



The Drifting Seed

November 1, 1995

Vol. 1, No. 2

THE DRIFTING SEED

A semiannual *Newsletter* covering seeds and fruits dispersed by tropical currents and the people who collect and study them.

Dr. Charles R. (Bob) Gunn & Cathie Katz (Coeditors)

Please send us your notes and comments about drift disseminules and/or yourself for use in future issues. Please mail seeds and fruits for identification to Bob Gunn at the address below.

From Your Editors

The May 1995 *The Drifting Seed* was mailed on time, and we appreciate your subsequent comments, suggestions, and support. This *Newsletter* is the result of a fortunate meld of our talents, but its success resides in your hands. We need to fill the following columns and only you can do this: **From Your Editors**, **Feature Articles** (mainly about collectors and contributors), **News and Notes from Readers**, **Recent Literature Citations**, and **Collector's Gallery** and **Unknown Disseminules Photographs**. We welcome your suggestions for other columns. If possible, please send your articles on either 5¼ or 3½ diskettes using ASCII or WordPerfect for an IBM-compatible computer.

We have a caveat: Because of postage charges, the *Newsletter* cannot exceed ten pages (eight text pages and two photo pages). This will keep the postage for domestic mail to \$0.32 per ounce and to \$1.00 per ounce for foreign mail.

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From Cathie

In *The Drifting Seed* in May I wrote, "...the two true sea-beans (*Mucuna*) I just picked up this week will be the last ones I find until the Fall." That was true except for a few renegade sea hearts (*Entada gigas*) in May and one sea purse (*Dioclea reflexa*) in June ... but nothing else worth mentioning all summer. None of my sea-bean spotters along the Space coast reported any sightings either.

So by the time Hurricane Erin approached Central Florida in August, I anticipated LOTS OF BEANS! (I had visions of Mary's-beans dancing in my head.) Even though Melbourne Beach residents were ordered to evacuate the barrier island, I couldn't resist the opportunity to see what the storm activity would bring and I stayed. Not only was it the scariest night of my life (I was powerless), I found ONE BEAN (*Mucuna*) the next morning! I guess Nature has Her own agenda and She just couldn't get those Central American sea-beans to drift to the Gulf Stream as quickly as I would have liked.

However, by mid-September (right on schedule), the first armada of coin plant seeds and red, black and white mangrove seeds started washing onto shore with lots of little sea-coconuts and country almonds. Then on September 22, I saw the first true sea-bean wash in with the high tide. On September 25, a Cape Canaveral beachcomber picked up a box fruit and on September 30, I saw hundreds of buttonwood seeds, one mahogany seed and one large egg fruit drift onto shore. Was this the official opening of SEA BEAN SEASON?



Above from left: coin plant seeds (*Dalbergia ecastaphyllum*), red mangroves (*Rhizophora mangle*) black mangroves (*Avicennia germinans*), white mangroves (*Laguncularia racemosa*), sea-coconuts (*Mancaria saccifera*), country almonds (*Terminalia catappa*), buttonwood seeds (*Conocarpus erectus*) and mahogany seed (*Swietenia mahagoni*).

As I write this in mid-October, a few more true sea-beans are being reposted by Space Coast bean-heads, but I'm still waiting for the *Mucuna-Dioclea-Entada* armada to arrive. I wonder why this year and last year haven't been as plentiful or predicable as in past years? Does anyone have a clue? Delayed or disappearing? Maybe the armada will arrive as soon as I mail this newsletter.

FEATURE ARTICLES

Francis Raymond (Ray) Fosberg

20 May, 1908 to September, 1993

by Bob Gunn with quotes from D.R. Stoddard, Atoll Research Bulletin, Nos. 390-396, 1994

There is no doubt in my mind that Ray Fosberg was the most famous botanist to regularly collect tropical drift seeds. He made these collections from islands in the Pacific and the Indian Ocean Basins. Even though he published over 700 papers and books, with the first paper in 1929, and he has over 40 species named for him, he never wrote about his drift collecting or collections. And yet Ray made a unique and major drift seed collection that has gotten little attention. But first more about Ray.

