Typification of the name *Lavatera triloba* subsp. *pallescens* (Moris) Nyman and reassessment of *L. minoricensis* Cambess. (*L. triloba* subsp. *minoricensis* comb. nov.)

by

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Abstract


The taxonomic identity of two poorly known taxa of the *Lavatera triloba* aggregate (Malvaceae) is clarified. The name *L. triloba* subsp. *pallescens* (Moris) Nyman is reassessed, and a new combination, *L. triloba* subsp. *minoricensis*, is proposed. Both taxa were originally described as species, and later either regarded as synonymous or alternatively subsumed as mere forms within subsp. *pallescens*. The extreme rarity of the plants led to insufficient knowledge and subsequent misinterpretation of the basionyms, *L. minoricensis* Cambess. from Minorca (Balearic Islands, Spain) and *L. pallescens* Moris from southwestern Sardinia (Italy). The combination *L. triloba* subsp. *pallescens* (Moris) Nyman was used to refer the Minorcan plants despite their clear differences in morphology and ecology. The rediscov-ery of two Sardinian populations of *L. triloba* subsp. *pallescens* in nature, after more than 110 years without reports or collections, has allowed for re-evaluation and typification of the misused names.

Keywords: *Lavatera triloba* aggregate, Malvaceae, taxonomy, endemism, Sardinia, Minorca, typification.

Introduction

The *Lavatera triloba* aggregate is a monophyletic group of perennial herbs or sub-shrubs endemic to the Western Mediterranean region (Escobar & al., 2009). The presence of clear morphological synapo-morphies, such as the indumentum composed of varying mixtures of fasciculate and stellate hairs as well as single glands, and the arrangement of the flowers in axillary fascicles, led Fernandes (1968a) to recognise it as section *Glandulosae* R. Fern. The *L. triloba* aggregate includes five taxa of ambiguous tax-
onomastic status: *L. triloba* L. subsp. *triloba* is a tall herbaceous perennial or subshrub with large purple flowers and petals up to 30 mm long. It occurs on the Iberian Peninsula and in Sardinia. *Lavatera flava* Desf. is a tall perennial herb or subshrub endemic to north Africa growing on clayey sediments with high contents in salts. *Lavatera agrigentina* Tino from Sicily is morphologically and ecologically similar to *L. flava*. Both taxa have large pale flowers (yellowish in *L. agrigentina*; whitish, yellowish or pinkish in *L. flava*) with petals up to 25 mm.

*Lavatera pallescens* was described in 1837 by the Italian botanist G.H. Moris to distinguish a plant with pale green leaves and whitish-pinkish flowers from coastal grasslands on the isle of San Pietro (offshore southwestern Sardinia), from typical *L. triloba* growing on clayey sediments around Elmas. The taxon was for the last time collected in 1894 by Ugolino Martelli (herbarium voucher preserved in FI). Only after more than 110 years, we encountered two small populations in southwestern Sardinia. In 1827, the French botanist J. Cambessèdes described *L. minoricensis* from Minorca, on the basis of its round, crispate leaves and shorter corolla. This taxon shares with *L. pallescens* a lower growth height than *L. triloba* and pale (pink to whitish-pinkish, sometimes yellowish) flowers.

Our work is the first contribution to the knowledge of the Sardinian endemic *L. pallescens* after its description. We aim to prove that the Minorcan and Sardinian *L. minoricensis* and *L. pallescens* represent distinct taxa, which are morphologically and ecologically differentiated both from each other and from other members of the *L. triloba* aggregate. We argue that *L. pallescens* and *L. minoricensis* should be treated as subspecies of *L. triloba* and provide evidence that the use of the name *L. triloba* subsp. *pallescens* to refer to the Minorcan plants is erroneous and led by the extreme rarity of *L. triloba* subsp. *pallescens* in nature, and subsequently in the collections.

