

Variable horticulture within a small garden on Ahuahu (Great Mercury Island)

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Archaeological excavations in a small gardening complex on Ahuahu (Great Mercury Island, New Zealand) documented variable horticultural practices within a limited area. The gardening features were located on the lower slope of a ridge and extended into a present-day swamp. A series of rock-faced terraces were constructed on the steeper upper slope, with a set of stone alignments orientated parallel to the gradient on the lower slope. The excavations documented gardening behind the terraces, around and between the alignments, within a linear depression or channel, and in the swampy low lying area. A transect of test pits also documented the probable addition of sand to a small area, possibly as a means of creating a more friable horticultural soil. The presence of these horticultural features in the small garden suggest that it was more intensively used than the surrounding area, however there are much larger more intensified gardening complexes in the north of the island.

Las excavaciones arqueológicas en un complejo pequeño de horticultura en la isla Ahuahu (Great Mercury Island, Nueva Zelanda) documentaron las prácticas variables de horticultura dentro de un área limitada. Las rasgas del jardín estuvieron en la ladera de una colina baja y extendida a un pantano que esta en el área hoy día. Una serie de terrazas de rocas se construyeron sobre la pendiente mas pronunciada superior, con una serie de líneas de rocas en paralelo al gradiente en la pendiente inferior. Las excavaciones documentaron prácticas de horticultura detrás de las terrazas, alrededor y entre las líneas de rocas, dentro de una depresión lineal o canal, y en el área baja pantanosa. Un transecto de pozos de excavación también se documenta la adición probable de arena en un área pequeño, posiblemente como un medio para crear un suelo más friable horticola. La presencia de estas características horticolas en el jardín pequeño sugiere que fue utilizado mas intensivamente que el área circundante, sin embargo, hay mucho más grande y más intensificado complejos jardineras en el norte de la isla.

Introduction

Eighteenth century accounts of Captain James Cook's first landfall on the East Coast of New Zealand provide the earliest known in-depth descriptions and depictions of Māori gardening (see Leach 1984). Joseph Banks and William Monkhouse's October 1769 observations at Anaura Bay indicate that sweet potato (*Ipomoea batatas*), taro (*Colocasia esculenta*), yam (*Dioscorea* spp.), and gourd (*Lagenaria siceraria*) were grown in a series of systematic and neatly gardened plots (Jones 1989:49). While early European accounts note the types of cultigens that were grown, the neatness and weedless state of the gardens, and some of the rituals that were involved in the planting of certain cultigens, these accounts lack specifics about gardening features and soils. Best (1976) relied on these early European accounts and nineteenth century Māori informants to provide an excellent summary of gardening practices. Jorgensen (2009) notes, however, that archaeological studies of Māori horticulture have focused on: a) the

classification of gardening features (Barber 2004, 2010; Furey 2006; Leach 1984); b) the distribution of gardens across landscapes in relation to the environmental variables such as rainfall, soil types and soil nutrient levels (Barber 2010; Furey 2006; Horrocks et al. 2004; 2008; Jorgensen 2009); and c) the morphological and symbolic layout of horticultural features (mounds, alignments and ditches) within gardening zones (Barber 2004; Leach 1984). While these studies provide a good basis for understanding which crops were grown where, less is known about how mixed horticultural practices might have functioned within relatively small garden areas. In this paper, we report on archaeological research on Ahuahu (Great Mercury Island), where we have investigated a small stone row garden (New Zealand Archaeological Association Site T10/356) with evidence of multiple categories of horticultural activities.

