NOTES

## Self-Sown Wild-Type Coconuts from Australia

Are coconuts indigenous to Australia, or have all Australia's coconuts been introduced by man? Two lines of evidence suggest that they are indigenous: historical records and the occurrence of self-sown, wild-type coconut palms on beaches in tropical Queensland.

The evolution and dissemination of the coconut, "one of the intriguing problems of botany" (Corner 1966) has been "a topic of controversy, often heated, for more than a century" (Purseglove 1972). In the 19th century the orthodox view was that of von Martius, who considered *Cocos* to be entirely a New World genus originating on the west coast of Central America (Child 1974). However, *Cocos* is currently believed to have originated somewhere in the Melanesian region, extending south to the Tropic of Capricorn between 145° and 180°E (Purseglove 1972, Moore 1973, Child 1974). Support for this view comes from the presence of Miocene fossil fruit of *Cocos zeylandica* in New Zealand and from *Cocos nucifera* remains in New Guinea more than 4000 years old and in Vanuatu more than 5000 years old (Berry 1926, Spriggs 1982).

There are many varieties of coconuts but with a primary division into two types, known as NIU KAFA and NIU VAI, respectively (Harries 1978, 1981a, b). The niu kafa types have long, angular fruit, up to 15 cm in diameter, with an ovoid nut inside a firm, thick husk. Niu vai types have more spherical fruit, up to 25 cm in diameter, with a spherical to oblate nut inside a thin husk. Harries (1978) argued that the niu kafa type represents the ancestral, naturally-evolved, wild-type coconut, disseminated by floating, and that the niu vai type was derived by selection for increased endosperm while under cultivation and disseminated by man. Both types of fruit can float but the thicker, angular husk adapts the niu kafa type particularly well to atoll conditions, where it can become the dominant plant form. Elsewhere, this type is naturally restricted to a narrow stretch of foreshore. Coconuts can only grow inland when taken there by man, and niu vai types are planted preferentially if available. Both types have been taken into cultivation throughout the humid tropics, however, and intermediate types have arisen by introgressive hybridisation.

On the basis of evidence then available, Harries (1978) noted that the pre-domestication niu kafa coconut apparently did not establish in Australia, despite the proximity of coconut-bearing islands to the north and east, perhaps because Australia was too dry. It is this aspect of the overall problem that we re-examine here; namely, does Australia have any indigenous coconuts?

Coconut palms in Australia were first recorded growing spontaneously at several points on the Queensland coast by Mueller (1867, p. 163) whilst Thozet (1869, p. 213) found a single palm on a sandy flat 275 m from the sea near Rockhampton and estimated its age as 40–60 years. In his *Flora Australiensis,* Bentham (1878) described stunted and twisted palms, nine m tall, near Keppel Bay, with obtusely 3-angled fruit about 15 cm in diameter—arguably a niu kafa type. Twenty years later, Bailey (1899–1902) in his *Queensland Flora,* described coconuts with fruit 25 cm in diameter, and suggested that they were not indigenous. They could well have come from introductions made by the Queensland Acclimatization Society in the 1870's (Stephens 1965). These coconuts came from Thailand and Singapore and supposedly had superior qualities for plantation development. Today, coconuts in Thailand are predominantly niu vai types (Harries, Thirakul, and Rattanapruk 1982).

In the absence of any taxonomic studies, coconuts in Australia are generally presumed to be in operating plantations, abandoned plantations, or small naturalised populations apparently deriving from plantations. The Jardine family, for example, planted 15,000 palms at Somerset on the tip of Cape York in the 1890's (Stephens 1965), many of which remain today (Buckley and Stoddart ms), and there are extensive plantations on many of the Torres Strait Islands. Occasional palms are recorded from the western shores of Cape York, between Weipa and the Jardine River; a few survive from the Mapoon plantation on the Wenlock River, and small populations have become naturalised nearby (Tucker 1980). There are scattered palms near Cooktown and on the islands and mainland shores of the northern Great Barrier Reef Province east of Cape York (Covacevich and Covacevich 1980, Tucker, pers. comm., Buckley and Stoddart ms). Most of these, however, can be traced either to plantings by early voyagers (Steers 1928, p. 92), or to recent plantings on vegetated sand cays by yachtsmen or fishermen, with the marks of the initial excavations still visible (Buckley and Stoddart ms). Sprouts up to one m high from partially buried seednuts on the strandline have also been recorded, but most of these do not survive (Buckley and Stoddart ms), and it has not been demonstrated previously that any mature palms have grown from self-sown fruit.

