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LETTERS TO THE EDITOR

Dear Editor,

We should like to comment on some matters raised by Weisler, Lalas and Rivett (1999). Their interesting and useful paper prefaces its description of research on fish bone from Kakanui with a critical appraisal of earlier research which, unfortunately, misreads some of the evidence. They do not seem to be aware that sieving of large bulk samples of midden at relatively fine mesh sizes (down to approximately 3 mm) is a long-established practice in New Zealand, going back at least to the Palliser Bay programme, 30 years ago, and mesh sizes down to 0.5 mm were used for midden samples from various northern North Island sites by Nichol in the 1980s. The scarcity of otoliths produced in these and other projects does not seem to be related only to recovery techniques. While Weisler et al (1999) argue that otoliths preserve well in a range of sedimentray situations, zooarchaeological research on European fishing sites has reached a contrary opinion. Van Neer et al (1999: 117), conclude that "The main reason for the rarity of otoliths is the unstable nature of the aragonite compared to the hydroxyapatite of bone."

In regard to the Shag River project, Weisler *et al.* (1999: 37), paraphrase a book review to say that "only "diagnostic" bones were collected". However, as Smith and Anderson (1996: 70) state, we retained all the excavated fish bone in categories required by the orthodox identification strategy (below) plus "a number of unsieved bulk samples were also retained from every major stratigraphic layer in each area". For the main midden component this included most of a $2m^2$ column sample taken by Higham (1996). In the light of heavy recovery of bulk sample we discarded most of the infracranial fish bone from that portion of the midden which was sieved and sorted at a field station. In hindsight, recovery of additional material would have been

preferable, but it could not have altered the estimation of MNI derived by the conventional strategy.

Weisler *et al.* (1999: 37), compare unfavourably our use of "diagnostic bones" as against their identifications based on the "usual five-paired mouth bones" plus otoliths. Reference to Anderson and Smith (1996: 237), shows that our identification array consisted of the same five cranial bone pairs, plus various other distinctive bones (pharyngeal clusters, operculae, elasmobranch remains) and otoliths. In other words, our breadth of identification was no less than that employed for the Kakanui material.

As to the particular results described by Weisler *et al.* (1999), it is not apparent that the mesh sizes used at Kakanui were responsible for the massive disparity between bone and otolith counts for red cod. The same mesh sizes were employed at Shag River but we found only a few eroded otoliths from red cod (Anderson and Smith 1996: 237). It is not unusual either, for red cod to be co-dominant or dominant in South Island sites, occasionally at levels similar to those at Kakanui (e.g. at Fox River the MNI of red cod is 88, but only 2 for barracouta), but the overall trend still shows a strong dominance of barracouta.

The Kakanui results are certainly interesting but also unusual. They are reminiscent of the discovery of numerous crayfish mandibles in the Black Rocks sites (Palliser Bay), an event which similarly suggested that many more crayfish would be found in subsequent midden analyses - yet this did not happen. Otolith recovery may prove more successful and the thrust of the Weisler *et al.* (1999) research is certainly to be encouraged, but we should be very cautious about extrapolating the results from a single site.

Atholl Anderson & Ian Smith

References

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Dear Editor,

In reference to the comments made by Atholl Anderson and Ian Smith about Weisler et al. (1999), I would like to make the following points.

The Weisler *et al.* (1999) article did precisely what was intended; that is, stimulate discussion on field procedures in general and, specifically, to highlight the use of otoliths to increase the number of fish taxa identified from archaeological sites in New Zealand.

A little background seems in order. In 1980, while directing the Kawela archaeological project in Hawai'i, I systematically used nested 6.4 mm (1/4") and 3.2 mm (1/8") sieves for more than 400 m2 of excavation. Material retained in the 6.4 mm sieves was field sorted, while all material retained in the 3.2 mm sieves was returned to the lab, cleaned by water sieving, then sorted. Fish otoliths were found from nearly every site. This includes cultural deposits composed primarily of lateritic sediments (highly acidic) or calcareous sand (highly alkaline). Since the Kawela project, I have found fish otoliths in almost all archaeological deposits excavated at a broad functional range of sites and in equally diverse sedimentary contexts: volcanic and makatea islands to coral atolls. In my nearly 20 years of experience, then, I would expect to find otoliths in all archaeological sites that have fish bones. If otoliths are not found in archaeological deposits, it begs an explanation. While varying taphonomic conditions can contribute to differential preservation of otoliths, I believe that identification of otoliths in the field-and even under lab conditions-is not as easy as one would like.

(One need only peruse the Pacific literature to see that otoliths are rarely mentioned in studies of prehistoric fishing.) Aside from the highly distinctive red cod otoliths, many New Zealand otoliths are difficult to identify, especially those of barracouta that are thin and break easily. For these reasons, all material retained in the 3.2 mm sieves at Kakanui (Weisler and Somerville-Ryan 1998) was returned to the archaeology labs at the University of Otago, washed, then sorted under strong light and, in some cases, with magnification. All the sorting was done by Paul Rivett, who had previously written an honours thesis on otoliths. The material was then checked by Dr Chris Lalas, a marine fisheries biologist who specialises in the identification of otoliths as a means to reconstruct the diets of sea birds and seals. I submit, then, that the analysis of the sieved material at Kakanui was not identical to that employed at the Shag Mouth excavations.

What further interests me is that the Shag Mouth sediments and those of Kakanui are roughly similar; that is, both are primarily dune deposits. Why, then, were only a few eroded otoliths of red cod recovered at Shag Mouth (Anderson and Smith 1996:237), yet hundreds found at Kakanui? This is an intriguing question that may have something to do with collection methods but, ultimately, may correspond to different prehistoric activities conducted at the sites.

I agree with Anderson and Smith that the results of Kakanui should not be extrapolated to all New Zealand sites-at least not until other archaeological deposits from throughout the country, representing a range of depositional contexts, taphonomic processes and occupation ages, are excavated and analysed in a similar manner.

Marshall I. Weisler

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