In 1934 Ray "joined Harold St. John on the Bishop Museum's Mangarevan Expedition, led by the malacologist C. Montague Cooke, Jr. This took him from Hawaii to Fanning in the Lines, Tahiti and Mehitia in the Societies, to the atolls of Anaa, Tepoto, Napuka, Fangatau, Hao, and Vahitahi in the Tuamotus, Mangareva in the Gambiers, Pitcairn and nearby Henderson and Oeno in southeastern Polynesia, to the islands of the Australs from Marotiri to Maria, and back to Hawaii by way of Raiatea, Borabora, Vostok, Flint, Christmas and Fanning. In total the expedition visited 25 high islands and 31 coral islands; St. John and Fosberg brought back 15,000 plant specimens."

After obtaining an M.S. degree in 1935, Ray obtained his Ph.D. in 1939 from the University of Pennsylvania and became an assistant botanist for the U.S. Department of Agriculture. From 1954 to his death, Ray was a member of the Permanent Committee for Spermatophytes for the international Association for Plant Taxonomy. In this capacity he had a great influence on the evolution of the International Code of Botanical nomenclature and on the correct application of scientific names for plants. During the 1950's and 1960's, Ray, now joined by Dr. Marie-Hélène Sacht served on various boards and projects that centered on tropical Pacific Islands.

Ray's trip to Arno Atoll in the Marshall Islands in 1950 and 1951 was the first expedition with the coral Atoll program of the Pacific Science Board directed by Harold Jefferson Coolidge. Ray and Marie-Hélène assembled a mass of data on the Pacific island biogeography. These data were published in *Island Bibliographies* and its *Supplement* in 1955 and 1971.

Ray joined the U.S. National herbarium (US) Smithsonian Institution in 1966 and continued with his Pacific projects and working with Marie-Hélène and Royce Oliver. Major works from 1966 to his death include a checklist of plants of Micronesia, *Flora of Micronesia*, *Flora of Aldabra and Nearby Islands*, *Revised Handbook of the Flora of Ceylon*, *Vascular Flora of the Northern Mariana Islands*, and *Partial Vascular Flora of the Society Islands*. Ray collected over 66,000 plant numbers in multiple sets, and among these collections (but unnumbered) were drift seed and fruit collections from Aldabra and Wotho Atoll. He also received drift seeds and fruits from other Pacific basin collectors. Though Ray retired in 1978, eight years after the sudden death of Marie-Hélène, he remained active until just before his death.

In addition to assembling a vast collection of plant specimens and knowledge of the islands, Ray was instrumental in saving islands from schemes of the U.S. military. He helped to save Aldabra, a western Indian Ocean elevated atoll; islands in the Phoenix Islands; and Henderson Island in southeastern Polynesia. "Ray also advised Mr. Marlon Brando over many years on his management of Tetiaroa Atoll in the Societies."

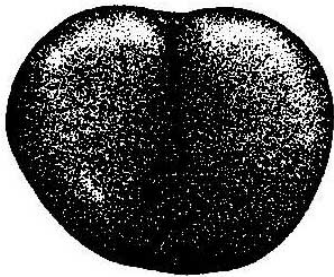
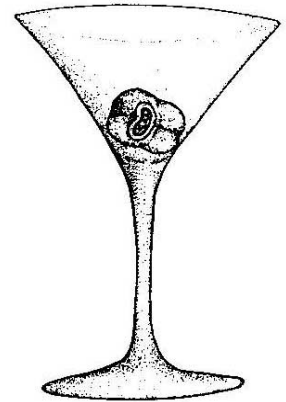
Ray received many honors: The George Davidson Medal, the Edward W. Browning Achievement Award, the Robert Allerton Medal, the Herbert E. Gregory Medal, and the Daly Medal. Even though his drift seed collection on Wotho Atoll was not in a league with these medals, Ray knew it was a major and unique contribution. A Mary's-bean, *Merremia discoidesperma* (Donn. Sm.) O'Donnell, seed that I found in a 1952 collection made by Ray on a Wotho Atoll beach, Marshall Islands, had been carried from Costa Rica at least 11,000 km westward by the North Pacific Equatorial Current. Another collection of the same species was made by Marie-Hélène on a beach on Clipperton Island, about 2,500 km west of Costa Rica. Ray turned his collection of drift seeds and fruits as well as other collections from the Pacific basin over to me, and his Mary's-bean seed is in the collection I now curate. Marie-Hélène's Mary's-bean seed collection was not found.

