

BLISTER POD OR COJON DE BURRO *SACOGLOTTIS AMAZONICA* MART. (MALPIGHIALES: HUMIRIACEAE) DRIFT ENDOCARP STRANDED IN COUNTY CLARE ON THE ATLANTIC COAST OF WESTERN IRELAND, AND A REVIEW OF NW EUROPEAN RECORDS

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Abstract

During early December 2020, LMN discovered a drift endocarp of the Blister Pod or Cojon de Burro *Scaoglottis amazonica* Mart. measuring 40mm in length and 30mm in width stranded on Fanore Beach, Fanore Mor, County Clare (53.1196°N, 9.2882°W), on the Atlantic coast of western Ireland. The specimen represents the second record of *S. amazonica* from Irish maritime shores and the fourth from the NW European Atlantic.

Key words: Blister Pod, *Sacoglottis amazonica*, stranded drift-endocarp, Irish and NW European maritime shores.

Introduction

The Humiriaceae is a relatively small monophyletic flowering plant family within the order Malpighiales. The Humiriaceae contains eight genera (*Sacoglottis*, *Schistostemon*, *Humiriastrum*, *Humiria*, *Hylocarpa*, *Endopleura*, *Duckesia* and *Vantanea*), and circa 65 extant species (Cuatrecasas, 1961; Herrera *et al.*, 2010, 2014; Wurdack and Zartman, 2019).

The genus *Sacoglottis* currently includes 11 recognised extant species, ten of which are native to tropical South and Central America (*S. amazonica* Mart., *S. ceratocarpa* Ducke, *S. cydonioides* Cuatrec., *S. guianensis* Benth., *S. holdridgei* Cuatrec., *S. maguirei* Cuatrec., *S. mattogrossensis* Malme, *S. ovicarpa* Cuatrec., *S. perryi* K. Wurdack & Zartman, and *S. trichogyna* Cuatrec.), and one in tropical West Africa (*S. gabonensis* (Baill.) Urb.) (Anon., 2021a) which may have been naturally dispersed from South America across the Atlantic via the North Equatorial Current (Renner, 2004).

All of the Neotropical *Sacoglottis* species, except one (*S. holdridgei*) occur within hydrometric catchments draining into the Atlantic Ocean and/or Caribbean Sea. *S. holdridgei* appears to be confined to the Pacific side of Costa Rica and Ila del Coco (Cocos Island), circa 550km south-west of mainland Costa Rica. *S. ovicarpa* has been recorded on both the Pacific and Atlantic side of Panama (San Jose Island) and Columbia (Nariño and Valle del Cauca), and

from the Atlantic side of Nicaragua (Nueva Guinea, Cerro El Escobin), and southern Brazil (APA do Rio Pandeiros, Minas Gerais) (Johnston, 1949; Cuatrecasas, 1961; Anon., 2021b).

During early December 2020, LMN discovered a drift endocarp of *S. amazonica* measuring 40mm in length and 30mm in width stranded on Fanore Beach, Fanore Mor, County Clare (53.1196°N, 9.2882°W), on the Atlantic coast of western Ireland (Plates 1-2). The specimen represents the second record of *S. amazonica* from Irish maritime shores and the fourth from the NW European Atlantic.

Geographical distribution of *Sacoglottis amazonica*

Sacoglottis amazonica is a relatively small tree reaching up to 10m in height and is widely distributed in flooded forests of the Amazon basin, albeit chiefly its estuary. The tree has also been recorded, albeit disjunctly, from Costa Rica (Volcan Orosi), Panama, Columbia, Peru (Loreto), Ecuador (Sucumbios), Venezuela (Orinoco delta), Trinidad and Tobago, Guyana, and French Guiana (Ducke, 1922; Cuatrecasas, 1961; Nelson, 2000; Bernal *et al.*, 2019; Anon., 2021b).