Various cultigens were grown in Māori gardens using a variety of techniques. Burtenshaw et al.'s (2003) recent experimental gardening suggests sweet potato

is best grown in light, porous or sandy soil in sloping gardens. Furey (2006:13) notes that taro requires much more moisture than *kumara*, and must be grown on flatter or lower lying ground that is closer to a water source, in light, but very deep or alluvial soils. Stone features such as rows and alignments were used in the cultivation of both crops, and these horticultural features are some of the best archaeological evidence of pre-European gardening (Jones 1989:49). Stone rows generally appear roughly parallel, in a systematic pattern and may have adjoining rows at right angles (Furey 2006:27). Furey (2006:29) suggests that most stone alignments are not generally more than one course high and that they are present on the surface and within the garden layer. In some cases the stone rows served as windbreaks and markers of plot boundaries, with the gardened area occurring predominately between the stone rows (Jones 2007:97; Leach 1976:221). In contrast, based on research at Okoropunga in eastern Wairarapa, McFadgen (1980a) argues that the rows themselves were gardened, as the soils between the rows had not been modified by the addition of gravel or sand, and the gardened horizon surrounding the features were particularly deep in comparison to the areas between the alignments. As noted by Furey (2006:29), "it is useful to examine both the stone rows and the soil between rows for ... evidence ... to indicate where crops were grown." Our excavation strategy at site T10/356 was to investigate both the stone rows and terraces in the area, and the plots or areas between these to discern which areas were and were not being used for gardening.

Excavations at Site T10/356

Ahuahu, or Great Mercury Island, is the largest of the Mercury Islands, and lies ca. 5.5km off the east coast of the Coromandel Peninsula of the North Island, New Zealand. Māori traditions suggest that Ahuahu is the site of one of the earliest arrivals of people to New Zealand, and the site of the earliest landing of the canoe *Horotua*, commonly associated with the first introduction of sweet potato (Gudgeon 1892:77; and see Wright 1976). The island contains considerable evidence of Māori occupation, with previous archaeological work including excavations at Stingray Point Pā (Golson 1955), an extensive survey of the island's archaeological sites (Edson 1973), a survey of the southern half of the island (Furey 1983), excavations by Irwin (n.d.) at Te Huruhi Pā in 1979, and excavations by Furey (2009) in the beach dunes on the western side of the tombolo (sandbar) at the center of the island. Most recently, archaeologists at the University of Auckland in partnership with *tangata whenua* Ngati Hei, staff at the Auckland War Memorial Museum, and the landowners

of the Fay and Richwhite families, have established a long-term archaeological project on the island.

In February 2012, excavations were carried out at a gardening complex previously recorded as NZAA Site T10/356 (Figure 1). The garden is located at the side of the central tombolo that links the northern and southern parts of the island. The horticultural complex is ca. 80 x 50m and consists of a series of terraces on the upper hill slope, and a set of relatively parallel stone alignments that run down the slope into a flat area that is currently a swamp (Figure 2). Several of the alignments have been recently disturbed by cultural and natural processes, including trampling by cattle. Five test trenches labelled as "excavation areas" (EA6-EA9, and EA11) ranging in length from 1.6m to 5m were excavated in the gardening complex. Within each of these trenches, individual 1m test units were labelled according to a North-East grid. In addition to the trench excavations, small test pits (30 x 30cm) were excavated at 5m intervals along 3 transects extending from the top of the slope to the swamp below (see Figure 2). These test pits were labelled sequentially along each of the transects (e.g., TL3TP6 refers to transect 3 test pit 6). The slope of the garden can be divided into three zones: 1) steep upper slope; 2) moderate middle slope; and 3) bottom gentle slope. The excavations focused on the form and function of horticultural features, plots, and soils.

The excavations suggest that 5 different categories of gardening activities took place within the garden complex. The first category of horticultural activity is found in the upper steeper slope of the garden complex. In this area, there are a number of stone-faced terraces, and EA7 was situated to bisect three of these terraces (Figure 3). The upper terrace face in the trench was located in EA2N100E101, where smaller rocks were placed on top of each other. The second terrace in the trench was located in excavation unit EA2N100E100 and consisted of a front retaining wall, made of 2-3 courses of stone (between 25-60cm in diameter), with a deep layer of gardened soil behind it. This horizon was a dark loam with a loose structure, with charcoal flecking or inclusions. It is clear that only a small area was gardened behind this terrace, but the build-up of soil behind the terrace facing was substantial. At the downslope end of the excavation area there is another terrace face in EA2N100E97, with the associated gardened horizon containing considerable charcoal flecking. The presence of a charcoal lens in EA2N100E99-EA2N100E98 (not shown in the profile) suggests rake-out from a hearth feature close to the garden terrace, or alternatively, burning of secondary growth.

