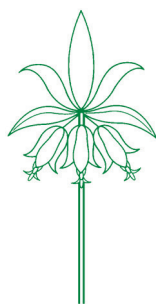


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Madeira giant bellflower (*Musschia aurea*), an endemic species from Madeira, in the botanical literature of the 18th and 19th centuries

Sandra Mesquita, Cristina Castel-Branco and Miguel Menezes de Sequeira

Abstract

Musschia aurea (Linnaeus f.) Dumortier, Madeira giant bellflower, is a plant species endemic to the Madeira Archipelago, first discovered and described in the late 18th century. As part of a broader investigation on the evolution of the knowledge of Madeira's plants up to the 19th century, research was conducted to locate references and illustrations of *Musschia aurea* produced or published during the 18th and 19th centuries. We were able to retrieve 15 illustrations depicting the whole plant or details of it, comprising 3 original paintings and 12 printed illustrations, as well as several references in books about botany and gardening and catalogues of several of Europe's leading botanic gardens. The presence of *Musschia aurea* in historical records touches critical moments in the history of botany and taxonomy; in the history of botanical illustration, having been depicted by famous illustrators, such as Pierre-Joseph Redouté, Sydenham Edwards and James de Carle Sowerby; and in the history of gardening and horticulture. Although the plant rapidly spread through the gardens of the European aristocracy and ruling families at the turn of the 18th century, its presence in nurseries was scarce, and there is no evidence that the Madeira giant bellflower became popular as an ornamental plant. Nevertheless, it is still present in the collections of most botanic gardens in Europe.

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Introduction

The genus *Musschia* (Campanulaceae) is endemic to the Madeira Archipelago, which comprises Madeira, Porto Santo and the Desertas Islands. It comprises the Madeira giant bellflower, *Musschia aurea*, endemic to Madeira and Desertas Islands, as well as two additional species, *Musschia wollastonii* Lowe, endemic to Madeira Island and described by Richard Thomas Lowe (1856), and the most recently discovered *Musschia isambertoii* M. Sequeira, R. Jardim, M. Silva and L. Carvalho, endemic to Deserta Grande Island (Menezes de Sequeira et al. 2007).

Madeira was populated in the early 15th century, but most of its native flora remained unknown in mainland Europe for a long time. Historical records describe an island covered in dense forest with large trees, cleared to make room for crop production and cut down for timber and firewood (Cadamosto 1812; Frutuoso 1998). Which paths the first Madeiran plants took to reach European gardens are unknown. The dragon tree (*Dracaena draco* Linnaeus) was recorded in Lisbon by 1494 (Paz-Sánchez 2004), but it may have come either from Madeira or from the Canary Islands. The white Azorean jasmine (*Jasminum azoricum* Linnaeus) was the first Madeiran endemic plant cultivated on the continent, included in a list of plants observed in Lisbon and its surroundings (Grisley 1661). The first records of Madeiran plants in Europe outside Portuguese territory relate to gardens either directly—their presence recorded in the botanic gardens at Leiden and Amsterdam—or

indirectly, through the work of Leonard Plukenet (Francisco-Ortega et al. 1994, 2011, 2015a). Plukenet (1641–1706) was one of the most preeminent botanists in the 17th century, and his profusely illustrated books on botany include the earliest published depiction of Madeiran endemic plants (*Jasminum azoricum* and *Sibthorpia peregrina* Linnaeus, in Plukenet 1696), probably drawn from garden specimens from his herbarium.

The first exploratory ventures by European naturalists in Madeira focusing on its flora took place in the late 17th century, thanks to the island's particular geographic position as the last stop for ships on their way to the Southern Hemisphere. Sir Hans Sloane, in 1687 and on his way to Jamaica, was the first naturalist who collected plants in Madeira, followed much later by Sir Joseph Banks and Daniel Solander in 1768, during James Cook's first Pacific Voyage (Menezes de Sequeira et al. 2010, Francisco-Ortega et al. 2015a). However, the first to systematically collect plant material in Madeira was Francis Masson, the first collector for the Royal Botanic Gardens, Kew, from 1776 to 1779 (Francisco-Ortega et al. 2008).

In this paper we explore the presence of *Musschia aurea* in historical records, from the first testimony of its existence by the hand of Francis Masson to the end of the 19th century. Furthermore, we demonstrate that depictions and references or descriptions of *Musschia aurea* relate to several crucial moments in the development of botany and botanical illustration and literature.

Data and research methods

In order to investigate the existence of Madeira giant bellflower references, illustrations and historical appearance, available published lists of plants cultivated in European gardens, European nursery catalogues and books and periodicals on gardening, as well as

relevant manuscript sources, were inspected for mentions of *Musschia aurea* (or its synonyms, particularly *Campanula aurea*, the basionym, i.e., the name under which it was first published). The research was conducted on available online data or accessed in libraries, primarily at the Lindley Library (Royal Horticultural Society) and at the Royal Botanic Gardens, Kew, Library and Archives (the full list of examined titles is presented in the Appendix). This investigation was complemented by a concluding search conducted in *Index Londinensis* (Stapf 1929–1941), listing all representations of flowering plants and ferns published in botanical and horticultural publications from the 18th and 19th centuries, and in Max Antheunisse's database of plant illustrations (<http://plantillustrations.org>).

For each reference found, the following information was retrieved: type of source document (original sketch, book, periodical, herbarium specimen, garden catalogue, nursery catalogue, letter, other), where it was seen or downloaded, all the necessary information required for full citation of the source (authors, title, year of publication or production, publisher and publisher location for books, volume and issue for periodicals), country of publication or deposit, type of occurrence (original drawing, printed illustration, a plant specimen, list item, description, other), authors (of text, original drawing, illustration and printing, when applicable), and location of occurrence in the document (page number, figure or plate number, if applicable).

18th century: Discovery, early references and introduction to gardens

Musschia aurea thrives mainly on coastal cliffs at low altitudes. A visitor arriving by boat at Funchal, Madeira's main harbour, would undoubtedly find specimens within the range of a short excursion. It is a genuinely



Figure 1. *Musschia aurea* in its habitat.

impressive plant with an exuberant and exotic golden-yellow flower and rather showy, coriaceous shiny bright green perennial leaves arising from a large congested stock, growing as a chasmophyte in naked rock. Being, therefore, hard to miss (Fig. 1), it is difficult to explain how trained botanists and plant collectors could have passed this plant over.

The beauty of the plant is emphasised by Richard Thomas Lowe, who, in his book *A Manual Flora of Madeira*, wrote (Lowe¹ 1868 [1857–1872], 1(5):576):

Had this pl[ant]. grown in Italy, it might well be supposed to have suggested the idea of the famous golden branch of the Cumæan Sybil to the Roman poet [Virgil]: —

“Discolor unde auri per ramos aura refulsit,
Quale solet silvis brumali frigore viscum
Fronde virere nova quod non sua seminat
arbos,
Et croceo fœtu teretes circumdare truncos.
Talis erat species auri frondentis opaca
Ilice, sic leni crepitabat bractea vento.”²

Æneid. vi. 204–209.

