

THE FAMILY MALVACEAE (*SENSU STRICTO*) IN TEXAS

by

Marquise Gates, B.S.

A thesis submitted to the Graduate Council of
Texas State University in partial fulfillment
of the requirements for the degree of
Master of Science
with a Major in Biology
August 2022

Committee Members:

David E. Lemke, Chair

Paula S. Williamson

Alan W. Lievens

COPYRIGHT

by

Marquise Gates

2022

FAIR USE AND AUTHOR'S PERMISSION STATEMENT

Fair Use

This work is protected by the Copyright Laws of the United States (Public Law 94-553, section 107). Consistent with fair use as defined in the Copyright Laws, brief quotations from this material are allowed with proper acknowledgement. Use of this material for financial gain without the author's express written permission is not allowed.

Duplicate Permission

As the copyright holder of this work I, Marquise Gates, authorize duplication of this work, in whole or in part, for educational or scholarly purposes only.

ACKNOWLEDGEMENTS

I would like to acknowledge my family and friends for their extensive support in my academic journeys, and I also would like to acknowledge my mentors, graduate advisor, and committee for providing their support in assisting me towards pursuing a Master's degree in Biology with a focus on plant taxonomy.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	vi
ABSTRACT.....	vii
CHAPTER	
I. INTRODUCTION.....	1
II. MATERIALS AND METHODS.....	12
III. TAXONOMIC TREATMENT.....	14
LITERATURE CITED.....	90

LIST OF TABLES

Table	Page
1. Genera and species of Malvaceae in Texas as documented by Correll and Johnston (1970).....	5
2. Genera and species of Malvaceae in Texas as documented by Hatch et al. (1990).....	6
3. Genera and species of Malvaceae in Texas as documented by Jones et al. (1997).....	8
4. Genera and species of Malvaceae <i>sensu stricto</i> (= subfamily Malvoideae) in Texas as documented by the Flora of North America Editorial Committee (2015).....	10

ABSTRACT

Taxonomic keys are helpful devices that allow instructors, students, botanists, and others to identify unknown plant specimens. With respect to the flora of Texas, many of the currently available keys for flowering plant identification have become outdated due to changes in the classification system and may cause confusion for users when the keys are based on obscure or highly technical characteristics of the plants. A good example is provided by the mallow family (Malvaceae) in Texas. The mostly widely available keys to the family are those presented by Correll and Johnston (1970); however, these keys are largely based on technical characteristics that can be difficult for the inexperienced user to recognize or interpret, making accurate identifications difficult and uncertain.

This thesis focuses on producing new keys and a revised taxonomic treatment for the identification of members of the plant family Malvaceae in Texas. The keys are based on first-hand observation of specimens on deposit in the Biology Department Herbarium at Texas State University (SWT), as well as reviews of online specimen data and images and relevant literature citations. Thirty-one genera and eighty-eight species of Malvaceae are recognized in this treatment as being native or naturalized to Texas. A description of each genus is provided, along with keys and descriptions of the Texas species.

I. INTRODUCTION

Malvaceae *sensu stricto*, the mallow or hibiscus family, consists of approximately 243 genera and 4200 species worldwide. In Texas, the family comprises 31 genera, 87 species, and 10 subspecies and varieties. Members of the family are shrubby or herbaceous in their growth form and have leaves that are simple or rarely compound, alternate, stipulate, and petiolate. The floral characteristics are distinctive and make the family easily recognizable. Malvaceous plants have small to large, radially symmetric perfect flowers, with an epicalyx, a 5-merous calyx and corolla, a monadelphous androecium, and a syncarpous gynoecium with a superior ovary. The fruits are capsules or schizocarps, the seeds numerous or solitary (Correll and Johnston, 1970). In Texas, members of the family are found in every natural region of the state, although they are relatively uncommon in the High Plains and Rolling Plains regions.

Malvaceae is a family of economic importance throughout the world, particularly the cotton genus *Gossypium*. *Gossypium* species of economic importance include *G. hirsutum* and *G. barbadense* from the Americas and *G. arboreum* and *G. herbaceum* from Africa and Asia (Wendel et al., 2009). Cotton is the primary product obtained from *Gossypium* that has provided a variety of resources globally, such as fibers and lint from the seeds that are used in creating rope, clothing, paper, twine, textiles, and many more products (Simpson and Ogorzaly, 2014). In addition, cotton seeds are a source of oil used in cooking and in producing consumables such as mayonnaise, margarine, and salad dressings. In Africa the leaves of cotton are a source of therapeutic medicine for the treatment of a variety of ailments such as constipation, low blood pressure, slowly healing wounds, and stomach aches (Ikitoo, 2011).

Several other Texas species of Malvaceae also have demonstrated medicinal importance. *Abutilon theophrasti* has been used for synthesizing medicines useful in the treatment of chest infections, urethritis, toothaches, piles, gonorrhea, and hemorrhagic diseases (Hassan et al., 2021), while the flowers of *Anoda cristata* have been used for producing a drink to treat stomach ailments, fevers, and cough (Rendón et al., 2001; Zheng et al., 2004). Both Texas species of *Malva* (*M. neglecta* and *M. parviflora*) have been used medicinally to heal wounds, and the dried, powdered leaves and roots of the latter are used to clean open wounds and sores (Shale et al., 2005; Saleem et al. 2020). *Malvastrum coromandelianum* has been used to synthesize compounds with anti-inflammatory, antioxidative, and wound healing properties (Saxena et al. 2020).

