

Curatorial Report Number 7

Nova Scotia Museum
1747 Summer Street
Halifax Nova Scotia Canada

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Preliminary
Survey of the
Cancrid Crabs
in
Nova Scotia
Coastal
Waters

By Pamela Malcolm
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INTRODUCTION

Brachyurans, or true crabs, are represented by two species in the Western Atlantic, namely the common rock crab, Cancer irroratus Say and the jonah crab, Cancer borealis Stimpson, both of which belong to the family Cancridae. Cancer irroratus occurs from the Strait of Belle Isle, where it frequents shallow inshore waters, to South Carolina where it is found at considerable depths. Cancer borealis ranges from the shallow inshore waters of Southern Nova Scotia to deep water off the coast of Florida. The distributions of both these cancrid species in the northern part of their range are represented in Figs. 1 and 2 (Squires, 1966).

Studies of marine fauna in the Bay of Fundy and Southwestern Nova Scotia (Bousfield, 1958, Bousfield and Leim, 1960) indicated that C. borealis was common in the Bay of Fundy but absent in the Minas Basin and along the South Shore, whereas C. irroratus, although less common in the Bay of Fundy, was abundant along the South Shore of Nova Scotia between Yarmouth and Halifax.

The collection of cancrid crabs in the Nova Scotia Museum, prior to 1966, consisted of several whole specimens in addition to various parts and appendages found along coasts of western Nova Scotia. These specimens and the localities at which they were found are listed in Table 1. This collection failed to provide sufficient information regarding the distribution of the cancrid crabs in the coastal waters of Nova Scotia.

In 1966-1967, the Nova Scotia Museum conducted a crab survey in order to obtain additional information on the distribution of these two species. The specimens collected from various localities along the coast of Nova Scotia were identified, sexed, and measured. The purpose of this publication is to record these observations and the results of the survey.

METHODS

Arrangements were made with lobster fishermen from selected localities around Nova Scotia, to collect any crabs that were caught in their traps. The nine fishermen who co-operated in this survey were: Gerald Smith, Cape Sable, Shelburne County; Freeman Corkum, Lunenburg, Lunenburg County; Victor Kiley, Prospect, Halifax County; Stan Purdy, Eastern Passage, Halifax County; Earl Power, East Jeddore, Halifax County; Ervin Scott, Sand Point, Guysborough County; George Cadden, New Waterford, Cape Breton Island; Joe Boudreau, Cheticamp, Cape Breton Island and Clarence Piper, Northport, Cumberland County.

All the specimens collected were initially put into formalin and later transferred to 50% isopropyl alcohol. The collection was identified and catalogued by Gilhen (1968). In 1971 the specimens were re-catalogued to include the following information: sex distinction, the total number of each species found at each locality, and measurements of length and breadth of carapace. Length was measured as the distance from the posterior end of the carapace to the rostrum. Breadth was measured as the distance between the lateral extensions on each side of the carapace. Graphs were drawn for each species to illustrate the carapace lengths of both males and females in relation to their total population. The distribution of each species in Nova Scotian waters was plotted. When the observations had been recorded, the crabs were selectively discarded in an effort to reduce the material to the level of representative specimens. These were dried and retained in the reference collection.

Identification of these two cancrid species was based on external morphological features. *C. irroratus* has a finely granulated carapace and chelipeds which are relatively smooth to the touch in comparison with the rough surface characteristic of *C. borealis*. In addition, the latter species tends to have a more strongly arched carapace. The sexes were distinguished by the width and position of the abdomen. The female of both these species has a broader and more convex abdomen which is not as closely applied to the thorax as it is in the male. The female abdomen bears four pairs of appendages or pleopods while the male has only two pairs of abdominal appendages.

RESULTS AND DISCUSSION

Abundance:

In this survey, a total of 356 crabs was obtained, 311 of which were C. irroratus and 45 C. borealis. The ratio of C. irroratus to C. borealis was found to be 7:1. The total number of each species found at each locality is shown in Table II. These figures do not indicate relative abundance of each species due to differences in lobster season but they do indicate their presence or absence.

Distribution:

The attempt to discover a pattern of distribution of C. irroratus and C. borealis in this survey has indicated that these two species appear to correspond in occurrence to the localities included in the previous record of collections (Table I), as well as occurring in various other localities. In general, C. irroratus is represented throughout the Nova Scotia coastal waters, whereas C. borealis is restricted to the south western part of Nova Scotia, although one specimen was found in the sample from Guysborough County. (Fig.3).

