The Archaeobotanical Analysis

Introduction

The analysis of carbonised plant remains recovered from Urumbal Pocket has two aims: (i) to identify the types of rainforest plants found in the archaeological record; and (ii) to investigate whether their presence in the archaeological record reflects human activity or site formation processes. The plant assemblage from Urumbal Pocket consists mainly of carbonised endocarp fragments, generically referred to as nutshells. Complete and incomplete seeds were also recovered and their identification was undertaken by using modern samples at the CSIRO herbarium in Atherton. The careful application of ethnographic analogy and comparison with a modern reference collection enabled the identification of many of the archaeological remains. The results are used to reconstruct Aboriginal plant use at Urumbal Pocket which provide longitudinal information on Aboriginal rainforest subsistence strategies.

Documented Aboriginal use of rainforest plant foods

Explorers, botanists, Aboriginal protectors, and naturalists (e.g. Lumholtz 1889; Meston 1889; Mjöberg 1918; Roth 1901–10) recorded the extensive use of plant foods by Aboriginal rainforest people. Historical documents and oral traditions (e.g. Mjöberg 1918:492–494; Pedley 1993; M. Barlow, pers. comm., 2004) have shown that plant foods comprised a significant proportion of the Aboriginal diet and included the collection, processing, and consumption of a large number of toxic and non-toxic rainforest nuts, an Aboriginal tradition that survived European contact. Much of the ethnohistorical literature on rainforest plant food has been summarised and discussed previously by Harris (1975, 1987), Horsfall (1987, 1990), and Pedley (1992, 1993). In addition, interviews with Jirrbal elders on the use of rainforest plants past and present confirms that a wide variety of species were being exploited at the time of European contact (Duke and Collins 1994; M. Barlow, pers. comm., 2004). However, the analyses presented here focus on those varieties which were retrieved archaeologically from Urumbal Pocket and are commonly referred to in the historical record. It is recognised that they represent only a small proportion of the rainforest plants utilised and consumed by rainforest Aboriginal people in the past. Historical records suggest that rainforest nuts were a staple food source in the Aboriginal rainforest economy at the time of European contact. They have high food value, high seasonable abundance and storage potential (both above and below ground) and, therefore, could be stored for later use in the seasonal calendar (Coyyan 1915; Harris 1975; Mjöberg 1918). Experimental work by Pedley (1993:179–180) and Tuechler (2010) has shown that the contribution of rainforest tree nuts to the diet of Aboriginal rainforest people was significant and that they were important sources of starch, carbohydrates, protein and fat in various quantities. It has been estimated that toxic rainforest tree nuts comprised around 10–14% of the diet to rainforest people in the study area (Pedley 1993).
Historical accounts on the processing of rainforest tree nuts

Historical accounts describing Aboriginal nut exploitation in the study area mainly refer to two types of walnut—Beilschmedia bancroftii (yellow walnut), Endiandra palmerstonii (black walnut)—a type of black pine nut Sundacarpus amara, and the black bean Castanospermum australe (Coyyan 1915; Mjöberg 1918). Michael O’Leary described some of the economically important plants used on Evelyn Tableland in the late nineteenth century:

The principal food trees are the koah, burra, bean tree, tchupella and a number of smaller varieties; there are also a few vines or tree climbers that at times bear edible fruit. The bean tree is not often used by those people on account of its poisonous nature and the amount of work that is attached to preparing it. The nuts are pared into very thin slices, then there is a considerable time that it has to go under the water process and fire before it is fit for consumption. While other food is plentiful those people sacredly leave the bean tree alone. The tchupella is a smaller nut and grows on the trees we know as black pine. When the season is on the food is eagerly sought for by those people and they will travel over miles of country to partake of it. They also grind those nuts, into fire, but it does not require the water treatment, baking in the hot ashes being sufficient. The tchupella is an annual bearer, but is not too plentiful and is generally found on the high or tableland country. There are several other smaller nuts that supply food but they also have to be ground into flour and go through the fire and water process (Coyyan 1918 part IX:1).

