British & Irish Botany 4(3): 364-384, 2022

A new spontaneous hybrid in *Gunnera* subgenus *Panke* (Gunneraceae) widespread in the British Isles, with notes on the typification of *G. manicata*

Julian M. H. Shaw*, Dawn Edwards, John David
Royal Horticultural Society, Wisley, Woking, Surrey, U.K.

Corresponding author: Julian Shaw: julianshaw@rhs.org.uk

This pdf constitutes the Version of Record published on 9th September 2022

Abstract.
Gunnera x *cryptica* J.M.H.Shaw representing the hybrid *G. manicata* Linden ex André × *G. tinctoria* (Molina) Mirb. is described from spontaneous seedlings in cultivation. It is widespread in the British Isles, and appears to have completely replaced *G. manicata* in cultivation. Details of the earliest publication, authorship and typification of *G. manicata* are provided, along with the origin and history of the hybrid, and notes on *G. tinctoria* including a previously overlooked synonym *G. thyrsiflora* Ruiz ex Barreiro.

Keywords: identification; invasive alien species; hybridisation; horticultural plants

Introduction

Cultivation of taxa in close proximity such as in a garden may afford opportunity for gene exchange between taxa that are widely separated in the wild. Numerous examples are known where novel hybrid interactions have occurred spontaneously in cultivation, some resulting in new nothospecies that have gone undetected for years masquerading under the name of a parental taxon. Recent examples include *Lysichiton* × *hortensis* J.D.Arm. & B.W.Phillips, derived from *L. americanus* Hultén & H.St.John × *L. camtschatcensis* (L.) Schott, (Armitage & Phillips, 2011) and *Cenchrus* × *cupreus* (Thorpe) Govaerts, syn. *Pennisetum advena* Wipff & Veldkamp, derived from *C. elegans* (Hassk.) Veldkamp × *C. setaceus* (Forssk.) Morrone (Shaw, 2020).

For over 150 years, giant *Gunnera* plants have been widely cultivated for their spectacular sized foliage and architectural value, usually under the names *G. tinctoria* (Molina) Mirb. and *G. manicata* Linden ex André. However, distinguishing these two species of *Gunnera* has long been regarded as challenging (Goldring, 1879; Elwes & Stapf, 1919; Stapf, 1919; Clement, 2003; Grant, 2004). This has become more critical with the wider appreciation of the invasive threat posed by *G. tinctoria* (Silva *et al*., 1996; Taranaki Regional Council, 2007; Sheehy Skeffington & Hall, 2011), which is listed in UK Invasive Alien Species legislation as a Species of Special Concern and in the EU as a Species of Union Concern. In order to be able to understand better the distribution of these two taxa and to assist those managing natural areas where *Gunnera* occurs, as well as to provide guidance to gardeners and the horticultural sector, a study was undertaken to determine the identification

of these species in UK and Ireland. This investigation used both morphological and molecular approaches and the latter is reported in another paper (Edwards *et al*., in prep.). Here we report on the principal conclusion on the identity of plants widely known in cultivation as *G. manicata*.

Both species originate from South America: *G. manicata* occurs in the Atlantic rainforest habitat in southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina) (Hassemer, 2017, 2019), whereas *G. tinctoria* occurs in Chile and S.W. Argentina where it occurs in a wide range of habitats, including the edges of forest and alongside rivers in the wetter parts of the country, especially the island of Chiloé (Gardner *et al*., 2015; Gioria & Osborne, 2013). Both species belong in subgenus *Panke*, and share the same chromosome number (2n = 34) (Dawson, 1983). Introduction into cultivation in Western Europe in the latter part of the nineteenth century brought these two closely related species together. The results of the molecular analysis of samples from plants in their native ranges and in cultivation demonstrated that *G. manicata* is not found in cultivation in UK and Ireland, and the existence of a hybrid between the two species (Edwards *et al*., in prep.) which is here described. Spontaneous hybridisation between species of *Gunnera* subgenus *Panke* has been observed in the wild on several occasions (Palkovic, 1978; Mora-Osejo *et al*., 2011) so that this instance is by no means unique.

Taxonomic treatment

Gunnera* × *cryptica J.M.H.Shaw nothosp. nov.
Synonymy: *G. manicata* auctt. *non* Linden ex André (1866).
G. scabra var. *major* T.Smith, *Alpine plants* [Daisy Hill Nursery catalogue, Newry] no. 56: 97 (1904), (Arnott, 1908a; Nelson & Grills, 1998).
G. scabra var. *longiscapa* T.Smith ex Burbidge in *Flora and Sylva* 1901: 294 (1901), (Smith, 1904; Nelson & Grills, 1998).

Diagnosis

Distinguished from *G. manicata* by an open leaf basal sinus; leaf main veins often asymmetrically branched; inflorescence branches shorter, 11 cm long or less, elongated sepals without a stipitate bulbous base. Distinguished from *G. tinctoria* by leaf basal lobes present, sometimes slightly overlapping; inflorescence diffuse, conical, with thin branches to 11 cm long; petals often present.

Description

Giant rhizomatous herb with a rosette of leaves produced annually from a terminal bud. Rhizome usually horizontal, occasionally vertical, with numerous adventitious roots along underside. Rhizome and apical bud densely covered with ligules. Ligules to 24.5 cm long × *c*. 10 cm wide, usually pink, but cream or deep red on some individuals, deeply laciniate with a conspicuous central rib. Petioles often long to *c*. 1.5 m, longitudinally grooved, armed with prickles 4-5 mm long, green to pink.

Leaves often very large on mature plants to *c*. 2 m diam., size variable and dependant on age and size of plant and environmental conditions, often slightly asymmetrical in outline due to irregular vein branching in central leaf lobes, conspicuously lobed; lobes 5-7, usually with acute apices, margin toothed, sinuses penetrating between ⅓ to ½ radius; lobules apically acute to rounded, penetrating

to more than ⅒ of radius; basal sinus usually cordate, open, basal lobes not overlapping on mature foliage; upper surface scabrid.

Inflorescences solitary, axillary, arising from the rhizome apex, diffuse with branches to *c*. 11 cm or less long, often with a few short, sterile upper branches and a bare extension of the rachis apically; branches sometimes becoming slightly inflated during fruiting, sometimes subtended by a linear bract. Flowers densely inserted along branch with those bearing two anthers towards the branch tip, often with a solitary anther towards the rachis. Sepals 1-1.5 mm long, lanceolate, margin irregular, with a darker central line, often slightly exceeding filaments. Petals of sporadic occurrence, solitary or in pairs, cuculate, some with a long apical mucro, exterior minutely verrucose. Stamens 1-2 or absent; filaments 1-1.5 mm, anther basifixed, 1 mm or less. Ovary globular, *c*. 1 mm or less, enveloped by calyx, with short apical styles. Fruit globular, reddish, 2-3 mm diam. rarely produced.

Interspecific hybrid derived from *G. manicata* × *G. tinctoria* intermediate between parents (Table 1), and including back-crosses that resemble one parent more than the other.

Stapf commented regarding plants cultivated at Kew as *G. manicata*, that fruits remain green, and the seeds fail to germinate, he also notes the anthers are minute c. 0.5 mm (c. ¼ line), which suggests the plant was an infertile *G.* ×*cryptica*. (Elwes & Stapf, 1919).

