Fishing, Diet, and Environment in the Iron Age of the Northern Isles

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Abstract: It has been argued that no fishing occurred during the British Iron Age. However, sites in the Northern Isles have been producing large assemblages of small fish bones, complicating the picture. This project reconsiders this argument by investigating fish bone assemblages excavated from the site of Swandro on Rousay, Orkney.

Multiple analytical methods were applied to the assemblages in order to determine the range of species present, the method of capture and treatment of the fish, and their influence on diet. Preliminary work consisted of identifying each individual bone to element and species. Due to the size of the average specimen, scanning electron microscopy was employed to examine samples for any indication of butchery, charring, or digestion. Light isotope analysis was also utilised to determine the effects of fish on the diets of the inhabitants of Iron Age Swandro.

Results from these analytical approaches indicated the occurrence of low intensity fishing activity and consumption that had no significant effect on diet. However, intensification in fishing would begin to occur during the Later Iron Age, as evident by a shift in the composition of fish bone assemblages.

This project can be considered a pilot study in the successful application of analytical methods to faunal assemblages in order to develop a more detailed interpretation of the environmental aspects of a site.

Keywords: Orkney, North Atlantic, Fish, Zooarchaeology, Iron Age

I. Introduction

It has been previously argued by Dobney and Ervynck (2007) that fishing had become an insignificant contributor to subsistence during the British Iron Age. The authors have supported this argument by emphasising the widespread absence of both archaeological and textual evidence indicative of fishing.

However, it appears that this is not the case in the Northern Isles; significant amounts of fish bones have been recovered from sites in Shetland and the Orkney Islands (Nicholson 1997; Cerón-Carrasco 1998; Dockrill et al. 2015). With this project, I intended to further challenge Dobney and Ervynck's argument by

presenting the fish bone assemblages excavated from the site of Swandro, Rousay as another example of this trend observed in the Northern Isles.

The aims of this project were twofold; to determine the role of fish at the site of Swandro, and to reconstruct the Iron Age environment from which these fish were taken from. Objectives for this project included the identification and analysis of both species and bone element representation, comparative analysis of the assemblage from Swandro with other sites in the North Atlantic, and the use of analytical methods such as SEM and light isotope analysis for a more in-depth examination of how these fish impacted the lives of the Swandro inhabitants.

II. The Site

The Knowe of Swandro, located on Rousay, in the Orkney Islands, is a multi-period site with a complex narrative spanning from the Neolithic to the Viking Age (Dockrill and Bond 2013a). The site consists of a Neolithic chambered cairn and several Iron Age buildings, possibly illustrating the reoccupation of a Pictish settlement by Vikings (Fenton 1997). Unfortunately, the integrity of Swandro is currently being threatened by rising sea levels and heavy erosion from global climate change; this has caused a radical change to the coastline of the site, which has destroyed much of the archaeological content of the site (Dockrill and Bond 2013a; Dockrill and Bond 2013b). Swandro is currently part of an ongoing project called *Gateway to the Atlantic*, in which students from the University of Bradford participate in an intensive summer field school to excavate at the site.

III. The Assemblage

The specimens analysed in this project were recovered by students either by hand or as bulk samples during excavations between 2011 and 2015. Bulk samples were later sorted by placement students, with fish bones collected and bagged specifically

for this project. A conscious effort was made during sample selection to represent each area of the site as equally as possible. Time constraints made consideration of every single specimen from the site impossible.

Overall preservation of the assemblage was good, as demonstrated by the large amount of small bones to survive. Most of the specimens were retrieved from Area E and consisted of small fish. Area A boasted the largest specimens in the assemblage. Some burnt vertebrae were observed as well.

IV. Species and Bone Element Identification

A total number of 1,884 individual fish bones were identified for this project. All bones were identified to element, but not all were able to be identified down to species level. The most represented cranial element was the premaxillae, with 13 individual specimens identified.

Most of the assemblage was identified as vertebrae; this isn't surprising, as vertebrae have been noted to have a high survival rate in the archaeological record (Nicholson 1992). However, most of the vertebrae were represented only by the body, or vertebral centrum; very little vertebral processes and spines survived.

One otolith was retrieved from the assemblage; this is not surprising, as otoliths are known to be rare finds in fish bone assemblages. The fragmented nature of the otolith meant that it couldn't be identified to species.

1,824 fish scales were also recovered from Area E, with most measured to 5mm or less in length. Time and lack of resources meant that every scale could not be examined and identified to species, but working under the assumption that most of the scales came from the same fish, it is most likely that these were herring scales.

Bone elements such as teeth, ribs, rays, and spines were identified but not included in quantifying the assemblage; this is to ensure that certain species were not overrepresented by these smaller elements.

Fish bones have been noted to be difficult to identify to species; in the case of this project, many bones were only able to be identified down to the *Gadidae* family, and some bones were lacked any diagnostic characteristics to identify at all. Species represented in the assemblage include cod, saithe, and ling. One monkfish specimen was also identified. Due to the large amount of vertebrae, individual specimens were not identified and quantified to species. However, a cursory glance shows that most vertebrae were from the *Gadidae* family, specifically small saithe.