The showy, colorful flowers of many Malvaceae have led to their use as garden ornamentals. Among Texas members of the family, species of *Abutilon*, *Alcea*, *Hibiscus*, and *Lavatera* are frequently cultivated.

The first comprehensive taxonomic treatment of Texas Malvaceae was published in 1970 by Correll and Johnston, who recognized 22 genera, 86 species, and 2 varieties as occurring in the state (Table 1). While the descriptions of genera and species provided by these authors are thorough and detailed, the identification keys included in the treatment have proven difficult for many workers to use effectively. Many of the key characters employed are highly technical in nature or are difficult to discern by those not already familiar with the family.

Hatch et al. (1990) provided an updated checklist of the vascular plant species occurring in Texas, which incorporated the results of taxonomic work done since the publication of Correll and Johnston (1970). This work, while lacking any keys or

descriptions of taxa, documented the occurrence of 29 genera, 95 species, and 13 subspecies or varieties of Malvaceae in the state (Table 2).

An updated checklist of the vascular plants of Texas published by Jones et al. (1997) incorporated the results of investigations completed since the publication of Hatch et al. (1990). This work provided a comprehensive checklist and included a complete synonymy and bibliography. In contrast to the publications of Correll and Johnston (1970) and Hatch et al. (1990), Jones et al. (1997) include a number of cultivated species of Malvaceae in their checklist, recognizing 32 genera, 97 species, and 5 subspecies and varieties for the state (Table 3).

The most recent comprehensive account of Texas Malvaceae is found in volume six of the *Flora of North America North of Mexico* (Flora of North America Editorial Committee, 2015), which recognizes a total of 31 genera, 90 species, and approximately 3 subspecies and varieties as occurring in North America (Table 4). The greater number of genera recognized, as compared to the treatment of Correll and Johnston (1970), is due to a revised circumscription of the family based on the studies of authors such as Judd and Manchester (1997), Alverson et al. (1998, 1999), and Bayer et al. (1999). Recent phylogenetic work by the above-cited authors has supported new relationships among the clades that constitute older Malvales. These authors have suggested that families such as Sterculiaceae, Tiliaceae, and Bombacaceae should be merged together and recognized at the subfamily level (Bayer et al., 1999) based on geography and morphology. More studies done involving the differentiation, merging, and subdividing of the families included with Malvaceae have recognized that they should be separated into their own subfamilies even though the similarities are relatively similar to the core (Judd and

Manchester, 1997). These views have been accepted and recognized as reasons why these families should be categorized as subfamilies within the Malvaceae phylogenetic clade.

In the present study, I will provide an updated taxonomic treatment of Texas Malvaceae *sensu stricto* (=subfamily Malvoideae), including keys, standardized descriptions, and relevant literature citations, based on the work presented in volume six of the *Flora of North America North of Mexico* (Flora of North America Editorial Committee, 2015), as well as more recently published works. The goal is to produce a comprehensive, yet user-friendly, treatment that does not rely on the highly technical characteristics often employed by Correll and Johnston (1970).

Table 1. Genera and species of Malvaceae in Texas as documented by Correll and Johnston (1970).

<i>Abutilon</i>	<i>Gossypium</i>	<i>Pavonia</i>
<i>A. glabriflorum</i>	<i>G. hirsutum</i>	<i>P. lasiopetala</i>
<i>A. hulseanum</i>		
<i>A. hypoleucum</i>	<i>Herissantia</i>	<i>Pseudabutilon</i>
<i>A. incanum</i>	<i>H. crispa</i>	<i>P. lozanii</i>
<i>A. lignosum</i>		
<i>A. malacum</i>	<i>Hibiscus</i>	<i>Sida</i>
<i>A. marshii</i>	<i>H. cardiophyllus</i>	<i>S. ciliaris</i>
<i>A. parvulum</i>	<i>H. coulteri</i>	<i>S. cordifolia</i>
<i>A. sonorae</i>	<i>H. cubensis</i>	<i>S. filicaulis</i>
<i>A. theophrasti</i>	<i>H. dasycalyx</i>	<i>S. filipes</i>
<i>A. trisulcatum</i>	<i>H. denudatus</i>	<i>S. grayana</i>
<i>A. umbellatum</i>	<i>H. lasiocarpus</i>	<i>S. hederacea</i>
<i>A. wrightii</i>	<i>H. militaris</i>	<i>S. helleri</i>
	<i>H. moscheutos</i>	<i>S. leprosa</i>
<i>Althaea</i>	<i>H. syriacus</i>	<i>S. lindheimeri</i>
<i>A. rosea</i>	<i>H. trionum</i>	<i>S. longipes</i>
		<i>S. neomexicana</i>
<i>Anoda</i>	<i>Kosteletzkya</i>	<i>S. paniculata</i>
<i>A. cristata</i>	<i>K. virginica</i>	<i>S. physocalyx</i>
<i>A. pentaschista</i>		<i>S. rhombifolia</i>
<i>A. pygmaea</i>	<i>Lavatera</i>	<i>S. spinosa</i>
<i>A. wrightii</i>	<i>L. trimestris</i>	
		<i>Sphaeralcea</i>
<i>Bastardia</i>	<i>Malachra</i>	<i>S. angustifolia</i>
<i>B. viscosa</i>	<i>M. capitata</i>	<i>S. coccinea</i>
		<i>S. digitata</i>
<i>Callirhoë</i>	<i>Malva</i>	<i>S. fendleri</i>
<i>C. alcaeoides</i>	<i>M. neglecta</i>	<i>S. hastulata</i>
<i>C. digitata</i>	<i>M. parviflora</i>	<i>S. incana</i>
<i>C. involucrata</i>	<i>M. rotundifolia</i>	<i>S. laxa</i>
<i>C. leiocarpa</i>	<i>M. sylvestris</i>	<i>S. leptophylla</i>
<i>C. papaver</i>		<i>S. lindheimeri</i>
<i>C. scabriuscula</i>	<i>Malvastrum</i>	<i>S. pedatifida</i>
	<i>M. americanum</i>	<i>S. subhastata</i>
<i>Cienfuegosia</i>	<i>M. aurantiacum</i>	<i>S. wrightii</i>
<i>C. drummondii</i>	<i>M. coromandelianum</i>	
		<i>Wissadula</i>
<i>Gaya</i>	<i>Malvaviscus</i>	<i>W. amplissima</i>
<i>G. violacea</i>	<i>M. arboreus</i>	<i>W. holosericea</i>
		<i>W. periplocifolia</i>
	<i>Modiola</i>	
	<i>M. caroliniana</i>	

