



## Tropical drift-seeds from the French coast: an overview

Christophe J. E. BROCHARD<sup>1</sup> and Gerhard C. CADÉE<sup>1\*</sup>

<sup>(1)</sup> *Netherlands Institute for Sea Research (NIOZ), P.O. Box 59,  
1790 AB, Den Burg, Texel, The Netherlands*

\* *Corresponding author: E-mail: cadee@nioz.nl*

**Abstract:** The term ‘tropical drift-seed’ is used by botanists to refer to any fruit and seed which has the ability to float for a long time in water. Two categories of drift-seeds are found in the tide marks on the beach: the ‘true long-distance drift-seeds’ (wild species) and the ‘refuse’ species (result of human activity). Some seeds from Tropical America can reach the coast of Europe with the help of wind and the Gulf Stream and North Atlantic Current. Seven species of drift-seeds have been recorded up to now along the French coast, which is few compared with the fifty-five species recorded from the rest of Europe.

**Résumé :** *Graines tropicales flottantes des côtes françaises.* Le terme ‘graine tropicale flottante’ est utilisé par les botanistes pour définir certains fruits et graines qui ont la propriété de flotter dans l’eau durant une longue période. On peut distinguer deux catégories parmi ces graines: les ‘vraies graines flottantes’ d’origine naturelle et les graines trouvées sur les plages mais résultant de l’activité humaine et classées dans la catégorie ‘graines refusées’. Ces graines proviennent d’Amérique Tropicale et atteignent les côtes de l’Europe grâce au vent et aux courants marins tel que le Gulf Stream et le courant de l’Atlantique Nord. Sept espèces sont répertoriées sur les côtes de France, ce qui est peu comparé aux cinquante cinq espèces trouvées en Europe.

**Keywords:** *Attalea, Dioclea, Entada, Mucuna*, tropical drift-seed.

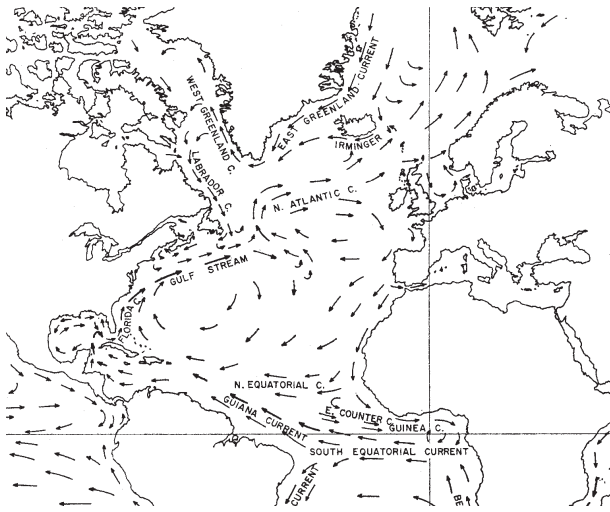
### Introduction

Only a few tropical fruit and seed species have the ability of floating in seawater and freshwater for long time-periods. These seed species generally originate from Tropical America and reach Europe with the aid of wind and sea currents. The Gulf Stream and the North Atlantic Current are the main transporting currents (Fig. 1). It takes about

1-2 years for small objects like drift-seeds to float across the Atlantic and land on European beaches (Nelson, 2000).

Not all fruit and seed species found on the beach are ‘true, long-distance drifters’ (also called ‘peregrine’) (Nelson, 2000). Instead, some are introduced into Europe via trade in souvenir shops or alternatively are thrown overboard at sea. Those species are classified into a category called ‘refuse’ (Nelson, 2000). This makes finding a true drift-seed uncertain.

Despite the occurrence of ‘refuse’ drift-seeds, true drift-seeds are not rare in Europe and a large amount of literature exists. Nelson (2000) documents 55 species for Europe.



**Figure 1.** North Atlantic ocean currents (adapted from McLean, 1968).

**Figure 1.** Courants de l'océan Atlantique nord (adapté d'après McLellan, 1968).

Despite this large literature on drift-seeds, only a small amount of papers has been published for France (Dizerbo, 1970; Cadée & Piersma, 1990). This is unusual, because France has a perfect location for landing drift-seeds. As it is unlikely that the seeds are not landing in France, the conundrum may be explained by a smaller French interest in looking for drift-seeds. This paper reviews old data and adds many recent records.