The yellow (burra or barra) and black (koah or goaj) walnuts are available for around eight months of the year, mainly over the spring and summer months, and grow at altitudes ranging from 0–1,300 m. The black pine (tchupella or tjubala) has a considerably shorter fruiting period and is available only between October–December and has a more limited distribution, growing in altitudes ranging from 600–1,200 m (Cooper and Cooper 2004). The black bean tree (wakki) fruits between March and November and grows at altitudes between 0–840 m (Cooper and Cooper 2004:204). The yellow walnut and black pine are eaten by cassowaries and bush rats, whilst the black walnut is popular with white-tailed rats. Nuts that have fallen to the ground are preyed upon by these types of rainforest animals, leaving only a brief opportunity of time to collect them intact (personal observation). However, historical observations suggest that nuts were commonly collected by Aboriginal people who climbed into the tree canopy to collect them (Coyyan 1918; Mjöberg 1913a, 1918). Maisie Barlow recalls the types of plant foods her mother, grandmother and other Jirrbal women used to collect in the rainforest and process and consume during their travels to and from Gumbulumba around the turn of the nineteenth century:

They would collect beans, brown [black] and white [yellow] walnuts and black pine nuts on the way out and on the way back to Gumbulumba. We had all of that and we had meat, the men hunted and the women collected and also processed the nuts. My grandmother knew where to get them. They give you lots of energy you know. It’s like eating meat, fish and butter but all at once. You feel like you are full of beans! (M. Barlow, pers. comm., 2004).

Most of the plant varieties mentioned above are noxious and require complex detoxification processes before they can be consumed. Maisie describes the traditional way of processing two types of rainforest nuts in order to prepare them for human consumption, a process taught to her by her grandmother in the 1920s:

When you cook the barra [yellow walnut] you have to boil it, grandmother used a kerosene tin, but in the old days they used to bake everything, they dig a pit in the ground, put a lot of leaves in it, a lot of wet ginger leaves, and they put the barra in that, put a lot of leaves on top and then make the fire on top. They had to be cooked twice that way. Goaj [black walnut] you can grate and mix in a bowl, they used to mix it on a sheet of bark, and then make like a damper out of it. But goaj you can throw straight on the coals and you can eat it straight away (M. Barlow, pers. comm., 2004).
The baking of *barra* using a ground oven, sometimes referred to as steaming, was also traditionally applied to *tjabala* (black pine nuts) and the *wakki* (black bean) (M. Barlow, pers. comm., 2004). Ethnohistorical accounts of Aboriginal subsistence strategies in the rainforest region (Coyyan 1918; Pedley 1992) similarly recount how people would dig earth ovens to bake tree nuts (and other foods, including meat and fish). At times, they would line the pit with pebbles as well as ginger leaves, placing the nuts in the pit and covering them up with more leaves and finally placing more hot coals on top. In April 1913 at the Cedar Creek campsite, Mjöberg recorded the use of two pieces of basalt (Fig. 6.1) to crack black pine nuts:

> I have observed nut-cracking implements at several locations around Cedar Creek and Malanda. When the blacks [sic] have nothing else to occupy their time with, they sit in their huts and crack large numbers of *tjabala*, which reportedly is from a tree called black pine but probably one of the *Cycas*-species. During rainy or cold days, this is what keeps them busy (Mjöberg 1918:437).

Figure 6.1 Nut-cracking stones (the largest is approximately 15 cm in maximum dimension) collected by Eric Mjöberg at Cedar Creek.

Source: Courtesy Mjöberg collection, Stockholm’s Museum of Ethnography.

Figure 6.2 shows a different type of nut-cracking stone implement unique to the rainforest region located in a survey on the Russell River. No such characteristic nut-cracking stones were recovered from Urumbal Pocket, but it appears that a couple of unmodified rocks might have sufficed in cracking the nuts open.
The next step in the detoxification process was grating (sometimes referred to as slicing or crushing) the seeds, which are enclosed within a hard nutshell layer (the endocarp). This was traditionally done by using a second stone implement unique to the rainforest region—an incised slate grinding stone (see Fig. 4.5). O’Leary refers to this stone implement as a *mo-an*:

The *mo-an* is always carried with them when travelling as it is sometimes a difficult task to find the desired sort [of stone]. All those nuts are thrown into the fire. This toughens them and makes it easier for the miller (Coyyan 1918 part IX:3).

Eric Mjöberg was informed by a European settler at Cedar Creek that the incised slate grinding stones were exclusively used by the local Aboriginal people to process *barra*, the yellow walnut, at the time of European arrival (Mjöberg 1913a). In the final processing step, the grated pulp was put in lawyer cane dilly bags and leached for two to three days in a small running creek with a couple of rocks holding it in place (M. Barlow, pers. comm., 2004).

The *barra* is ground into flour, sifted through the bottom of a dilly-bag until an evenness or suitable fineness is obtained, then it is cooked in the hot ashes (they make use of large leaves to protect their food from dirt), and when finished is restored again to the dilly-bag and placed in water. A very small quantity of water is allowed to filter through the bag, and after about twelve hours of this treatment it is fit to eat (Coyyan 1918 part IX:2).