Size Range:

The variations in the size of males and females of both crab species, as indicated by carapace length and breadth measurements, are tabulated in Tables III-XV. A comparison of the graphs, Figs. 4 and 5 shows that males of both species tend to have a larger body size than do females. Both males and females of C. borealis were found to be larger than the corresponding sexes of C. irroratus. C. borealis males have an average carapace breadth of 111.9 mm in comparison with 93.4 mm for C. irroratus. C. borealis females have an average carapace breadth of 96.5 mm. This was slightly larger than the 80.4 mm average breadth recorded for C. irroratus females.

The size range of spawning females that were collected in this survey was from 77.3 mm to 94.3 mm. Since none of the C. borealis female specimens carried eggs, the criterion for determination of reproductive ability, it was impossible to obtain any information concerning the spawning size of this species. The ratio of the total number of males to females C. borealis was 2:1. The male-female ratio for C. irroratus was 6:1.

CONCLUSIONS

This survey confirms the distribution of C. irroratus, previously stated by Bousfield (1958) and Squires (1966), as extending around the coast of Nova Scotia, and extends the range of C. borealis to the Atlantic coast of Nova Scotia south west of Halifax.

The localities sampled along the eastern shore of Nova Scotia, north of Halifax, did not generally indicate the presence of C. borealis. However, one specimen was found at Guysborough County, which might possibly extend the range of this species even further north.

ACKNOWLEDGEMENT

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Table I. Nova Scotia records of C. irroratus and C. borealis in the Nova Scotia Museum collection prior to 1966.

Locality	Date	Number of specimens
<u>C. irroratus</u>		
Nova Scotia	1902-1903	5
Cape Sharp, Cumberland Co.	Sept. 24, 1957	2
Caribou River, Pictou Co.	Sept. 26, 1957	1
Herring Cove, Halifax Co.	Sept. 18, 1951	1
Crystal Cliffs, Antigonish Co.	Sept. 27, 1957	1
Kingsport, Kings Co.	July 27, 1959	2 dry
Avonport Beach, Kings Co.	June 3, 1959	Parts dry
Port Mouton, Queens Co.	Aug. 27, 1959	2 dry
Margaretsville, Annapolis Co.	Aug. 20, 1959	4 claws dry
Black Rock, Kings Co.	July 10, 1959	1
Kingsport, Kings Co.	July 27, 1959	3
Kingsport, Kings Co.	July 20, 1959	1
Avonport Beach, Kings Co.	June 9, 1959	1
Port Herbert, Shelburne Co.	July 29, 1960	1 carapace dry
Brule Wharf, Colchester Co.	Aug. 3, 1960	2
Hall's Wharf, Kings Co.	April 23, 1960	1
<u>C. borealis</u>		
Hubbards, Halifax Co.	July 26, 1920	1 chele dry
Port Herbert, Shelburne Co.	July 29, 1960	1 carapace dry

Table II. Collections of C. irroratus and C. borealis made around the coast of Nova Scotia, during lobster seasons 1966-1967.

Locality, date and accession number	No. of specimens	
	<u>C. irroratus</u>	<u>C. borealis</u>
Front Hbr., Lunenburg Co. Nov. 28 - Dec. 10, 1966 1966-Z-28	30	21
Front Hbr., Lunenburg Co. 1967. 1967-Z-3	28	7
Northport, Cumb. Co. 1967. 1967-Z-7	20	0
Sand Point, Guys. Co. 1967. 1967-Z-8	29	1
New Waterford, Cape Breton Co. 1967. 1967-Z-9	36	0
Eastern Passage, Halifax Co. 1967. 1967-Z-10	38	0
Cheticamp, Inverness Co. 1967. 1967-Z-11	29	0
East Jeddore, Halifax Co. 1967. 1967-Z-12	37	0
Cape Sable, Shelburne Co. Nov. - Dec. 1966 1966-Z-29	19	6
Prospect, Halifax Co. Nov. - Dec. 1966 1966-Z-30	45	10
Total numbers	311	45