### Material and methods

Most of the drift-seeds are found on beaches between small plant debris and small mostly white, circular plastic pellets (very good drifters) on tide marks. Seed abundance on beaches is in relation with the production of seeds at their source. Finding drift seeds on the beaches depends on several conditions. Wind might probably be the most dominant condition (Perry, 1999). The best time of the year finding drift-seeds will be in September-October and during winter. However, drift-seeds can be found throughout the year, but are generally much more abundant at some times of the year. For identification we used Gunn & Dennis (1976) and Nelson (2000) and the reference collection of drift-seeds of the second author.

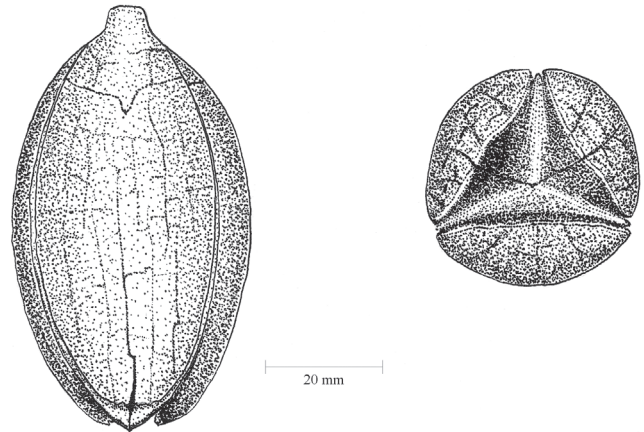
### Results

#### *Records of drift-seeds from the French coast*

##### *Attalea* sp. (Palmae)

This species is a hard woody endocarp of about 8 cm long and 4 cm broad with a pointed tip and three pores at the

other end (Fig. 2). *Attalea* is not a true long-distance drifter (refuse category) and European specimens cannot float. Therefore, where a lot of specimens are found together they might be the result of human introductions (Cadée, 1988, 1997; Nelson, 2000).



**Figure 2.** *Attalea funifera* (Mart.), (Collection C. Brochard). From Richel (The Netherlands) 53°17.86'N, 05°08.53'E. Drawn by C. Brochard.

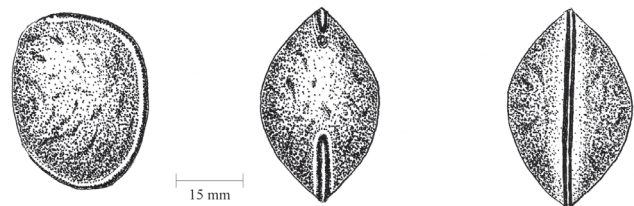
**Figure 2.** *Attalea funifera* (Mart.) (Collection C. Brochard), en provenance de Richel (Pays-Bas) 53°17.86'N, 05°08.53'E. Dessin de C. Brochard.

*Record:* the only record of *Attalea* sp. (probably *Attalea funifera* Mart.) is from the beach of Les Sables Blancs at Concarneau, in 1963. It concerns a large amount of seeds (Dizerbo, 1970).

##### *Dioclea reflexa* Hooker (Fabaceae)

The seed is round or D-shaped of about 3 cm diameter and has a hilum (black band around 3/4 of the seed) less than 2 mm wide (Fig. 3). The colour of *Dioclea reflexa* can vary from pale to dark brown. They originate from tropical America and reach Europe via the Gulf Stream. The seeds can float in seawater for at least 18 years (Nelson, 2000). It is a true long-distance drift-seed.

