THE HARDY *HIBISCUS*—STILL HARDY, BUT NO LONGER *HIBISCUS*: REINSTATEMENT OF *MUENCHHUSIA* (MALVACEAE: HIBISCEAE)

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ABSTRACT

Phylogenetic data have demonstrated that the circumscription of *Hibiscus* L. as traditionally defined must be modified to establish monophyletic genera in the tribe Hibisceae. In accordance with a recent recommendation to reduce the circumscription of *Hibiscus*, we here reinstate the genus *Muenchhusia* Heist. ex Fabr. to accommodate five cold-hardy species from *Hibiscus* section *Muenchhusia* (Heist. ex Fabr.) O.J. Blanch. Species of *Muenchhusia* are restricted to temperate wetlands in North America and have large, showy flowers. Species in this genus have long been cultivated and hybridized for a wide variety of vegetative and floral characteristics, and their hardiness in temperate winters. We make new combinations in *Muenchhusia*, designate lectotypes or neotypes where required, and provide a key to the genus.

RESUMEN

Datos filogenéticos recientes han demostrado que la delimitación tradicional del género *Hibiscus* L. debe ser modificada para establecer géneros monofiléticos dentro de la tribu Hibisceae. En base a un estudio reciente que recomienda reducir la circunscripción de *Hibiscus*, este trabajo propone la restitución del género *Muenchhusia* Heist. ex Fabr., para incluir cinco especies resistentes al frío anteriormente asignadas a la sección *Muenchhusia* (Heist. ex Fabr.) O.J. Blanch. Estas especies, endémicas de humedales templados de América del Norte, se distinguen por sus grandes y vistosas flores y por ser ampliamente cultivadas e hibridizadas debido a sus atributos ornamentales y su tolerancia a inviernos templados. Asimismo, se proponen nuevas combinaciones taxonómicas dentro de *Muenchhusia*, ademas de asignar los lectotipos o neotipos que correspondan y proporcionar una clave para el género.

Key Words: classification, hardy hibiscus, *Hibiscus* section *Muenchhusia,* Malvaceae, *Muenchhusia,* rose-mallow, taxonomy

INTRODUCTION

The non-monophyly of the genus *Hibiscus* L. (family Malvaceae) is well documented (e.g., Pfeil & Crisp 2005; Koopman & Baum 2008; Hanes et al. 2024) and is mirrored by historical challenges in morphologically defining its generic limits. Hanes et al. (2024) found that at least 20 other genera are embedded within the traditionally circumscribed *Hibiscus*, and provided a new classification for the genus (and tribe Hibisceae; see supplementary Table SI in Hanes et al. 2024). This proposal promotes recognizing a smaller *Hibiscus* and other units supported as monophyletic in a phylogenetic framework as genera, rather than significantly expanding *Hibiscus*. Such a solution also makes groups easy to define and identify with morphology. With the recent reinstatement of *Sabdariffa* (DC.) Kostel. (Barrett et al. 2025), our current work identifies approximately 63 species currently included in *Hibiscus*, but not part of the core *Hibiscus* clade (*Hibiscus* s.s.; Hanes et al. 2024), that require new combinations in alternate genera.

In North America, Blanchard (2015) identified 21 species of *Hibiscus* distributed across nine sections of the genus. Under our vision of a monophyletic *Hibiscus*, only eight North American species will remain in the genus *Hibiscus* (in sections *Hibiscus*, *Lilibiscus*, and *Bombicella*). Our work thus far has transferred *Hibiscus clypeatus* L. (sect. *Clypeati* O.J. Blanch.) to a new genus, *Blanchardia* M.M. Hanes & R.L. Barrett (Hanes et al. 2024), and the four North American species from section *Furcaria* DC. have been moved to the reinstated genus *Sabdariffa* (Barrett et al. 2025). The work here focuses on moving another five species with a long-standing history of morphological cohesiveness out of *Hibiscus*.

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Hibiscus section *Muenchhusia* (Heist. ex Fabr.) O.J. Blanch. forms a natural group for recognition at generic rank. The group was recognized as a segregate of *Hibiscus* section *Trionum* (L.) DC. based on several significant characters (Blanchard 1976). All species in *H.* sect. *Muenchhusia* are perennial herbs with very large, showy flowers (petals up to 14 cm long; Fig. 1A–C), are restricted to wetlands in North America and have $n = 19$ chromosomes (Wise & Menzel 1971). Their occupation of wetlands, an unusual habitat for Hibisceae, may in part explain their cold tolerance as these water bodies naturally moderate winter soil temperatures. Section *Muenchhusia* has been resolved as monophyletic with strong support (Small 2004; Hanes et al. 2024) and, as expected, has been recovered embedded within the /Trionum clade, within a polytomy that includes *Abelmoschus* Medik , *Anotea* (DC.) Kunth, *Cravenia* T.B.G. McLay & R.L. Barrett, *Fioria* Mattei, *Hibiscus* sections *Aristivalis* Ulbr., *Striati* O.J. Blanch. and *Venusti* Ulbr , *Malachra* L , *Malvaviscus* Fabr., *Pavonia* Cav , *Peltaea* (C. Presl) Standl., *Senra* Cav., *Trionum* L. and *Wercklea* Puttuer & Standl. (Hanes et al. 2024). This clade is distantly related to the core *Hibiscus* clade (*Hibiscus* s.s.; Hanes et al. 2024).

Section *Muenchhusia* comprises five species as monographed by Blanchard (1976). Four of the five species are well-accepted and clearly delineated (*Hibiscus coccineus* Walter, *H. dasycalyx* Blake & Shiller, *H. grandiflorus* Michx., *H. laevis* All.). *Hibiscus moscheutos* L., however, is an extremely polymorphic species with a widespread distribution across North America. Taxa, as varieties, subspecies, or distinct species, within *H. moscheutos s.l.* have long been variously recognized (Fernald 1942). For example, several subspecies have been recognized at the regional level in the United States: *Hibiscus moscheutos* subsp. *palustris* L. in the northeast and *H. moscheutos* subsp. *incanus* Wendl. in the southeast have been synonymized with the broadly eastern *H. moscheutos* subsp. *moscheutos* and broadly western *H. moscheutos* subsp. *lasiocarpos,* respectively, by Blanchard (1976, 2008). These same entities have also been recognized at the species level, *H. moscheutos s.s.* and *H. lasiocarpos* Cav. by Fryxell (1988) and Hill (1993). Additional populations in California have been variously delineated (*H. californicus* Kellogg; *H. lasiocarpos* Cav. var. *occidentalis* (Torr.) A. Gray; see Hill 2009). Hochreutiner (1900) included all *Hibiscus* species from Europe under the name *Hibiscus palustris* L., though additional names have subsequently been used and/or proposed for regional forms (e.g., *Hibiscus moscheutos* subsp. *roseus* (Thore ex Loisel.) P. Fourn. in France, *H. roseus* Thore ex Loisel. in Portugal, *H. ponticus* Ruprecht in Eurasia).

