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Type designation of the Maritime pine *Pinus pinaster* (*Pinaceae*)

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Abstract

The typification of the name *Pinus pinaster* (*Pinaceae*) is discussed. The designation of the type is based on the consultation of the original elements and the literature cited in the protologue. An illustration published by Duhamel du Monceau in 1755 is designated as the lectotype.

Keywords: Lectotype, nomenclature, *Pinus*, taxonomy, type, William Aiton.

Introduction

Pinus Linnaeus (1753: 1000) (*Pinaceae* F. Rudolphi) is the largest extant genus of conifers with over 100 recognized species (Keeleyv & Zedler 1998, Price *et al.* 1998, Farjon 2017). *Pinus pinaster* Aiton (1789: 367) (sect. *Pinus*, subsect. *Pinaster* Loudon) (Gernandt *et al.* 2005) is a broadly distributed conifer in the western Mediterranean Basin, in Southern Europe (Italy, Spain, Portugal, France) and Africa (Morocco, Algeria, Tunisia), and the Atlantic coast in Portugal, Spain and France (Gaussen *et al.* 1964, Pignatti 2017, do Amaral Franco 1989, Tison & Foucault 2014, Tison *et al.* 2014). The island distribution of the species is limited to Corsica, and to a very limited extent, northern Sardinia. There is a marginal stand in Pantelleria Island, close to the Tunisian shore (see Gaussen *et al.* 1964, Critchfield & Little 1966, Farjon & Filer 2013, Farjon 2017, Earle 2022).

Pinus pinaster have a high ecological value and is one of the most important forest species in France, Portugal and Spain, and occurs on about 2×10^6 ha in the Mediterranean Basin. The main uses of the species are related to wood (construction, chipboards, floor boards and palettes), pulp and paper production, resin production of high quality, and recreation and soil protection. This species is cultivated worldwide in temperate regions and has been used in several afforestation programmes throughout the world (Alía *et al.* 1997, Le Maitre 1998).

It regenerates readily almost everywhere it is planted and in many places it invades natural shrubland, forest and grassland. *Pinus pinaster* forms dense thickets which supress native plants, changes fire regimes and hydrological properties and alters habitats for many animals (see Glen 2003, Global Invasive Species Database 2022). On the other hand, it is also an important ornamental plant in gardens and parks in the Mediterranean region and in some arboreta around the world (Alía & Martín 2003, Ruiz de la Torre 2006, Abad Viñas *et al.* 2016).

The species is sometimes split into two or three subspecies: subsp. *pinaster* (incl. subsp. "*atlantica* Villar" [nom. inval., *ICN* Art. 38.1, see Turland *et al.* 2018)]) distributed in the Atlantic coasts of SW Europe, subsp. *escarena* (Risso 1826: 340) distributed in the Mediterranean coasts of SW Europe, and subsp. *renouri* (Villar 1948: 241) Maire (1952: 145) (≡ *P. pinaster* var. *renouri* Villar 1948: 241) [incl. var. *maghrebiana* Villar (1947: 84)] distributed in North Africa. However, the differences are small, minor details of leaf anatomy (e.g., size leaves, resin-canals, and size cones) and poorly researched (see Gaussen *et al.* 1964, Ruiz de la Torre 2006, Farjon 2017, Earle 2022).

This species is usually treated as monotypic in subsect. *Pinaster* (Price *et al.* 1998), with the existence of at least three separate refugia during the last ice age, and consequently three different genetic regions: the first ('Moroccan') is found in all populations from Morocco except Punta Cires; the second (western) is present in all populations from the Iberian peninsula, except for that of Catalonia in northeastern Spain, and all populations from continental France except the two easternmost; the last ('eastern') is found in all populations from southeastern France, Corsica, Italy,

Pantelleria island, Tunisia and Algeria (Burban & Petit 2003). This greogaphic subdivision matched some previous taxonomic subdivisions of the species (e.g. Villar 1934a, 1934b).