Hans Sloane (1660–1753) was the first known visitor arriving in Madeira with the specific intent of collecting plants, even if only for a short period during 21–23 October 1687. He collected specimens of 38 taxa, which constitutes the earliest documented herbarium collection from the island (Menezes de Sequeira et al. 2010), but he missed *Musschia aurea*. Joseph Banks (1743–1820) and Daniel Solander (1733–1782) did, too. They visited Madeira on 13–18 September 1768 on James Cook’s first Pacific Voyage, collecting more than 200 species (Francisco-Ortega et al. 2015).

The earliest reference to *Musschia aurea* was made by Francis Masson (1741–1805), the most prominent plant collector in Macaronesia in the 18th century and employed by Joseph Banks as a collector for the Royal Botanic Gardens, Kew. Masson spent time in Madeira from 1776 to 1779, travelling from there to the Azores in 1777 and the Canary Islands in 1778. The extensive collection he gathered resulted in the description of over 100 species by leading 18th- and 19th-century naturalists, including Linnaeus (1707–1778) and Linnaeus filius (1741–1783; Francisco-Ortega et al. 2008).

The first documented reference to the plant was, therefore, that of Masson, who sent a collection of 50 plants from Madeira to Banks, accompanied by a four-page letter dated 28 July 1776 (Masson 28 July). In this letter, on page 2, Masson presented the list of specimens sent in the following way: “some of them I flatter myself will prove new, but the greatest part I have not been able to ditermin [...] I have not sent you the Portugee names, nor the Loco of the plants, not having time to get them corrected.” Detailed descriptions of plants numbered 29 (page 3) and 50 (page 4), i.e., “Triandria. 1 gynia N Genus” and “*Aitonia pulchella*,” were included in Latin. Specimen no. 50, *Aitonia pulchella*, was, in fact, *Musschia aurea*, and Masson showed his admiration for this plant by ending his description with the



Figure 2. Description of specimen no. 50, *Aitonia pulchella*, part of a letter sent by Francis Masson to Joseph Banks, from Madeira, dated 28 July 1776. Source: State Library of New South Wales, [FL481633].

expression “*Planta Pulcherrima*” — which can be translated as “a very beautiful plant” (Fig. 2).

Nine days later, in a subsequent letter written on 6 August 1776, Masson sent a smaller collection comprised of 21 specimens, this time to Linnaeus. This collection also included a specimen of *Aitonia pulchella* (no. 19) and a specimen under the name *Aitonia rupestris* (no. 21). Masson, in the accompanying letter, once more described *A. pulchella* (Fig. 3) and explained why he proposed the name *Aitonia*, although it had already been used by Johann Forster (1729–1798) to name a liverwort (now *Plagiochasma rupestre* (J. R. Forster and G. Forster) Stephani), with no further details concerning the plant (Masson 6 August):

I have sent you a plant under the name of *Aitonia rupestre* (Forster’s *Genera Plantarum*) [specimen no. 21] which he discovered at Madera and named it in honour of William Aiton his Majesties Botanical Gardener at Kew.

But if the said Gentleman deserved that honour I think Forster did him great injustice, to give an ingenious Gardener a Plant which can never be introduced into Europe, and consequently its existence will be still doubted; I know Mr. Aiton has no ambition for that honour, but still for the respect I have for so ingenious a Gardener I took the liberty to give N^o 19 that name thinking it a new Genus is a Plant which will soon be introduced into the European Gardens; but this I must refer to your better judgment.

Francisco-Ortega et al. (2008) suggested that specimen no. 21 may be *M. wollastonii*, which remained undescribed until 1856. However, the corresponding herbarium sheet has yet to be found, and this seems an unlikely hypothesis since *M. wollastonii* grows in shady, moist crevices in forest clearings and fringes, and on ravines cut by permanent



Figure 3. Description of specimen no. 19, *Aitonia pulchella*, part of a letter sent by Francis Masson to Linnaeus, from Madeira, dated 6 August 1776. Source: The Linnean Society of London.

Figure 4. Detail from a letter sent by Francis Masson to Joseph Banks, from Madeira, dated 8 August 1776, identifying specimen no. 50 as *Aitonia pulchella*, the name *Campanula aurea* added later. Source: State Library of New South Wales, [FL447136].



streams on steep slopes, under the partial protection of tree crowns. Therefore, it is not what is commonly called a rock plant. Another possible interpretation, which we consider more probable than the previous one, is that no. 21 is indeed a specimen of the liverwort *Plagiochasma rupestre*, although the corresponding specimen is also unknown in Linnaeus' herbarium.

Masson probably sent a second specimen of *Musschia aurea* to Linnaeus, which was also accompanied by a description, held at the Linnean Society of London under the name "Aitonia" (Masson 1776). Since, unfortunately, the document was torn, and part of it is missing, we cannot confirm whether it is indeed a description of *Aitonia pulchella*. However, the description is almost an exact copy of the one shown in Fig. 3, describing a plant growing in rock crevices by the sea. Two differences, however, are noticeable: the collection locality is identified—Paul do Mar, a coastal village in the southwest of Madeira island; and, at the end of the document, the note, in English "NB Send this description along with the Plant." The document metadata describes it as an enclosure to the letter from Francis Masson to Carl Linnaeus, 6 August 1776.

Two days later, on 8 August, Masson wrote to Banks once again (Masson 8 August; Fig. 4):

I wrote you a few day ago [...] I then took the liberty to direct to your care a few seeds for Mr Aiton which I hope you will soon receive. The letter also contained a list of some dry Plants, which I now send you by way of

Lisbon. I have now added ten more, but to be more certain I shall here give a list of the whole with some of their Loca [...] 50 Aitonia pulchella Campanula aurea Mss. in fisuris rupium prope Paul de Mar.

In the last sentence, “*Campanula aurea* Mss.” was written later in distinct handwriting in the free dotted space left by Masson between the plant name and its location. This note does not correspond to the receiver’s handwriting but may have been written by Daniel Solander. At the time Solander was Banks’ librarian, assisting him in cataloguing and classifying his herbarium collection (Rose 2019).

Francis Masson was also an excellent painter and made watercoloured drawings of the plants

during his expeditions, most of which are currently deposited in The Natural History Museum, London (Francisco-Ortega et al. 2008, 2009). Among these are the earliest known representations of *Musschia aurea*, a splendid depiction of a flowering branch (Fig. 5, see also Francisco-Ortega et al. 2009) and an unfinished sketch, also of a plant in flower (Fig. 6). These representations are not dated and may have been painted between 1776 and 1779 or later in 1784 during a short visit in which Masson also collected some plants.

Seeds sent by Masson to William Aiton (1731–1793; director of the Royal Botanic Gardens, Kew) were the origin of the first extensive batch of Madeiran plants



Figure 5. *Musschia aurea*, by Francis Masson. Watercolour Drawings of Plants from South Africa, Canaries, Azores, West Indies, Francis Masson collection, t. 17 (Masson n.d.). Source: Natural History Museum, London, Library and Archives.