Cuatrecasas (1961) stated that the tree was also found on some islands of the Lesser Antilles, and on the authority of Lansdown Guilding (1797-1831; see Howard and Howard, 1985), he specifically mentioned St Vincent. However, Morris (1895) had previously noted that Guilding's specimens of *S. amazonica* from St Vincent may have been collected in Trinidad whence many of the botanical specimens that he had donated to Kew Herbarium (London) had originated. *S. amazonica* was not included in the lists of specimens cultivated in St Vincent's Botanic Garden during 1773 (Howard, 1997-98), 1806 (Guilding, 1825), or presently (Anon., 2021c). Indeed, Acevedo-Rodriguez and Strong (2012) listed no representatives of either the genus *Sacoglottis* or family Humiriaceae established anywhere in the West Indies.

Fruits, endocarps and seeds of *Sacoglottis amazonica*

Sacoglottis amazonica produces oblong-ellipsoidal fruits (drupes), 50-60mm in length and 30-35mm in diameter. The exocarp is more or less smooth, coriaceous when dry, and 15-20mm thick. The light to dark brown or greyish endocarp is slightly and irregularly 10-sulcate and bullate, woody, filled with resinous cavities, the 5-locular ovum usually containing only one oblong seed (Morris, 1895; Hemsley, 1897; Cuatrecasas, 1961; Gunn *et al.*, 1999).

The tree producing the fruits and endocarps of *S. amazonica* was not positively identified for 290 years. A partly eroded endocarp from an unknown tree was first described and figured as an '*Exoticos fructus*' by Charles de L'Ecluse (also known as Clusius) in his *Exoticorum Libri Decem* published in 1605 (Plate 3 left). Forty five years later, Bauhino *et al.* (1650) reproduced L'Ecluse's figure and description under the name '*Fructus exotica cinereus*', and in 1662,

Jonston referred to the same specimen. Sloane (1696a, 1725) subsequently recorded having collected endocarps of '*Fructus exotica cinereus, cum lineris & tuberculis duris*' stranded on the coast of Jamaica. In 1767, Petriveri published a figure of a well-eroded endocarp (Plate 3 right), describing it as 'a hard oval fruit with seed holes round its surface, found on the shore of Jamaica'. In 1826, Martius provided the first detailed description of the tree (as *S. amazonica*) and its vegetative parts (but not the ripe fruits or endocarps) which were subsequently reproduced and figured by Urban (1877).

In 1884, Morris (1889) collected a number of unidentified endocarps stranded on the Palisadoes (Kingston Harbour, Jamaica) which were similar to those already described and figured by the previously mentioned authors. Morris (1889) also noted that an endocarp had recently been found stranded on the coast of Devon (UK) during November 1887 which was identical to the endocarps that both he and Sloane (1696a, 1725) had collected in Jamaica. Six years later, the fruits and endocarps were finally confirmed as belonging to *S. amazonica* following a comparison with previously unpublished detailed descriptions and figures of *S. amazonica* made by Herman Crüger in Trinidad during 1861 (Morris, 1895). It would appear that Crüger was unaware of the existence of *S. amazonica* in Trinidad until 1861 because he did not include the species in his Outline of the Flora of Trinidad published three years earlier (Crüger, 1858). Hemsley (1897) subsequently provided a detailed composite illustration of the vegetative and reproductive parts of *S. amazonica*, including the ripe fruit and endocarp (Plate 4).

Floatation properties of *Sacoglottis amazonica* endocarps

The air-filled cavities (empty resin cysts) of *Sacoglottis amazonica* endocarps resemble blister-like protuberances on the surface which aid floatation for up to five years in sea water (Nelson, 1978, 2000; Thiel and Gutow, 2005; Perry and Dennis, 2010), long enough for at least some endocarps to drift from the Caribbean Region via the Antilles Current, Gulf Stream and North Atlantic Drift to NW Europe within the estimated minimum passive trans-Atlantic floatation time interval of 14 to 18 months (Quigley *et al.*, 2016).

