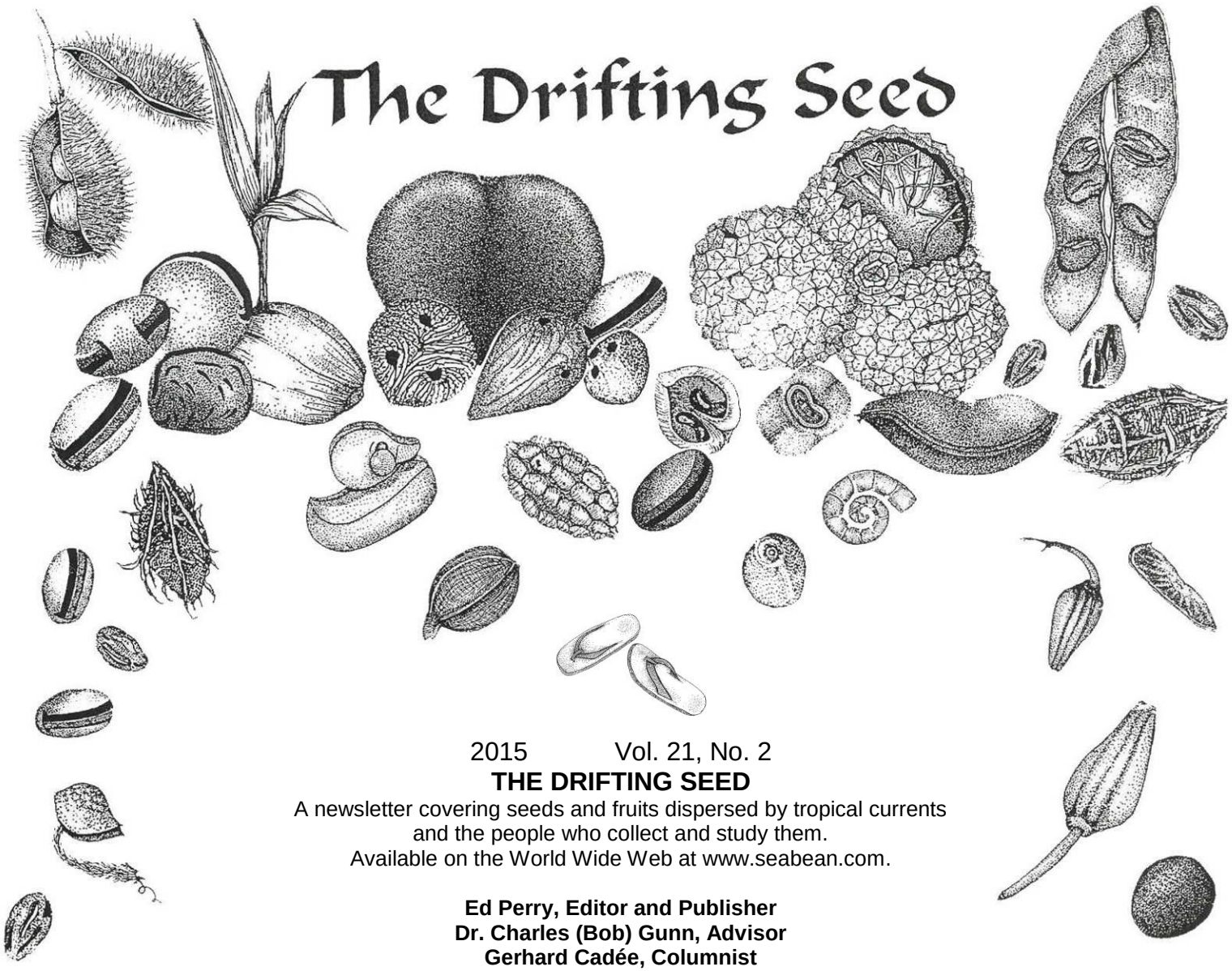
The Drifting Seed



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THE DRIFTING SEED

A newsletter covering seeds and fruits dispersed by tropical currents
and the people who collect and study them.
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The 20th Annual International Sea Bean Symposium and Beachcombers' Festival will be held at the Cocoa Beach Public Library, October 16th and 17th, 2015.

