

A PRELIMINARY ANALYSIS OF FISH REMAINS FROM CROMARTY (2013–2014 excavations)

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Introduction

The burgh of Cromarty is located close to the entrance of the Cromarty Firth north of Inverness. Due to this strategic position Cromarty would have been in a favourable position to exploit marine resources and trading possibilities. Medieval fish trade, most notably the large scale consumption of species in the cod family (Gadidae), has been amply documented in the literature. It has been suggested that in the Middle Ages, much fishing tended to be done using hook and line or nets, either from the shore or in cobbles. These simple techniques did not need the construction of an extensive quayside infrastructure, thus leaving little evidence aside from the fish remains themselves (Lomas 1992: 197).

The find material

The excavation of the medieval burgh of Cromarty is an ongoing project. Materials reviewed here originate from excavations in 2013–2014. Thanks to water-sieving carried out at the site, over six-thousand fish bones were recovered (n=6070). Their diachronic distribution will be reviewed in this short report by the following phases:

- Phase 1 - Medieval (13th to 14th centuries), n=4838 fish remains
- Phase 2 - Post Medieval (16th to early 18th centuries) n=386 fish remains
- Phase 3 - Post Medieval (c.1760 to 1820) n=340 fish remains
- Phase 4 - Post Medieval (c.1780 to 1880) n=272 fish remains

A minor portion of the remains (n=234) could not yet be assigned to any of these time periods and will thus be referred to as “Unknown” throughout the paper. The fish taxa (species, genera and families) identified at the site are listed in Appendix–Table 1. (A small number of non-ichthyological animal remains recovered from the sieved material are shown in Appendix–Table 2).

While some of the material was fragmented beyond recognition, a considerable portion could be identified to at least family level. Figure 1 shows the relationship between the number of identifiable specimens (NISP) and the number of taxa represented in the sub-assemblages assigned to various phases. The best represented family gadids, were not included as a generic entity among the number of fish taxa, thanks to the presence of identifiable bones from cod, saithe, pollack and whiting.

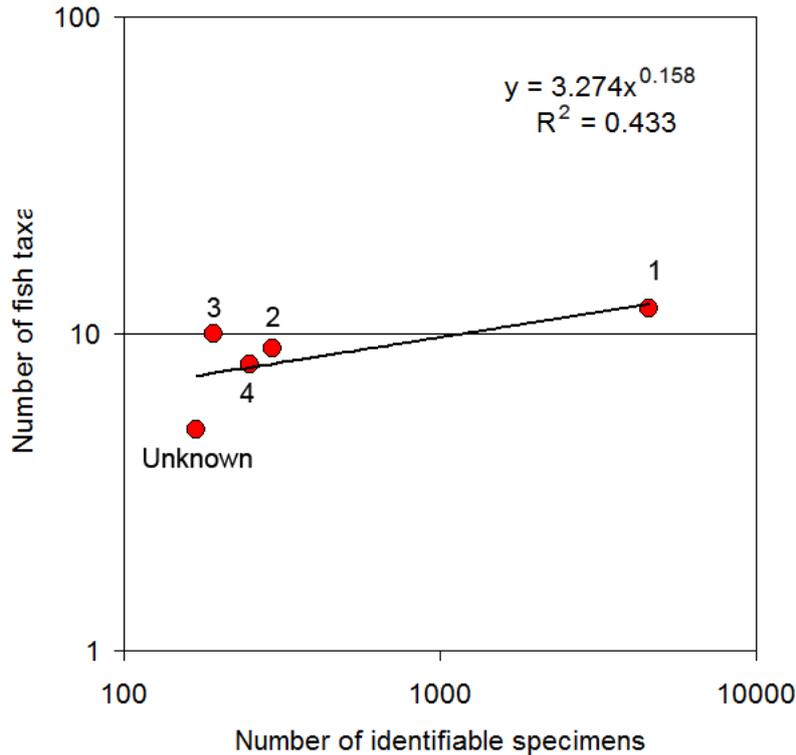


Figure 1: The relationship between sub-assembly sizes (NISP) and taxonomic richness as expressed by the number of fish taxa. Data points are labelled by phase numbers. Both scales are set to decimal logarithms.