V. Scanning Electron Microscopy

Due to the small size of most of the fish bones, it was decided that SEM, or scanning electron microscopy, would be best for examining select bones for any indication of processing or consumption. 20 vertebrae were selected for SEM work and analysed for butchery marks, charring, gnaw marks, or erosion caused by digestion.

SEM analysis was ultimately not fruitful; nearly all vertebrae that seemed to display signs of processing and consumption when looked at by eye were observed under the SEM to only show common signs of breakage and abrasion associated with taphonomic processes. However, one vertebra showed abnormal warping that could have indicate compression of the centrum that is often associated with digestion (Butler and Schroeder 1998).

VI. Stable Isotope Analysis

A small selection of 9 suitable fish bones were used for stable isotope analysis, which would determine the carbon and nitrogen values in the collagen. All samples were identified as *Gadidae*, and consisted of both cranial and post-cranial elements;

this is because cranial bones often represent locally-caught fish, while post-cranial bones can sometimes reflect traded fish (Barrett et al. 2011). Collagen from the samples were extracted and prepared using the method established by Richards and Hedges (1999).

Collagen yield for the samples were relatively low, but the resulting values ultimately reflected what was considered normal for fish. The close proximity of most of the isotope values seems to reflect that regionally, these fish samples originate from the same area; in other words, these fish were most likely captured locally and not from long-distance trade.

Two specimens have values that fall outside the majority of the other values. These outliers, both cranial elements, have relatively higher nitrogen values; it is possible that these samples were derived from fish that consume smaller fish for sustenance. It is also possible that this could represent older fish, whose trophic levels are significantly higher than younger, juvenile fish.

VII. Conclusions

The composition of the Swandro assemblage seems to similarly reflect assemblages from other Iron Age sites in the North Atlantic (Nicholson 1997; Cerón-Carrasco 1998). Gadid species generally seem to be the most commonly represented in these assemblages, specifically cod and saithe. Other North Atlantic sites have noted that increased numbers of cod and saithe seem to correlate with the transition into the Late Iron Age (Nicholson in Dockrill *et al.* 2015: 228). This appears to have been the case at Swandro as well, with fishing strategies most likely changing to specifically target gadid species in later periods.

The large amount of saithe recovered from the assemblage probably indicates that the normative practice for fishing was coastal fishing, as saithe are often found

inshore. However, the large specimens of cod suggest that some deep sea fishing must have occurred as well, although not as often. This is further evident by the single monkfish specimen found in the assemblage; monkfish, or anglerfish, are also deep sea fish and not commonly considered to be a resource used in the Iron Age. This may represent an accidental catch, or caught as a curiosity due to the unusualness of its jaws.

The significant amounts of cranial elements recovered may indicate areas of processing, as the heads of fish were commonly removed before further consumption or use. Processing is also evident by the presence of burnt vertebrae in the assemblage; the black colour of these bones most likely indicates that the bones were exposed to low temperatures of heat. Fish have often been assumed to be suspended over fires by the tail; it is possible fish at Swandro were decapitated and then suspended over fire prior to consumption.

Without human remains from Swandro for comparison, very tentative conclusions can be drawn from the isotope data regarding dietary effects. However, it can be concluded from the little information that we have that the fish found at Swandro were locally caught and not from long-distance trade.

By synthesizing the results from all analyses, it can be reasonably concluded that the fish bone assemblage from Swandro is indicative of significant fishing activity occurring at the site during the Iron Age, despite the presumed overall decrease in fishing. That the representation of both element and species in the Swandro assemblage is comparable to assemblages from other sites in the North Atlantic suggests that this is what was more normative in this area in comparison to Britain. \

Because of the limitations of the project, I have ultimately considered this to be more of a pilot study that shows the sort of analytical work that can be done on fish bones and how much information can be derived from these results. Fish bones tend to be overlooked by archaeologists, but this pilot study illustrates just how valuable they can be to developing an interpretation.

With regards to this particular project, further research could be performed on these fish bones by simply adjusting the perimeters of the already performed analyses; for example, higher magnification could have been for SEM analysis. A larger sample size for both the SEM and isotopic analysis would result in more conclusive data that could have been used to illustrate recurring trends that may have been missed. More external data could be acquired to improve current analysis as well; the absence of human bone from the site of Swandro meant that trophic values could not be compared to those derived from the fish bones. Having that sort of data on hand would allow for a better investigation into how these fish affected the diets of the Swandro inhabitants. The addition of an optical microscope could have identified more bones with potentially diagnostic characteristics for SEM analysis.

Overall, I believe this pilot study reveals the potential of performing a focused analysis of fish bone assemblages. Although the small scope of each analytical method resulted in outcomes that were too broad and vague for any definite conclusions, the results that we do have may be the first step in a longer, more focused study that could have significant impact on future interpretations of the site at Swandro and how fishing truly factored into Iron Age life.

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