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LAPITA ON AN ISLAND IN THE MANGROVES? THE EARLIEST HUMAN OCCUPATION AT QOQO ISLAND, SOUTHWEST VITI LEVU, FIJI

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In November–December 2004 a research team from the University of the South Pacific and the Fiji Museum undertook geoarchaeological investigations along the coast of the Rove Peninsula, part of southwest Viti Levu Island (Figure 1A) where evidence for Lapita-era occupation had been found on previous occasions (Kumar et al., 2004; Nunn et al., 2004). The main target was the extensive, early-period site at Bourewa but we were also shown a collection of pottery from nearby Qoqo Island (by owner Peter Jones) that included a dentate-stamped sherd that led to mapping and excavation of that island's coastal flat.

Qoqo is a bedrock island (40,000 m²) reaching 32 m above sea level, located in the 7.3 km² mangrove swamp at the mouth of the Tuva River (Figure 1B). The island comprises two hills surrounded, particularly along their eastern side, by a 20–50 m broad coastal flat that also connects them (Figure 1C). At the time of Lapita arrival in Fiji, sea level was higher (+1.5 m, cal 3000 BP, Nunn 2005) and the hills on Qoqo are interpreted as recently-separated islands connected by a tombolo, the approximate form of which can be reconstructed today (Figure 1C).

Surface collection of pottery from the Qoqo coastal flat yielded four dentate-stamped sherds and two notched rims (immediately post-dentate). Since the site was relatively undisturbed, we suggest that they had probably

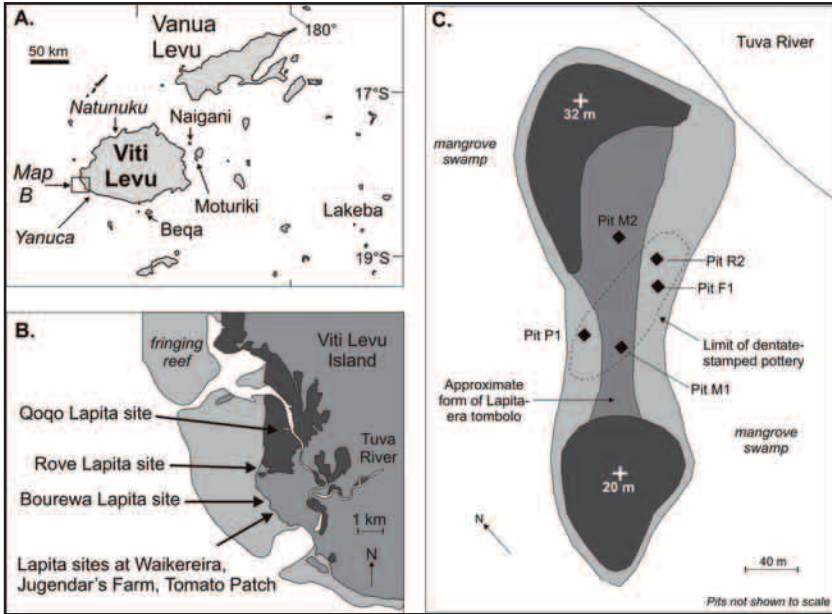


Figure 1. A: Map of the main Fiji Islands showing the locations of selected islands and Lapita sites. The location of Map B in southwest Viti Levu is shown. B: Map of the area of southwest Viti Levu Island where the Lapita sites referred to in the text are located. The dark shading is mangrove swamp. C: Map of Qoqo Island showing the location of the former tombolo, the five test pits, and the extent of dentate-stamped pottery, as determined by surface collection and excavation.

reached the surface through excavation by the numerous burrowing land crabs (*Cardisoma carnifex*) living there. The sherds appeared to lie along the sides of the tombolo, an observation that informed the locations of subsequent test pits. This inference seems to have been correct for the pits located along the sides of the tombolo had far thicker cultural sequences and proved richer in artifacts (largely pottery and lithics) and shell remains than the pits along its crest. We assume that the Lapita occupants of Qoqo were living on the tombolo and tossed their broken pots, unwanted tools, animal bones and shells into the shallows along its sides.

