

NOTES ON *WISSADULA* (MALVACEAE), WITH THE DESCRIPTION OF TWO NEW SPECIES

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Abstract: Some historical considerations concerning the identity of *Wissadula stellata* (Cav.) K. Schum., lectotypifications of *Sida stellata* Cav. and *W. fuscrosea* Ulbr., the description of two new species (*W. ecuadoriensis* and *W. macrocarpa*), and the discussion of the legitimacy of a name widely but incorrectly used in *Wissadula* Medik., *W. macrantha* R.E.Fr., nom. illegit., are presented.

Resumen: Se presentan una discusión de la historia de la identidad de *Wissadula stellata* (Cav.) K. Schum., las lectotipificaciones de *Sida stellata* Cav. y *W. fuscrosea* Ulbr., las descripciones de dos especies nuevas (*W. ecuadoriensis* y *W. macrocarpa*), y una discusión del nombre *W. macrantha* R.E.Fr., un nombre muy utilizado a pesar de ser ilegítimo.

Keywords: Malvaceae, *Wissadula*, South America.

Several years ago I began studies on the genus *Wissadula* Medik., with the intent of updating the now century-old monograph of Fries (1908). I wished to bring together a dispersed literature, account for all of the species (including the description of new species), provide improved keys and descriptions, and to otherwise facilitate the identification of specimens. Then in June of 2010 I had a medical mischance that threatened the loss of vision and led to other complications. Subsequently I have come to the realization that a satisfactory completion of this study of *Wissadula* will not be possible, as a result of my impaired vision. However, there are some parts of the work done so far that can be put on record to benefit a future study of the genus, and that is the purpose of this communication.

TYPIFICATION AND CIRCUMSCRIPTION OF *WISSADULA STELLATA*

Most but not all authors have regarded *Wissadula stellata* (Cav.) K.Schum. and *W. nudiflora* (L'Hér.) Benth. as representing the same species (e.g., Garcke, 1890; Schumann, 1891; Baker, 1893; Macbride, 1956; Krapovickas, 1996). The basionyms, *Sida stellata*

Cav. (Cavanilles, 1785) and *S. nudiflora* L'Hér. (L'Héritier, 1789), were both described at least in part from plants cultivated in the Jardin des Plantes, Paris. However, Fries (1908) disagreed with earlier authors and provided a lengthy discussion of *W. nudiflora* in which he rejected Schumann's (1891) use of the name *W. stellata* as the earlier, correct name for this species. Fries did this based on Cavanilles' reference to *S. stellata* occurring in Santo Domingo, which in turn was based solely on a reference by Cavanilles to a Plumier manuscript concerning a plant that Cavanilles had not examined. Fries noted that *W. nudiflora* was known with certainty only from Peru. He referred *W. stellata* to synonymy under *W. amplissima* (L.) R.E.Fr.

Sida amplissima L., the basionym for *Wissadula amplissima*, was described by Linnaeus in the first edition of *Species Plantarum* (Linnaeus, 1753), but by the second edition (Linnaeus, 1763) the same taxon was treated by Linnaeus as an unnamed variety of *S. periplocifolia* L. It is clear from Cavanilles' protologue for *S. stellata* that he feels that his new species is the same as Linnaeus's unnamed variety from the second edition, and Cavanilles

makes no mention of the name *S. amplissima* from the first edition. Cavanilles therefore repeats Linnaeus's reference to a plate by Plumier, and this plate subsequently has been selected by Krapovickas (1996) as lectotype for *Sida amplissima*. However, it is abundantly clear in his protologue that Cavanilles (1785) was describing *S. stellata* based on observations of cultivated material at Paris, and that the Plumier reference is simply based on presumed synonymy with the Linnaean variety. Thus, typification of *Sida stellata* must be based, if possible, on material related to the cultivated material at Paris, and Fries' contention that *Wissadula stellata* is a synonym of *W. amplissima* would be correct only if the cultivated material at Paris were indeed *W. amplissima*, which is not the case. The history of the usage of the name *W. amplissima* is provided by Krapovickas (1996).

