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A Critique of McFadgen's Use of Landsnail Analysis

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ABSTRACT

McFadgen's reconstruction of Tamatean and Ohuan vegetation cover from landsnail data is poorly based. It also suffers from confused and contradictory analysis and presentation of results. No case of regional vegetation change is contained in the landsnail data presented.
Keywords: OHUAN, TAMATEAN, LANDSNAILS, TAPHONOMY, TAXONOMY, ECOLOGICAL PREFERENCES.

McFadgen (1985: 51) describes subfossil landsnail assemblages from middens on the east coast of the North Island and uses these data to conclude that his 'Tamatean' soils supported forest in the period 600–450 B.P. He further argues that, following a period of renewed sedimentation 450–400 B.P., forest did not establish on the new soils. One of McFadgen's nine assemblages contains only five landsnails and can be ignored. However, seven assemblages from his 'Tamatean' phase and one from his 'Ohuan' phase have sample sizes (72 to 887 individual shells) which are large enough to be useful. McFadgen also calls upon an unstated number of sites of 'Ohuan' soil age in which no shells were found to support his interpretation of Ohuan vegetation.

It is the present author's opinion that the conclusions McFadgen draws from the landsnail evidence are based on some questionable taphonomic premises, on undocumented or non-existent snail ecological preference data and on sometimes confused and contradictory analysis and presentation. Furthermore, McFadgen's landsnail results do little or nothing to support the vegetation history he proposes.

The first point reviewed here concerns McFadgen's use of landsnail absence from middens to support the idea of open or non-existent vegetation 'Ohuan' soils. Only one assemblage from this chronozone is presented (Assemblage M4, Figure 22). According to McFadgen's ecological classifications, this assemblage is as clear an indicator of forest presence as any other he presents, yet he ignores this, preferring instead to support his thesis by claiming that the paucity or absence of land snails in 'Ohuan' middens indicates open environments (1985: 51). This conclusion is based on the premise that if no subfossil land snail shells are preserved then no forest existed when the middens were deposited. In claiming this McFadgen ignores the fact that absence of forest is no barrier to the existence of abundant land snail populations, albeit ones of reduced diversity and number of species. This is obviously the case, if only because McFadgen himself describes a whole class of species said to live in open dry plant litter (1985: 54–5; Figures 20–23). Furthermore, such populations can be preserved in middens, as one of his 'Tamatean' middens clearly shows (McFadgen 1985: Figure 20, Midden M6). It is at least equally plausible that the absence or paucity of landsnail shells in the 'Ohuan' middens demonstrates that the taphonomic conditions necessary for their accumulation did not occur.

Nothing has been published on the taphonomy of archaeological landsnails in New Zealand but some basic inferences can be drawn from practical experience. Shells of land

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snails are preserved in highly calcareous conditions existing inside concentrated shell middens. Assuming McFadgen's 'Ohuan' sites possessed these conditions it would seem that factors controlling the presence or absence of land snail shells in them would involve the ability of the snails to enter the crevices of the middens. It has been the experience of the present author that dense middens on hard and immobile substrates tend to contain the most shells (see, for example, middens in the Chatham Islands described by Wallace 1979a: 52–74) and that those on loose mobile sediments, especially loose sand, contain fewer shells or even none at all. In the latter case, the explanation may be that the midden had its crevices infilled by sand very rapidly and thus became sealed off from the snails in the leaf litter layer above.

An illustration of the latter case is material. This author is analysing snail assemblages from the Aupouri State Forest (Ninety Mile Beach) sand dunes. There 55 concentrated shell middens were sampled (Coster 1983: 180) for land snail shells. Only 13 sites produced adequate assemblages and most sites had no snails at all. A study of the 13 snail assemblages and of a larger number of charcoal samples showed no correlation whatsoever between prehistoric vegetation and landsnail abundance. Snail assemblages showed vegetation ranging from broadleaf forest to very open cover. Examination of modern open vegetation showed amazingly high numbers of two species of living snails. This proves that absence of forest does not imply absence of snails. One must conclude that the absence of subfossil landsnail shells from the majority of the midden sites is due to their rapid compaction because of sand infiltration. In short, absence of snails in sites cannot be explained as a consequence of absence of forest.

