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SEA FISH INDUSTRY AUTHORITY
Marine Farming Unit - Ardtoe

LOBSTER STOCK ENHANCEMENT TRIALS

PROGRESS REPORT SEPTEMBER 1986

Internal Report No. 1295

September 1986

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SUMMARY

This report describes the progress with the lobster stock enhancement trial since May 1985. Proof now exists that lobsters grown at Ardtoe can exist in the wild for subsequent recaputre.

1. Introduction

This report provides details of progress in the lobster stock enhancement trial since May 1985. Considerable advances have been made towards proving that hatchery reared lobsters can survive in the wild and the first returns of tagged lobsters were obtained during 1985. The production of juveniles has generally been good, though 1986 turned out to be a relatively poor year. Thus, whilst the field trials have progressed well, further work on husbandry and production is required to overcome the problems experienced in 1986.

2. Juvenile Production

During the summer of 1985 some 7000 juvenile lobsters were ongrown. Of these, 5200 were tagged for transport to Orkney the remainder being retained to supplement the local releases in 1986. Fresh broodstock for the winter rearing programme were purchased during November and acclimated to elevated temperatures. Three females subsequently died and one was sent to DAFS, Aberdeen for analysis. However, there were no further losses and the mortalities were probably due to prolonged storage and handling prior to purchase.

The first larvae were collected on 27th January but production was slow and quality of larvae variable. Egg loss was also noticed in the stock. After consolidation of 1985 juveniles (removal of cripples and runts) there were approximately 1200 juveniles for release. Delays in the release date due to illness, breaking down of boats and severe weather led to losses of the juveniles and consequently 583 were available for release

on 9th September.

Obtaining fresh broodstock for the summer production programme proved difficult owing to poor weather keeping creel boats in port during March and early April. Eventually 31 females were obtained from Wilsons of Holyhead. However these animals had an average weight of 3.8 lb. (1.5 lb. being optimum) and were too large for our holding facilities, with the result that massive egg loss was experienced. A further batch of smaller females was purchased to replace the spent ones. In general the egg condition of females was behind that of similar stock in the summer of 1985. Larval survivals were also lower at 18.8% (cf 35% in 1985). This reduction in survival was probably due to nutritional deficiences of purchased frozen mysids in comparison with fresh, locally caught mysids which were virtually unobtainable in 1986. Low larval survivals and difficulties with broodstock selection early on in the season will thus mean that we will have around 2500 animals suitable for release in November.

3. Juvenile Releases

1,335 juveniles produced during the winter of 1984-85 were released locally during July 1985 (see Release areas Table 1 + Fig.1). A grid was laid at the Farquars point site to aid in the identification of the release area when searched. 535 juveniles were laid on the grid to give a density of approximately $1/m^2$.

On 16th October, 5200 juveniles were transported by road from Ardtoe to the lobster holding facilities of Orkney Sea

Foods, Kirkwall Ltd. for storage prior to release. Unfortunately, a pump failure caused the mortality of 1200 juveniles. The remainder were distributed at suitable sites around Scapa Flow which had been identified during survey dives in August. The juveniles were transported to the release sites in water and were consequently in better condition at release than during 1984, displaying hiding and digging behaviour almost immediately.

The release of the 1985-86 winter production finally took place on the 9th September. Forty of this stock have been retained for tag retention trials, nutrition and growth studies.

4. Lobster Tag Detection + Recaptures

Searches of release areas close to Ardtoe were carried out in June '85 and on areas in Scapa Flow, Orkney during August '85. Five tagged juveniles were found from the releases in 1984. Two were found local to Ardtoe and three in Scapa Flow (details in Table 2). These captures proved that hatchery reared lobsters could survive in the wild for one year at least.

Further searches were carried out during summer 1986 but none of the few juveniles which were caught possessed tags. In addition it was hoped to find a method of capture which did not require divers to destructively search the reefs. The method chosen was the use of prawn creels. Two types were tried, the first being a commercially available traditional Scottish prawn creel (eyes 9cm mesh 3cm Kn-Kn) and the other of similar design but with smaller eyes and mesh (5cm and 2cm respectively). It was hoped that the latter would allow juvenile lobsters to enter

but stop the entry of velvet and shore crabs. Creeled animals were measured, weighed and sexed and then tail-punched with a binary code (Table 3).

