# Gulf Stream Coconuts. The Harries-Baker Test for Discrimination between Flotsam/Jetsam and Natural Dissemination

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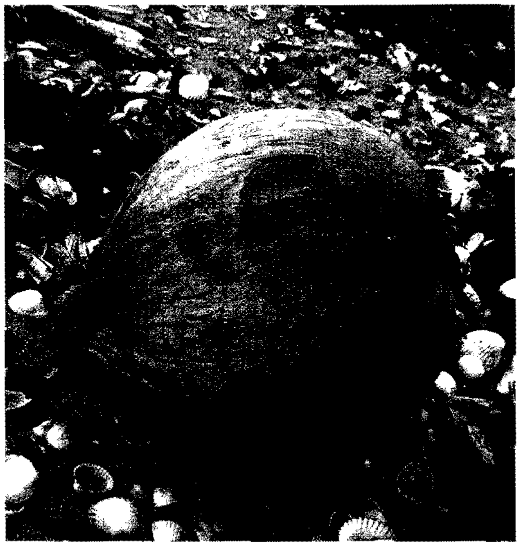
**Harries and Baker's (2005) paper in PALMS was based on the discovery of coconuts (*Cocos nucifera*) with their husks intact in drift on Balevulin Beach on Tiree (Inner Hebrides, UK). They argued that such entire coconuts might arrive with the Gulf Stream from the Caribbean. They suggested a viability test to prove this and suggested trying to let them germinate at a warm moist place at a minimum temperature of 25°C. I am not so sure this 'Harries-Baker' test is conclusive. Flotsam and jetsam coconuts might also germinate, and the time needed to reach Europe with the Gulf Stream might be too long for the coconuts to remain viable.**

Nelson (2000) wrote an excellent book on tropical seeds and fruits stranded on beaches in north-western Europe. He enumerated some 36 different species of genuine Gulf Stream drift seeds and fruits identified from European coasts. The first were found on the coast of Cornwall already more than 400 years ago. Cornwall is still a favorite and rich place for collectors of tropical drift. Darke (2003) collected here over 200 larger tropical drift seeds in four years! Nelson (2000) also mentioned some 20 other exotic species that are not real long-distance floaters but probably transported by man to our coasts. For some seeds and fruits it remains difficult to discriminate between transport by man and by the Gulf stream (Cadée 1997, Nelson 2000, Brochard & Cadée 2005); among these is the coconut (Fig. 1) (Nelson 2000, Cadée 1988a).

Guppy (1917) estimated the time needed for tropical drift seeds to cross the Atlantic Ocean to be on average 14 months based on drift bottles released in the north-eastern part of the West Indies and reaching the European coast. Such bottles were filled partly with sand to decrease the effect of wind and make them follow the surface water layer. Empty plastic bottles offer a much larger surface to the wind and these may travel much faster over the Atlantic Ocean – the fastest took 4 months (Cadée 1988b). From experiments with drifters that can be followed via satellites we know the path travelled is not a straight line but one with many spirals (e.g., Otto & van Aken, 1996, fig. 11), so the distance traveled by drifting objects is much longer than as the crow flies. This fact was already obvious from shipwrecks that were followed from the US coast all over the Atlantic (e.g., the *W.L. White* wrecked 13 March 1888 near Cape Hatteras and stranded 23 January1889 on the Outer Hebrides, see Krümmel, 1911 fig. 169).



1. A 21 cm long coconut with husk found on the beach of the Island of Texel in the 1980's by Dr R. Witbaard (collection G.C. Cadée)

**Viability of coconuts after floating in sea**

Although it is repeatedly stated that coconuts do not remain viable after a couple of months floating in the sea (Nelson 2000, Brochard & Cadée 2005), actual experiments are scarce. Thor Heyerdahl's experiments aboard the *Kon-Tiki* in 1947 are probably the most famous. Its cruise over the Pacific from Peru to Raroia took from 28 April to 7 August 1947. The coconuts kept under the raft in contact with seawater did not remain viable. Seawater had slowly penetrated the area of the coconut eyes, causing microorganisms to start the rotting process. However, of those kept on deck (as food), a number started germinating, and after 10 weeks at sea, the *Kon-Tiki* had six coconut palms of one foot length on board (Heyerdahl, 1948, 1968). During their *Kon-Tiki* cruise, Heyerdahl was unaware of the experiments of Edmondson (1941), which he, however, mentioned in 1968.

Edmondson (1941) did more quantitative experiments on viability of coconuts after floating in the ocean. Unfortunately his experiment did not last more than 4 months. Contrary to the data of Heyerdahl, he observed that 10 out of 15 coconuts were capable of developing after having floated up to 110 days in the sea. Some started germinating during the experiment. Remarkable was the long time it took the coconuts, planted in the Botanical Garden after the experiment, to sprout (from 3 months to over one year). The roots appeared before the stem, one specimen having floated 28 days required 582 days for the stem to emerge.

**Some comments on Harries and Baker (2005)**

Harries and Baker (2005) stated that it could take a coconut 6 months to cross the Atlantic. However, the time needed will be at least twice as long. Even the wreck of the *White*, which must have profited more from westerly winds than a coconut, took 11 months to cross the Atlantic from near Cape Hatteras to the Outer Hebrides. Coconuts must come from the Caribbean farther away.

Whether coconuts can remain viable after drifting in seawater for one year or more remains questionable. The experiments on the *Kon-Tiki* indicated that coconuts could not survive three months in seawater. Edmondson (1941) noticed that 2/3 of his coconuts remained viable after floating up to 110 days. No newer and longer experiments are known to me. Harries and Baker (2005) may be right that the Caribbean coconut has wild type characteristics, one of which is slow germination.