*Record:* *Dioclea reflexa* is quite a frequent species in Ireland and Brittany but the seed found in April 1968 at



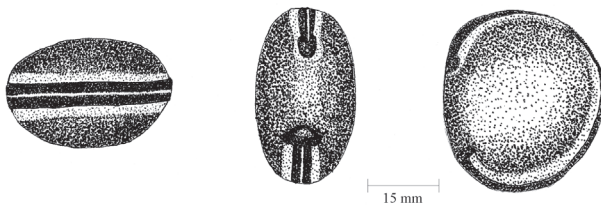
**Figure 3.** *Dioclea reflexa* Hooker. (Collection G.C. Cadée). Drawn by C. Brochard.

**Figure 3.** *Dioclea reflexa* Hooker. (Collection G.C. Cadée). Dessin de C. Brochard.

Porspoder, near Brest, is the only record in France (Dizerbo, 1970).

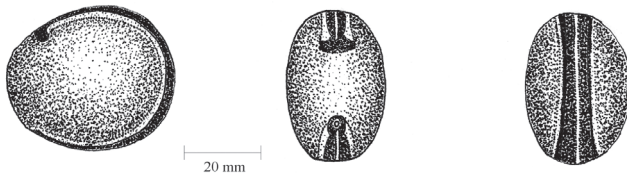
***Mucuna urens*** Linné and ***Mucuna sloanei*** Fawcett & Rendel (Fabaceae)

This circular seed is 2 to 4 cm diameter and has a black hilum of 0.3-0.5 cm. *Mucuna* sp. can be confused with *Dioclea reflexa* but the hilum is different (broader than 2 mm). These *Mucuna* species are difficult to identify (Perry, 2000). The difference between the two species is that *M. sloanei* is more spherical than *M. urens*. The hilum of *M. urens* (Fig. 4) is less broad and less flat than in *M. sloanei* (Fig. 5). The colour of the seed (dark in *M. sloanei* and red in *M. urens*) is not a good identification criterion (Nelson, 2000). These seeds originate from Tropical America (including the Antilles).



**Figure 4.** *Mucuna urens* Linné, (Collection C. Brochard), from the Plage des Granges, Brétignolles sur Mer, Vendée (France) 46°35.15'N, 01°50.75'W. Drawn by C. Brochard.

**Figure 4.** *Mucuna urens* Linné. (Collection C. Brochard), en provenance de la plage des Granges, Brétignolles sur Mer, Vendée (France) 46°35.15'N, 01°50.75'W. Dessin de C. Brochard.



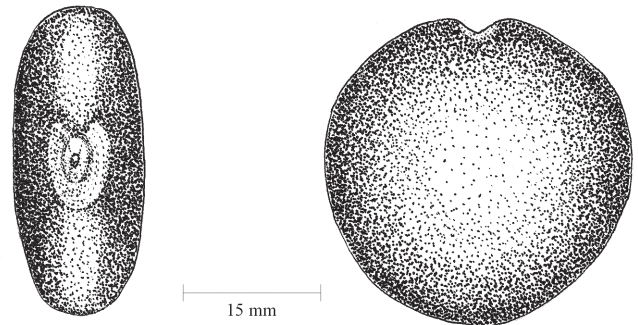
**Figure 5.** *Mucuna sloanei* Fawcett & Rendel, (Collection C. Brochard), from the Plage des Granges, Brétignolles sur Mer, Vendée (France). Drawn by C. Brochard.

**Figure 5.** *Mucuna sloanei* Fawcett & Rendel. (Collection C. Brochard), en provenance de la plage des Granges, Brétignolles sur Mer, Vendée (France). Dessin de C. Brochard.

**Records:** at the Plage des Granges (Brétignolles sur Mer, Vendée), C. Brochard found five seeds of *Mucuna urens* and one seed of *Mucuna sloanei* during the period 12-17 February 2001. R. Arhuero found two seeds of *Mucuna sloanei* at the Plage du Manet (Plouharnel, Morbihan) on the 25<sup>th</sup> of March 2001. There are in total three records of *Mucuna sloanei* and five records of *Mucuna urens* in France. The *Mucuna* species have been commonly found in Ireland and Britain, however, up to 2001, never in France.

