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## Hunter-gatherer specialization in the late Neolithic of southern Vietnam – The case of Rach Nui

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### ABSTRACT

Rach Nui is a late Neolithic settlement of hunter-gatherers in southern Vietnam. However, the site also has a series of mortared floors corresponding to a sedentary lifestyle, where the inhabitants continued to live in the same area and repaired or replaced their floors over a period of 150 years. The inhabitants relied on a mixed economy that included domesticated and gathered plants, as well as hunted and managed animals. Although, there is evidence for the consumption of domesticated rice and foxtail millet, the inhabitants were mainly hunter-gatherers who relied on their surrounding mangrove and swamp forest habitats for most of their food requirements. From the archaeobotanical work done, it appears that the domesticated cereals, rice and foxtail millet, found at the site were imported. On the other hand, sedge nutlets and parenchyma were identified in high frequencies and were probably locally sourced, suggesting that foraging and/or vegiculture played a major role in the economy of Rach Nui.

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### 1. Introduction

Discussions of transitions from hunting and gathering to farming are central to archaeology in all regions of the world (Barker, 2006; Bellwood, 2005; Larson et al., 2014). Early discourses suggested cultural shifts, including the uptake of farming, brought about by foreign colonisers into Europe where indigenous hunter-gatherers lived (Price, 2000). More recently, indigenous adoption has played a more significant role in the understanding of transitions in subsistence regimes (Price, 2000). This article appreciates that there are continuities between a hunting-gathering lifestyle and that of farming, as opposed to a strict dichotomy between hunter-gatherers and farmers (Harris, 1989).

In situations where domesticated plants and animals are inferred to be non-local in origin, their arrival is attributed either to a moving frontier of farmers migrating into a region sparsely inhabited by hunter-gatherers, or to a gradual adoption of agriculture by foragers due to interactions with adjacent farmers (Alexander, 1977; Zvelebil, 1986; Fuller, 2006, pp. 2–3).

The former of these hypotheses is most commonly invoked for the arrival of cereal agriculture in Southeast Asia (SEA). For example, although rice occurs wild throughout much of SEA, rice genetic studies and archaeobotanical evidence point to the origins of SE Asian domesticated rice in parts of the Yangtze basin by at least 4000 BCE (Fuller et al., 2010; Silva et al., 2015), prior to its later dispersal as part of a Neolithic cultural package that included incised and impressed pottery designs by migrating rice farmers from China, entering SEA and settling amongst the pre-existing hunter-gatherer communities, firstly in Taiwan and northern Vietnam, before spreading more widely (Bellwood, 2005; Rispoli, 2007; Higham, 2013; Higham et al., 2011). Some of the oldest Neolithic sites in Thailand and Vietnam contain evidence for the presence of rice, and, with the exception of the north Vietnamese site Man Bac, all Neolithic cranio-dentally analysed human material so far are of Northeast Asian or mixed Northeast Asian/Australo-Melanesian descent (Matsumura and Oxenham, 2014; Oxenham and Matsumura, 2016).

It has been suggested by Bellwood et al. (2011) that a 'Greater Mekong' cultural network linking Vietnam, Thailand and Cambodia existed from about 2500 cal BC. For example, the site of An Son, a southern Vietnamese Neolithic settlement dating from about 2100–1050 BCE, has material culture, including pottery traditions,

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with parallels in other Neolithic sites in Vietnam (e.g. Loc Giang and Cu Lao Rua) and in Thailand (Tha Kae, Ban Non Wat, Nong Nor and Khok Phanom Di) [Sarjeant 2014]. Rice phytoliths have also been found in abundance at this site (Tan et al. 2012) as well as domestic pig and dog, which formed a major part of the subsistence at An Son (Piper et al., 2014). However, subtle differences between material culture repertoires, the geographic locations of raw material sourcing and socio-economic strategies are also becoming more apparent between various regional settlement groups in Mainland Southeast Asia (MSEA), implying relatively complex interactions between the different Neolithic communities that inhabited the region (see Sarjeant, 2014).

The earliest evidence of domesticated rice in MSEA is from the Thai coastal site Khok Phanom Di (ca. 2000–1500 BCE) where rice consumption was integrated into an economy focused on the exploitation of the mangrove environments surrounding the settlement (Higham and Thosarat, 2004). In the early phases of site occupation, rice appears to have been acquired through exchange, whereas later in the sequence local rice cultivation was adopted. Intriguingly, the adoption of rice cultivation coincided with the appearance of women whose isotopic signature suggests that they were immigrants into, what was presumably, the patrilineal society of Khok Phanom Di (Higham and Thosarat, 2012). However, the Khok Phanom Di community continued to use a diverse range of locally obtainable resources in the acquisition of their food supply.