Type: England, Hampshire, Sir Harold Hillier Arboretum. 12 July 1983, *British Museum staff no. 2040*. (holo. **BM**, 4 sheets from an individual plant, BM001209641, BM001209642, BM001209643, BM001209644).
Additional specimens examined: England, Dorset, Abbotsbury, 27 Aug 1976, *D. McClintock s.n.* (**BM**); England, Hampshire, Sir Harold Hillier Gardens, 21 Sept 1982, *British Museum staff 2120* (**BM**); England, Hampshire, Sir Harold Hillier Gardens, acc. no. 1977.7362, 26 Jun 2007, *A. Coombes s.n.* (**WSY**); England, Hampshire, Sir Harold Hillier Gardens, acc. no. 1977.8754, Sep 2007, *A. Coombes s.n.* (**WSY**); England, Surrey, Clarendon Park, 25 June 1974, *D. McClintock s.n*. (**BM**); England, Surrey, Royal Horticultural Society Garden Wisley, 17 Oct 1919, *Anon.* (**K**); England, Surrey, Royal Horticultural Society Garden Wisley, acc. no. W852298, 14 Jun 2007, *J. Shaw s.n*. (**WSY**); England, Surrey, Royal Horticultural Society Garden Wisley, acc. no. W852298-C, *B.W. Phillips & J.D. Armitage s.n.* (**WSY**); England, West Sussex, Wakehurst Place, Aug 1920, *G. Loder s.n.* (**K**); Germany, Bonn, Rhenanie, cult. Jard. Bot., Sep 1923, *Ch. d'Alleizette s.n.* (**P**); Ireland, Co. Wexford, Mt Usher, Aug 1976, *N. Scannell s.n.* (**BM**); Ireland, Glasnevin, 17-18 Oct 1919, *Anon*. (**WSY**); Scotland, Argyll, Canndow, 15 Aug 1974, *D. McClintock s.n.* (**BM**); England, *sine loc*. [probably Myddleton House *cf*. Allen, 1973: 55], cultivated June 1916, *E.A. Bowles s.n.* (**BM**).

Distribution: widespread in the British Isles. Likely to be widespread in Europe. Also reported from Dunedin Botanic Gardens, and elsewhere in New Zealand, (cf. Webb *et al*., 1988, as *G. manicata*), Tasmania (Curtis & Morris, 1975, as *G. manicata*) and apparently in cultivation in North America (cf. Hinkley, 1999, as *G. manicata*).

Table 1. Comparison of *G.* × *cryptica* with parents

Character	*G. manicata*	*G.* × *cryptica*	*G. tinctoria*
Ligules	Narrow to broad, *c.*20 cm long, deeply laciniate, reddish.	To 24.5 cm long, shorter and broader than *G. tinctoria*, midribs conspicuous. Variable colour: cream with a hint of pink, pink, deep red.	Ovate to deeply dissected, 3.5-15 cm wide × to 30 cm long, membranous, pubescent on prominent midveins, less brightly coloured than *G. manicata*.
Petiole	Length to 2 m, white to green	Length 1.5-2.5 m, variously green to pale pink	Length 1-1.5 m, pale reddish to green
Prickle length	2-3 mm	4-5 mm	to 4 mm
Leaf	Outline regular	To 2 m across, outline variable, usually irregular	Less than 2 m across, outline irregular
Lobe apex	rounded (acute on juveniles)	often retains acute apex	acute
Lobe sinus	penetrates to ⅓ leaf radius	intermediate	penetrates ½ radius
Lobules	rounded	intermediate	acute, irregular
Lobule sinus	penetrates *c.*1/12 radius	deeper than *G. manicata*	penetrates *c.*1/3 radius
Base	cordate, lowest lobes often overlapping	cordate, but not overlapping except in immature leaves	cordate to rounded, open

Basal sinus	usually covered by lowermost lobes	Intermediate, variable	always wide and open
Inflorescence	diffuse, *c.*30 long cm, to 1.3 m in wild state.	diffuse, shape like *G. manicata* or conical. Often with a few short, sterile apical branches and elongated bare rachis.	compact, cylindrical, rarely diffuse, 20-60 cm. Rarely plants bearing both diffuse and compact inflorescence types are found in cultivation.
Branches	Long, thin, 11-15(-20) cm long, floppy and slightly pendant, only slightly swollen in fruit.	Usually thin, rigid, length variable 3-11 cm, shorter than *G. manicata*. Sometimes slightly swollen in fruit.	Short to 8 cm and thick, swelling in fruit.
Flower	Hermaphrodite towards the apex, and unisexual flowers along the entire length of the inflorescence branches, sessile to subsessile.	Densely packed on branch. Fls with 2 anthers towards tip, 1 anther fls towards base. Ageing to green.	Male towards branch tips, female towards base. Ageing to reddish-brown. Gardner *et al.*, (2015: 130), report 'separate male and female stems'
Calyx	Urceolate-globular, *c.*1 mm	Urceolate-globular, *c.*1 mm.	Urceolate-globular, *c.*1 mm
Sepals	Polymorphic, stipitate bulbous base, apex conical or entire with single filiform apical projection to 2 mm, glabrous, Fig. 3. Sometimes reduced to small 1 mm callus.	1-1.5 mm long, lanceolate, irregular edge, with darker central line. Slightly exceeding filaments.	*c.*1 mm long, basally often with short lateral projections, acuminate apex.
Petals	Rarely found, apart from terminal fls. Cuculate with	A few flowers have 1 or 2 petals, cuculate, some with long apical	Always absent or exceedingly fugacious Not recorded in

	long apical projection, exterior minutely verrucose	projection, exterior minutely verrucose.	cultivation or Chilean plants. Only reported from Argentina.
Filaments	short, less than 1 mm	intermediate to 1-1.5 mm	long to 4 mm
Anthers	basifixed, 1-1.5 mm long × 0.6 mm wide, laterally dehiscent.	basifixed, smaller than both parents. *c.*0.5 mm (Stapf, 1919)	basifixed, 1-1.2 mm.
Ovary	Spherical enveloped by calyx.	Spherical enveloped by calyx.	Spherical to subspherical, enveloped by calyx
Stigmas	Stigmas 2, notably plumose, to 3 mm.	Stigmas 2, plumose, less than 1 mm long.	Stigmas 2, short, 0.75-1 × 0.3-0.75 mm.
Fruit	Drupe globular, pericarp membranous, 2 mm × 1.75 mm, not ribbed.	Drupe globular, yellow to red, 2-3 mm diam., rarely fully developed.	Drupe globular-ovoid, red, 2-3 mm diam., irregularly rough.
Illustrations	*Fl. Ilustr. Catarinense. Fasc. GUN* (1976) p.10, f.3; p.12, f.4.	*BSBI News* 93: 53 (Apr 2003), captioned *G. manicata* auctt.	Clement *et al.*, *Illustr. Alien Pl. Brit. Is.* 171 (2005). Gardener *et al.*, 2015.
In this paper	Fig. 1, 2, 3.	Fig. 4.	Fig. 1, 5.

The hybrid can attain larger dimensions than either parent due to hybrid vigour (Grant, 2004); however, caution should be exercised when using this to identify an individual because plant and leaf size are also strongly influenced by age and growing conditions. Observations from living plants demonstrate that the hybrid can reach greater height than either of its parents, the Brazilian *G. manicata* or Chilean *G. tinctoria,* and have larger leaves. However, it may be difficult to distinguish plants of either parent from the hybrid in publications using leaf measurements. Both in cultivation and in the wild leaf dimensions are considerably influenced by such factors as the age of the plant, depth of soil, water supply and nutrients. Exaggeration and 'guestimates' can also be responsible for large leaf sizes in publications. Container-grown plants produce smaller leaves, while carefully cultivated plants tend to become larger than their wild counterparts do. Just as skilled cultivators who produce prize-winning vegetables can produce plants of great size, so too competitive Victorian gardeners used various techniques to produce enormous plants of *Gunnera*. Records describe the excavation of large pits filled with rich compost (Jenkins, 1908), regular applications of manure (Burbidge, 1901; Arnott, 1908b) and artificial fertilizers (Bartlett, 1904, 1908) and removal of inflorescences (Mayne, 1908).

Several well-illustrated identification guides available on the internet, describe the differences between *G. tinctoria* and *G.* x *cryptica* (under the misapplied name *G. manicata*) such as:
https://www.cabi.org/isc/datasheet/107826
https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gunnera-ID.pdf
https://www.rnzih.org.nz/pages/Gunnera_tinctoria_and_G_manicata.htm

Origin of the hybrid.
Both the parental species were introduced to European cultivation via Belgium during the 19th Century. In 1845 Louis van Houtte (Ghent) published an illustration of his cultivated *G. tinctoria* (van Houtte, 1845). Later in 1869 he revealed his original stock had come from Van Den Maelen in Brussels 30 years previously giving a date of just prior to 1839 for a first introduction (van Houtte, 1869). It first flowered at Kew gardens in 1862 (Crocker, 1862).