As noted above, both *Sida stellata* and *S. nudiflora* were described based on cultivated material in the Jardin des Plantes, Paris. In the case of *S. nudiflora*, L'Héritier (1789) states that this cultivated material was from seed collected in Húanuco, Peru, by Joseph Dombey; while Cavanilles (1785) does not state this, it is presumed that *S. stellata* also is based on plants from the same seed source. (For a discussion of the disputed publication date for *S. nudiflora*, see: Cavanilles (1789) and Buchheim (1965).) However, L'Héritier, the only one of the two authors who also had access to the herbarium specimens collected by Dombey (Stafleu, 1963), could also have used those field-collected specimens in describing this species. Krapovickas (1996), who like most authors considered *S. nudiflora* to be a synonym of *S. stellata*, lectotypified the former based on a Dombey collection at P. This specimen simply says "Peróu" and "Dombey" and is presumably Dombey's field-collected specimen, although it is possible that it was collected from the living material in the garden in Paris.

However, neither Krapovickas (1996) nor any other author appears to have

typified the earlier *Sida stellata*. Although it is possible that both Cavanilles (1785)—who was working in Paris at the time (Garilleti, 1993)—and L'Héritier (1789) described their respective species from exactly the same plant, there seems little doubt that they described them from plants grown from the same seed batch sent by Dombey. It would thus be convenient to lectotypify *S. stellata* on the same Dombey specimen that Krapovickas (1996) used to lectotypify *S. nudiflora*, but as noted above, it seems likely that the Dombey specimen represents field-collected material rather than material from the garden-grown plants. Dombey's field-collected specimens were not available for study in Paris until at least 1786—and then mostly were studied by L'Héritier (Stafleu, 1963)—so Cavanilles could not have seen the Dombey specimen before publication of *S. stellata* in 1785. Other material must therefore be used to typify Cavanilles's species. Although many Cavanilles names are typified by material in his herbarium now at MA, that applies for the most part to species described after he returned to Spain in 1789 (Garilleti, 1993). Garilleti (1993) lists no material of *Sida stellata* in the Cavanilles herbarium in Madrid, and although the Global Plants Initiative website (plants.jstor.org, consulted 10 April 2012) lists four specimens purportedly of this species in the Cavanilles herbarium at MA, none of these specimens is type material and most or all appear to be different species. Types for Cavanilles species published during his Paris stay (1777–1789) are mostly to be looked for in the Lamarck, Jussieu, or general herbaria at P (Stafleu & Cowan, 1976); however, the specimen that seems most clearly to represent type material is the one in the Delessert herbarium that I below designate as the lectotype of *S. stellata*. A specimen cited by Krapovickas (1996) in the Jussieu herbarium ("in horto Issy, Cavanilles"; P-JU 12309) bears the date 1788 and thus does not appear to be type material.

Wissadula stellata (Cav.) K.Schum. in Mart., Fl. Bras. 12 (3): 444. 1891. *Sida*

stellata Cav., Diss. 1: 27. 1785, t. 5, fig. 4. *Abutilon stellatum* (Cav.) Kuntze, Rev. Gen. Pl. 3 (3): 18. 1898. TYPE: Hortus Parisiensis [presumably from Peruvian seed from Dombey] (LECTOTYPE (here designated): G (herb. Delessert) 176139).

Sida nudiflora L'Hér., Stirp. Nov. 5: 123, t. 59. 1789. *Abutilon nudiflorum* (L'Hér.) Sweet, Hort. Brit., ed. 1, 1: 53. 1826. *Wissadula nudiflora* (L'Hér.) Benth., Bot. Voy. Sulphur 69. 1844. LECTOTYPE (designated by Krapovickas, 1996): Pérou, *J. Dombey s.n.* (P).