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A Shea Nut, *Vitellaria paradoxa*, from the Dutch Coast

by Gerhard C. Cadée, gerhard.cadee@nioz.nl

It took some time to identify this egg-shaped black nut, Paula Velting found in 2009 on the North Sea beach of the island Vlieland, the second of the barrier islands in the northern part of the Netherlands. Its size is 27.6 x 20.4 x 19.8 mm and it has a characteristic large attachment area (hilum). Apparently it is not a 'real' tropical drift seed as it is not mentioned in the drift-seed literature (Gunn & Dennis, 1976, Nelson, 2000; Perry & Dennis, 2003), nor was it found earlier on the Dutch coast (Brochard & Cadée, 2005). Even Ed Perry did not recognize it from the picture I e-mailed to him, which suggests its origin might not be the American tropics.

For another reason carefully looking through the excellent Atlases prepared by Cappers et al. (2009), I came by accident across a picture (p. 1356) of a very similar seed. After sending him a picture, Dr. René Cappers agreed with my identification. Also the seed specialist at the Millenium Seedbank, Wakehurst UK, Dr. Wolfgang Stuppy, who I did show the specimen, agreed.

The Shea-nut tree

The Shea-nut tree, *Vitellaria paradoxa,* grows in West Africa and its nuts are used locally to produce oil for cooking and shea-nut butter (Boffa et al., 2013). Most of the nuts are sampled in the wild. Trees start producing nuts only after 20 years, they reach their maximum production at 45 year and may continue for as much as 200 years (Anon. 1999). This slow start of producing nuts discourages large-scale plantation. There is also export from Ghana: shea-nut butter is used as a Cocoa Butter Equivalent (CBE) for the production of chocolate. This is forbidden in most countries except UK, Denmark, Portugal, Ireland, Russia and Japan. It is also used for producing soap and lip-salve. Nuts are imported in Europe, most probably by ships. The seed found in the Netherlands may be lost during this transport.

The Dutch coast sometimes receives seeds lost at sea such as sunflower seeds, castor- and cacao-beans. These reach our coast irregularly in large numbers (Cadée, 2000; Brochard & Cadée, 2005). In 2014 sunflowers, not indigenous in the Netherlands, started flowering along the coast of Texel, the first of the Dutch barrier islands, where I live. This I had seen here also in the summer of 1991 (Cadée, 1992) but not in the years between. On castor-beans, *Ricinus communis* growing and even flowering once on Texel's beach I reported also earlier (Cadée, 2000). Cacao-beans are fermented before they are shipped to Europe and have lost their viability during this process, so they will not germinate when stranded on our beaches.

Second report from Europe

V. paradoxa was only once reported earlier from European coasts. In his preface Nelson (2000) mentioned that the text of his book was finished already in 1998 and since then new drift seeds had been reported among which he mentions *V. paradoxa.* One specimen was found at Hayle in Cornwall and identified by scientists from Kew Botanical Gardens.

V. paradoxa belongs to the Sapotaceae, a family that produces some better known real drift seeds such as *Calocarpum (= Pouteria)* en *Sideroxylon* (Gunn & Dennis, 1976; Perry & Dennis, 2003). Two *Pouteria* sp. seeds were also collected on the North Sea coast of Texel (Cadée & Mol, 2004).

A genuine tropical drift seed?

According to Gunn & Dennis (1976) these are all tropical seeds and fruits found in drift on the temperate beaches. They are able to drift at least one month, but usually (much) longer. They do not include viability in their definition, some may have lost viability already before they entered the water, or lost it during drifting. Others remain viable for months and use water transport and a means of dispersal. For a Shea nut growing in the Sahel, transport by water does not seem important for

dispersal. How long a Shea nut may drift is unknown. Our specimen is filled with air around the kernel, which increases its floating capacity. In this respect it is comparable to hazelnuts which regularly occur in drift along Dutch rivers and the North Sea beaches. These are often partly or completely filled with air.

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Figure. The shea-nut *Vitellaria paradoxa* from Vlieland (Netherlands), mm paper for scale.

Seeds and Fruits Cast Ashore in Fajara, The Gambia (West-Africa)

by Koen Verschoore, koen.verschoore@skynet.be
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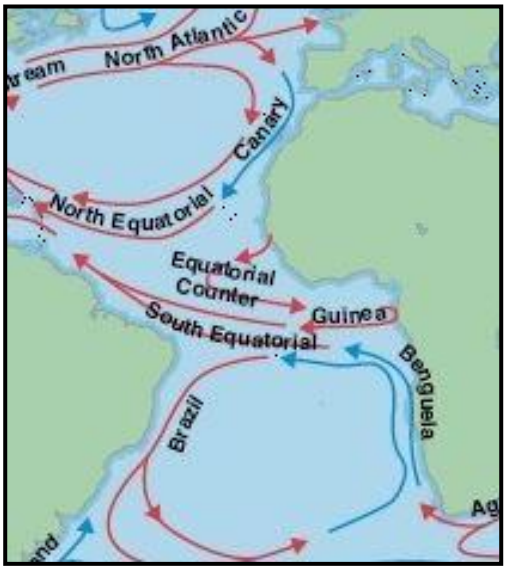
As part of a citylink project between the city of Ostend, Belgium and the capital of The Gambia, Banjul, a survey was made about Gambian biodiversity.

