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RV *Aora* Charter Cruise

REPORT

4-14 March and 8-11 April 1991

Personnel

Part I: 4-14 March (Ref H40)

C Chapman	PSO (8-14 March)
A Weetman	ASO (4-8 March)
R Field	SERC Case student

Part II: 8-11 April (Ref H41)

C Chapman	PSO
R Field	SERC Case student
Mrs S Pihl Baden	(University of Götenburg, Sweden)

Objectives

1. Trawl survey of *Nephrops* stock abundance and composition in Clyde (Parts I and II), Sound of Jura and South Minch (Part I).
2. Studies of distribution, frequency of occurrence and survival of *Nephrops* with abnormal blood conditions.
3. Comparison of stomach contents, condition factors, biochemistry and blood physiology in normal and abnormal *Nephrops*.
4. Sea bed temperature measurements.

Narrative

Part I. Scientific staff joined *Aora* at Keppel Pier, Millport on 4 March. After loading and setting up equipment the vessel sailed at 1035. During the first two days trawling was carried out at five locations in the Clyde Sea area. *Nephrops* catches were generally poor so it was decided to move out of the Clyde. Between 6-10 March improved catches were obtained in the Sound of Jura, off Mull, Staffa, the Small Isles and in Loch Linnhe. C Chapman replaced A Weetman on 8 March at Oban. *Aora* returned to the Clyde on 11 March. Six trawl stations were worked around Arran, Cumbrae and in Loch Fyne and catches were much improved compared to the beginning of the cruise. Part I of the cruise ended at Millport on 14 March.

Part II. Scientific staff rejoined *Aora* at Keppel Pier on 8 April. Because of adverse weather conditions this part of the cruise was confined to relatively sheltered waters around Millport and in Loch Fyne. Due to an unfortunate illness R Field left the ship on 10 April and returned to Glasgow. The cruise ended at Largs Marina on 11 April.

Results

1. Trawling

The main purpose of the cruise was to assess the incidence of *Nephrops* with abnormal blood, the condition of the animals being assessed by their dull orange colour and by microscopic observation of the characteristically dense blood cell aggregations in the pleopods. Table 1 shows the incidence of the condition at each trawl station (see Fig. 1) on different occasions during the cruise. Because less severe cases of the condition are more readily distinguished by pleopod examination this method generally reveals a higher incidence than colour.

At the beginning of the cruise roughly half of all trawled *Nephrops* in the Clyde appeared to be abnormal, though samples were very small. By 11-13 March and during Part II in April the incidence of the condition had fallen to around 26-27%. A lower incidence was recorded in March at sites in the Sound of Jura and South Minch. At most sites females showed a higher incidence of the condition than males.

2. Survival Experiments

Groups of normal and abnormal *Nephrops* were held in tanks on board *Aora* during each part of the cruise. Each animal was identified by claw tagging after noting sex, carapace length, moult stage and degree of abnormality on a scale of 1-4 (from pleopod examination). At the end of each part of the cruise, the remaining animals were transferred to Glasgow University in order to continue the experiment. The results in Table 2 refer only to the experiment set up during Part I and subsequently assessed at Glasgow on 7 April. The results show 86% mortality of abnormals over 27 days compared to 47% in the case of controls.

3. Other Work

Blood cell counts were made on groups of normal and abnormal animals. Dr Baden collected specimens for haemocyamin, glycogen and heavy metal analysis. Results so far available show much variability but in general blood cell counts were elevated and haemocyamin concentration depressed in abnormals. Additional physiological work will be carried out on material taken to Glasgow.

C J Chapman
28 May 1991

Table 1

Incidence (%) of *Nephrops* with abnormal blood condition in trawl (BT126D) samples in the Clyde, Sound of Jura and South Minch assessed by A) colour and B) microscopic examination of pleopods. Positions numbered as in Figure 1. *indicates subsample taken.

Part	Area	Position	Date	Hours fishing	Catch No	A			B		
						M	F	M&F	M	F	M&F
I	Clyde	1. Cumbrae Channel	04 03	1½	8	20.0	33.3	25.0	-	-	-
		2. S of Little Cumbrae	04 03	1	34	28.0	77.8	41.2	-	-	-
		3. Loch Fyne	05 03	1½	31	30.4	50.0	35.5	27.3	62.5	36.7
		4. North of Arran	05 03	2	154	32.0	42.9	35.7	46.3	66.7	54.0
		5. Off Holy Isle	05 03	1	7	33.3	-	28.6	-	-	-
		Overall		7	234	30.8	46.2	35.9	42.7	66.2	51.1
	Sound of Jura South Minch	8. NW of Gigha	06 03	3	1,339*	18.2	16.7	17.8	18.5	-	-
		9. Ross of Mull	07 03	1	1,724*	20.5	18.8	19.9	24.9	-	-
		10. Loch Linnhe	08 03	½	1,017*	23.6	19.9	21.9	28.6	-	-
		11. Maxwell Bank	09 03	1½	774*	6.4	10.6	7.9	11.4	21.4	14.9
		12. South of Staffa	10 03	1	307	9.3	19.8	12.0	11.6	30.9	16.7
		Overall		7	5,161*	17.5	17.4	17.5	19.2	25.5	15.8
	Clyde	6. South of Arran	11 03	1	267	8.7	18.9	12.4	14.5	28.1	19.4
		5. Off Holy Isle	11 03	1	43	5.9	22.2	9.3	-	-	-
		2. S of Little Cumbrae	11;13 03	2	257	14.1	24.2	16.7	26.9	31.0	27.7
		1. Cumbrae Channel	12 03	1	750*	14.1	20.8	16.8	22.2	33.0	26.5
		4. North of Arran	12 03	1	474*	21.7	26.3	23.2	29.8	39.0	32.8
		3. Loch Fyne	13 03	1	127	8.4	28.1	13.4	13.7	42.4	21.1
		Overall		7	1,918*	14.7	22.5	17.4	21.8	33.7	25.6
II	Clyde	1. Cumbrae Channel	08 04	2	390	18.4	37.3	22.0	23.3	43.6	27.6
		3. Loch Fyne	09 04	3	137	18.0	42.3	22.6	18.8	63.0	27.3
		7. Skelmorlie	10 04	2	213	19.1	39.3	24.9	-	-	-
		Overall		7	740	18.5	38.9	23.0	21.7	50.0	27.5

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Table 2

Survival experiment (Part I). Cumulative mortalities within groups of normal (n = 51) and abnormal (n = 50) *Nephrops* maintained in tanks on *Aora* for three days and subsequently at Glasgow University for 24 days

	Days	Σ deaths		
		Normals	Abnormals	
	1	0	9	)
	2	2	14	) on board *Aora*
	3	2	16	)
	.	.	.	)
	.	.	.	) at Glasgow
	.	.	.	)
	27	24	43	)
Mortality %		47	86	

AORA 1991