"Ray occupied a very special place in the development of coral reef and island studies in the twentieth century. Through the Atoll Research Bulletin (founded in 1951) he helped create an autonomous branch of science, known now for its national and international meetings, its public importance, and its diverse and dynamic research programs. The bulletin was and remains central in these endeavors.

Wayne P. Armstrong
Life Sciences Department
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I am a freelance writer and Associate Professor of Biology at Palomar College in San Diego County, California. Probably my main niche of expertise is the taxonomy of the Lemnaceae: a far cry from drifting seeds. Ten years ago I was a co-instructor on a Palomar College field trip to the U.S. Virgin Islands, primarily the island of St. John. Unwilling to spend eight hours a day snorkeling with my marine biology colleagues, I spent a great deal of time beachcombing and exploring the littoral vegetation. But it wasn't until our trip to the Caribbean shores of the Yucatan Peninsula that my interest in drift disseminules was really kindled. On the Yucatan trip I collected a multitude of drift seeds, including sea hearts, sea beans and sea purses, all of which I identified with the wonderful book by Bob Gunn and John Dennis. From that time on my life was changed - - and I became hooked on drift seeds!

Over the years my colleagues have led trips to Central America, Ecuador, the Galapagos Islands and French Polynesia, and I became the resident botanist/drift seed person. In fact, Jamie Platt, a dear student and drift seed enthusiast who is getting her Ph.D. in molecular biology, gave me a desk label that reads "Professor of Sea Hearts." But of all the drift seeds that I had read about, the most fascinating to me was the unique and elusive Mary's-bean (*Merremia discoidesperma*). On a subsequent trip to Grand Cayman I searched in vain for a Mary's-bean. Then one fateful evening, a strange "olive" with a faint cross etched on one side turned up in my martini, a gift from my students. Since the Grand Cayman trip I have found Mary's-beans in Belize and Costa Rica (including Mary's-beans for sale by a street vendor in San Jose); but I always wanted to photograph the vine that produced these remarkable seeds.



PROFESSOR OF SEA HEARTS

In spring 1992 I went to Golfito, Costa Rica with my marine biologist colleague, Lester Knapp. Thanks to my friends "eagle vision" and the help of a local man and his son, we finally found the Mary's-bean liana with hundreds of black, fuzzy Mary's-beans dropping from their papery capsules. We also photographed the marvelous "escalera de mono" (monkey ladder) - - the huge liana *Entada gigas*, with its enormous pods and polished brown sea hearts. My friend

actually videotaped the sea hearts floating down a stream after a heavy cloud burst. We saw other leguminous lianas including several species of *Mucuna* with their beautiful seeds inside fuzzy pods covered with glistening, stinging trichomes. My interest in drift seeds has also evolved into tropical seed jewelry and the photos from my field trips have appeared in a number of magazine articles including Pacific Discover, Pacific Horticulture, Ornament, Sea Frontiers, and Herbalgram. Julia Lowther, a friend who I met in Costa Rica has now started a seed jewelry business, and some of her lovely pieces come from drift seeds that she collects along Costa Rican Beaches.

I am currently writing a pictorial article about morning glories for Zoonooz, and of course I plan to mention the fabulous Mary's-bean. But, I must admit that my writings about drift seeds were really inspired by the wonderful articles and the fascinating book by Bob Gunn and John Dennis! I am very excited about the *Drifting Seed* newsletter by Bob Gunn and Cathie Katz. I look forward to feature articles and the sharing of information and ideas about these marvelous botanical voyagers of the open sea. I am anxiously awaiting the "unknown disseminules" column!

Drift seed Pursuits in the Coral Sea and Australia

Jeremy M. B. Smith

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The Coral Sea is that corner of the west Pacific lying between Queensland, Australia on the west, New Guinea and the Solomon Islands on the north, Fiji (Vanuata) and New Caledonia on the east, and merging with the Tasman Sea in the south. It is a name widely associated with fierce fighting during the Second World War, but it is of a much happier note in connection with drift seeds, drift fruits, and drift seedlings. My first acquaintance with tropical drifters was in 1986 during an expedition to Swains Reefs, nearly 200 km off the Australian coast at the southeast extremity of the Great Barrier Reef. We were studying sea snakes, seabird breeding, and the poor flora clinging to the small sand cays on some of the reefs. But what gripped my imagination and attention was the diversity of drift seeds to be found amidst the pumice and ocean debris along the strandlines. These tiny, remote islands, just a few hundred metres around and supporting only a few species of tough strand plants which were constantly trampled and disturbed by nesting turtles and boobies, but nevertheless gathered a wide array of tropical drift seeds and fruits. These disseminules could not have grown anywhere in the vicinity. They must have drifted for weeks if not months to get to these specks of sand encircled by a blue ocean to every horizon.