Joseph Libon (1821-1861), a Belgian plant collector and explorer, collected seed of *G. manicata* in Brazil shortly before his death in 1861, which was received and grown by Jean Jules Linden (1817-1898) of Brussels who listed the first plants for sale in 1865 (Linden, 1865). Linden first flowered *G. manicata* in 1866, and obtained copious seed (Delchevalerie, 1867). By 1873 several large plants of both species were growing together outside at van Houtte's nursery (Jongkindt-Coninck, 1873); as *Gunnera* are wind pollinated (Gonzalez & Bello, 2009), hybrids could have resulted if flowering coincided. In 1879 *The Garden* felt it necessary to publish illustrations (Fig. 1) and an explanation on how to distinguish the two species (Goldring, 1879). By 1894 *Gunnera* seed obtained from Trelissick Gardens, Cornwall, and subsequently raised at Livermere Park, Bury St Edmunds, produced seedlings that varied greatly in colour, style, leaf shape and size (Tallack, 1894). In 1901 (by which time such variable seedlings would be flowering) Burbidge reported on a plant called *G. scabra* var *longiscapa* with very robust growth, that carried long tapering flower-spikes unlike the usual club-shape. (Burbidge, 1901). Here 'tapering' is comparable to 'conical' as used to describe the inflorescence of hybrid plants by

some authors. It indicates a *G. manicata* influence. Burbidge also remarked on the seedlings varying in character, size and shape of the leaf, which he attributed to the "two or three named varieties of *G. chilensis* now found in gardens" (Burbidge, 1901). He elaborated, "There are also forms distinct in leaf: one has the leaves not fully spread but more or less rigidly cupped, the veins and footstalks bright red, and the leaf surface bronze-green; another has flat spreading leaves in which the ribs and veins are pale, and the leaf a purer green. Intermediate forms connect the two." Then in 1905 Tom Smith of Daisy Hill Nursery, Newry, lists several different varieties of giant *Gunnera* for sale (Nelson & Grills, 1998).

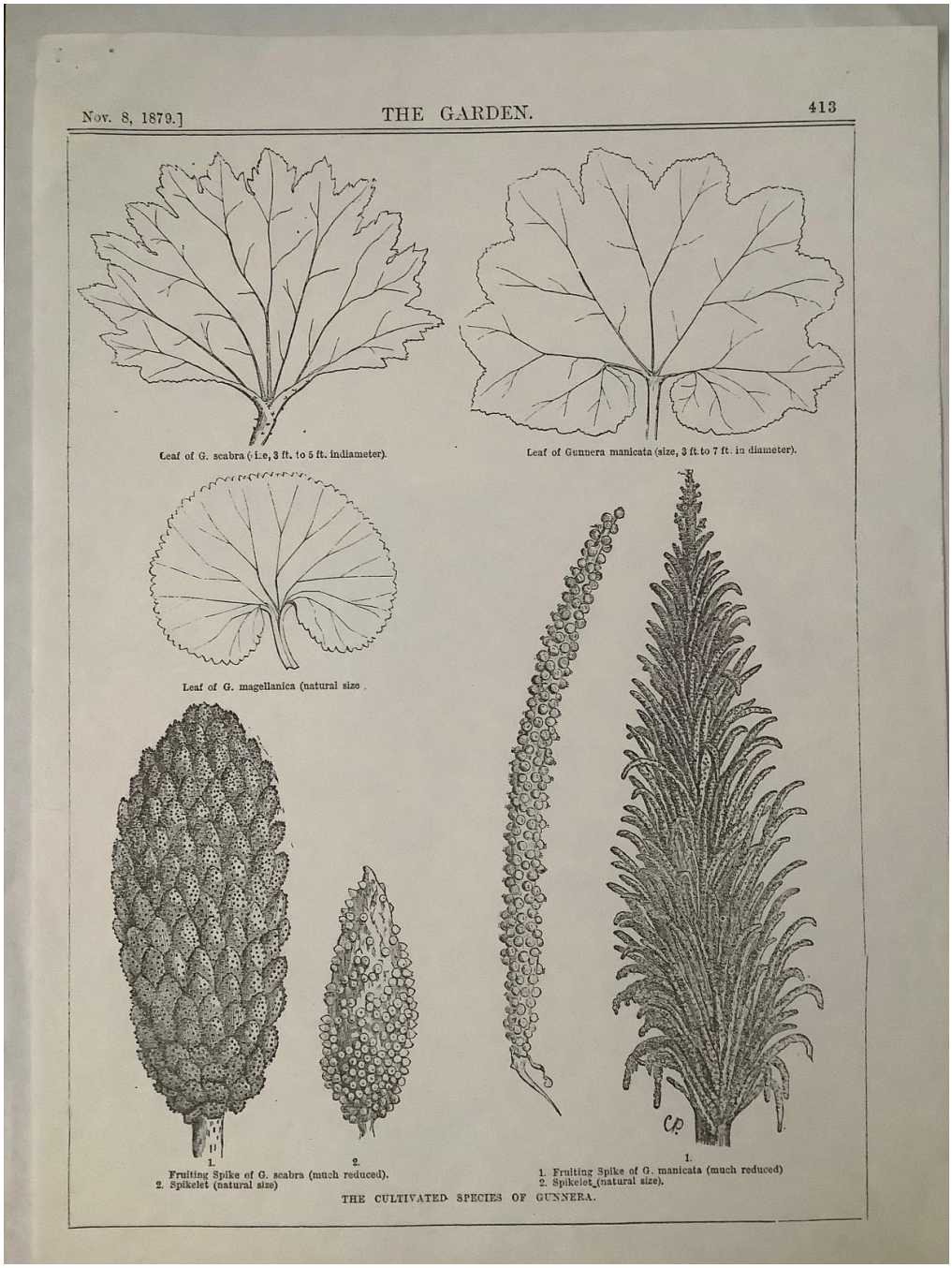

Figure 1. Plate from *The Garden* 8 Nov 1879: 413 depicting *Gunnera tinctoria* (as *G. scabra* Ruiz & Pavon) and *G. manicata* from plants at Pendell Court

These observations indicate that hybrid plants were appearing in cultivation from the late 1870s onwards. This date agrees well with a possible origin of the hybrid around 1873, by which time plants of *G. manicata* from Linden's first home-produced seed batch had matured, resulting in greater availability of the new introduction so that large flowering specimens of both species were often grown together for a spectacular display. A circumstance that would have resulted in multiple origins of the hybrid *G.* × *cryptica*. Due to the loss of *G. manicata* seedlings and plants during cold winters (Tallack, 1894), along with garden selection for size and vigour, the hybrid gradually supplanted it. For example, McMillan Browse (2007) reported that at Heligan Gardens, Cornwall, the original plantings of giant rhubarb (*Gunnera* "*manicata*") thrived in the bogs of the lower valley. However, a severe late frost destroyed many tender plantings in April 1891; hence, much of what is currently present dates from the very end of the nineteenth century. Consequently, original planting that may have been *G. manicata* would unknowingly have been replaced by plants of *G.* × *cryptica*. While it is not impossible that genuine *G. manicata* may yet be rediscovered in a sheltered garden, this scenario seems increasingly unlikely. Consequently, all plants from the British Isles and Ireland examined in this study were determined to be either *G. tinctoria* or *G.* × *cryptica* (Edwards *et al.*, in prep.).

Application of the name *Gunnera manicata.*

Since *G. manicata* was described from cultivated material grown by Linden, and the type specimen was obtained from a plant cultivated in Britain about 20 years later, the application of the name *G. manicata* had to be established. The question arises whether the name should apply to the plants found wild in Brazil or to the hybrid from cultivation here named as *G.* × *cryptica*? The matter is complicated by the first appearance of the name in horticultural literature and so the following notes on the authorship and first publication of the name, and origin of the type material, are included. These update the accounts provided by Wanntorp (2003) and Shaw (2007).