Although there are numerous records of stranded drift endocarps of *S. amazonica* from the coasts of northern South America, Central America, Caribbean Region, Gulf of Mexico, and North America as far north as North Carolina (L'Ecluse, 1605; Sloane, 1696a, b, 1725; Hemsley, 1897; Morris, 1889, 1895; Cuatrecasas, 1961; Gunn, 1968; Gunn *et al.*, 1984, 1999; Gunn and Dennis, 1972, 1973, Zies, 1997; Dennis, 2000; Katz, 2001; Boykin, 2003; Sullivan, 2003, 2004; Foreman, 2004; Norton, 2007, 2008; Perry and Dennis, 2010; Witherington and Witherington, 2011, 2017; Anon., 2021b), it is strange that the species has not become naturally established northwards of Costa Rica or any of the offshore Caribbean Islands other than

Trinidad and Tobago (Guppy, 1917; Ridley, 1930; Acevedo-Rodriguez and Strong, 2012; Wurdack and Zartman, 2019). Guppy (1917) suggested that the seeds within drifting *S. amazonica* endocarps probably lose their germination capacity after six months. However, Gunn *et al.* (1999) noted that up to 30% of the endocarps stranded on the coasts of North and Central America contained viable seeds. According to Nelson (2000), *S. amazonica* requires tropical conditions, with a minimum temperature of about 12°C, and is killed by frost. Indeed, Gunn and Dennis (1973) noted that freezing temperatures prevented the establishment of *S. amazonica* on the northern coast of the Gulf of Mexico.

NW European records of stranded *Sacoglottis amazonica* endocarps

Despite their excellent floatation properties and numerous stranding records from the western Atlantic, there are only four records of stranded *Sacoglottis amazonica* endocarps from the European Atlantic, including two from western Ireland, one from the Orkneys, and one from Devon (Table 1). Indeed, the current specimen from County Clare represents the first record of *S. amazonica* from NW Europe over the last 130 years.

Although Nelson (1978, 1990, 2000) was sceptical about the authenticity of Sloane's (1696b, 1725) record (as *Fructus exoticus cinereus*) from the Orkneys c.1696, stating in 1990 that 'there is no account of it in Sloane's work', it is clear that Sloane was familiar with these unusual endocarps when Dr George Garden sent him the specimen from the Orkneys (Sloane, 1696b). Indeed, Sloane (1696a, 1725) had already collected identical stranded endocarps in Jamaica during the late 17th century which were deposited in the Sloane Collection (No. 1656) in the British Museum of Natural History (Morris, 1889, 1895).

Although Ridley (1930) stated that stranded endocarps of *S. amazonica* had been found on the coasts of the Azores, Guppy (1917) did not refer to any records from these mid-Atlantic islands.

Discussion

Nelson (2000) speculated that although stranded *Sacoglottis amazonica* drift endocarps are evidently very infrequent long-distance peregrine disseminules in NW European waters, it is possible that they are not collected by beachcombers because of their colour and uninteresting appearance, and are thus under-reported; perhaps just dismissed as walnuts which they superficially resemble (see Quigley *et al.*, 2016; Quigley and MacNamara, 2020).

It is possible that other species of *Sacoglottis* endocarps may occur in NW European waters and therefore all stranded endocarps should be critically examined. For example, endocarps of the single tropical West Africa species *S. gabonensis* have been recorded, albeit rarely, from the Gulf of Mexico (Van der Ham *et al.*, 2015). Although endocarps of *S. gabonensis* are

commonly found stranded along the coast of tropical West Africa (Cuatrecasas, 1961; Van der Burgt, 1998; Sullivan *et al.*, 2008), clearly some are carried across the Atlantic to South America via the South Equatorial Current and onwards via the Caribbean to the Gulf of Mexico.

Since 1976, ten distinctly furrowed endocarps resembling *Sacoglottis* sp. found stranded along the North Atlantic Ocean, including the Gulf of Mexico and the Dutch coast (North Sea) have so far eluded identification (Van der Ham *et al.*, 2015). Although the endocarps superficially resemble *S. amazonica*, they are larger and have deep furrows. The authors considered that the endocarps may represent an undescribed *Sacoglottis* species (provisionally denoted as *Sacoglottis* cf. *costata*) because it most closely resembles the fossil *S. costata* Reid recorded from Tertiary deposits in Columbia (NE South America).