The second matter requiring review concerns McFadgen's landsnail ecological classifications. He divides the snail species into two classes; 'stable' and 'tolerant', with the latter being divided into those species which normally live in damp forest conditions but can tolerate dry open conditions and those which can live in dry open litter but can tolerate damp forest litter (1985: 51). The difference between the last two groups, in terms of palaeoenvironmental interpretation, is unclear.

McFadgen gives no sources for his quite detailed land snail ecological data. In the present author's experience, there are only two sources. First, one can collect snails from a range of modern vegetation types and compare these data with the archaeological assemblages. There is no indication given that McFadgen has done this. Second, one can ask Dr Frank Climo for suggestions as to the vegetation represented by the subfossil assemblages, along with his species identifications. Climo is the main authority on New Zealand land snails and he bases his opinions on experience accumulated while undertaking the monumental task of revising the systematics, taxonomy and zoogeography of this fauna. Climo's research is not ecological in orientation and he never claims that his suggestions are other than broad indications (Climo pers. comm.). To what extent McFadgen has used this source is unclear from his published paper.

The problems of ecological interpretation of land snail data are highlighted by the case of one species *Lamellidea novaseelandica*, found in the Wairarapa area and in archaeological sites there (see Wallace 1979b: 226), though not by McFadgen. This species is described by Climo as arboreal, living on broadleaf trees above the 2 m level (Climo pers. comm. 1975–85; Climo 1973: 579). The present author has subsequently found that this species also occurs in very large numbers in some extremely open environments (e.g., in *Muehlenbeckia complexa* forming 20-cm-thick mats on sand with no other plant species present), the only other snail species present being *Paralaoma caputspinulae*. In other words, *Lamellidea*,

in the absence of forest species, may be hard evidence of very open environments. When told of this observation, Climo was not at all surprised since he rarely collects from such open environments because the landsnail species there are few and would also be found in forest along with all the other species of the region. In short, the available ecological information is not as detailed and concrete as McFadgen implies.

McFadgen's ecological classification of snails are presented in a seriously confused manner. He records a *Cavellia buccinella* in Figures 21, 22 and 23 and a *Fectola buccinella* in Figure 20. These terms refer to a single species. *Fectola trilamellata* is classified as 'tolerant' in Figures 20 and 22 but 'stable' in Figure 23. Similarly, 'Punctid' *lateumbilicata* is 'stable' in Figure 20 but 'tolerant' in Figure 23. *Charopa prestoni* is 'tolerant' in Figure 20 but 'stable' in Figure 21. The case of *Paralaoma* sp. in Figure 22 is very strange. Given the large number of species in this genus and their likely range of ecological preferences (e.g., *P. caputspinulae* is an open environment indicator) exactly how one could confidently classify this unknown species as 'stable', as McFadgen does, is inexplicable.

A final criticism concerns the questionable suitability of land snail analysis for characterising more than a very few local environs of archaeological sites. Perhaps if McFadgen had analysed many more sites better distributed across the landscape then his results might have been more convincing. This author feels that the characterisation of vegetation on sediments deposited over a coastal region from Cooks Cove to the Wairarapa using only eight land snail assemblages from sites on rather exposed coastal locations is stretching the data well beyond their capacity to explain anything.

In conclusion, McFadgen's claim to have demonstrated that forest existed on his Tamatean soils but not on the Ohuan ones by using land snail analysis is not supported by the data he presents. It is argued here that with the exception of the one Ohuan assemblage that, incidentally, contradicts his own thesis, no valid evidence for any type of vegetation is presented for his Ohuan phase sediments and thus no case for regional vegetation change is contained in the land snail data presented.

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