***Entada gigas*** (Linné) Fawcett & Rendel (Fabaceae)

Another drift-seed found on the French coast is *Entada gigas*. The seed is circular, (4-6 cm diameter and 1.5 cm thick) (Fig. 6) and originates from Tropical America or the West Indies. *Entada gigas* can drift in seawater for at least 19 years; it is thus a true long-distance drift-seeds species. However, it is difficult to tell whether all those found in Europe have a 'wild' origin. Because of its heart-shape *Entada gigas* are popular imports to souvenir shops as lucky sea beans.



**Figure 6.** *Entada gigas* (Linné) Fawcett & Rendel. (Collection C. Brochard), from the Plage des Granges, Brétignolles sur Mer, Vendée (France). Drawn by C. Brochard.

**Figure 6.** *Entada gigas* (Linné) Fawcett & Rendel. (Collection C. Brochard), en provenance de la plage des Granges, Brétignolles sur Mer, Vendée (France). Dessin de C. Brochard.

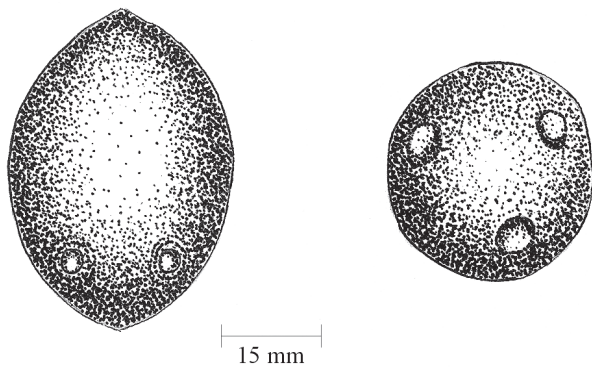
**Records:** before 1990 only three other findings of *Entada gigas* from France have been documented by Nelson (1986, unpublished catalogue): one seed found by M. Moseley in 1897 at Wimereux close to Boulogne (Nord-Pas-de-Calais) (Guppy, 1917), one seed at Paimpol (Côtes d'Armor) (Dizerbo, 1970), one seed in July 1981 at Audierne (Finistère) (Le Roux, 1988 in Nelson, 2000). Matthieu Vaslin found one seed on the 13<sup>th</sup> of November 1997 at the plage Luzéronde at l'île de Noirmoutier (Vendée). In April 1990 one seed was found at Quend-plage close to Marquenterre (Somme) (Cadée & Piersma, 1990). The 2<sup>nd</sup> of January 2001 C. Brochard found two seeds at the Plage des Granges (Brétignolles sur Mer, Vendée) and between the 12<sup>th</sup> and 19<sup>th</sup> of February 2001 he found four others on the same beach. R. Arhuero found the 25<sup>th</sup> of March 2001, one seed at the Plage du Mentor (Plouharnel, Morbihan) and at the Plage de L'Aubraie (Olonnes sur Mer, Vendée) begin April 2001 two seeds and half May 2001 one seed. The last seed was found by M. C. Cadée on the 26<sup>th</sup> of July 2001 at the Bec d'Andaine (close to Genêts, Manche).

At least 15 seeds of *Entada gigas* have been recorded now for the French coast.

***Palmae*** sp.

The egg-shaped seed has a dark, hard woody endocarp, is about 3 cm diameter and 4 cm long (Fig. 7). *Palmae* sp. is recognized by three holes at its base.





**Figure 7.** *Palmae* sp. (Collection C. Brochard), from the Plage des Granges, Brétignolles sur Mer, Vendée (France). Drawn by C. Brochard.

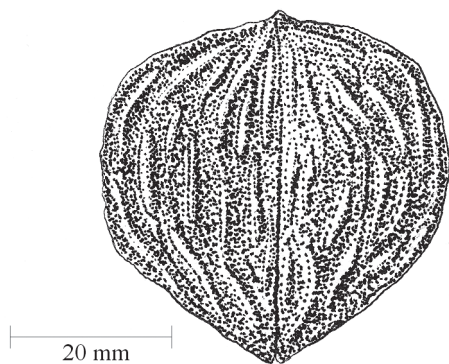
**Figure 7.** *Palmae* sp. (Collection C. Brochard), en provenance de la plage des Granges, Brétignolles sur Mer, Vendée (France). Dessin de C. Brochard.

