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MRV *Alba na Mara*

Survey 1322A

PROGRAMME

7-15 September 2022

Ports

Loading: Fraserburgh, 06 September 2022 (provisional)

Sailing: Fraserburgh, 07 September 2022

Unloading: Fraserburgh, 15 September 2022

In setting the survey programme and specific objectives, etc. the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the Survey Report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

Costs to Project: 20175 (SU03C0) - 9 days.

Equipment:

BT 158 - rigged with SELTRA sorting box and 300 mm SMP
Trawl doors, sweeps, bridles, backstrops and pennants
Spare netting and twine
Photosynergy PSL-5000 light unit x 2 (green lights)
Photosynergy SLS-2500 light unit x 2 (green lights)
Photosynergy SLS-2500 light unit x 2 (white lights)
10 x 20 m Fibre optic side emitting light cables
Battery pods
LI-COR LI-192SA Underwater Quantum Sensors x 2
LI-COR LI-250A Light Meter
LI-COR LI-1500 Light Sensor Logger & U/W Housing
LI-COR 2222UWB Underwater cables 2 x 10 m, 1 x 100 m
LI-COR LI-180 Spectrometer & U/W Housing
RBR Solo³ Turbidity logger & sensor
Aquatec Turbidity logger & sensor
GoPro, Bowtech, Navigator Video Cameras & Lights
Flashback recorders and housing
Pyramid camera frames
Scanmar units – door, headline, wing, depth

Objectives

- Investigate whether artificial light can influence fish behaviour and enhance escape through a square mesh panel (SMP) in the extension of the trawl.

- Obtain video footage of fish behaviour when passing through the illuminated bottom panel of a SELTRA box fitted with 300 mm SMP on the top panel.

Procedure

Equipment will be loaded onto MRV *Alba na Mara* at Fraserburgh on 3 September (provisional) 2022, where the trawl will be rigged onto the net drum. Scientific staff will join Alba around 0830 on 7 September and will then leave harbour once all drills and familiarisation have been completed. The vessel will sail thereafter and steam, weather permitting, to fishing grounds in the Moray Firth or alternatively the Dog Hole approximately 9 nm east of Aberdeen. The first day will be dedicated for fine tuning the gear configuration with a number of short hauls carried out to ensure rigging, lights and sensors are operating as intended through observations with video cameras mounted on the trawl. After the rigging trials are complete the fish behaviour trials will commence. The intention is for *Alba* to work daily from Fraserburgh harbour but may need to change fishing grounds if fish species composition and size is not suitable or weather is not favourable. *Alba* will return to Fraserburgh on the evening of 14 September to unload equipment and scientific personnel on 15 September.

Fish Behaviour Trials

Although the trial configuration is likely to evolve during the length of the survey depending on observations, initially the BT158 trawl will be fitted with a SELTRA box that has a 300 mm SMP on the top panel, situated 9 m from the codline (Figure1). The bottom panel will be rigged with two fibre optic cables each illuminated by two Photosynergy LED pods (2 x SLS-2500 & 2 x PSL-5000) powered by 12 V battery packs. The SLS-2500 and PSL-5000 have the same output with the only difference being that the SLS-2500 is a newer, more compact unit. The light pod units will emit green light and hauls will be conducted either with lights off (control) or on (test).

For the first time ambient light and turbidity conditions as well as light spectrum changes from the artificial light source will be recorded in real time during all fishing operations. Two LI-COR LI-192SA underwater quantum sensors, coupled on a LI-COR LI-1500 light sensor logger (in a custom made underwater housing by the MSS engineering team), will be rigged to collect real time ambient and artificial light data, while turbidity will be recorded by an RBR Solo³ logger equipped with a Seapoint turbidity sensor. A second turbidity sensor and logger will be available (Aquatec Aqualogger 210 series) as a backup or if additional data collection is required. A LI-COR LI-180 spectrometer will record the light spectrum emitted by the artificial light source. The LI-180 will be positioned at various distances from the artificial light to examine how light spectrum might be altered through water and therefore the perception of light colour from fish as they approach the light source. The exact positions of all sensors will be determined during the trip. These data will provide information on the environmental conditions that might affect light propagation and how fish might perceive their surroundings during trawling.