One of us (RB), therefore, searched for mature coconut palms growing in strandline sites where they were unlikely to have been planted by man; some were found on Lizard Island, North Queensland. Lizard Island is a granitic island approximately seven km$^2$ in area, lying on the continental shelf at 14°40′S, 145°30′E, about 30 km NE of Cape Flattery (Fig. 1). On at least two of its beaches there are mature coconut palms growing immediately above

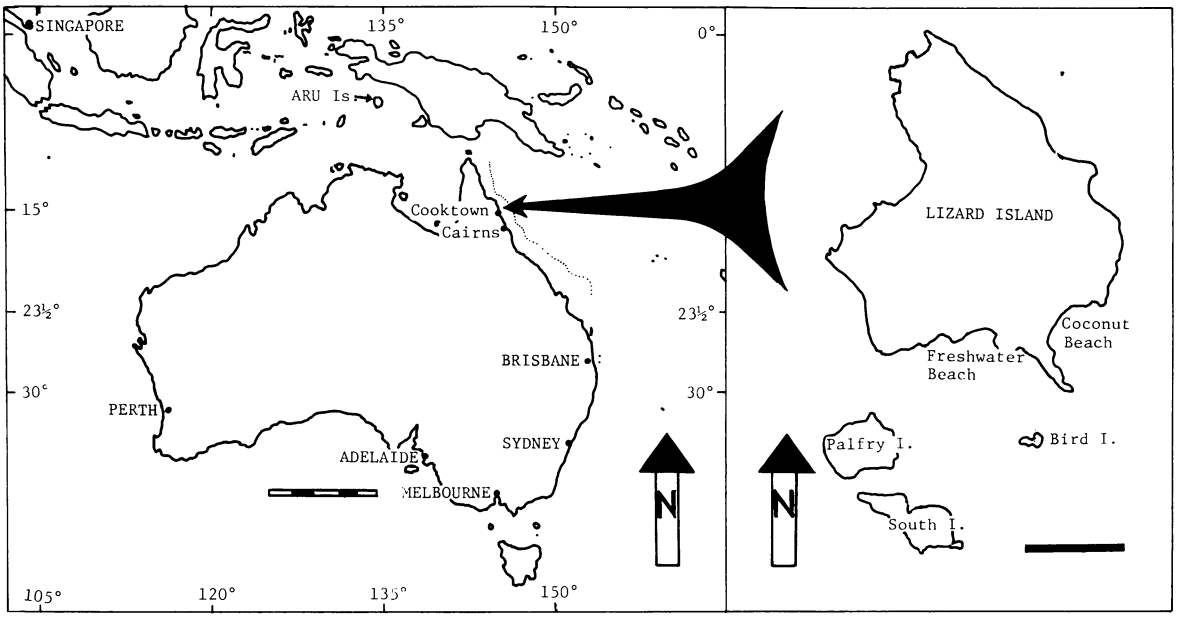


FIGURE 1. Location map of the Lizard Island sites. Main map: scale bar 1000 km at Tropic. Inset: scale bar 1 km.


←

FIGURE 2. Vertical half section of Lizard Island fruit.

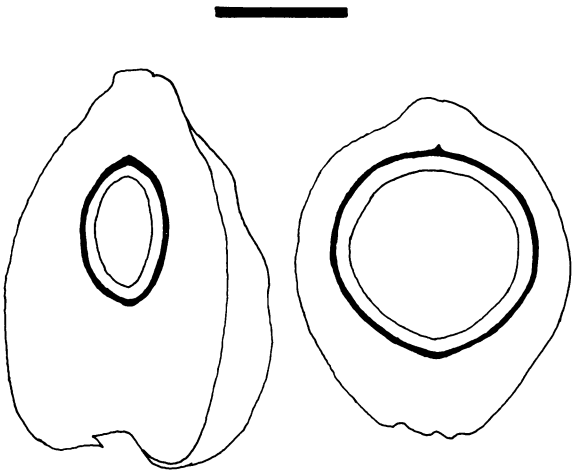

FIGURE 3. Vertical half sections of niu vai type fruit (left) and niu kafa type (right). Scale bar = 10 cm. Taken from Dwyer (1938, Plate 11).

the strandline, within the range of storm tides. These habitats are quite distinct from those of the planted palms mentioned above. There is a single palm over ten m tall on Freshwater Beach, and a clump of smaller palms at the southwest end of Coconut Beach: all produce abundant fruit of the long, angular, thick-husked niu kafa type, resembling fruit described by Bentham (1878). A vertical half section of one of these Lizard Island nuts (Fig. 2) may be compared with drawings (Fig. 3) taken from an early photograph of two contrasting coconut types found in New Guinea (Dwyer 1938) and subsequently identified as niu kafa and niu vai types (Harries 1978). The Lizard Island coconut is clearly a niu kafa type. We cannot be certain that these particular palms were self-sown, but in view of their type and habitat it seems highly probable. Hence their presence provides strong evidence that *Cocos nucifera* could have established itself on Australian shores from seaborne fruit and without human assistance in dispersal, site selection, or cultivation.

If coconuts are indigenous to Australia, why are they not as common on tropical Australian shores as elsewhere in the Pacific and Southeast Asia? The reason seems to be that whilst the coconut may have been the "milkbottle on the doorstep of mankind" in those regions (Harries 1981c), the Australian Aborigines ate drift nuts immediately rather than waiting for them to grow and produce fruit. Fermented nuts washed ashore in north central Arnhem Land were eaten (Jones and Meehan 1977) as were freshly planted seednuts on Groote Eylandt (Tindale, pers. comm.). Similarly, Wallace (1869) noted that the inhabitants of the Aru Islands, 700 km north of Arnhem Land, would not bury a good coconut for the prospective advantage of a crop in 12 years because the nut would be dug up and eaten unless watched day and night. On the east coast of Cape York, however, Hynes and Chase (1982) state that the coastal Aborigines see coconuts as native, and plant germinating strandline nuts above the tidemark. Such trees are then "owned" by the planters and their descendants. It appears, therefore, that seaborne coconuts could have reached Australia during past millenia, germinated, and become established in small numbers. A limited coastal planting by Aborigines occurred but without the establishment of secondary stands.

