



# THE *Tweed* FOUNDATION

A Tweed Foundation Paper

## 3 THE FISHES OF THE TWEED AND THE EYE

### C.2

### Beardie *Barbatulus barbatulus* Stone Loach

*“The inhabitants of Italy ..... cleaned the Loaches, left them some time in oil, then placed them in a saucepan with some more oil, garum, wine and several bunches of Rue and wild Marjoram. Then these bunches were thrown away and the fish was sprinkled with Pepper at the moment of serving.”*

A recipe of Apicius, the great Roman writer on cookery. Quoted by Alexis Soyer in his “*Pantropheon*” published in 1853



Photo C.2.1 : A Beardie / Stone Loach

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A charitable trust established by the River Tweed Commission to promote the development of fish stocks in the Tweed River System

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The Beardie / Stone Loach is a small, purely freshwater, fish, 140mm (5.5”) in length at most. Its body is cylindrical except near the tail, where it is flattened sideways, its eyes are set high on its head and its mouth low – all adaptations for life on the bottom in amongst stones and debris. Its most noticeable feature is the six barbels set around its mouth (from which it gets its name “Beardie”), with which it can sense prey, also an adaptation for bottom living. Generally gray and brown, its tail is bright orange. It spawns from Spring to late Summer, shedding its sticky eggs amongst gravel and vegetation. For a small fish it is very fecund, one 75mm female was found to spawn 10,000 eggs in total in spawning episodes from late April to early August.

The species is found in clean rivers and around loch shores throughout west, central and Eastern Europe and across Asia to the Pacific coast. In the British Isles they were originally found only in the South-east of England, but they have been widely spread by humans for use as bait – Loach Tails are still used as bait for Salmon in some places – or for food:

*“The flesh is accounted excellent; and in some parts of Europe these little fishes are in such estimation for their exquisite delicacy and flavour, that they are often transported with considerable trouble from the rivers they naturally inhabit to waters contiguous to the estates of the wealthy. Linnaeus, in his Fauna Sueicca, says that Frederick the First, King of Sweden, had them brought from Germany, and naturalised in his own country.”*

(Yarrell, 1841)

In Elizabethan England, Loach (presumably cooked) were swallowed in glasses of wine, particularly when toasts were being drunk (Houghton, 1879). Walton (1676) records that they were regarded by some doctors as particularly good food for invalids. These uses make it quite likely that this species has been introduced to new waters as a resource.

**The Beardie on Tweed :** The Scottish name “*Beardie*” is recorded by an Edinburgh-based author in 1844, which suggests they had been familiar in at least this part of Scotland for some time (Wilson, 1844). The earliest references to them found so far on the Tweed are from Johnston’s “*List of the Fishes of Berwickshire...*” of 1838 in which they are noted as being “*In the Tweed and several of our burns*” and as having the local name of “Beardie”. Other early reports are in the New Statistical Accounts of the Parish of Yarrow, where they must be the fish described as “*barbels*” in the Yarrow Water, and of Hownam parish where they are reported in the Kale Water under their then scientific name (Anon, 1841). At the beginning of the 20<sup>th</sup> Century Bolam (1919) records them as being “*common and usually abundant in all our rivers and burns*”.

**The sizes of Beardies on Tweed:** The lengths of 708 Beardies taken in samples in 1979, 1991 and 1992-93 from a range of sites in the Tweed catchment are shown in Graph C.2.1. From this it can be seen that few reach over 100mm (4”). The small number of fish under 50mm recorded is due to the sampling methods. The 1979 and 1991 samples were taken in March and April, before the breeding season, when the smallest sizes are not present and the 1992-93 samples, though taken in July and August after breeding, were not designed to take very small fish:

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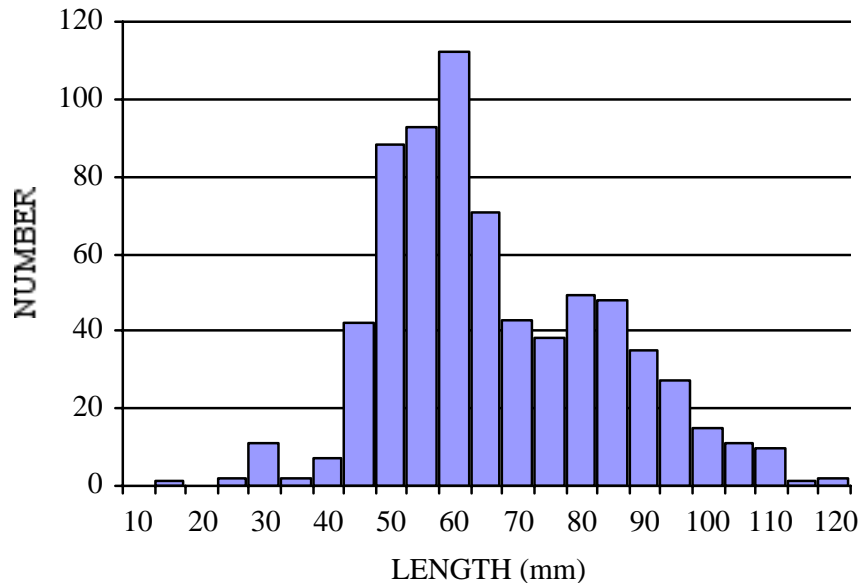
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Graph C.2.1: The Length Distribution of Beardies / Stone Loach in the Tweed Catchment.



The apparent peak at 65mm is an artefact of the sampling method : Electric-fishing is not very effective for fish of 50mm and less so the small numbers under that size are due to the sampling technique, not necessarily to any lack of small fish. The long spawning season, April to August, means that fish of the same age will cover a wide range of sizes, especially in the younger age groups but the peaks in this graph can be said to approximate to ages : Around 30mm to first year fish; 50 to 70mm to fish in their second; 80 to 90mm to three year olds and with four year old fish being the few large ones.

The length-weight relationship of the 1979 samples is shown in Graph C.2.2, from which it can be seen that 16 to 18g (around 0.6 oz) is the largest weight reached, about half the size of a Salmon Smolt.

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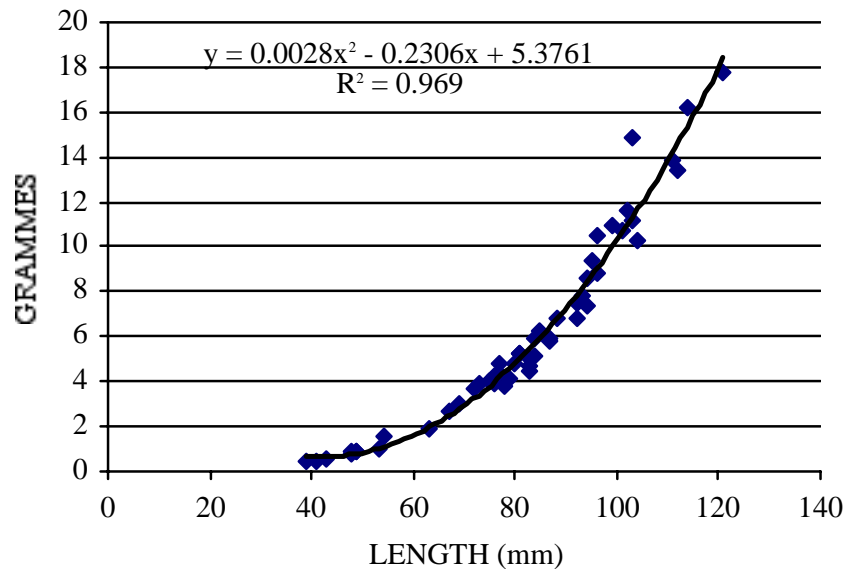
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Graph C.2.2: The Length – Weight Relationship of Beardies / Stone Loach found in samples taken from the Talla Water, Meldon Burn, Eden, Leet and Oxnam in March and April 1979



**The Ages of Beardies on Tweed :** These can be read from the otoliths (ear-bones) and operculi (gill-covers), where growth rings are visible. The 1979 study results (Crawford, 1979), read from otoliths, are shown in Graph C.2.3. The convention adopted for the ageing of this species is to take their “birthday” as the 31<sup>st</sup> of May. As the 1979 samples were taken in March and April, the “1 year” group represents fish at the end of their first year of life when they are from 40 to 50mm in length. No fish older than four were found, though at 110 to 120mm in length, the older fish are large for the species.