Table 2. Genera and species of Malvaceae in Texas as documented by Hatch et al. (1990).

Abutilon

A. abutiloides
A. berlandieri
A. fruticosum
A. glabriflorum
A. hulseanum
A. hypoleucum
A. malacum
A. parvulum
A. sonorae
A. theophrasti
A. trisulcatum
A. umbellatum
A. wrightii

Alcea

A. rosea

Allowissadula

A. holosericea
A. lozanii

Anoda

A. cristata
A. lanceolata
A. pentaschista

Bastardia

B. viscosa

Batesimalva

B. violacea

Billieturnera

B. helleri

Callirhoë

C. alcaeoides
C. digitata
C. involucrata
C. leiocarpa
C. papaver
C. scabriuscula

Cienfuegosia

C. drummondii

Fryxellia

F. pygmaea

Gossypium

G. hirstum

Herissantia

H. crispa

Hibiscus

H. aculeatus
H. coulteri
H. dasycalyx
H. denudatus
H. grandiflorus
H. laevis
H. lasiocarpus
H. martianus
H. moscheutos
H. striatus
H. syriacus
H. trionum

Kosteletzkya

K. virginica

Lavatera

L. trimestris

Malachra

M. capitata

Malva

M. neglecta
M. parviflora
M. rotundifolia
M. sylvestris

Malvastrum

M. americanum
M. aurantiacum
M. coromandelianum

Malvaviscus

M. arboreus

Malvella

M. lepidota
M. leprosa
M. sagittifolia

Meximalva

M. filipes

Modiola

M. caroliniana

Pavonia

P. lasiopetala

Rhynchosida

R. physocalyx

Sida

S. abutilifolia
S. ciliaris
S. cordifolia
S. elliottii
S. lindheimeri
S. longipes
S. neomexicana
S. rhombifolia
S. spinosa
S. tragifolia

Sidastrum

S. paniculatum

Table 2. Continued

Sphaeralcea

S. angustifolia

S. coccinea

S. digitata

S. fendleri

S. hastulata

S. incana

S. laxa

S. leptophylla

S. lindheimeri

S. pedatifida

S. polychroma

S. subhastata

S. wrightii

Wissadula

W. amplissima

W. periplocifolia

Table 3. Genera and species of Malvaceae in Texas as documented by Jones et al. (1997).