Five test pits were dug on the Qoqo coastal flat (Figure 1C). The deepest and most productive were those (F1, P1 and R2) along the tombolo's side. Radiocarbon ages (Table 3) and stratigraphy in Pit P1, the only one on the

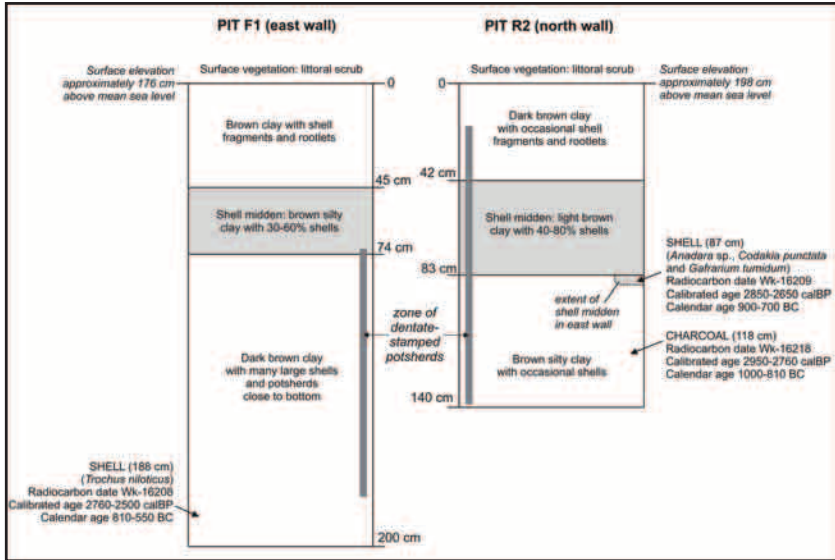


Figure 2. Stratigraphic sections of Pits F1 and R2 on Qoqo Island showing the prominent shell midden and the three radiocarbon dates obtained.

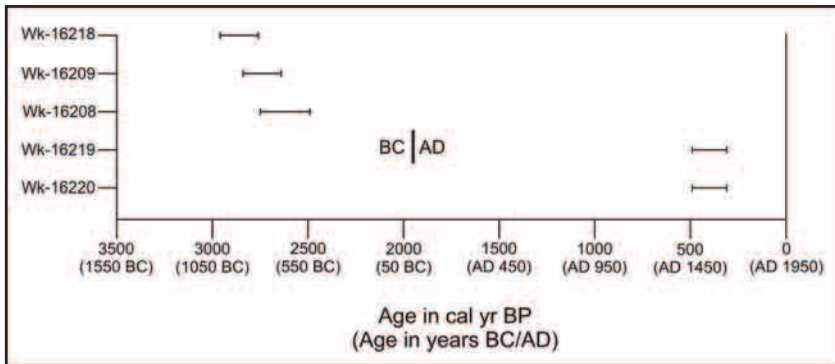


Figure 3. Plotted radiocarbon ages for indicators of human settlement on Qoqo Island. The three earlier dates (see also Figure 2) suggest initial Lapita occupation as much as cal 2950 BP (1000 BC) but more probably cal 2850–2650 BP (900–700 BC).

western side of the tombolo, suggested it had been disturbed, probably by repeated wave action in the time before the mangrove forest was established. The two pits (F1 and R2) on the southern side of the tombolo appear to have retained their original stratigraphy (Figure 2).

Dentate-stamped (Lapita) sherds were found through most of Pit R2 but only between 70–170 cm in Pit F1 (Figure 2). There are many possible explanations for this but, perhaps more interestingly, dentate pottery extends through the shell midden in R2 but not in F1. This may reflect changing preferences for disposal of broken pots through time, something that may have been more dynamic with a stilt-house occupation than with an occupation comprising land-founded houses on the narrow tombolo. A first analysis of potsherds from F1 and R2 is given in Table 1. Of 1525 sherds from Pit F1, only 1.2% were decorated and fewer than 0.5% were Lapita. Of 1109 sherds from Pit R2, 6% were decorated and 5% were Lapita.