Lobsters with carapace lengths of less than 60mm were retained to check for the presence of tags, the others being re-released to the area where caught. Many of the juveniles which have been caught are too large to pass easily through the existing quality control device. Prior to purchasing our own larger detection system, the newly purchased MAFF machine was borrowed to evaluate its usefulness. Tagged and un-tagged lobsters of all sizes were passed through it and detection was 100% accurate although it was possible to obtain a false positive by jarring the machine.

5. Catch Effort Data

It is most important that background information on the lobster fishery in Scapa Flow should be obtained prior to the recruitment of hatchery reared stock, so that the impact of the release programme can be accurately assessed. Consequently we have requested Dr. J. Kinnear of DAFS Marine Laboratory, Aberdeen to carry out the collection of catch statistics in the area for us.

6. Lobster Nutrition

Any commercial hatchery system for lobsters will require the incorporation of automated feeding and husbandry to reduce costs incurred with the present equipment. Much work has already been

done with fairly crude diets to indicate the most economical one for our present lobster ongrowing systems. There is, however, a need for more fundamental research into the nutritional requirements of the lobster to ascertain the best feeding regime. Thus a joint project on lobster nutrition has commenced with Heriot Watt University. The initial part of this work being to review all of the present literature available on diet and nutrition, using Heriot Watt's on-line computer database search facilities, with two ends in view:

i) To provide information on dietary requirements and on diet trials previously carried out. This should avoid repetition of previous work while indicating the ingredients and physical requirements of a 'concensus' diet.

ii) To highlight deficiencies in the research where our joint facilities could be best used.

7. Future Work

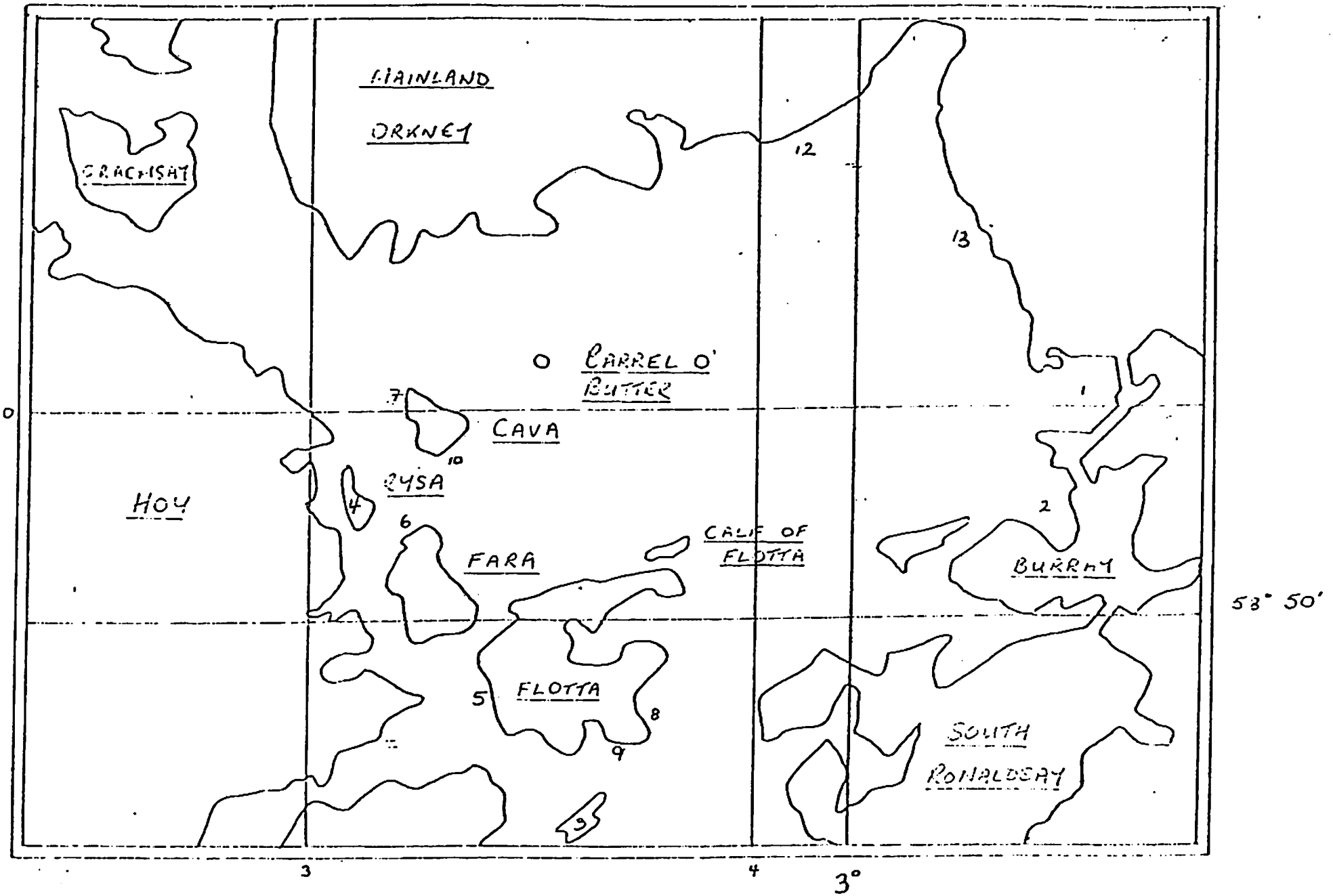
The work to define optimum diets and manufacture trial diets with vigorous quality control will be commenced before the end of 1986 with a view to undertaking comparative trials in 1987. In addition, research into the digestive processes of lobsters by Heriot Watt should give a further guide to substrates which can be used by the lobster e.g. protein saving by the use of carbohydrates as the main energy source.