<i>Abelmoschus</i>	<i>Cienfuegosia</i>	<i>Malva</i>
<i>A. esculentus</i>	<i>C. drummondii</i>	<i>M. neglecta</i>
<i>Abutilon</i>	<i>Fryxellia</i>	<i>M. parviflora</i>
<i>A. abutiloides</i>	<i>F. pygmaea</i>	<i>M. rotundifolia</i>
<i>A. berlandieri</i>	<i>Gossypium</i>	<i>M. sylvestris</i>
<i>A. fruticosum</i>	<i>G. hirstum</i>	<i>Malvastrum</i>
<i>A. hulseanum</i>	<i>Herissantia</i>	<i>M. americanum</i>
<i>A. hypoleucum</i>	<i>H. crispa</i>	<i>M. aurantiacum</i>
<i>A. malacum</i>	<i>Hibiscus</i>	<i>M. coromandelianum</i>
<i>A. mollicomum</i>	<i>H. aculeatus</i>	<i>Malvaviscus</i>
<i>A. parvulum</i>	<i>H. cannabinus</i>	<i>M. arboreus</i>
<i>A. theophrasti</i>	<i>H. coccineus</i>	<i>M. penduliflorus</i>
<i>A. trisulcatum</i>	<i>H. coulteri</i>	<i>Malvella</i>
<i>A. umbellatum</i>	<i>H. dasycalyx</i>	<i>M. lepidota</i>
<i>Alcea</i>	<i>H. denudatus</i>	<i>M. leprosa</i>
<i>A. rosea</i>	<i>H. grandiflorus</i>	<i>M. sagittifolia</i>
<i>Allowissadula</i>	<i>H. laevis</i>	<i>Meximalva</i>
<i>A. holosericea</i>	<i>H. martianus</i>	<i>M. filipes</i>
<i>A. lozanii</i>	<i>H. moscheutos</i>	<i>Modiola</i>
<i>Anoda</i>	<i>H. mutabilis</i>	<i>M. caroliniana</i>
<i>A. crenatiflora</i>	<i>H. rosa-sinensis</i>	<i>Pavonia</i>
<i>A. cristata</i>	<i>H. striatus</i>	<i>P. lasiopetala</i>
<i>A. lanceolata</i>	<i>H. syriacus</i>	<i>Rhynchosida</i>
<i>A. pentaschista</i>	<i>H. tiliaceus</i>	<i>R. physocalyx</i>
<i>Bastardia</i>	<i>H. trionum</i>	<i>Sida</i>
<i>B. viscosa</i>	<i>Kosteletzkya</i>	<i>S. abutilifolia</i>
<i>Batesimalva</i>	<i>K. depressa</i>	<i>S. ciliaris</i>
<i>B. violacea</i>	<i>K. virginica</i>	<i>S. cordifolia</i>
<i>Billieturnera</i>	<i>Lavatera</i>	<i>S. elliotii</i>
<i>B. helleri</i>	<i>L. trimestris</i>	<i>S. lindheimeri</i>
<i>Callirhoë</i>	<i>Malachra</i>	<i>S. longipes</i>
<i>C. alcaeoides</i>	<i>M. capitata</i>	<i>S. neomexicana</i>
<i>C. involucrata</i>		<i>S. rhombifolia</i>
<i>C. leiocarpa</i>		<i>S. spinosa</i>
<i>C. papaver</i>		<i>S. tragiifolia</i>
<i>C. pedata</i>		

Table 3. Continued

Sidastrum

S. paniculatum

Sphaeralcea

S. angustifolia

S. coccinea

S. digitata

S. fendleri

S. hastulata

S. incana

S. laxa

S. leptophylla

S. lindheimeri

S. pedatifida

S. wrightii

Thespia

T. populnea

Wissadula

W. amplissima

W. periplocifolia

Table 4. Genera and species of Malvaceae *sensu stricto* (= subfamily Malvoideae) in Texas as documented by the Flora of North America Editorial Committee (2015).

<i>Abutilon</i>	<i>Cienfuegosia</i>	<i>Malvastrum</i>
<i>A. abutiloides</i>	<i>C. drummondii</i>	<i>M. americanum</i>
<i>A. berlandieri</i>		<i>M. aurantiacum</i>
<i>A. fruticosum</i>	<i>Fryxellia</i>	<i>M. coromandelianum</i>
<i>A. hulseanum</i>	<i>F. pygmaea</i>	
<i>A. hypoleucum</i>		<i>Malvaviscus</i>
<i>A. malacum</i>	<i>Gossypium</i>	<i>M. arboreus</i>
<i>A. mollicomum</i>	<i>G. hirstum</i>	
<i>A. parvulum</i>		<i>Malvella</i>
<i>A. theophrasti</i>	<i>Herissantia</i>	<i>M. lepidota</i>
<i>A. trisulcatum</i>	<i>H. crispa</i>	<i>M. leprosa</i>
<i>A. wrightii</i>		<i>M. sagittifolia</i>
	<i>Hibiscus</i>	
<i>Alcea</i>	<i>H. aculeatus</i>	<i>Meximalva</i>
<i>A. rosea</i>	<i>H. clypeatus</i>	<i>M. filipes</i>
	<i>H. coulteri</i>	
<i>Allowissadula</i>	<i>H. dasycalyx</i>	<i>Modiola</i>
<i>A. holosericea</i>	<i>H. denudatus</i>	<i>M. caroliniana</i>
<i>A. lozanii</i>	<i>H. laevis</i>	
	<i>H. martianus</i>	<i>Pavonia</i>
<i>Anoda</i>	<i>H. moscheutos</i>	<i>P. hastata</i>
<i>A. crenatiflora</i>	<i>H. radiatus</i>	<i>P. lasiopetala</i>
<i>A. cristata</i>	<i>H. striatus</i>	
<i>A. lanceolata</i>	<i>H. trionum</i>	<i>Pseudabutilon</i>
<i>A. pentaschista</i>		<i>P. umbellatum</i>
	<i>Kosteletzkya</i>	
<i>Bastardia</i>	<i>K. depressa</i>	<i>Rhynchosida</i>
<i>B. viscosa</i>	<i>K. virginica</i>	<i>R. physocalyx</i>
<i>Batesimalva</i>	<i>Krapovickasia</i>	<i>Sida</i>
<i>B. violacea</i>	<i>K. physaloides</i>	<i>S. abutilifolia</i>
		<i>S. ciliaris</i>
<i>Billieturnera</i>	<i>Lavatera</i>	<i>S. cordifolia</i>
<i>B. helleri</i>	<i>L. trimestris</i>	<i>S. elliotii</i>
		<i>S. lindheimeri</i>
<i>Callirhoë</i>	<i>Malachra</i>	<i>S. longipes</i>
<i>C. alcaeoides</i>	<i>M. capitata</i>	<i>S. neomexicana</i>
<i>C. involucrata</i>		<i>S. rhombifolia</i>
<i>C. leiocarpa</i>	<i>Malva</i>	<i>S. spinosa</i>
<i>C. papaver</i>	<i>M. neglecta</i>	<i>S. tragiifolia</i>
<i>C. pedata</i>	<i>M. parviflora</i>	
<i>C. scabriuscula</i>	<i>M. sylvestris</i>	

