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Preliminary observations on the crawfish Palinurus vulgaris  
Latr. off the coast of Guernsey, Channel Islands

by

B. T. Hepper  
Fisheries Experiment Station, Conway



Introduction

The waters around Guernsey support a small but locally important fishery for lobsters and crawfish. Until the mid-1960s this fishery was pursued solely by fishermen using pots of various designs, but in the mid-1960s divers entered the fishery, particularly in search of crawfish. The pot-fishermen became afraid that the catches made by the divers would reduce the crawfish stocks and adversely affect the livelihood of the pot fishermen.

In 1968 the States of Guernsey Sea Fisheries Committee sought the advice of the Ministry of Agriculture, Fisheries and Food, and the author was asked to suggest a programme of research into the Guernsey crawfish stocks. This programme was initiated by the then Sea Fisheries Officer, Capt. P. Walker, and was continued by W. J. Marquand, the present Sea Fisheries Officer. The programme has been supported by the States of Guernsey Sea Fisheries Committee and the author wishes to record his thanks to the Committee for its support, and to Capt. Walker for the initial work, to Mr W. J. Marquand for conducting most of the field work and to all who helped in the investigation, particularly those who kept records of their fishing.

The programme has involved: (1) records of catch and effort by pot fishermen and divers, (2) measurements of crawfish caught, and (3) tagging experiments.

Landings

Records of landings of crawfish are available only from May 1968, and are shown in Table 1 as the monthly landings in hundredweights.

Table 1 Guernsey crawfish landings (cwt)

	1968	1969	1970
January	-	12	27
February	-	10	12
March	-	26	18
April	-	24	22
May	11	13	63
June	14	8	23
July	40	67	4
August	40	92	13
September	40	91	9
October	29	82	8
November	30	44	9
December	38	38	3
Total	-	507	211

Records of catch and effort

Some fishermen, both potters and divers, have kept records of their catch and the fishing effort expended to make that catch. The catch has in some cases been recorded as numbers of crawfish, and in others as weights. The effort in the case of pot fishermen is given by the number of pots hauled, and in the case of divers by the quantity of air used; the catch per unit of effort is then calculated as the weight or number of crawfish caught per 100 pots hauled or per 100 cubic feet of air used. Such a measure of catch/effort is a better indicator of the state of the stock than total landings, since landings may fluctuate because of changes either in effort or in abundance of the stock. The use of catch per effort will tend to eliminate that part of any fluctuation which is due to effort changes.

Records of pot fishing catch per unit of effort from both the north and south coasts of Guernsey suggest that during the summer months catches are very low, rising in late summer or early autumn to a peak in September-October, followed by a decline during the winter months (Fig. 1). Records of divers' catches per unit of effort would, however, seem to suggest that the best catches by this method of fishing are made in the spring and that catches tend to fall to low levels in the autumn (Fig. 2).

Since the two methods of fishing show different patterns, it is difficult to see which method gives the better indication of the abundance of crawfish. The divers' records would seem to indicate that the crawfish stock is at a peak much earlier than would seem to be the case if judged by the potters' catches. Under these circumstances it must be assumed that behaviour of the crawfish plays an important part in the success of fishing.

The records of the pot fishermen indicate that the catch per unit of effort was lower in 1970 than in 1968 or 1969, but it is too early yet to say whether this is part of a downwards trend or whether 1970 was a poor year due to other causes.

#### Catch measurements

A number of crawfish from the Guernsey fishery were measured in 1968, 1969 and 1970. The carapace length was measured as described by Hepper (1966) to the millimetre below; the results are shown in Fig. 3. Since it has only been possible to measure small numbers at any time it is not yet possible to compare the size distribution of potters' and divers' catches, or to compare the size distributions from different areas around the coast. The data in Fig. 3 are from all coasts of Guernsey and from crawfish taken by both pots and divers.

It will be noticed from Fig. 3 that the catch is predominantly of female crawfish. The highest sex ratio observed was 28 males per 100 females in 1968, falling to 5 males per 100 females in 1970. It will also be noticed that most of the female crawfish taken are between 110 mm and 150 mm carapace length. A similar size distribution has been noticed for crawfish taken off Cornwall (Hepper 1970).