From that first encounter stemmed my enduring fascination for this phenomenon. Identifications were initially a major problem till, one by one, all the common seeds and many of the rarer ones came to be known by name, and to become almost like old friends. A Scientific paper (*Smith et al., 1990*) resulted from this and other trips to the Swains, and a pattern was set for further journeys and investigations. Intrigued by where the seeds came from, and to confirm some of their identities, I went to Fiji I 1988 to describe its beach seeds (Smith, 1990). Family holidays to the coast of New South Wales, Australia, tracked their drift further down current (Smith, 1991). Later expeditions to the Chesterfield Reefs (west of New Caledonia), to Torres Strait off the northernmost point of Australia, and elsewhere, led to the drift pattern becoming clearer as gaps were filled (Smith, 1992 and 1994a). It is now clear that the overall drift direction in the Coral Sea us from the northeast and east (Solomons, Vanuatu, and Fiji) towards tropical Australia by the South Equatorial Current (Fig. 1).

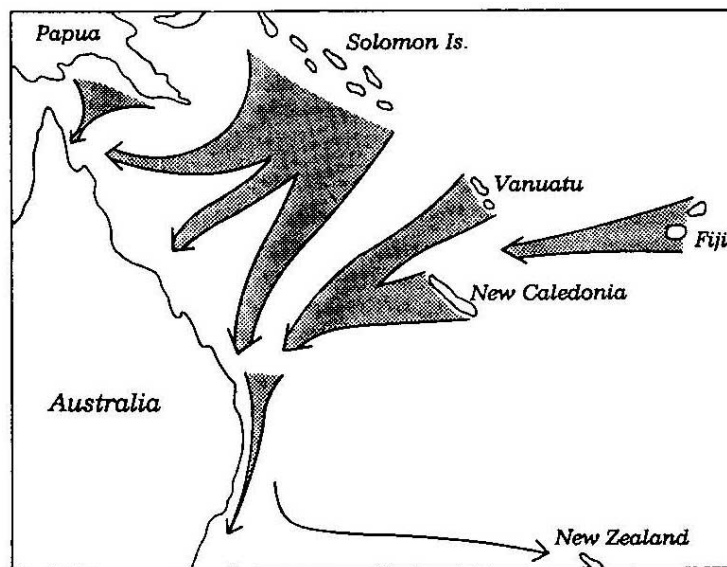


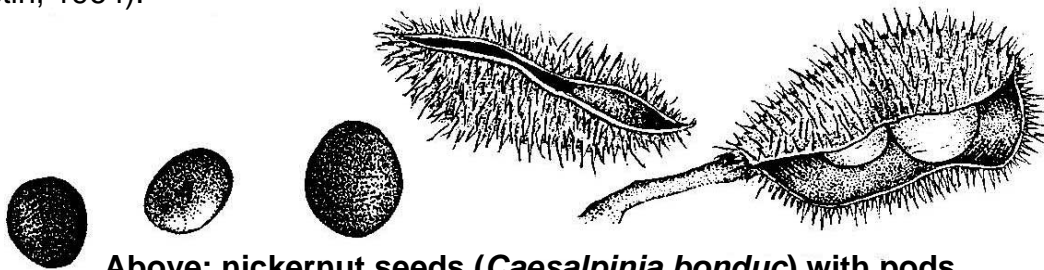
Figure 1. Main drift tracks in the Coral Sea region, as revealed by studies of drifted seeds and fruits