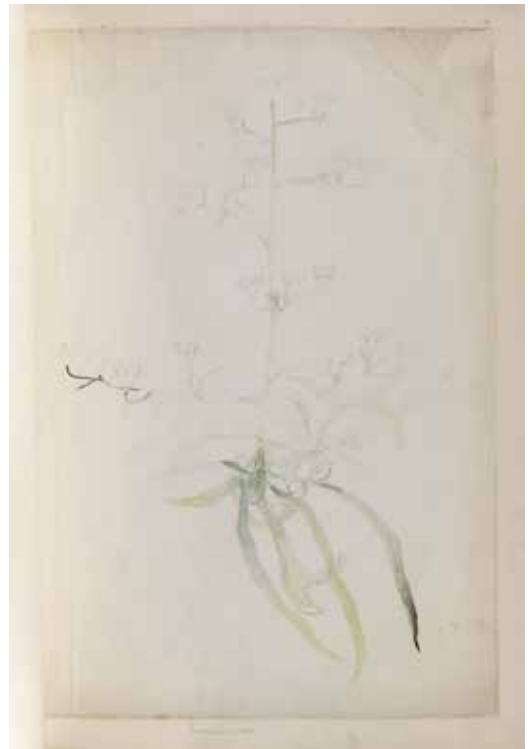


Figure 6. *Musschia aurea*, unfinished sketch by Francis Masson. Watercolour Drawings of Plants from South Africa, Canaries, Azores, West Indies, Francis Masson collection, t. 18 (Masson n.d.). Source: Natural History Museum, London, Library and Archives.

introduced in European gardens (W. Aiton 1789), apart from a very small number of species introduced earlier in single events. For example, *Genista canariensis* and *Persea indica* were cultivated in London gardens during the mid-17th century (Menezes de Sequeira et al. 2010). The *Musschia aurea* herbarium specimens Masson shipped from Madeira were traced by Francisco-Ortega et al. (2008) to three herbaria: The Natural History Museum Herbarium, London (BM, specimens BM000829318 and BM000829319); the Linnaean Herbarium (LINN 221.24; Fig. 7); and the Uppsala University Herbarium (UPS, specimens V-004607, V-004608, V-004609).

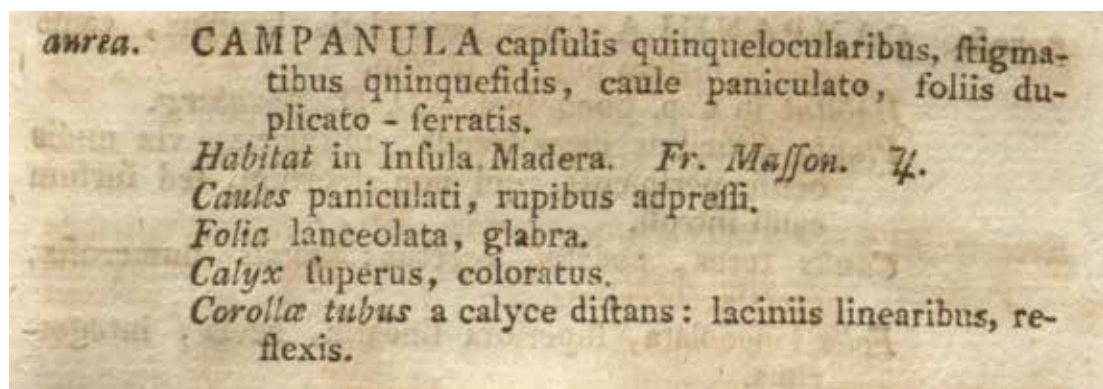
None of the recipients of Masson's *Musschia aurea* specimens and descriptions paid much attention to this plant. Since Linnaeus was already in poor health when he received the specimen (Stöver 1794), his son was responsible for the publication of the first description of this species, in 1781, as *Campanula aurea* (Linnaeus f. 1781, p. 141). The short Latin protologue cited Francis Masson as the provider of the plant material on which this description was based (Fig. 8).

For the next 20 years, accounts of the plant, under the name *Campanula aurea*, were occasionally published in botany books (Lamarck 1791–1823, 1:590, 2:56; Willdenow 1797, p. 912), both in French and Latin.



Figure 7. Specimen of *Musschia aurea* sent by Francis Masson to Linnaeus. The Linnean Collections, LINN 221.24. Source: The Linnean Society of London.

Figure 8. Detail from *Supplementum Plantarum Systematis Vegetabilium* (Linnaeus f. 1781, p. 141). Source: Peter H. Raven Library, Missouri Botanical Garden.



William Aiton (1789, 1:223–224) listed *Campanula aurea* as a plant cultivated in the Royal Botanic Gardens, Kew, since 1777, introduced by Francis Masson. This was the first reference to this species in cultivation in a European garden. In 1802 it was presented by the botanist and gardener Friedrich Dietrich in his work on winter gardens (Dietrich 1802).

Only one representation of *Musschia aurea* within this period is known: vellum by Pierre-Joseph Redouté (1759–1840), part of the Collection des Vélins (the Vellum³ Collection) kept at the Muséum National d’Histoire Naturelle in Paris and dated 1794–1795 (Fig. 9). Redouté is, according to Blunt and Stearn (2015, p. 189), “the most celebrated flower painter of his day—the most popular, indeed, in the whole history of botanical art.”

The Vellum Collection dates back to the 1640s when Gaston d’Orléans, brother of Louis XIII, hired an artist to paint the plant collection in his gardens at Château de Blois. The collection was entrusted to Louis XIV in 1660 and went on to include depictions of plants and birds from the Jardin Royal des Plantes Médicinales, later the Jardin des Plantes. In 1793 the Muséum Nationale d’Histoire Naturelle was created, and the collection was transferred to its premises (Cardinal 2017). Redouté was employed as a botanical illustrator to continue the Vellum Collection, along with his younger brother, in December 1793. The collection encompasses around 500 of Redouté’s magnificent illustrations, no. 28 in volume 30 depicting *Campanula aurea* (Fig. 9).

19th century: Published descriptions and illustrations

The first illustrations of *Campanula aurea* were published in 1804 in books intended to show the world the richness of gardens created for Europe’s ruling families: Malmaison for Joséphine and Napoleon (Ventenat 1803–



Figure 9. Painting of *Musschia aurea* by Pierre-Joseph Redouté, ca.1795. Collection des Vélins du Muséum National d’Histoire Naturelle, portefeuille 30, t. 28 (http://bibliotheques.mnhn.fr/medias/doc/exploitation/IFD/MNHN_VEL_PORTEFEUILLE030_FOL028/campanula-aurea-l-fils-redoute-pierre-joseph). Source and photo ©: Muséum National d’Histoire Naturelle, Dist. RMN-Grand Palais / image du MNHN, bibliothèque centrale.

1804[–1805], 2: pl. 116) and Schönbrunn for the emperors of Austria (Jacquin 1797–1804, 4:37, pl. 472).

Redouté produced a second illustration of this plant (Fig. 10) for Napoleon’s first wife, Empress Joséphine de Beauharnais. Joséphine acquired the Château de Malmaison and surrounding estate in 1798 and created a garden with the rarest plants and exotic animals (Blunt and Stearn 2015). Redouté was engaged in painting a selection of flowers to be engraved and printed in the book *Le Jardin de Malmaison*, accompanying detailed descriptions



Figure 10. Illustration of *Campanula aurea*, after an original by Pierre-Joseph Redouté (Ventenat 1803–1804[–1805], 2: pl. 116). Source: Smithsonian Institution Libraries.

