SECTION 3: THE FISHES OF THE TWEED AND THE EYE

B.1: Flounder
Platichthys flesus

Photo B.1.1: A Flounder netted in the Tweed estuary at Gardo

This is the only flatfish in Europe that regularly enters freshwaters, where they can live in lochs as well as rivers – in Loch Lomond, some 50kms from the sea, they have been found at depths of 100m. Generally 20 to 30cm (8-12") as adults, they can very occasionally reach 50cm (20") and 3.5kg. In April and May, they migrate to their spawning grounds off the coasts but the young fish often move into fresh water for a year or so, where they feed on bottom living invertebrates.

Photo B.1.2: Flounders are famous for being able to blend into their backgrounds to hide from both predators and their prey

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Flounders on the Tweed: Dr.George Johnston's *"A List of the Fishes of Berwickshire, exclusive of the Salmones"* (History of the Berwickshire Naturalist's Club, 1838) states that the Flounder "*Ascends the Tweed as far as the Till, which river it also enters. Found in the Whiteadder, and in our other burns which have communication with the sea*." George Bolam's *"The Fishes of Northumberland and the Eastern Borders"* (History of the Berwickshire Naturalist's Club, 1919) is less specific, simply saying that "*The Common Fluke is well known along the coast, and ascends all our burns and river till stopped by some unsurmountable obstruction, considerable weirs being frequently successfully passed. …. For the table, it is the least favoured of the family, but in Tweed, and elsewhere, it is much sought after by Cormorants and Divers, and appears to be a favourite food of the Otter. I have taken small ones from the maw of a trout, and have occasionally caught it on artificial fly*."

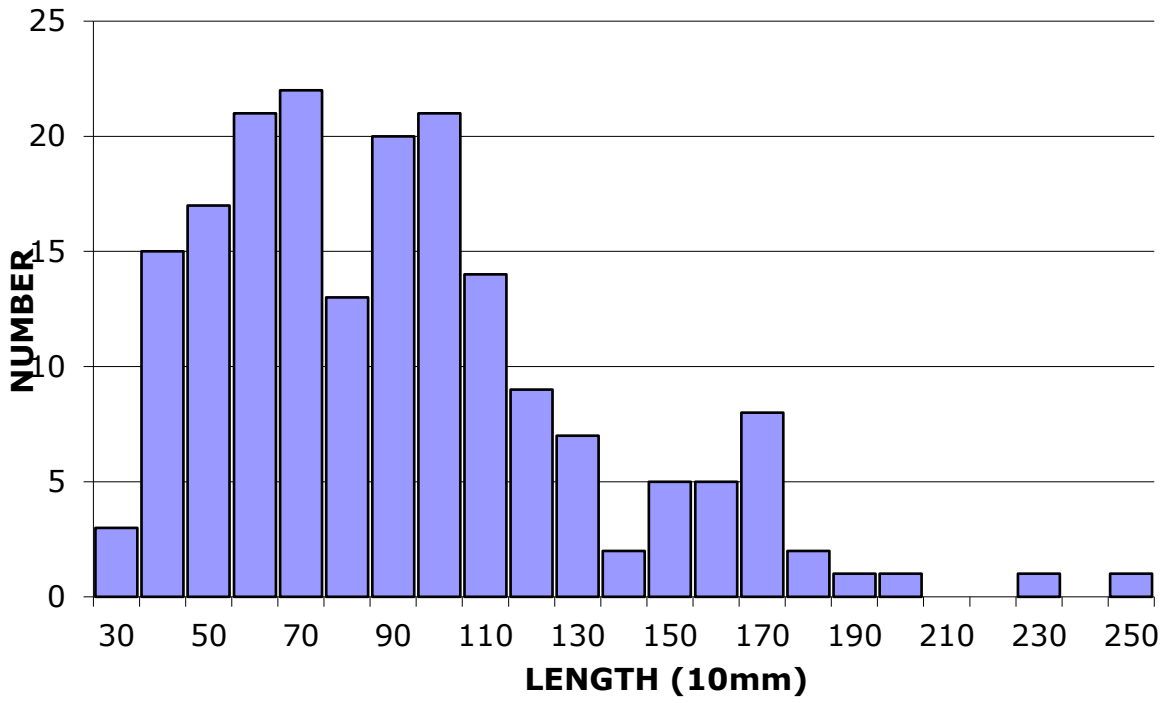
Diet of Tweed Flounders: There have been two studies of the food eaten by Flounders in the Tweed. The first was of 50 Flounders averaging 176mm in length taken in the Norham area in September 1938 (Radforth 1940) and the second of 80 stomachs taken from fish caught in the Horncliffe area in Spring 1974 (made up of 15 stomachs taken in February, 5 in March and 60 in April, sampling being at the Union Bridge and at Norham Bridge). The results of these two studies are shown in Table B.1.1.