Drift Seed Pursuits in the Coral Sea and Australia (Continued)

by Jeremy M.B. Smith

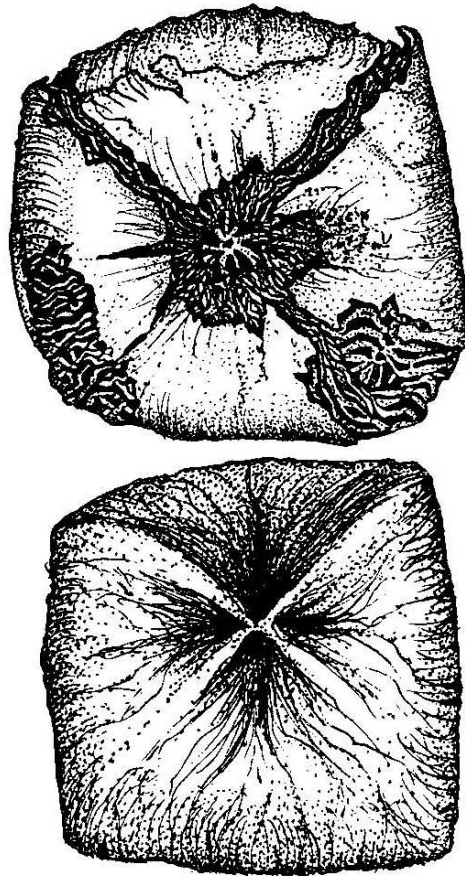
Some of this drift is swept south in the East Australia Current to enter temperate latitudes on the east Australian coast, with a few seeds reaching northern New Zealand. To the north, some continue westward, at least during the dry season of May to October, through Torres Strait south to New Guinea. There is also some southward drift from New Guinea to Australia, particularly during the wet season from December to March.

Drift patterns and drift seeds around other Australian coasts are less well known than those in the Coral Sea, but they beckon strongly! Preliminary findings (e.g., Kenneally, 1972) suggest that some seeds drift from Indonesia southwestward off the west coast of Australia as far as beaches south of Perth, but that not many become entrained in the wet wind drift to be cast up along the southern coast of the continent (Smith, 1994b). However, there is one fascinating record of a viable seed of *Caesalpinia bonduc* (L.) Roxb. found on the subantarctic Macquarie Island, far to the south of New Zealand (Costin, 1964).



Above: nickernut seeds (*Caesalpinia bonduc*) with pods

Common Australian drift seeds are mainly the same as, or related to, those collected from beaches receiving tropical drift in other parts of the world. Coconuts (*Cocos nucifera* L.) are often conspicuous, as may be the candlenuts (*Aleurites moluccana* (L.) Willd.), boxfruits (*Barringtonia asiatica* (L.) Kurz), sea-beans (*Dioclea javanica* Benth and *Mucuna gigantea* Willd.) DC, sea hearts (*Entada phaseoloides* (L.) Merrill), coraltree seeds (*Erythrina* spp.), sea-almonds (*Terminalia catappa* L.), and on beaches close to large islands or to tropical Australia a variety of mangrove (*Rhizophora mangle* L.) seeds and seedlings. However, there are different ones too, and in terms of unraveling drift directions these are often more revealing: For example the large pods of black-bean (*Castanospermum australe*) A. Cunn.) indicate Australian origin, while the large corky 'cracked eggs' of *altuna racemosa* Raf. imply drift from Fizi, and the segmented spheroids of *Excoecaria indica* (Willd.) Muell. Arg. and the husked fruit of *Nypa fruticans* Wurmb. probably come from New Guinea.



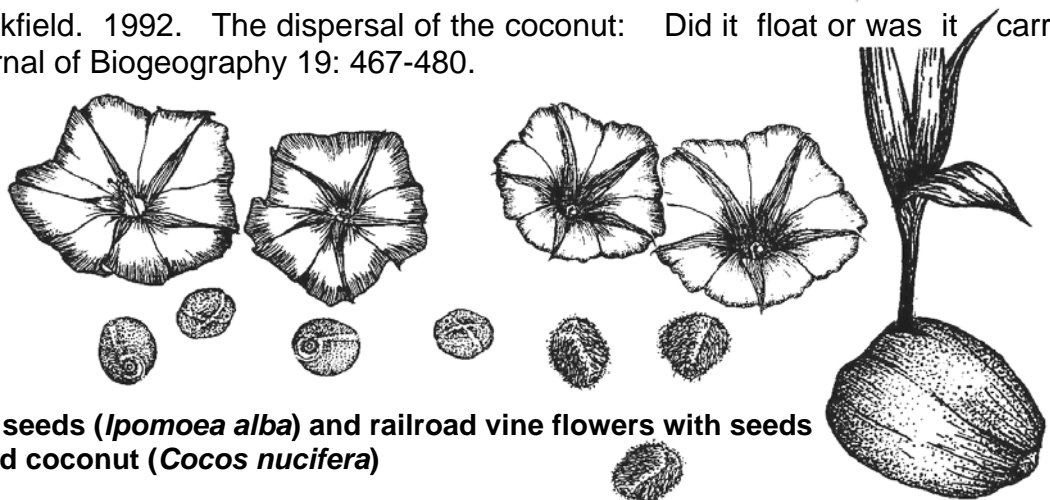
Above: box fruit (*Barringtonia asiatica*)