Figure 11. Illustration of *Campanula aurea*, author not identified (Jacquin 1797–1804, 4: pl. 472). Source: Peter H. Raven Library, Missouri Botanical Garden.

by Étienne Pierre Ventenat (1757–1808), who wrote about *Campanula aurea* (Ventenat 1803–1804[–1805], 2: pl. 116):

La *CAMPANULA aurea* découverte à Madère, en 1777, par M. Masson, a été d'abord cultivée en Angleterre, d'où elle s'est ensuite répandue dans toute l'Europe. Cette belle espèce qui n'avoit point été encore figurée et complètement décrite, est surtout remarquable par la couleur dorée de ses fleurs, par sa corolle presque en forme de roue, et par son stigmate à cinq divisions profondes. Les espèces les plus belles et les plus rares du genre *CAMPANULA* sont cultivées à la Malmaison.⁴

That same year *Campanula aurea* was also depicted in *Plantarum Rariorum Horti Caesarei Schoenbrunnensis Descriptiones et Icons*, a publication on the plants grown in Schönbrunn's imperial gardens, in Austria (Fig. 11), along with a description of the plant in Latin (Jacquin 1797–1804, 4:37, pl. 472). It is a magnificent hand-coloured illustration, but its authors are not identified. The text's author, the great Dutch botanist Nikolaus Joseph Jacquin (1727–1817), whose career bloomed in Austria through association with Schönbrunn's gardens and the University and Botanic Garden in Vienna, was himself an accomplished illustrator. However, he needed assistance for the many illustrated books he published. According to Blunt and Stearn (2015), the drawings for this book were made by Franz von Scheidel (1731–1801) in collaboration with Johann Scharf (1788–1860), but Jacquin, in the first volume, lists other collaborators with whom he worked, such as Martin Sedelmayer (1766–1799), Josef



Hofbauer (1752–1809) and both Ferdinand and Franz Bauer (1760–1826; 1758–1840), although not being clear about who participated in his work on Schönbrunn’s plants (Jacquin 1797–1804; Blunt and Stearn 2015; Madriñán 2013).

References to *Campanula aurea* or, from 1822 onwards, to *Musschia aurea* continued to appear occasionally throughout the first part of the 19th century. Recognising its distinct characteristics, Dumortier (1823, p. 28) segregated the genus *Musschia* from *Campanula* based on *Campanula aurea* Linnaeus f., as *M. aurea* (Linnaeus f.) Dumortier and dedicated the new genus to Jean Henri Mussche (1765–1834), director of the Ghent Botanical Garden (Menezes de Sequeira et al. 2007). Two other authors subsequently published similar works, proposing the names *Chrysiangia aurea* (Linnaeus f.) Link (Link 1829, p. 632) and *Benaurea sempervirens* Rafinesque (Rafinesque 1836, p. 78), which are later synonyms and, therefore, illegitimate according to the International Code of Botanical Nomenclature (Turland et al. 2018).

The species was described in treatises on systematic botany (e.g., Persoon 1805, p. 192; Roemer and Schultes 1819, p. 109), as well as in John Lindley’s *Ladies’ Botany* (Lindley 1834, p. 171), a book intended to provide “an elementary introduction to the modern method of studying systematic Botany” to the “unscientific reader” (Lindley 1834, p. iii). John Lindley (1799–1865) was secretary of the Horticultural Society and a prime personality in Victorian horticulture (Drayton 2009). His acknowledgement of *Musschia aurea* reflected its value as a garden plant.

The plant was also commonly listed in catalogues of plants cultivated in many European royal or botanic gardens: in Schönbrunn’s Imperial gardens (Willdenow 1805, p. 52); Royal Botanic Gardens, Kew (W. T. Aiton 1810–1813, 1:351) and the botanic gardens in Madrid (Gómez Ortega



Figure 12. Illustration of *Campanula aurea*, after an original by Pierre-Joseph Redouté (Duhamel du Monceau [1800–]1801–1819, 3: pl. 41). Source: Real Jardín Botánico, Madrid.

1800, p. 3); Paris at the École de Botanique du Muséum d’Histoire Naturelle (Desfontaines 1804, p. 85); Montpellier (de Candolle 1813, p. 13); Copenhagen, where it was introduced in 1805 (Hornemann 1815, p. 202); Cambridge (Donn 1819, p. 56; Donn et al. 1845, p. 96); and Glasgow (Hooker 1825, p. 12).

Bearing such unique golden flowers, *Campanula aurea* quickly found its way into books on horticulture, which became popular at the beginning of the 19th century. It was listed and described by Dumont de Courset (1811, pp. 524–525) in a book intended to provide information on the morphology, culture and uses of the plants cultivated in France, Austria, Italy and England. It also was listed by Robert Sweet (1826, p. 250) as one of the plants cultivated in the gardens of Great Britain, and by Heynhold (1840, p. 535), who

listed the crops cultivated in European gardens. Finally, it is one of the many plants described in Loudon's monumental work *Arboretum et Fruticetum Britannicum* (Loudon [1835–]1838, 2:1063), in four volumes of text plus four volumes of plates. Loudon's encyclopaedic books on gardening were extremely popular among the aristocracy and the emerging middle-class (Simo 1983). It was the first published text providing advice on how to cultivate this plant. The author described *Musschia aurea* as “an interesting shrub, which may be compared to a miniature tree. [...] it is better adapted for conservative rockwork, than for being trained to a wall” (Loudon [1835–]1838, 2:1063).

In 1806 two illustrations of *Campanula aurea* were included in publications dedicated to gardening, although of very different natures: a profusely illustrated seven-volume work with descriptions of trees and shrubs cultivated in France at the time; and a much more affordable monthly periodical with two or three coloured plates per issue. The first was the third volume of what was commonly known as the *Nouveau Duhamel*, which included a beautiful engraving etched after Redouté's painting in the Vellum Collection (Duhamel du Monceau [1800–]1801–1819, 3: pl. 41., see Fig. 12). In this depiction, however, the greenish yellow used by Redouté to colour the sepals, style and stigmas in the mature flowers was replaced by a moss green, which is unsuited for these flower's details, as can be seen in Fig. 1 (N. Morin, pers. comm., 9 September 2020). As pointed out by Morin, in general these flowers seem to be difficult for artists. This is probably because, on the one hand, artists were not painting from a live specimen, and, on the other, because the flower's chromatic development is quite atypical: the sepals (and distal part of the calyx) change from yellowish green in flower buds, to bright yellow in mature flowers and again to deep, bright green



Figure 13. Illustration of *Campanula aurea*, author not identified, but clearly a simplified copy of an illustration by Pierre-Joseph Redouté (Bertuch 1806, pl. 24.) Source: Gottfried Wilhelm Leibniz Bibliothek – Niedersächsische Landesbibliothek, Hannover, [KGBH 64:3, Tab. 24].

during fruitification. In the description that accompanied this image, the author stated that “On le cultive depuis quelques années dans plusieurs jardins de l’Europe, dont il supporte assez bien le climat; mais il faut avoir soin de le tenir, pendant les froids, renfermé dans les serres d’orangerie” (Duhamel du Monceau [1800–]1801–1819, 3:170).⁵ The second publication was the third volume of a German gardening magazine, *Garten-Magazin*, published in Weimar (Bertuch 1806). The only coloured plate of the September 1806 issue represented two flowering plants: the Canary Island endemic *Lavatera phoenicea* on the left part of the illustration and *Campanula aurea* on the right (Fig. 13). It was a simplified copy of Redouté's illustration in Ventenat's work (1803–1804[–1805], 2: pl. 116). The accompanying text stated that this species was



Figure 14. Original watercolour of *Campanula aurea*, after an illustration by Pierre-Joseph Redouté (Kerner 1795–1830, 19: pl. 219). Source: Universitäts- und Landesbibliothek Darmstadt.