#### Tagging experiments

A total of 421 tagged crawfish have been released off Guernsey since 1968, as shown in Table 2. The crawfish were tagged with an arrow-shaped tag, cut from plastic sheet, the tag being inserted between the second and third abdominal segments.

To March 1971, 23 of these tags have been returned, as shown in Table 2. From this table it will be noticed that most of the crawfish were recaptured close to the point of liberation; only two (1006, 1060) show appreciable movements of 9 and 5 miles after 46 and 48 weeks at liberty respectively.

Table 2 Record of tagged crawfish recaptured from Guernsey tagging experiments

Tag No.	Sex	Release date	Time free	Distance moved (miles)	Growth (mm)
1108	M	10 Dec '68	6 weeks	0	-
1106	F	12 Sept '68	36 weeks	0	-
1115	M	10 Dec '68	1 year	0	-
1141	F	9 Aug '69	2 weeks	0	-
1140	F	9 Aug '69	5 weeks	0	-
1183	F	7 Oct '69	6 weeks	0	-
1248	F	14 Aug '69	6 weeks	0	-
1153	F	14 Aug '69	8 weeks	0	-
1013	M	30 Oct '69	12 weeks	0	8
1169	F	14 Aug '69	14 weeks	0	-
1243	F	13 Aug '69	36 weeks	0	2
1038	F	30 Oct '69	39 weeks	0	-
1055	F	31 Oct '69	42 weeks	0	-
1006	F	30 Oct '69	46 weeks	9	4
1060	F	31 Oct '69	48 weeks	5	21
1008	F	30 Oct '69	49 weeks	0	14
1233	M	13 Aug '69	1 year, 3 weeks	0	-
1228	F	11 Aug '69	1 year, 4 weeks	0	-
1001	F	30 Oct '69	1 year, 6 weeks	0	-
1204	F	9 Aug '69	1 year, 17 weeks	0	5
1096	F	24 Aug '70	1 week	0	-
1406	F	26 Aug '70	3 weeks	0	2
1396	F	26 Aug '70	6 weeks	0	10

It will be noticed that only a very small proportion of the tags has been returned, the highest rate being 15% from the 1968 experiment. However, since it was possible to release only 20 tagged crawfish in that year, it would be unwise to place much weight on the results. From the 217 tags released in 1969, 13 (6%) were returned during the first year after release, with a further 4 tags (2%) returned after more than a year at liberty. In the part year since the 1970 tag releases, 3 of the 184 (1.6%) have been returned.

Table 3 Details of recaptured tagged crawfish which have shown growth increments during the period at liberty

Tag No.	Sex	Carapace length (mm) at		Growth (mm)
		Release	Recapture	
1006	F	135	139	4
1008	F	113	127	14
1013	M	133	141	8
1060	F	131	152	21
1204	F	141	146	5
1243	F	130	132	2
1396	F	117	127	10
1406	F	135	137	2

Of the tagged crawfish returned 8 had increased in length by from 2 to 21 mm carapace length (Table 3). It will be noticed that one crawfish (1060), originally 131 mm carapace length, was 152 mm carapace length on recapture 48 weeks later. This increment of 21 mm would seem to be substantially larger than the others noted and it may be that this crawfish had moulted twice in its period of liberty. The two crawfish (1243, 1406) showing increments of 2mm may represent errors in measurement, since the carapace of crawfish is slightly flexible and it is quite easy to compress it slightly with the callipers when measuring.

The growth increments in the present study are considerably higher than those recorded from Cornwall (Hepper 1970). However, it will be noticed from Table 2 that of the 5 crawfish returned after a year at liberty only one (1204) shows a growth increment (of 5 mm). It therefore seems that the annual growth rate off Guernsey is low.

#### Discussion

Although the present investigation has only been going on for two seasons, certain preliminary conclusions may be drawn.

It appears that off Guernsey during 1968, 1969 and 1970 the best catches of crawfish were made in autumn by pot fishermen but rather earlier in the year by divers. A similar situation has been noted in Cornwall (Hepper 1970). It is also clear that there has been a substantial fall in the catch per 100 pot-days from both north and south coasts of Guernsey from 1968 to 1970, suggesting a reduction in the available stocks of crawfish over this period.

Catch measurements from the Guernsey crawfish fishery indicate that the fishery is taking only the larger members of the population, and the sex ratio shows a very low proportion of male crawfish in the catch. The size distribution is similar to that observed in Cornwall (Hepper 1970).

