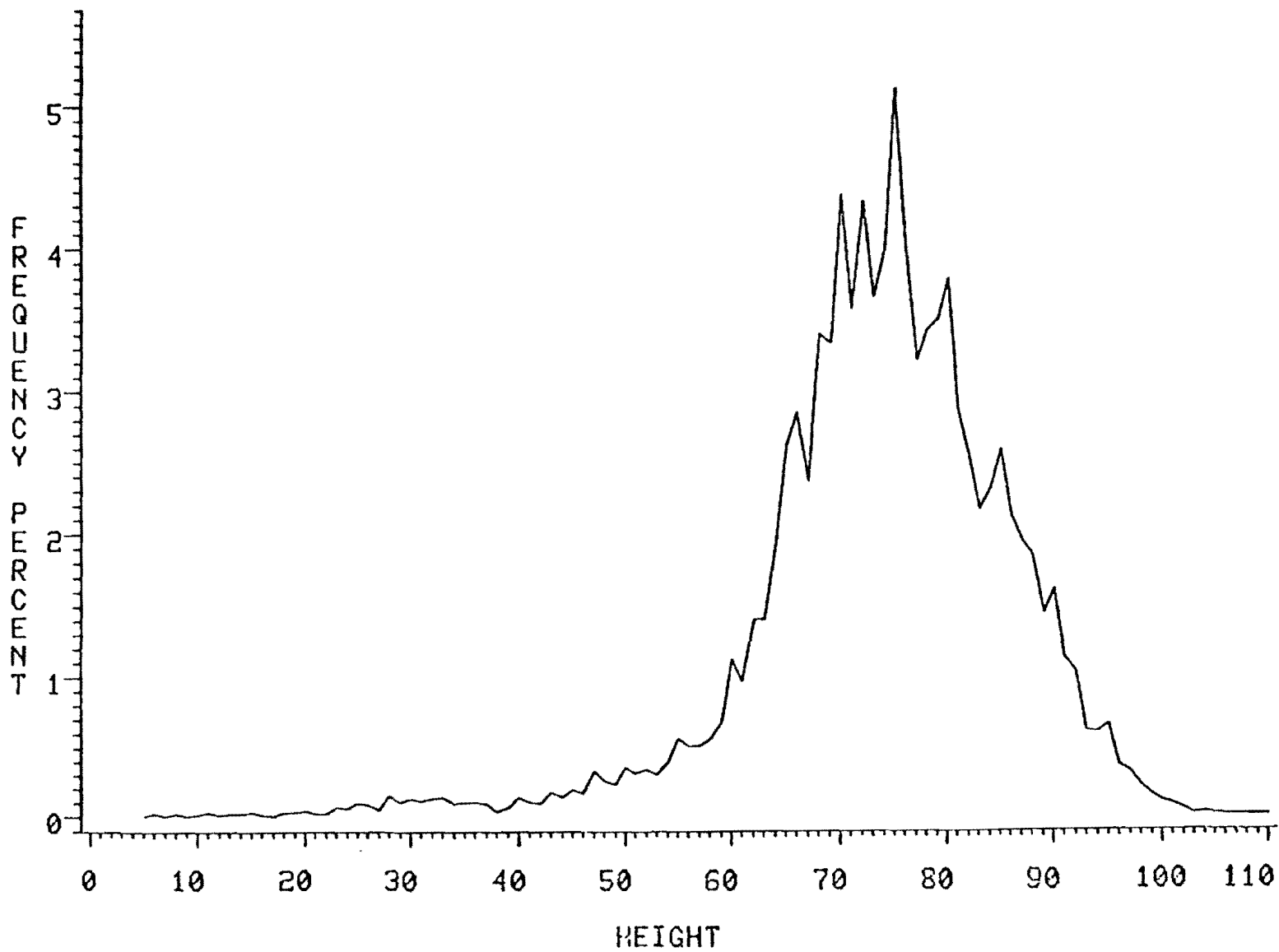


Fig. 5. Shell-height distribution of Iceland scallops on St. Pierre Bank in September 1984.