Several authors (Greuter *et al.* 1984, do Amaral Franco 1989, Farjon 1998, Mateo *et al.* 2011) considered that the identity of *P. pinaster* can be assigned to the concept of "subsp. *atlantica*" [incl. *P. pinaster* [β] var. *obtusisquama* Boissier (1842: 584)], characterized by leaves 18–25 cm; resin-canals more than 2 under the sheath, and cones 14–22 cm. On the other hand, Gaussen *et al.* (1964) considered that the genuine of *P. pinaster* can be assigned to the concept of subsp. *escarena*, characterized by leaves 10–20 cm; resin-canals 2 under the sheath, and cones 9–18 cm. In this sense, as the origin of the cultivated plant first described by Aiton is unknown (see below), the concept of *P. pinaster* could not be confidently assigned to any subspecies (see Greuter *et al.* 1984, Gaussen *et al.* 1964).

In consequence, this species remains in a certain taxonomic and nomenclatural instability, and a full study of the traditional concept and current use of the name is really necessary, including historical research into the material available to Aiton and typification of the name. As part of the nomenclatural studies of the genus *Pinus* for the Spanish flora (see Ferrer-Gallego & Boisset 2018, Ferrer-Gallego & Farjon 2019), the purpose of this paper is to contribute to the stability of nomenclature by the typification of the name *Pinus pinaster*.

Materials and methods

The designation of the lectotype is based on the consultation of Aiton's original elements and the literature cited in the protologue. The typification strictly follows the International Code of Nomenclature for algae, fungi, and plants (Turland *et al.* 2018).

Results and discussion

Background and typification of the name

Pinus pinaster was published in *Hortus kewensis* in 1789 by William Aiton. This author set to work in the 1780s to catalogue every plant being grown at Kew. The result, published in 1789, was called *Hortus kewensis* and included information on the country of origin of every plant, and who first cultivated it in Britain. The botanical descriptions in the *Hortus kewensis* were not made by the Aitons (William Aiton [1731–1793] and William Townsend Aiton [1766–1849]), but by Daniel Carl Solander, Jonas Carlsson Dryander and Robert Brown, based on material from Kew. On the other hand, some of the new taxa described in the first edition of the *Hortus kewensis*, published in 1789, originated from L'Héritier (so indicated) and the types of those taxa are in the L'Héritier herbarium at G-DC. Concretely, as indicated by Britten (1912) and Krok (1925), the diagnoses in *Hortus kewensis* vols. 1 & 2 were largely written by Dryander, who used a manuscript left by Solander, and this manuscript is present at the Botany Library at BM. Accordingly, in the Art. 46.8 Ex. 43 of the *Shenzhen Code* (*ICN*; Turland *et al.* 2018) is indicated "Although the descriptions in Aiton's *Hortus kewensis* (1789) are generally considered to have been written by Solander or Dryander, the names of new taxa published there are attributed to Aiton, the stated author of the work, except where a name and description were both ascribed in that work to somebody else" (see Turland *et al.*, 2018).

The protologue of *Pinus pinaster* (Aiton, 1789: 367) includes a Latin diagnosis, "2. P. [Pinus] foliis geminis margine subasperis, conis oblongo-conicis folio brevioribus basi attenuatis: squamis echinatis", followed by three names "Pinus sylvestris γ" cited from Linnaeus (1763: 1418 [γ Pinaster latifolius, julis virescentibus s. pallescentibus. Bauh. pin. 492]), "Pinus sylvestris" cited from Miller (1752, 1754, 1768: without number page [PIN]), and "Pinus maritima altera" cited from Duhamel du Monceau (1755: 125, t. 29), the English names "Pinaster, or Cluster Pine Tree", the provenance "*Nat*. [native] of the South of Europe" and the comments "*Cult*. [Cultivated] 1596, by Mr. John Gerard. *Hort*. *Ger*." and "*Fl*. April and May".

The reference of Duhamel du Monceau (1755: 125, t. 29) includes an illustration "PINUS, PIN. N.º 4." and is undoubtedly original material for *P. pinaster*. The illustration shows a branch with leaves and five female cones (Fig. 1).