**Material and methods**

During spring and early summer 2008 we collected materials for a project dealing with the phylogography of the *L. triloba* aggregate. We collected *L. triloba* subsp. *triloba* in Iberia and Sardinia, *L. minoricensis* in Minorca, *L. flava* in North Africa and *L. agrigentina* in Sicily. We searched for *L. pallescens* in Sardinia, including its locus classicus on the Isle of San Pietro, and the main coastal limestone massifs (cliffs of Capo Caccia near Alghero in northwestern Sardinia, cliffs and mountains of southwestern Sardinia, Isle of Tavolara).

The materials studied included herbarium vouchers from BC, CAG, FI, MA, MPU, SASSA and TO. Vouchers of the materials collected were deposited at CAG and WU.

**Results and discussion**

**Taxonomic treatment**

*Lavatera minoricensis* is morphologically and ecologically substantially different from the Sardinian *L. pallescens* (Table 1). It is a compact plant lower than 50 cm, while *L. pallescens* is usually taller than 1 m. The leaves of *L. pallescens* are pale yellowish-green, usually up to 10 × 10 cm and have three to five lobes (sometimes seven) and an undulate margin. *Lavatera minoricensis* has pale green round, smaller leaves (up to 3.5 × 3.5 cm) with crispate margins, and only the upper leaves subtending the flowers are shallowly three- or five-lobed. The adaxial leaf epidermis is markedly differentiated, and trichome type and relative abundance are important diagnostic characters (Fig. 1). In *L. pallescens*, the upper leaf surface is covered by a dimorphic indumentum of numerous fasciculate hairs and sparse single glandular hairs (Fig. 1, C, H). Contrastingly, the upper leaf surface indumentum of *L. minoricensis* is trimorphic, consisting of sparse fasciculate hairs, sparse glands and abundant subsessile to long pedicellate, stellate hairs that detach when the plant is touched (Fig. 1, D, I). As a result, *L. minoricensis* is strongly hispid while *L. pallescens* is not. Both taxa are also easily distinguishable from the other members of the *L. triloba* aggregate. *Lavatera t.* subsp. *triloba* has a trimorphic indumentum with numerous fasciculate hairs, numerous shortly pedicellate or (sub-)sessile stellate hairs that detach when the plant is touched, and abundant single glands (Fig. 1, E, J, K); as a result, plants feel often wet when touched and are hispid. *Lavatera agrigentina* and *L. flava* display a dimorphic upper leaf surface indumentum of sparse fasciculate hairs and abundant single glands, resulting in fetid, viscid plants that are not hispid (Fig. 1, A, F; B, G).

In *L. pallescens*, the flowers are smaller than in typical *L. triloba* with petals up to 25 mm long, clearly exceeding the calyx lobes, while in *L. minoricensis* the flowers are smaller and the petals, which are up to 15 mm long, are shorter or only slightly longer than the calyx. While the flowers of *L. pallescens* open normally, those of *L. minoricensis* often remain almost closed, as depicted on plate CXLVI of Willkomm’s *Illustrationes Florae Hispaniae II* (1886-1892, under Malva minoricensis). Moreover, *L. minoricensis* seems to be selfing (Iriondo & al., 2003), while other members of
Table 1. Diagnostic morphological characters, ecology and distribution of the five members of the Lavatera triloba aggregate.