The inhabitants of MSEA, including those from Khok Phanom Di, possibly subsisted from older traditions of tuber cultivation such as taro and yams, as well as banana and palm starch (commonly known as *vegeculture*) that potentially first emerged in the Late Pleistocene or Early Holocene (Blench, 2013; Barton and Denham, 2011). Although there is currently no empirical evidence for *vegeculture* in early Neolithic sites in MSEA, there is starch and phytolith evidence for the consumption of palm starch, bananas, yams and sedge tubers (*Eleocharis* type), along with seed starches from job's tears (*Coix lacryma-jobi*) and acorns (*Quercus* sp. *sensu lato*) found on the ends of stone pounding tools at the site of Xincun in Guangdong in southern China, dating ca. 3350–2470 BCE (Barton, 2015; Yang et al., 2013), as well as very low frequencies of rice phytoliths recovered from sediments adhering to tools in deposits dating to ca. 2500 BCE (Barton, 2015). Early sedentary communities in MSEA might have had similar mixed economies, which could have supported reasonably dense and well-adapted populations.

Recent archaeobotanical evidence has also indicated that foxtail millet (*Setaria italica*), which originated in the Yellow river basin of northern China, spread south like rice during the Neolithic (Castillo, *in press*; Castillo and Fuller, 2010; Weber et al., 2010; Guedes and Butler, 2014; Stevens and Fuller, 2016). Limited identification of foxtail millet in the archaeological record makes it difficult to determine the timing and routes of translocation across MSEA, but it has been recorded at Gantouyan on the border between southwestern China and Vietnam, together with rice, and dating ca. 2000–1000 BCE (Lu, 2009). The only other Neolithic record comes from the site of Non Pa Wai in the Khao Wong Prachan Valley, where a single foxtail millet grain was directly dated using AMS radiocarbon to 2470–2200 cal. BC (Weber et al., 2010).

In this paper, we will examine the archaeobotanical assemblage from Rach Nui, a late Neolithic site in southern Vietnam dating between ca. 1500 and 1300 cal. BC (Fig. 1). Rach Nui is located close to the town of Can Giouc, in Long An Province, near the estuarine confluence of the Vam Co Dong, Vam Co Tay and Dong Nai rivers, approximately 22 km from the modern coastline, to the southeast. The contemporary environment consists of low-lying mangrove and *Nypa fruticans* palm swamp forest, and small tidal channels surround the archaeological settlement site. In the past, Rach Nui would have been even closer to the sea and it is likely the local

environment would have been very similar (Piper and Oxenham, 2014). Rach Nui provides an opportunity to examine the potential diversity of subsistence regimes practiced in the later Neolithic period, when domesticated cereals had already been introduced into MSEA but also taking into consideration the environment of the settlement. The archaeobotanical research conducted at Rach Nui makes it possible to understand the type of subsistence strategies used during this early period, which has parallels in some other MSEA sites. It is therefore, an important site for discussions about adaptations of people to their environment for food procurement and possibly, transitions from a hunter gathering lifestyle to one of farming or vice versa (see Table 1 for the list of sites mentioned in the text).

## 2. Archaeobotany of Vietnam

Archaeobotany as a specialization in Southeast Asia began in the late 1960s (Castillo and Fuller, 2010). Archaeobotanical methods, including flotation, phytolith and pollen sampling are still not routinely used in archaeological fieldwork in Southeast Asia, although in the past ten years they have gained momentum. In Vietnam, few archaeobotanical studies have been conducted. From published data and personal communication, only forty-three sites in Vietnam have employed any method (such as looking at pottery impressions), which could result in the observation of plant remains (Table 2). In Vietnam, as in the rest of Southeast Asia, organic impressions in pottery have been relied upon to understand the agriculture of the region. However, using rice chaff or impressions as a method does not provide sufficient information and can result in misleading interpretations (Castillo, 2013). Of these forty-three sites, phytolith sampling was done in ten sites but not all of them have been analysed, whereas fourteen sites have been sampled for palynology. Wet and dry-sieving have been used in the past for recovery of macroremains, but it was only in 2007 that flotation was used to investigate potential palaeobotanical remains within the burial pots during the Man Bac excavations. The 2012 excavations at Rach Nui was the first time systematic flotation for the retrieval of macroremains had been applied in Vietnam. There are now seven sites, including Rach Nui, where flotation has been conducted.

The archaeological analysis of plant remains from Rach Nui contributes to our understanding of what crops were consumed in Neolithic Southern Vietnam. Academic research has assumed that the main crop of cultivation in prehistoric Mainland Southeast Asia was rice (Glover and Higham, 1996; Higham, 2013), and although this may be true for some sites, more archaeobotanical research is needed to support this general hypothesis. For instance, foxtail millet or taro could have also been a major crop in prehistory. This is highlighted in Central Thailand where the site of Khok Phanom Di has yielded abundant rice remains (Thompson, 1996), whereas Non Pa Wai, Non Mak La and Nil Kham Haeng in Central Thailand have produced evidence for consumption and cultivation of foxtail millet, prior to the introduction of rice (Weber et al., 2010). These examples suggest that rice was not the only cereal being consumed during the Neolithic. Therefore, a significant question in Rach Nui was whether both cereals are also found in southern Vietnam in the Neolithic. Presence of both cereals could confirm the movement of a crop package from the southern China/northern Vietnam region into the Mekong Delta region of southern Vietnam.

## 3. Methodology and sample integrity

### 3.1. Sampling

Fieldwork, including archaeobotanical sampling and flotation,

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