The light units cannot be wound onto the net drum as it could damage the equipment. During hauling the net will be wound onto the drum up to the SELTRA, then the power block will be used to bring the codend aboard. Large bins will be used on deck to receive and store the catch from the codend. The catch will be sorted into key species, weighed and individual total length measurements recorded.

The vessel 12 hour period of operation will be provisionally 0700 to 1900 hours for the behaviour trials, so that all hauls will be conducted in daylight. Around four fishing hauls will be carried out each day, with the last haul being heaved up at 1700-1730 hours. Hauls will be between 60 and 90 minutes long initially, with the potential to be adjusted depending on the

catch volume. The net will be towed at three knots with Scanmar units monitoring door and wing spread and headline height during each haul. A provisional breakdown of the hauls during the survey is provided in Table 1.

DATE	Gear Configuration 1	Gear Configuration 2	Gear Configuration 3	Gear Configuration 4
06/09/2022	Loading Alba			
07/09/2022	Test haul / Shake gear	Test haul / Shake gear	Test haul / Shake gear	Test haul / Shake gear
08/09/2022	Light - Full Panel	No Light - Open Panel	No Light - Open Panel	Light - Full Panel
09/09/2022	No Light - Open Panel	Light - Full Panel	Light - Full Panel	No Light - Open Panel
10/09/2022	Light - Full Panel	No Light - Open Panel	Light - Full Panel	No Light - Open Panel
11/09/2022	No Light - Open Panel	Light - Full Panel	No Light - Open Panel	Light - Full Panel
12/09/2022	Light - Full Panel	No Light - Open Panel	Light - Full Panel	No Light - Open Panel
13/09/2022	No Light - Open Panel	Light - Full Panel	No Light - Open Panel	Light - Full Panel
14/09/2022	Light - Full Panel	No Light - Open Panel	Light - Full Panel	No Light - Open Panel
15/09/2022	Unloading Alba			

Table 1. Provisional schedule of trip and hauls.

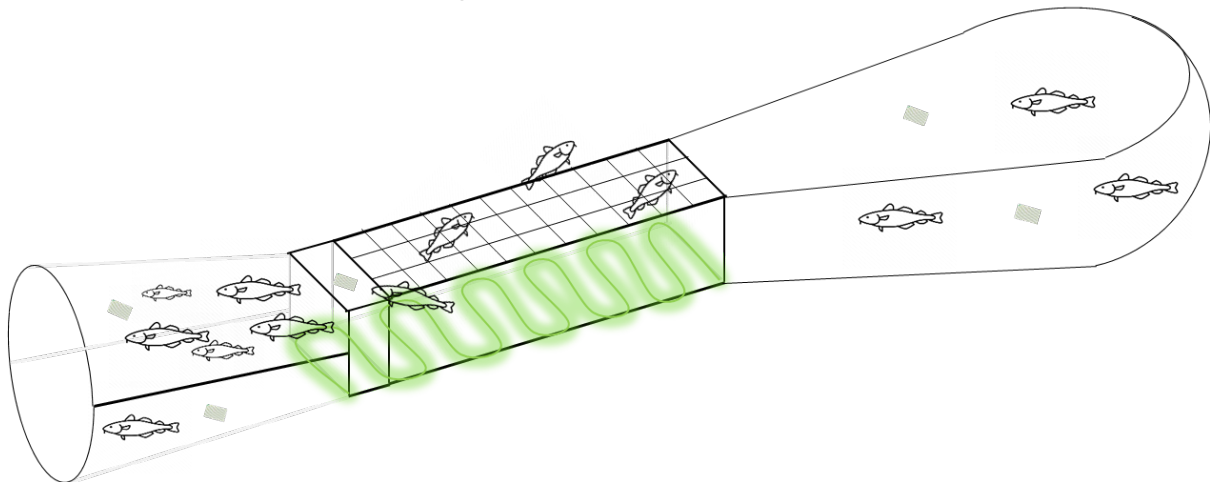


Figure 1. SELTRA box with 300 mm SMP and illuminated bottom panel.

General

There is no need for any night hauls during this cruise and work patterns will be arranged around the normal working hours/practices of the vessel. The survey will end in Fraserburgh on the evening of 14 September, with all staff, fishing gear and scientific equipment returning to the Marine Laboratory on 15 September.

Normal contacts will be maintained with the laboratory.

Submitted:
A. Edridge
10 August 2022

Approved:
I Gibb
11 August 2022