<table>
<thead>
<tr>
<th>Character</th>
<th>L. triloba subsp. triloba</th>
<th>L. triloba subsp. pallescens</th>
<th>L. triloba subsp. minoricensis</th>
<th>L. flava</th>
<th>L. agrigentina</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plant height</strong></td>
<td>80-150(200) cm</td>
<td>10-50 cm</td>
<td>(80)100-150(200) cm</td>
<td>70-150 cm</td>
<td></td>
</tr>
<tr>
<td><strong>Glands</strong></td>
<td>Strongly glandular, often viscid</td>
<td>Sparsely glandular</td>
<td>Sparsely glandular</td>
<td>Strongly glandular, viscid, fetid</td>
<td>Strongly glandular, viscid, fetid</td>
</tr>
<tr>
<td><strong>Adaxial leaf surface indumentum</strong></td>
<td>Trimorphic</td>
<td>Dimorphic</td>
<td>Trimorphic</td>
<td>Dimorphic</td>
<td>Dimorphic</td>
</tr>
<tr>
<td>(see also Fig. 1)</td>
<td>Fasciculate, long-radiated hairs numerous</td>
<td>Fasciculate, very long-radiated hairs sparse</td>
<td>Fasciculate, short-radiated hairs very sparse</td>
<td>Fasciculate, long-radiated hairs sparse</td>
<td></td>
</tr>
<tr>
<td><strong>Leaf shape</strong></td>
<td>Orbicular to oblong, subentire to 3-lobed. Leaf margin undulate or crenate</td>
<td>Orbicular to oblong, subentire to 3-5-lobed. Leaf margin undulate</td>
<td>Orbicular, subentire. Leaf margin crispate</td>
<td>Orbicular to oblong, subentire to shallowly 3-lobed. Upper leaves progressively triangular. Leaf margin dentate, undulate</td>
<td>Orbicular to oblong, subentire to 3-lobed. Upper leaves progressively triangular. Leaf margin dentate, undulate</td>
</tr>
<tr>
<td><strong>Leaf size</strong></td>
<td>Up to 10 x 10 cm</td>
<td>Up to 10 x 10 cm</td>
<td>Up to 3.5 x 3.5 cm</td>
<td>Up to 7 x 7 cm</td>
<td>Up to 7 x 7 cm</td>
</tr>
<tr>
<td><strong>Flower colour</strong></td>
<td>Petals deep purple, only occasionally white, petal nerves darker</td>
<td>Petals pale, whitish with pink shade, petal nerves not darker than the lamina</td>
<td>Petals pale, yellowish or pinkish, petal nerves not darker than the lamina</td>
<td>Petals whitish, pale pink or yellowish, only occasionally purple, very often with darker nerves</td>
<td>Petals pale yellow or white, nerves not darker than the lamina</td>
</tr>
<tr>
<td><strong>Dry flower colour</strong></td>
<td>Not turning green when dry</td>
<td>Not turning green when dry</td>
<td>Not turning green when dry</td>
<td>Turning green when dry</td>
<td>Turning green when dry</td>
</tr>
<tr>
<td><strong>Petal size</strong></td>
<td>(15)20-30 mm, clearly longer than the calyx</td>
<td>(10)20-25 mm, clearly longer than the calyx</td>
<td>10-15 mm, included in the calyx or slightly exerted</td>
<td>(15)20-25 mm, clearly longer than the calyx</td>
<td>(15)20-25 mm, clearly longer than the calyx</td>
</tr>
<tr>
<td><strong>Habitat</strong></td>
<td>Open habitats, clayey saline sediments, often subruderal. Rarely in primary habitats (open scrubland on limestone bedrock)</td>
<td>Coastal limestone screes and rocky outcrops. Only in areas directly exposed to the sea</td>
<td>Coastal limestone areas. Sometimes subruderal</td>
<td>Open habitats, clayey saline sediments, often subruderal</td>
<td>Open habitats, clayey saline sediments</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Iberian Peninsula, southern Sardinia</td>
<td>Southwestern Sardinia</td>
<td>Northern and eastern Minorca</td>
<td>Northwestern Africa (Morocco, Algeria, Tunisia)</td>
<td>Southern Sicily, historically recorded also in Calabria</td>
</tr>
</tbody>
</table>
the *L. triloba* aggregate fail to set seeds in the absence of pollinators (Escobar, unpubl.). All taxa flower in late spring (May-June, sometimes also July). The morphological characters are stable and are retained under uniform conditions in the greenhouse (Escobar, unpubl.). Seed morphocolorimetric data (Bacchetta, unpubl.) also provide further morphological evidence to distinguish between both taxa.