*Record:* one *Palmae* sp. was found by C. Brochard at the Plage des Granges (Brétignolles sur Mer, Vendée) in February 2001. It is the only record in France. Other *Palmae* (*Astrocaryum* sp. Mey) have been mentioned several times by Nelson (2000) in Ireland and Britain. The seeds can float for about two years. It is a true long-distance drift-seed.

#### *Juglans nigra* Linné (Juglandaceae)

This is a species with a black to brown endocarp and a lumpy surface, it has a diameter of 3 to 4 cm (Fig. 8). Trees grow in Eastern North America, fruits have been recorded from Florida (Ebbesmeyer, 1997). The seeds can float for about one and a half years. It is also a species found in Western Europe in botanical gardens (Ferguson, 2000) so it might not be a true long-distance drifter.

*Records:* two *Juglans nigra* were collected by C. Brochard at the Plage des Granges (Brétignolles sur Mer,



**Figure 8.** *Juglans nigra* Linné, (Collection C. Brochard), from the Plage des Granges, Brétignolles sur Mer, Vendée (France). Drawn by C. Brochard.

**Figure 8.** *Juglans nigra* Linné. (Collection C. Brochard), en provenance de la plage des Granges, Brétignolles sur Mer, Vendée (France). Dessin de C. Brochard.

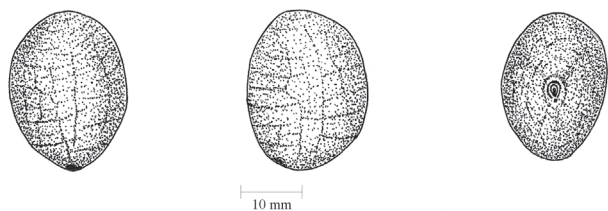
Vendée) in February 2001. Nelson (2000) has also mentioned a finding in Jersey (1990), there are also several records from the Dutch coast.

## Discussion

Seven drift-seed species have been documented along the French coasts. All the records come from Finistère, Manche, Morbihan, Nord-Pas-de-Calais, Somme and Vendée.

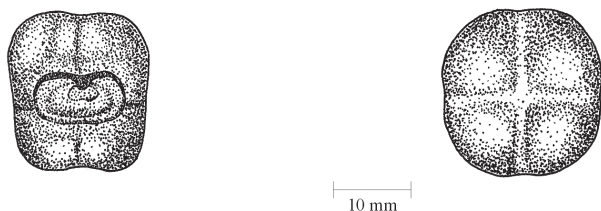
The seeds from the Plage des Granges (Brétignolles sur Mer, Vendée) were found during winter after a long period of western winds. On this beach a shell of *Spirula spirula* Linné, 1758 was collected by C. Brochard in February 2001. This cephalopod with a spiral-shaped shell originates from the Tropical oceans but its shell can drift huge distances (Goud, 1985; Schmidt, 1922). It rarely reaches the coasts of France and England. This record of *Spirula spirula* suggests that the seeds found at the Plage des Granges may indeed originate from South America.

In the future, other species recorded from Ireland, Britain and the Netherlands might be found in France as well, such as the Nickar nuts *Caesalpinia bonduc* Linné (Fabaceae-Caesalpinioideae) with a globular pale grey seed of ca. 2 cm diameter (Fig. 9). A second species is Mary's bean *Merremia discoidesperma* (Donn & Smith) O'Donell (Convolvulaceae). The seed is ca. 2 cm long and 1.5 cm broad, black to brown, oblong, in cross section with a C-like hilum (Cadée, 1996; Nelson, 2000) (Fig. 10). Another



**Figure 9.** *Caesalpinia bonduc* Linné, (Collection G.C. Cadée), from Texel (The Netherlands). Drawn by C. Brochard.

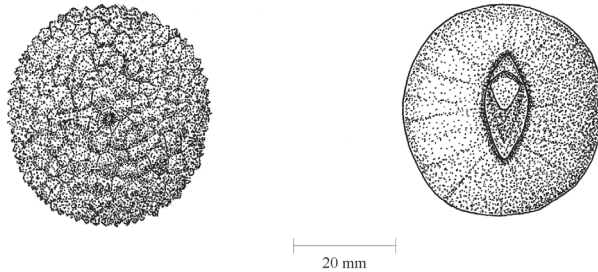
**Figure 9.** *Caesalpinia bonduc* Linné (Collection G.C. Cadée), en provenance de Texel (Pays-Bas). Dessin de C. Brochard.



