

# New aliens in Malvaceae for the North African flora, with nomenclatural notes

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## Abstract

NEW ALIENS IN MALVACEAE FOR THE NORTH AFRICAN FLORA, WITH NOMENCLATORIAL NOTES.— As part of ongoing studies on Tunisian Malvaceae, populations of two *Hibiscus* species (*H. rosa-sinensis* and *H. syriacus*) and *Lagunaria patersonia* were discovered in northern Tunisia, representing first records for the national and North African flora. Morphological characters, as well as ecological and chorological data are given. Nomenclatural notes about the names *H. acerifolius* (= *H. syriacus*), *H. chinensis* (= *H. syriacus*), *H. patersonius* (basionym of *L. patersonia*), and *H. rhombifolius* (= *H. syriacus*) are provided, i.e. indication of the holotype for *Hibiscus chinensis* (van Braam Houckgeest's illustration), and designation of lectotypes for *H. acerifolius* (a Salisbury's illustration), *H. rhombifolius* (Cavanilles's illustration), and *H. patersonius* (Andrew's illustration). Further illegitimate and invalid names (*Althaea frutex*, *H. floridus*, *Ketmia syrorum*, *K. arborea*, and *K. arborescens*) are also treated.

Key words: *Hibiscus*; *Lagunaria*; non-native taxa; Tunisia; typification.

## Resumen

NUEVAS ALÓCTONAS EN MALVACEAE PARA LA FLORA AFRICANA DEL NORTE, CON NOTAS NOMENCLATORIALES.— Como parte de los estudios en curso sobre las *Malvaceae* de Túnez, se descubrieron poblaciones de dos especies de *Hibiscus* (*H. rosa-sinensis* y *H. syriacus*) y de *Lagunaria patersonia* en el norte de Túnez, que representan los primeros registros de la flora nacional y norteafricana. Se describen caracteres morfológicos, así como datos ecológicos y corológicos. Se proporcionan notas nomenclaturales sobre los nombres *H. acerifolius* (= *H. syriacus*), *H. chinensis* (= *H. syriacus*), *H. patersonius* (basiónimo de *L. patersonia*) y *H. rhombifolius* (= *H. syriacus*), incluida la designación de holótipo para *H. chinensis* (ilustración de van Braam Houckgeest), y designación de lectótipos para *H. acerifolius* (una ilustración de Salisbury), *H. rhombifolius* (ilustración de Cavanilles) y *H. patersonius* (ilustración de Andrew). También se tratan otros nombres ilegítimos e inválidos (*Althaea frutex*, *H. floridus*, *Ketmia syrorum*, *K. arborea* y *K. arborescens*).

Palabras clave: *Hibiscus*; *Lagunaria*; táxones no nativos; tipificación, Túnez.

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## INTRODUCTION

Malvaceae Juss. is a family of about 243 genera and over 4225 species, mainly distributed in tropical areas, but also occurring in temperate regions (Stevens, 2001–).

Many Malvaceae species are used for various purposes, such as natural fibers (e.g. cotton, genus *Gossypium* L.), ornamentals (e.g. genera *Alcea* L., *Hibiscus* L., *Lavatera* L.), foods (e.g. cacao, genus *Theobroma* L.), vegetable oils [e.g. from baobab (genus *Adansonia* L.)], beverages (e.g. colas, genus *Cola* Schott. & Endl.), timber (e.g. genus *Tilia* L.), medicinals [e.g. for the demulcent nature, genus *Althaea* L., or astringent (genus *Hibiscus*), or diuretic (genus *Abutilon* Mill.)] (see e.g. Mitchell, 1982; Forrest, 2006; Wakelyn *et al.*, 2007; Benchasri, 2012; Ogbu, 2014; Țiței & Teleuță, 2018; Tumpa & Islam, 2019). Some species are able to escape from cultivation, impacting both natural (loss of biodiversity) and agricultural (economically with reduction in productivity and crop quality) systems (Spencer, 1984; Pasiecznik, 2016).