The second category of horticultural practices is defined by the addition of material to a gardened soil, a practice noted elsewhere by McFadgen (1980b) and Barber (2010). This category is evident in TL3, where

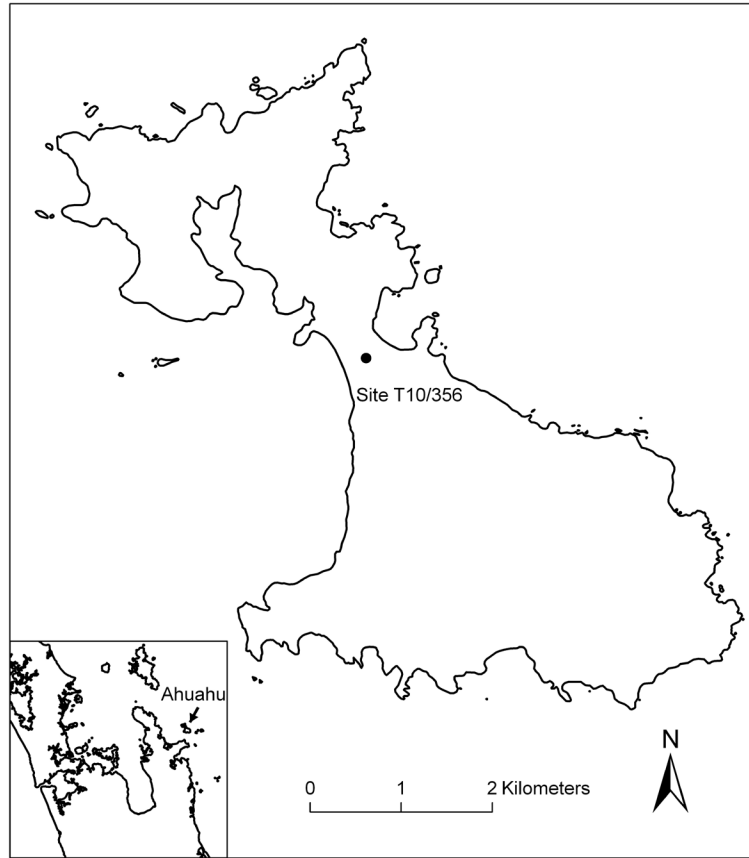


Figure 1. Ahuahu (Great Mercury Island) and the location of Site T10/356.