Wissadula fuscrosea Ulbr., Bot. Jahrb. Syst. 54, Beibl. 117: 59. 1916, **syn. nov.** TYPE: PERU. HUANCAVELICA: Río San Bernardo, Tayacaja, 11°55'S, 1600–1700 m, 2 Apr 1913, A. Weberbauer 6556 (HOLOTYPE: B (destroyed; photo F-9299); LECTOTYPE (here designated): MOL (see Velarde Núñez, 1969); ISOLECTOTYPES: F (629330), GH (00058183).

SHRUBS 1–2 m tall, the stems densely stellate-pubescent, the hairs ferruginous or yellowish, stellate, often stipitate. LEAF BLADES broadly ovate or suborbicular, 6–9 cm long, 5–8 cm wide, deeply cordate (sinus 1–2 cm deep, acute or open), entire or irregularly crenulate, short-acuminate, discolorous, minutely stellate-pubescent above and beneath, the hairs whitish beneath and larger on the upper surface, palmately 7–9-nerved, the nerves more prominent beneath. PETIOLES with pubescence like stem, subequal to blades below, progressively reduced upward to very short in the inflorescence. STIPULES filiform to subulate, 7–10 mm long, tomentose, deciduous. INFLORESCENCE terminal, a raceme or panicle, branched, the flowers occasionally solitary in the lower leaf axils but usually congested at the tips of the inflorescence branches; pedicels 0.5–1.3 cm long, geniculate, with stipitate-stellate hairs. CALYX basally rounded, 4–5 mm long, stellate-pubescent, the lobes ovate-triangular, 2–3 mm long. PETALS 1–2 cm long, yellow, spatulate-orbicular, hirsute on margins of claw; staminal tube ca. 1 mm long, stellate-pubescent, the

filaments 4–5 mm long; styles 5, with capitate stigmas. FRUITS 10–12 mm in diameter, minutely puberulent. MERICARPS 5, constricted below, 5 mm long, bulbous-apiculate (or merely acute) apically, arranged in pentagonal, stellate form. SEEDS 3 per carpel.

The preceding description is taken principally from the description provided by Fries (1908, pp. 65–66), who had examined a Dombey specimen of *Sida nudiflora* (subsequently destroyed) in the Berlin herbarium, and secondarily from the descriptions and illustrations of L'Héritier and Cavanilles of *S. nudiflora* and *S. stellata*, respectively, as well as from the digitized image of the lectotype of *S. stellata* available at plants.jstor.org. Some details of the description (e.g., the nature of the pubescence) cannot be evaluated accurately from images, of course, and in particular the nature of the inflorescence is ambiguous — whether it is of the narrow racemoid form or the more open paniculate type, both of which are found in *Wissadula*. Details from *W. fuscrosea*, which I now consider a synonym of *W. stellata* (see below), are nevertheless not included in the description.

Macbride (1956) was the first to cite field-collected material for *Wissadula stellata*, treating it as a species of the Peruvian Andes in the departments of Huánuco and San Martín. Krapovickas (1996) extended the range to the department of Junín. However, I (Fryxell, 1992) applied the name to a group of Ecuadorian plants that are quite unlike the type material of *W. stellata*. This was an egregious error on my part, which I herewith disavow; further study of the Ecuadorian specimens has shown them to represent an undescribed species (described below as *W. ecuadoriensis* sp. nov.) with very different affinities. On the other hand, of the specimens cited by Macbride (1956) as *W. stellata*, two were initially determined by me to be *W. fuscrosea* Ulbr. (*Macbride & Featherstone 2042* and *Stork & Horton 9406*). The occurrence of what I had considered to be *W. fuscrosea* in Huánuco, the type locality of *W. stellata*, and Macbride's

referral of these specimens to *W. stellata*, caused me to reexamine the descriptions of *W. stellata* and *W. fuscrosea*, from which reexamination I concluded that the latter was evidently a synonym of the former, as listed above. This extends the range of *W. stellata* at least as far south as the department of Huancavélica, from which the type of *W. fuscrosea* was collected. It is conceivable that the distinctive rose-colored corolla of the type of *W. fuscrosea* was environmentally induced by the relatively high elevation at which it grew, a phenomenon that did not manifest itself in the garden-grown specimens that typify *Sida stellata* and *S. nudiflora*. The apparent disparity in corolla size as described for *W. fuscrosea* and *W. stellata* may have a similar basis.