Should it prove necessary, an alternative later name for the Brazilian plants is available as *G. brasiliensis* Schindler, the application and typification of which is considered in detail by Hassemer (2019). Interestingly the type collection of *G. brasiliensis, E.H.G.Ule 1229* (**P**) appears to consist of material from more than one individual plant, including several immature seedlings with immature foliage, and a detached solitary immature larger leaf. There is a detached partial inflorescence (on P00238859) which is the only extant mature plant part present since the duplicate at **B** was destroyed. Consequently this inflorescence should be designated the lectotype specimen of *G. brasiliensis* Schindler. A possibility is that this unusual collection may represent seedlings from a wild seed collection subsequently cultivated, perhaps at the Botanical Garden in Rio de Janeiro. This could account for the locality on the label being Rio de Janeiro followed by Serra do Oratario, which two locations are geographically distant.

Timeline of early publications of the name *Gunnera manicata*.

G. manicata Linden, in Cat. No. 19: 53 (1865), *nomen nudum*, "nouveau et très-beau"

Gunnera manicata Linden ex André, in Les pl. feuill. ornem.: 171 (1866), diagnosis compared to *G. tinctoria* (as *G. scabra*) "a feuilles plus grandes encore et très-longuement pétiolées." Neotype: *F.Ross s.n.,* **K**, designated here.
G. manicata Linden, in Cat. No. 21: 5 (prior to 1 May 1867), "chaque feuille de ce Gunnera acquiert 5 mètres de circonférence"
G. manicata W.Bull, in Cat. No. 19: 70 (Spring 1867), "every leaf of this Gunnera acquires about 15 feet in circumference"
G. manicata Linden, in Belgique Hort. 17: 104 (1867), repeats entry in Cat. No. 21 word for word.
G. manicata Linden ex Delchevalerie, in Rev. Horticole 39: 219 (second fortnight in May 1867), a more detailed description.
G. manicata Linden ex André, in Ill. Hort. 20: 156--157 (1873). Neotype: *F.Ross s.n.,* **K**, designated by Wanntorp *et al*. (2002).
G. manicata Linden ex Baker, in Gardeners' Chronicle n.s., 26: 8 (3 Jul 1886), very detailed original description. Holotype, *F.Ross s.n.*, **K**, designated by Baker (1886). ICN Art. 9.1, Note 1.

The author citation for *Gunnera manicata*.

When Wanntorp *et al*. (2002) investigated the history of the name *G. manicata* they concluded that André (1873) had validated Linden's prior use of the name, which they considered was published as a *nomen nudum*. Subsequent research by Shaw (2007) drew attention to the previous validating description of Delchevalerie (1867) and Linden ex Delchev. became the recognised authority for *G. manicata* (Mora-Osejo *et al*. 2011). However, further investigation has found that prior to this Linden (1865) and André (1866) provided short descriptive phrases, which should be taken into consideration. The first use of the name *G. manicata* can now be traced to Linden (1865) where plants were offered for sale at 1 franc, with the comment "nouveau et très-beau". As this does not enable comparison with another taxon, it is to be regarded as an earlier *nomen nudum*.

In André (1866) the description of *G. manicata* included "…à feuilles plus grandes encore et très-longuement pétiolées." [with even larger leaves and very long petioles]. This enabled comparison with *G. tinctoria* (as *G. scabra*), the only other large *Gunnera* of subgenus *Panke* then in cultivation. It would appear that this publication of the name has previously been overlooked or dismissed as being a *nomen nudum*, but on advice from R. Govaerts (Kew) this is accepted as a validating diagnosis.

Typification of *Gunnera manicata* Linden ex André.

When Baker (1886) described *G. manicata* Linden, citing Linden's (1867b) publication of the name with its very minimal description and no type specimen citation, his detailed description was based solely on one specimen (*F.Ross s.n.*, **K**). In accordance with ICN, Art. 9, Note 1, (Turland *et al*., 2018) this specimen must be accepted as the holotype of Baker's name, and consequently *G. manicata* Linden was inadvertently neotypified. Subsequently, Wanntorp *et al*. (2002) neotypified *G. manicata* Linden ex André (based on André, 1873) using this same specimen, unaware of the previous typification. This investigation has now shown that *G. manicata* Linden ex André based on André (1866) is the earliest known valid publication of the name but also was not typified at the time. In order to ensure

consistent application of the name *G. manicata*, the same specimen used by Baker (1886) and Wanntorp *et al*. (2002) is here designated as neotype: UK, Sir G. Macleay's Garden [at Pendell Court], 11 June 1886, *F.Ross s.n.,* **K** [material from one individual plant mounted on 5 sheets: K000786055, K000786056, K000786057, K00078658, K00078659].

Origin of the plant from which the neotype specimen was made.

The neotype specimen was collected from Sir George Macleay's garden in 1886. It has been established that this garden was at Pendell Court, which is near Bletchingly, Surrey (Boulger, 2004). It appears that Macleay took up residence at Pendell Court in the late 1860s, initially as a tenant and subsequently purchasing it in 1876 (Anon. 'B', 1886; Driver, 2012, 2016; Wilman, 2021). Indeed, this is mentioned in a letter from J.D. Hooker to Charles Darwin dated 6 or 7 July 1870 (Darwin letter 7267), where he comments, "We spent last Sunday at Mr G. Macleay's who has taken Pendell Court near Bletchyngly [sic]…"

In 1876 Macleay appointed the noted plantsman Charles Green as Head Gardener, who supervised the remodelling of the gardens (Driver, 2012). It seems likely that he had previously become acquainted with the work of Charles Green through William Saunders as both held office within the Linnean Society of London. At the time, Green was head gardener for Saunders' collection. After Saunders experienced financial difficulties, Green was able to find employment with Macleay at Pendell Court, after a brief period attempting to run his own plant nursery (Driver, 2012, 2016).

In 1878, two years after Green started work at Pendell Court, a feature article in *Gardeners' Chronicle* on the gardens at Pendell Court noted, "At one end of the lake is a noble clump of Gunneras, *G. manicata*, here far exceeding in the magnitude of its leaves (4 feet across) its near ally *G. scabra* [*G. tinctoria*], growing in juxtaposition. A nobler composition than this group of Gunneras on a slightly sloping bank at the end of the lake, with a thriving young Oak as a background, would be difficult to realise." (Anon, 1878). Shortly before this on 4 June 1878 the RHS Floral Committee had awarded *Gunnera manicata* a First Class Certificate, based on an inflorescence and a young leaf of *G. manicata*, exhibited by Charles Green (Denny, 1878).

While there is no evidence of the source of the *Gunnera manicata* planted at Pendell Court at that time, for it to have achieved the size it had by 1878 argues for it being first planted some years before while Macleay was renting the property, or that it arrived at Pendell Court as a well-grown plant (cf. Gumbleton, 1884). A possible explanation is that it had been acquired by Green who, while working for Saunders, had opportunity to purchase stock directly from William Bull. *Gunnera manicata* is first offered for sale in the UK in Bull's nursery catalogue in 1867, and the description he gives is a direct translation of that provided in Linden's catalogue (Linden, 1867a), which suggests that Bull was able to secure plants directly from that source.

Taking into account the size and therefore the likely age of the *Gunnera* at Pendell Court it seems most probable that the plant was one of the seedlings from the original introduction of *G. manicata* being distributed by Linden from 1867. While elsewhere we indicate that the hybrid probably arose sometime around 1873, this was at the nursery of van Houtte, and would seem to be too recent to have

produced a plant the size of that evident at Pendell Court in 1878. Unfortunately, there is no longer any trace of *Gunnera* at the Pendell Court estate, now The Hawthorns School, and so living plants could not be examined. However, the school provided a monochrome print of unknown date, depicting a large plant of *G. manicata* growing by a lakeside at Pendell Court (Fig. 2). From the leaf features visible, it is identifiable as *G. manicata*.