On two occasions, in February and April 2014, I had the opportunity to search the shoreline of Fajara, 25 km westwards of Banjul, for marine sealife. At that time I also started a collection of seeds, not all of which are true drift seeds: many of them have a local or regional origin. The proximity of the Tanbi Wetland Complex, largely a mangrove habitat along the estuary of the Gambia river, is the cause of many of the finds being propagules of Red Mangrove (*Rhizophora mangle*) and Black mangrove (*Avicennia africana*). The coast of Fajara is highly erosive, as are many shores in this part of the country.

Ocean currents along the Gambian (and Senegalese) coast are branched off from the Canarian Current.

The warm tropical Equatorial Current passes the Gulf of Guinea and sets off westwards for the Atlantic, resulting in the bypass of a large potential of drift seeds washing ashore from tropical Africa. Typical drift seeds such as *Mucuna* and *Entada* are for sale on local markets. Since I have never found any of these on the Gambian beaches—not even in the years before I actually started collecting seeds—I can only assume that these seeds are being traded.

Neocarya macrophyla



Map: Ocean currents Atlantic ocean

Seeds and fruits found in the floodmark are listed below.

NAME	FAMILY	COMMON ENGLISH NAME
Anacardium occidentale	Anacardiaceae	Cashew tree
Avicennia germinans	Acanthaceae	Black mangrove
Calophylum inophylum	Calophyllaceae	Laurel wood
Canavalia rosea	Fabaceae	Bay bean
Cocos nucifera	Arecaceae	Coconut tree
Cola nitida	Malvaceae	Cola nut
Dalbergia ecastaphylum	Fabaceae	Coin vine
Detarium senegalense/microcarpum	Caesalpiniaceae	Tallow tree
Elaeis guineensis	Arecaceae	African oil palm
Mangifera indica	Anacardiaceae	Mango tree
Neocarya macrophyla	Chrysobalanaceae	Gingerbred plum
Rhizophora mangle	Rhizophoraceae	Red mangrove

Surprisingly, no *Canavalia rosea* plants were found on the sandy beaches, though they appeared to be widespread on top of the sandstone cliffs. I believe this is due to overgrazing by local livestock, mostly free running goats. Apart from the above-mentioned lack of *Mucuna* and *Entada* seeds I also missed *Caesalpinia bonduc* or Grey nickernut. These are well-known in the Gambia because the seeds are used in a popular and widespread game called *mancala (*or *wouri)*. Moreover, I could not identify three more seeds also found in the stretch of 6 km of coastline.

Unidentified seeds and fruit with 2 eurocent as reference.

I thank Mr Xander van der Burgt (Kew Gardens) for his kind help in identifying the seeds and Mrs Sharon Kesteloot for editing this article.

Editor's note: The bottom left seed appears to be a *Terminalia* sp.; the above seeds (right) appear to be *Barringtonia racemosa*.

Baobab Seeds on the Gambian Coast

by Koen Verschoore, koen.verschoore@skynet.be
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22 Feb 2015 – Strolling along the beach in Fajara, I started gathering seeds that were unfamiliar to me at that moment. These seeds were cast ashore on a stretch of 1.5 km from Fajara to Kotu beach. They were identified as Baobab seeds (*Adansonia digitata*) by Xander van der Burgt (Kew Gardens) and Ed Perry, the latter having found one on a Florida beach back in 2000 (Anon 2004).

Baobab seeds are not entirely considered as genuine drift seeds. Floating baobab seeds seem to have a lesser viability as they lack sufficient endosperm. The tree becomes scarce in the African mainland due to very poor germination. Young trees are mostly absent very likely due to grazing by livestock or wild animals, considering the fact that the trees grow in arid or semi-arid regions (Hines 1993). Another factor restricting the growth is that the seed coat appears to be impermeable for water.