ADDITIONAL SPECIMENS EXAMINED: **PERU. HUÁNUCO:** ca. 7000 ft, May 1922, *J. F. Macbride & Featherstone 2042* (S); 8 km N of Huánuco, 1900 m, 15 Oct 1938, *H.E. Stork & O.B. Horton 9406* (MO, UC).

TWO NEW SPECIES

As stated above, the plants referred to *Wissadula stellata* in the *Flora of Ecuador* (Fryxell, 1992) in fact represent a new species and are here described, together with a second related species from Peru.

Wissadula ecuadoriensis Fryxell, sp. nov.

TYPE: **ECUADOR. AZUAY:** between Paute and Cuenca, 7200–8000 ft, 10 Apr 1945, *W.H. Camp E-2545 coll. F. Prieto* (HOLOTYPE: NY; ISOTYPES: MO, S-09-24152, TEX). Fig. 1.

Suffrutices erecti caulibus minute atque dense pubescentibus pilis stellatis ferrugineis 0.1–0.2 mm longis; laminis foliorum ovato-cordatis marginibus obscure crenulato-dentatis vel integris discoloribus petiolis 1(–5) cm longis; pedicellis solitariis in axillis foliorum petiolum contiguum excedentes; calyce 5 mm longo lobis rotatis in fructo; flores non visis; fructibus 10–11 mm longis; mericarpiis 4–5, glabris, parte superiore nervatura manifesta, ad apicem acutis vel acuminatis.

SHRUBS 1.5 m tall, the stems minutely and densely pubescent, the hairs stellate, ferruginous, 0.1–0.2 mm long. LEAF BLADES ovate, 5–8 cm long, 3.5–5 cm wide, basally cordate

(sinus 10–12 mm deep), the margins obscurely crenulate to subentire, the apex acuminate, palmately 7–9-nerved, discolorous, the lower surface densely pallid-pubescent, the hairs whitish (or somewhat ferruginous), the upper surface subglabrous. PETIOLES short (usually ca. 1 cm long, subequal to the sinus) but up to 5 cm long, with pubescence like stem. STIPULES subulate, 4–6 mm long, caducous. INFLORESCENCE: Young flower buds congested apically in apparent early stage of developing terminal inflorescence but not seen in mature state; pedicels solitary in the leaf axils, 1–2.5 cm long (exceeding the corresponding petiole), articulated 5–7 mm below the calyx. CALYX 5 mm long, stellate-pubescent, the 5 lobes ovate, acute or acuminate, spreading (rotate) in fruit. FLOWERS not seen. FRUITS 10–11 mm long, 4–5-carpelled; MERICARPS glabrous, indehiscent in lower third, dehiscent above, the upper carpel wall with evident venation, apically acute or acuminate. Seeds not observed.

DISTRIBUTION: Ecuador (endemic), 2200–2400 m.

ADDITIONAL SPECIMENS EXAMINED: **ECUADOR. AZUAY:** junction of Río Azogues and Río Paute, between Paute and Cuenca, 2200–2400 m, 6 Feb 1945, *W.H. Camp E-1828* (NY, S-09-24153); in valley Río Paute, 2350 m, 24 Sep 1944, *I. Wiggins 10787* (MO, NY).

The specimens included in the new species were incorrectly treated as (and confounded with) *Wissadula stellata* in Fryxell (1992), but they are here recognized as a distinct species endemic to the Paute Valley of Azuay Province in Ecuador. Although the new species is imperfectly known (the nature of the inflorescence is not known, nor have open flowers been seen), the morphology of the mature fruits is unlike that of any other *Wissadula* except *W. costaricensis* Standl., and the very short petioles are distinctive. The mericarps walls have characteristically prominent venation.