As part of an ongoing study on the family Malvaceae (e.g. Iamónico, 2010, 2014a, b, 2016, 2018; Iamónico & Peruzzi, 2014; Iamónico & Del Guacchio, 2017; Iamónico & Valdés, 2017) and the alien Flora of Tunisia (El Mokni & Iamónico 2017, 2018a, b, 2019; Iamónico & El Mokni, 2017, 2019a, b), field surveys allowed to find some populations of three Malvaceae species which were not previously reported from both the country and the whole of northern Africa [*Hibiscus rosa-sinensis* L., *H. syriacus* L., and *Lagunaria patersonii* (Andr.) G. Don]. Distribution of the African populations in Tunisia, and notes on their habitats are provided. The nomenclature of the untypified names *Hibiscus acerifolius* Salisb., *H. chinensis* DC., *H. patersonius* Andr., and *H. rhombifolius* Cav. is also discussed.

## MATERIALS AND METHODS

The research is based on field surveys, analysis of relevant literature, and searching/examination of specimens preserved at BM, G, HFLA, MA, LINN, and P [herbarium codes following Thiers, 2020 (continuously updated)].

The Articles cited through the text follow the International Code of Nomenclature for algae, fungi, and plants (Turland *et al.*, 2018, hereafter ICN).

## RESULTS AND DISCUSSION

### *Hibiscus rosa-sinensis*

The genus *Hibiscus* is represented in the flora of Tunisia by just one species, i.e. *H. trionum* L. (Le Floch *et al.*, 2010: 268; Valdés, 2011a). Five *Hibiscus* species (*H. micranthus* L. f., *H. palustris* L., *H. sabdariffa* L., *H. trionum* L., and *H. vitifolius* L.) are currently recorded in North Africa (Valdés, 2011b; SANBI, 2012 and literature therein). Our finding of *H. rosa-sinensis* L. represents the first record for both the Tunisian and the North African floras.

*Hibiscus rosa-sinensis* L., Sp. Pl. 2: 694 (1753) (Fig. 1A).

Lectotype (designated by Borssum Waalkes, 1966: 72): Herb. Hermann 3: 4, No. 260 (BM, barcode BM-000621802 [photo!], image available at <https://data.nhm.ac.uk/object/a481219f-0364-42d4-8b9c-ddb192d0ef11/1587427200000>).

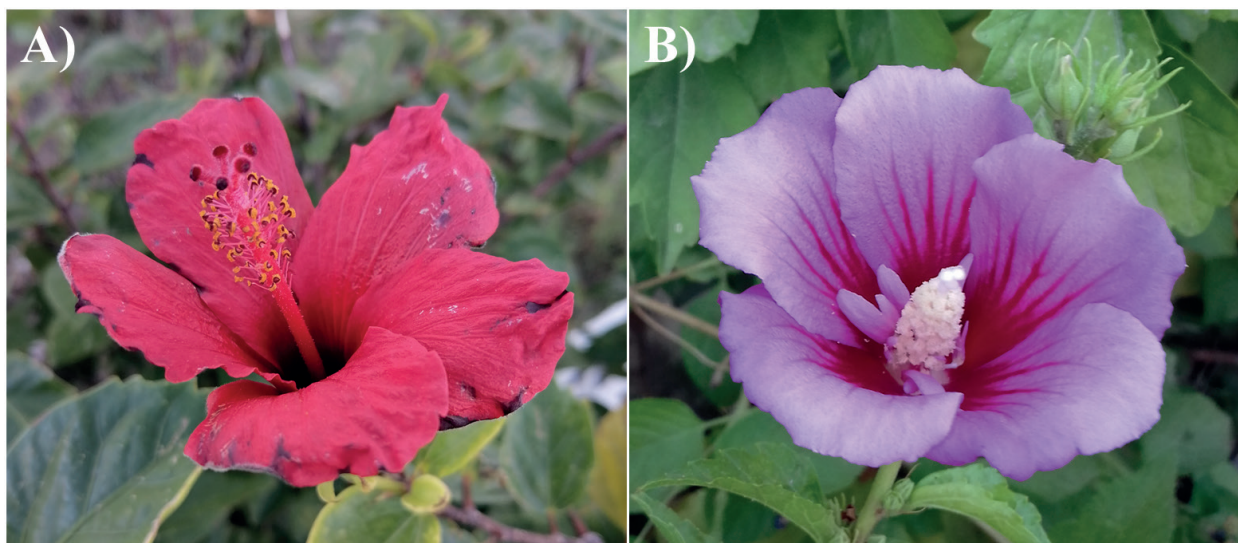
*Habitat in Tunisia*: sidewalks in urban areas.