Table III. Record of carapace breadth and length measurements and sex of individual C. irroratus specimens from the collections made at Front Harbour, Lunenburg, Lunenburg County, Nova Scotia, November 28-December 10, 1966 and early 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	97.8	64.2	M	30	85.0	56.7	M
2	82.1	53.4	M	31	100.9	64.6	M
3	87.1	59.3	M	32	83.3	55.2	M
4	96.5	62.3	M	33	85.0	55.8	M
5	104.8	68.2	M	34	72.5	47.8	M
6	90.5	58.5	M	35	95.2	61.7	M
7	84.1	56.4	F	36	86.4	58.8	M
8	80.6	51.6	M	37	79.2	53.1	F
9	106.0	68.0	M	38	87.0	55.8	M
10	73.1	49.5	F	39	67.8	43.7	M
11	67.9	46.1	M	40	99.0	64.6	M
12	92.4	60.2	M	41	88.9	58.3	M
13	73.2	47.7	M	42	88.4	58.3	M
14	96.9	62.3	M	43	83.8	55.9	M
15	90.8	59.4	M	44	83.7	56.3	M
16	90.0	58.6	M	45	82.5	55.8	F
17	94.4	60.0	M	46	88.3	58.3	M
18	97.2	61.9	M	47	86.8	56.4	M
19	87.9	57.8	M	48	67.9	45.0	M
20	83.8	53.8	M	49	69.1	47.5	F
21	77.9	50.9	M	50	71.3	46.4	M
22	93.7	61.6	M	51	76.8	49.7	M
23	76.8	52.8	F	52	88.7	57.0	M
24	77.4	51.9	F	53	71.6	46.8	M
25	77.1	51.8	F	54	96.4	61.5	M
26	75.1	49.1	M	55	95.8	63.8	M
27	94.1	60.5	M	56	86.9	56.8	M
28	91.6	62.8	F	57	95.8	62.2	M
29	85.5	53.8	M	58	97.8	63.8	M

* M - male specimen
 F - female specimen

Table IV. Record of carapace length and breadth measurements and sex of individual C. irroratus specimens from the collections made at Northport, Cumberland County, Nova Scotia, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	119.8	76.8	M	11	102.4	64.8	M
2	112.6	73.8	M	12	92.3	61.8	M
3	118.3	75.9	M	13	100.3	63.8	M
4	118.7	76.4	M	14	91.1	58.9	M
5	92.1	61.5	F	15	95.8	63.0	M
6	92.7	60.6	M	16	95.4	62.5	M
7	78.5	53.3	F	17	95.3	63.1	M
8	79.2	54.9	F	18	87.4	56.8	M
9	103.4	69.4	M	19	73.5	49.3	F
10	99.0	65.3	M	20	121.2	80.0	M

Table V. Record of carapace length and breadth measurements and sex of individual C. irroratus specimens from the collections made at Sand Point, Guysborough County, Nova Scotia, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	113.9	72.4	M	16	96.7	64.9	M
2	121.3	76.6	M	17	87.6	58.3	M
3	100.0	67.0	M	18	54.3	35.9	M
4	109.5	72.2	M	19	109.7	70.6	M
5	107.6	70.6	M	20	109.2	72.9	M
6	111.0	71.9	M	21	101.3	65.2	M
7	114.7	69.5	M	22	111.3	72.4	M
8	90.6	59.9	M	23	103.6	67.4	M
9	108.5	70.0	M	24	114.1	66.0	M
10	95.2	60.9	M	25	104.8	68.3	M
11	107.3	70.3	M	26	104.0	68.3	M
12	112.5	71.2	M	27	98.1	63.8	M
13	111.5	71.5	M	28	87.2	56.1	M
14	106.4	68.5	M	29	90.2	59.5	M
15	103.6	67.0	M				

Table VI. Record of carapace length and breadth measurements and sex of individual *C. irroratus* specimens from the collections made at New Waterford, Cape Breton, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	83.6	55.7	M	19	83.5	56.3	M
2	97.8	65.9	M	20	75.0	50.0	M
3	91.2	60.1	M	21	77.8	51.2	M
4	89.5	57.8	M	22	69.5	45.7	M
5	86.6	56.9	M	23	79.7	52.6	M
6	92.6	62.1	M	24	94.4	61.2	M
7	82.1	54.7	M	25	72.1	46.5	M
8	86.6	58.3	M	26	82.6	55.2	M
9	89.2	58.5	M	27	74.8	49.4	M
10	84.8	55.7	M	28	90.5	59.9	M
11	90.2	57.3	M	29	86.6	56.3	M
12	79.9	51.5	M	30	96.7	62.6	M
13	74.9	51.0	M	31	86.2	57.8	M
14	72.4	50.4	M	32	76.3	50.9	M
15	69.7	47.5	M	33	80.2	51.9	M
16	67.6	45.2	M	34	79.3	52.9	M
17	62.4	41.3	M	35	89.0	59.7	M
18	93.9	62.8	M	36	76.6	52.1	M