Once leached of their toxins, the pulp was chewed and formed into a paste that was eaten raw or made into ‘Johnny cakes’ or flat cakes that were baked on hot coals (Coyyan 1918; Mjöberg 1918:492).
Materials, methods and results

The assemblage characteristics

The assemblage consists for the most part of nutshell remains in the form of robust endocarp fragments, which is the inner section of the fruit pericarp (Cooper and Cooper 2004:590). Archaeobotanical remains are generally rare in archaeological deposits, although they have been found in abundant quantities at Urumbal Pocket and other archaeological sites in the rainforest region (Cosgrove 2005; Cosgrove et al. 2007; Horsfall 1987). All of the botanical remains have been carbonised, transforming them into inert charcoal (Horsfall 1987, 1990). The nutshells may derive from a number of important food plants, referred to in the ethnohistorical literature as staple food sources for Aboriginal rainforest dwellers. What they have in common is that they consist of a hard shell (endocarp) that encapsulates a single seed.

Potential limitations of the data

It has been suggested that a good indication of the past cultural use of a plant species is its presence in high concentrations, a continuous presence through time in cultural deposits, and the state of the preservation of the remains (Minnis 1981)—criteria which are fulfilled at Urumbal Pocket. Generally, ethnobotanists also argue that it is safe to assume that charred plant remains are prehistoric (Minnis 1981:147), perhaps more so in tropical rainforests where natural fires are rare. Discriminating between cultural and natural plant accumulations in the archaeological record is important to the interpretation of the plant assemblage from Urumbal Pocket and of plant evidence found at archaeological sites in general (Beck et al. 1989). It has been suggested that criteria to consider include radiocarbon dating of plant remains, comparison of species represented in cultural soils compared to adjacent non-cultural soils, and a presence of high concentrations and good preservation of identifiable elements (Keepax 1977:226–228; Minnis 1981). To assist in the separation of cultural and natural plant accumulations in the archaeological record at Urumbal Pocket, shovel pits were dug in a 150 m transect perpendicular to the site to test for plant remains (discussed in Chapter 4). No nutshell or other cultural materials were identified in the pits. This is an important observation, demonstrating that adjacent non-cultural soils contain no charred nutshells and eliminating the possibility that the botanical remains were deposited at the site from natural bush fires and subsequent slope wash. In addition, none of the identified species are growing within the immediate vicinity of the site. The surrounding vegetation is currently dominated by eucalypts, suggesting that the archaeological plant remains are not the result of nuts and seeds falling into the site from overhanging vegetation. A further indicator that strongly supports the hypothesis that humans discarded the carbonised plant remains at the site is the lack of evidence for animal activity on the archaeological plant remains (see Asmussen 2008). Rodents and cockatoos often feed upon modern nuts and seeds of the species identified archaeologically, leaving distinct gnaw marks (Figs. 6.3 and 6.4). Scatters of chewed nuts are commonly found on the forest floor near nut trees (personal observation).
Experimental results

Experimental work on the taphonomic pathways of rainforest nuts and other plant foods may help explain how they became burnt and, as a result, survived in the archaeological record. Experimental work shows that nutshell fragments put on hot coals produced from a small log-fire burn fast and crumble almost immediately (personal observation). The carbonisation of the archaeological plant remains is therefore more likely a result of a low oxygen environment, whereby the nutshells were not subject to the high heat produced by a log-fire. Results from experimental work on traditional nut processing and cooking (Tuechler 2010; Tuechler et al. 2014) provide one explanation as to how the archaeological remains may have become charred. In the cooking experiments, a traditional ground oven was used to steam yellow walnuts and black pine nuts. The nutshells did not become carbonised during the cooking process, instead the cracked fragments became charred when incorporated as waste products into the coals of a dying fire during clean-up activities. These results compare very well with the archaeological remains.

The sample size

The excavations at Urumbal Pocket recovered carbonised macrofossil plant remains in relatively large numbers (n=9149) weighing a total of 422.7 g. Of these, 482 (5.3%) are diagnostic to family level, at least. The plant remains are highly fragmented. This is probably a result of nut-cracking during processing and other human activities at the open site, such as trampling and cleaning up, as described by Maisie Barlow (pers. comm., 2004):

When we arrived at the campsite, the women would clean up the old leaves and sticks and burn it all. They liked it nice and tidy in camp. They repaired old gunyahs [huts] or burnt them and built new ones, collected lots of nuts and other food whilst the men went hunting. They started fires built on top of the old ones. Each hut had at least one fireplace and there was one big communal fire.