According to this graph, fish remains from the site were available in the largest numbers from Phase 1, consisting of Medieval (13th–14th c.) deposits. The number of bones in this part of the material exceeded the others by an entire order of magnitude and may therefore be considered the most representative. The cluster of smaller assemblages in the left hand section of the graph is especially rich in taxa in Phase 3, dated to ca. 1760–1820: the ten taxa represented in this smallest of all datable sub-assemblages is far more than would have been expected on the basis of the relatively small number of bones. The regression equation calculated between the two variables is indicative of a strongly degressive relationship: increasing the number of identifiable bones does not contribute a proportionate number of new taxa to ever-larger sub-assemblages. The coefficient of determination shows a ca. 40% connection between the number of taxa and the number of identifiable bone specimens.

Results

Most fish remains from the site are indicative of sea fishing with some species representing brackish waters typical for the area. In accordance with the historic trend mentioned in the introduction, however, there was a striking dominance of gadid remains already during the hands-on identification of the find material. The gross taxonomic composition of various datable sub-assemblages may be compared in Figure 2.

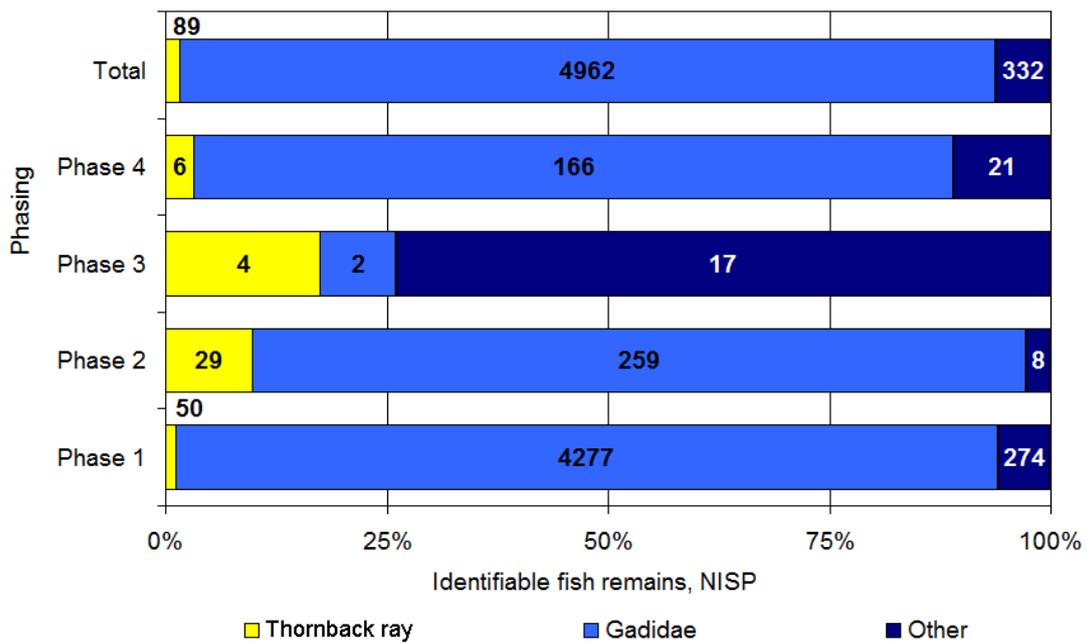


Figure 2: The percentual contribution of major types of fish to the sub-assemblages by phases and the entire material.

With the exception of the small Phase 3 Post-medieval subset (fewer than two dozen identifiable bones) there is an overwhelming dominance of gadid fish (cod family). However, a χ^2 test carried out to test the homogeneity of the three best represented phases (1, 2, and 4) showed that in spite of the comparably great importance of gadids these sub-assemblages were different from each other in statistically significant terms ($\chi^2=143.749$, $df=4$, $P=0.000$).

The overwhelming ratio of gadids is most convincingly demonstrated by the large Phase 1 Medieval material which also determines the overall importance of these fish in the entire material in comparison with thornback ray and a number of non-gadid species (flatfish, gurnard, and bullhead) which rather look like by-products of what seems to have been targeted cod exploitation. At least hundreds of bones from these economically important fish usually make up approximately 90% of the assemblage. These numbers are remarkable, even if the raw number of identifiable specimens (NISP) is a simple count, uncorrected for the evident possibility that some of the bone fragments may originate from the same individual. In fact, in some provenances articulated bones could be recognized, although their numbers have never been too high.