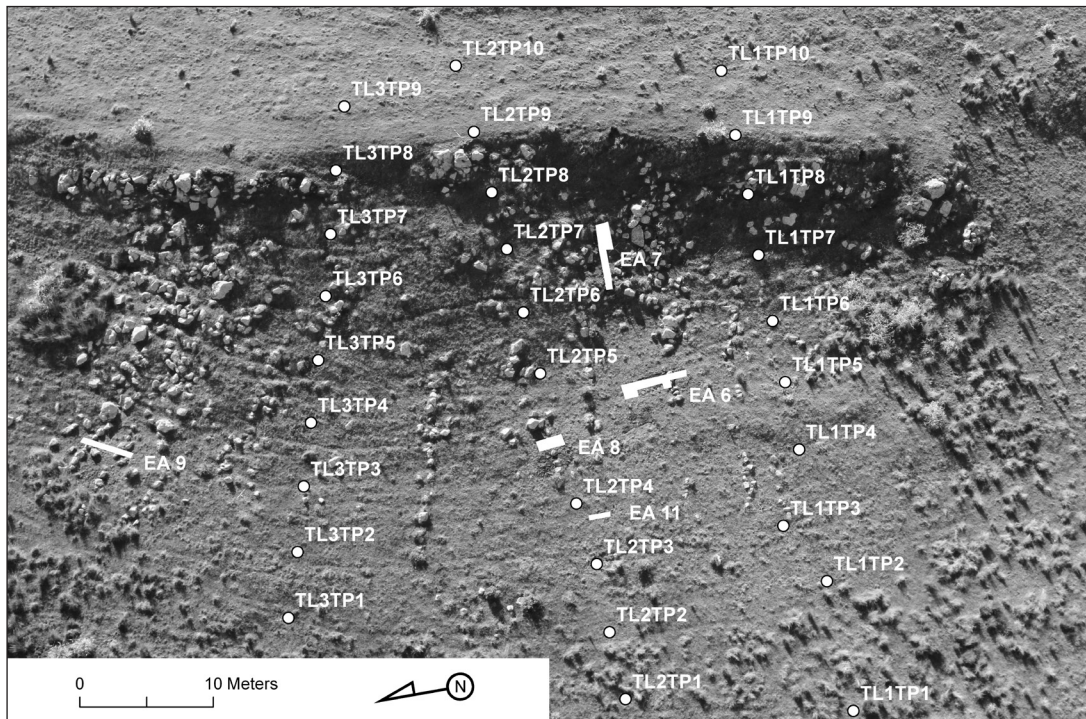


Figure 2. Aerial photograph of Site T10/356 showing location of excavations.

the addition of sand was noted in TP6 located on the upper steeper slope of the garden. It is possible that the sand is the result of natural deposition, but given that there was no other evidence of sand within the other test pits along any of the other transects, it

seems more likely that the sand in this small area was a cultural additive. The sand additive would lighten the clay loam, and possibly reflect experimentation or the development of horticultural practices within the higher slopes of the garden complex.

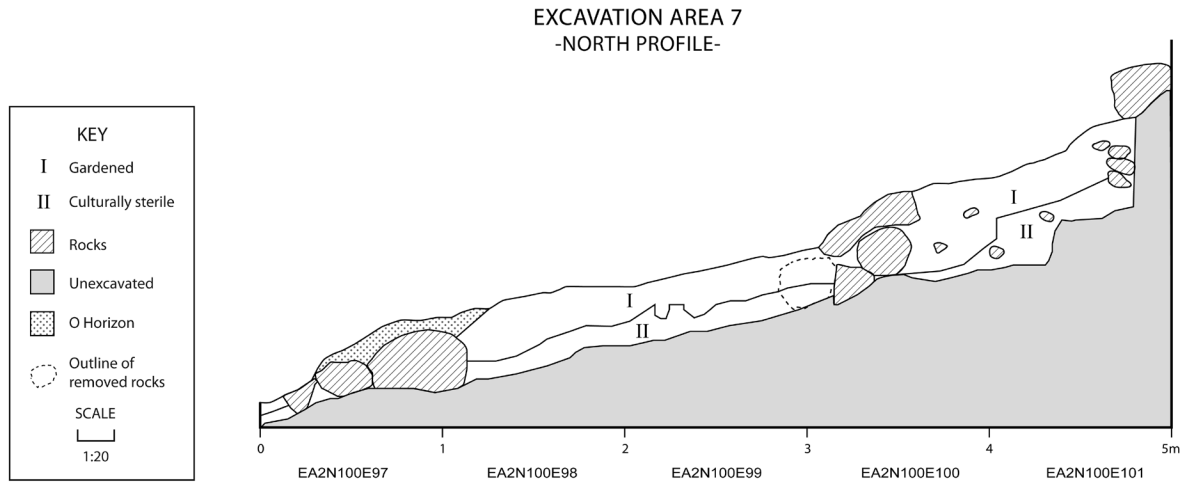


Figure 3. Profile of excavation area 7.