Maisie's childhood account highlights the activities carried out before the reoccupation of a campsite in the contact period, and the potential disturbance these activities may have had on any materials left from previous visits. This is particularly evident for plant remains which break easily, even when handled carefully (personal observation, 2004).
Recovery methods of the nutshell fragments and seeds

Large nutshell fragments with a maximum dimension greater than 10 mm were recorded in situ during excavation and smaller fragments and seeds were collected from the sieves. All soil excavated was wet-sieved on site. This allowed sorters to distinguish between small charcoal pieces, nutshell fragments, and complete and incomplete seeds, and prevented further breakage. The excavation teams were careful to protect fragments with diagnostic features that might facilitate identification. Any fragments or seeds considered potentially identifiable were wrapped in foil and placed in separate bags labelled according to square and spit and then stored in boxes. While this protected them from breakage, it also prevented contamination of radiocarbon dating samples. The material was then sorted into batches of fragments and seeds with and without diagnostic features, as discussed further below. At this stage, non-diagnostic nutshell pieces were counted (n=8667) and weighed (345.9 g) and bagged together according to square and spit. No further analysis was carried out on the unidentifiable fragments.

Creating a modern reference collection

To aid identification of excavated nutshell fragments, modern samples of yellow (Fig. 6.5) and black walnuts as well as black pine nuts were collected from underneath trees in the study area and in locations with a vegetation structure similar to that of pre-European times.

Figure 6.5 Modern yellow walnuts (Beilschmedia bancroftii) showing distinct morphological features that were used in the analysis of the archaeological plant remains (scale=1 cm).
Source: Photograph by R. Cosgrove.

Modern nut samples were collected from a number of locations on the Tablelands. This was to ensure that the modern reference collection was as comparable to the archaeological plant remains as possible and that, if a range in size exists in modern walnuts, this was taken into account in the analysis of the archaeological plant assemblage. In two instances, modern nut samples were collected from the same trees that Maisie Barlow’s grandmother and other women collected nuts from in the 1920s and 1930s. A black walnut tree with an Aboriginal carving of unknown age (Fig. 6.6) grows in the vicinity of the Jambilan campsite (discussed in Chapter 7), which suggests that this area was used by Aboriginal people prior to European arrival as well as in the contact period.
Black pine nuts were also collected from the forest floor underneath a black pine (*Sundacarpus amara*) growing in an area now referred to as Mt Hypipamee National Park (Fig. 6.7). Jirrbal women collected nuts from this same tree in the 1920s and 1930s (M. Barlow, pers. comm., 2006).
The nutshells

To assist in the identification of the archaeologically derived endocarp fragments, the morphological features of 22 modern samples of yellow and black walnut and five modern samples of black pine nut were recorded. These attributes were then used as a guide to compare and contrast attributes
recorded on the archaeological plant material. The key morphological features recorded for modern walnuts and black pine nuts are described in Table 6.1 and discussed below. The archaeological endocarp fragments selected for identification, i.e. fragments with distinctive features, were all greater than 10 mm in maximum dimension, and features were visible to the naked eye (Fig. 6.8). Surface structures were further compared using a standard binocular microscope (7–40 X).

Table 6.1 Morphological features recorded on modern walnuts and black pine nuts, compared with results from the archaeological nutshell fragment analysis.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Modern yellow and black walnut</th>
<th>Excavated nutshell fragment</th>
<th>Modern black pine</th>
<th>Excavated nutshell fragment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Globose</td>
<td>Curved</td>
<td>Globose but slightly more oblong than walnuts</td>
<td>Slightly curved</td>
</tr>
<tr>
<td>Size (refer to section B below)</td>
<td>28-50 mm</td>
<td>25-50 mm</td>
<td>20-25 mm</td>
<td>&lt;25 mm</td>
</tr>
<tr>
<td>Endocarp thickness</td>
<td>1-3 mm</td>
<td>1-3 mm</td>
<td>0.5-1 mm</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>Surface ornamentation</td>
<td>Sharp protrusions on one or two ends, smooth surface with veins, ribbed or ruminate structures</td>
<td>Sharp protrusions on ends, smooth surface with veins, foveate, rough and ruminate structures</td>
<td>Lack protrusions on ends, overall smooth surface</td>
<td>Smooth surface</td>
</tr>
</tbody>
</table>

Source: Author’s data.

A) Shape
In the modern samples, yellow and black walnuts have a globose form, i.e. they are spherically shaped. The main surface feature on the black walnut is a pointed and sharp apex with an opposite blunt base. On the yellow walnut the apex and base both have sharp protrusions. Black pine nuts are also globose in form, but are slightly more oblong, smaller and lack the pointed ends. In the first instance, large, curved endocarp fragments and fragments with distinctly pointed or swollen ends were selected for further analysis and identification.

