

# New Mississippian fish microvertebrate assemblages spanning a deepening marine environment, from St. Brendan's Well, Co. Clare, Ireland

Avery Fenton<sup>1</sup>, Aodhán Ó Gogáin<sup>1,2</sup>, Eamon Doyle<sup>3</sup> & John Murray<sup>1,2</sup>

<sup>1</sup> Earth and Ocean Sciences, School of Natural Sciences, National University of Ireland Galway, University Road, Galway, Ireland. <sup>2</sup> Irish Centre for Research in Applied Geoscience (iCRAG), <sup>3</sup> Burren UNESCO Geopark, Clare County Council, Ennistymon, Co. Clare, Ireland

a.fenton1@nuigalway.ie



## 1. Introduction

The Mississippian was an important time in the evolution of marine vertebrates, with the emergence of the first ecosystems dominated by jawed fish. Despite this, understanding of Mississippian fish ecology remains poor. Here, we present preliminary findings about new fish assemblages, representing differing ecologies, recovered from Serpukhovian carbonates at St Brendan's Well in County Clare.

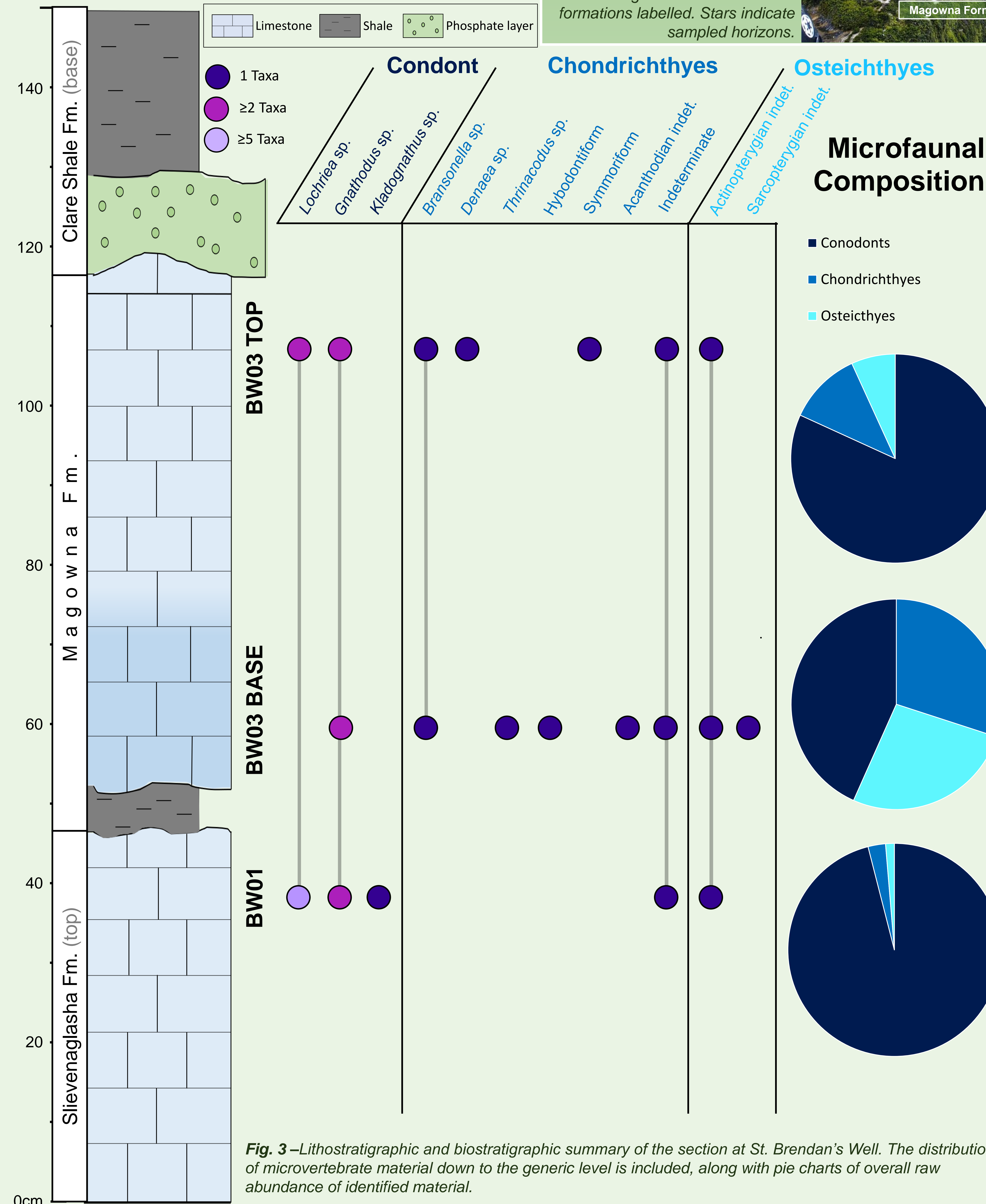
## 2. Locality

Three horizons (BW01, BW03 BASE and BW03 TOP) were sampled (Fig.1) in order to extract microvertebrates (Fig. 2).

Fig. 1 - Field photograph of sampling location at St. Brendan's Well, with the Slievenaglasa, Magowna and Clare Shale formations labelled. Stars indicate sampled horizons.