Table 4. Continued

Sidalcea

S. neomexicana

Sidastrum

S. paniculatum

Sphaeralcea

S. angustifolia

S. coccinea

S. digitata

S. hastulata

S. laxa

S. leptophylla

S. lindheimeri

S. pedatifida

S. polychroma

S. wrightii

Wissadula

W. amplissima

W. parvifolia

W. periplocifolia

II. MATERIALS AND METHODS

This project focuses on a taxonomic treatment and revision of the genera and species of the Malvaceae (mallow family) native to or naturalized in the State of Texas.

Treatments are based primarily on the examination of preserved specimens on deposit in the Texas State University Herbarium (SWT), supplemented with online data and images available through the TORCH (Texas Oklahoma Regional Consortium of Herbaria) Data Portal (<https://portal.torcherbaria.org/portal/index.php>). TORCH was developed to advocate for and to organize approximately 4 million plant specimens across more than 50 herbaria in the two-state region. The data portal provides access to specimen data and associated images from member herbaria to facilitate botanical research for the purpose of conservation, management, and education and is an open access portal powered by Symbiota (<https://symbiota.org>). Data records are aggregated by iDigBio, the National Resource for Advancing Digitization of Biodiversity Collections, funded by the National Science Foundation. New records are made available as specimens are digitized (imaged, databased, and georeferenced) by participating herbaria.

Specimens were observed with the use of a dissecting microscope to completely view the reproductive and vegetative components of the plants. The components of the specimen played an important role in constructing the taxonomic key when modifying and revising generic and species descriptions. The data collected through these observations were compared to the descriptions published in Correll and Johnston (1970), in order to properly adjust the complex and outdated descriptions of the species. The generic descriptions included here are largely based on those presented in the Flora of North America north of Mexico (Flora of North America Editorial Committee, 2015),

while the species descriptions are based on those included in Correll and Johnston (1970). Both genera and species are arranged alphabetically. Common names largely follow those used by the Flora of North America Editorial Committee (2015).

III. TAXONOMIC TREATMENT

Malvaceae Jussieu *sensu stricto*

Herbs, subshrubs, shrubs, or trees, erect, decumbent, or procumbent, often stellate-pubescent, often with glandular hairs, usually mucilaginous. Leaves usually cauline, alternate, usually petiolate but occasionally subsessile or sessile, usually stipulate; blades usually symmetric, usually unlobed, sometimes palmately lobed or dissected, the margins serrate, crenate, dentate, or entire. Inflorescences terminal or axillary, racemes, panicles, umbels, spikes, or solitary flowers. Flowers bisexual or unisexual; involucrel present or absent; sepals persistent, 5, \pm connate; petals 5, usually distinct, connate at base and adnate to staminal column, falling together; androecium monadelphous, forming a staminal column, this sometimes toothed at apex, stamens 5–many, the filaments connate; anthers 1-thecate; gynoecium syncarpous, ovary superior, 3–40-carpellate; style 1, branched or unbranched; stigmas capitate, truncate, linear, or filiform, 1 or 2 times the number of carpels. Fruits usually schizocarps with 5–many wedge-shaped mericarps, or capsules with 3–5 cells, or rarely berries, the carpels sometimes with an internal protrusion dividing the carpel into 2 cells, dehiscence loculicidal, rarely indehiscent. Seeds 2–30, often reniform, glabrous or pubescent.

A family of \pm 110 genera and ca. 1800 species of nearly worldwide distribution, although most common in tropical areas.