A first analysis of the shell remains from the Qoqo excavations gives a snapshot of the varieties and quantities being consumed at particular times (Table 2). This analysis used only shells from Pit F1 and shows how the largest marine species, such as *Trochus niloticus* and *Tridacna* sp., were common in the lower levels but were significantly less so, or absent, in the upper layers. A similar picture is shown for the most popular smaller shellfish, such as *Anadara antiquata*, *Gafrarium pectinatum* and *Codakia punctata*, although because of their comparatively low individual weight this is not as clear as for larger species. Such a pattern of predation is similar to that found in early-period sites elsewhere in the Pacific Islands and appears characteristic of colonizing people in pristine island ecosystems (Amesbury, 1999; Nagaoka, 1988; Spennemann, 1987). The freshwater mussel, *Batissa violacea*, is common along the banks of rivers such as the Tuva and its general decline towards the present probably tracks the conversion of the Qoqo area from open-coast to mangrove (see below). None of the species listed in Table 2 live in mangrove swamps suggesting that, as Qoqo was gradually enclosed by mangrove, its occupants sought alternative locations where their lifestyle was viable.

Radiocarbon determinations on both marine shell and charcoal from Pits F1 and R2 (Table 3) are considered to represent the time of earliest discernible human occupation of Qoqo Island, probably within the range cal 2850–2650 BP (900–700 BC) but perhaps cal 2950–2760 BP (1000–810 BC) (Figure 3).

The discovery of a Lapita-era tombolo occupation is far from unprecedented. Similar sites are known from the Bismarck Archipelago of Papua New Guinea (Kirch, 2001), the Ha'apai Islands of Tonga (Dickinson et al., 1999), and from Naigani Island in central Fiji (Best, 1981; Nunn 2005). At

Table 1. Analysis of potsherds from Pits F1 and R2 on Qoqo Island.

Pit	Spit	Plain body sherds	Decorated body sherds	Plain rims	Decorated rims	Total body sherds	Total rims	Total sherds	Total Lapita sherds
Pit F1	0-10	64	0	0	0	64	0	64	0
Pit F1	10-20	57	0	0	0	57	0	57	0
Pit F1	20-30	63	0	0	0	63	0	63	0
Pit F1	30-40	42	1	0	0	43	0	43	0
Pit F1	40-50	49	0	0	0	49	0	49	0
Pit F1	50-60	78	0	1	0	78	1	79	0
Pit F1	60-70	114	0	3	1	114	4	118	0
Pit F1	70-80	32	2	2	0	34	2	36	1
Pit F1	80-90	337	6	7	0	343	7	350	0
Pit F1	90-100	79	0	10	1	79	11	90	1
Pit F1	100-110	101	2	9	0	103	9	112	1
Pit F1	110-120	103	0	3	0	103	3	106	0
Pit F1	120-130	19	0	0	0	19	0	19	0
Pit F1	130-140	110	4	5	0	114	5	119	3
Pit F1	140-150	46	0	2	0	46	2	48	0
Pit F1	150-160	31	0	2	0	31	2	33	0
Pit F1	160-170	39	1	1	0	40	1	41	1
Pit F1	170-180	2	1	0	0	3	0	3	0
Pit F1	180-190	88	0	0	0	88	0	88	0
Pit F1	190-200	7	0	0	0	7	0	7	0
Pit F1 Totals		1461	17	45	2	1478	47	1525	7
Pit R2	0-10	53	0	2	0	53	2	55	0
Pit R2	10-20	38	0	1	0	38	1	39	0
Pit R2	20-30	94	2	0	2	96	2	98	4
Pit R2	30-40	93	5	3	2	98	5	103	4
Pit R2	40-50	76	5	3	2	81	5	86	7
Pit R2	50-60	103	0	9	7	103	16	119	6
Pit R2	60-70	80	7	9	1	87	10	97	7
Pit R2	70-80	83	5	13	1	88	14	102	6
Pit R2	80-90	62	6	8	0	68	8	76	6
Pit R2	90-100	67	4	0	1	71	1	72	5
Pit R2	100-110	100	2	12	4	102	16	118	4
Pit R2	110-120	33	1	2	0	34	2	36	1
Pit R2	120-130	50	2	2	1	52	3	55	1
Pit R2	130-140	46	1	1	5	47	6	53	4
Pit R2 Totals		978	40	65	26	1018	91	1109	55

Table 2. Analysis by weight of edible shell remains from Pit F1 on Oqoqo Island.