Small (2004) explored monophyly and phylogenetic relationships in sect. *Muenchhusia* and sampled all species in the section, as well as four of the most-recognized subspecies of *H. moscheutos*. This phylogenetic study broadly recovered two clades: the first included *H. coccineus, H. dasycalyx*, and *H. laevis*, while the second included *H. grandiflorus* and *H. moscheutos s.l.* (all subspecies of *H. moscheutos* fell into a clade, though relationships therein remained unresolved). Additional work further confirmed a close relationship between *H. dasycalyx* and *H. laevis* (Klips 1995; Mendoza 2004; Sain et al. 2021). Wise and Menzel (1971) predicted similar species relationships (though they did not include *H. dasycalyx*) based on crossing studies within and between species in the section. For example, crosses between *H. grandiflorus* and *H. moscheutos s.l.* formed fertile hybrids, however crosses between *H. grandiflorus* and *H. coccineus* did not set fruit (Wise & Menzel 1971).

Putative hybrid specimens between species of *Muenchhusia* are noted on specimens (e.g., *Fryxell 1896; Palmer 31501*) and additional evidence of hybridization between many species pairs abound (Wise & Menzel 1971; Blanchard 1976; Klips 1995; Mendoza 2004; Small 2004). Such propensity for hybridization makes this a very attractive group for breeding programs. Cultivars in sect. *Muenchhusia* have been long-grown as ornamentals in the United States, and subsequently in Europe and globally, for their large, colorful flowers and cold tolerance (summarized in Winters 1970; Kuligowska et al. 2016; Fig. 1D,E). Though hybridization between members of tribe Hibisceae is usually restricted to closely related species (Janakiram & Patil 2017), interspecific hybrid forms between *H. mutabilis* L. (sect. *Venusti* Ulbr.) and/or *H. coccineus* and *H. moscheutos* now exist (e.g., Tachibana et al. 1957; Tachibana 1958; Kuwada 1959, 1964; Winters 1970; Wise 1973; Malinowski 2019). Lack of recognition of the hybrid origin of some cultivars has led to confusion in sequence data. Some data added to GenBank under the name *H. mutabilis* has actually come from these interspecific hybrids, leading to supposed conflicts between plastid and nuclear markers in the phylogenetic reconstructions of some taxa by Landrien et al. (2024) as utilization of sequence data from multiple samples resulted in a

Fig. 1. A. Hybrid *Muenchhusia* growing in a Michigan backyard. B., C. *Muenchhusia coccinea* cultivated at the Royal Botanic Gardens, Sydney demonstrating the showiness of the flowers. D., E. Hybrid *Muenchhusia* cultivated at the Beijing Botanical Garden. Photos credits: A: by Margaret Hanes; B–E: by Russell Barrett.

chimera. Breeding programs in the last 75 years have selected many interspecific hybrids of *Muenchhusia* for a wide variety of vegetative and floral characteristics, specifically color (Malinowski 2012, 2019; Austin 2023), and disease resistance (Pounders 2013).

MATERIALS AND METHODS

We follow Blanchard's (1976) revision of *Hibiscus* sect. *Muenchhusia* as the most comprehensive treatment available. We provide hyperlinks to available digitized type specimens from the following herbaria: AV, BM, CAN, CAS, F, G, GH, LINN, MA, MO, NDG, NEB, NY, NYS, P, PH, S, UC, US; accessed primarily through JSTOR Plants (https://plants.jstor.org/, accessed Feb 2025), with additional links provided from specific open-access websites; abbreviations based on *Index Herbariorum,* New York Botanical Garden's Virtual Herbarium (http://sweetgum.nybg.org/ih/, accessed Feb 2025). Typifications are made when we have been able to locate the appropriate original materials, in accordance with Turland et al. (2018). Distribution statements broadly follow Blanchard (2015) and Plants of the World Online (POWO, Facilitated by the Royal Botanic Gardens, Kew, see https://powo.science.kew.org/, accessed Feb 2025), with small changes based on recent collections or field work.

RESULTS AND DISCUSSION

We make six new combinations in the genus *Muenchhusia* (for 5 species and 1 subspecies) and formally designate 12 lectotypes or neotypes. Blanchard (1976) proposed many of these typifications, but as that thesis is not considered a published work, these selections require formal designation, and we do so here, for the most part following Blanchard's recommendations. In our goal towards a monophyletic *Hibiscus* 13 new combinations are required for North American *Hibiscus* species outlined by Blanchard (2015), our treatment here brings the number of completed combinations to 10.

TAXONOMIC TREATMENT

Muenchhusia Heist. ex Fabr., Enum., ed. 2, 278. 1763 (as *Münchhusia*). *Hibiscus* sect. *Muenchhusia* (Heist. ex Fabr.) O.J. Blanch. in Fryxell, Syst. Bot. Monogr. 25:471. 1988. Type: *Hibiscus palustris* L. [=*Hibiscus moscheutos* L.; =*Muenchhusia moscheuta* (L.) M.M. Hanes & R.L. Barrett].

Hibiscus subsect. *Muenchhusia* (Heist. ex Fabr.) O. Kuntze In Post & Kuntze, Lexlc. Gen. Phaner. 280. 1903, excl. syn. *Ketmia* Mill. & *Hibiscus* sect. *Sabdariffa* DC., as "Muenchhausia."

Diagnostic characters.—Herbaceous perennials, 1–3.5 m tall, with one to several, erect to ascending, simple to much-branched stems. Branchlets sometimes glaucous, glabrous, or juvenile growth sometimes with stellate, simple or glandular hairs. Leaf blades 4–30 cm long, concolorous or discolorous, narrowly lanceolate, ovate, elliptic, deltoid or orbicular, unlobed or shallowly to deeply palmately or hastately 3(5)-lobed or deeply (3)5(7)-parted to divided, the terminal lobe broadly to narrowly triangular or lanceolate to linear, the apex broadly acute to long-acuminate, the base of the blade varying from cordate to truncate or cuneate, margins crenate, crenate-dentate, serrate, or nearly entire, commonly glabrous above, stellate and commonly simple and glandular hairs below; petioles 2–20 cm long, 1/4 to exceeding the length of the blade; stipules 1–7 mm long, caducous. Flowers solitary in the axils of the upper leaves; peduncles 1–15 cm long, articulated towards the apex or towards the base. Involucellar bracts linear, 8–15(–16), 10–45(–50) mm long, ca. 1/2 as long to longer than the calyx, sometimes ciliate. Calyx rotate or broadly campanulate to cylindric-campanulate, 15–60 mm long, weakly to strongly accrescent and sometimes inflated in fruit, lobed 1/3 to 3/4 of its length, the lobes narrowly to very broadly triangular, glabrous, hirsute in *M. dasycalyx*, occasionally hairy in *M. moscheuta*, or hairy in bud, the apices acute to acuminate or nearly caudate. Corolla red, pink or white, with or without a darker, central spot; petals 4–14 cm long, 2–4 times the length of the calyx, spreading beyond the calyx tube. Staminal column included or exserted, 12–95 mm long, less than half to as long as the petals; filaments 80–220, distributed over the length of staminal column or sometimes restricted to the distal 1/3; anthers red, pink, yellow, or white, 1.5–2 mm long. Ovary 5-locular, ovoid or truncate-conoid; ovules 8–40 (–45) per locule; style exceeding the staminal column by 3–40 mm, branches 5, 4–10 mm long; stigmas discoid or depressed-capitate, 1–5.5 mm in diameter, red, pink, yellow or creamy-white. Fruit ovoid to globose, (1.4–)1.6–3.5 cm long, the apex acute or short acuminate to rounded-truncate and often apiculate, glabrous or variously pubescent with stellate, simple, or glandular hairs. Seeds 10–35 per locule, reniform-globose, 2.2–3.8 mm long, brown, verrucose-papillose, or densely stellate- or simple- and stellate-pubescent. $n = 19$ (Wise & Menzel 1971).