Identity of the type

William Goldring (1854-1919) was a gardener at Kew from 1875-1879, before becoming assistant editor of *The Garden* in 1879. Therein he authored an article on *Gunnera*, in which he enumerated the differences between the two large species, basing his observations on the *G. manicata* plant at Pendell Court, which he acknowledged as the largest, and therefore possibly the oldest, he had encountered (Goldring, 1879). The illustrations accompanying his article (Fig. 1) depicted material from this plant, which later became the source of the holotype. As the Pendell Court plant had acquired this reputation, it is understandable that seven years later when faced with a large *Gunnera* leaf from the garden curator at Kew requiring verification, J. G. Baker of the Kew herbarium, after expressing astonishment at the absence of any herbarium material, applied to Pendell Court for reference material (Baker, 1886). The resulting leaf and inflorescence became the type of *G. manicata*.

Figure 2. Undated monochrome print showing a plant of *Gunnera manicata* growing by a lakeside at Pendell Court. By courtesy of the Headmaster, Hawthorns School

Morphological examination of the neotype from this site, comprising five sheets, and the published description (Baker, 1886) shows that it represents the

Brazilian species rather than the hybrid. The leaf parts of the plant that were available on the neotype herbarium sheets were photographed and printed out on paper and the original shape was partly reconstructed by matching up the available fragments. The discernible shape and vein branching pattern matched Brazilian *G. manicata* rather than the hybrid. This also was compared with images and drawings in Fevereiro & Barbosa (1976), herbarium sheets from **NY** and colour images of wild plants collected in Brazil. In addition, the length of the inflorescence branches on the neotype exceeds that recorded for the hybrid, and matches the Brazilian material, as do the flowers. The complete flowers of *G. manicata* are only known from drawings made in Brazil by Fritz Muller (Fig. 3) that appear in a letter to C. Darwin dated 12 September 1875 which Darwin passed on to Hooker at Kew. The drawing is reproduced in Gonzalez & Bello (2009), and Fritz Muller's drawings provided the basis for the plates in Schwacke (1890) and Schindler (1905). Muller lived in Blumenau, Santa Catarina state, from where the Serra do Mar was easily accessible. This was also the locality where Libon made his original collection (Stapf, 1919). The flowers in *G. manicata* are variable with apparently a mixture of functionally pistillate, staminate and hermaphrodite flowers present on most inflorescence branches. Muller stated (folio 1 of the letter) that perfect flowers, meaning those with all parts including petals as he illustrated (Fig. 3), only occurred towards the branch apex. An observation that has been confirmed for 24 other related species mostly in subgenus *Panke* (Gonzalez & Bello, 2009). However the sepals are polymorphic, sometimes reduced to triangular enations like those illustrated for *G.* × *cryptica* (Fig. 4), but often elongated with a stipitate swollen base (Fig. 3) which may contain the basal hydathode reported by Gonzalez & Bello (2009) that is thought to ensure *Nostoc* travels with the developed fruit to aid the resultant seedling. These unusual sepals do appear to be unique to *G. manicata* in subgenus *Panke*, and are present on the neotype specimen of *G. manicata* at Kew providing a useful confirmation, linking the cultivated neotype with Brazilian material.

Hence, from morphological and to some extent historical evidence the neotype specimen of the name *G. manicata* applies to the Brazilian species and the hybrid *G. manicata* × *G. tinctoria* should be described under a new name, *G.* × *cryptica*.

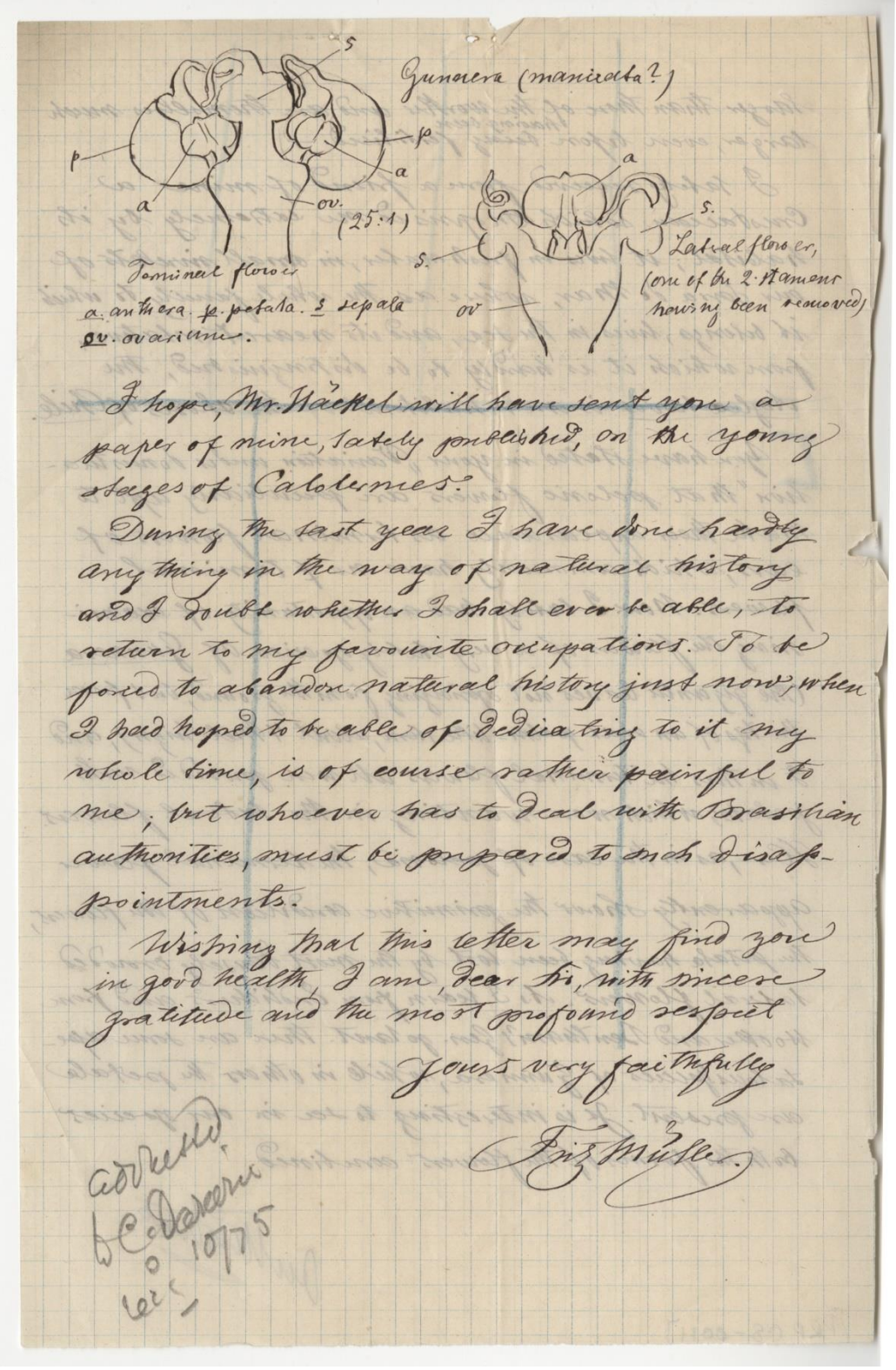

Figure 3. *Gunnera manicata* flower, drawn by Fritz Muller in Brazil. Image reproduced with the kind permission of the Board of Trustees of the Royal Botanic Gardens, Kew. Item PrP 08-0011 Papers: Hooker correspondence, 12 Sept 1875, folio 2