Species	Weight (per spit) g										
	0-10	20-30	40-50	60-70	80-90	100-110	120-130	140-150	160-170	180-190	
<i>Anadara antiquata</i>	780	880	1085	1484	1245	2454	490	3425	2190	334	14367
<i>Gafrarium pectinatum</i>	1091	1795	1690	2686	2600	3372	807	3793	2544	449	20827
<i>Codakia punctata</i>	211	813	273	407	319	461	143	557	338	63	3585
<i>Saccostrea</i> sp.	49	84	85	68	143	332	11	1495	257	55	2579
<i>Tridacna</i> sp.	0	0	0	0	115	0	17	101	1016	52	1301
<i>Batissa violacea</i>	66	0	0	79	0	174	49	406	449	19	1242
<i>Fimbria fimbriata</i>	114	104	102	178	115	210	22	200	135	27	1207
<i>Periglypta puerpera</i>	0	0	53	23	117	128	49	104	70	7	551
<i>Codakia tigrina</i>	28	55	12	23	7	2	2	12	4	0	145
<i>Isognomon</i> sp.	3	0	0	0	38	27	0	0	17	24	109
<i>Tellina palatam</i>	0	8	2	3	0	16	3	13	6	0	51
<i>Atactodea striata</i>	11	6	4	4	4	3	2	9	2	1	46
Unidentified	186	263	48	249	287	140	0	53	65	0	1291
Subtotal	2539	4008	3354	5204	4990	7319	1595	10168	7093	1031	47301
Gastropods											
<i>Trochus niloticus</i>	25	0	214	6	290	400	43	1149	477	63	2667
<i>Lambis lambis</i>	0	0	0	0	66	28	102	472	21	0	689
<i>Turbo chrysostomus</i>	29	39	19	39	54	179	17	318	11	0	705
<i>Conus</i> sp.	0	0	5	0	23	49	24	121	111	11	344
<i>Cypraea tigris</i>	0	26	0	26	33	0	0	43	26	0	154
<i>Strombus</i> sp.	16	13	18	13	7	23	0	16	21	10	137
<i>Nerita polita</i>	7	5	0	5	4	0	0	2	2	0	25
Unidentified	0	234	131	119	60	50	0	369	22	62	1047
Subtotal	77	317	387	208	537	729	186	2490	691	146	5768
Total	2616	4325	3741	5412	5527	8048	1781	12658	7784	1177	53069

Table 3. Radiocarbon dates from Qoqo Island. Ages calibrated using OxCal 3.9 and, for marine shell, Marine98 curve of Stuiver et al. (1998) with Delta-R of 38±16 yrs (Toggweiler et al. 1991); 2 sigma range given. Samples Wk-16219 and Wk-16220 are not considered diagnostic of the earliest period of human occupation of Qoqo.

Pit	Lab number	Material	Depth (cm)	$\delta^{13}\text{C}$	CRA BP	cal BP
F1	Wk-16208	marine shell	188	3.2±0.2	2925±38	2760-2500
P1	Wk-16219	charcoal	185	-24.2±0.2	402±39	500-320
P1	Wk-16220	charcoal	205	-24.2±0.2	393±38	500-320
R2	Wk-16209	marine shell	87	-0.2±0.2	2990±38	2850-2650
R2	Wk-16218	charcoal	118	-24.7±0.2	2790±41	2950-2760

the time Qoqo was first occupied it was probably fringed on its ocean-facing sides by coral reef while riverine environments, where freshwater shellfish like *Batissa violacea* could be found, lay close to its land-facing side. The likelihood that the establishment of Lapita settlement on Qoqo postdated that at Bourewa, 3 km southeast, shows that it could have been settled from there, but at present this scenario is conjectural.

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