Distribution.—North America. Primarily U.S.A.: in the north from Massachusetts to Minnesota, eastern Nebraska south to Texas to Florida, also New Mexico and California. Outside the U.S.A. members of *Muenchhusia* are known from one locality in northern Chihuahua, Mexico (*H. moscheutos* subsp. *lasiocarpos*); one locality in Remates, Cuba (*H. grandiflorus*); and several localities in southern Ontario, Canada (*H. moscheutos* subsp. *moscheutos*). Several species have been naturalized in western Eurasia (France, Germany, Italy, Portugal, Georgia, Romania, Transcaucasus, Uzbekistan), North Africa (Algeria), and in China and Korea.

Etymology.—Seven generic names have been published honoring Otto von Münchhausen (see Stafleu & Cowan, *Taxon. Litt*. 3: 1981: 653). Five of these names, three published by Linneaus, and one each by Murray and Scopali are all based on a single species of Lythraceae, validly published as *Munchausia speciosa* L., *Hausvater* 5:357 (1770), (now known as *Lagerstroemia speciosa* (L.) Pers.), and should clearly be considered

orthographic variants of each other. A second published species name, *Munchausia ovata* J. St.-Hil., *Expos. Fam. Nat*. 2:176 (1805) is a synonym of *L. speciosa* and has no bearing on the matter. The two remaining names both belong to Malvaceae, including the first published, *Muenchhusia* Heist. ex Fabr., *Enum*., ed. 2: 278 (1763). Rafinesque (1838) later published the name 'Munchusia' without knowing its origin and it is considered a homonym of *Muenchhusia* Heist. ex Fabr. (Hanes et al. 2024). Given the variation in spelling of the generic name provided in Lythraceae, it also seems reasonable to consider all of these to be later homonyms of *Muenchhusia* Heist. ex Fabr. Therefore, the following names are all considered homonyms on the basis that the spelling should be corrected to a single form (the first published and therefore only valid name is listed first):

Muenchhusia Heist. ex Fabr., Enum., ed. 2 [Fabr.] 278. 1763. [Malvaceae]

Munchhausia L., Hausvater 5:356. 1770, *nom. illeg.*, *orth. var.* [Lythraceae]
Munchhausia Murray, Prod. Gotting. Praef. 105. 1770, *orth. var.* [Lythraceae]
Munchausia L., Mant. Pl. Altera 153. 1771, *orth. var.* [Lythraceae]
Muenchhausia L., Syst. Veg., ed. 13:581. 1774, *orth. var.* [Lythraceae]
Muenchausia Scop., Intr. Hist. Nat. 220. 1777, *orth. var.* [Lythraceae]
Munchusia Heist. ex Raf., Sylva Tellur. 115. 1838, *orth. var.* [Malvaceae]

Muenchhusia coccinea (Walter) M.M. Hanes & R.L. Barrett, **comb. nov.** (**Fig. 2A, B**). *Hibiscus coccineus* Walter, Fl. Carol. 177. 1788. TYPE: U.S.A. FLORIDA. St. Johns Co.: wet ditch at woods' edge on both sides of Fla. Rte. 16, 0.4 mi E of the St. Johns River, between Orangedale and Green Cove Springs, 14 Jul 1968, *Blanchard* 173 (NEOTYPE, designated by Ward (2008:478): GH [GH00247970]; ISONEOTYPE: CAS [CAS00123645]).

Hibiscus speciosus Sol. in Aiton, Hort. Kew. 2:456. 1789. TYPE: Cultivated, Hort. Fothergill, 1779 (**LECTOTYPE, designated here:** BM [BM000645447], following Blanchard 1976:186).

Hibiscus jerroldianus Paxton, Paxton's Mag. Bot. 13:1, *t. 1.* 1847, the plate as "Jerroldii." TYPE CITATION: "It was raised in the spring of 1843, from seeds gathered in the Brazils by Dr. Lippold, and presented to his Grace the Duke of Devonshire, by Mrs. Berry." (**LECTOTYPE, designated here:** in the absence of any known Paxton herbarium, Paxton's Mag. Bot. 13:1, *t. 1.* is designated as lectotype, following Blanchard 1976:187).

Hibiscus coccineus var. *integrifolius* Chapm., Bot. Gaz. (Crawfordsville) 3:3. 1878. *Hibiscus semilobatus* Chapm., Fl. S. U.S. ed. 3:52. 1897. *Hibiscus integrifolius* (Chapm.) Small, Bull. Torrey Bot. Club 25:135. 1898, *nom. illeg.* TYPE: U.S.A. East FLORIDA: 1871, *Chapman s.n.* (**LECTOTYPE, designated here:** NY [NY00221724]; ISOLECTOTYPES: F [F0062906F], US [US00098079], US [US00098080], following Blanchard 1976:187).

Common name.—Scarlet rose-mallow.

Distribution.—Freshwater marshes in northeastern Florida. Two older records are known from Georgia but are likely extirpated. A modern, and larger, distribution of *M. coccinea,* into Alabama, Arkansas, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia almost certainly represents escapes from cultivation rather than a natural distribution (Blanchard 2015).

Notes.—Hochreutiner (1900) united *H. coccineus*, *H. laevis* (as *H. militaris*), and *H. semilobatus*, under the name *H. coccineus*, choosing to distinguish these taxa as varieties rather than species. The conspecificity of *H. laevis* and *H. coccineus* has since been rejected. Hochreutiner (1900) further listed *Malvaviscus coccineus* Medicus (1787) as the basionym of Walter's name, however, it is clear that Medicus' name is based on *H. malvaviscus* L. (= *Malvaviscus arboreus* Cav.). Subsequently several herbaria may have *Muenchhusia coccinea* filed under *Malvaviscus* at this point.

Blanchard (1976) lists an isotype at UC, but recent searches have failed to locate such a specimen.

Landrein et al. (2024) use the name 'Muenchhusia coccinea (Walter) Heist. ex Fabr.', however, no such combination has been published and the combination is not validated there.

A rare, white-flowered form of *M. coccinea* was known from southern Florida and is now available in the horticultural trade where it is variously called White Swamp Hibiscus, White Texas Star Hibiscus, Lone Star Perennial Hibiscus, or *Hibiscus coccineus* 'alba'. Petal color in *M. coccinea* (and presumably other Hibisceae) is controlled by a diallelic locus where loss-of function affects the anthocyanin pathway (Gettys 2012). A complete chloroplast genome sequence for this species now exists (Wang et al. 2022).

Fig. 2. *Muenchhusia coccinea* (**A., B.**) and *M. dasycalyx* (**C., D.**). Photo credits: A: Gail Fishman, iNaturalist:239524390, ©. B: Matthew StClair, iNaturalist: 259028932, CC-BY-NC. C: palomak, iNaturalist: 49455649, CC-BY-NC. D: Michelle Wong, iNaturalist: 54815932, CC-BY.