Harries and Baker (2005) stated that very few coconuts are nowadays shipped across the Atlantic *with their husks intact*. Nevertheless, such intact coconuts do arrive on the Dutch coast, albeit less often than those without husks. One of the regular beachcombers on the island of Texel, the Netherlands, my colleague Maarten Brugge (pers. comm.), regularly collects coconuts on Texel's beach, most without husk but some intact; even in 2005 he collected one with husk.

The Dutch coast receives far fewer genuine tropical drift seeds and fruits than the UK coasts. Brochard and Cadée (2005) could document only 35 for the period 1955–2003 (exclusive of the coconuts, which they thought mainly to be man-transported). Darke (2003) collected more tropical drift seeds per year on the Cornish coast! Darke mentioned only one coconut but did not state whether this had its husk intact. Some years ago, germinating coconuts could be bought in flower markets in the Netherlands, so there must have been transport of intact coconuts. However, coconuts may drift almost forever. Perry and Dennis (2003) described a coconut (without husk) that had floated for >30 years! So coconuts certainly will be able to cross the Atlantic as Gulf Stream drift.

Cadée (1988b) mentioned a coconut that was found during the exceptional warm summer of 1947 by L.F. Weijdt to have germinated on Engelsmansplaat, an uninhabited, very high tidal flat in the Dutch Wadden Sea. This coconut passed the Harries-Baker test. There are rumors (which I have not yet checked) that more have been found in the warmer summers of recent years. Is this proof of Harries and Baker's "natural dissemination"? I still think this could have been a man-transported coconut, even though they may also pass the Harries-Baker test.

### Acknowledgments

I am very grateful to my son Niels (RSPB, Edinburgh) for sending me "Mystery of island coconut bounty" from BBC News Scotland of 18 September 2006, based on the Tiree coconuts. Remarkable that BBC news believed that Dr. W.J. Baker considered the possibility of commercial growing coconuts in the UK, which must have been a practical joke to get BBC interested. I also thank Dr. W.J. Baker (Kew) for discussions via e-mail and for sending me a copy of his paper (with Harries) in PALMS. I thank Maarten Brugge (Texel) for his data on coconuts from the beach of Texel.

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## PALM LITERATURE

**FIELD GUIDE TO THE RATTANS OF AFRICA.** Terry Sunderland. Kew Publishing, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK. 2007. ISBN 978 1 84246 180 8. Price $40.00. Paper. Pp. 66.

This is another volume in the series of palm field guides published by Kew Gardens.

The guide begins with an introductory section on rattans and their ecology, distribution and uses in Africa. Notes are also given on collecting herbarium specimens of rattans. A key to the genera is given, and there are also keys to the species of each genus.

Twenty-two species of rattan are found in west and central Africa, and all are treated in this guide. For each species the guide gives the Latin name and common names, a description, notes on uses, conservation status, habitat, distribution and distribution map, a line drawing – very nicely done by Lucy Smith – and several, beautiful color images.

I found hardly anything to criticize – in fact this guide could serve as a model for other aspiring authors. One small thing I noticed and found slightly confusing was that the page of images opposite the treatment of *Eremospatha barendii* are not of that species, nor those opposite *Oncocalamus wrightianus* of that species.

Like the other guides in this Kew series, the *Field Guide to the Rattans of Africa* is based on sound taxonomic research. The author spent many years in West Africa working on rattans and has a deep knowledge of his subject. This knowledge is reflected in the guide – it is an excellent, high-quality piece of work, and the author is to be congratulated.

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**GROWING PALM TREES IN HAWAI'I AND OTHER TROPICAL CLIMATES.** David Leaser. Mutual Publishing, Honolulu, Hawaii. 2007. ISBN 987-1-56647-825-0. Price $12.95. Softcover. Pp. 128.

This how-to volume is David Leaser's follow-up to his attractive homage to palms, *Palm Trees: A Story in Photographs*. While the first book was a visual tour de force, it had virtually no information on palm horticulture. Persons attracted to the palm family by the photos in the first book had to look elsewhere for information on growing the palms. Leaser's second book is the perfect companion to the first. While it lacks photographic impact of the first, it has illustrated chapters on choosing the right palm for specific environments, planting palms, pests and diseases, germinating seeds, and pruning and grooming. A brief glossary is also included. While this book is aimed mostly at Hawaii, palm growers in other tropical or subtropical areas will find something of value in this manual.

Most of the book's pages are devoted to portraits of commonly cultivated palms from Hawaii and other warm areas. This "sampler" of palms covers an impressive 81 species. Each portrait takes up most of the page and is captioned with a short paragraph giving the scientific and common names, place of origin, distinctive features and noteworthy horticultural traits. Almost all of the portraits illustrate mature palms, so readers can get an accurate idea of each palm's size, shape and garden-worthiness.

A very useful feature of this book is the section on Hawaiian botanical gardens with important palm collections. Leaser provides names and addresses (and websites) of a dozen botanical gardens, arranged by island. He also gives a brief account of each garden, highlighting the size, history or important palms for each garden. The garden section is followed by a section on palm organizations, including the International Palm Society. Contact information for local palm societies around the world is also included.

This book is deceptively slim, but it carries much the same weight as some of the larger books already on the market. It covers a very broad range of topics, not always in great depth, but with enough solid information to get the first-time palm grower off on the right foot. This book would be an excellent accompaniment to the purchase of a first palm or a welcome gift to a newcomer to palms (or a new neighbor, whose landscape needs palms!). With this book, Leaser has produced an attractive, affordable guide to growing some of the world's most beautiful plants.

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