*Elevation*: 5 m a.s.l.

*Distribution in Tunisia*: we found one population at Bizerta-City (NE-Tunisia) comprising five individuals which occupy an area of about 21 m<sup>2</sup>. At the current state of knowledge, we tentatively consider *Hibiscus rosa-sinensis* as casual alien species for Tunisia and North Africa. No seedlings were observed.

*Chorology*: the origin of *Hibiscus rosa-sinensis* is unknown, but it could have originated in China (Tang *et al.*, 2007). It has also been thought to have originated in Africa (Borssum Waalkes, 1966) or the New World Tropics (Prendergast, 1982). However, since *H. rosa-sinensis* includes a wealth of hybrids and other selections and has a complicated history in cultivation, its origin remains uncertain at present (Tang *et al.*, 2007; Braglia *et al.*, 2010). This species is considered as alien in Asia (Tang *et al.*, 2007; Valdés, 2011b), Europe (only in Italy, in Sardinia region; Galasso *et al.*, 2018), Central and South America (Blanchard, 2015), and eastern Australia (Atlas of Living Australia, 2020a).

*Notes on cultivar name*: *Hibiscus rosa-sinensis* is widely cultivated as ornamental plant and many cultivars were created (The American Hibiscus Society, 2016). A recent molecular study on 47 cultivars (Braglia *et al.*, 2010) showed that there are few differences among them using DNA sequences,



**Figure 1.** (A) *Hibiscus rosa-sinensis*; (B) *Hibiscus syriacus* (photographs by R. El Mokni).

although some clusters were moderately to highly supported (bootstrap values > 80). It is difficult to identify the variety/cultivar. On the basis of the size and color of corollas, Tunisian plant can be referred to the cultivar ‘*Leuchtfeuer*’ (Braglia *et al.*, 2010).

*Specimina visa from Tunisia:* Tunisia, Bizerta, Bizerta-South, sidewalks near public gardens, 5 m a.s.l., 6.III.2020, *El Mokni & Iamonico s.n.* (Herb. Univ. Monastir!); *ibidem* (HFLA!).

### *Hibiscus syriacus*

As already stated above (see under the paragraph “*Hibiscus rosa-sinensis*”) the occurrence of *Hibiscus syriacus* is here recorded for the first time in both Tunisia and the whole of northern Africa (Le Floc’h *et al.*, 2010: 268; Valdés, 2011a; SANBI, 2012 and literature therein).

*Hibiscus syriacus* L., Sp. Pl. 2: 695 (1753) ≡ *Ketmia syriaca* (L.) Scop., Fl. Carniol. (ed. 2) 2: 45 (1772) ≡ *K. syrorum* Medik., Malvenfam.: 45 (1787), *nom. superfl. et illeg.*<sup>1</sup> (Art. 52.2 of ICN) ≡ *H. arborescens* Gatereau, Descr. Pl. Montauban 122 (1789),

<sup>1</sup> Medikus (1787: 45) proposed the new name *Ketmia syrorum* listing “*Hibiscus* L. num. 12” as a synonym. This citation refers to the twelfth species listed by Linnaeus (1762: 978) in the 2<sup>nd</sup> edition of *Species Plantarum*, i.e. *Hibiscus syriacus*. Since the Linnaean species was validly published, the Medikus’ name is superfluous and illegitimate under the Art. 52.2 of ICN.