Muenchhusia dasycalyx (S.F. Blake & Shiller) M.M. Hanes & R.L. Barrett, **comb. nov.** (**Fig. 2C, D**). *Hibiscus dasycalyx* S.F. Blake & Shiller, J. Wash. Acad. Sci. 48:277, f. 1. 1958. Type: U.S.A. Texas. Trinity Co.: W of the Neches River & about 13 mi W of Lufkin (which is in Angelina Co.), 23 Jun 1955, *Shiller 231* (holotype: US [US00098083]).

Common names.—Neches River rose-mallow.

Distribution.—Known from five counties, across three watersheds in Eastern Texas (Cherokee, Harrison, Houston, Nacogdoches (introduced), and Trinity).

Notes.—*M. dasycalyx* (as *H. dasycalyx*) was designated as a threatened species under the Endangered Species Act of 1973 in 2013 by the U.S. Fish and Wildlife Service (USFWS, 2013). *M. dasycalyx* is sympatric with two more widespread congeners (*M. laevis* and *M. moscheuta*). Sain et al. (2021) demonstrated that the ecological niche models of *M. laevis* and *M. dasycalyx* are nearly identical while those of *M. dasycalyx* and *M.*

moscheuta are significantly different from one another. However, extensive evidence of hybridization exists between each species pair (Blanchard 1976; Klips 1995; Mendoza 2004; Small 2004).

Muenchhusia grandiflora (Michx.) M.M. Hanes & R.L. Barrett, **comb. nov.** (**Fig. 3A, B**). *Hibiscus grandiflorus* Michx., Fl. Bor.-Amer. 2:46. 1803, non Salisbury, 1805, nec Hort. Type: "In maritimis Georgiae et Floridae et in regione Natchez ad Mississippi" s.d., *Michaux s.n.* (lectotype, designated by Blanchard (2008:5): P [P02285914]; isolectotypes: P [P02285913], P [P02285915]).

Hibiscus urbanii Helwig in Urban & Helwig, Repert. Spec. Nov. Regni Veg. 24:236. 1928. Type: Cuba. Pinar del Rio Province: Prope Remates, in paludibus apertis, Jun, *Ekman 11176* (**lectotype, designated here:** S [S-R-11267]; isolectotype: NY [NY00084167] fragment), following Blanchard 1976:157).

Hibiscus velutinus Muhl., Cat. 63. 1813, pro syn., non de Candolle, 1824.

Common name.—Swamp rose-mallow.

Distribution.—Freshwater and brackish marshes in southeastern U.S.A , from southern South Carolina along the coast through Georgia, Florida, Alabama, Mississippi and Louisiana and possibly into Texas; also known from one site in western Cuba.

Muenchhusia laevis (Allioni) M.M. Hanes & R.L. Barrett, **comb. nov.** (**Fig. 3C, D**). *Hibiscus laevis* Allioni, Auct. Syn. Taurin. 31. 1773 [independently paged preprint of Allioni, Misc. Taur. 5:83. 1774]. *Hibiscus laevis* Scop., Delic. Fl. Faun. Insubr. 3:35, fig. 17. 1788. *nom. illeg.* Type citation: Cultivated at Turin; 'virginici ... nomine missus est." Type: A specimen is yet to be located in the Allioni herbarium at TO, so we here designate a neotype. (**neotype, designated here:** Deliciae Florae et Faunae Insubricae, fig. 17, 1788, following Blanchard 1976:167).

Hibiscus militaris Cav., Diss. 6:352, t. 198, f. 2. 1788. Type: U.S.A. Louisiana: without collector. (**lectotype, designated here:** U.S.A. Louisiane: s.d., without collector, *s.n.* (P-JU [no barcode yet available, image seen, IDC Microfiche photograph, fiche 917, cat. No. 12384] following Blanchard 1976:165). Possible original material: Amérique septentrionale, Sep, *Michaux 6* (P-JU [P02285925]); cultivated in Paris, ex Louisiana, *n. dat., n. coll.* (P [P06612125]).

Hibiscus virginicus Walter, Fl. Carol. 177. 1788, non Linnaeus, 1753, *nom. illeg. Hibiscus coccineus* var. *virginicus* Hochr., Annuaire Conserv. Jard. Bot. Geneve 4:139 1900. Type: Hochreutiner (1900) cited only a single collection under this variety, so it appears that he could not locate original material for the name *Hibiscus virginicus* Walter and we have also failed to locate any original material. We therefore designate this specimen as a neotype. (**neotype, designated here:** U.S.A.: Texas, 1836, *Drummond* III, 41 (BM [BM013730504]).

Hibiscus hastatus Michx., Fl. Bor.-Amer. 2:45. 1803, non Linnaeus f., 1781, nec Cavanilles, 1787, *nom. illeg.* Type: "Hab. ad ripas fluviorum Ohio, Mississippi, et amnium Carolinae," e descr. orig. (**lectotype, designated here:** Amérique septentrionale, sur les isles et les rives de la rivierre Sante en Caroline, Juillet 1790, *Michaux s.n.* (P [no barcode yet available, image seen, IDC Microfiche photograph, fiche 84]; isolectotype: P [P02285926], following Blanchard 1976:165). Seed fragments at PH are possibly part of the type [PH00098098].

Hibiscus riparius Pers., Syn. Pl. 2:254. 1806, [nom. nov.]. Type: Persoon cited both *H. virginicus* Walter and *H. hastatus* Michx. in synonymy as he recognised that both were illegitimate names. We here designate the type of *H. hastatus* as the basis of Persoon's name. (**lectotype, designated here:** Amérique septentrionale, sur les isles et les rives de la rivierre Sante en Caroline, Juillet 1790, *Michaux s.n.* (P [no barcode yet available, image seen, IDC Microfiche photograph, fiche 84]; isolectotype: P [P02285926], following Blanchard 1976:165). Seed fragments at PH are possibly part of the type [PH00098098].

Common names.—Halberd-leaved or smooth rose-mallow, sweating-weed military hibiscus.

Distribution.—North America, on edges of freshwater and other wet sites in 25 eastern and central US states. Southeastern Pennsylvania westward through northern Ohio and into western Wisconsin and southeastern Minnesota (extirpated in Michigan; MNFI, https://mnfi.anr.msu.edu/species/description/14406/Hibiscus-laevis, accessed Aug 2025). Eastern Nebraska, south to central Texas, eastward to northern Florida and up the eastern coast and all other states within these bounds. One collection is known from southern Ontario, Canada, on Pelee Island, in the Erie Island group (Stuckey 1968).

Notes.—Despite its comparatively wide distribution in North America *M. laevis* is quite uniform in character.

Muenchhusia moscheuta (L.) M.M. Hanes & R.L. Barrett, **comb. nov.** *Hibiscus moscheutos* L., Sp. Pl. 2:693. 1753; St. Lager, Ann. Soc. Bot. Lyon 7:127. 1880, as "moscheutus." *Hibiscus petioliflorus* Stokes, Bot. Mat. Med. 3:543. 1812, *nom. illeg.* Type citation: "Habitat in Canada, Virginia" Type: (lectotype, designated by Reveal in Jarvis (2007:570): LINN [LINN 875.1]).