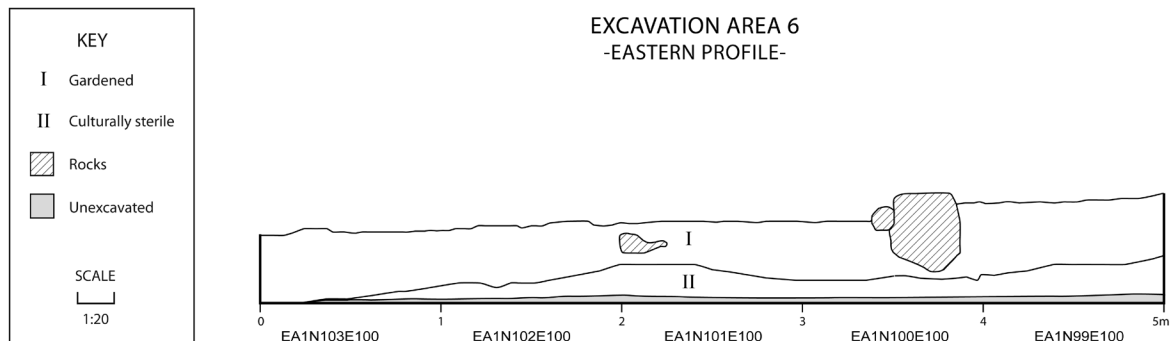


Figure 4. Profile of excavation area 6.

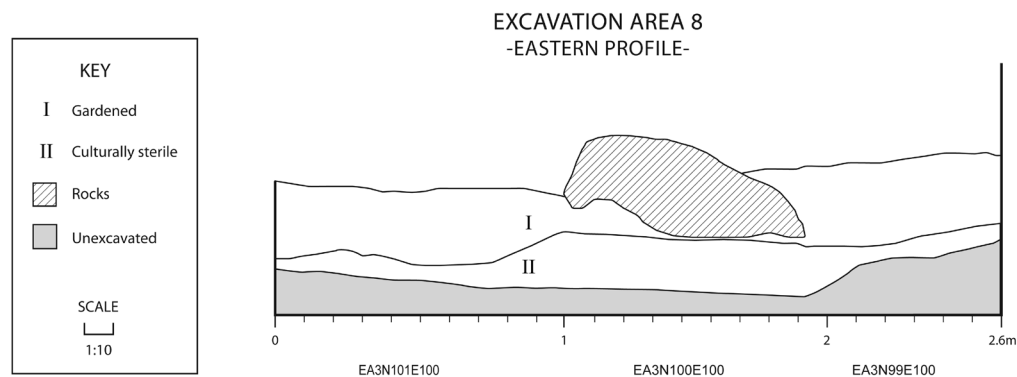


Figure 5. Profile of excavation area 8.

The third category of gardening activity is located in the moderate middle slopes of the garden complex where there is evidence of gardening on and between stone alignments. This category is evident in EA6, EA8 and EA9. The excavations at EA6 extend north from one stone alignment into a garden plot, and stopped just short of a second alignment (Figure 4). The test units EA1N99E100-EA1N103E100 contained a well-developed gardened horizon consisting of a dark loam, with a loose structure, mottling with small pieces of the underlying sterile clay layer, and charcoal flecking throughout. It has clearly been gardened and appears to be slightly deeper in the area close to the second alignment (not shown in the profile) in test unit EA1N103E100. The boulder in EA1N100E100 is approximately 35-40cm in diameter and is sitting close to the base of the gardened horizon. We do not think that much, if any, gardening occurred before the rock alignment was constructed. The excavation extended into the culturally sterile clay substrate.

The excavations at EA8 bisected an additional stone alignment (Figure 5), however, unlike the other parallel stone alignments in the garden complex that run perpendicular to the slope, this alignment

is oriented more diagonally in relation to the slope. Within the test units EA3N99E100-EA3N101E100 the gardened horizon is loose dark loam with charcoal flecking. The boulder in EA3N100E100 is sitting at the base of the gardened horizon, again suggesting that little gardening occurred before the construction of the alignment. Underlying the gardened horizon is the same culturally sterile clay substrate.