Figure 15. Illustration of *Campanula aurea*, after an original by Sydenham Edwards (Bot. Reg. 1: pl. 57. 1815.). Source: Peter H. Raven Library, Missouri Botanical Garden.

first taken from Madeira to England by Francis Masson in 1777 and only later to France and Germany (Bertuch 1806, p. 352, pl. 24). In the following year a simplified copy of the same illustration was included in *Hortus Sempervirens* (Kerner 1795–1830, 19: pl. 219), a rare work comprising 71 volumes, each containing 12 original watercolours (Blunt and Stearn 2015; Fig. 14).

Periodicals on botany and horticulture multiplied in the first decades of the 1800s—according to Desmond (1977), at least 16 new gardening magazines were published for the first time in the 1830s. The *Botanical Register* was founded in 1815 by the botanist Ker Gawler (1764–1842) and the botanical artist Sydenham Edwards (1768–1819), who chose *Campanula aurea* as the subject for plate



no. 57 (Fig. 15), here depicted in detail. Edwards was the leading illustrator for the popular illustrated gardening and botanical journal *The Botanical Magazine* from 1788 to 1814, when he left to join Ker Gawler's new editorial project (Ellis 1959; Blunt and Stearn 2015). The author provided detailed information on the cultivation of *Campanula aurea* (Bot. Reg. 1: pl. 57. 1815.):

Introduced by Mr. Masson in 1777: but even at this day far from a common plant in our collections, notwithstanding its handsome bloom and easy culture. If planted in a proportionate pot of common sandy loam, and placed in the greenhouse in winter, it requires no more care than the commonest vegetable of that department of the garden. To us it has the formal appearance of an artificial plant.

Chiefly, we believe, raised from seed, which is sometimes ripened with us. [...]

The drawing was made from a fine specimen, with several flower-spikes, at the nursery of Messrs. Whitley, Brames, and Milne, in the King's Road, Parson's Green, Fulham.

Garden designer John Claudius Loudon (1783–1843) was one of the most influential authors in horticulture, in particular with the general public, thus popularising gardens outside the aristocratic sphere (Simo 1983). He wrote, among others, *An Encyclopaedia of Gardening* (1822), *An Encyclopaedia of Plants* (1829) and *The Encyclopaedia of Trees and Shrubs* (1842). He was the editor to several periodicals on gardening and architecture, the most successful being *The Gardener's Magazine*, which he founded in 1826. *Musschia aurea* was listed in *An Encyclopaedia of Plants* (Loudon 1829, pp. 164, pl. 2643), accompanied by a small engraving after a drawing by James de Carle Sowerby (1787–1871; Fig. 16). He was the son of James Sowerby (1757–1822), the contributor of at least 70 drawings to the first 4 volumes of the *Botanical Magazine* (Blunt and Stearn 2015). J. de C. Sowerby inherited his father's skills and produced, among other

works, almost 10,000 small illustrations for Loudon's *Encyclopaedia of Plants*.

Due to the uniqueness of *Musschia's* flowers, details of its anatomy were depicted in de Candolle's *Monographie des Campanulées* (de Candolle 1830, pl. 4A; Fig. 17) and in *Le Règne Végétal* (Réveil [1864–]1870–1871, 2: pl. 18, no. 11; Fig. 18).

During the 19th century, ideas introduced by Alexander von Humboldt on the relationship between plants and their environment developed, in particular on the concept of vegetation zones being a result of variations in climate throughout latitude and altitude gradients (Morton 1981). Knowledge about the native flora of Madeira was fragmentary and produced in Continental Europe, based on dried plant specimens or live plants cultivated in European gardens. Observations of the species' natural habitat were reduced to small sentences, usually from a plant collector, repeated in herbarium labels and garden plant catalogues. The first botanist who established himself in Madeira and thoroughly and systematically studied its flora was Richard



Figure 16. Illustration of *Musschia aurea*, after a drawing by James de Carle Sowerby (Loudon 1829, p. 164, no. 2643). Source: Smithsonian Institution Libraries.

Thomas Lowe (1804–1874), who lived on the island from 1826 to 1852, regularly returning until his death. The description of *Musschia aurea* he produced for his leading work on the flora of the archipelago was the first in which the plant’s habitat was described referencing a system of “Regions or Zones of Vegetation in Madeira” (Lowe 1868 [1857–1872], 1(1):iii–vii). It also was the first published description of the plant based on systematic observations in the wild. However, Lowe could not help commenting on the beauty of the plant at the end of his description (Lowe 1868 [1857–1872], 1(5):574–576):

Herb[aceous], per[ennial], Mad[eira]. reg[ion]. 1 (sea-cliffs) chiefly, but running up ravines to reg[ion]. 3, r [rare] or r/2 [rather rare]. Cliffs at the back of the Praia formosa [sic] near Funchal; “S. Gonçallo,” S^r Moniz; sea-cliffs all along the S. coast to the W. of Funchal here and there abundantly, and in the N. above P^{ra} Delgada. [...] Root thick fleshy striking deep into the fissures of perpendicular dry sunny rocks. [...]



Nothing can indeed exceed the singularity and splendour of a fine panicle as it occurs in Mad. on its native rocks, almost wholly of a rich golden-y[ellow]., and shining as if varnished, in full contrast with the equally bright shining dark-gr[een]. foliage. The whole pl. abounds in a thick viscid mild or tasteless milky juice.

Finally, in 1881 *Musschia aurea* found its way into the pages of the renowned *Curtis’s Botanical Magazine* with a folded-page illustration (Bot. Mag. 107: pl. 6556. 1881; Fig. 19). Initially named *The Botanical Magazine*, this periodical was created in 1787 with the intent of describing and illustrating the exotic ornamental flora cultivated in England (Blunt and Stearn 2015).

Figure 17. *Left*, Illustration depicting flower and fruit details of *Musschia aurea* (de Candolle 1830: pl. 4 A). Source: Smithsonian Institution Libraries.