Table VII. Record of carapace length and breadth measurements and sex of individual C. irroratus specimens from the collections made at Cheticamp, Cape Breton, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	115.3	75.3	M	16	81.2	56.2	F*
2	121.1	75.4	M	17	77.3	53.4	F*
3	85.4	58.2	F	18	76.5	52.3	F
4	93.4	62.0	M	19	70.7	48.7	F
5	95.8	63.3	M	20	111.0	71.8	M
6	100.2	66.3	M	21	119.0	75.7	M
7	102.5	68.2	M	22	65.1	101.4	M
8	99.3	66.3	M	23	110.6	71.4	M
9	89.3	61.1	F	24	112.6	74.6	M
10	83.3	55.3	M	25	104.1	66.9	M
11	88.3	59.7	F*	26	101.7	65.1	M
12	84.1	59.8	F*	27	84.4	57.2	F
13	91.3	60.1	M	28	77.1	51.5	F
14	86.6	59.1	M	29	89.0	58.3	M
15	107.9	71.0	F				

* Females carrying eggs.

Table VIII. Record of carapace length and breadth measurements and sex of individual *C. irroratus* specimens from the collections made at Eastern Passage, Halifax County, Nova Scotia, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	103.1	67.6	M	20	85.7	54.1	M
2	93.3	60.8	M	21	74.8	49.7	M
3	106.5	69.1	M	22	73.9	48.1	M
4	106.4	67.1	M	23	40.2	28.1	M
5	96.9	64.5	M	24	116.1	75.8	M
6	102.1	65.3	M	25	116.6	75.2	M
7	99.0	63.4	M	26	103.2	67.7	M
8	109.4	70.8	M	27	103.5	67.3	M
9	101.6	65.2	M	28	101.8	65.6	M
10	74.1	50.1	M	29	101.5	65.8	M
11	61.7	41.4	M	30	93.0	60.3	M
12	91.2	59.5	M	31	76.4	53.1	F
13	95.7	61.3	M	32	68.6	46.8	M
14	100.2	65.8	M	33	64.2	42.8	M
15	105.3	69.0	M	34	61.3	40.4	M
16	95.9	62.4	M	35	62.1	42.2	M
17	104.4	67.4	M	36	52.8	35.4	M
18	104.8	67.5	M	37	46.8	31.7	M
19	101.4	66.3	M	38	26.6	18.0	M

Table IX. Record of carapace length and breadth measurements and sex of individual *C. irroratus* specimens from the collections made at East Jeddore, Halifax County, Nova Scotia, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	98.8	65.2	M	20	94.4	63.6	M
2	94.3	64.9	F*	21	94.2	61.9	M
3	111.6	66.4	M	22	101.4	64.4	M
4	96.6	62.8	M	23	100.4	65.3	M
5	95.5	62.3	M	24	96.7	65.6	F
6	115.3	74.0	M	25	100.9	64.8	M
7	104.6	68.0	M	26	104.4	67.4	M
8	98.5	65.9	M	27	89.3	59.7	F
9	94.5	61.6	M	28	107.7	69.4	M
10	96.8	63.2	M	29	93.7	69.7	M
11	85.6	56.4	M	30	95.3	62.9	M
12	96.5	64.0	M	31	96.5	63.1	M
13	98.1	63.2	M	32	83.1	53.5	M
14	107.3	68.7	M	33	82.0	55.5	F*
15	92.7	60.8	M	34	90.0	62.8	F*
16	101.4	66.7	M	35	118.2	75.4	M
17	85.1	55.6	M	36	96.6	62.3	M
18	98.9	65.8	M	37	111.1	71.6	M
19	100.5	67.7	M				

* Females carrying eggs.

Table X. Record of carapace length and breadth measurements and sex of individual C. irroratus specimens from the collections made at Cape Sable, Shelburne County, Nova Scotia, 1966.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	109.9	69.9	M	11	110.5	71.7	M
2	108.7	70.9	M	12	109.0	71.3	M
3	101.8	66.3	M	13	103.9	67.9	M
4	110.5	70.5	M	14	129.1	81.8	M
5	105.5	67.8	M	15	121.6	77.4	M
6	100.5	70.0	M	16	117.6	77.3	M
7	70.4	108.4	M	17	119.7	73.8	M
8	109.9	72.3	M	18	120.9	78.7	M
9	112.8	70.6	M	19	111.8	72.4	M
10	109.9	72.3	M				

