

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1979 RESEARCH VESSEL PROGRAMME

REPORT: Commercial Charter
FV TORBAY PEARL
FV NONO

STAFF:

S J Lockwood M G Pawson (part-time)
G Howlett D Eaton
D Swift B C Mumford (part time)

P Aughton) School of Biology
R Boutilier) University of East Anglia

DURATION:

11 August - 7 September. All times BST

LOCALITY:

Mevagissey - Falmouth

AIMS:

1. To make further observations on the effects of holding mackerel at different densities in keep nets.
2. To measure mackerel tagging mortality rates.
3. To make observations on the biochemical changes in mackerel tissue resulting from exercise and stress.
4. To examine the respiratory physiology of mackerel.

NARRATIVE:

Fisheries Laboratory staff arrived in Mevagissey during the afternoon Saturday 11 August and discussed the following day's plans for unloading and parking the caravan laboratory with the village policeman and harbour master. The caravan was unloaded and in position on the quay by 0730h 12 August; the rest of the day was spent unloading all other equipment and making up keep nets. All the keep nets (1 x 1m³, 2 x 3m³ and a hexagonal net 6m on the long axis by 3m deep) were made up and anchored in position by 15 August when Mr Mumford returned to Lowestoft. Also Messrs Aughton and Boutilier arrived in Mevagissey and Mr Eaton joined FV NONO in Falmouth on 15 August.

Poor weather conditions prevented fishing before the evening 17 August when sufficient fish were caught to stock the laboratory holding tank. Fishing to stock the keep nets began on 18 August and continued until 4 September. Mackerel were never abundant but best catch rates were obtained between dawn and 0900h. Only on the last day, 4 September,

were mackerel caught continuously and the deck tank filled rapidly. On five occasions during the charter sea conditions caused excessive turbulence in the deck tanks and rendered fishing impractical.

The UEA staff completed their work on Friday 31 August and left for Norwich the same day. On 4 September two of the four keep nets were dismantled and brought ashore, the remaining two were brought ashore 5 September after the caravan had been removed from the quay.

Staff returned to Lowestoft 7 September.

RESULTS:

1. Eleven trials were carried out with the keep nets, 5 simple crowding trials in the 1m³ and 6 stressing trials with 1m³ and 3m³ keep nets. In all trials fish densities were considerably lower than those used in 1973 but although the physical effects of stress and crowding were not so severe as at higher densities the results indicated that stressed mackerel have a low probability of survival.

2. 110 mackerel were tagged with internal tags and released into the 6m x 3m hexagonal net. For each tagged fish an untagged fish visually matched for colour, condition and size was released without being subjected to the handling stress of measuring and tagging. The fish were held for 15 days during which time (but mainly within the first week) 15 tagged and four untagged fish died.

3. Blood samples were collected from fresh caught fish and fish subjected to a variety of stress regimes. The samples were frozen and returned to Lowestoft for analysis.

4. Breathing rate, pattern and buccal and opercular pressures were recorded. Mackerel swimming at low speeds (< 0.4 m/sec) exhibit a coupled buccal-opercular breathing pattern similar to other teleosts. This active ventilation is superseded by passive ventilation (ram jet ventilation) when fish approach swimming speeds of 0.8 m/sec and above. Arterial blood measurements show that mackerel can oxygenate their blood irrespective of forward swimming speed.

Mackerel that have been swimming at high velocities for more than 1 hour or so exhibit an arterial acid-base disturbance which has a respiratory, but to a greater extent a metabolic, acid component. Lactate analysis along with Na⁺, K⁺ and Cl⁻ ion determinations will further clarify the underlying cause of this disturbance.

5. Throughout all aspects of the work summarised in paragraphs 1-4 above close attention was given to the colour of the fish. It was concluded that mackerel showing any blue coloration, whether patchy or uniformly blue, were suffering from stress and less likely to survive than fish which were the uniformly pale green of freshly caught fish.

6. During the period of work in Mevagissey we received visits from Mr P Martin (FO, Newlyn), Mr B Tonkin (Chief Fishery Officer, Cornwall SFC) and Mr J Faull (member, Cornwall SFC).

Dr Lockwood and Mr Howlett paid a courtesy call to the Devon SFC boat SPIRIT OF DEVON when it made an overnight stop at Mevagissey during a patrol.

Stephen J Lockwood
19 September 1979

INITIALLED: AJL

DISTRIBUTION:

Basic list +

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