The tagging experiments suggest that there is little movement within the fishery, and that fishing is apparently removing only a small proportion of the stock. It is possible that the tagged crawfish are not being returned in representative numbers, and hence fishing may have a greater effect on the stock than is suggested by the tag returns to date. The growth increments of recaptured tagged crawfish seem to be rather higher than noted in similar experiments off Cornwall (Hepper 1970), and it will be interesting to see what growth increments are shown by any tagged crawfish returned in the current season.

References

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HEPPER, B. T., 1970. Cornish crawfish investigations. M.A.F.F. Laboratory Leaflet (new series) No. 22, 21 pp.

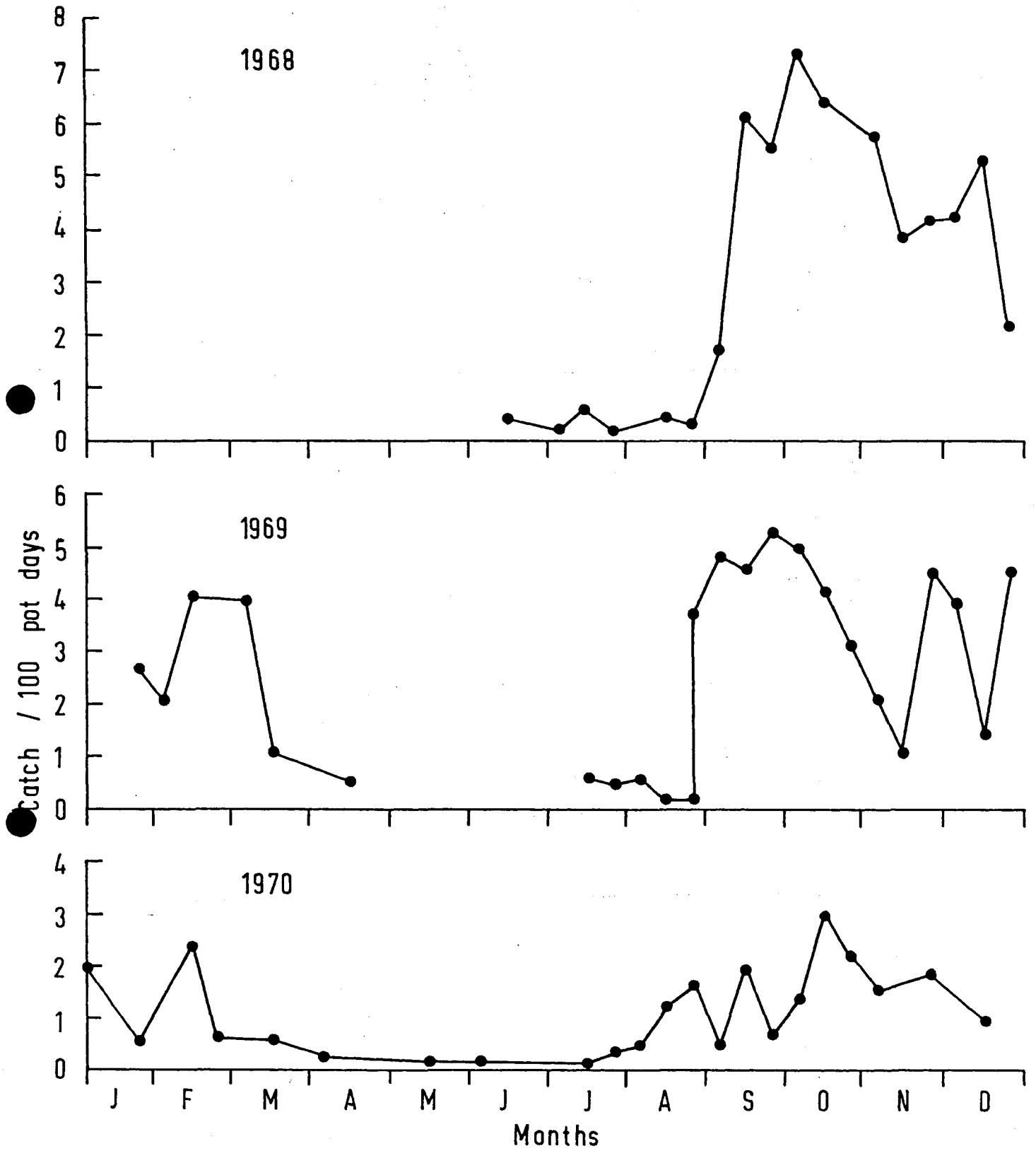


Fig. 1a Catch per 100 pots of crawfish from the north coast of Guernsey.