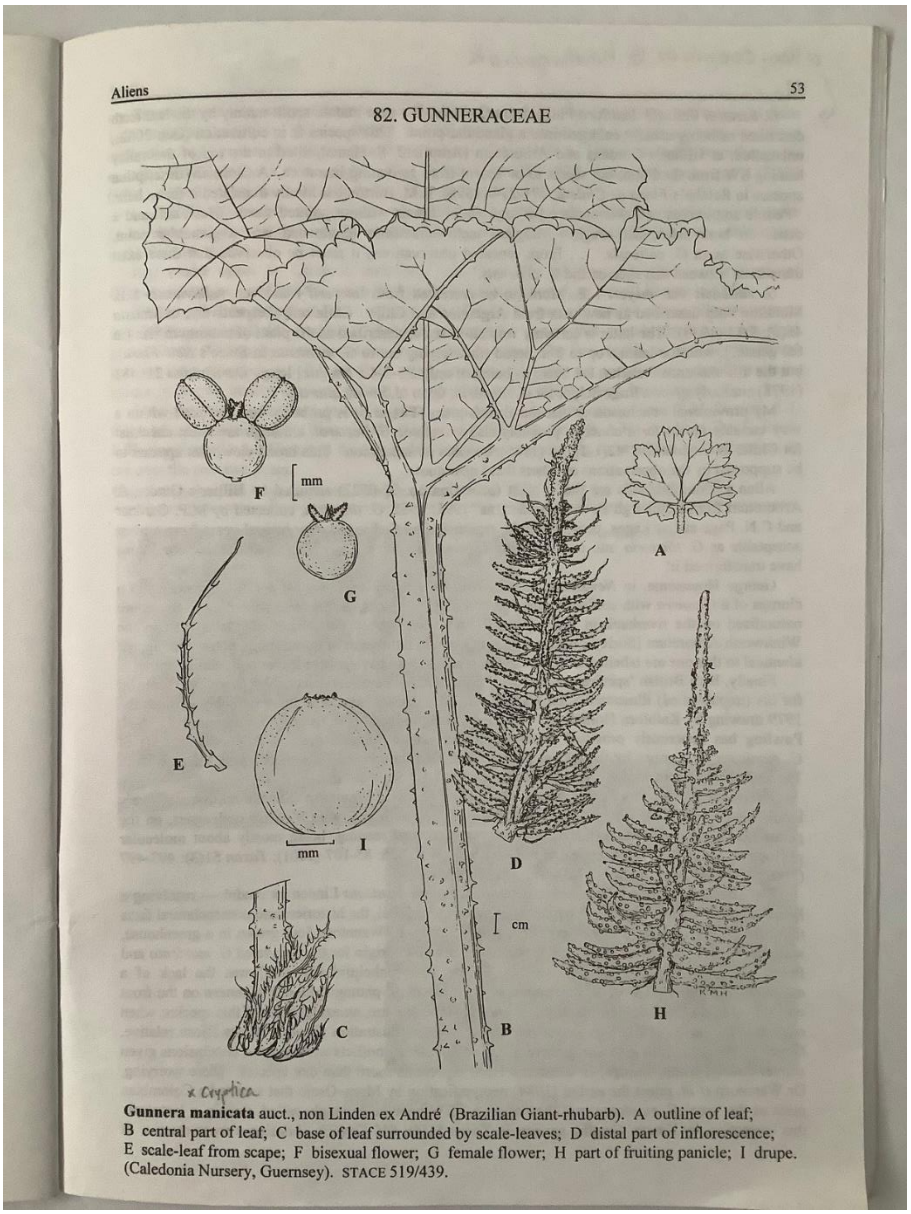

Figure 4. *Gunnera* × *cryptica* (as *G. manicata* auctt.) in *BSBI News* 93: 53, April 2003

Library research has also revealed that it was in André (1866) that the geographical misinformation that *G. manicata* came from 'Nouvelle-Grenade', now Colombia, was first introduced, rather than the usually cited André (1873) as by Stapf (1919), Wanntorp *et al*., (2002) and Wanntorp (2003).

A note on *Gunnera tinctoria*.

During this investigation, it has become apparent that *G. tinctoria* (Fig. 5) is itself poorly understood. It is a complex and variable taxon that invites further taxonomic investigation and may contain yet unrecognised entities. For instance, plants in cultivation and naturalised in the British Isles and wild in Chile are described as without petals. Those Floras that provide sufficiently detailed descriptions are all unanimous on this absence of petals, including Sell & Murrell (2007), Tebbitt (2011), Muñoz-Schick (1980) and Mora-Osejo *et al*. (2011). Schindler (1905) thought that

flowers were imperfect in European cultivation due to the petals always aborting and falling early. Gonzalez & Bello (2009) did not include material of *G. tinctoria* or *G. manicata* in their study of intra-individual variation of *Gunnera* flowers. However, they concluded that floral unisexuality in subgenus *Panke* is restricted to the formation of female flowers by incomplete development of the androecium. Such flowers usually lack petals which appear to be associated with protection of the anthers and fall at anthesis. Possibly also relevant here is the intriguing report by Gardner *et al*. (2015) that *G. tinctoria* were observed that produced separate male and female inflorescences.

In contrast, two publications from Argentina describe the petals, even illustrating them on a hermaphrodite flower, and employing them as key characters to separate *G. tinctoria* with entire margined, glabrous petals from *G. apiculata* Schindler with irregular margined, pilose petals. Molina (1978: fig. 3) provides an illustration based on *O'Donell 2087* (**BAB**, **LIL**), collected from Neuquén, that clearly shows two petals present, though smaller than the anthers. *Flora Patagonica* (Molina, 1988) comments the flowers are generally perfect, meaning hermaphrodite with all parts present, and describes them thus, "petals 2, 2.5 x 0.5 mm, obovate, somewhat concave or navicular, with a small mucro, readily falling, glabrous." Thus the possibility exists that there is regional variation or an unrecognised taxon may be present.

During the course of this study a previously overlooked name for *G. tinctoria* was uncovered. The name *Gunnera thyrsiflora* Ruiz appears in Schultes & Jaramillo-Arango (1998: 212), which is an English translation based on a collation of two unpublished manuscript accounts in the library of the London Natural History Museum in Spanish by Ruiz, providing a narrative of the Ruiz and Pavon expedition to Peru and Chile from 1777 to 1788. An earlier draft manuscript by Ruiz discovered in Spain was edited and published in Spanish by Agustín J. Barreiro in 1931. As this predated the ICBN requirements for a Latin description or type designation, several previously overlooked names for South American plants were validated inadvertently in the Barreiro edition (Shaw, 2022a, b). In turn, Barreiro's edition was translated in to English by Dalhgren (1940). The Colombian scholar and botanist Jaramillo-Arango (1952, 2: 130) identified *G. thyrsiflora* with *G. magellanica* Lam., but in view of the vernacular name cited as *Panke*, the description of uses by natives, and the dimensions in the description it is evidently *G. tinctoria* that was described by Ruiz in his account. ***Gunnera thyrsiflora*** Ruiz ex Barreiro, *Relación del Viaje*: 192 (1931). Lectotype here proposed: *Ruiz & Pavon s.n.* (**S**), which is also the holotype of *G. scabra* Ruiz & Pavon (1798). Both *G. thyrsiflora* and *G. scabra* are synonyms of *Gunnera tinctoria* (Molina) Mirb., *Hist. Nat. Pl.* 10: 141 (1805).

Additionally, it is worth noting that in the past several authors have confused *G. tinctoria* with other *Gunnera* taxa from western South America. Hence, its distribution has been said to extend into Bolivia and Colombia (Gioria & Osborne 2013). However, the species concepts and taxa delimited by Mora-Osejo *et al*. (2011) in *Flora Neotropica*, *Gunneraceae* are accepted in this study.
This is of relevance to identifying and recording material present and previously grown in the British Isles and Ireland as numerous introductions of live material have been made into cultivation, some of which appear to represent *G. tinctoria* var. *valdiviensis* (L.E. Mora) Mora, Pabon-Mora & F.Gonzalez. Reports of cultivated plants of *G. tinctoria* that produce two distinct types of inflorescence from a single

individual (such as at Wisley) may represent hybrids between var. *tinctoria* and var. *valdiviensis* - a fascinating possibility that requires further investigation.