*nom. superfl. et illeg.*<sup>2</sup> (Art. 52.2 of ICN) ≡ *K. arboorea* Moench, Methodus: 617 (1794), *nom. superfl. et illeg.*<sup>3</sup> (Art. 52.2 of ICN) ≡ *H. floridus* Salisb., Prodr. Stirp. Chap. Allerton: 383 (1796), *nom. superfl. et illeg.*<sup>4</sup> (Art. 52.2 of ICN) (Fig. 1B).

Lectotype (designated by Abedin, 1979: 13): Herb. Linn. 875.24 (LINN [photo!], image available at <http://linnean-online.org/6872/>).

= *Hibiscus rhombifolius* Cav., Diss. 3, Tertia Diss. Bot.: 156 (1787)

Lectotype (**designated here**): [Icon] Tab. LXIX f. 3 *Hibiscus rhombifolius* in Cavanilles (1787), image of lectotype available at <https://archive.org/details/monadelphiaeclas14cava/page/n363/mode/2up/search/LXIX>.

= *Hibiscus acerifolius* Salisb., Parad. Lond. 1: Tab. 33 (1805).

Lectotype (**designated here**): [Icon] Tab. 33 *Hibiscus acerifolius* in Salisbury (1805), image of lectotype available at <https://www.biodiversitylibrary.org/page/36898142#page/70/mode/1up>.

<sup>2</sup> Gatereau (1789: 122) proposed the new name *Hibiscus arborescens* reporting the validly published *Hibiscus syriacus* L. as a synonym. As a consequence, the Gatereau’s name is superfluous and illegitimate under the Art. 52.2 of ICN.

<sup>3</sup> Moench (1794: 617) proposed the new name *Ketmia arboorea* listing the validly published *Hibiscus syriacus* L. as a synonym. As a consequence, the Moench’s name is superfluous and illegitimate under the Art. 52.2 of ICN.

<sup>4</sup> Salisbury (1796: 383) proposed the new name *Hibiscus floridus* reporting the validly published *Hibiscus syriacus* L. as a synonym. As a consequence, the Salisbury’s name is superfluous and illegitimate under the Art. 52.2 of ICN.



= *Hibiscus chinensis* DC., Prodr. 1: 455 (1824), *nom. illeg.* (Art. 53.1 of ICN) non *H. chinensis* Roxb.

Holotype: [Icon] Tab. 24 in van Braam Houckgeest (1821), image of lectotype available at <https://gallica.bnf.fr/ark:/12148/btv1b7300008x/f53.item>.

– *Althaea frutex* Mill., Gard. Dict., ed. 8. (1768), *nom. inval. pro syn. of Hibiscus syriacus* (Art. 36.1b of ICN).

*Habitat in Tunisia:* foots of walls of an ancient building.

*Elevation:* 35 m a.s.l.

*Distribution in Tunisia:* one population was found at Lahouemdeya (Tabarka, Jendouba, NW-Tunisia) which comprises six individuals occupying an area of about 3 m<sup>2</sup>. At the current state of knowledge, we tentatively consider *Hibiscus syriacus* as casual alien species for Tunisia and North Africa. No seedlings were observed.

*Chorology:* *Hibiscus syriacus* is native to China (Provinces of Anhui, Guangdong, Guangxi, Jiangsu, Sichuan, Taiwan, Yunnan, and Zhejiang) but it was taken into cultivation very early and was distributed to the Middle East where it is considered as alien (Tang *et al.*, 2007). This species is also naturalised in Europe (France, Italy, Hungary, Serbia, and Greece; Valdés, 2011b), North America (eastern USA.; Swearingen & Barger, 2016), and southeastern Australia (Atlas of Living Australia, 2020b).