Fig. 3. *Muenchhusia grandiflora* (**A., B.**) and *M. laevis* (**C., D.**). Photo credits: A: John Serrao, iNaturalist:229912713, CC-BY-NC. B: lightning_whelk, iNaturalist:230967233, CC-BY-NC. C: Abel Kinser, iNaturalist:234837244, CC-BY-NC. Randy Shonkwiler, iNaturalist:259795210, CC-BY-NC.

Common name.—Common rose-mallow.

Distribution.—Broadly the range of the genus, but absent from Iowa, Minnesota, Nebraska, and Cuba.

Notes.—As discussed in the introduction, extensive population variation exists within this widespread species and populations can morphologically differ substantially from one another, especially in pubescence, and in the western part of its range (Blanchard 1976, 2008; Fryxell 1988; Turner 2008; Hill 2009). Blanchard defines two largely discrete subspecies (subsp. *moscheutos* and subsp. *lasiocarpos*; Blanchard 1976, 2008, 2015; supported by Turner 2008) while Hill (1993, 2009) and Fryxell (1988), instead, maintained two separate species (*H. moscheutos* and *H. lasiocarpos*). Existing molecular data puts all subspecies in an unresolved clade (Small 2004) suggesting recognition of just one species is appropriate, and we follow this here. Additional work is welcome to explore morphological and molecular variation across the large distribution of this widespread complex, and especially to test the concepts of Hill (1993, 2009) to determine whether recognition of

any additional taxa might be justified. In Canada, this species is listed as a species of Special Concern under Schedule 1 of the Species at Risk Act (Environment Canada, 2013). A whole plastome sequence was recently completed for *Muenchhusia moscheuta* (Sun et al. 2025).

Muenchhusia moscheuta (L.) M.M. Hanes & R.L. Barrett subsp. **moscheuta** (**Fig. 4C,D**).

Hibiscus moscheutos subsp. *moscheutos*

Hibiscus palustris L., Sp. Pl. 2:693. 1753. *Abelmoschus palustris* (L.) Walp., Repert. Bot. Syst. 1:311. 1842. *Hibiscus moscheutos* subsp. *palustris* (L.) R.T. Clausen, Cornell Univ. Agric. Exp. Sta. Mem. 291:8. 1949. TYPE: Cultivated. Switzerland: Basileae, in horto Bauh. (LECTOTYPE, designated by Reveal in Jarvis (2007:570): Burser's "Hortus Siccus," vol. 18(1), sheet no. 21, "Althaea palustris Bauh." UPS [image!]).

Althaea grandiflora Scop., Delic. Fl. Faun. Insubr. 2:33, t. XVII. 1787. TYPE: none cited. (**LECTOTYPE, designated here:** *Delic. Fl. Faun. Insubr.* 2: t. XVII, 1787).

Hibiscus incanus J.C. Wendl., Bot. Beob. 54. 1798. *Hibiscus moscheutos* var. (β?) *flavescens* Alph. Wood, Class-Book Bot. edn 2b;270. [1861] 1864. *Hibiscus moscheutos* subsp. *incanus* (J.C. Wendl.) H.E. Ahles, *J. Elisha Mitchell Sci. Soc.* 80: 173 (1964). TYPE: "Tempus flor. Aug. Sep. Patria. Carolina." (**LECTOTYPE, designated here:** *Hortus Herrenhusanus*; J. Wendland, *Hort. Herrenh.* 4: 8, t. 24, 1801, following Blanchard 1976:111).

Hibiscus roseus Thore ex Loisel., Fl. Gall. 2:434. 1807. *Abelmoschus roseus* (Thore ex Loisel.) Walp., Repert. Bot. Syst. 1:311. 1842. *Hibiscus palustris* [unranked] *roseus* (Thore ex Loisel.) Rouy & E.G. Camus in G.Rouy & J.Foucaud, Fl. France 7:411. 1901. *Hibiscus moscheutos* subsp. *roseus* (Thore ex Loisel.) P. Fourn, Quatr. Fl. France 610. 1936. TYPE: "Habitat ad ripas Atruri et stagnorum aquitaniae," e descr. orig. (LECTOTYPE, designated by Lazare & Charpin (1996:101): AV [AV0022906]; ISOLECTOTYPE: BM [BM000751648]).

Hibiscus aquaticus DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 6:627. 1815. non Tussac, 1824. *Abelmoschus aquaticus* (DC.) Walp., Repert. Bot. Syst. 1:311. 1842. *Hibiscus roseus* β *albiflorus* Parl., Fl. Ital. 5:112. 1872 [1873, probably April]. TYPE: "H. palustris de Savi (cent. p. 126), qui croit en Toscane dans le marais de Bientina et de Castiglione della Pescaia." ITALY. In palude di Bientina, 1810, *Savi s.n.* (**LECTOTYPE, designated here:** G [G00219129]).

Hibiscus laevigatus O. Targ. Tozz. ex Colla, [*Hortus Ripul.*, App. 2] Memorie Accad. Sci. Torino 31:349–350. 1826. TYPE CITATION: "Ortus e seminibus missis a Cl. Targioni-Tozzetti nondum floruit: monuit tamen ipse in litteris pertinere ad *H. roseum* Savii. an stirps eadem ac sequens ?" [Probably the same type collection as *Hibiscus roseus* β *albiflorus*, though possibly based on a duplicate sheet at PI (*n.v.*).]

Hibiscus moscheutos β *purpureus* Sweet, Brit. Fl. Gard. ser. 1, 3:286, t. 286. 1829. TYPE: *Bot. Mag.* 23: t. 882, 1806.

Hibiscus ponticus Rupr., Mém. Acad. Imp. Sci. Saint Pétersbourg (7)15(2):251. 1869. TYPE: GEORGIA: "... haud procul a litore Pontus Euxini in Guria inter ostium fl. Supsa et St. Nicolai, ad pontem prope Sepski Post, in paludlbus, 19 Sep," e descr. orig., *Ruprecht s.n.* (HOLOTYPE: ?KAZ, *n.v.*).

Hibiscus oculiroseus Britton, J. New York Bot. Gard. 4:219. 1903; Britton ex. L.H. Bailey, Stand. Cycl. Hort. 3:1486. 1915. *Hibiscus palustris* f. *oculiroseus* (Britton) Fernald, Rhodora 41:112. 1939. TYPE: Cultivated plant, H.[erbaceous] G.[arden], New York Botanical Garden, 17 Sep 1902, *Nash s.n.* (HOLOTYPE: NY [NY00221727]).

Hibiscus opulifolius Greene, Leafl. Bot. Observ. Crit. 2:65. 1910. TYPE: CANADA: ONTARIO PROV.: Pelee Point, Lake Erie, 23 Jul 1892, *Macoun s.n.* (HOLOTYPE: US [US00101848]; ISOTYPES: CAN [CAN10090440], MO [MO-309105]).

Hibiscus pinetorum Greene, Leafl. Bot. Observ. Crit. 2:66. 1910. TYPE: U.S.A. GEORGIA: Wet pine-barrens between Copeland and Rhine, Dodge Co., 6 Jul 1903, *Harper 1874* (HOLOTYPE: US [US00101849]; ISOTYPES: F [F0062907F], GH [GH00052813], MO [MO-309108], NEB [NEB-V-0000442], NY [NY00221728]).