Excavations at EA9 bisected two stone alignments which were spaced closer together than the stone alignments associated with EA6 (Figure 7). The stratigraphy of EA9 includes the same gardened horizon with underlying sterile clay substrate. In test unit EA4N103E100 within EA4 there is a boulder which is 35-40cm in diameter that is sitting at the base of the gardened horizon. On the boundary of EA4N101E100 and EA4N100E100, there is a boulder that is set slightly within the O Horizon, and below that, another boulder approximately 25cm in diameter is sitting within the un-gardened culturally sterile clay substrate. It is possible that this boulder is part of an alignment that was constructed before the alignment represented by the boulder in EA4N103E100, but it is also possible that the two alignments were constructed at the same time.

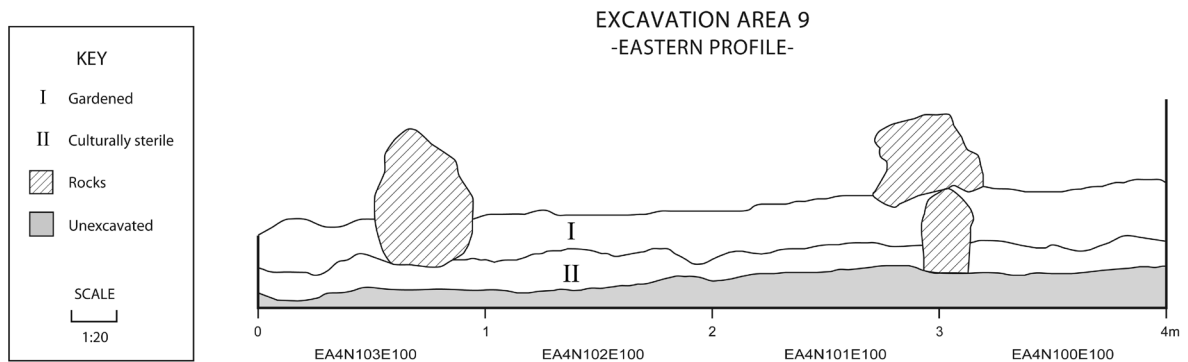


Figure 6. Profile of excavation area 9.

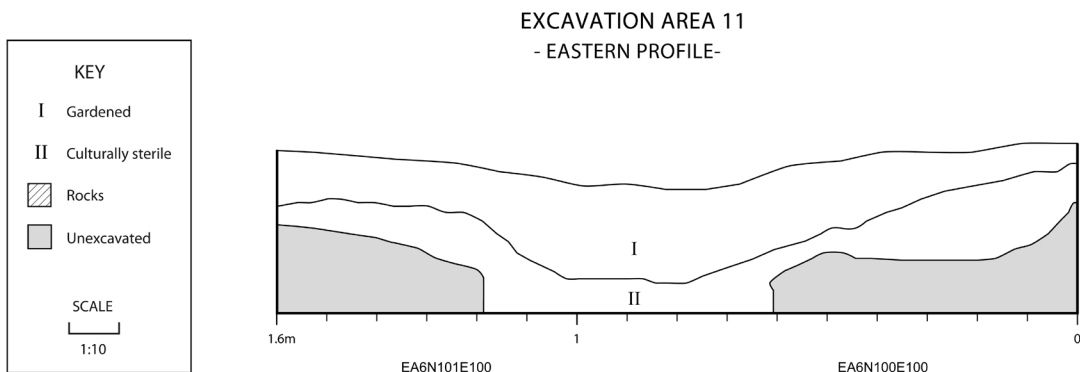


Figure 7. Profile of excavation area 11.

The fourth category of horticultural practices is represented by a linear depression or channel located on the lower gentle slope of the garden complex. The channel extended down the slope of the garden and was evidenced by a slight depression on the surface with remnants of a surface stone alignment marking it. The trench of EA11 was situated to bisect the channel feature, and excavations clearly indicate that the area within ca. 1m of the channel was gardened (Figure 7). The gardened zone narrowed away from the channel suggesting that horticultural activities focused on the channel, perhaps as a method of concentrating moisture for cultigens.