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Above: moonflower with seeds (*Ipomoea alba*) and railroad vine flowers with seeds (*Ipomoea pes-caprae*) and coconut (*Cocos nucifera*)

News and Notes from Readers

The Asheville Citizen-Times, Monday, April 3, 1995: Seven months ago 14-year-old **Jackie Borzio** put a note into a plastic water bottle, sealed it, and dropped it in the Atlantic Ocean at Cape Hatteras, North Carolina. A month ago Jackie received a post card from 11-year-old **Marc Gurun**, who lives on Ile de Houat, off the coast of Brittany, France. Marc wrote: "Greetings...I found your bottle on Saturday, March 4, 1995 at about 1:00pm."

Deene Decker-Walters of the Cucurbit Network published a note and a photograph of a punitive Cucurbitaceae seed that was dredged from the Puerto Rico Trench. Identified disseminules dredged up at the same time are shown in Fig. 4, page 14 of *World Guide to Tropical Drift Seeds and Fruits*. **Dick Wunderlin** (University of South Florida and new reader) identified the seed as *Fevillea pedatifolia*.

Helene Fortune Hopkins, who currently is living and working in Paris, gave a poster presentation on the drift disseminules of New Guinea at the Flora Malesiana symposium held at the Royal Botanic Gardens, Kew, England. Helen collected drift seeds for five years from the beaches of New Guinea.

On February 21, 1995, **Dana Marple** of Cape Canaveral found a stranded fruit in the wreck at Cape Canaveral beach. It is *Garcinia mangostana*, L., from the *Clusiaceae*. G.C. Cadée discusses and depicts this fruit (figs. 2a & b) in his paper published in *Heb Zeepaard* 51(3): 56-64. 1991. Others who have found stranded mangosteen fruits include Lindman from the Lofoten Islands (Norway), Ridley from the Cocos-Keeling Island and from Portland Island in the English Channel. These collections are not thought to be the result of long range drifting, but the result of a "ship's garbage." Gunn, Dennis, and Paradine do not list the mangosteen as a drift fruit in their *World Guide to Tropical Drift Seeds and Fruits*. But this does not rule out the drift capacity of the Marple fruit. Ship's garbage or drift?

Jeremy Smith, see above: The Antarctic Division (Australia) has offered me the position of Station Leader for the 1995-96 season (starting in November) at the subantarctic Macquarie Island. There is one record of a *Caesalpinia donduc* (L.) Roxb. seed from this island, and I hope to find other drift seeds. From late July, 1995, I will be on leave from the University.

Gary M. Williamson, Chief Ranger, Kiptopeke State Park, Cape Charles, Virginia: "I was leading a bird hike during the Eastern Shore Birding Festival at Kiptopeke Beach on Sunday Oct. 9th, 1994 when I found the ivory nut palm seed lying in the middle of a large mat of seaweed along the high tide line approximately 12 miles south of the Sunset Beach Inn." This is the second ivory nut palm found here: The other was found in September 1991. [Eds. Note: The ivory nut palm is *Phytelephas macrocarpa* Ruiz & Pav.]

On May 13, 1995, **Peter Zies** of Lake Mary, Florida, reported seeing a field of nickernuts growing with the shore vegetation on Keewayden Island off the Gulf Coast of Florida. Most groupings in the one-mile stretch of nickernuts were 4-5 feet high, but two clumps were over 6 feet. Seed pods were found on the largest clump, with many of the pods open and the seeds inside either attached or resting loose in the pod. Very few drift seeds or fruits were found at the wash lines and "It seems likely that the large number of nickernut plants are self-perpetuating rather than the result of numerous nickernuts floating up at this location."