We are presently in the process of obtaining our own tag detection system for larger animals and, which will allow the expansion of our fishing programme to capture lobsters without the use of divers.

Our broodstock holding facilities and husbandry are to be improved along MAFF lines to avoid a repetition of the poor production of 1986. This will involve much closer monitoring of broodstock and water quality.

We are presently designing a more intensive ongrowing system in an effort to save space. The first modular unit will be ready this winter for testing.

Fig. 1



SCAPA FLOW : RELEASE SITES

Table 1.

Release sites and numbers released

Site	1984	1985	1986	Map
Orkneys				1
St. Marys Bay	560			2
Echnaloch Bay	560			3
Switha	1200	200		4
Rysa	1280	640		5
W. Flotta	560			6
N. Fara	320			7
N.W. Cava	225	640		8
E.Stanger Head		640		9
S.Stanger Head		640		10
S. Cava		240		11
Hang Back		500		12
58°53'W 3°1'N		500		13
Ardtoe				
S.Channel L.Moidart	80	320	80	
Gorten E.	160		180	
Gorten W.	240	480	180	
Farquars Point		535	100	

Table 2.

Returns of tagged lobsters

Date	Site	Carapace length (mm)	Weight
4.6.85	MacQueens Bay	31.0	14.15g
11.6.85	S.Channel Loch Moidart	41.4	44.5
12.8.85	Echnaloch Bay (Orkney)	22	Not taken
12.8.85	Echnaloch Bay	18	"
13.8.85	Switha Island (Orkney)	22	"

Table 3.

Captures of Juvenile Lobsters by coding

	C.L.(mm)	Weight (g)	Sex
1	77	320	F
2	67	193	F
3	49	78	F
4	54	95	M
5	58	105	M
6	76	281	M
7	60	143	M
8	46	65	M
9	64	186	M
10	60	119	F
11	76	281	F
12	69	233	M
13	60	137	M
14	72	-	F
15	51	-	M
16	49	-	F
17	55	-	M
18	77	310	M
19	45	56	M
20	63	162	F
21	64	181	M
22	55	105	F
23	60	161	F
24	67	201	M
25	72	285	M
26	77	314	M
27	49	76	F
Mean	61.9	177.7	M:F
SD. (n-1)	10.1	84.7	16:11