



Late Pleistocene humans in Sri Lanka used plant resources: A phytolith record from Fahien rock shelter

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ABSTRACT

Little is known of the human use of rainforest plant resources of prehistoric Sri Lanka due to the lack of preservation of organic material and the effects of various destructive taphonomic processes. Phytoliths recovered from a AMS radiocarbon and OSL dated sequence at Fahien Rock Shelter indicate interactions of anatomically modern humans with the lowland rainforests of south-western Sri Lanka from 44,952–47,854 cal. BP to 11,991–12,402 cal. BP. During this period, the Rock Shelter occupants extracted their livelihood from a number of wild plants including bananas, rice, breadfruits, durians, *canarium* and species of palm and bamboo. These taxa are associated with present-day disturbed lowland rainforests. Gathering and processing of plant resources by existing modern rainforest foragers cannot directly be compared with the subsistence activities of the Late Pleistocene Rock Shelter occupants.

1. Introduction

Tropical environments are reputed to be among the most challenging for human colonization (Friesem et al., 2016). Until recently, many anthropologists held that it was impossible for hunter-gatherers to live in rainforest environments if they could not exchange forest resources with adjacent agricultural populations (Headland and Bailey, 1991). Ethnohistorical, geomorphological, palaeoecological, archaeological and archaeobotanical evidence is important to examine questions concerning the antiquity of rainforest colonization by humans on a global scale (Cosgrove et al., 2007; Barker et al., 2007, 2017). However, there is emerging archaeobotanical evidence (e.g. phytoliths, pollen and macro-plant remains) to indicate that humans were able to colonise and exploit rainforest environments in Island South East Asia, Melanesia, Australasia, Sri Lanka and Africa from the late Pleistocene and in doing so, they utilized fire to manage rainforest vegetation (e.g. Premathilake, 2003, 2006; Barker et al., 2007, 2017; Petraglia et al., 2009; Clarkson et al., 2009; Lentfer et al., 2010; Summerhayes et al., 2010; Perera, 2010; Perera et al., 2011; Hunt et al., 2012; Castillo and Fuller, 2015; Roberts and Petraglia, 2015; Roberts et al., 2015, 2017).

Phytoliths - minute silica bodies produced by plants (Piperno, 1988) - are one of the most promising lines of evidence in tropical environments. These environments are often highly oxidizing, with frequent free iron, aluminium oxides and other clay minerals and thus with poor preservation of organic materials such as pollen, plant macrofossils and wood. This has major

implications in reporting the history of use of rainforest plant resources (Deraniyagala, 1992; Goldberg and Bar-Yosef, 1998; Bowdery, 1999; Albert et al., 1999; Denham et al., 2003; Premathilake, 2003, 2006; Fuller and Harvey, 2006; Vrydaghs et al., 2009; Castillo and Fuller, 2010; Perera, 2010; Perera et al., 2011; Madella and Lancelotti, 2012; Castillo and Fuller, 2015; Friesem et al., 2016; Bates et al., 2017; Premathilake et al., 2017a, 2017b). We report the results of phytolith analysis from the deposits at Fahien Rock Shelter, one of the oldest prehistoric sites in South Asia, which contains a sequence containing evidence for habitation by rainforest hunter-gatherers through the second half of the late Pleistocene and into the Holocene.

2. Fahien rock shelter environment

Fahien Rock Shelter, one of the largest caves in Sri Lanka, is situated at 6° 38' 55" N 80° 12' 55" E and 130 m above sea-level close to Yatagampitiya village, near Bulathsinhala in the Kalutara District, southwest Sri Lanka (Fig. 1). It is a complex of interconnected Rock Shelters developed in coarse crystalline gneiss rock faces (Cooray, 1984). The mouth has a width of 30 m and average height above the floor of 20 m. The interior is about 10 m deep and slopes down west to east. Data from the meteorological station in Sinharaja, in lowland rainforest some 10 km away (06°23'22"N 80°30'05"E) indicate that the regional climate is humid-tropical with a mean annual temperature of 26 °C and annual average rainfall of 4300 mm (Zoysa and Raheem, 1987; Gunatillake et al., 2004). Today, the landscape around the site is

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