RECENT LITERATURE

Katz, Cathie. *The Nature of Florida's Beaches Including Sea Beans, Laughing Gulls and Mermaids' Purses*. (ISBN 1-888025-07-7) Atlantic Press, Box 510366, Melbourne Beach, Florida 32951. \$7.00 (add \$2. for postage and handling), 64 illustrated pages [Ed. notes: A beautifully illustrated and well-written beachcomber's guide covering all aspects of the biota along the shore under four main headings: Sea wrack, beach, shore, and dunes. Sea-Beans are given their due.]

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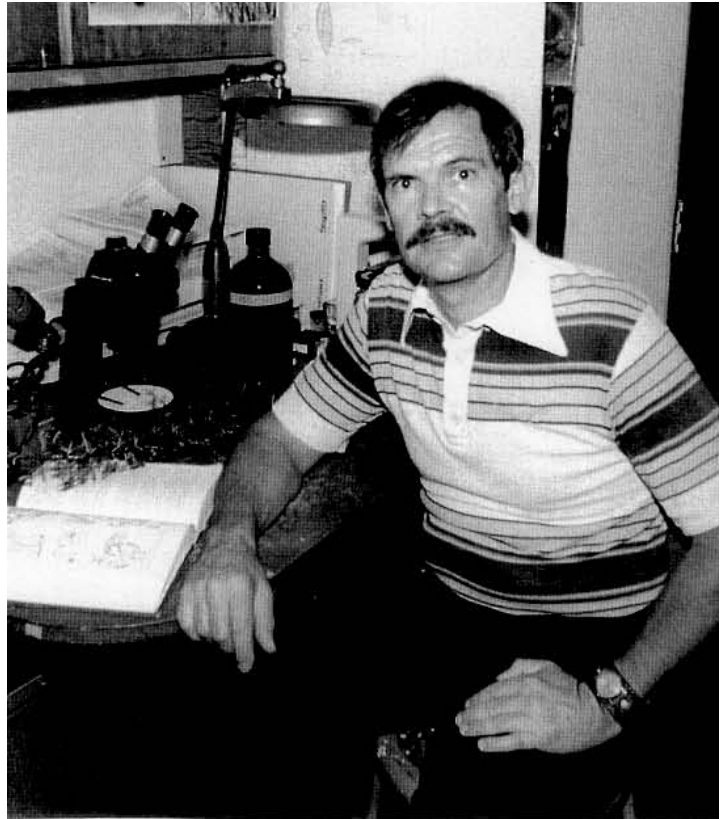
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Collector's Gallery

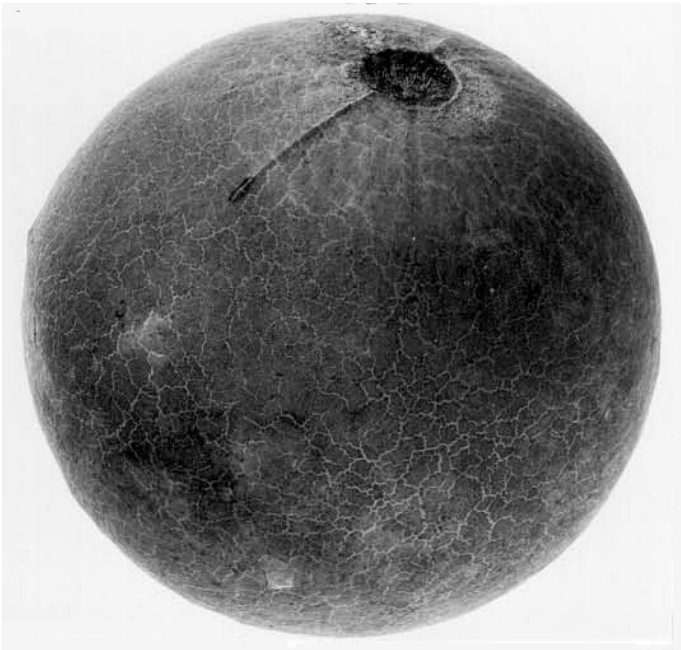


John V. Dennis, Sr. with Daisy



Wayne P. Armstrong

Unknown Disseminules from Florida (Atlantic Coast)



Palm Beach Florida drift fruit with seeds on right (1:1)

Unknown Disseminules from Florida (Atlantic Ocean) (Continued)
(1:1 except where noted)