Having encountered the aforementioned indubitably significant numbers of bones originating from various gadid fish, the next comparison was narrowed down to this fish family. NISP values for the four identifiable species are shown in Figure 3.

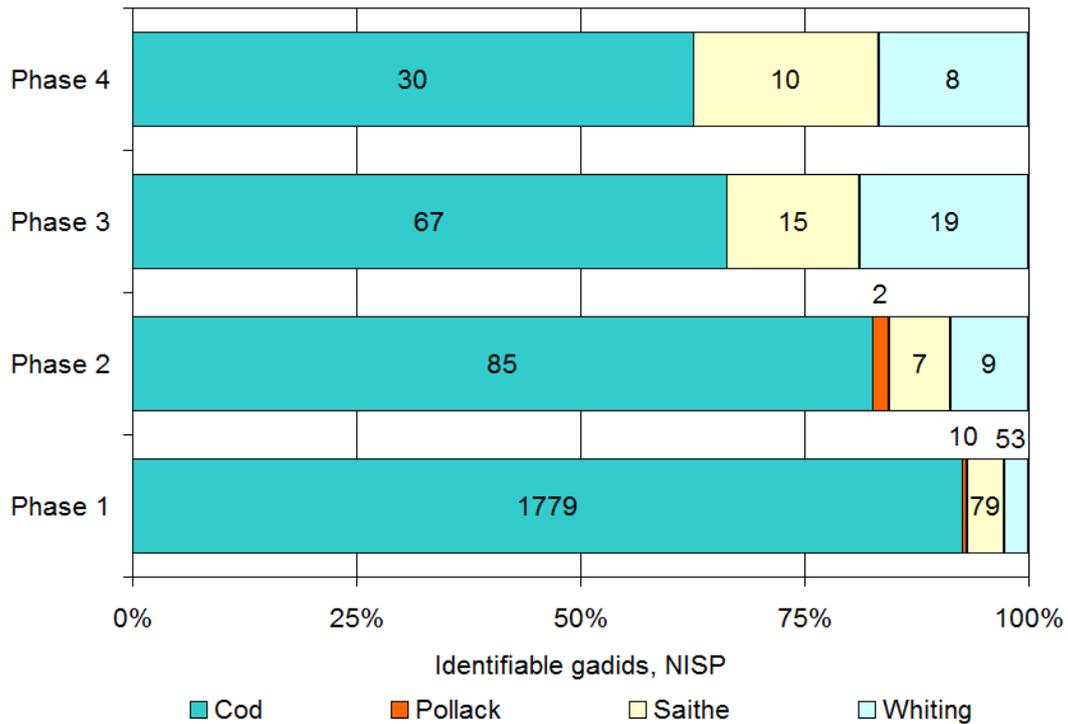


Figure 3: The relative contribution of various gadid species to each sub-assembly

The numbers of bones are inevitably smaller in this comparison, as only relatively few diagnostic skeletal elements can be used in distinguishing between various gadid species. However, consecutive Chi^2 tests carried out on the data indicate that even the few bones outline statistically significant differences between chronological phases. Unsurprisingly, when all data in Figure 3 are considered, the heterogeneity of species composition is evident ($\text{Chi}^2=144.528$, $\text{df}=6$, $P=0.000$; bones of rarely occurring pollack were added to those of cod). The relative diachronic contribution of cod steadily decreases in the studied proveniences.

In the largest Medieval (Phase 1) and earliest Post-medieval (Phase 2) sub-assemblages the remains of some likewise large-bodied pollack occur, while in later assemblages saithe and whiting steadily gain in importance at the expense of cod. A comparison limited to the Medieval and earliest Post-medieval sub-assemblages (Phases 1 and 2) also resulted in a significant difference ($\text{Chi}^2=13.857$, $\text{df}=2$; $P=0.001$), largely attributable to the markedly decreasing contribution by cod.

On the other hand, the small and visually similar Post-medieval fish bone assemblages from Phases 3 and 4 were not significantly different from each other ($\text{Chi}^2=0.850$, $\text{df}=2$; $P=0.654$). Given the fact that according to Figure 2 these latter, Post-medieval sub-assemblages are altogether poorer in the remains of the gadid family, one may hypothetically juxtapose targeted medieval cod fishing showing signs of specialization with subsequent diversification of the catch in later, Post-medieval times.