Hibiscus moscheutos f. *peckii* House, Bull. New York State Mus. 243–244:54. 1923. *Hibiscus palustris* f. *peckii* (House) House, Bull. New York State Mus. 254:490. 1924. TYPE: U.S.A. NEW YORK: Patchogue, L.I., Aug, *Peck s.n.* (HOLOTYPE: NYS [NYS 33337]).

Distribution.—North America, mostly U.S.A. Distributed in most states east of the Mississippi River in freshwater, brackish marshes and roadside ditches; also known from Kansas, Oklahoma and Texas. Naturalized in widely separated parts of western Eurasia and western Georgia; in Africa on the coast of Algeria, east to China and Korea.

Notes.—Plants distributed in the Old World and identified as *Hibiscus palustris* (or *Hibiscus moscheutos* subsp. *roseus* (Thore ex Loisel.) P. Fourn., *H. roseus* Thore ex Loisel., *H. ponticus*) are conspecific with *Muenchhusia moscheuta* subsp. *moscheuta*. These plants have been in cultivation in Europe since at least 1753 (and possibly before). No wild collections exist before the early 19th century, and as such it is challenging to envision how large, herbaceous perennials with such large flowers could go unnoticed and uncollected before then if they had been present. Berghen (1966) and Blanchard (1976) suggest, instead, that it is much more likely that accidental introductions or escapes from cultivation are responsible for the first European plants with subsequent dispersal throughout Eurasia by water birds. Fernald (1942) traced the history of the

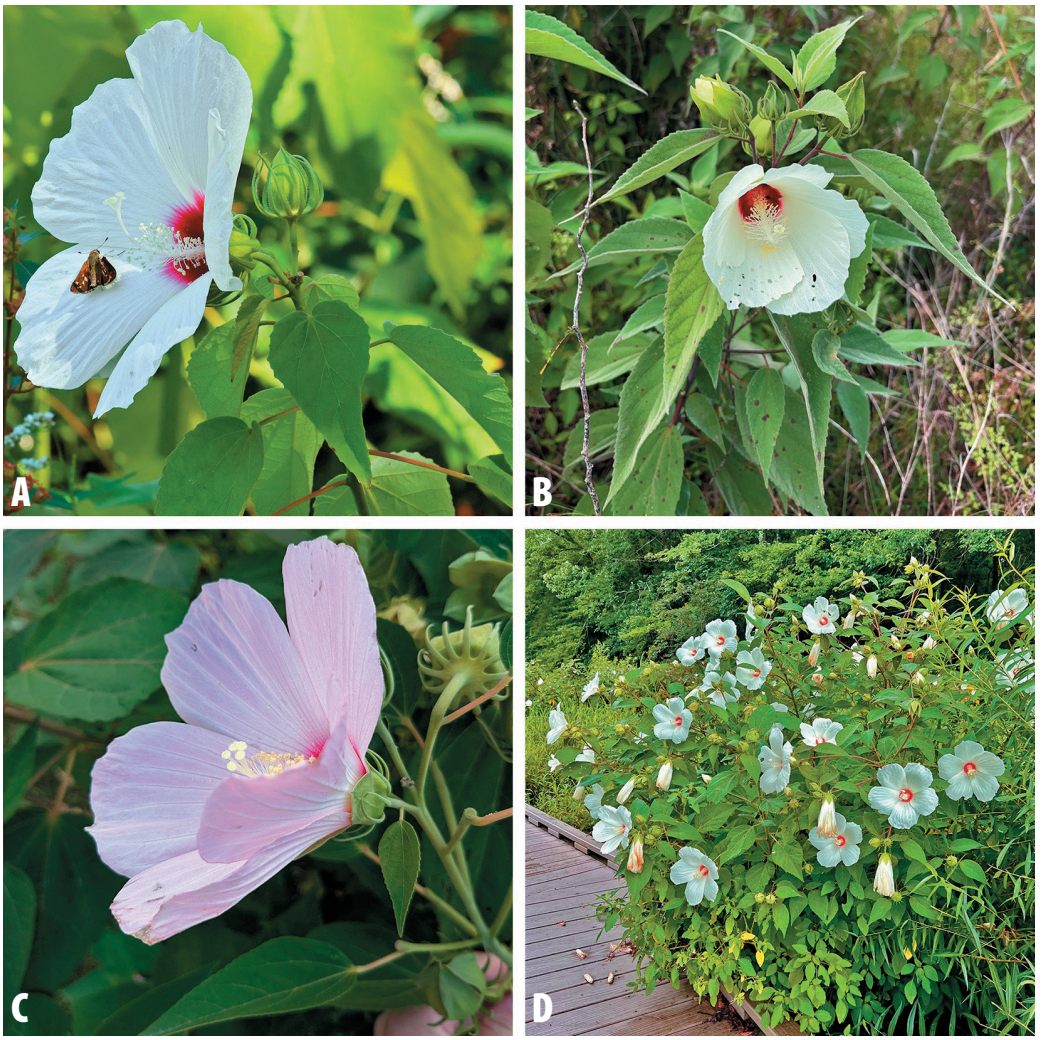

Fig. 4. ***Muenchhusia moscheuta*** **subsp.** ***lasiocarpa*** **(A., B.) and** ***M. moscheuta*** **subsp.** ***moscheuta*** **(C., D.). Photo credits: A: Ron Goetz, iNaturalist:270046016, CC-BY-NC-ND. B: J. Barkalow, iNaturalist:282907986, CC-BY-NC. C: Margaret Hanes. D: alexnard, iNaturalist:269707725, CC-BY-NC.**

application of the Linnaean names *H. moscheutos* and *H. palustris*, and considered their typification. Blanchard (1976) also discussed these and other names at length.

Muenchhusia moscheuta subsp. **lasiocarpa** (Cav.) M.M. Hanes & R.L. Barrett, **comb. nov.** (**Fig. 4A, B**).

Hibiscus lasiocarpos Cav., Diss. 3:159, t. 70, f. 1. 1787. *Hibiscus moscheutos* subsp. *lasiocarpos* (Cav.) O.J. Blanch., Novon 18:4. 2008. Type: s. loc., s.d., s. coll. (lectotype, designated by Fryxell (1988: 211): P-JU 12390 [image!]; isolectotype: MA [MA475805]).

Hibiscus californicus Kellogg, Proc. Calif. Acad. Sci. 4:292. 1873. *Hibiscus lasiocarpos* var. *californicus* (Kellogg) L.H. Bailey, Stand. Cycl. Hort. 3:1486. 1915, *nom. illeg.* Type: U.S.A. California. San Joaquin Co.: growing among tules on island near Middle River bridge, San Joaquin River (Byron-Stockton highway), 1 Sep 1943, *Alexander & Kellogg 3526* (neotype, designated by Fryxell (1988:211): (3 sheets) CAS [CAS00123646], CAS [CAS00123647], CAS [CAS00123648]; isoneotypes: UC [UC1035821], US [US00098076], US [US00098077]).