Maybe because of the early description, the rarity of the plant and the fact that the flower colours are not preserved in dry specimen of *Lavatera*, the name *L. pallescens* has been repeatedly misunderstood and confused. *Lavatera pallescens* was combined as subspecies of *L. triloba* by Nyman (1878), who ignored the binomial *L. minoricensis*, and was ever since used to refer to the Minorcan plant. In his synopsis of tribe *Malveae*, E.G. Baker (1890) listed both names and gave them varietal status within *L. triloba*. Later on, *L. pallescens* and *L. minoricensis* were repeatedly interpreted as synonyms, or *L. minoricensis* was treated as forma of subsp. *pallescens* (Fernandes, 1967, 1993).

In her account for *Flora Europaea*, R.B. Fernandes (1968b) followed Nyman (1878) and included both entities in a Minorcan-Sardinian *L. triloba* subsp. *pallescens*. Later, in her synthesis for *Flora iberica*, Fernandes (1993) relied on epicalyx characters to separate subsp. *pallescens* from subsp. *triloba*. Epicalyx pieces united in their lowest third should be characteristic for subsp. *triloba*, while almost free epicalyx pieces should characterize subsp. *pallescens*. The epicalyces of Iberian populations of subsp. *triloba*, however, are often deeply divided, sometimes almost to the base. Deep epicalyx lobation can also be observed in *L. flava* and *L. agrigentina*, as has been noted previously (Cambessèdes, 1827; Rodríguez, 1874; Pau, 1933). Free epicalyx pieces characterize the artificial
Linnaean circumscription of Malva. The epicalyx configuration of *L. minoricensis* led Rodríguez (1874) to publish the binomial *Malva minoricensis*, later used also by Willkomm (1886-1892) and Pau (1933).

**Lavatera triloba** subsp. *pallescens* (Moris) Nyman, Consp. Fl. Eur.: 128. 1878

*Lavatera pallescens* Moris in Fl. Sardoa 1: 301. 1837 [Basionym]


**Type:** [Italy, Sardegna:] Isola di San Pietro. In maritimis. *Moris* 226 (lectotype, here designated, TO!) (Fig. 2, A, C).

**Lavatera triloba** subsp. *minoricensis* (Cambess.) P. Escobar, **comb. nov.**

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Fig. 2. Type specimens of: **A,** *Lavatera triloba* subsp. *pallescens* (Moris) Nyman stored in TO; **C,** detail of the label; **B,** *L. t.* subsp. *minoricensis* in MPU; **D,** detail of the label.
**Lavatera minoricensis** Cambess. in Mém. Mus. Hist. Nat. 14: 334. 1827 [basionym]


**Lavatera triloba** var. **minoricensis** (Cambess.) Baker in J. Bot. (London) 28: 241. 1890

**Althaea minoricensis** (Cambess.) Borbás, Magyar Bot. Lapok 2: 302. 1903

**Althaea pallescens** Borbás, Magyar Bot. Lapok 2: 302. 1903

**Lavatera flava** var. **minoricensis** (Cambess.) Pau in Brotéria Ci. Nat. 2: 47. 1933

**Lavatera triloba** [subsp. **pallescens**] f. **minoricensis** (Cambess.) R. Fernandes in Feddes Repert. 74: 20. 1967


**Type:** [Spain, Balearic Islands, Menorca] In Minorca. Hernandez dedit nomine Malvae crispae. Junio 1825. Knoche herbarium, unnumbered (lectotype, MPU! selected by Rosselló & Sáez, 2000) (Fig. 2, B, D).

**KEY TO THE LAVATERA TRILoba AGGREGATE**

1. Petals purple, rarely whitish or white .......................................................... .............................. **L. triloba** subsp. **triloba**

2. Leaves up to 3.5 × 3.5 cm, crispate, rounded. Petals 10-15 mm long, included in the calyx or only slightly exerted ..............