Baobab seeds *(Adansonia digitata)* from Fajara

A series of experiments revealed that the most effective (yet unnatural) way of stimulating germination is to soak the seeds for one hour in a 98% sulfuric acid solution, as this process softens the seed coat without damaging the embryo (Esenowo 1991,Falemara 2013). It can easily be assumed that in natural conditions the fruits are eaten by wild animals (elephants?) who's gastric acids could break the seeds dormancy. But where do the seeds on the Fajara coast come from? *Adansonia digitata* is not uncommon along the Gambian coast. Even in the higher parts surrounded by stretches of mangrove with brackish water the trees flourish. It is obvious that the seeds found on the beach in Fajara are of local origin. Seeds can easily be transported and spread by the Gambia river, 30 km north of Fajara. Kunta Kinte Island (formerly known as James Island) for instance is an upstream island dominated by tall baobab trees. Hence, a frequent transport of seeds along the river is plausible.

Kunta Kinteh Island with *Baobab* stand (Photo Anais Vanden Auweele)

Acknowledgements

Thanks to Ed Perry and Xander van der Burgt for identification and Miss Sharon Kesteloot for editing this article.

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Plastic Toothpaste

by Curt Ebbesmeyer,
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Humanity, I mused might be making progress in reducing the amount of plastic in the sea. File it under wishful thinking. In October 2014, **Ed Perry**, co-author of *Sea-Beans from the Tropics: A Collector's Guide to Sea-Beans and Other Tropical Drift on Atlantic Shores*, set me straight as we prepared for the 19th Annual Sea Bean Symposium and Beachcombers' Festival.

To make his point, Ed showed me his empty box and tube of Crest 3D White toothpaste, pointing out the word 'polyethylene' listed in the inactive ingredients on the box. To see the plastic the toothpaste contained, we dissolved a small drop of toothpaste in a cup of water. As we mixed water and toothpaste, thousands of small plastic grit began adhering to the sides of the plastic cup.

When I returned home, I set a goal of filtering a tube of 3D Crest through a coffee filter to visualize the number in a tube. It's slow going. No matter how much I dilute the paste with water, it's taking weeks to filter just a small amount. Every morning in my bathroom, I look to see the progress.

Though I'm only ten percent filtered, the residue of blue microbeads is hideous. I imagine these filtering through my gut and those of sea creatures realizing these tiny particles pass through sewage treatment plants and cannot be filtered from the sea. We have passed the point of no return.

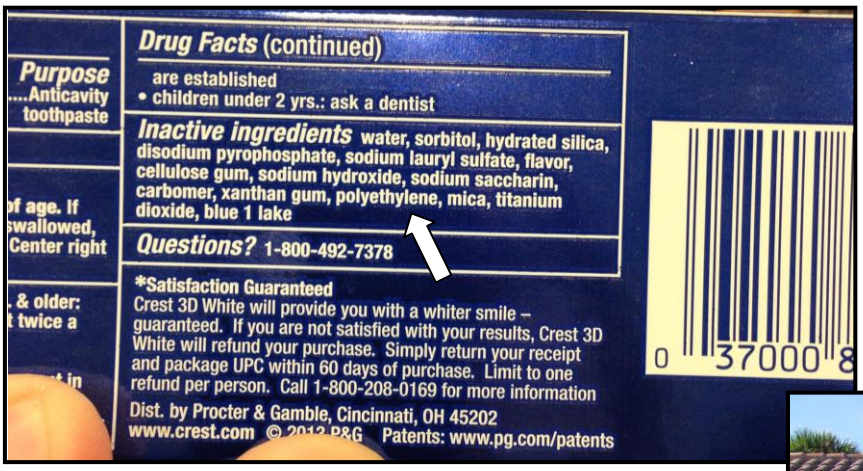
Micro plastics are those less than a millimeter in size. Microbeads have been detected in more than 200 different consumer products. Little wonder plastic researchers are finding microbeads in lakes and rivers, one count being 450,000 per square kilometer on the surface of Lake Erie.

Microplastics contaminate the world's oceans. At some locations along a 320-kilometer section of the river from Lake St. Francis and Quebec City, researchers measured over 1,000 microbeads per liter

of sediment, a magnitude rivaling that in the world's most contaminated ocean sediments. In such large numbers, it's to be expected they are entering the food chain.