*Typification of the name Hibiscus rhombifolius:* Cavanilles (1787: 156) validly published *H. rhombifolius* through a detailed description, the provenance (“Habitat in India orientali”) and the following statement: “V. S. [Vidi Siccam] unicum exemplar apud D. de Lamarck ex collectis sonneratianis”. The latter sentence indicates that J. A. Cavanilles has seen a single specimen collected by P. Sonnerat (1748–1814), a French naturalist and explorer (Stafleu & Cowan, 1985: 744). However, we cannot consider it as the holotype of the name *Hibiscus rhombifolius* since Cavanilles (loc. cit.) also published an illustration (“Tab. LXIX, fig. 3”) which is part of the original material for the name *Hibiscus rhombifolius* (see Arts. 9.1 and 9.4 of ICN). As a consequence, a lectotypification is necessary (Art. 9.3 of ICN). Sonnerat’s collection is preserved at P (Stafleu & Cowan, 1985: 744). In the online database of the P herbarium (see <https://science.mnhn.fr/institution/mnhn/collection/p/item/p00287601>)

appears a record form referring to a specimen of *H. rhombifolius* (P00287601) which would be included in the Historical Collection of Paris Herbarium. This specimen was identified by J. van Borssum Waalkes (April 1959) as *H. syriacus* and marked by him as “ISOTYPE” according to the record form. There also is a later annotation (“Type”) by S. Doorenbos (in 2013). Since no image of P00287601 is available on line, we requested it but we have not received a reply. Fortunately, the Cavanilles’ illustration, which morphologically matches the original description of *H. rhombifolius*, can be used to fix the name and it is here designated as the lectotype. According to the current concept in *Hibiscus* (see e.g. Tang *et al.*, 2007; Blanchard, 2015) the lectotype of *H. rhombifolius* can be identified with *H. syriacus* and the two names are considered as heterotypic synonyms.

*Typification of the name Hibiscus acerifolius:* Salisbury (1805: without pagination) validly described *H. acerifolius* by giving a short diagnosis and a detailed description highlighting the species is “very distinct ... from the *Syriacus* of Linneé, in which the leaves are wedge-shaped at the base with much shorter petioles”. Salisbury (loc. cit.) also provided a colored illustration which is original material. We have not been able to trace specimens of original material and, as a consequence, we are forced to designate the Salisbury’s illustration no. 33 as the lectotype of the name *Hibiscus acerifolius*. Note that this image matches the Salisbury’s diagnosis and description. According to the current concept in *Hibiscus* (see e.g. Tang *et al.*, 2007; Blanchard, 2015) the lectotype of *H. acerifolius* can be identified with *H. syriacus* and the two names are here synonymized.

*Type of the name Hibiscus chinensis:* Candolle (1824: 455) validly described *H. chinensis* providing a short diagnosis and citing as synonym “Braam. ic. chin. 1821. t. 24” which refers to *Icones plantarum sponte China nascentium, e bibliotheca braamiana excerptae* by Braam Houckgeest (1821). Braam’s illustration (t. 24) is original material for the name. Note that Candolle (loc. cit.) did not reported “v. s.” (*vidi siccam*) under *H. chinensis*, which would have indicated that he examined herbarium specimens (see the *Prefatio* by Candolle 1824: vi). Moreover, no specimen was found by us. According to the Art. 9.1 of ICN and the considerations by McNeill (2014), the image no. 24 of Braam Houckgeest (1821) can be considered as the holotype of the name *H. chinensis*. According to

the current concept in *Hibiscus* (see e.g. Tang *et al.*, 2007; Blanchard, 2015) this holotype can be identified with *H. syriacus* and the two names are here synonymized.

*Taxonomic notes on the infraspecific variability:* *Hibiscus syriacus* is a very popular frost-hardy flowering shrub commonly used as ornamental plant in gardens and public green (e.g. as street trees) and many cultivars have been developed, some of which have been given formal scientific names. According to Tang *et al.* (2007) these varieties can be distinguished on the basis of flowers arrangement (solitary or double), the diameter of the corollas, and the color of the petals. The Tunisian plants have solitary flowers, 5–6 cm in diameter, lavender or violet with a dark red center which would correspond to the var. *grandiflorus* Rehder.

*Specimina visa from Tunisia:* Tunisia, Jendouba, Lahouemdeya, Tabarka, 35 m a.s.l., 30.IX.2015, *El Mokni & Iamonico s.n.* (Herb. Univ. Monastir!); *ibidem* (HFLA!).

### *Lagunaria patersonia*

*Lagunaria patersonia* is currently recorded in Africa only in Kenya (Lebrun & Stork, 1991), and South Africa (Coyne, 2011). Our finding represents the first record for both the Tunisian and the North African floras.