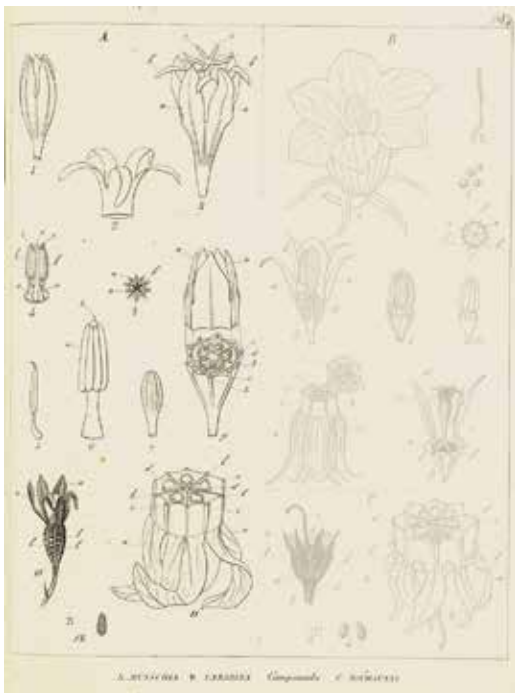


Figure 18. *Above*, Illustration of *Musschia aurea*’s flower pistil (Réveil [1864–]1870–1871, 2: pl. 18, no. 11). Source: The Mertz Library, New York Botanical Garden.

The articles were always accurate and detailed but written in a simple language and intended for the general public. The article on *Musschia aurea* was signed by Joseph Dalton Hooker (1817–1911), at the time editor of the magazine and director of the Royal Botanic Gardens, Kew (Brittain 2006). The plate was prepared after an illustration by Eleanor Anne Ormerod (1828–1901), an entomologist who published pioneer research in agricultural and horticultural entomology (Clark 1992). Ormerod lived near the Royal Botanic Gardens, Kew, where she spent much time looking for insects for her research and was a frequent visitor at Hooker's house. Lady Hooker wrote about her (Ormerod 1904, p. 74):

Her observation was always on the alert and she saw many minute things in nature that others would have passed by. She was a fine artist—and so was her sister, Miss G. Ormerod. At one time my husband was needing some drawings made for Botanical Magazine and she offered her services and drew three or four very beautifully.”



Indeed, four illustrations after originals by E. A. Ormerod were published in *Curtis's Botanical Magazine*, and *Musschia aurea* was one of them (Bot. Mag. 107: pl. 6556. 1881.), lithographed by John Nugent Fitch (1840–1927). It is worth mentioning that, at the time, the magazine was probably the only one preserving the tradition of hand colouring the plates (Desmond 1977).

One last illustration (Fig. 20) was published in 1894 in the fourth volume of *Die Natürlichen Pflanzenfamilien* (Engler and Prantl 1887–1915, 4(5): fig. 36), with the note “Nach Bot. Mag. Verändert.”⁶ included in the caption. This is one of the two major works in which the Engler system of plant taxonomy was devised. It was one of the first post-Darwinian (phylogenetic) classification systems and was probably the most widely used in plant taxonomy throughout the 20th century (Stace 1989). Although this was not a particularly interesting depiction, it was remarkable that *Musschia aurea* was one of the 11 species chosen to be illustrated within the subfamily *Campanuloideae*, which by then included 31 genera.

Before the turn of the century, *Musschia aurea* was listed once more as cultivated in the gardens of Pierre Edmond Boissier (1810–1885), an eminent Swiss botanist (Autran and Durand 1896, p. 186). Boissier was born into a wealthy family and divided his time between the house at Rivage (in Chambésy, near Geneva) in the winter, where he created a vast arboretum, and the summer house at Valleyres, where he kept a greenhouse for tropical and subtropical plants (le Lièvre 1994).

Figure 19. Illustration of *Musschia aurea*, after a drawing by Eleanor Ormerod (Bot. Mag. 107: pl. 6556. 1881.). Source: Peter H. Raven Library, Missouri Botanical Garden.



Figure 20. Illustration of *Musschia aurea*, a simplified copy of an illustration by Eleanor Ormerod (Engler and Prantl 1887–1915, 4(5): fig. 36). Source: Real Jardín Botánico, Madrid.

Discussion

From the late 18th century to the end of the 19th century, records of *Musschia aurea* appeared in many of the critical moments in the history of botany, botanical illustration and gardening. The plant was first acknowledged

due to the diligence of Joseph Banks, a remarkable figure in late-18th-century botany who was president of the Royal Society of London for 41 years (Gilbert 1966). Although the great Linnaeus never saw the plant, his son published the first valid description of *Musschia aurea*. It was soon included in the great treatises on systematic botany by authors such as Jean-Baptiste de Lamarck (1744–1829), Carl Ludwig Willdenow (1765–1812) and Alphonse Pyramus de Candolle (1806–1893).

Illustrators of Musschia aurea

Most of the depictions of *Musschia aurea* were magnificent illustrations, showing the entire plant. Nevertheless, it also was represented in dissections showing anatomical details of little artistic expression but that reflect the evolution of botany in the latter half of the 19th century: the development of natural classification and comparative morphology in the new post-Darwinian context (Morton 1981). The culmination of *Musschia aurea*'s representation was its depiction in the work of Engler and Prantl (1887–1915, 4(5): fig. 36), which established the first significant phylogenetic plant classification system.

Musschia aurea was present in all chapters of the history of botanical illustration. Its very first depiction was made directly from live plants in the field, during an expedition—a safe procedure for ensuring a record of the plant in full colour, more resistant to decay than herbarium specimens (Lack 2001; Faria 2001).

The plant is present in the essential Collection des Vélins in the Muséum National d'Histoire Naturelle (Paris), by the hand of one of the leading names in botanical illustration: Pierre-Joseph Redouté. He painted *Musschia aurea* twice, the second time after the plant in Napoleon and Joséphine Bonaparte's gardens. Redouté was a central character in botanical illustration in the late

18th century and the first half of the 19th, but the work of some of his contemporaries also must be acknowledged. Ferdinand and Franz Bauer, two of the finest draughtsmen in the history of botanical illustration (Blunt and Stearn 2015), are probably the most remarkable omission from the history of the representation of *Musschia aurea*. Nevertheless, they may have participated in Jacquin's work on the plants cultivated in the gardens at Schönbrunn, including *Musschia aurea*. One last depiction of this plant was produced within this concept of fine and expensive illustrated books, in *Hortus Sempervirens*, in the form of an original watercolour. It is a simplified copy of Redouté's painting of the plant in Malmaison, not particularly noteworthy for the excellence of the painting, but for the enormity of the task of making a total of 852 watercolour drawings per copy.

By the early 19th century, botanical Latin had evolved considerably, emerging as a universal language specific to plant science. With its spelling, grammar and very accurate technical vocabulary, it was more useful for fully describing a plant than the most detailed image (Stearn 1966). However, as botanical illustration lost importance for botanists, it became fashionable for the general public who was captivated by the new exotic plants arriving from distant lands and finding their way into European gardens, books and periodicals. Moreover, printing processes developed enormously in the 19th century (Burns 2017), allowing for the production of quality illustrations at lower prices, so becoming available to a broader public.

Musschia aurea was present in the illustrated periodicals dedicated to botany, gardening and floriculture that flourished in the early decades of the 19th century. *The Botanical Magazine* was the first of its kind, with good quality illustrations by artists such as James Sowerby (1757–1822), Sydenham Edwards

(the magazine's leading illustrator from 1788 to 1815), William Hooker (1785–1865) and the extraordinarily prolific Walter Hood Fitch (1817–1892), who joined the magazine in 1834 and soon became its only illustrator until 1877. Several artists contributed with illustrations during the following years. The original illustration of *Musschia aurea* by Ormerod in the *Botanical Magazine* in 1881 testifies to the significant contribution of several lesser-known illustrators after Fitch's resignation. Sydenham Edwards produced the original drawing for the illustration in the *Botanical Register* (1815). However, other periodicals published illustrations of inferior quality copied from previously published depictions, as is the case of the illustration in Bertuch (1806), a simplified copy of Redouté's painting in Ventenat (1803–1804[–1805], 2: pl. 116).