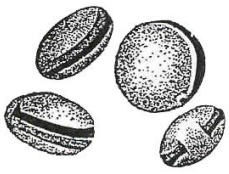
"My sister said it has now been banned up north (New York) and that yes, it was wedging into the gums of users and causing dental problems," Ed concluded. "I cannot see why the American Dental Association would EVER approve of this product; I now have little confidence in them. I feel like writing Crest and asking for my purchase money back for the last 5 years and telling them why I am not using the product anymore."

Factoids: 356,000 microbeads are found in one 4.2-ounce tube of a leading facial cleanser. 90 percent of floating ocean debris is made of plastic. 36.5 percent of fish in the English Channel have plastic within their gastrointestinal tracts.

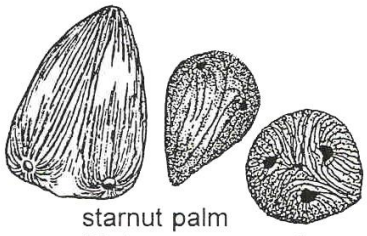


Simple Guide to Common Drift Seeds

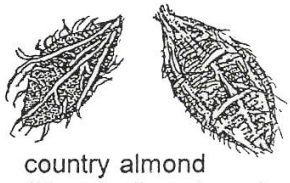
(Illustrations by Cathie Katz and Pamela J. Paradine)



hamburger bean
(*Mucuna* spp.)

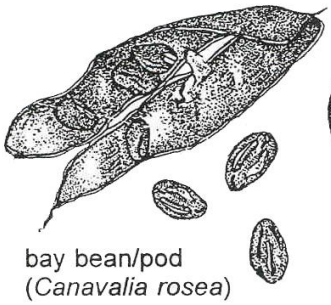


starnut palm
(*Astrocaryum* spp.)



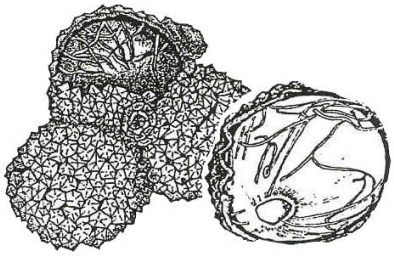
country almond
(*Terminalia catappa*)

sea pearl/pod
(*Caesalpinia bonduc*)

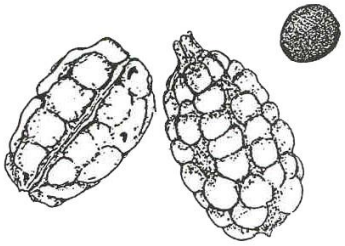


bay bean/pod
(*Canavalia rosea*)

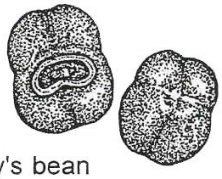
sea heart
(*Entada gigas*)



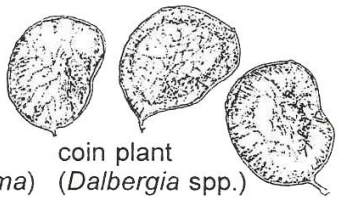
golfball/pod
(*Manicaria saccifera*)



hand grenade
(*Sacoglottis amazonica*)

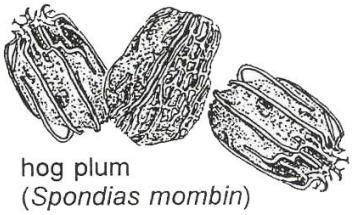


Mary's bean
(*Merremia discoidesperma*)

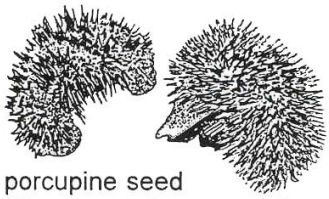


coin plant
(*Dalbergia* spp.)

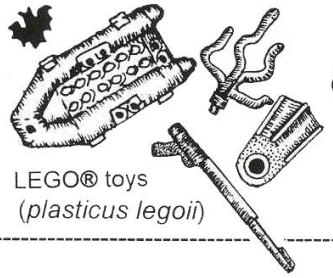
sea purse
(*Dioclea reflexa*)



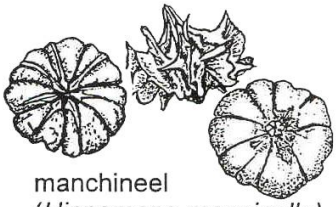
hog plum
(*Spondias mombin*)



porcupine seed
(*Caryocar microcarpum*)



LEGO® toys
(*plasticus legoii*)



manchineel
(*Hippomane mancinella)*

white/black/red mangrove
(various genera)

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