3. Plants with sparse single glands and a dense indumentum of fasciculate hairs ........................................... .......................... **L. triloba** subsp. **pallescens**

4. Petals white or yellowish ........................................... **L. agrigentina**

- Petals white, yellowish or pinkish .......................................................... 2
- Leaves up to 10 × 10 cm, undulate, with 3-6(7) lobes. Petals (15)20-25 mm long, clearly longer than the calyx .............. 3
- Plants strongly glandular, fetid; upper leaf surface sparsely covered with fasciculate hairs ........................................... 4
- Petals white or pinkish with contrasting darker veins, rarely yellowish or completely white ........................................... **L. flava**

**Distribution and ecology**

The taxa included in the *L. triloba* aggregate are restricted to the central and western Mediterranean Basin (Fig. 3) (Fernandes, 1968b, 1993; Maire, 1932; Pignatti, 1982). *L. triloba* subsp. **pallescens** is a local endemic of southwestern Sardinia (two populations near the town of Buggerru), and thrives on limestone cliffs and scree slopes directly exposed to the sea (Fig. 4, D). The population on the locus classicus (Isle of San Pietro, offshore southwestern Sardinia) may be extinct due to urban development in the area, as despite intensive field search we failed to find any individuals. *L. triloba* subsp. **minoricensis** is a rare endemic of north and east Minorca and grows principally on limestone scree exposed to the sea, punctually also in

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**Fig. 3.** Distribution map of the five entities included in the *Lavatera triloba* aggregate.
subruderal habitats (Fig. 4, B). *L. agrigentina* is a rare plant endemic of Sicily (Italy), and thrives on saline unconsolidated clayey sediments (Fig. 4, A), mainly in the south of the island near the towns of Siculiana, Agrigento and Aragona. *Lavatera flava* is locally common and occurs in the northwestern Maghreb (north-eastern Morocco, northern Algeria, northwestern Tunisia) close to the Mediterranean shoreline, growing on clayey soils, often around endorheic saline lagoons, or as subruderal along irrigation ditches (Fig. 4, C). *Lavatera triloba* subsp. *triloba* is distributed mainly in the tertiary basins of the central and southern Iberian Peninsula and southern Sardinia (principally around the lake of Santa Gilla, Elmas), and can be locally abundant growing around endorheic lagoons, or mainly as subruderal (Fig. 4, E). Only sometimes the plants grow in primary habitats, namely open scrubland on limestone bedrock.

**Conclusions**

We have shown that *L. pallescens* and *L. minoricensis* are substantially different taxa. The Sardinian plants should be referred to as *L. triloba* subsp. *pallescens* (Moris) Nyman, whereas the Minorcan populations should be treated as subsp. *minoricensis*. This conclusion is not only supported by morphological but also by genetic data (Escobar & al., unpubl.).

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References


Appendix 1. Studied populations

Lavatera triloba subsp. minoricensis. Spain. Menorca: Cap de Favarits, 30-VI-2008, cercana al borde de la carretera, 39°59′49.0″N, 4°15′4.6″E, 75 m, P. Escobar & P. Fraga 839. Illa de l’Aire, 30-VI-2008, calizas, 39°48′5.4″N, 4°17′21.2″E, 4 m, P. Escobar & P. Fraga 836. Illa de l’Aire, 30-VI-2008, junto al embarcadero, 39°48′5.5″N, 4°17′22.8″E, 4 m, P. Escobar & P. Fraga 838.

Lavatera triloba subsp. pallescens. Spain. Menorca: Punta Nati, 30-VI-2008, pastizales rala sobre litosoles calizos, 40°02′37.9″N, 3°49′26.9″E, 100 m, P. Escobar & P. Fraga 841. S’Escullar, 30-VI-2008, calizas, 40°3′16.8″N, 5°31′58.9″E, 132 m, P. Escobar & P. Fraga 840.


Appendix 2. Herbarium voucher list


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