*Lagunaria patersonia* (Andr.) G. Don, Gen. Hist. 1: 485 (1831, as “*patersonii*”) ≡ *Hibiscus patersonius* Andr., Bot. Repos. 4: t. 286 (1803) [basonym] (Fig. 2).

Lectotype (**designated here**): [Icon] Plate CCLXXXVI *Hibiscus patersonius* in Andrews (1803), image of lectotype available at <https://www.biodiversitylibrary.org/item/109451#page/144/mode/1up>.

*Habitat in Tunisia:* sidewalks in urban area.

*Elevation:* 5–15 m a.s.l.

*Distribution in Tunisia:* two populations were found at Ariana-City and Bizerta-North (NE-Tunisia).



**Figure 2.** *Lagunaria patersonia*: (A), flowers; (B) fruits (photographs by R. El Mokni).



The first population comprises five individuals which occupy an area of about 24 m<sup>2</sup>, the second population includes three individuals occupying an area about 16 m<sup>2</sup>. At the current state of knowledge, we tentatively consider *Lagunaria patersonia* as casual alien species for Tunisia and North Africa. No seedlings were observed.

**Chorology:** *Lagunaria patersonia* is native to the Pacific Islands (Lord Howe Island, Norfolk Island) and Australia (Queensland and New South Wales) and it is alien in America [San Diego County (Hanes, 2015), California (Calflora, 2020), and Hawaii islands (Coyne, 2011)], Australia [south-east (Jessop & Toelken, 1986; Atlas of Living Australia, 2020c) and New Zealand (Coyne, 2011; New Zealand Plant Conservation Network, 2020)], Europe [e.g. in Portugal (Almeida & Freitas, 2006) and Sicily (La Mantia *et al.*, 2015)], Africa [Kenya (Lebrun & Stork, 1991), and South Africa (Coyne, 2011)].

**Typification of *Hibiscus patersonius*:** The name *Hibiscus patersonius* was validly published by Andrews (1803) who provided a diagnosis and a detailed and colored illustration (Plate CCLXXXVI) that is part of the original material used by Andrews (*loc. cit.*) to describe the species. Stafleu & Cowan (1976: 49) stated that H. C. Andrews (1799–1830), a botanical painter and engraver, prepared his illustrations based on living plants and no herbarium specimens are known to exist. However, Andrews (*loc. cit.*) stated “Our figure is from a specimen received from the Right Hon. Lord Viscount Courtenay, in whose collection at Powderham, near Exeter...”. As a consequence, the Andrews’ t. 286 can not be considered as the holotype (see Arts. 9.1 and 8.4 and the consideration by McNeill, 2014), but it is available as a possible lectotype. The Courtenay’s specimen cited by Andrews (*loc. cit.*) in the protologue was not found. As a consequence, the Plate CCLXXXVI, which matches the diagnosis and corresponds to the current concept of the species (see e.g. Hanes, 2015), is here designated as the lectotype of the name *H. patersonius*.

**Taxonomic notes:** Craven *et al.* (2006) treated the populations occurring in Queensland at species rank, naming them as *Lagunaria queenslandica* Craven (in Craven *et al.*, 2006: 352). This species was said to differ from *L. patersonia* by the length of the petals (47–58 mm vs. 40–46 mm), length of the staminal column (40–62 mm vs. 30–36 mm), and length of the antheriferous part (8–13 mm vs. 13–20 mm). The populations discovered in Tunisia

display morphological characteristics that match those of *L. patersonia*.

**Specimina visa from Tunisia:** Tunisia, Ariana, Ariana-City, near public gardens, 6 m a.s.l., 5.XII.2018, *El Mokni & Iamónico s.n.* (Herb. Univ. Monastir!); *ibidem* (HFLA!); *ibidem*, 8.III.2020 (Herb. Univ. Monastir!); Bizerta, Bizerta-North, sidewalks near public gardens, 15 m a.s.l., 5.III.2020 (Herb. Univ. Monastir!).

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