Prey Category	Radforth 1938	Edwardson 1974
Midge Larvae	88.89%	61.02%
Midge Pupae	8.50%	1.58%
Oligochaet Worms	0.74%	3.16%
Snails	0.70%	11.10%
Mayfly nymphs	0.50%	9.35%
Water Beetle larvae	0.35%	0.00%
Caddis larvae	0.19%	1.34%
Stonefly nymphs	0.03%	0.00%
Water Mites (Hydracarina)	0.03%	0.12%
Freshwater "Shrimps"	0.02%	11.28%
Leeches	0.01%	0.29%
Water Boatmen	0.01%	0.76%
Fish	0.01%	0.00%
TOTAL	**100.00%**	**100.00%**

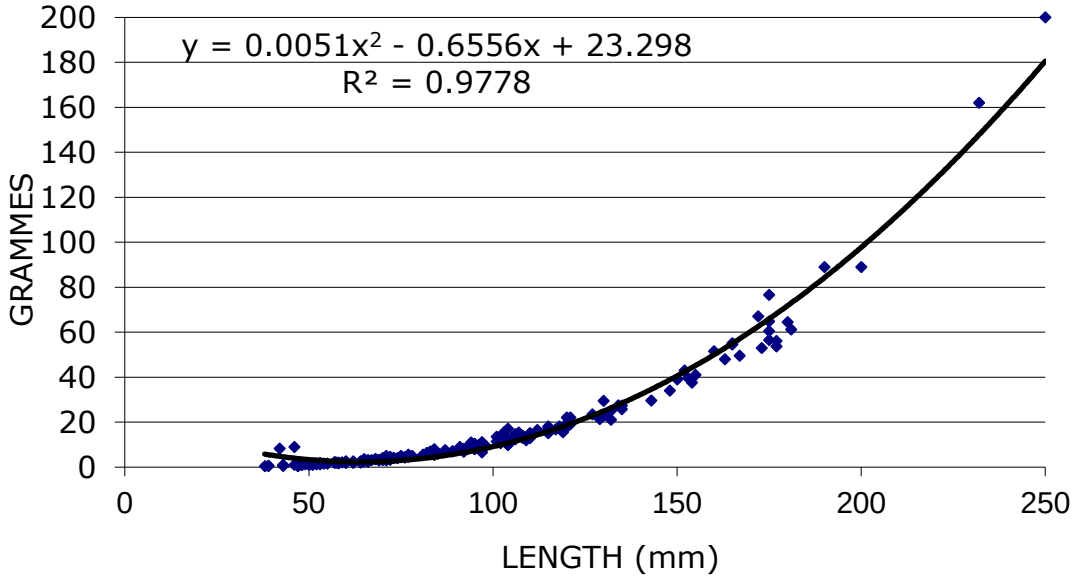
Table B.1.1: The percent composition of diet of Tweed Flounders

In both samples, Midge (Chironomid) larvae predominated. In the 1938 September sample, of the 8,767 individual items of prey identified, 7,791 were Midge larvae and 48 out of the 50 sampled Flounders had eaten them. No other prey category reached 10% of the diet, only Midge pupae coming close to this level, at 8.5%. In the 1974 spring sample, Midge larvae again predominated, making up 61% of the diet (1,041 out of 1,728 individual prey identified) and occurring in 73 of the 80 fish sampled. This spring sample showed a somewhat more diverse diet, with Snails, Freshwater "Shrimps" (*Gammarus* and *Asellus*) contributing just over 10% each and Mayfly nymphs just under.

Sizes and Ages: The Length – Frequency pattern of the Flounders sampled in the Horncliffe area in spring 1974 is shown in Graph B.1.1. Four distinct peaks can be seen in this distribution, at around 60-70mm, 90-100mm, 170mm and 240 mm. Otolith readings (otoliths are the ear bones of fishes and some species show patterns of growth in these that can give their ages) confirmed that these peaks represent Flounders of one, two, three and four years of age.



Graph B.1.1: The Lengths of Flounders sampled in the Horncliffe area, Spring 1974



Graph B.1.2: The Length – Weight relationship of Flounders sampled in the Horncliffe area, Spring 1974

Flounders as Prey: Flounders are a popular prey of fish-eating birds. A 1972-73 study of the stomach contents of 26 Cormorants shot on the lower Tweed found 36 Flounders amongst the 137 individual fish of all sizes that had been eaten (MacIntosh, 1978).