



AN ROINN TALMHAIOCHTA AGUS IASCAIGH
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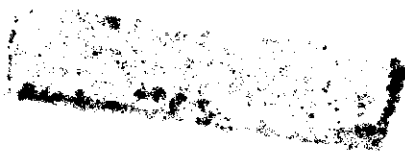


CRAWFISH INVESTIGATIONS 1966-68.

by

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The fishery for crawfish (Palinurus elephas) in Irish waters has previously been described by Gibson and O'Riordan (1965) and by Gibson (1967). Molloy (1968) has given some details of the scientific work done on this species in recent years. One of the most important aspects of this fishery is that both lobsters and crawfish are exploited simultaneously by boats which use the same type of traps and baits for the two species. Neither the location nor extent of the fishery has shown any marked change since it first became an important aspect of the Irish fishing industry but the annual landings still show considerable variations. These fluctuations in the yearly catch would seem to depend more on the duration of the season and its length, rather than on changes in stock abundance (Gibson 1967). The annual landings (to the nearest thousand fish) since 1951 are shown in Fig. 1 attached. The landings in 1968 were surprisingly low for a season which was marked by exceptionally fine weather.

The purpose of the present investigations was (a) to study the reaction of the stocks to the effects of fishing, (b) to estimate the time of year at which spawning takes place, and (c) to determine at what length, length range or age crawfish are recruited to the adult stock.

Samples of crawfish were first examined in 1966 and were obtained only from a small section of the south and southwest coasts. In 1967 samples were obtained from an area extending from Cork Harbour to Blacksod Bay, Co. Mayo, while the area of sampling was again increased in 1968 to include the coast line from Dunmore East, Co. Waterford, to Co. Donegal, which in fact embraced the whole of the present fishing area. For convenience the coastline was divided into a number of different sections, namely, Donegal, Sligo, Mayo, Galway, Clare, North Kerry, West Kerry, West Cork, East Cork and Waterford. The number of crawfish examined was as follows:-

1966	-	1,675
1967	-	7,236
1968	-	8,445

All sampling was carried out at the major storage ponds on the south and south-west coasts where most crawfish are stored before they are exported.

to the continent. Samples whenever possible were composed of the entire catch of different boats for one week or if the catch was too big a random sample was taken. Each individual crawfish was sexed, measured, examined for the presence of eggs and for the degree of hardness of the shell. The total carapace length (i.e. from the tip of the interorbital spine in a straight line to the posterior edge of the carapace) to the nearest mm. was recorded in each case. Eggs were classified into two categories, (1) eyed and (2) non-eyed. Length distributions in 5 mm. groups per sex for different areas were compared for the three years under review. It could be said that the main feature to emerge from the length distributions of these samples was the inconsistency, particularly in the male length distributions which were quite different in each of the three years. Mean carapace lengths per sex were examined for crawfish from each area. It was noticed that in some areas considerable decreases in mean lengths occurred over the three years for which data is available, particularly in North and West Kerry and West Cork. This decrease was more obvious in the males than in the females. In the only other area for which three years data was available, i.e. East Cork an increase in mean length took place. No explanation can be given at the moment for these annual differences. While in 1967 it was noted that the smaller crawfish appeared to be more numerous off the Cork coast, this pattern was not repeated in 1968. Mean carapace lengths per area are shown in Table I.

Table I. Mean lengths (mm.) of Crawfish from different areas.

Area		1966	1967.	1968.
Donegal	males	-	-	129.0
	females	-	-	115.9
Sligo*	males	-	-	144.3
	females	-	-	119.7
Mayo	males	-	121.6	111.6
	females	-	113.7	109.3

Table I. (contd).