The fifth category of horticultural practices includes evidence of gardening near the edge of the current swamp. In TP1 of TL1, a deep gardened horizon with considerable charcoal flecking was recorded above the current water table. It appears that this deep wet environment was gardened, and it seems probable that taro, as opposed to sweet potato, would have been grown in this wetter soil.

The transect lines (TL1-TL3) give an indication of the spatial distribution of the different horticultural practices across the garden complex. Within TL1 there is evidence of gardening extending from the upper slope at TP8 to the bottom slope at TP1, with the lower slope being the focus of taro cultivation and the upper being the focus of sweet potato production. Within TL2 there is the presence of both gardened and non-gardened areas. The gardened areas are particularly concentrated on the moderate middle slope, and completely absent in TP7 and TP8. In TL2 at TP9 there is evidence of further gardening and a charcoal lense within the deep gardened horizon. In TL3, there is evidence of gardening from TP2 to TP7, with the addition of sand in TL3TP6 indicating variation across the horticultural area.

Conclusions

Archaeological investigations at Site T10/356 document five categories of gardening practices within a small ca. 0.4ha area. In the steeper upper slopes of the garden complex the construction of stone-faced terraces created an area suitable for sweet potato production. The addition of sand in one of these upper slope zones may indicate the refinement of horticultural practices related to sweet potato cultivation. Below the upper slopes extending into a relatively flat area there is significant evidence of gardening with the construction of stone alignments. Given the relatively light soils in this zone, it is likely that sweet potato was grown. At the lower edge of this flat zone a linear depression or ditch was constructed, with evidence of planting within ca. 1m of the ditch. At the very bottom of the garden complex, the deep gardened horizons above the current

water table indicate that this too was a gardening zone. Given the very moist conditions and heavy soils it seems likely that the area would have been used for taro production as opposed to sweet potato.

Site T10/356 is just one small garden area set within a much larger Ahuahu archaeological landscape of residential features, *pā*, and large horticultural complexes. It is the only location in the tombolo area with gardening alignments. The small limited size of the site is noteworthy, and it is not immediately clear why this portion of the slope was selected for horticultural development as opposed to others. It is possible that the close proximity of the slope to the small swamp was a factor, creating an environment where a variety of horticultural activities could take place. Reconnaissance survey of the adjacent slopes in the tombolo area has recorded indications of gardening activities, but no infrastructural improvements such as alignments have been noted. In contrast, there is a large horticultural complex near Tamawhera Pā on the northwest side of the island, and a slightly smaller but similar complex on the northeast side of the island. In these zones, there are several hectares containing dense concentrations of horticultural alignments and terraces. Our future research on the island will focus on documenting these larger gardening areas, with the hope that we will gain a greater appreciation of the variation of horticultural activities throughout the island.

Acknowledgements

This research was carried out during a University of Auckland archaeological field school associated with the Great Mercury Island Archaeological Project (GMIAP). The GMIAP is jointly directed by Thegn Ladefoged, Simon Holdaway, and Louise Furey. Rebecca Phillipps, Rod Wallace and Alex Jorgensen directed aspects of the fieldwork and helped gather the data presented here, and we thank them for their very helpful support and suggestions. Furthermore, we thank the students of the field school for their long hours of work and tireless efforts filling out forms. We thank Briar Sefton for redrawing the profile figures for us. The GMIAP is a partnership between the University of Auckland, the Auckland War Memorial Museum, Ngati Hei, and the Fay and Richwhite families. We sincerely thank Peter Tiki Johnson and Peter Matai Johnson for welcoming us to Ahuahu, sharing their knowledge and enthusiasm, and helping us in the field. Sir Michael Fay has been a most gracious host on the island, providing fundamental support and inspiration for our project, and we very much thank him. This research was partially funded by grants from the University of Auckland.

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This article has been peer-reviewed. Received 15 January 2013; accepted 10 March 2013