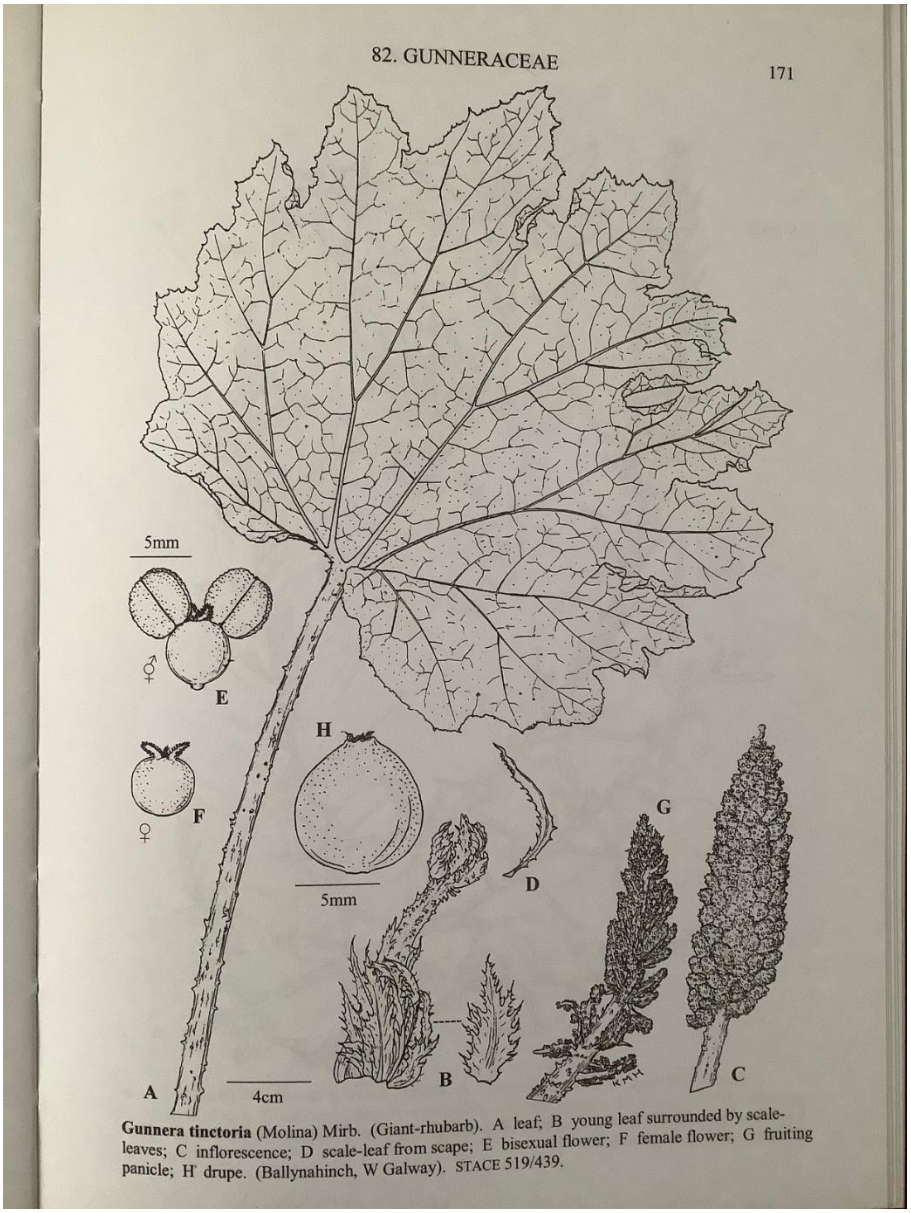

Fig. 5. *Gunnera tinctoria* in Clement *et al*. *Illustrations of Alien Plants of the British Isles*. BSBI, 2005

Acknowledgements

We would like to thank S. Andrews; J. Armitage, P. Boillat (G), C. Brough (K), E. Clement, N. Holstein, C. Nelson, J. Wajer & J. Hunnex (BM), M-H. Weech (K), S. Witz (The Botanische Staatssammlung München) and Library staff at Kew and RHS Garden Wisley for providing scans herbarium sheets and literature; R. Govaerts (Kew) for advice on nomenclature; staff of The Hawthorns School, Surrey, for an image and information on gunneras that were grown there.

References

Allan, M. 1973. *E.A. Bowles and his garden at Myddleton House 1865-1954*. London: Faber & Faber.

André, E. 1866. *Les plantes à feuillage ornemental: description, histoire, culture*. p. 171.

André, E. 1873. Quelques plantes rares. *L'Illustration Horticole* 20: 156-158.

Anon. 1878. Pendell Court. *Gardeners' Chronicle* n.s., 10: 310-311 [7 Sept 1878].

Anon. 'B'. 1886. Pendell Court, Bletchingley. *Gardeners' Chronicle* 25: 598 [8 May 1886].

Armitage, J. & Phillips, B.W. (2011) A hybrid swamp lantern. *The Plantsman* n.s., 10(3): 155-157.

Arnott, S. 1908a. *Gunnera scabra major*. *Gardeners' Chronicle* 43: 97. [15 Jan 1908]

Arnott, S. 1908b. The Gunneras. *Gardeners' Chronicle* 43: 156.

Baker, J.G. 1886. New Garden Plants: *Gunnera manicata*. *Gardeners' Chronicle* 26: 8.

Barreiro, A.J. 1931. *Relacion del Viaje.* Madrid: Don Hipólito Ruiz.d. (Available at Biblioteca Digital).

Bartlett, A.C. 1904. Flower Garden. *The Garden* 26: 225.

Bartlett, A.C. 1908. The hardiness of Gunneras. *Gardeners' Chronicle* 43: 141.

Boulger, G. S. (revised by B.H. Fletcher) 2004. Macleay, Alexander. *Oxford Dictionary of National Biography,* Oxford: Oxford University Press. https://www.oxforddnb.com/

Bull, W. 1867. *Catalogue of New, Beautiful and Rare Plants, Spring 1867.* p. 70.

Burbidge, F.W.T. 1901. Gunnera. *Flora and Sylva* 1901: 293-295.

Clement, E.J. 2003. What is *Gunnera manicata*? – and whence? *B.S.B.I. News* 93: 52--55.

Clement, E.J., Smith, D.P.J. & Thirwell, I.R. 2005. *Illustrations of alien plants of the British Isles.* London: BSBI.

Crocker, C.W. 1862. Home correspondence. *Gunnera scabra*. *Gardeners' Chronicle* 285.

Curtis, W.M. & Morris, D.L. 1975. *The student's Flora of Tasmania* 1: 194. Government printer, Tasmania.

Dahlgren, R.E. 1940. *Travels of Ruiz, Pavon, and Dombey in Peru and Chile*. Volume 21, Chicago: Field Museum of Natural History Publications.

Dawson, M.I. 1983. Chromosome numbers of three South American species of *Gunnera* (Gunneraceae). *New Zealand Journal of Botany* 21: 457-459.

Delchevalerie, G. 1867*. Gunnera manicata*. *Revue Horticole (Paris)* 39: 219.

Denny, J. 1878. Floral Committee *Gardeners' Chronicle* n.s. 9: 739 [8 June 1878].

Driver, J. 2012. Charles Green (1826-1886): Head gardener to Sir George Macleay at Pendell Court, Surrey. *Garden History* 40(2): 199-213.

Driver, J. 2016. *The Late and Clever Mr Green*. The Cloister House Press, London.

Elwes, H.J. & Stapf, O. 1919. *Gunnera chilensis* and *G. manicata*. *Gardeners' Chronicle* ser. 3, 66: 210. [25 October 1919].

Fevereiro, P.C.A. & Barbosa, V.P. 1976. Gun[n]eráceas. In Reitz, P.R. (ed.) *Flora Ilustrada Catarinense*. Itajai, Brazil: Herbario Barbosa Rodrigues.

Gardner, M.F., Hechenleitner, V., P. & Hepp, C., J. 2015. *Plants from the Woods and Forests of Chile*. Edinburgh: Royal Botanic Gardens Edinburgh. Reissued 2022.