Table XI. Record of carapace length and breadth measurements and sex of individual C. irroratus specimens from the collections made at Prospect, Halifax County, Nova Scotia, 1966.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	109.3	70.6	M	24	83.8	56.2	F
2	110.3	72.1	M	25	69.3	46.3	F
3	99.5	65.1	M	26	77.8	50.6	M
4	102.1	67.8	M	27	77.9	51.4	M
5	102.4	64.6	M	28	73.6	50.3	F
6	82.8	53.4	M	29	88.4	57.8	M
7	89.2	57.4	M	30	57.2	40.1	F
8	80.4	52.6	M	31	70.5	47.3	F
9	70.3	45.8	M	32	84.1	55.9	M
10	67.1	45.0	F	33	79.4	54.1	F
11	83.0	54.4	F	34	84.8	55.4	M
12	96.1	63.7	M	35	80.4	52.9	M
13	84.5	55.1	M	36	86.2	56.2	M
14	90.4	59.5	M	37	78.9	51.4	M
15	72.6	47.9	M	38	95.4	61.6	M
16	80.5	53.8	F	39	95.0	61.5	M
17	83.2	53.8	M	40	81.5	55.1	M
18	74.7	49.2	F	41	82.9	54.4	M
19	77.6	51.6	M	42	76.9	50.3	F
20	89.5	60.0	M	43	113.1	73.4	M
21	78.8	52.8	F	44	72.8	48.2	M
22	80.2	54.1	F	45	103.3	65.1	M
23	77.0	50.9	F				

Table XII. Record of carapace length and breadth measurements and sex of individual C. borealis specimens from the collections made at Front Harbour, Lunenburg, Lunenburg County, Nova Scotia, November 28 to December 10, 1966 and 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	99.8	64.6	M	15	100.3	68.1	F
2	103.4	69.7	F	16	89.2	60.1	F
3	107.5	70.3	M	17	77.3	51.7	F
4	107.3	67.4	M	18	105.0	65.5	M
5	95.9	63.4	F	19	106.6	68.9	M
6	112.5	74.6	F	20	107.1	68.8	M
7	94.4	61.8	F	21	101.8	64.9	M
8	103.6	66.0	M	22	101.5	67.4	M
9	99.9	64.8	M	23	89.7	55.4	M
10	104.9	68.4	M	24	76.6	51.3	F
11	96.2	64.2	F	25	110.5	70.4	M
12	101.0	66.9	F	26	117.3	68.4	M
13	105.1	68.9	F	27	112.9	78.6	M
14	106.4	68.9	M	28	126.0	81.0	M

Table XIII. Record of carapace length and breadth measurements and sex of individual C. borealis specimens from the collections made at Cape Sable, Shelburne County, Nova Scotia, 1966.

