The "Niu" Indies: Long Lost "Home" of the Coconut Palm

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1. First landing of Christopher Columbus, Frederick Kemmelmeyer 1800/1805. National Gallery of Art, Washington DC.

The coconut palm flourishes in both the East Indies and the West Indies, but where is "home"?

Until Columbus discovered the New World the "Indies" were the islands that lay to the east of the Indian sub-continent – east of the river Indus. The famous Italian was looking for a western route to these spice islands to break the Middle East–Mediterranean overland trading monopoly. So the people he met, in what was to become America, were thought to be Indians. The mistake was quickly realized and the native Americans became "red" indians, written about and filmed in "westerns". Likewise, the sugar producing islands of the Caribbean were called the West Indies to distinguish them from the spice islands of the East Indies.

The coconut palm

The coconut palm (*Cocos nucifera*) fits into this naïve historico-geographical account because everyone should know that Columbus identified *Nux indica* as one proof of his arrival in the Indies. The "Indian nut" was a generic term that had once included nutmeg as well as coconut because they were both hard-shelled. How was a European in the Middle Ages supposed to know that the nutmeg came from a different tree and was not just a small or underdeveloped coconut? Columbus had misidentified the Cuban Royal palm and he did not see any coconut palms in the 1490s, despite fanciful but inaccurate pictures (Fig. 1) that were painted some three hundred years later, long after the coconut palm had become "ubiquitous in the dry and sandy parts of Caribbean islands such as Jamaica" (Sloane 1696).

In fact, the coconut reached Puerto Rico as early as 1549 and Bahia in Brazil in the same year (Harries 1977), yet 300 years later Wallace, the co-discoverer of the theory of evolution, could write about the coconut palm in the Amazon region "It is in a foreign land. It flourishes . . . but no part of it is applied to any useful purpose, the fruit only being consumed as an occasional luxury. In the towns and larger villages where the Portuguese have settled it has been planted, but among the Indians of the interior it is still quite unknown" (Wallace 1853). In marked contrast, when Wallace left South America he went to the East Indies where he described coconut palms at night, illuminated by bonfires of their old leaves 'The effect was most magnificent, the tall stems, the fine crowns of foliage, and the immense fruit-clusters, being brilliantly illuminated against a dark sky, and appearing like a fairy palace supported on a hundred columns, and groined over with leafy arches' (Wallace 1869).

And it was whilst in the East Indies that Wallace made his other well known discovery, that plants and particularly animals in Asia were separated from those in Australasia by a geographic divide that became know as "Wallace's Line". In an address to the Royal Geographic Society Wallace said "I would particularly call attention to the fact that the division of the Archipelago here pointed out, into two regions characterized by a striking diversity in their natural productions, does not correspond to any of the physical or climatal divisions of the surface. The great volcanic chain runs through both parts: Borneo closely resembles New Guinea, not only in its vast size but in its climate and the general aspect of its vegetation; the Moluccas are the counterpart of the Philippines in their volcanic origin, their extreme fertility, their luxuriant forests, and their frequent earthquakes; and the east end of Java has a climate almost as dry as that of Timor. Yet between these corresponding groups of islands, constructed as it were after the same pattern, there is the greatest possible contrast in the animal productions" (Wallace 1863). What Wallace had noticed was that "this sea of islands" was continental in extent (some 26 million square kilometres).

In the same address Wallace acknowledged that "It was first pointed out by Mr. George Windsor Earl, in a paper read before this Society eighteen years ago, that a shallow sea connected the great islands of Sumatra, Borneo, and Java, to the Asiatic continent, with which they generally agreed in their natural productions; while a similar shallow sea connected New Guinea and some of the adjacent islands to Australia". But Wallace went a step further than Earl: "Returning now to the Malay Archipelago, we see that the whole of the seas connecting Java, Sumatra, and Borneo with Malacca and Siam are under 50 fathoms deep, so that an elevation of only 300 feet would add this immense district to the Asiatic continent" and he drew the conclusion "that at a very recent geological epoch the continent of Asia extended far beyond its present limits in a south-easterly direction, including the islands of Java, Sumatra, and Borneo, and probably reaching as far as the present 100 fathom line of soundings" (Wallace 1863). Modern satellite imagery reveals the full extent of this area (Fig. 2).