Area		1966.	1967.	1968.
Galway	males	-	131.4	128.4
	females	-	117.6	115.3
Clare	males	-	-	124.6
	females	-	-	110.5
North Kerry	males	130.4	128.5	124.1
	females	114.7	115.0	111.3
West Kerry	males	119.2	121.4	114.5
	females	112.7	115.1	110.0
West Cork	males	131.2	121.0	114.4
	females	107.1	114.1	112.6
East Cork	males	115.0	113.7	117.5
	females	112.1	109.9	114.2
Waterford	males	-	-	119.9
	females	-	-	119.0

* Only 40 individuals.

No regular pattern of size distributions could be seen from the different areas with the dominant length group in each distribution varying considerably.

The type of distribution for males and females was in the main strikingly different. The male distribution has a wider range and has usually no dominant length group, while the females have a more compact normal type distribution with the dominant length group usually about the same for the different areas. A suggested explanation for the inconsistent male distribution is that the males make greater migrations than the females and are continuously on the move, while the females by comparison lead a more sedentary type of existence. As can be seen from Table I, males have usually

a greater mean length than females and are usually outnumbered by females in the catches.

As is the case with most other types of shellfish, it is difficult to age crawfish. Cassie (1952) has demonstrated a method by which different groups in a sample could be separated out by plotting their percentage cumulative size frequency distribution on probability paper. If the sample comes from a normal distribution the resulting line will be straight but will have certain points of inflection which would correspond to the beginning of each new group which can then be extracted mathematically. This method was tried on the results from each area during 1967 and 1968 but, while it was possible to determine certain inflection points, it was felt that these were too vague to enable any exact age groups to be extracted. However, the resulting lines for both sexes were very similar for each area examined and suggested that all the samples originated from the same basic population. In Fig. 2 the percentage cumulative size frequency distribution for all males and females during 1967 and 1968 plotted on probability paper can be seen. It is clear that the patterns for both sexes during the two years are very similar, that the females and males grow at approximately the same rate for some time after entering the exploitable phase but the females later increase their growth rate and attain their maximum size sooner than the males.

When the percentage size distributions were compared for the different areas for the years 1967 and 1968 it was hoped to be able to trace particular length groups from year to year and hence determine the growth rate. However, it was impossible to determine a length group in 1968 that corresponded to the one selected in 1967. This feature also prevented an accurate estimate to be made of the size range at which the major recruitment to the adult stock takes place, although it can be seen from the size distributions that small numbers are recruited when the carapace length is approximately 70 mm. Neither could the size be determined, above which recruitment no longer takes place. This feature also prevented any estimates of size at recruitment being made. It could not be said that a critical size was determined above which recruitment did not take place. This would again suggest a continuous mingling of groups of crawfish and substantial migrations from one area to another along the coast.

The distribution of ovigerous (egg bearing) females for 1966, 1967 and 1968 is shown in Table 2. No month during the sampling period (end of June to August) tended to have a particularly large numbers of ovigerous females. This would suggest that the main hatch takes place prior to June.

Table 2. Percentage distribution of ovigerous females.

	1966.	1967.	1968
Donegal	no sampling	no sampling	15.3
Mayo	"	6.3	11.5
Galway	"	2.5	8.0
Clare	"	no sampling	9.7
N. Kerry	34.4	9.4	13.8
West Kerry	16.0	14.0	12.7
West Cork	5.7	7.4	12.5
Cork	14.3	10.1	24.5
Waterford	no sampling	no sampling	14.2