Hibiscus moscheutos var. *occidentalis* Torr., Botany II. Phan. Pacif. Coast N. Amer. 256. 1874 (in *U.S. Expl. Exped.* Wilkes. 1845–1874). *Hibiscus lasiocarpos* var. *occidentalis* (Torr.) A. Gray, Proc. Amer. Acad. Arts 22:303. 1887, as "lasiocarpus." Type: U.S.A. California: Sacramento Valley, Wilkes' U.S. Exploring Exped. 1364 (holotype: NY [NY00221726]).

Hibiscus platanoides Greene, Leafl. Bot. Observ. Crit. 2:66. 1910. TYPE: U.S.A. LOUISIANA: South Pass, 20 Aug 1900, *Tracy & Lloyd 58* (HOLOTYPE: US [US00101850]; ISOTYPE: MO [MO-3845061]).

Hibiscus langloisii Greene, Leafl. Bot. Observ. Crit. 2:67. 1910. TYPE: U.S.A. LOUISIANA: Swampy borders of Mississippi River, Plaquemines Co. [sic], La., Jun 1882, *Langlois s.n.* (LECTOTYPE, designated by Fryxell (1988:211): NDG [NDG01971]; ISOLECTOTYPE: NDG [NDG01957]).

Hibiscus leucophyllus Shiller, Southw. Naturalist 5:170. 1960. TYPE: U.S.A. TEXAS. Orange Co.: Mauriceville, 15 Jul 1958, *Shiller s.n.* (HOLOTYPE: US [US00098091]; ISOTYPES: US [US01013720]; US [US01013721]).

Hibiscus grandiflorus auct. non Michx.: Torr., Ann. Lyceum Nat. Hist. New York 2:172. 1828; Gray, Man. ed. 5, 102. 1867.

Hibiscus incanus auct. non J. Wendl.: Small, FI. S.E. U.S. 775. 1903; Man. S.E. FI. 856. 1933; Britton & Brown, Illus. Fl. ed. 2, 2:524. 1913, pro parte.

Distribution.—North America, mostly U.S.A. Southern Illinois and Indiana southward through western Kentucky and Tennessee, Mississippi and Alabama and westward to southeastern Kansas and central Texas; further west as scattered populations in western Texas, New Mexico, and, especially, the San Joaquin-Sacramento Valley of California; also in northern Florida and Chihuahua, Mexico.

Notes.—Rare or Endangered in California as *Hibiscus lasiocarpos* var. *occidentalis* (California Native Plant Society 2024). Blanchard (1976) suggests there is an isotype of *Hibiscus moscheutos* var. *occidentalis* held at US, but we have been unable to locate such a specimen.

KEY TO *MUENCHHUSIA*

1. Leaves hastately or palmately 3(–5)-lobed; leaf surface entirely glabrous; seeds densely hairy; restricted to eastern and central U.S.A.
   2. Calyx and capsule entirely glabrous.
      3. Calyx lobed to ¾ its length; corolla, stigma and style red; staminal column ¾ to equal length of petals; northeastern Florida _____ **M. coccinea** (Walter) M.M. Hanes & R.L. Barrett
      3. Calyx lobed ⅓ to ½ its length; corolla, stigma and style pink or white; staminal column ½ the length of petals; eastern and central U.S.A. _____ **M. laevis** (Allioni) M.M. Hanes & R.L. Barrett
   2. Calyx and capsule hairy; eastern Texas _____ **M. dasycalyx** (S.F. Blake & Shiller) M.M. Hanes & R.L. Barrett
1. Leaves elliptical, lanceolate to orbiculate, 3-lobed, 3-cleft, or unlobed; leaf surface hairy, at least on abaxial surface; seeds verrucose to papillose; widespread in eastern and central U.S.A., California, south central Canada, Mexico, Cuba, western Eurasia, Algeria, China, and Korea.
   4. Staminal column ⅔ length of petals, >5 cm long; filaments with free portions secund; pedicels never fused to petioles; SE U.S.A., Cuba _____ **M. grandiflora** (Michx.) M.M. Hanes & R.L. Barrett
   4. Staminal column ½ length of petals, <5 cm long; filaments with free portions not secund; pedicels of later-produced flowers often fused to petioles; widespread in eastern and central U.S.A., California, south central Canada, Mexico, western Eurasia, Algeria, China, and Korea _____ **M. moscheuta** (L.) M.M. Hanes & R.L. Barrett
      5. Leaves hairy abaxially, adaxially; capsule hairy; involucellar bracts usually ciliate; mostly west of the Mississippi River; northern Florida, California; also in Chihuahua (Mexico) _____ **M. moscheuta** subsp. **lasiocarpa** (Cav.) M.M. Hanes & R.L. Barrett
      5. Leaves hairy abaxially, glabrous adaxially; capsule glabrous; involucellar bracts usually not ciliate; mostly east of the Mississippi River; also in southern Ontario, Canada _____ **M. moscheuta** subsp. **moscheuta**

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REFERENCES

AUSTIN, C.C. 2023. Utilization and Improvement of *Hibiscus* species. Ph.D thesis, University of Florida, Gainesville, Florida, U.S.A.

Barrett, R.L., V.N. Yoshikawa, T.B.G. McLay, M.C. Duarte, G. Mwachala & M.M. Hanes. 2025. Reinstatement of *Sabdariffa* and new combinations to support a monophyletic concept of *Hibiscus* (Malvaceae: Hibisceae). Austr. Syst. Bot. 37(SB24013):1–97.

Berghen, C.V. 1966. Initiation à l'étude de la végétation. Les naturalistes belges. Bruxelles, Belgium.

Blanchard, O.J. 1976. A revision of species segregated from *Hibiscus* Sect. *Trionum* (Medicus) de Candolle sensu lato (Malvaceae). Ph.D. Thesis, Cornell University, Ithaca, New York, U.S.A.

Blanchard, O.J. 2008. Innovations in *Hibiscus* and *Kosteletzkya* (Malvaceae, Hibisceae). Novon 18:4–8.

Blanchard, O.J. 2015. *Hibiscus* L. In: Flora of North America Editorial Committee, eds. Flora of North America north of Mexico. Oxford University Press, New York, U.S.A. and Oxford, U.K. 6:252.

California Native Plant Society, Rare Plant Program. 2024. Rare plant inventory (online edition, v9.5). Website https://www.rareplants.cnps.org [accessed 13 August 2024].

Dandy, J.E. 1970. Stirpium Horti Reg. Taurinensis. Taxon 19(4):617–626.

Environment Canada. 2013. Management plan for the Swamp Rose-mallow (*Hibiscus moscheutos*) in Canada. Species at risk Act management plan series. Environment Canada, Ottawa. iv + 18 pp.

Fernald, M.L. 1942. *Hibiscus moscheutos* and *H. palustris*. Rhodora 44:266–278.

Fryxell, P.A. 1988. Malvaceae of Mexico. Syst. Bot. Monogr. 25:1–522.

Gettys, L.A. 2012. Genetic control of white flower color in scarlet rosemallow (*Hibiscus coccineus* Walter). J. Heredity 103(4):594–597.