Available evidence therefore indicates that wild-type coconuts can reach Australia and establish successfully without human intervention; that such wild-type coconuts were already present on the Queensland coast at the time of European discovery and before cultivated varieties were introduced; that early Aboriginal populations generally tended to destroy coconuts rather than to actively propagate them; and, that in the sense of having reached Australia unaided by man, the coconut is therefore probably indigenous to Australia.

This study was supported by the Lizard Island Research Station, the Australian Institute of Marine Science, and the Rothmans University Endowment Fund. We thank Dr. B. Goldman and L. Goldman of L.I.R.S. for assistance and Dr. N. M. Wace and Prof. G. Ward of A.N.U. for valuable discussion.

BAILEY, F. M. 1899–1902. The Queensland flora. Queensland Government, Brisbane.
BENTHAM, G. 1863–1878. Flora Australiensis: A description of the plants of the Australian Territory. L. Reeve & Co., London.
BERRY, E. W. 1926. *Cocos* and *Phymatocaryon* in the Pleiocene of New Zealand. Am. J. Sci. 212: 181–184.
BUCKLEY, R. C., AND D. STODDART. Ms. Vegetation and phytogeography of northern Great Barrier Reef islands.
CHILD, R. 1974. Coconuts. London: Longmans, Second Edition.
CORNER, E. J. H. 1966. The natural history of palms. London: Weidenfeld & Nicholson.
COVACEVICH, J. M. AND J. COVACEVICH. 1980. Palms in northeastern Australia II: Species from the Cooktown area. Principes 24: 154–161.
DWYER, R. E. P. 1938. Coconut improvement by seed selection and plant breeding. New Guinea Agric. Gaz. 4: 24–102.
HARRIES, H. C. 1978. The evolution, dissemination and classification of *Cocos nucifera* L. Bot. Rev. 44: 265–320.
———. 1981a. Practical identification of coconut varieties. Oléagineaux 36: 63–72.
———. 1981b. The antiquity of the coconut palm in Western Borneo. Sarawak Museum Journal 23: 239–242.
———. 1981c. The natural history of the coconut palm. Paper presented to 13th Int. Bot. Congr., Sydney. Aug. 21–28, 1981.
———, A. THIRAKUL, AND V. RATTANAPRUK. 1982. The coconut genetic resources of Thailand. Thai J. Agric. Sci. 15: 141–156.
HYNES, R. A., AND A. K. CHASE. 1982. Plants, sites and domiculture: Aboriginal influence upon plant communities in Cape York Peninsula. Archaeology in Oceania 17: 38–50.
JONES, R., AND E. MEEHAN. 1977. Floating bark and hollow trunk. Hemisphere 21: 16–21.
MOORE, H. E. 1973. The major groups of palms and their distribution. Gentes Herbarum. 11: 27–141.
MUELLER, F. VON. 1867. Australian vegetation, indigenous or introduced, considered especially in its bearings on the occupation of the Territory, and with a view of unfolding its resources. J. Bot. 5: 160–174.
PURSEGLOVE, J. W. 1972. Tropical Crops: Monocotyledons 2. Coconut pp. 440–478. London: Longmans.
SPRIGGS, M. J. T. 1982. Early coconut remains from Aneityum Island, Vanuatu, SW Pacific. Unpubl. Ph.D. thesis, Australian National University.
STEERS, J. A. 1938. Detailed notes on the islands surveyed and examined by the Geographic Expedition to the Great Barrier Reef in 1936. Reports of the Great Barrier Reef Committee, 4: 51–96.
STEPHENS, S. E. 1965. Coconut. *In* The Australian encyclopedia. The Grolier Society of Australia Pty Ltd.

THOZET, A. 1869. The coco-nut in Australia. J. Bot. 7: 213–214.
TUCKER, R. 1980. Notes on the palms of northwestern Cape York peninsula. Principes 24: 99–104.
WALLACE, A. R. 1869. The Malay archipelago: The land of the orang-utan and the bird of paradise. A narrative of travel with studies of man and nature. Dover Books, Inc., New York.

**Ralf Buckley**[1]

Department of Biogeography and Geomorphology,
Australian National University
P.O. Box 4, Canberra
A.C.T. 2600. Australia

and

**Hugh Harries**[2]

O.D.A. Coconut Development Project
Agricultural Experiment Station
P.O. Box 3, Amphoe Sawi
Chumphon, Thailand

---

[1] Present address: Amdel, P.O. Box 114, Eastwood. S.A. 5063. Australia.

[2] Present address: Dami Oil Palm Research Station, P.O. Box 165, Kimbe, West New Britain Province, Papua New Guinea.