

Northwest Atlantic



Fisheries Organization

Serial No. N854

NAFO SCR Doc. 84/VI/65

SCIENTIFIC COUNCIL MEETING - JUNE 1984

Results of Comparative Experiments Using
13.6 m and IGYPT Trawls

by

A. S. Noskov and A. I. Sherstyukov

Atlantic Research Institute of Marine Fisheries and Oceanography (AtlantNIRO)
5 Dmitry Donskoy Street, Kaliningrad, 236000, USSR

Abstract

The results of comparative experiments using 13.6 m trawl and International trawl IGYPT conducted jointly with the Canadian scientists on the Nova Scotian shelf in October 1983 are presented. The experiments were aimed at determination of relative catchability of juvenile silver hake.

Introduction

In order to study the reasons that influence the strength of year classes, the surveys of abundance and distribution of juvenile silver hake were conducted annually, in October-November, during the 1978 to 1983 period in the Nova Scotian area according to the joint USSR-Canada program. In 1978-1980 the juvenile 13.6m trawl (AtlantNIRO design) was used throughout the day. Tows were 30 minutes in duration, and the trawl was towed 1-2m off bottom, at the towing speed of 3.5 knots. In 1981-1983, as agreed with the Canadian side, the IGYPT trawl was used. Tows were 30 minutes in duration, and the trawl was towed at the speed of 3.5 knots only during the night at three steps: near bottom, in the pelagial, and at the surface.

In October 1983, the SRTM-8086 "1500 Let Kievu" was used to conduct a comparative experiment in the area of massive juvenile silver hake aggregations (fig. 1) aimed at the determination of relative catchability of IGYPT and 13.6m trawls.

Materials and Methods

Brief description of trawls

Juvenile trawls can be used both in near bottom and mid-water regimes. These are 4-panel trawls with the upper and side panels differing in size. They are made of kapron netting with the 50 to 20 mm mesh size. A chafer with the 5 mm mesh size is inserted into the bag. Trawl boards of Biplan type are successfully used both near bottom and in the pelagial.

Specification

	IGYPT	13.6 m trawl
1. Length of headline, m	17.5	13.6
2. Length of footrope, m	17.5	13.6
3. Length of siderope, m	14.5	13.6
4. Perimeter of cross-section of the front part of the trawl, m	51.0	35.8
5. Vertical opening, m	6 - 8	6
6. Horizontal opening, m	10 - 12	8
7. Towing speed, m/sec	1.8- 2	1.8- 2

The juvenile 13.6 m trawl was only used to perform near bottom hauling, and the IGYPT trawl was used for three-step hauling: near bottom, in the pelagial, and at the surface. Tows were 30 minutes in duration, and trawls were towed at the speed of 3.5 knots. The needed depth was achieved using the echo depth recorder (IGEK) fitted to the headline. 24 and 31 tows were made using 13.6m and IGYPT trawls respectively.

Results of Comparative Experiment

The data of a comparative experiment conducted using 13.6m (AtlantNIRO design) and IGYPT trawls are presented in table 1. It should be noted, that during the experiment the juvenile hake (0+) used to aggregate near bottom before stormy weather as, for example, at night before 28 October

1983. The body length of juvenile hake (0+) fluctuated in the catches between 2 and 11 cm, and mean lengths were 5.7 cm for the 13.6m trawl and 5.1 cm for the IGYPT trawl (fig. 2). This is indicative of the fact that by that time the larger specimens were already descending to the near-bottom layers.

Mathematical processing of catch data obtained from different trawls (table 2) during the comparative experiment showed that these data were insufficient to calculate the conversion factor. So, the error of the mean value was 18-41%, and the variance amounted to $2979 \cdot 10^3$. That is why, further calibration studies of juvenile 13.6 m and IGYPT trawls by the SRTM-8086 "1500 Let Kievu" during the period from 15 October to 28 November, 1984, are provided for in the program of the joint USSR-Canada fishery investigations.