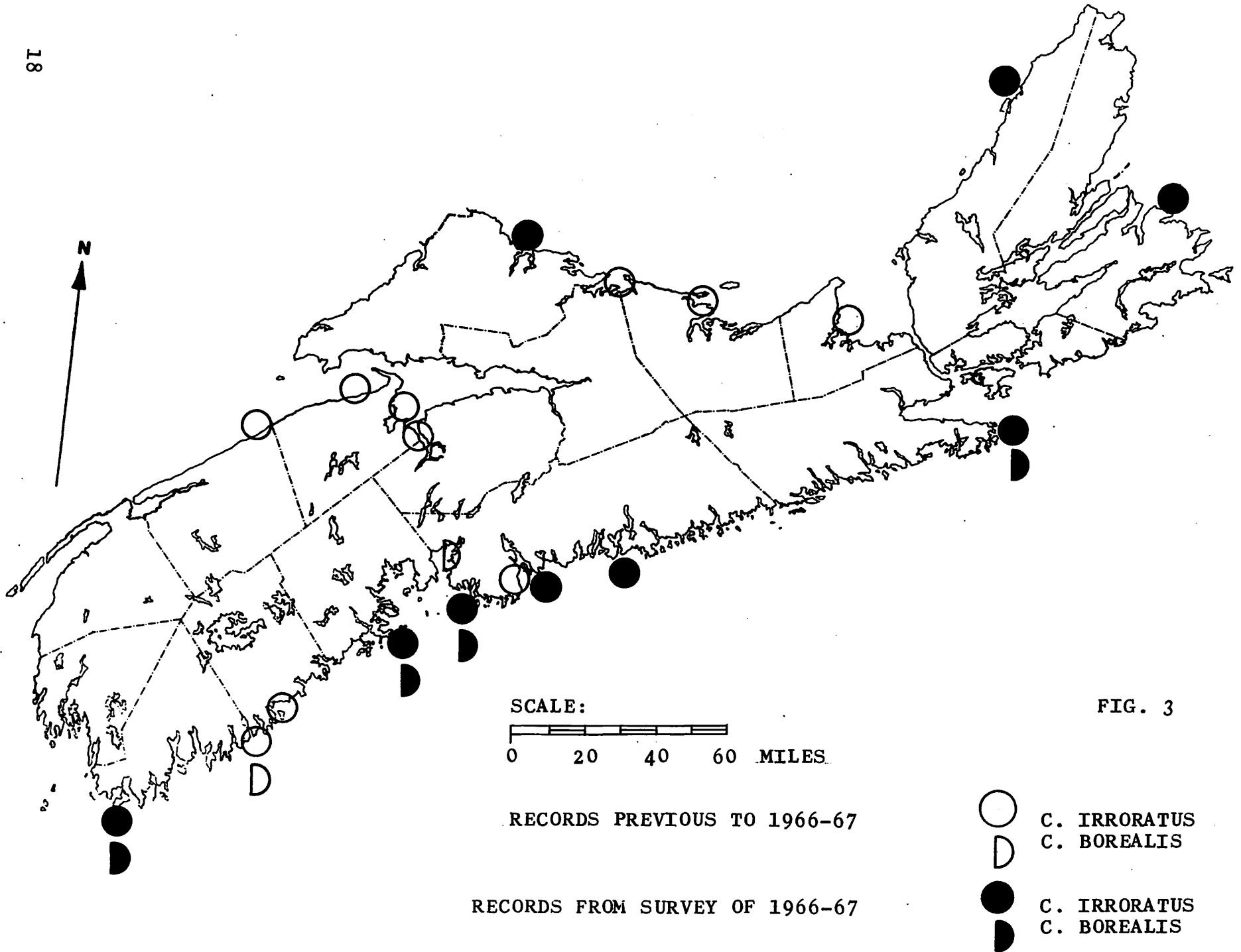
Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	100.6	66.4	M	4	124.1	80.1	M
2	132.4	85.2	M	5	138.1	86.0	M
3	136.7	85.4	M	6	130.3	85.0	M

Table XIV. Record of carapace length and breadth measurements and sex of individual C. borealis specimens from the collections made at Prospect, Halifax County, Nova Scotia, 1966.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	101.6	68.2	F	6	111.3	66.6	M
2	106.5	70.6	F	7	103.1	66.6	M
3	104.5	68.5	F	8	82.7	55.6	F
4	98.8	64.2	M	9	108.5	69.2	M
5	115.4	72.4	M	10	146.9	93.9	M

Table XV. Record of carapace length and breadth measurements and sex of individual C. borealis specimens from the collections made at Sand Point, Guysborough County, Nova Scotia, 1967.

Specimen Number	Breadth (mm)	Length (mm)	Sex	Specimen Number	Breadth (mm)	Length (mm)	Sex
1	103.0	64.4	M				