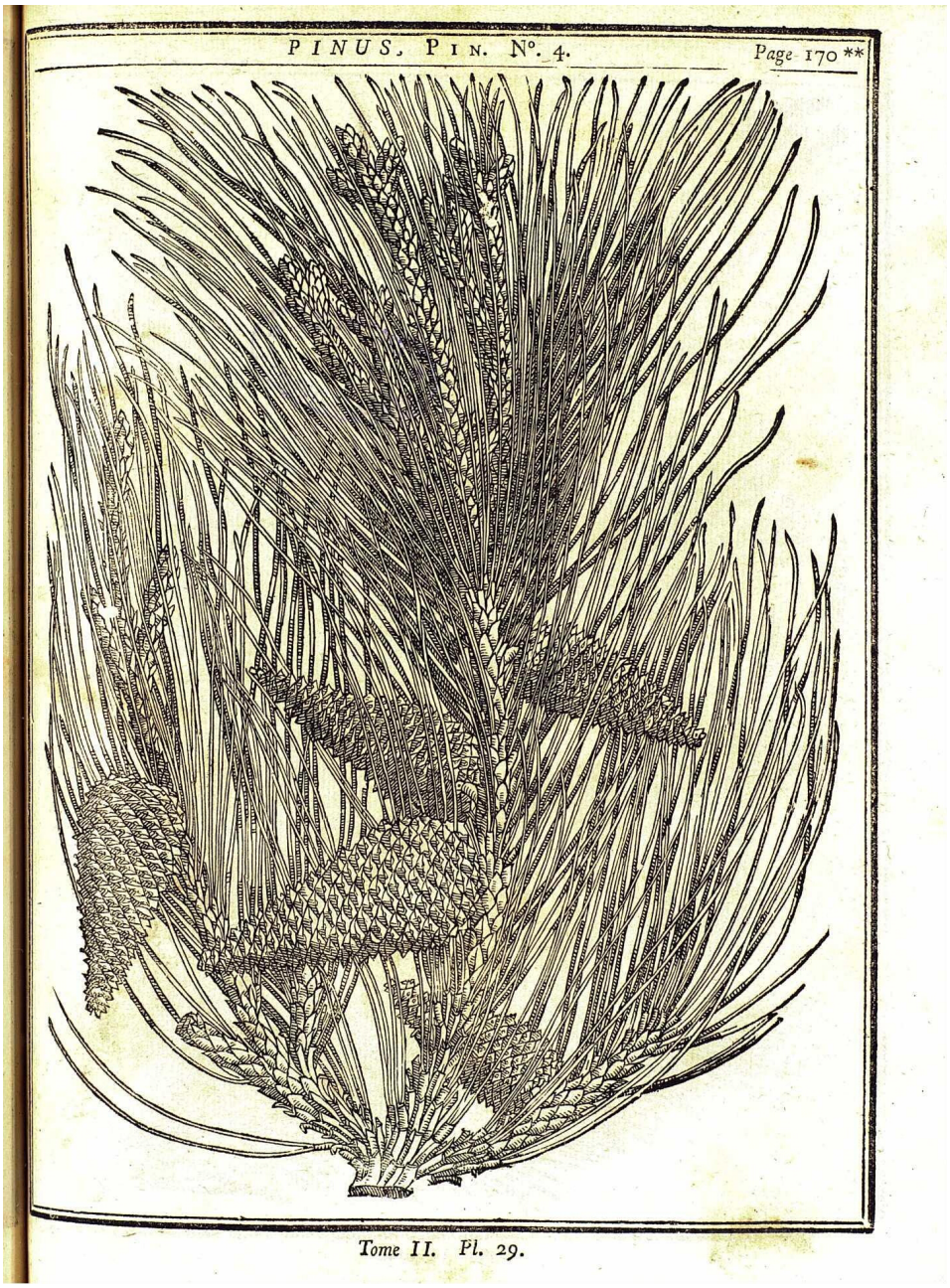

FIGURE 1. Lectotype of *Pinus pinaster* Aiton, illustration "Pinus maritima altera" in Duhamel du Monceau (1755: t. 29).