B) Size measurements
Some size variability in the modern walnut samples was observed, similar to that recorded in the botanical literature of tropical rainforest plants (Cooper and Cooper 2004:242). In all cases, black pine nut samples were relatively small (20–25 mm) and fall outside the modern walnut size range (28–50 mm). A circle template was used to measure large, curved endocarp fragments in the archaeological assemblage so that the complete modern samples could be compared. This enabled the estimation of the size of the nut, including the complete seed surrounded by the endocarp layer. The modern sample sizes were used to assess the potential for endocarp shrinkage during the carbonising process, which might result in misidentification. Those samples that matched the modern walnut size were selected for further analysis. Fragments significantly smaller than the modern range of walnuts and without any other morphological indicators, such as endocarp thickness or surface ornamentations, were eliminated from the analysis and recorded as unidentified fragments. Black pine nuts are outside the walnut size range and, due to a lack of diagnostic morphological features other than size and shape, it was difficult to identify these fragments with any certainty.

C) Thickness of endocarp wall
The thickness of the endocarp was measured in millimetres using callipers. This was done to investigate whether or not fragments shrunk in the process of carbonisation, potentially making identification ambiguous.
The endocarp walls of the modern black pine nut are consistently thinner than those of the walnuts, making them susceptible to breakage and difficult to identify. Although some thin pieces of endocarp with a smaller circumference have tentatively been attributed to black pine, further microscopic analysis of cell structure is required for a conclusive identification. Therefore, nut endocarps resembling black pine have been excluded from the analysis.

**D) Surface structures**

Surface structures were carefully examined and recorded, following Anderberg (1994:9). Endocarp fragments preserving a complete or part of a pointed apex were easily identified to either black or yellow walnuts (refer to Fig. 6.8). Other surface structures recorded on modern samples were smooth surfaces with veins and surfaces with foveate, ruminate, rough and ribbed ornamentations (Fig. 6.9).

**Complete and partially complete seeds**

Also recovered in the archaeological deposits were a number of complete and incomplete seeds. The excavated seeds were identified by comparison with modern reference material held at CSIRO’s tropical herbarium in Atherton and with samples collected in the field. A number of the seeds are identified as Sapotaceae, genus *Pouteria* (B. Grey, pers. comm., 2006). *Pouteria* spp. seeds have a number of key distinguishing features. They are ovate with one or two pointed ends and a smooth surface with a groove running down the centre of the body (Fig. 6.10).

The interpretation that *Pouteria* species were used and deposited in the sites by humans cannot be supported by reference to ethnographic analogy. A survey of the ethnohistorical literature and interviews with Aboriginal elders failed to find any historical evidence relating to the human use of *Pouteria* spp. in the rainforest region. Another variety, *Pouteria sericea*, is, however, commonly considered ‘bush tucker’ in field guides to vegetation of dry tropical areas in Queensland (Brock 2005:287). In this case, it is the fleshy pericarp that is consumed by humans. The presence of *Pouteria* spp. seeds in the deposits, and their association with nutshells,
stone artefacts and other cultural material, strongly suggests that they were being discarded at the sites by people, rather than a result of animal activity. Modern *Pouteria* spp. seeds are often preyed upon by rodents and birds, which leave distinct gnaw marks on the seeds (refer to Fig. 6.3). The archaeological remains show no evidence of such animal activity, suggesting that their presence in the archaeological deposits is a result of human use, as people brought them into the site and probably discarded them into dying fires.

Another type of seed found in the archaeological deposits is a small, round to slightly oval seed, between 10 to 14 mm in diameter, with distinct surface ornamentations. The seed is enclosed within a thin, wrinkled, and woody endocarp (Fig. 6.11).

This type has tentatively been identified as belonging to the Elaeocarpaceae and is probably one of the *Elaeocarpus* (quandong) species (B. Hyland, pers. comm., 2006). The use of other *Elaeocarpus* species by rainforest dwellers was recorded in the contact period. For example, *Elaeocarpus bancroftii*, the Johnstone River almond (Harris 1975:39–43), although none of its remains were found at Urumbal Pocket.

**Summary**

The evidence presented above supports the notion that the charred plant remains found in the Urumbal Pocket excavations were brought to the site by Aboriginal people. To summarise, the evidence for this is:

1. The species represented were used by Aboriginal people in the contact period, according to oral traditions and ethnohistorical documents.
2. The plant remains are charred.
3. Pits dug outside the site contain no charred plant remains.
4. The remains have not been chewed by rats and other animals.
Thus, it appears that human agency is the most likely explanation for the presence of plant remains at Urumbal Pocket, with Aboriginal people bringing toxic nuts and other rainforest food to the site in the past.