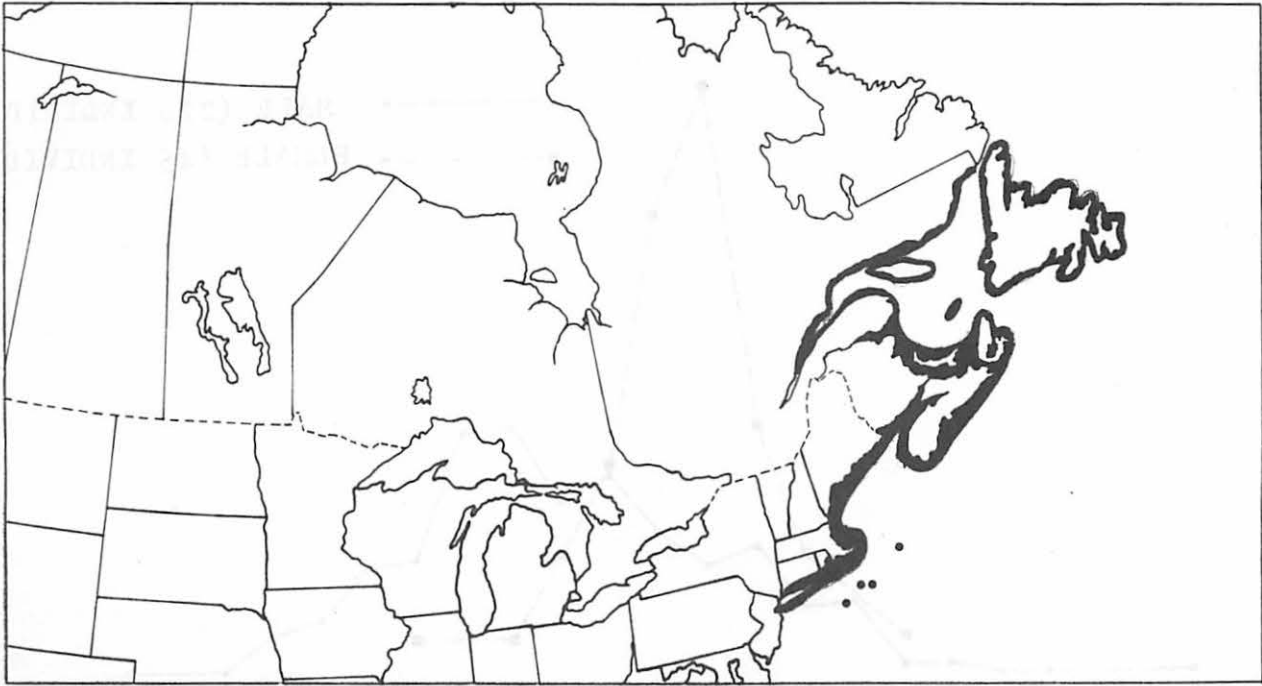


FIG. 1 DISTRIBUTION OF *C. IRRORATUS* IN THE NORTHERN LIMIT OF ITS RANGE (AFTER SQUIRES, 1966)

- MANY RECORDS
- FEW OR ISOLATED RECORDS

FIG. 2 DISTRIBUTION OF *C. BOREALIS* IN THE NORTHERN LIMIT OF ITS RANGE (AFTER SQUIRES, 1966)