Key to the Texas Genera of Malvaceae (*sensu stricto*)

- 1. Leaf blade orbiculate to reniform, unlobed to palmately lobed; stipules deciduous*Malva*
- 1. Leaf blade pedate to suborbiculate, often lobed to oblong lobed; stipules caducous (2)
- 2. Fruits reticulate, dehiscent; mericarps 10, 2-celled*Callirhoë*
- 2. Fruits indurate, indehiscent; mericarps 5, 1-celled (3)
- 3. Corolla lavender, white, or pink*Pavonia*
- 3. Corolla pale yellow, yellow-orange, or red-orange (4)
- 4. Inflorescence of solitary flowers or terminal panicles.....*Sida*
- 4. Inflorescence of fascicles or racemes (5)
- 5. Involucel absent; fruits indurate; calyx not accrescent.....*Sphaeralcea*
- 5. Involucel present; fruits not indurate; calyx accrescent (6)
- 6. Leaf blade lanceolate, margins denticulate.....*Malvastrum*
- 6. Leaf blade elliptic, margins serrate to crenate (7)
- 7. Styles 10-branched; fruits schizocarps, glabrous.....*Malvaviscus*
- 7. Styles 5-branched; fruits capsules, minutely pubescent (8)
- 8. Calyx inflated, the lobes not strongly ribbed; seeds 1 per locule *Kosteletzkya*
- 8. Calyx not inflated, the lobes strongly ribbed; seeds > 1 per locule (9)
- 9. Leaf margins toothed; involucel absent (10)
- 9. Leaf margins entire; involucel present (11)
- 10. Calyx not ribbed; fruits capsules, the fruit apex apiculate.....*Hibiscus*
- 10. Calyx strongly ribbed; fruits schizocarps, the fruit apex acute..... *Abutilon*

11. Stipules caducous, filiform; leaf blade unlobed; seeds 1 per mericarp.....
..... *Allowissadula*
11. Stipules deciduous, linear; leaf blade lobed; seeds 3 per mericarp (12)
12. Calyx accrescent, lobes ribbed.....*Anoda*
12. Calyx not accrescent, lobes not ribbed (13)
13. Stems prostrate; flowers axillary, solitary; styles 7–10-branched; mericarps 7–10;
seeds glabrous*Malvella*
13. Stems erect; flowers in terminal panicles or racemes; styles 3–6-branched;
mericarps 3–6; seeds pubescent (14)
14. Leaf blade broadly ovate, unlobed; involucl absent; calyx not accrescent
..... *Wissadula*
14. Leaf blade orbicular, weakly or deeply palmately; involucl persistent; calyx
accrescent (15)
15. Calyx accrescent*Alcea*
15. Calyx not accrescent (16)
16. Fruits capsules (17)
16. Fruits schizocarps (18)
17. Leaves spirally arranged; stems erect; corolla purple; seeds glabrous*Sidastrum*
17. Leaves not spirally arranged; stems ascending to procumbent; corolla pale yellow;
seeds pubescent..... *Billieturnera*
18. Involucl present.....*Cienfuegosia*
18. Involucl absent (19)
19. Styles 10–14-branched; seeds 2–6 per mericarp..... *Herissantia*
19. Styles 6–8-branched; seeds 1 per mericarp (20)
20. Stems with glandular hairs, viscid *Bastardia*
20. Stems with simple and stellate hairs, not viscid (21)

21. Leaf margins coarsely crenate *Batesimalva*
21. Leaf margins dentate (22)
22. Seeds puberulent *Fryxellia*
22. Seeds glabrate (23)
23. Corolla cream colored *Gossypium*
23. Corolla yellow (24)
24. Leaf blade lobed, surface stellate pubescent; calyx not accrescent; fruits schizocarps *Malachra*
24. Leaf blade unlobed, surfaces tomentose; calyx accrescent; fruits capsules (25)
25. Fruits inflated *Krapovickasia*
25. Fruits not inflated (26)
26. Involucel present; seeds glabrous *Lavatera*
26. Involucel present or absent; seeds puberulent (27)
27. Calyx accrescent, inflated in fruit *Rhynchosida*
27. Calyx not accrescent, not inflated in fruit (28)
28. Leaf blade narrowly ovate, unlobed, margins serrate; involucel absent *Meximalva*
28. Leaf blade orbiculate, palmately lobed, margins dentate; involucel present (29)
29. Involucel present *Modiola*
29. Involucel absent (30)
30. Fruits dehiscent; seeds 2 or 3 per mericarp *Pseudabutylon*
30. Fruits indehiscent; 1 seed per mericarp *Sidalcea*

Abutilon Miller

Subshrubs, shrubs, or herbs. Stems erect, sometimes trailing or procumbent or ascending, glabrescent or pubescent, sometimes viscid. Leaves: stipules usually persistent, subulate, lanceolate, or filiform; blade elliptic to ovate, sometimes shallowly lobed, base often cordate, margins usually crenate or serrate, stellate-pubescent. Inflorescences axillary, of solitary flowers or cymose, racemose, or paniculate; involucre absent. Flowers: calyx accrescent or not accrescent, not inflated, not completely enclosing fruit, lobes not ribbed, lanceolate, ovate, cordate, or acuminate; corolla usually yellow or orange, sometimes pinkish, sometimes with dark red center; staminal column included or exserted; styles 5–25-branched; stigmas sometimes black, capitate. Fruits schizocarps, erect, not inflated, usually not indurate, variably pubescent; mericarps 5–25, 1-celled, apex usually acute or acuminate to spinescent, sometimes rounded or obtuse, abaxially dehiscent. Seeds usually 3–6 per mericarp, usually puberulent or scabridulous.

This treatment recognizes eleven species of *Abutilon* as occurring in Texas. These species are distinguished primarily on the basis of growth form, stipule and petiole length, leaf shape, inflorescence type, number of calyx lobes, petal length, and fruit characteristics. *Abutilon umbellatum*, recognized by Correll and Johnston (1970), is here treated as a species of *Pseudabutilon*.