Wissadula macrocarpa Fryxell, sp. nov.

TYPE: **PERU. ANCASH:** Arriba de Lampanin (Jimbe), 2200 m, 2 May 1987, *J. Mostacero et al. 1833* (HOLOTYPE: NY; ISOTYPES: HUT-n.v., MO). Fig. 2.



FIG. 1. Holotype of *Wissadula ecuadoriensis* Fryxell.

Sufrutices erecti caulibus pilis dispersis stipitato-stellatis 0.2–0.4 mm longis demum glabrescentibus; laminae foliorum ovato-cordatis obscure crenatis discoloribus; stipulis filiformibus 8–10 mm longis; pedicellis solitariis in axillis foliorum et in paniculis expansis terminalibus; calycibus 5 mm longis lobis costis manifestis; petalis 7–8 mm longis flavis vel aurantiacis; fructibus 12–16 mm longis glabris; mericarpiis 5, ad apicem acutis vel spinosis, spinis 2–3 mm longis.

Erect SUBSHRUBS, the stems with scattered stipitate-stellate hairs 0.2–0.4 mm long, glabrescent. LEAF BLADES ovate, 7–8 cm long, 4–5 (–7.5) cm wide (smaller upward), deeply cordate (sinus 1–2 cm deep, narrow, or lobes often overlapping), the margins curved, shallowly crenate, apically acuminate, palmately 7–9-nerved (the nerves raised beneath), discolorous, the upper surface nearly glabrous, the lower surface densely and minutely stellate-puberulent with whitish hairs. PETIOLES to 7 cm long (smaller upward), sparsely pubescent (with stipitate hairs like stem) except densely so distally near juncture with lamina. STIPULES narrowly linear or filiform, pubescent, 8–10 mm long. FLOWERS in the axils of the upper leaves and in a terminal panicle rising above the leaves, the pedicels (in fruit) 2–3 cm long, slender, sparsely and minutely pubescent (hairs stipitate) to subglabrous, articulated 5–10 mm below the calyx. CALYX 5 mm long, minutely pubescent, deeply divided, the lobes with manifest midribs. PETALS yellow [in sicco] or orange [fide collectors], to 7–8 mm long, the staminal column very short, the apical filaments 3–4 mm long, the anthers exserted. FRUITS [at maturity] glabrous, 12–16 mm long. MERICARPS 5, apically acute or spinose, the spines

2–3 mm, constricted in lower 1/4, dehiscent above constriction. SEEDS not seen.

DISTRIBUTION: Peru (Ancash). Known from the type collection at 2200 m and possibly from a disjunct collection from Venezuela (Lara).

ADDITIONAL SPECIMENS EXAMINED: **VENEZUELA. LARA:** Distrito Morán, selva a lo largo del Río Tocuyo, al sur de Humocaro Alto, lat. 9°32'N, 70°2'W, 1300 m, 13 Oct 1974, J.A. Steyermark & V. Carreño Espinoza 111052 (NY).

The specimen cited above from Venezuela is included here only tentatively inasmuch as its fruits are not fully developed so that mature size measurements are not available. The fruit morphology agrees with that of the cited type, and the partially grown fruits are nearly as large (10 mm long) as the mature fruits of the type. Nevertheless, the geographical disjunction between western Peru and northern Venezuela seems problematic, and the Venezuelan material may well prove to be distinct.

Wissadula macrocarpa is closely allied to *W. costaricensis* and was initially thought to be a disjunct population of the latter species. These two species, together with *W. ecuadoriensis*, share the feature of having fruits of similar morphology, which are the largest in the genus. Ever since *W. costaricensis* was described (Standley, 1937), the species has stood apart from the remainder of the genus because of its large fruits and its large mericarps (10–16 mm long) with distinctive long-acute apices. Now we find that it forms part of a nexus of at least three species that share these very characters.