SUMMARY

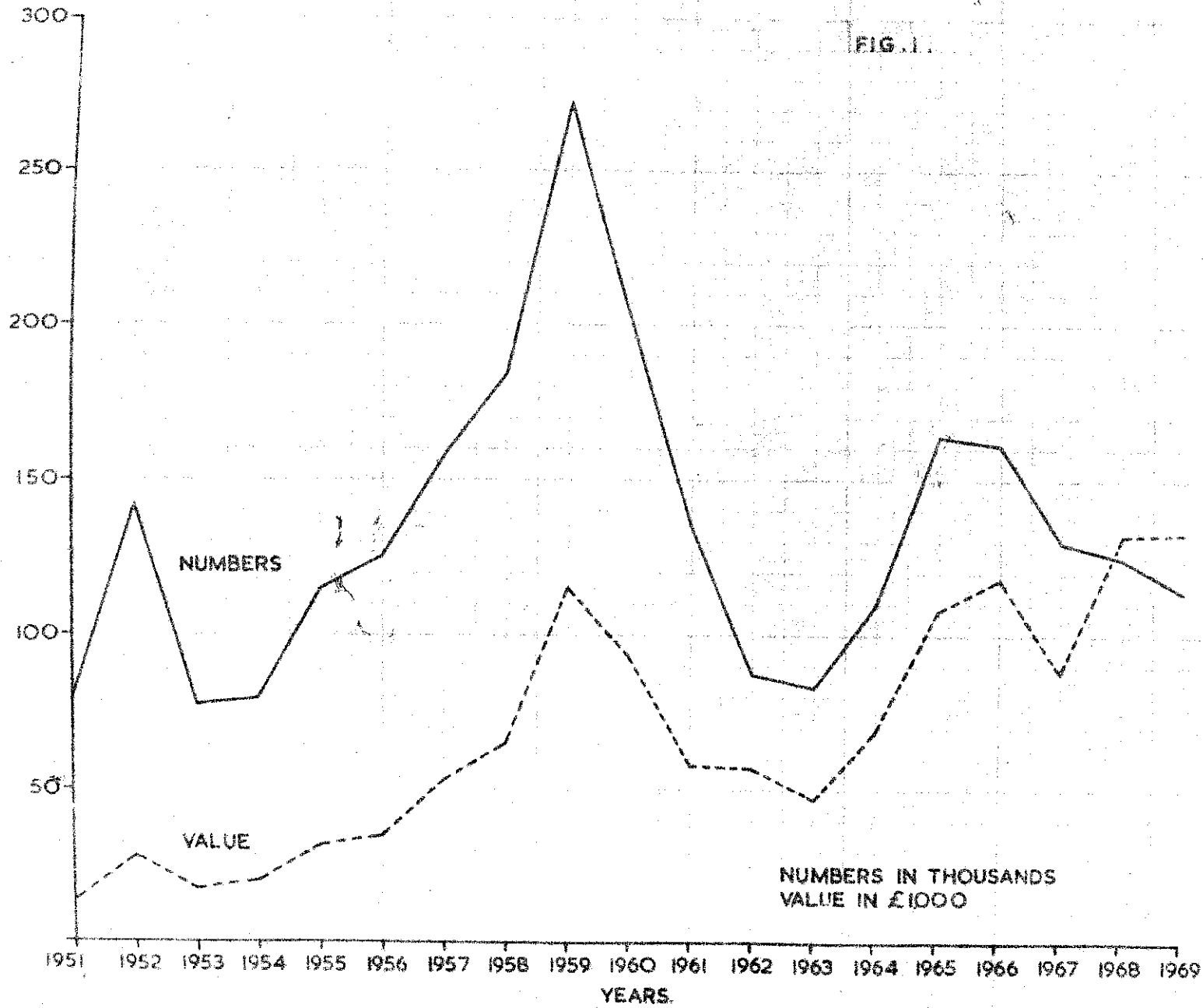
- 1) The annual landings of crawfish have declined in recent years.
- 2) While increased exploitation of shellfish stocks is usually accompanied by a decrease in mean lengths, it is not yet known whether the decrease in size in crawfish which has occurred in certain areas is due to over exploitation of the stocks in those areas.
- 3) It is felt that the stocks which frequent our coasts migrate from place to place to a considerable extent.
- 4) Progress in scientific investigations is impeded by the lack of any accurate method for age determinations for this species.