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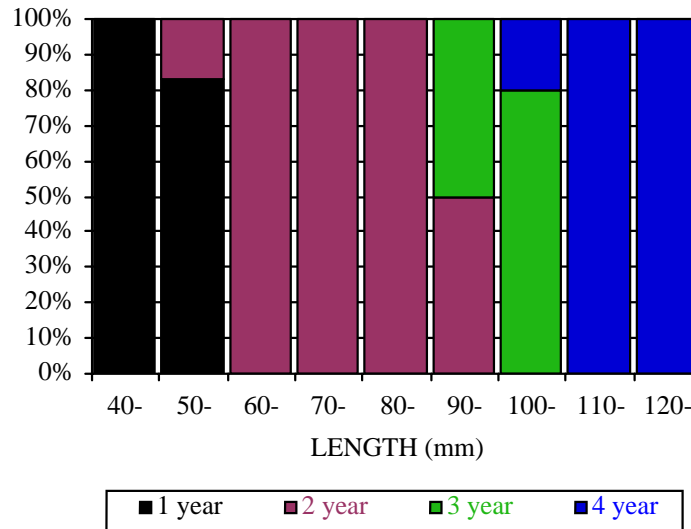
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Graph C.2.3 : The Ages of Beardies / Stone Loach found in samples taken from the Talla Water, Meldon Burn, Eden, Leet and Oxnam in March and April 1979



The samples of the 1991 study (Sinclair, 1991) taken from the Jed Water found the same range of sizes and ages, again with no fish over four years old.

**The Diet of Beardies on Tweed :** Beardies / Stone Loach are adapted for life on the bottom and this is reflected in their diet, as shown in the 1979 samples. There are two main ways of showing diet in fishes:

- 1) "Percent Composition" which is the total number of a prey species found in all the stomachs of the fish of a sample as a percentage of the total number of all prey species found in the sample stomachs.
- 2) "Percent Occurrence" which is the frequency with which a prey species is found in sample (i.e the number of fish in a sample that have eaten it).

Both these are generally used together, as neither method gives a full picture by itself: A prey species, for example, may be frequently eaten but never in great quantities. The Percentage Composition results for the 1979 samples are shown in Graph C.2.4a and the Percentage Occurrence in Graph C.2.4b. From these graphs it can be seen that while a range of insect nymphs and larvae occur at high and medium frequencies in the diet of these samples, in terms of the actual numbers eaten, the diet is completely dominated by Chironomidae (Midge) larvae – of the 2,616 prey items identified in these samples, 2,250 were Chironomid larvae.

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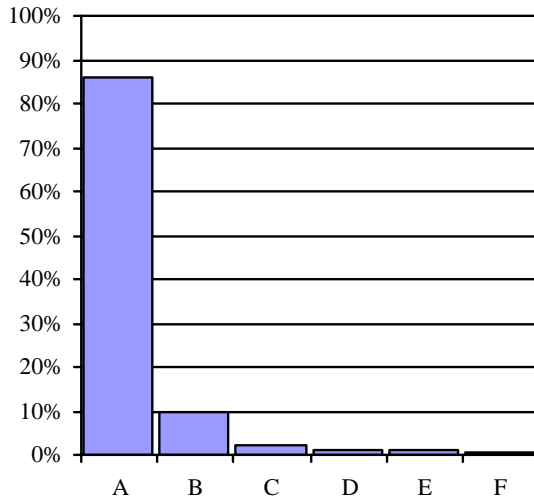
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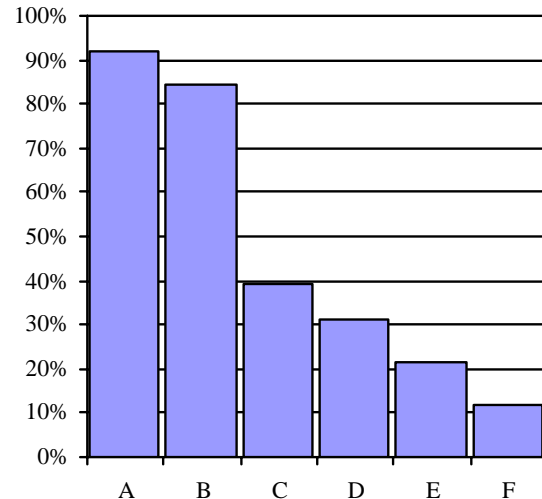
Graph C.2.4a : Percent Composition of Diet



A= Midge larvae  
B= Mayfly nymphs

C= Midge pupae  
D= Blackfly larvae

Graph C.2.4b : Percent Occurrence in Diet



E= Stonefly nymphs  
F= Caddis larvae



Photo C.2.2 : An unusual colour variety of the Beardie, a completely orange fish – usually, orange is the colour of the tail alone. This specimen was found at the electric-fishing monitoring site in Coldstream at the bottom of the Leet Water in 2001.

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