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TABLE 1. NW European records of Blister Pod *Sacoglottis amazonica* drift endocarps.

1.	Date: c.1695. Location: Orkney Isles, N Scotland. Latitude (°N): c.58.9809. Longitude (°W): c.2.9605. Recorder: Dr George Garden. Voucher Material: unknown. Reference: Sloane (1696b, 1725).
2.	Date: November 1887. Location: Bigbury Bay, S Devon, SW UK. Latitude (°N): 50.2794. Longitude (°W): 3.8968. Recorder: Mrs Hubbard. Voucher Material: KEW Economic Botany Collection 67923. Reference: Morris (1889, 1895).
3.	Date: c.1890. Location: Bartragh Strand, Killala Bay, Co Mayo, W Ireland. Latitude (°N): 54.2140. Longitude (°W): 9.1630. Recorder: Miss Amy Warren. Voucher Material: not preserved. Reference: Colgan (1919).
4.	Date: early December 2020. Location: Fanore Beach, Fanore Mor, Co Clare, W Ireland. Latitude (°N): 53.1196. Longitude (°W): 9.2882. Recorder: Liam McNamara. Voucher Material: Liam MacNamara's private collection. Reference: this paper.



PLATE 1. Blister Pod (*Sacoglottis amazonica*) from County Clare. Lateral views. Photographs: Liam MacNamara.



PLATE 2. Blister Pod (*Sacoglottis amazonica*) from County Clare. Left: basal view. Right: apical view. Photographs: Liam MacNamara.

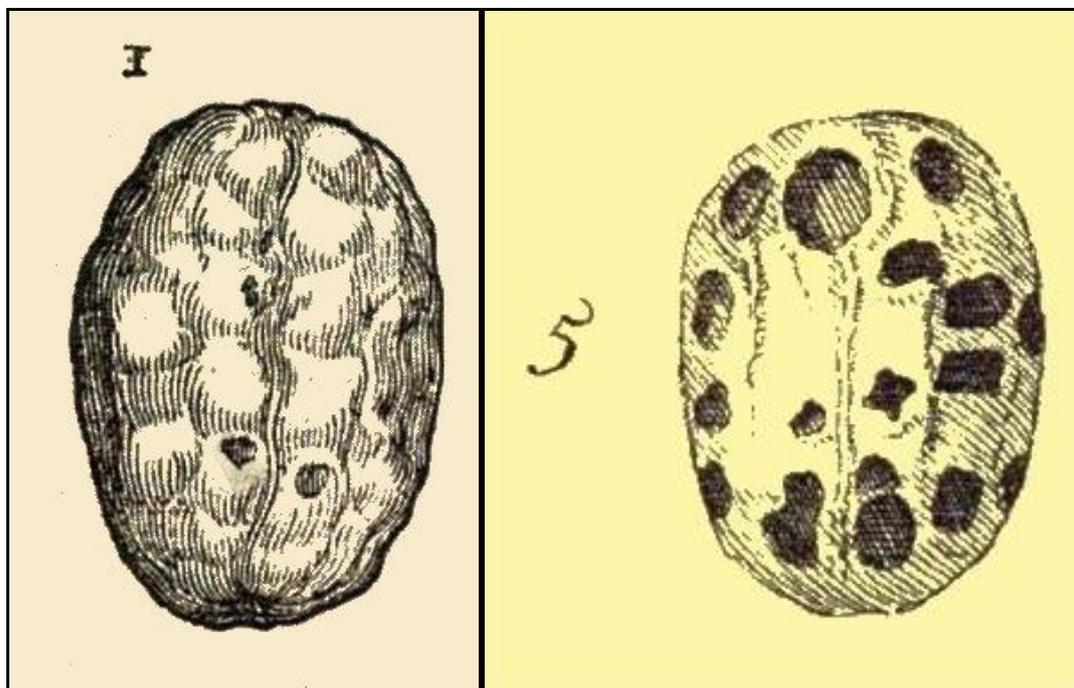


PLATE 3. Blister Pod (*Sacoglottis amazonica*) endocarp. Left: from L'Ecluse (1605). Right: from Petiveri (1767).