Key to the Texas species of *Abutilon*

1. Stipules subulate, ± 2 mm long; petiole $\frac{1}{2}$ the length of the leaf blade; schizocarps ovoid (2)
1. Stipules filiform, ± 8 mm long; petiole approximately the length of the leaf blade; schizocarps oblate *A. hulseanum*

- 2. Calyx >6 mm long (3)
- 2. Calyx 3–5 mm long (4)
- 3. Petals 10–13 mm long; inflorescence panicles*A. berlandieri*
- 3. Petals <10 mm long; inflorescence racemes*A. malacum*
- 4. Stems erect or procumbent; corolla yellow; petals \pm 15 mm long (5)
- 4. Stems trailing; corolla pink; petals \pm 4 mm long *A. parvulum*
- 5. Stems erect; stipules subulate, leaf blade \pm 5 cm long; styles 7–13-branched (6)
- 5. Stems procumbent to ascending; stipules filiform; leaf blade \pm 1.5 cm long;
styles 6–9-branched*A. wrightii*
- 6. Leaf blade broadly ovate, margins crenate; petals 10–15 mm long (7)
- 6. Leaf blade narrowly ovate, margins serrate; petals 9–12 mm long *A. fruticosum*
- 7. Stems sparsely stellate pubescent; calyx accrescent (8)
- 7. Stems densely/roughly stellate pubescent; calyx not accrescent*A. abutiloides*
- 8. Corolla lobes not overlapping; fruit ovate; mericarps spinose at apex (9)
- 8. Corolla lobes overlapping; fruit broadly cordate; mericarps acuminate at apex
..... *A. hypoleucum*
- 9. Stipules lanceolate; leaf blade ovate, margins serrate; inflorescence a panicle;
schizocarps subcylindric (10)
- 9. Stipules subulate; leaf blade suborbiculate, margins crenate; inflorescence a raceme;
schizocarps broadly ovoid..... *A. theophrasti*
- 10. Petals <5 mm long; style 5-branched; schizocarp subcylindric..... *A. trisulcatum*
- 10. Petals 5–8 mm long; style 8-branched; schizocarp ovoid.....*A. mollicomum*

Abutilon abutiloides (Jacquin) Garcke ex Hochreutiner—INDIAN-MALLOW—Plant shrubby, densely stellate-tomentose, erect, to 1.5 m high. Leaves slender-petioled, orbicular-ovate, stellate-tomentose, dentate or denticulate, cordate at base, acute to acuminate at apex, to ± 10 cm long. Flowers axillary, solitary on peduncles mostly longer than the petioles; calyx ± 1 cm long, tomentose, deeply 5-parted, the lobes broadly ovate to ovate-lanceolate and acute to acuminate; petals yellow to orange-color, slightly longer than the calyx; carpels 7 to 10, swollen, beaked, stellate-pubescent, ± 15 mm long. On disturbed sites, in woodlands and chaparral in the Rio Grande Plains and Valley. Flowering throughout much of the year.

Abutilon berlandieri A. Gray ex S. Watson—Shrubs, 0.5–1 m high, stellate-pubescent with intermixed glandular hairs. Leaves with petioles shorter than blade; blades ovate, truncate to cordate at base, acute at apex, the margins obscurely crenate to serrate, 2.5–10 cm long, usually slightly longer than wide. Flowers solitary or in racemes or panicles; calyx 8–13 mm long, the lobes basally overlapping; petals orange-yellow, ± 10 mm long; carpels 8 to 10, acuminate, with both stellate and glandular hairs. Seeds ± 3 mm long. Brushlands, woodlands, and disturbed sites, primarily in the Rio Grande Plains. Apr–Jul.

Abutilon fruticosum Guillemin & Perrottet—PELOTAZO—Plant herbaceous, minutely tomentose, to about 0.6 m high. Leaves thickish, mostly ovate-cordate, acute to acuminate, irregularly serrate, to 10 cm long, smaller on the branchlets. Flowers solitary and mostly slender-peduncled in the axils, sometimes loosely paniculate on the branchlets; calyx 2–4 mm long, usually reflexed under the canescent-puberulent fruit; petals orange-yellow, 6–10 mm long; carpels 5 (or 6), mucicous or nearly so. Seeds when

young smooth and glabrous, in age minutely cinereous-pubescent. In dry areas on slopes, grasslands, and woodlands and chaparral in central, south and west Texas. Flowering throughout the year.

Abutilon hulseanum (Torrey & A. Gray) Torrey ex Baker f.—Shrub to about 1 m high, densely velvety-tomentose, the branches and stalks villous or hirsute with spreading hairs. Leaves long-petioled, broadly ovate, rather abruptly acute to acuminate, 5–12 cm long, irregularly crenulate, acute at apex, deeply cordate at base, the lower surface densely canescent. Flowers axillary, solitary or short-paniculate; peduncles equal to or surpassing the petioles, 5–10 cm long; calyx deeply 5-cleft, \pm 13 mm long, with angled base, the lobes ovate and acute; petals white, fading to rose-color, 13 mm long or more, slightly exceeding the calyx; carpels 12 to 14, swollen, black, apiculate. Thickets in palm groves in the Rio Grande Valley. Feb–May.