**Figure 10.** *Merremia discoidesperma* (Donn & Smit) O'Donell, (Collection G.C. Cadée). Drawn by C. Brochard.

**Figure 10.** *Merremia discoidesperma* (Donn & Smit) O'Donell, (Collection G.C. Cadée). Dessin de C. Brochard.

species which might be found on the beach is *Manicaria saccifera* Gaertner (Palmae: Arecaceae). When the fruit is fresh, the endocarp looks like a golf-ball of 4-5 cm in diameter (Fig. 11). When the fruit is getting older or eroded in the ocean the endocarp is smooth with a yellowish colour (Gunn & Dennis, 1976; Nelson, 2000).



**Figure 11.** *Manicaria saccifera* (Gaertner), (Collection G.C. Cadée). Drawn by C. Brochard.

**Figure 11.** *Manicaria saccifera* (Gaertner), (Collection G.C. Cadée). Dessin de C. Brochard.

### Acknowledgements

Our special thanks are due to R. Arhuro, M.C. Cadée, D. Desmots and M. Vaslin sending us records from France and to D. Kuijper for his good advice. Critical remarks by the CBM editor, Curt Ebbesmeyer and an anonymous referee have improved our paper.

### References

**Cadée G.C. 1988.** Seeds of *Attalea funifera* Mart. and a review of other tropical seeds from the Dutch coast. *Porcupine Newsletter*, **4**: 49-54.

**Cadée G.C. 1996.** Spoelt het tropische drijfzaad *Merremia discoidesperma* (Maria-boon) ook op het Nederlandse strand aan? *Het Zeepaard*, **56**: 4-6.

**Cadée G.C. 1997.** Tropical drift disseminules from the coast of the Netherlands: The human factor. *The Drifting Seed*, **3**(2): 3-4.

**Cadée G.C. & Piersma T. 1990.** A tropical drift seed of *Entada gigas* from the French coast. *Cahiers de Biologie marine*, **31**: 517-518.

**Dizerbo A.H. 1970.** Échouage de végétaux exotiques sur nos côtes. *Penn ar bed*, **7**: 257-258.

**Ebbesmeyer C.C. 1997.** Seagoing black walnut endocarps. *The Drifting Seed*, **3** (2): 8.

**Ferguson D. K. 2000.** Scrapes with the black Walnut. *The Drifting Seed*, **6**(3): 11

**Goud J. 1985.** *Spirula spirula*, een inktvis uit de diepzee. *Vita Marina*, Juli- Aug : 35-42.

**Gunn C.R. & Dennis J.V. 1976.** *World guide to tropical drift seeds and fruits*. New York : Demeter Press. (Reissued 1999, Melbourne (Florida): Krieger Publishing Co.). 240 pp.

**Guppy H.B. 1917.** *Plants, seeds, and currents in the West Indies and Azores*. Williams & Norgate, London. 531 pp.

**Mc Lellan H.J. 1968.** *Elements of physical oceanography*. Pergamon press. 151 pp.

**Nelson E.C. 2000.** *Sea beans and nickar nuts*. Botanical Society of the British Isles: Handbook No 10. 156 pp.

**Perry E. 1999.** The life of a sea-bean and the bean bulge hypothesis. *The Drifting Seed*, **5**(2): 10-11.

**Perry E. 2000.** *Mucuna* of North Atlantic shores. *The Drifting Seed*, **6**(2): 12-14.

**Schmidt J. 1922.** Live specimens of *Spirula*. *Nature*, **2771** (110): 788-790.

#### Internet sites:

<http://www.seabean.com/> (site with the newsletter *The Drifting Seed* online).

<http://homepage.mac.com/seabean/>

<http://waynesword.palomar.edu/pldec398.htm>