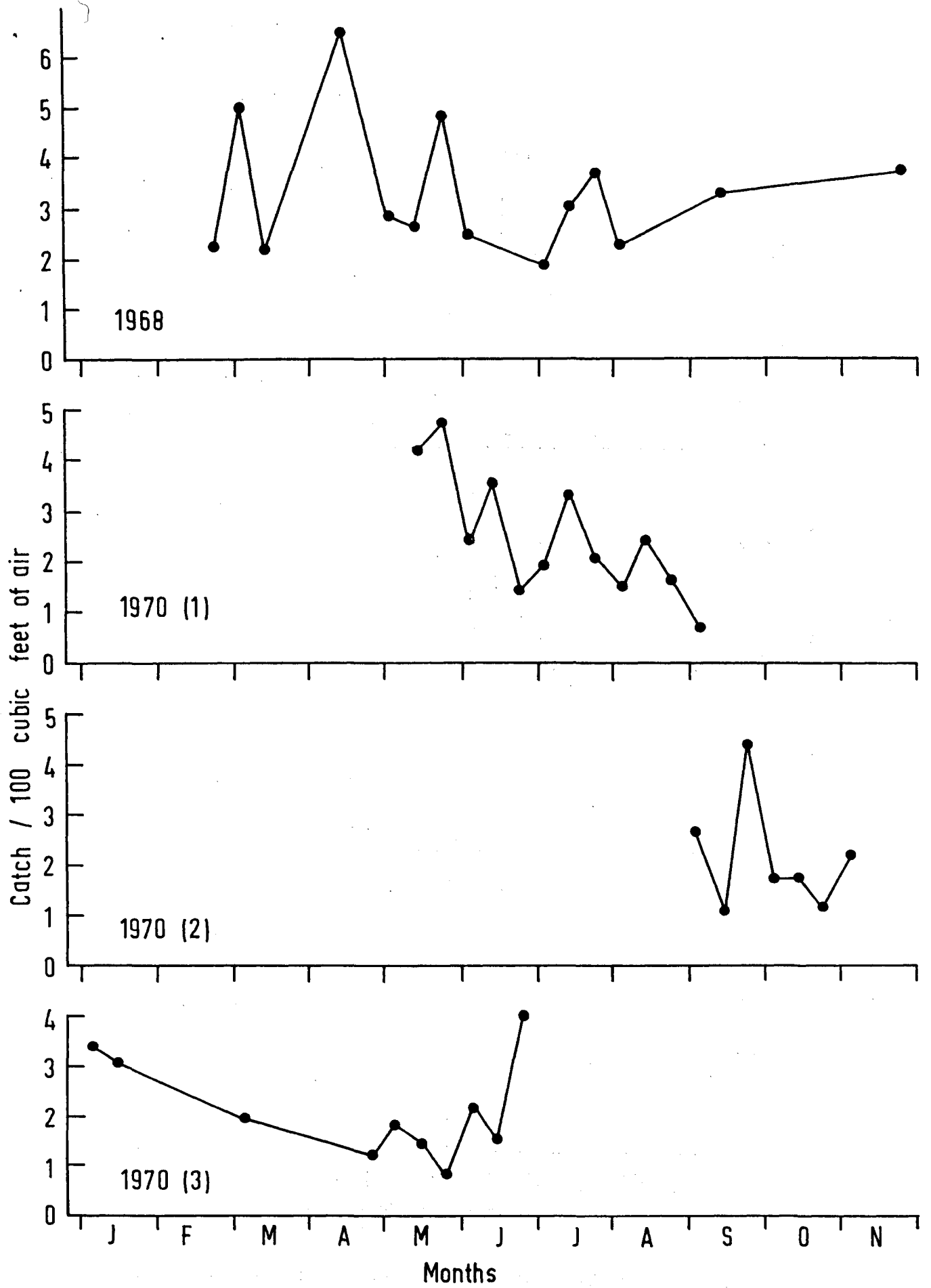


Fig. 2 Catch/100 cubic ft of air of crawfish off the coast of Guernsey.