Table 1 Comparative experiment using 13.6 m (AtlantNIRO design) and IGYPT trawls
 for trawling surveys of juvenile silver hake (0+) by the SRTM-8086
 "1500 Let Kievu" at Nova Scotia in October 1983

No.:	IGYPT trawl				13.6m trawl			
	Fishing area	Fishing depth, m	Date, time	Catch, nos.	Fishing area	Fishing depth, m	Date, time	Catch, nos.
1	43°41'-43°45'		18-19 Oct		43°36'-43°42'			
2	62°26'-62°40'	122-0	23.30-24.00	1 831				
3		124-0	03.45-04.15	1 014	62°33'-62°44'			
4	(1)	148-0	05.30-06.00	490				
5		143-0	06.37-07.07	618	(1)			
6		123-0	*07.38-08.08	141			21-22 Oct	
7							138-133	*17.24-17.54 23
8							143	18.50-19.20 435
9			19-20 Oct				143	20.30-21.00 921
9	44°17'-44°21'	218-0	*17.30-18.00	121				
10		223-0	18.40-19.10	231				

Table 1 (continued)

No.	IGYPT trawl				13.6 m trawl			
	Fishing area	Fishing depth, m	Date, time	Catch, nos.	Fishing area	Fishing depth, m	Date, time	Catch, nos.
11	62°25'-62°30'	198-0	19.48-20.18	110			21 Oct	
12		215-0	01.25-01.55	341	44°17'-44°21'	205-215	01.30-02.00	23
13	(2)	213-0	03.30-04.00	149		208-218	03.40-04.10	152
14		218-0	05.03-05.33	148	62°24'-62°31'	208-218	06.00-06.30	196
15		218-0	06.45-07.15	65				
16		218-0	*08.20-08.50	55	(2)	208-212	*08.13-08.43	39
			23-24 Oct				22-23 Oct	
17	43°42'-43°50'	148-0	*17.20-17.50	310	43°36'-43°49'	148-141	*17.20-17.50	61
18	62°21'-62°33'	138-0	18.38-19.08	605		152-153	18.42-19.12	277
19		123-0	19.40-20.10	715	62°34'-62°44'	153	19.52-20.22	241
20	(1)	117-0	01.25-01.55	480		145	01.22-01.52	131
21		118-0	02.30-03.00	536	(1)	143	02.50-03.20	106
22		118-0	03.45-04.15	1062		132-122	04.12-04.42	135
23		123-0	05.18-05.48	2187		143-128	05.50-06.20	123
24		120-0	06.25-06.55	651		158	*07.35-08.05	42
25		125-0	*07.45-08.15	161				

Table 1 (continued)

No.	IGYPT trawl				13.6 m trawl			
	Fishing area	Fishing depth, m	Date, time	Catch, nos.	Fishing area	Fishing depth, m	Date, time	Catch, nos.
			26-27 Oct				27-28 Oct	
26	43°45'-43°48'	138-0	*17.23-17-53	114	43°44'-48°48'	136-130	*17.22-17.52	239
27		128-0	18.40-19.10	670		128-126	18.45-19.15	695
28	62°15'-62°36'	128-0	20.08-20.38	432	62°22'-62°36'	128-123	19.57-20.27	481
29		157-0	01.18-01.48	676		145-131	01.25-01.55	2006
30	(1)	133-0	02.38-03.08	2512	(1)	123-118	02.45-03.15	2460
31		126-0	03.42-04.12	1729		123-118	04.30-05.00	7044
32		126-0	05.00-05.30	2549		128-123	06.00-06.30	2744
33		128-0	06.30-07.00	1730		128-126	*07.33-08.03	127
34		128-0	*07.35-08.05	252				

Note: daytime catches

Table 2 Calculation of statistical characteristics of catches taken with 13.6 m and IGYPT trawls

Variants of experiment	\bar{x}	$m, \%$	$D_1 \cdot 10^3$	$1 \cdot 10^2$	$V_1 \%$
1 - 1	165	22	8	0.9	53
1 - 2	85	36	6	0.8	88
1 - 3	897	18	589	8.0	85
1 - 4	1016	41	2979	17.0	170
1 - 5	756	41	2293	15.0	200
1 - 6	221	23	54	2.0	105