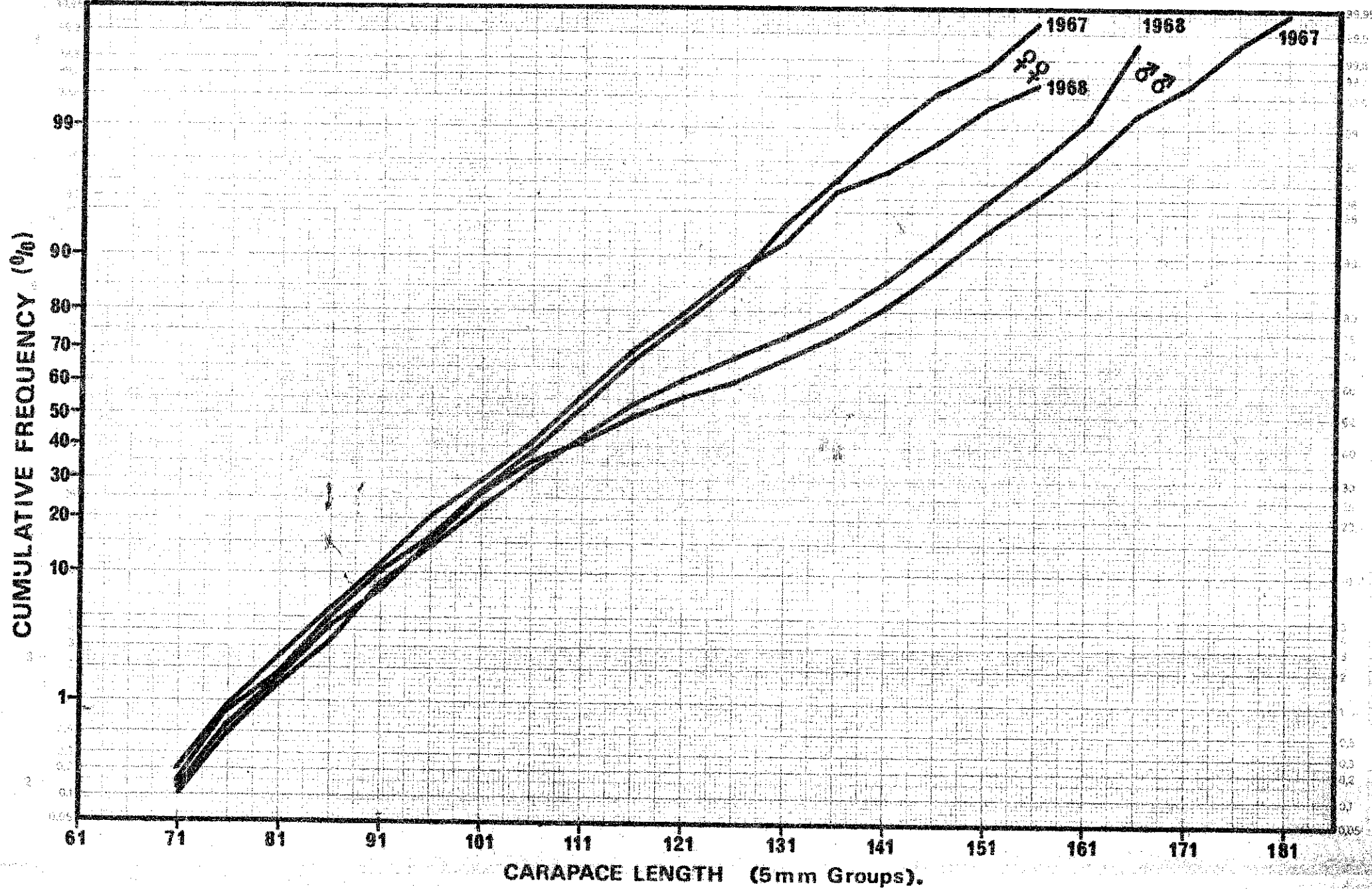
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FIG. 1.





Drumlet after Glass Abscissa 250 mm.