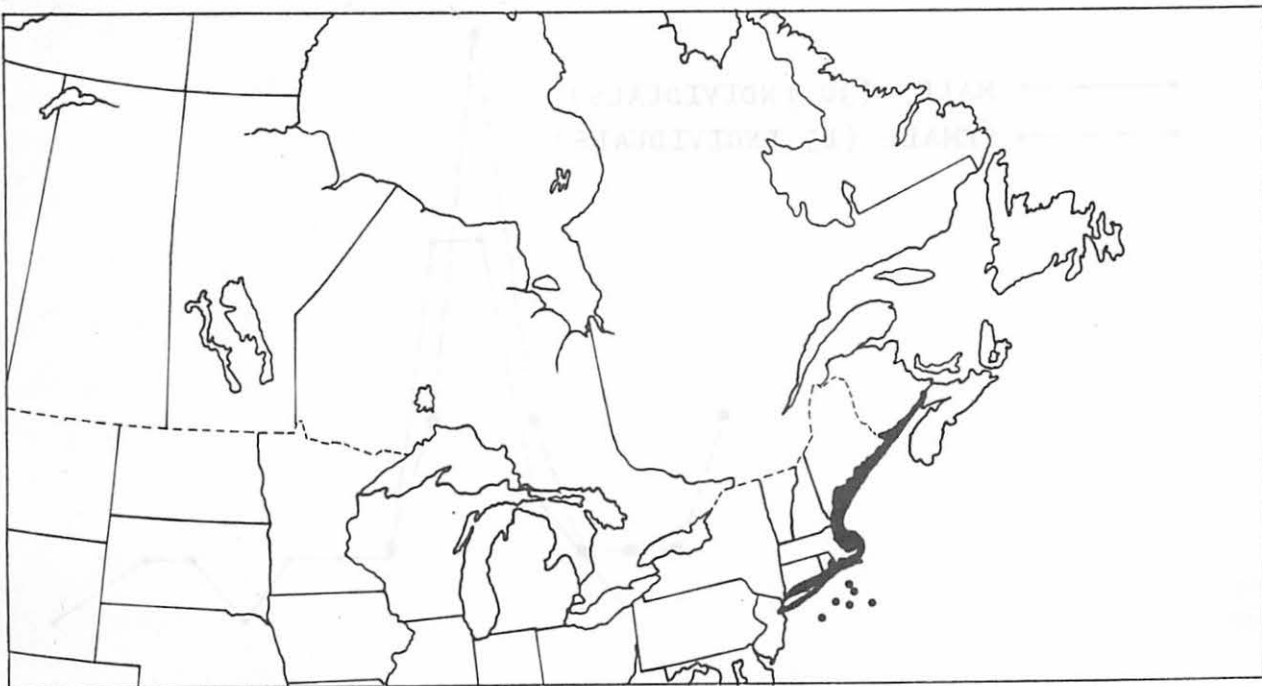


FIG. 4 **CANCER IRRORATUS** DISTRIBUTION IN SIZE AND NUMBER OF MALES AND FEMALES FROM NOVA SCOTIA COASTAL WATERS

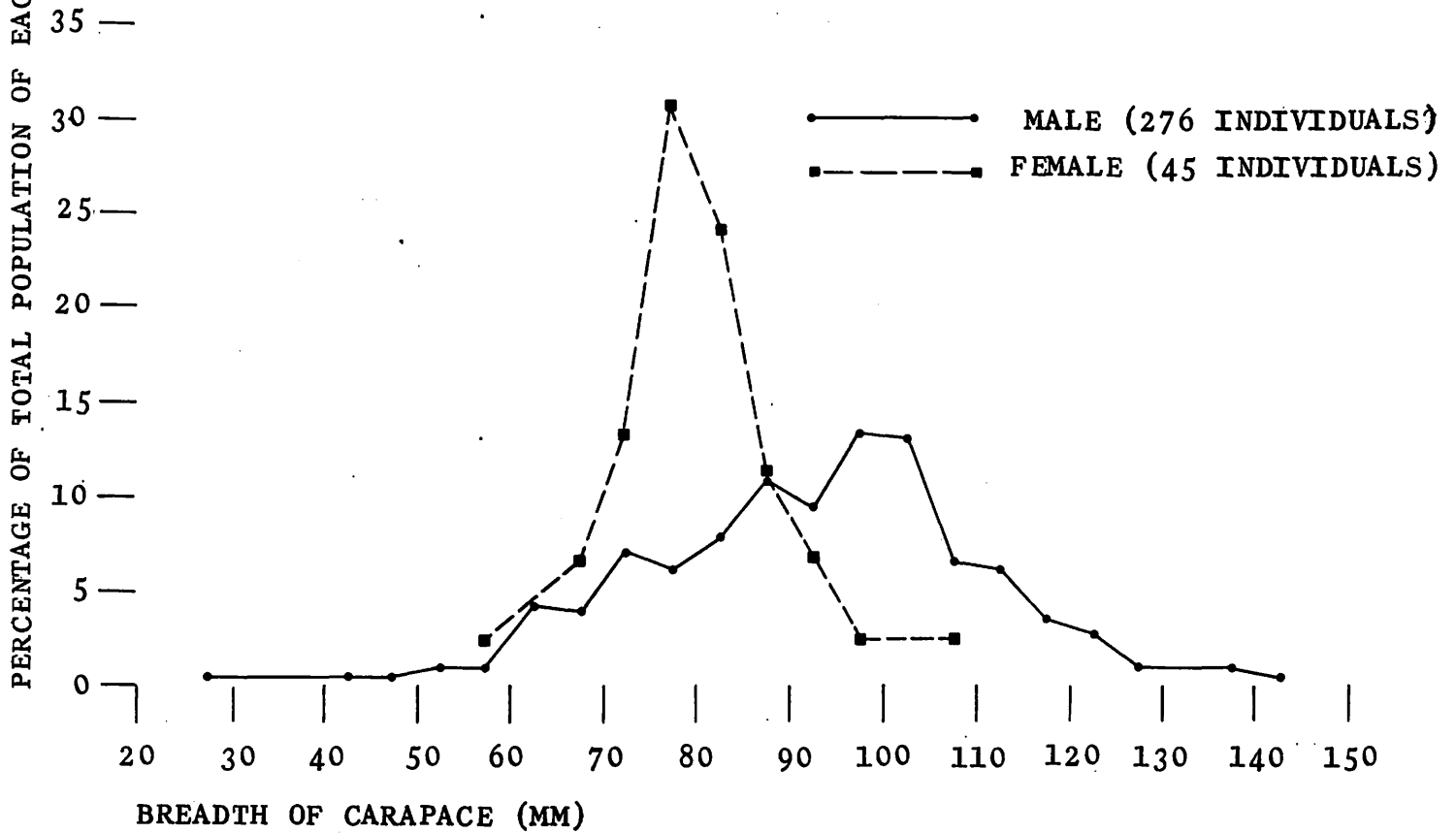


FIG. 5 **CANCER BOREALIS** DISTRIBUTION IN SIZE AND NUMBER OF MALES AND FEMALES FROM NOVA SCOTIA COASTAL WATERS