Note: 1-1 Daytime catches taken with IGYPT
 1-2 Daytime catches taken with the 13.6m trawl
 1-3 Night-time catches taken with IGYPT
 1-4 Night-time catches taken with the 13.6m trawl
 1-5 Round-the-day catches taken with the 13.6m trawl (without discard)
 1-6 Round-the-day catches taken with the 13.6m trawl (with discard)

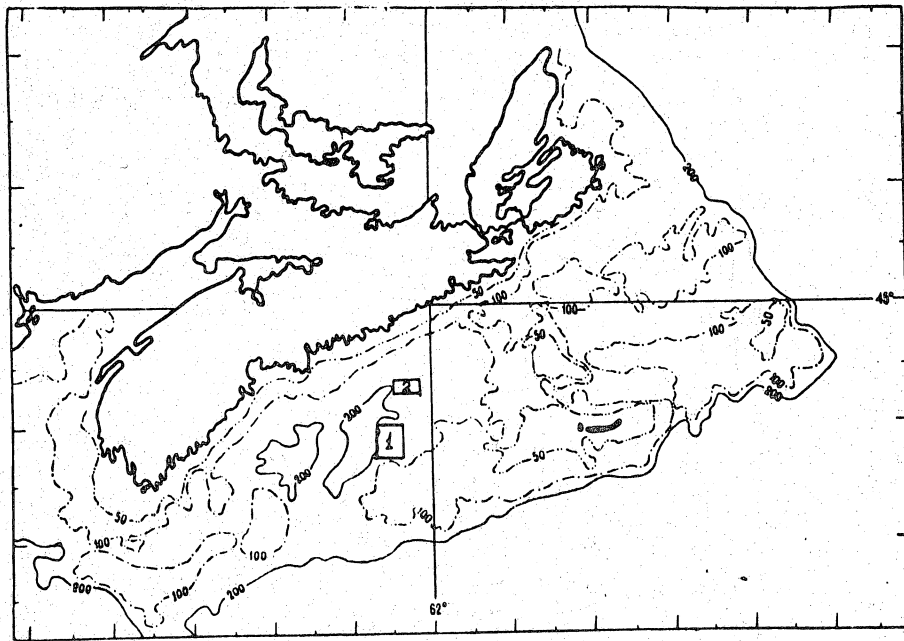


Fig 1. Areas of comparative experiments conducted using 1 the 13.6m and IGYPT trawls.

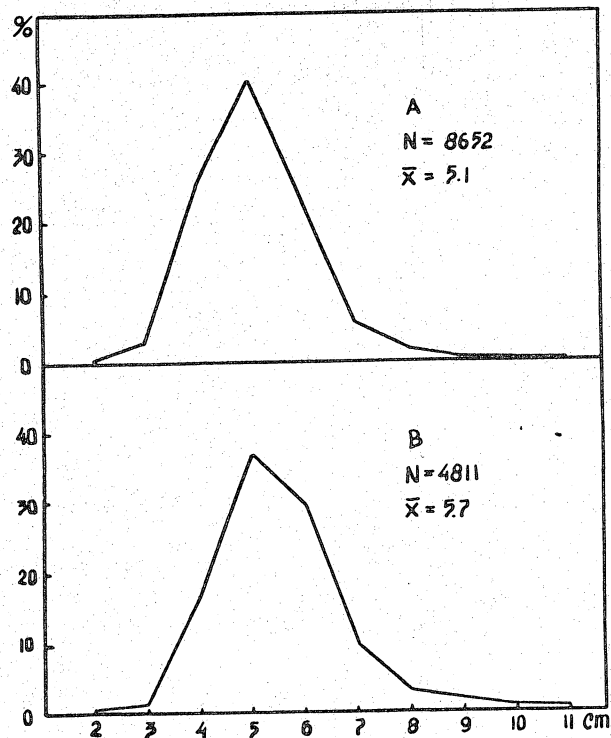


Fig 2. Distribution of juvenile silver hake:
A - in catches taken with IGYPT
B - in catches taken with the 13.6m trawl.