Discussion and conclusions

The evidence of targeted sea fishing is not surprising at this site as historically the waters of the Cromarty Firth and Moray Firth are known to have been excellent fishing ground. Naturally, trends seen in the medieval and Post-medieval fish remains can be safely interpreted only in light of the archaeological evaluation of the proveniences involved. Fish remains at the site offer direct evidence of processing and consumption, rather than reliably representing the actual fish stocks exploited at any given time. The close and mixed quarters of medieval burghs tends to compound the complexity of deposits. At this point it is often difficult to tell therefore whether fishing at Cromarty became less specialized through time or the decreasing representation of cod is also a reflection of changes in the marine fauna near the site. As has been demonstrated, the visibility of such trends to some extent is also a function of assemblage size.

Analysing fish remains from archaeological sites in England, Barrett et al. (2004) documented increasing exploitation of cod (and herring) during the Middle Ages. Studying assemblages from the late first millennium they suggested that the emergence of cod fishing in England had already begun by the end of the 10th century. Hodges (1982) provides tentative data for Scotland, with contested 12th century evidence and detailed documentary sources from the 15th century. Importantly, these dates mark not the earliest time of targeted exploitation but periods when cod became significantly exploited and traded. The 13th to 14th century medieval material from Cromarty falls comfortably within this time interval. It may also be added that by the 14th century, the fishing industry along the east coast of England was a complex enterprise, developing a capitalistic nature (Childs 2000: 23). These historic facts are of relevance as background information, even if gadid remains from Cromarty will turn out to be local household refuse within a broader archaeological context.

The analysis of additional fish remains as well as the estimation of fish sizes on the basis of the few measurements taken in the material should help testing hypotheses concerning this tendency: over the centuries decreasing fish sizes could be a real phenomenon at the site, but it must always be seen as a combination of conscious and inadvertent human action that has contributed to the formation, deposition and attrition of archaeological deposits.

References

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Appendix

Table 1: Fish remains identified in the sieved material from Cromarty

	Phase 1	Phase 2	Phase 3	Phase 4	Un- known	Total
Thornback ray (<i>Raja clavata</i>)	50	29	4	6		89
Gurnard (<i>Eutrigla gurnardus</i>)	10	2	5	2	4	23
Cod (<i>Gadus morhua</i>)	1779	85	67	30	40	2001
Pollack (<i>Pollachius pollachius</i>)	10	2				12
Saithe (<i>Pollachius virens</i>)	79	7	15	10		111
Whiting (<i>Merlangius merlangus</i>)	53	9	19	8	1	90
Shorthorn sculpin (<i>Myoxocephalus scorpius</i>)	82		5	1		88
Flatfish (Pleuronectes sp.)	63	1	6	6	8	84
Wrasse (Labrus sp.)	98			7		105
Gadid family (Gadidae)	2356	156	129	118	117	2876
Bullhead family (Cottidae)	15	5		1		21
Scorpionfish family (Scorpionidae)	6		1	4		11
Non-identifiable fish (Pisces)	237	90	89	79	64	559
Total	4838	386	340	272	234	6070

Table 2: Non-fish remains identified in the sieved material from Cromarty

	Phase 1	Phase 2	Phase 3	Phase 4	Un- known	Total
Rabbit (<i>Oryctolagus cuniculus</i>)			6			6
Hare/rabbit (Lagomorpha)	10				1	11
Pig (<i>Sus domesticus</i>)	4					4
Cattle (<i>Bos taurus</i>)	2		4			6
Sheep/goat (Caprinae subfamily)	109	9	11	2	5	136
Red deer (<i>Cervus elaphus</i>)			1			1
Domestic hen (<i>Gallus domesticus</i>)		1	1	2		4
Sparrow-like bird (Passeriformes)	2					2
Non-identifiable bird (Aves)	4	2	3		2	11
Frog/toad (Anura)		1		1		2
Non-identifiable large ungulate	4					4
Non-identifiable small ungulate	6		2	1		9
Oyster shell	1					1
Crab (Crustacea)	1					1
Total	143	13	28	6	8	198