**Outcomes of the analysis**

All of the 482 identified plant remains are from Analytical Unit 1 and account for 5.3% of the total plant assemblage excavated from six 1 x 1 m squares. An MNI (Minimum Number of Individuals) of 86 pieces of endocarp are derived from either *Beilschmedia bancroftii* (yellow walnut) or *Endiandra palmerstonii* (black walnut). Another 312 fragments are curved pieces of endocarp from a large type of fruit (greater than 25–30 mm in diameter). Given that the estimated size, endocarp wall thickness, and surface ornamentations of these partial remains are consistent with features recorded on modern walnuts, there is a strong possibility that these are also walnut fragments. Furthermore, modern and archaeological samples showed no significant difference in the size of the nuts or endocarp wall thickness and it is concluded that no major shrinkage occurred to the fragments at the time they were burnt, thus eliminating the possibility of misidentification. The remaining 98 identified specimens, which consist of complete and partly complete seeds, have been identified to Sapotaceae, and more specifically to species of *Pouteria*. A small round seed is also represented at Urumbal Pocket and has been tentatively identified to Elaeocarpaceae, probably one of the quandong species. Neither of these two taxa has previously been identified as economically important or historically documented as a food source by Aboriginal rainforest people.

**Starch residue analysis**

Linking food processing of particular plants directly to stone tools may be achieved through starch residue analysis (Cosgrove et al. 2007:163; Field et al. 2009). The grooves on incised grinding stones have great potential as ‘residue traps’ and preserve microfossils such as starch and phytoliths that can provide direct evidence for what types of plants were being processed on a particular stone artefact (Cosgrove et al. 2007:164). Past Aboriginal use of incised slate grinding stones in the rainforest region was discussed in Chapter 4. These stone tools, sometimes referred to as graters, are a type of stone tool found only in far north Queensland’s rainforest region. Starch analyst Judith Field carried out starch grain analysis on an excavated fragment of an incised slate grinding stone from Urumbal Pocket. The starch recovered provided a clear indication of target species on the basis of maximum dimension measurements. It appears that the incised used surfaces of these grinding stones provide ideal locations for the preservation and recovery of starch granules (Cosgrove et al. 2007). The residue analysis of one incised slate grinding stone fragment excavated from Urumbal Pocket indicates the processing of toxic starchy seeds, consistent with the identification of carbonised yellow walnut (*Beilschmedia bancroftii*). This lead Field to suggest that yellow walnut was the plant likely to have been targeted for processing at Urumbal Pocket.

**Summary of findings**

The analysis of archaeological plant remains excavated from the Urumbal Pocket open site has demonstrated the following:

(A) Aboriginal people were bringing rainforest nuts to the site in prehistoric times. Distinct morphological features allow for a small proportion of these macrofossils to be identified and it has been established that they belong to the family Lauraceae, i.e. the yellow (*Beilschmedia bancroftii*) and black walnuts (*Endiandra palmerstonii*). Complementary starch analysis on an incised slate grinding stone fragment excavated from square A2 supports the Lauraceae
identification and the suggestion that the carbonised nutshells reflect the use of nuts as a food source at Urumbal Pocket. It is likely that Beilschmedia bancroftii, the yellow walnut, was the primary economic species processed at Urumbal Pocket.

(B) Identification of the lowest excavated plant remains, in Analytical Unit 2, was not possible due to their fragmented state of preservation. However, the presence of nutshells in Analytical Unit 2 strongly suggests that Aboriginal people were also importing and processing nuts at the site before 2,000 years ago. The unambiguously lowest excavated Lauraceae fragment is from spit 9 in square V8 and dates to 1474±47 BP (OZJ718); it represents a minimum date for walnuts being brought to the site.

(C) Two other types of seeds were recovered in the excavations. One was identified to a species of Pouteria and the other a species of Elaeocarpaceae, probably one of the quandongs. Neither is referred to in the ethnohistorical literature nor remembered by Jirrbal Aboriginal elders as a food source in the recent past. In contrast, the use of Sundacarpus amara (black pine) nuts as a food source in the contact period was observed and documented (e.g. Mjöberg 1918) and until recently, Jirrbal elder Maisie Barlow still collected and processed black pine nuts (M. Barlow, pers. comm., 2004). Black pine could not be identified with certainty in the Urumbal Pocket plant macrofossil assemblage. However, recent excavations at Mooma Pocket, an archaeological open site on the Atherton Tableland, have demonstrated that black pine nutshells are not too fragile to survive site formation processes (personal observation). Thus, it is possible that since the black pine tree only produces nuts during a short period between October and December, the Urumbal Pocket site was occupied at other times of the seasonal cycle and pine nuts were not processed or used there.