On the other hand, the comment included in the protologue "*Cult*. 1596, by John Gerard. *Hort*. *Ger.*" refers to the English botanist John Gerard (c. 1545–1612), and author with a large herbal garden in London. In 1596, Gerard published his *Catalogue* (*Catalogus arborum, fruticum, ac plantarum tam indigenarum, quam exoticarum, in horto Johannis Gerardi civis et chirurgi Londinensis nascentium*), a list of rare plants (1,039 different kinds) he cultivated in his own garden at Holborn, where he introduced exotic plants from the New World. The only known copy of this list is in the Sloane collection at the British Library (Pavord 2005). A revised edition was issued in 1599 by John Norton, the Queen's Printer, this time with English and Latin names in opposite columns (Smolenaars 2008). In this catalogue, Gerard (1596: 46) includes "*Pinaster* The wilde Pine tree. 1175. I. P. sylvestris, *L.*" (https://www.biodiversitylibrary.org/item/30619#page/70/mode/1up). This reference is not illustrated. One year later, Gerard published his "Herball" (Gerard 1597: 1456) and includes an illustration of his "Pinus sylvestris", as "I Pinus sylvestris / The wilde Pine tree". This drawing illustrates a complete plant, with leaves and female cones (image available at https://archive.org/stream/herballorgeneral00gera#page/n1685/mode/2up). However, this illustration cannot be treated as original material of *Pinus pinaster* because Aiton did not cite the reference in the prologue.

FIGURE 2. Specimen of *Pinus pinaster* Aiton, BM (barcode BM001066259). Specimen from Chelsea Physic Garden sent to the Royal Society. Image reproduced with permission of the herbarium BM.

Among the herbarium specimen, there is a relevant specimen at BM, with barcode BM001066259. This sheet bears a branch with leaves and male cones, and was annotated as: "Pinus sylvestris / 1776" and "2737". The sheet bears also a revised label, a printed label "Plants from Chelsea Physick Garden sent to the Royal Society in accordance with Sir Hans Sloane's deed of conveyance to the Apothecarie's Company; 1722–96", and another printed label annotated as "Pinus pinaster Sol. in Ait. Solander cites this as being *P. sylvestris* Mill. dict. (the Scots' Fir was called *P. rubra* by Miller). The obvious choice for lectotype of *P. pinaster* would be a specimen from Kew Garden written upp by Solander, but no such specimen can be found. As it may be presumed that there would be only one specimen at Chelsea Garden of any *Pinus* and Miller gives a considerable description of his "Pinus sylvestris", which agrees with this specimen sent from Chelsea Garden to the Royal Society in 1776, it may be presumed by Miller as his *P. sylvestris*, said by Solander to be his *P. pinaster*. This specimen is therefore isosyntype of *P. pinaster* Sol., and, if no better syntype (written up by Solander) can be found, this would be suitable—possible the only specimen suitable for lectotype / João do Amanal Franco / 8-7-1949" (Fig. 2). The first label bears the synonym from Miller (1752, 1754, 1768) cited in the protologue, and clearly suggests that the specimen was collected from a tree cultivated in the Chelsea Physic Garden in 1776. However, this specimen at BM lack any link with the protologue published by Aiton (1789) for *P. pinaster*, and therefore this material cannot be treated as original material of *P. pinaster*.

In conclusion, the Duhamel du Monceau illustration (1755: t. 29) is the only original element available for the name *Pinus pinaster*. This drawing shows important diagnostic characters of this species (e.g., long leaves, in pairs, large cones, conic-ovoid, symmetrical, apophysis rhomboidal), and clearly represents the traditional concept and the current application and use of the name (see e.g., Miller 1768, Gaussen *et al.* 1964, López González 2001, Ruiz de la Torre 2006, Eckenwalder 2009, Debreczy & Rácz 2011, Farjon 2005, 2017, Earle 2022). This illustration is designated as the lectotypoe of the name.

Pinus pinaster Aiton (1789: 367) subsp. ***pinaster***

Type (**lectotype designated here**): [illustration] "Pinus maritima altera" in Duhamel du Monceau (1755: t. 29) (Fig. 1).

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