Gioria, M. & Osborne, B.A. 2013. Biological Flora of the British Isles: *Gunnera tinctoria*. *Journal of Ecology* 101: 243-264. https://doi.org/10.1111/1365-2745.12022
Goldring, W. 1879. The Gunneras. *The Garden* 16: 412--414.
Gonzalez, F. & Bello, M.A. 2009. Intra-individual variation of flowers in *Gunnera* subgenus *Panke* (Gunneraceae) and proposed apomorphies for Gunnerales. *Botanical Journal of the Linnean Society* 160: 262-283. https://doi.org/10.1111/j.1095-8339.2009.00974.x
Grant, M. 2004. Identifying *Gunnera* in the British Isles. *BSBI News* 96: 51-52.
Gumbleton, W.E. 1884. *Gunnera manicata*. *The Garden* 1884: 264 [27 Sep 1884].
Hassemer, G. 2017. Gunneraceae. In *Flora e Funga do Brasil 2020*. Jardim Botânico do Rio de Janeiro. http://floradobrasil.jbrj.gov.br/FB7953 (accessed 15 July 2022).
Hassemer, G. 2019. Notes on *Gunnera* (Gunneraceae) in Brazil and Uruguay. *Phytotaxa* 388(2): 192-200.
Hinkley, D.J. 1999. *The Explorer's garden. Rare and unusual perennials*. Portland: Timber Press, Portland.
Hooker, J.D. (1870) Letter to C. Darwin. (Darwin correspondence, letter 7267) Kew archives. [https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-7267.xml&query=7267#hit.rank1 accessed online 16 May 2022]
Jaramillo-Arango, J. 1952. *Relacion del Viaje,* 2nd ed. Madris: Don Hipólito Ruiz.
Jenkins, E.H. 1908. Gunneras. *Gardeners' Chronicle* 43: 279.
Jongkindt-Coninck, A.M.C. 1873. *Gunnera scabra* and *manicata* at M. L. van Houtte's, Ghent, Belgium. *Gardeners' Chronicle* 2: 44.
Linden, J.J. 1865. *Établissement d'introduction de J. Linden au Jardin royal de zoologie et d'horticulture à Bruxelles. Prix courant pour 1865*. 19: 55.
Linden, J.J. 1867a. *Établissement d'introduction de J. Linden au Jardin royal de zoologie et d'horticulture à Bruxelles. Prix courant pour 1867.* 21: 5.
Linden, J.J. 1867b. Plantes nouvelles introduites, par M. J. Linden. *Belgique Horticole* 17: 102-105.
Mayne, J. 1908. Gunneras. *Gardeners' Chronicle* 43: 182.
McMillan Browse, P. (2007) *Heligan Survivors, an introduction to some of the historic plant stock discovered in the lost gardens of Heligan*. Cornwall: Alison Hodge Publishers, Saint Day.
Molina, A.M. 1978. El género *Gunnera* en la Argentina y el Uruguay (Gunneraceae). *Darwiniana* 21: 473-489.
Molina, A.M. 1988. Gunneraceae. Pp. 301-304 in Correa, M.N. (ed) *Flora Patagónica*, vol. 8(5). Buenos Aires.
Mora-Osejo, L.E., Pabón-Mora, N. & González, F. 2011. Gunneraceae. *Flora Neotropica Monograph 109.* New York: The New York Botanical Garden Press.
Muller, F. 1875. Letter to C. Darwin. Item PrP 08-0011. In Hooker correspondence, Archives, RBG Kew.
Muñoz-Schick, M. 1980. *Flora del parque nacional Puyehue*. Santiago: Editorial Universitaria S.A.
Nelson, E.C. & Grills, A. 1998. *Daisy Hill Nursery, Newry. A history of 'the most interesting nursery probably in the world.'* Belfast: Northern Ireland Heritage Gardens Committee.

Palkovic, L.A. 1978. A hybrid of *Gunnera* from Costa Rica. *Systematic Botany* 3(2): 226-235.
Schindler, A.K. 1905. Halorrhagaceae in Engler, A. (ed.), *Das Pflanzenreich*, IV 225: 1-133. Leipzig: Verlag von Wilhelm Engelmann.
Schultes, R.E. & Jaramillo-Arango, M.J. 1998. *The Journals of Hipolito Ruiz*. London: Timber Press, London.
Schwacke, W. 1890. Eine brasilianische *Gunnera* (*Gunnera manicata* Linden). *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie, Beiblatt* 28: 1-3.
Sell, P. & Murrell, G. 2007. *Flora of Great Britain and Ireland*. Vol.3. Cambridge: Cambridge University Press.
Shaw, J.M.H. 2007. A new author citation for *Gunnera manicata*, and a note on a little known botanical author. *Hanburyana* 2: 46-49.
Shaw, J.M.H. 2020. Purple fountain grass – what and whence? *The Plant Review* 2(2): 62-64.
Shaw, J.M.H. 2022a. Hipolito Ruiz and the mysterious *Sedum ccallu*. *Sedum Society Newsletter* 143: 91-96.
Shaw, J.M.H. 2022b. Overlooked names of South American succulent plants in Ruiz' *Relación del Viaje*. *CactusWorld* 40(3): [in press].
Sheehy Skeffington, M. & Hall, K. 2011. The ecology, distribution and invasiveness of *Gunnera* L. species in Connemara, western Ireland. *Biology & Environment* 111B: 1-19. https://doi.org/10.3318/BIOE.2011.13
Silva, L., Tavares, J. & Pena, A. 1996. Ecological basis for the control of *Gunnera tinctoria* in São Miguel Island. Proceedings of the Second International Weed Control Congress Copenhagen, Denmark (eds. H. Brown; G.W. Cussans; M.D. Devine; S.O. Duke; C. Fernandez-Quintanilla; A. Helweg; R.E. Labrada; M. Landes; P. Kudsk; J.C. Strei), pp. 233-239. Flakkebjerg, Denmark: Department of Weed Control and Pesticide Ecology.
Smith, T. 1904. *Alpine plants* [Daisy Hill Nursery catalogue, Newry] no. 56: 97.
Stapf, O. 1919. *Gunnera manicata* and *G. brasiliensis*. *Bulletin of Miscellaneous Information, Kew* 9: 376-378.
Tallack, J.C. 1894. *Gunnera manicata*. *The Garden* 45: 85-86.
Taranaki Regional Council, 2007. Pest management strategy for Taranaki: plants. https://trc.govt.nz/assets/Documents/Plans-policies/PestManagementPlan/RPMP-Jun2021.pdf
Tebbitt, M.C. 2011. *Gunnera*. In Cullen, J., Knees, S.G., Cubey, H.S., (eds.) *European Garden Flora* (ed.2) 4: 211-212. Cambridge: Cambridge University Press.
Turland, N.J., Wiersema, J.H. *et al.* 2018. *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code). Regnum Vegetabile* 159. Konigstein: IAPT & Koeltz Botanical Books.
van Houtte, L. 1845. *Hortus Vanhoutteanus*. Ghent.
van Houtte, L. 1869-1870. *Gunnera chilensis* Lam. *Flore des serres et des jardins de l'Europe* 18: 119-120.
Wanntorp, L., Wanntorp, H-E., & Källersjö, M. 2002. The identity of *Gunnera manicata* Linden ex André-resolving a Brazilian-Colombian enigma. *Taxon* 51: 493-497. https://doi.org/10.2307/1554861
Wanntorp, L. 2003. Origin and identity of the cultivated *Gunnera manicata*. *The Plantsman* n.s., 2(4): 221-225.

Webb, C.J., Sykes, W.R. & Garnock-Jones, P.J. 1988. *Flora of New Zealand* vol. 4. Christchurch: Botany Division, D.S.I.R. p.749.
Wilman, C. (2021) *Pendell Court, a history: 1624-2020*. Bletchingley: Hawthornshistory. Available at https://issuu.com/hawthornshistory/docs/history_of_pendell_court_20 Accessed 18 May 2022.

ISSN: 2632-4970

https://doi.org/10.33928/bib.2022.04.364