Spatial distribution of plant remains

Distribution of plant remains per square

The numbers of individual plant specimens excavated from each square at Urumbal Pocket and the total weight of all plant remains per square are presented in Table 6.2. It shows that square Z3 and square V8 have the highest numbers of excavated plant remains.

Table 6.2 Total numbers and total weight (g) of plant specimens excavated from each square.

<table>
<thead>
<tr>
<th>Square</th>
<th>NISP (Number of Identified Specimens)</th>
<th>Total weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>1,350</td>
<td>77.3</td>
</tr>
<tr>
<td>Z3</td>
<td>3,209</td>
<td>140.6</td>
</tr>
<tr>
<td>V5</td>
<td>1,064</td>
<td>50.2</td>
</tr>
<tr>
<td>V8</td>
<td>2,079</td>
<td>94.3</td>
</tr>
<tr>
<td>S2</td>
<td>1,145</td>
<td>47.9</td>
</tr>
<tr>
<td>O2</td>
<td>302</td>
<td>12.4</td>
</tr>
<tr>
<td>Total</td>
<td>9,149</td>
<td>422.7</td>
</tr>
</tbody>
</table>

Source: Author’s data.

With almost 95% of the specimens in the assemblage being unidentified fragments, it may potentially produce an inaccurate result to use numbers of plant remains to analyse plant distributions at the site. However, as can be seen from Table 6.2, the total weight of plant specimens, per square, corresponds well with the total numbers in each of the squares. Square Z3 and square V8 have the highest numbers of plant specimens, and also have the highest weight. Variability in the distribution of plant materials between the excavation squares may reflect a combination of human activities at the site such as cooking, trampling and cleaning up at the site before reuse. These activities may
also explain the reversal of two radiocarbon dates in square V8 and square S2. However, only two date reversals in deposits that are relatively shallow in nature strongly suggests that the deposits are generally not very disturbed.

**Distribution of plant remains in composite spits**

The reason for grouping stone artefacts from 2.5 cm spits to 5 cm spits in squares Z3, V8, and S2 into one single unit was provided in Chapter 5. The total weight of plant remains per (composite) spit per square form the basis for the distribution analysis of plant remains at Urumbal Pocket (Table 6.3).

Table 6.3 Total weight (g) of plant remains per composite spit, per square at Urumbal Pocket.

<table>
<thead>
<tr>
<th>Composite spit</th>
<th>A2</th>
<th>Z3</th>
<th>V5</th>
<th>V8</th>
<th>S2</th>
<th>O2</th>
</tr>
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<td>18.7</td>
<td>3.9</td>
<td>37.3</td>
<td>5.2</td>
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<td>23.7</td>
<td>12.5</td>
<td>39.4</td>
<td>8.1</td>
<td>1.5</td>
</tr>
<tr>
<td>3</td>
<td>21.5</td>
<td>37.6</td>
<td>8.4</td>
<td>11.3</td>
<td>10.0</td>
<td>3.8</td>
</tr>
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<td>17.4</td>
<td>31.5</td>
<td>13.2</td>
<td>3.4</td>
<td>3.6</td>
<td>2.9</td>
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<tr>
<td>5</td>
<td>8.2</td>
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<td>3.6</td>
<td>2.8</td>
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<tr>
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<td>3.9</td>
<td>0.4</td>
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<tr>
<td>7</td>
<td>0.8</td>
<td>8.0</td>
<td>3.5</td>
<td>0.0</td>
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<tr>
<td>8</td>
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</tr>
<tr>
<td>9</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
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<td>1.2</td>
<td>0.0</td>
</tr>
<tr>
<td>10</td>
<td>0.1</td>
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<tr>
<td><strong>Total weight (g)</strong></td>
<td><strong>77.3</strong></td>
<td><strong>140.6</strong></td>
<td><strong>50.2</strong></td>
<td><strong>94.3</strong></td>
<td><strong>47.9</strong></td>
<td><strong>12.4</strong></td>
</tr>
</tbody>
</table>

Source: Author’s data.