Coconut evoultion and domestication

The current theory of coconut evolution and domestication (Harries 1995) can be considered as a logical sequence. First came the natural evolution and dissemination by floating of a variety with large, long, angular, thick-husked and slow-germinating fruit. It had a possible range between the east coast of Africa and the west coast of America, wherever currents were favourable. Domestication was predicated as happening in the region known as Malesia (Harries 1990) where

characteristics such as disease resistance and windstorm tolerance, early germination, plant growth habit and bright fruit colours would have been some of the more obvious selection criteria. Slightly less obvious was the fact that domestication was for increased endosperm at the expense of husk thickness because the coconut is the only fruit that comes already filled with a drinkable liquid, the monthly flowering pattern ensuring a year-round supply. If the immature fruit is banged on a rock the husk presents no problems to a good set of teeth, and no tools are needed to enjoy the liquid and partially developed endosperm. The desirability of individual palms would become well known and they would be identified by name. This still occurs today and palms producing fruit with wild type characters are called *Niu kafa* and are used for sennet (coir fibre) whilst those with domestic type characters are called *Niu vai* and are preferred for drinking. Nuts with less husks and more endosperm are less angular, more spherical and selection by fruit shape is easy and would be applied automatically by adult or child, without conscious thought or effort, at every human and every coconut generation. Selection pressure under these circumstances would be high, despite cross-pollination (Harries 1978).

The distinction between wild (*Niu kafa*) type and domestic (*Niu vai*) type coconuts was subsequently confounded by introgression, resegregation and further selection in nautical, mercantile and agricultural ecosystems (Harries 2001) but two questions are unanswered, till now:

How and where would the non-agricultural, coastal fishing communities have grown large coconut populations isolated from recurrent introgression from wild types?

Why should selection pressure be applied just for drinking when other qualities, particularly husk fibres for coir rope production, call for diametrically opposing demands on selection?