The three species may be distinguished with the aid of the following key:

- A. Petioles to 1 cm long (subequal to sinus of blade); mericarps 10–11 mm long. . . . **W. ecuadoriensis** Fryxell
 A. Petioles 1–8 cm long; mericarps 11–16 mm long.
 B. Leaves concolorous, subglabrous; stipules 3 mm long **W. costaricensis** Standl.
 B. Leaves discolorous, densely pubescent beneath; stipules 8–10 mm long. **W. macrocarpa** Fryxell

These three species may also form a more distant alliance with *W. rostrata* (Schumach.) Hook.f. and *W. parviflora*

(A.St.-Hil.) R.E.Fr. (Fryxell, 2010) in terms of fruit morphology if not of absolute size.



Wissadula parviflora (St. Hil.) R.E. Fr.
~~W. macrocarpa~~ *W. macrocarpa* Holotype
 Det. P. A. Fryxell, 2009

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Wissadula cf. costaricensis Standley (sp. nov.?)
 Det. por: P. Fryxell, 1988

N. Vulgar
 Hábito: Hierbe con flores anaranjadas
 Procedencia: Arriba de Lampenin (Jimbe)
 Prov.: Santa Dpto.: Ancash
 Habitat: Ladera
 Altitud: 2200 m.s.m. Fecha: 02-V-1987
 Leg. J. Mostacero L. Nº 1853
 S. Leiva G.
 F. Mejía C.
 F. Peláez P.
 D. Medina C. et W. Zelada E.

FIG. 2. Holotype of *Wissadula macrocarpa* Fryxell.

AN ILLEGITIMATE NAME IN *WISSADULA*

Krapovickas (2006) treated what had been recognized as *Wissadula grandifolia* Baker f. ex Rusby as two species. To provide the previously overlooked species with a name, he chose to undo a previous lectotypification (Fryxell, 1992), contrary to Article 9.17 (McNeill et al., 2006), so as to align the new species with the name *W. macrantha* R.E.Fr. and to distinguish it from *W. grandifolia*.

This nomenclatural action is flawed in two respects. In the first place, the name *Wissadula macrantha* was superfluous when published (McNeill et al., 2006; Article 52.1) and thus illegitimate, as was noted indirectly by Shoiners (1962). According to Article 6.4 (McNeill et al., 2006), "A name which according to this Code was illegitimate when published cannot become legitimate later unless it is conserved or sanctioned." Secondly, although Article 9.17 permits a previous lectotypification to be superseded in three specific situations, provision (b) was chosen as applicable in this instance, which states that a choice of lectotype may be superseded when it "is in serious conflict with the protologue." Such conflict was not demonstrated. In support of this action it was only mentioned that the previously chosen lectotype lacked fruits, which concerns an incomplete specimen but not a conflict with the protologue. Therefore the earlier choice of lectotype must stand, in accordance with Article 9.17. Even if the ICBN permitted the changing of a lectotype at will (which it does not), one would have to face the fact that the name *W. macrantha* is illegitimate.

Fries (1908) distinguished the two taxa largely on the basis of differences in corolla size. Krapovickas (2006) distinguished them on the basis of corolla size and pubescence type (pubescence glandular or not) and asserted that *W. grandifolia* has a more westerly distribution (largely in Bolivia) and the other taxon a more easterly one (in Brazil [cited as Bolivia [sic] in Krapovickas

(2006)] and Paraguay). This distinction seems relatively weak. If this variable population is indeed two distinct species, this fact needs to be more firmly established than it has been as yet, a scientific description of the easterly "species" needs to be published in support of this fact, and a legitimate name needs to be proposed. I am not yet persuaded that two species are involved.

EDITOR'S NOTE

This manuscript was submitted to *Lundellia* in the spring of 2011, and Paul Fryxell died on 11 July 2011. The manuscript had by that time been reviewed by Larry Dorr (US), who made extensive comments and suggested various problems and improvements, but the review had not been returned to Paul before his death. Starting from those comments, Tom Wendt has rewritten portions of the first section and incorporated changes into the rest. Portions of the first section on the typification of *Sida stellata* are substantially changed from Paul's original manuscript but preserve, we hope, Paul's intent and perspectives.