It was suggested that the concentration of a large number of stone artefacts in the flat section on the spur is likely to represent a central activity zone at the site. The number of artefacts in subsurface deposits in squares A2, Z3, and V5 suggested that these squares form part of a ‘central activity area’ at Urumbal Pocket. The distribution of plant remains in subsurface deposits suggests that plant processing took place in the area represented by squares Z3, A2, and V8 (Fig. 6.12). An expansion of the site was also suggested by the distribution of stone artefacts. This is not as pronounced in the plant remains. A distinct increase in the number of stone artefacts per spit began in composite 7 in squares A2, Z3, and V5. A similar pattern was found in the plant remains but began in composite spit 5 and continued up to spit 2. Spit 1 saw a decrease in plant remains except in square A2 and square V8 with only a slight decrease in spit 1. Overall, the distribution of plant remains from all six squares shows no other pattern except that the bulk of the plant remains are from the first five spits, a feature that is discussed below.
Figure 6.12 Total weights in plant remains recovered from Urumbal Pocket, in composite spits 1–12, per square.

Source: J. de Lange.
Aboriginal plant use through time

In order to analyse the distribution of plant remains through time at Urumbal Pocket, the total weight of plant remains per square and composite spit in the two Analytical Units was analysed.

Table 6.4 Distribution of carbonised plant remains in grams per square and per composite spit in Analytical Units 1 and 2 at Urumbal Pocket.

<table>
<thead>
<tr>
<th>Square</th>
<th>Analytical Unit 1</th>
<th>Analytical Unit 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (g)</td>
<td>Weight (g)</td>
</tr>
<tr>
<td>A2</td>
<td>75.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Z3</td>
<td>130.5</td>
<td>10.1</td>
</tr>
<tr>
<td>V5</td>
<td>49.7</td>
<td>0.5</td>
</tr>
<tr>
<td>V8</td>
<td>93.4</td>
<td>0.9</td>
</tr>
<tr>
<td>S2</td>
<td>45.1</td>
<td>2.8</td>
</tr>
<tr>
<td>O2</td>
<td>12.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>406.5</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Source: Author’s data.

Table 6.4 shows that most of the plant remains were excavated from Analytical Unit 1. Nutshell fragments from Analytical Unit 2 are characteristically smaller in size and lack any clear diagnostic features. They cannot be identified without histological analysis, which was beyond the scope of the analysis. However, the data demonstrate that carbonised nutshells survive in older deposits. Aboriginal people were most likely exploiting rainforest environments and bringing rainforest plant foods to the site before 2,000 years ago; unidentified nutshell fragments were recovered in association with stone artefacts and charcoal in layers radiocarbon dated to ca. 2,500 years old in square Z3 and square A2. The number of plant remains increased dramatically in deposits dated to the last 1,000 years of occupation in squares A2 and Z3, two squares with a well-established and ordered chronology. This pattern is similar to other archaeological sites investigated in the region (Cosgrove et al. 2007; Horsfall 1987) and, therefore, not considered likely to represent site preservation differences at Urumbal Pocket. At Urumbal Pocket, the number of plant remains peak in layers dated to between 800 BP and 400 BP in squares A2 and Z3, a time period also associated with high stone artefact numbers and the presence of rich charcoal deposits. A number of identified endocarp fragments recovered from Urumbal Pocket were dated (refer to Table 4.1) and suggest a minimum age of ca. 1500 BP for Aboriginal people bringing toxic varieties of rainforest nuts to Urumbal Pocket. The evidence suggests that yellow walnut was the most likely plant processed at Urumbal Pocket but it is likely that other varieties (of walnuts or other species) were also used.

Overall, analysing change and continuity in Aboriginal plant use at Urumbal Pocket is difficult due to the fragmented plant macrofossil record. It appears that the species identified have been an important and consistent component of Aboriginal rainforest diet over at least a 1,000-year-long period. Plant remains excavated from layers dated to before 1,500 years ago cannot be identified further than that they originate from nuts similar to those produced by species of Lauraceae, i.e. the yellow and black walnut. It is therefore possible that walnuts were brought to the site before 1500 BP. The identified seed varieties are first encountered in the lower spits of Unit 1, coinciding with other changes in Aboriginal occupation at Urumbal Pocket.

Summary

Analysis of the plant remains excavated from Urumbal Pocket demonstrated that the careful use of ethnographic analogy and the comparison of archaeological plant remains with modern samples are useful in the identification and interpretation of past Aboriginal plant use in the rainforest region.
The plants identified are rainforest species that grow only at certain altitudes, thus the Urumbal Pocket occupants would have had to collect them at locations in the rainforest on their way to the site. The analysis has established that toxic walnuts were being processed at the site, a detoxification process remembered in oral traditions and documented in the ethnohistorical literature as taking several days. This suggests that Aboriginal people stayed at the site for more than one night during each visit, and it is concluded that Aboriginal people continuously collected and processed rainforest walnuts at Urumbal Pocket over approximately the last 1,500 years of occupation.