A comparative analysis of all depictions of *Musschia aurea* (see Fig. 21) shows that only five original illustrations of the plant were produced and published until the end of the 19th century: two by Pierre-Joseph Redouté, the first eventually after a specimen from the Jardin des Plantes⁷ and the second after a plant from the gardens at Malmaison; one by an unidentified collaborator of Jacquin, depicting a plant in Schönbrunn; one by Sydenham Edwards from a specimen at the nursery of Messrs. Whitley, Brames, and Milne; and a last one by Eleanor Ormerod after a plant flowering in the Royal Botanic Gardens, Kew. All other depictions are simplified copies of these.

Artistic and printing techniques

Musschia aurea's depictions take us through the evolution of printing techniques in botanical illustration. Five different methods can be distinguished:

1. Three of the illustrations are black-printed copperplates, hand finished with

watercolour (Jacquin 1797–1804, 4: pl. 472 [Fig. 11]; Bertuch 1806 [Fig. 13]; Bot. Reg. 1: pl. 57. 1815. [Fig. 15]). These works were printed in Austria, Germany and England, where etching and line engraving were popular techniques in botanical illustration.

2. In France stipple engraving was preferred and developed to its best, and both illustrations of *Musschia aurea* printed in France — Ventenat (1803–1804[–1805], 2: pl. 116) and Duhamel du Monceau ([1800–]1801–1819, 3: pl. 41) — were stipple engravings, colour printed and retouched by hand (Blunt and Stearn 2015; Lawrence 1963). In this technique, dots of different sizes and density, rather than lines, are used to create tone. For colour prints, inks of different colours were applied to a single plate using a rag-stump or “doll,” an approach known as *a la poupée*, refined to its best in botanical illustration by Redouté (Brindle et al. 1985). Several tools were developed for producing more subtle effects with this technique, such as double- or triple-pointed needles and the roulette, a small rotating wheel with many small lumps, for creating groups of dots on the plate (Bridson and Wendel 1986).
3. Kerner’s (1795–1830) work was rather peculiar since no printing method was used and all illustrations were original watercolours. In 1834, after Kerner’s death, his family advertised some copies of this work left to sell at moderate prices, considering that “from their great size and cost, copies of them are only to be found in imperial or royal libraries” (Zoller 1834, p. 323). In the second half of the century, it was already the rarest of works, particularly the complete collection (Brunet 1860–1865).
4. The illustration in *Curtis’s Botanical Magazine* (Bot. Mag. 107: pl. 6556. 1881.)



Figure 21. Side by side comparison of all illustrations of *Musschia aurea* produced and published until the end of the 19th century, evidencing the apparent copies.

is a late example of hand-coloured, black-printed lithography, one of the most-used processes in 19th-century botanical illustration. Lithography is a planographic printing method, which relies on the

immiscibility of oil and water to create a printing surface—in this case, a flat stone or metal surface. Earlier processes printed in relief, with ink applied to the original surface (e.g., relief methods, such as woodcuts, in which the background is cut away); or to grooves below the surface (e.g., intaglio methods, such as etching and line engraving; Gascoigne 2004). Had the illustration been published four years earlier, it would have been prepared by Walter Hood Fitch—this is the second significant omission from the historical representations of *Musschia aurea*. A notable and prolific botanical artist, Fitch contributed to the *Botanical Magazine* with about 2,900 coloured plates. Over 40 years he produced close to 10,000 illustrations for several books and periodicals (Hemsley 1915; Smith 2017).

5. Finally, wood engraving was used to illustrate the works of Loudon (1829) and Engler and Prantl (1887–1915). This technique was a revival of woodcut, a relief method used in the earliest botanical illustrations in the 15th century and abandoned in the second half of the 16th century. In both processes, lines were drawn on wood, and the areas around them were removed, the plank side of the wood being used in woodcut, as opposed to the end grain of the wood, used in wood engraving (Gascoigne 2004). This technique was revived in the 19th century, despite its coarser results, because it was suitable for mass production in steam-driven printing machines (Bridson and Wendel 1986).

Musschia aurea in European gardening and horticulture

The history of *Musschia aurea*'s representations is markedly interlaced with

the history of gardening and horticulture in Europe. The plant was first recorded by Francis Masson, who was sent from Royal Botanic Gardens, Kew, in 1776 with the specific aim of collecting new plants (Brittain 2006). A search in the second edition of *Hortus Kewensis* (W. T. Aiton 1810–1813) returned 950 plant species introduced by Masson. *Musschia aurea* was one of them, first cultivated at Kew in 1777 from seeds sent by Masson and then sent to other European gardens, namely Schönbrunn's Imperial garden and the botanic gardens in Madrid, Paris, Montpellier, Copenhagen, Cambridge and Glasgow. Surprising is its omission from the lists of plants cultivated in Lisbon in the first half of the 19th century, in Ajuda Botanic Garden—from 1811 to 1828 (Brotero n.d.) and from 1840 to 1844 (Welwitsch n.d.). Being a plant native to a Portuguese territory that had been inhabited for 400 years, it should be present in the country's first botanic garden. This absence testifies to early Portuguese scientific expeditions' focus on economic botany, on the one hand, and more profitable territories, like Angola, Mozambique and Brazil, on the other (Simon 1983). Madeira was an attractive region from the earliest days as a source of good quality timber for construction and as an area of excellent climate for cultivating sugarcane and grapevines (Frutuoso 1998). Its native flora was not of priority consideration. Although several Portuguese naturalists visited the island, particularly in the 19th century, most of the works about local flora and vegetation were published by foreign visitors (Menezes de Sequeira and Jesus 2015).

Musschia aurea was first listed as a garden plant in an 1802 work on winter gardens published in Germany (Dietrich 1802). Instructions on its cultivation were subsequently included in books and periodicals dedicated to gardening. These furnished state-of-the-art information on the exotic plants in cultivation in Europe

and provided technical advice on climate, soils, garden constructions, greenhouse heating and garden design (Carter 1984). *Musschia aurea* was described in detail in several books intended to instruct the gardener, such as *Traité des Arbres et Arbustes* (Duhamel du Monceau [1800–]1801–1819), *Le Botaniste Cultivateur* (Dumont de Courset 1811), *Hortus Britannicus, or A Catalogue of Plants Cultivated in the Gardens of Great Britain* (Sweet 1826), Loudon's *An Encyclopaedia of Plants* (1829) and *Arboretum et Fruticetum Britannicum* ([1835–]1838); *A General System of Gardening and Botany* (Don 1834); and in the periodicals *Garten-Magazin* (Bertuch 1806), *The Botanical Register* (Bot. Reg. 1: pl. 57. 1815.) and *Curtis's Botanical Magazine* (Bot. Mag. 107: pl. 6556. 1881.).