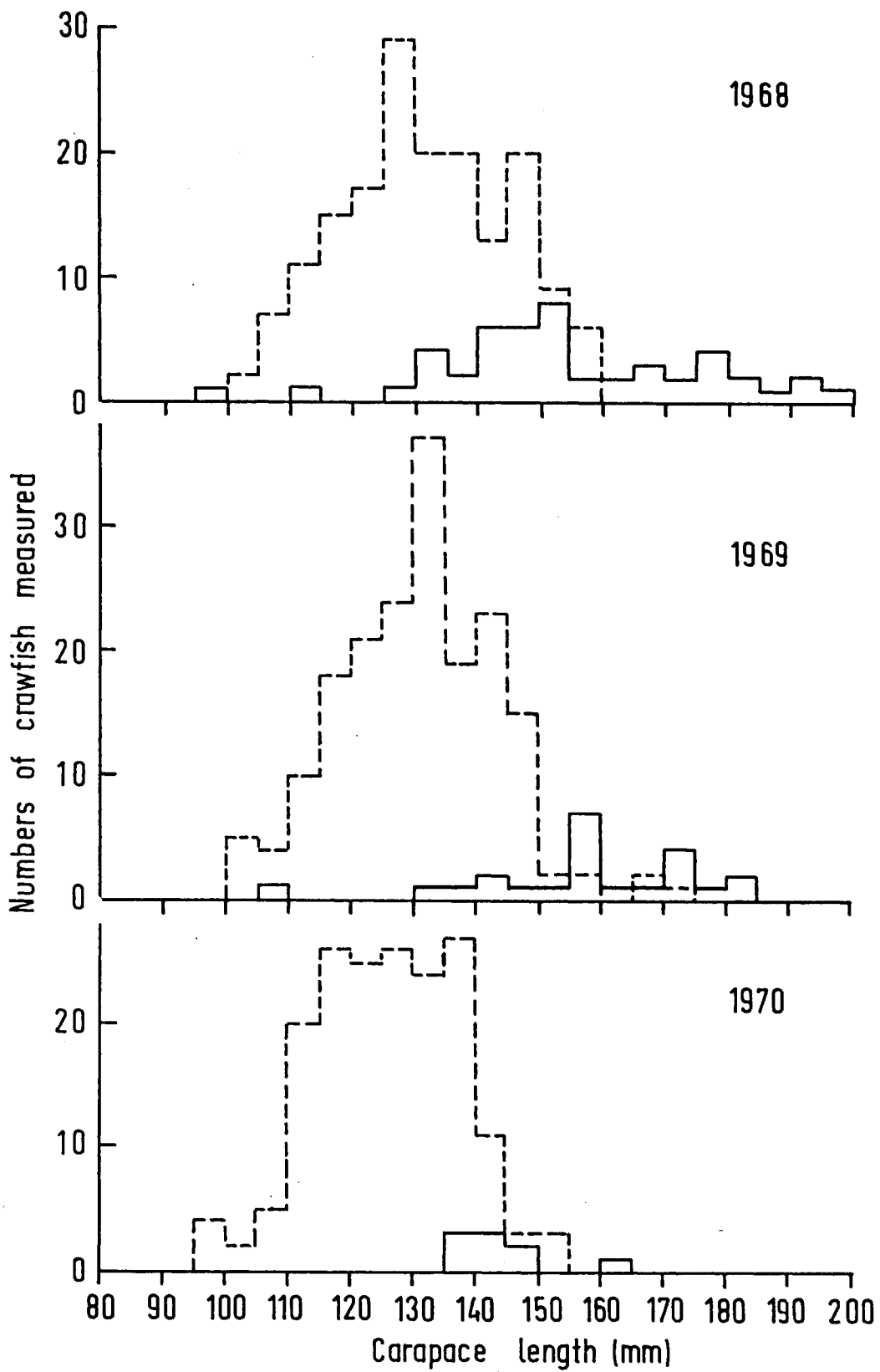


Fig. 3 Size frequency distribution of crawfish from Guernsey. Broken line - female, solid line - male.