## 4. Microvertebrate Range and Composition



## 3. Sample Preparation

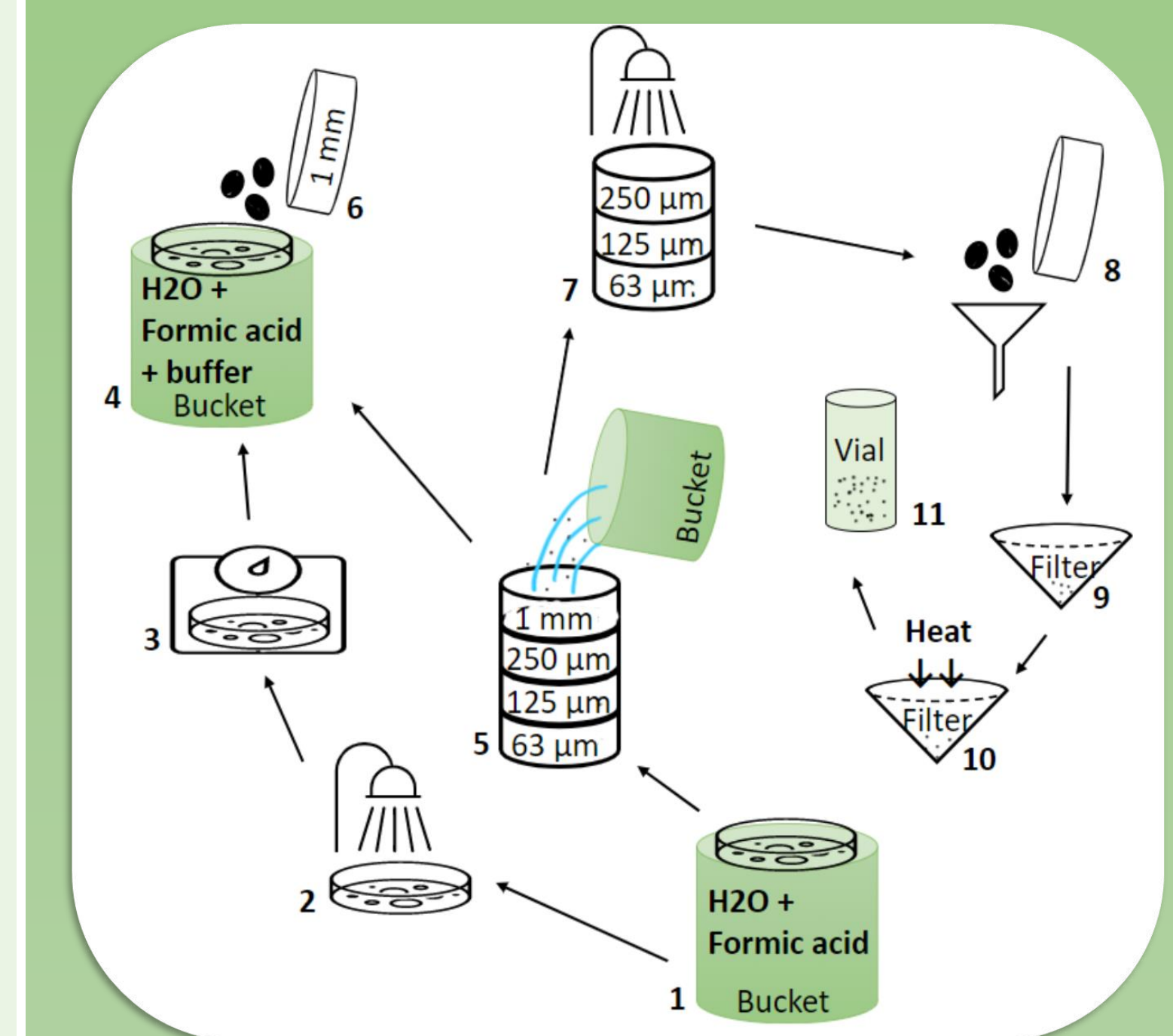


Fig. 2 - Numbered methodology for processing samples to produce residue for picking. Steps 1-6 show acid bath cycles using formic acid, steps 7-11 show cleaning, filtering and collecting leftover residue.

## 5. Discussion

Both the Slievenaglasa and Magowna formations have produced early **Serpukhovian conodont faunas** (Fig. 3) typical of the outer shelf/platform Gnathodus-Lochriea Biofacies.

The top of the Slievenaglasa Fm. (the Lissylisheen Member) produced a noticeably **richer and more diverse conodont fauna** in comparison to the overlying Magowna Fm. samples. Including over half of the total specimens recovered.

The Magowna Fm. yielded fewer specimens, but contains a wider range of fish groups, including Xenacanth (Fig. 4).

The reason for this difference in microfaunal composition is unclear - it may reflect more favourable ecological conditions in the Slievenaglasa Fm., or subtle differences in water depth or sedimentary regime between the two formations. The Lissylisheen Member has generally been interpreted as very shallow marine in character with a palaeokarstic top.

The **Xenacanth** material recovered from the Magowna Fm. suggest possible shallow, nearshore conditions; however, this is open to debate (Box 5).

## 6. Xenacanthiforme Physiology

Xenacanthiformes have traditionally been considered to be freshwater sharks, restricted to rivers and lakes (Gray, 1988). Recent evidence has indicated that these sharks were euryhaline (Carpenter *et al.* 2011), allowing them to tolerate a wide salinity range, permitting them to live in marine to freshwater environments.



The presence of the xenacanthiforme *Bransonella* in the Magowna Fm., a marine unit, supports a euryhaline adaptation in these fish.

Fig. 4 - Tooth of *Bransonella* (lingual view)