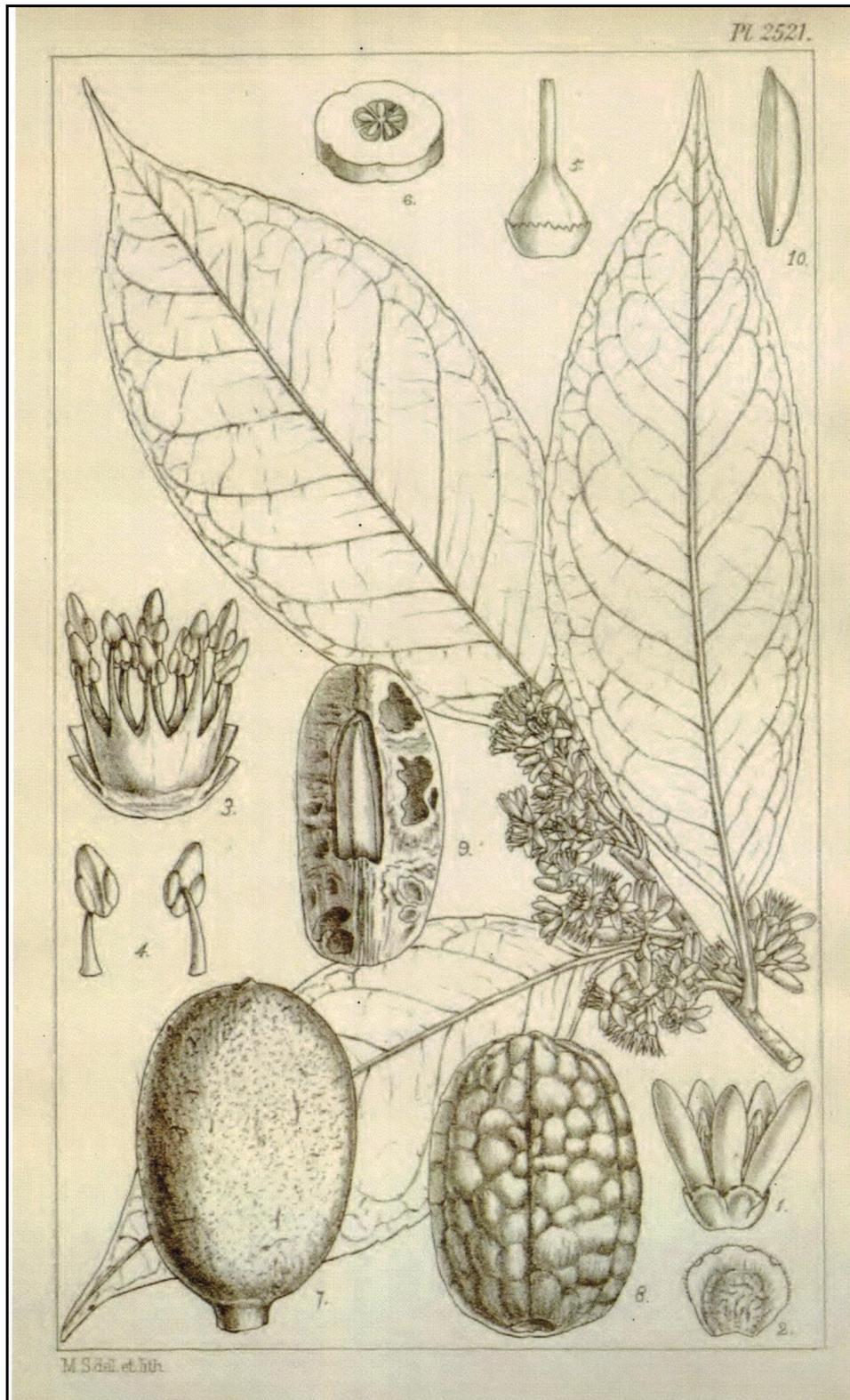


PLATE 4. *Sacoglottis amazonica* (after Hemsley, 1897).