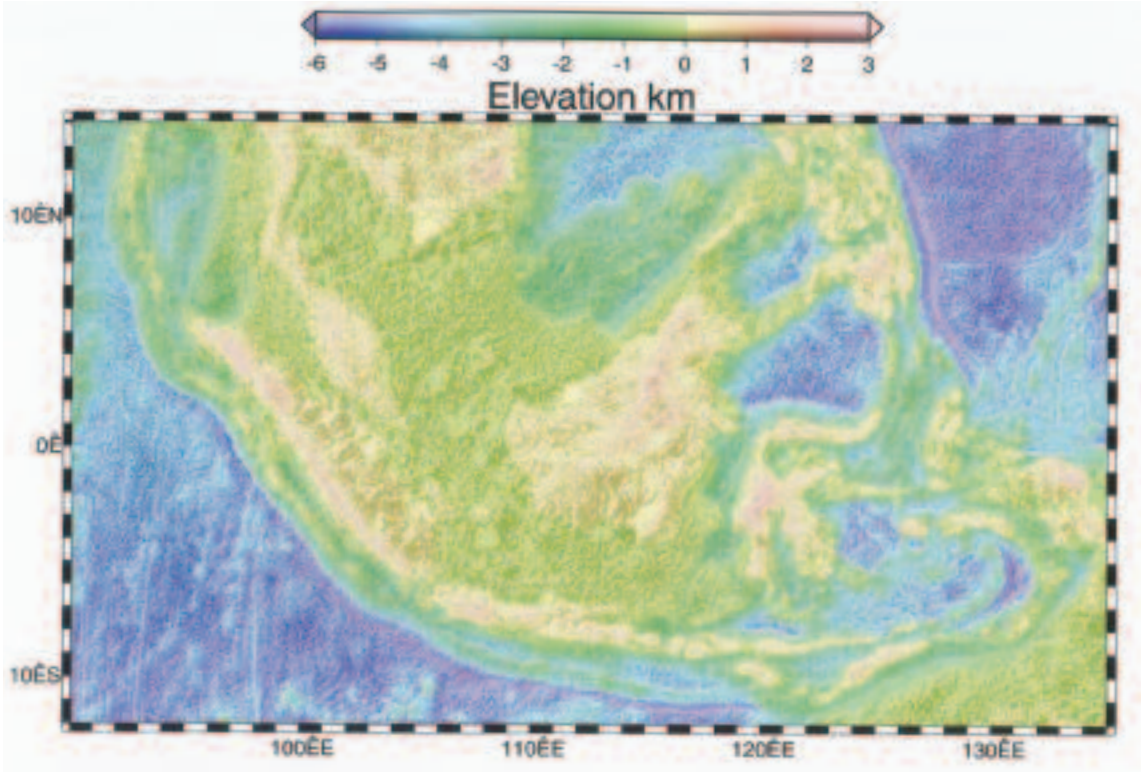
The Drowned Continent of Southeast Asia

As predicated by Wallace, it was change in sea level, flooding a huge Asiatic plain that accounted for coconut domestication in this region. This is explained in "Eden in the East" by Stephen Oppenheimer who suggested that catastrophic sea-level rises that were the result of a massive release of water following ice sheet collapse in the North American glacier lakes 8, 11 and 14 thousand years before present (Blanchon & Shaw 1995). Tidal waves and higher sea levels resulted in the submergence of a land mass, equivalent in size to the Indian sub-continent, which had been the centre for the development of paddy rice by agriculturally-based civilizations (Oppenheimer 1998).

The area of land that could have been above sea level prior to flooding is impressive but, more importantly, it is the fact that it would have been gently sloping to almost level and well watered by rivers coming from rain-fed higher ground. These represent ideal conditions for agriculture. It would also have been located in that part of the Pacific where seasonal droughts can be expected and where tropical windstorms (cyclones) are ferocious. Large agricultural communities occur there today despite those conditions.

If an agricultural civilization did populate this extensive area then coconuts would have been grown as a fruit crop (not for copra or oil which were 19th century developments). And, once the coconuts had been taken hundreds of kilometers inland (probably by boat along the major rivers) they would be beyond the introgressive effects of the wild type coastal coconuts. To this day, wild type coconuts can be found around the periphery of this area, on the Indian Ocean coast of Thailand and Indonesia or the Pacific Ocean coast of the Philippines. Yet, except during seasonal droughts, the coconut palms would have been a minor source of drinking water in a land so well served by rivers and rainfall. Nor would it have been required for coir fibre where rattans and various forms of hemp were readily available where rope and twine were needed. Coconuts would have been used in food preparation, including fattening pigs and feeding chickens. The coconut palm was a fruit tree – the haustorium inside of the germinating nut is a sweetmeat for children, varieties with edible husk (even with edible shell) when immature and with jelly-like endosperm (makapuno) would be popular (Harries et al., in press).

After the initial catastrophic rise in sea level the area of land flooded by sea water would have fluctuated as geological settling occurred but the process would have been progressive, extending over decades or even centuries (not the Biblical forty days and nights). In that period the coconut palms, which tolerate semi-saline groundwater conditions better than other plants, would have become immensely important to human populations deprived of drinking water (Harries 1979). Early germination, while the fruit was still on the palm, would also be a desirable characteristic in areas where fallen fruit might be washed away by flooding (Harries 1978, 1990). Palms surviving windstorms and epidemic diseases would account for the tolerance and resistance exhibited by the domestic type (Harries 1978).



2. West Malesia or the Sunda Shelf as visualized from satellite imagery. (Credit: NASA)

Epilogue

If the origin of *Cocos* was in Gondwanaland and the wild (*Niu kafa*) type evolved by floating between islands in the Tethys Sea, then there could have been no human intervention in either process. Therefore, the domestic (*Niu vai*) type is our earliest and most important interaction with the coconut palm. The site of that coconut continent, the "Niu Indies," is now lost but no longer forgotten.

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