In 1834 John Lindley wrote that *Musschia aurea* “was formerly not uncommon in our gardens” (Lindley 1834, p. 171), suggesting that the plant had been common in gardens in the early 19th century but was by then reasonably rare. Despite this, and its presence in horticultural and botanical literature, we believe that *Musschia aurea* was not a usual plant in gardens outside the circle of aristocratic and botanic gardens. It was present in the nursery collection of Whitley, Brames and Milne at Fulham in 1815 (Bot. Reg. 1: pl. 57. 1815.) but was absent from all commercial nursery catalogues we consulted. A total of 60 catalogues from 1794 to 1897 were examined, most of them from nurseries in Great Britain (e.g., E.G. Henderson & Son; Conrad Loddiges & Son; Benjamin S. Williams; James Veitch & Sons; S. Mackie), but also in France (Jardin de Fromont), Belgium (Alexandre Verschaffelt; Louis Van Houtte) and Portugal (José Marques Loureiro; Real Companhia Horticola-Agrícola Portuense), with no positive results.

Even today, *Musschia aurea* is a very uncommon plant in gardens. The Web site “Rareplants” (<http://www.rareplants.es/shop/default.asp?>), which is the only supplier offering seeds from this plant, refers to it as “absolutely rare.” Nevertheless, according to Botanic Gardens Conservation International (https://tools.bgci.org/plant_search.php), it is cultivated in 35 botanic gardens, e.g., in Lisbon (in Ajuda Botanic Garden), Funchal, Majorca, Meise and Edinburgh. It is still present in the Royal Botanic Gardens, Kew, from where it first began its journey to other European gardens.

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Appendix. List of documents checked for references to *Musschia aurea*

Document reference ⁸	Document type	Country code ⁹
Aiton, W. T. 1810–1813. Hortus Kewensis, or A Catalogue of the Plants Cultivated in the Royal Botanic Garden at Kew, ed. 2. 5 vols. London: Longman, Hurst, Rees, Orme, and Brown.	Garden catalogue	GB
Aldini, T. and P. Castelli. 1625. Exactissima Descriptio Rariorum Quarundam Plantarum, que Continentur Rome in Horto Farnesiano. Rome: Typis Iacobi Mascardi.	Garden catalogue	IT
Autran, E. and T. Durand. 1896. Hortus Boissierianus: Énumération des Plantes Cultivées en 1885 à Valleyres (Vaud) et à la Pierrière (Chambésy près Genève). Genève: Georg & Cie.	Garden catalogue	CH
Backhouse, T. and J. Backhouse. 1816. A Catalogue of Fruit and Forest-Trees, Evergreen and Deciduous Shrubs, Annual, Biennial, and Perennial, Culinary, Official & Agricultural Plants [...] York: Printed by Hargrove, Gawthorp & Cobb.	Nursery catalogue	GB
Brotero, F. A. n.d. Catálogo Geral de Todas as Plantas do Real Jardim Botânico d'Ajuda distribuídas Segundo o Systema de Linneo da Edicao do D. Wildennow: Feito com Assiduas Observacoes de Muitos Annos athe ao Presente. Depository: Biblioteca do Instituto Superior de Agronomia, R-3968. [Manuscript catalogue.]	Garden catalogue	PT
Carter, J. 1842. Catalogue for 1842, of a Choice Collection of Floricultural, Vegetable, & Agricultural Seeds [...]. London: Printed by Richard and John E. Taylor.	Nursery catalogue	GB
Cavanilles, A. J. 1787. Monadelphiae Classis Dissertationes Decem: Quarta Dissertatio Botanica. Paris: F. A. Didot.	Book	ES
Clarke, S. R. 1822. Hortus Anglicus, or The Modern English Garden [...]. 2 vols. London: F. C. & J. Rivington.	Book	GB
Commelin, J., C. Commelin, F. Kiggelaar and F. Ruysch. 1697. Horti Medici Amstelodamensis Rariorum Tam Orientalis, quam Occidentalis Indiae, Aliarumque Peregrinarum Plantarum [...], 2 vols. Amsterdam: P. & J. Blaeu and Abraham van Someren. [Information retrieved from Francisco-Ortega et al. 2015b.]	Garden catalogue	NL
Couret-Villeneuve, L. P. 1802. Hortus Gandavensis: Description de Toutes les Plantes qui se Cultivent dans le Jardin Botanique de l'École Centrale du Département de l'Escaut, à Gand. Paris: Frères Levrault.	Garden catalogue	BE
Cree, J. 1829. Hortus Addlestonensis, or A Descriptive Catalogue of Plants, &c. [...]. London: Hurst, Chance and Co.	Nursery catalogue	GB
Curtis, W., J. Sims, W. Hooker and J. D. Hooker, eds. 1787–1900. Bot. Mag. London.	Periodical	GB
de Candolle, A. P. 1813. Catalogus Plantarum Horti Botanici Monspelienensis [...]. Montpellier: J. Martel.	Garden catalogue	FR
Desfontaines, R. 1804. Tableau de l'École de Botanique du Muséum d'Histoire Naturelle. Paris: J. A. Brosson.	Garden catalogue	FR
Desfontaines, R. L. 1829. Catalogus Plantarum Horti Regii Parisiensis, cum Annotationibus de Plantis Novis aut Minus Cognitis, ed. 3. Paris: J. S. Chaudé.	Garden catalogue	FR
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Document reference ⁸	Document type	Country code ⁹
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Document reference ⁸	Document type	Country code ⁹
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Document reference ⁸	Document type	Country code ⁹
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Document reference ⁸	Document type	Country code ⁹
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Williams, B. S. 1881. B. S. Williams' New and General Plant Catalogue for 1881. London: Victoria and Paradise Nurseries.	Nursery catalogue	GB

Notes

1. The dates of publication for *A Manual Flora of Madeira* are discussed in Williams (2017).
2. "Just as mistletoe, that does not form a tree of its own, grows in the woods in the cold of winter, with a foreign leaf, and surrounds a smooth trunk with yellow berries: such was the vision of this leafy gold in the dark oak-tree, so the foil tinkled in the light breeze." (A Translation into English prose by A. S. Kline. <http://people.virginia.edu/~jdk3t/AeneidTrKline2002.pdf>)
3. Vellum is a calfskin treated to produce a fine-grained white surface, used as material for painting in watercolour or gouache, usually using techniques developed for miniature painting.
4. "The *CAMPANULA aurea* discovered in Madeira, in 1777, by Mr. Masson, has since been cultivated in England, from where it was disseminated throughout Europe. This beautiful species, which had not until now been depicted and thoroughly described, is remarkable primarily for the golden colour of its flowers, for the corolla shaped like a wheel and for its deeply 5-divided stigma. The rarest and most beautiful species in the genus *CAMPANULA* are cultivated in Malmaison" (translated by the authors).
5. "The species has been cultivated for some years in several gardens of Europe, so it endures the climate quite well; but one must be careful

to protect it during the cold, enclosed in the greenhouses of the orangery” (translated by the authors).

6. After *Botanical Magazine*, modified.
7. We found no definite evidence that *Musschia aurea* was actually cultivated in the garden prior to 1804, serving as a model for Redouté’s vellum.
8. In the Appendix documents prior to 1781 were checked for plants under other names, which may eventually correspond to *Musschia aurea*.
9. Country codes in Appendix are according to ISO 3166 standard.

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