Hanes, M.M., O.J. Blanchard Jr, J. Valencia-D, T.B.G. McLay, J.R. Abbot, S.F. McDaniel, R.L. Barrett, S. Mathews & K.M. Neubig. 2024. Phylogenetic relationships within tribe Hibisceae (Malvaceae) reveal complex patterns of polyphyly in *Hibiscus* and *Pavonia*. Syst. Bot. 49(1):77–116.

Hill, S.R. 1993. *Hibiscus* L. In J. C. Hickman ed., The Jepson manual: higher plants of California. University of California Press, Berkeley, California, U.S.A. Pp. 750–750.

Hill, S.R. 2009. Notes on California Malvaceae including nomenclatural changes and additions to the flora. Madroño 56(2):104–111.

Janakiram, T. & M.S. Patil. 2017. Breeding in *Hibiscus*: a review. Indian J. Agric. Sci. 87:159–166.

Jarvis, C. 2007. Order out of chaos. Linnaean plant names and their types. The Linnean Society of London in association with the Natural History Museum, London, London, U.K. 1017 pp.

Klips, R.A. 1995. Genetic affinity of the rare eastern Texas endemic *Hibiscus dasycalyx* (Malvaceae). Amer. J. Bot. 82:1463–1472.

Koopman, M.M. & D.A. Baum. 2008. Phylogeny and biogeography of tribe Hibisceae (Malvaceae) on Madagascar. Syst. Bot. 33:364–374.

Kudoh, H. & D.F. Whighan. 1997. Microgeographic genetic structure and gene flow in *Hibiscus moscheutos* (Malvaceae) populations. Amer. J. Bot. 84(9):1285–1293.

Kuligowska, K., H. Lütken, B. Christensen & R. Müller. 2016. Interspecific hybridization among cultivars of hardy *Hibiscus* species section *Muenchhusia*. Breed. Sci. 66(2):300–308.

Kuwada, H. 1964. The newly artificially raised amphidiploid plant named 'Ai-Fuyo' (*Hibiscus mutamoscheutos*), obtained from the progeny of *H. mutabilis* x *H. moscheutos.* Jap. J. Breed. 14:27–32.

Landrein, S, S-J. Song, J. Zhang, Y-J. Guo, J-Y. Shen, Q-.Y Jiang, & S.L. Low. 2024. *Thepparatia* vines (Hibisceae subtribe Trionum) phylogenomics and evolution. Bot. J. Linn. Soc. 205:391–402.

Lazare, J.-J. & A. Charpin. 1996. Lectotypification of names of taxa described by J. Thore. Taxon 45(1):99–103.

Malinowski, D.P., R.S. Brown, & W.E. Pinchak. 2012. 'Blue Angel' Winter-Hardy Hibiscus (*Hibiscus moscheutos* L.). HortScience 47:289–290.

Malinowski, D.P., R.S. Brown & W.E. Pinchak. 2012. 'Robert Brown' Winter-Hardy *Hibiscus* (*Hibiscus moscheutos* L.). HortScience 47:291–292.

Malinowski, D.P., W.E. Pinchak & K. Yanker-Hansen. 2019. Phenotypic similarities in flower characteristics between novel winter-hardy *Hibiscus* hybrids and their tropical relatives. Frontiers Pl. Sci. 10:1528.

Mendoza, A.E. 2004. Genetic diversity within *Hibiscus dasycalyx*, *Hibiscus laevis* and *Hibiscus moscheutos* utilizing ISSR techniques. MS Thesis, Stephen F. Austin State University, Nacogdoches, Texas, U.S.A.

Pfeil, B.E. & M.D. Crisp. 2005. What to do with *Hibiscus*? A proposed nomenclatural resolution for a large and well known genus of Malvaceae and comments on paraphyly. Austr. Syst. Bot. 18:49–60.

Pounders, C.T. 2013. 'Lufkin Red' and 'Lufkin White' Winter-hardy *Hibiscus* (*Hibiscus* × *laevis* All.). HortScience 48(2): 237–238.

Sain, M.P., J. Norrell-Tober, K. Barthel, M. Seawright, A. Blanton, K.L. Hertweck, J.S. Placyk Jr., R. Small, L.R. Williams, M.G. Williams, & J.A. Banta. 2021. Multiple complementary studies clarify which co-occurring congener presents the greatest hybridization threat to a rare Texas endemic wildflower (*Hibiscus dasycalyx*: Malvaceae). J. Bot. Res. Inst. Texas 15(1):283–308.

Small, R. 2004. Phylogeny of *Hibiscus* sect. *Muenchhusia* (Malvaceae) based on chloroplast *rpL*16 and *ndhF*, and nuclear ITS and GBSSI sequences. Syst. Bot. 29:385–392.

Stafleu, F.A., & R.S. Cowan. 1981. Taxonomic literature. A selective guide to botanical publications and collections with dates, commentaries and types, Second edition, Volume III: Lh–O. Regnum Veg. 105, Bohn, Scheltema & Holkema, Utrecht / dr. W. Junk b.v., Publishers, The Hague. 980 pp.

Sun, Y., Y. Jin, M. Sun, L. Wang, & Q. Lui. 2025. Whole plastome sequence of *Hibiscus moscheutos* L. 1753 (Malvaceae) and its phylogenetic analysis. Mitochondrial DNA Part B 10(3):239–243.

Tachibana, Y., N. Sakazaki., & Y. Ihara. 1957. Studies on *Hibiscus*. II Self-and cross-compatibility and hybridization. J. Japan. Soc. Hort. Sci. 25(4):255–260.

Tachibana, Y. 1958. Studies on *Hibiscus.* III An interspecific hybrid of *H. mutabilis* L. and *H. moscheutos*. L. J. Japan. Soc. Hort. Sci. 27(3):201–206.

Turland, N.J., J.H. Wiersema, F.R. Barrie, W. Greuter, D.L. Hawksworth, P.S. Herendeen, S. Knapp, W.-H. Kusber, D.-Z. Li, K. Marhold, T.W. May, A.M. Monro, J. Prado, M.J. Price, & G.F. Smith. (eds) 2018. International code of nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. Regnum Veg. 159. Glashütten: Koeltz Botanical Books.

Turner, B.L. 2008. Infraspecific categories of *Hibiscus moscheutos* (Malvaceae) in Texas. Phytologia 90(3):378–381.

US Fish & Wildlife Service. 2013. 50 CFR Part 17: Endangered and threatened wildlife and plants; designation of critical habitat for Texas Golden Gladecress and Neches River Rose-Mallow; final rule. http://www.gpo.gov/fdsys/pkg/FR-2013-09-11/pdf/2013-22083.pdf.

Wang, Z., H. Yang, F. Zhang, Y. Yin, & C. Gu. 2022. The complete chloroplast genome sequence of *Hibiscus coccineus*. Mitochondrial DNA Part B 7, 1:217–218.

Ward, D.B. 2008. Thomas Walter typification project, V: Neotypes and epitypes for 63 Walter names of genera D through Z. J. Bot. Res. Inst. Texas 2(1):475–486.

Winters, H.F. 1970. Our hardy *Hibiscus* species as ornamentals. Econ. Bot. 24:155–164.

Wise, D.A. & M.Y. Menzel. 1971. Genetic affinities of the North American species of *Hibiscus* sect. *Trionum*. Brittonia 23:425–437.