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LITERATURE CITED

- Baker, E. G.** 1893. *Wissadula*. In Synopsis of genera and species of Malvæ. J. Bot. 31: 69–71.
- Buchheim, G.** 1965. A bibliographical account of L'Héritier's "Stirpes novae. Huntia 2: 29–58.
- Cavanilles, J.** 1785. *Dissertatio botanica de Sida*. Paris: F. A. Didot.
- . 1789. Observationes in quintum fasciculum D. L'Heritier. In *Septima dissertatio botanica*, pp. 379–396, F. A. Didot, Paris.
- Fries, R. E.** 1908. Entwurf einer Monographie der Gattungen *Wissadula* und *Pseudabutilon*. Kungl. Svenska Vetenskapsakad. Handl., ser. 2 43(4): 1–114 + 10 plates.
- Fryxell, P. A.** 1992. 118. Malvaceae, in G. Harling and N. Andersson, eds. Flora of Ecuador No. 44: 1–141.
- . 2010. The position of the African *Wissadula rostrata* in the predominantly Neotropical genus *Wissadula*. Bonplandia (Corrientes) 19(1): 5–10.
- Garcke, A.** 1890. Wie viel Arten von *Wissadula* gibt es? Z. Naturwiss. (Halle) 63: 113–124.
- Garilleti, R.** 1993. Herbarium Cavanillesianum. Fontqueria 38: 1–248.
- Krapovickas, A.** 1996. La identidad de *Wissadula amplissima* (Malvaceae). Bonplandia (Corrientes) 9: 89–94.
- . 2006. El tipo de *Wissadula macrantha* R. E. Fr. (Malvaceae-Malveae). Bonplandia (Corrientes) 15: 121–123.
- L'Héritier, C. L.** 1789 ("1785") *Stirpes Novæ*, fasc. 5, Paris.
- Linnaeus, C.** 1753. *Species Plantarum*. Vol. 2. Stockholm: Laurentii Salvii.
- . 1763. *Species Plantarum*. Ed. 2. Vol. 2. Stockholm: Laurentii Salvii.
- Macbride, J. F.** 1956. *Wissadula*. In Flora of Peru. Publ. Field Mus. Nat. Hist. Bot. Ser. 13(IIIA, no. 2): 482–488.
- McNeill, J., F. R. Barrie, H. M. Burdet, V. Demoulin, D. L. Hawksworth, K. Marhold, D. H. Nicolson, J. Prado, P. C. Silva, J. E. Skog, J. H. Wiersema, & N. J. Turland, (eds).** 2006. International Code of Botanical Nomenclature. Regnum Veg., vol. 146. International Association for Plant Taxonomy. A. R. G. Gantner Verlag, Ruggell, Liechtenstein. xviii + 568 p.
- Schumann, K.** 1891. *Wissadula*. In C. F. von Martius. 1891. Flora Brasiliensis 12(3): 437–449.
- Shinners, L. H.** 1962. *Wissadula grandifolia* instead of *W. macrantha* (Malvaceae): Nomenclatural corrections. Sida 1: 106–107.
- Standley, P. C.** 1937. Malvaceae. In Flora of Costa Rica. Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 664–678.
- Stafleu, F. A.** 1963. L'Héritier de Brutelle: the man and his work. pp. xiii–xliii. In C. L. L'Héritier de Brutelle. *Sertum Anglicum 1788, Facsimile with Critical Studies and a Translation*. Pittsburgh: Hunt Botanical Library.
- and **R. S. Cowan.** 1976. *Taxonomic Literature*. Ed. 2. Vol. 1: A–G. Utrecht: Bohn, Scheltema & Holkema.
- Velarde Núñez, O.** 1969. Catálogo de isotipos de la colección de plantas peruana de A. Weberbauer que se conservan en el herbario de la Universidad Agraria del Perú (cont.) Raymondiana 2: 115–147.