Abutilon hypoleucum A. Gray—Shrub with branching stems to 1.2 m high, subglabrous to white-tomentose. Leaves slender-petioled, broadly ovate, cordate at base, abruptly narrowed and gradually acuminate at apex, erose-serrate, very soft white-tomentose beneath, green and scabrous-pubescent to somewhat velvety above, 5–7.5 cm long. Flowers axillary, usually solitary; calyx white-tomentose, 5-parted and -angled; petals yellow, slightly exceeding the calyx; carpels numerous, subulately erect-awned and villous-hirsute, 12 mm long or more. Primarily in palm groves in the lower Rio Grande Valley. Mar–Oct.

Abutilon malacum S. Watson—Plant tall, suffrutescent and branching, very finely and closely velvety-pubescent throughout. Leaves long-petioled, suborbicular-ovate, cordate at base, acute at apex, irregularly dentate, to about 10 cm long, about as long as

the petiole; Flowers in axillary and terminal panicles, short-pedicelled; calyx lobes lanceolate, acute to acuminate, 6–8 mm long; petals orange, about twice as long as the calyx; carpels 5, acutish, coarsely stellate-pubescent, about as long as calyx. On rocky hills, dry slopes and gravelly flats in west Texas. Jun–Sep.

Abutilon mollicomum (Willdenow) Sweet—PINTAPÁN CIMARRÓN—Herbaceous or suffrutescent perennial to about 1.5 m high with simple spreading or reflexed hairs. Leaves with petioles 5–15 cm long, broadly ovate to suborbicular, acuminate, deeply cordate at base, 5–20 cm long and wide, shallowly 3-lobed or the margins merely irregularly crenate-dentate, finely and densely stellate-pubescent, dark-green above, canescent and velvety beneath. Flowers in axillary and terminal panicles on peduncles 1–3 cm long. Flowers on pedicels 3– mm long; calyx finely stellate-puberulent, the ovate acute lobes 3–4 mm long; petals deep-yellow with orange tinge outside, 6–10 mm long; carpels 7 to 11, stellate-pubescent, 8–10 mm long, the spreading-ascending beak 0.5–1 mm long. Seeds usually 3 in each cell, about 2 mm long, dark-brown, dull, reticulate. In canyons and on rocky slopes in the Trans-Pecos (primarily El Paso County). Jul–Sep.

Abutilon parvulum A. Gray—Perennial herbs or subshrubs with slender, spreading or trailing stems, cinereous-tomentose with minute stellate pubescence to pilose with spreading hairs. Leaves to 5 cm long, broadly ovate, cordate at base, dentate, sometimes obscurely 3-lobed, usually obtuse at apex. Flowers axillary, solitary, the pedicels longer than the leaves; calyx lobes ovate, acuminate, reflexed in fruit; petals pink or red, - sometimes orange or yellowish, 4–6 mm long, exceeding the calyx; carpels 5, somewhat tomentose, erect and acute, to about 8 mm long. Limestone hillsides and mesas primarily on the western Edwards Plateau and in the Trans-Pecos. May–Nov.

Abutilon theophrasti Medikus—CHINGMA, VELVETLEAF BUTTERPRINT—Plant annual, tall, velvety and cinereous with very short and fine hairs. Leaves suborbicular-ovate, to 15 cm or more in diameter, abruptly acuminate at apex, cordate at base, velvety-pubescent. Flowers usually solitary, the pedicels shorter than petioles; calyx very deeply 5-parted; petals yellow, \pm 6 mm long; carpels villous, usually more than 10, with long divergent awns, much-surpassing the calyx. Occasional on disturbed sites in scattered areas of the state. May–Oct.

Abutilon trisulcatum (Jacquin) Urban—AMANTILLO—Shrub to about 1.5 m high, with slender ascending densely tomentulose branches. Leaves ovate, slender-petioled, cordate at base, abruptly acuminate at apex, to 12 cm long, crenate to crenulate, finely velvety on both sides. Flowers solitary and slender-pedicelled in the axils of leaflike bracts or subpaniculate; calyx 4–5 mm long, the lobes triangular-ovate and acuminate; petals yellow, reddish blotched at the base, 5–7 mm long; carpels about 5, stellate-puberulent, short-tipped, \pm 8 mm long. In palm groves and thickets in the lower Rio Grande Valley. Jan–Apr.

Abutilon wrightii A. Gray—WRIGHT'S INDIAN-MALLOW—Subshrub to about 0.6 m high, the stems ascending or decumbent, viscid-pubescent and villous with fine spreading hairs. Leaves thin, long-petioled, ovate-cordate, obtuse to acutish at apex, sharply dentate above, to 5 cm long, greenish and scabrous-velvety above, white-tomentose below. Flowers axillary, mostly solitary, the pedicels equal to or exceeding the petioles; calyx tomentose, 5-parted, angulate at base, \pm 13 mm long, with acuminate lobes that \pm equal the yellow petals; carpels thin, tomentulose, subulate-beaked, \pm 12 mm long. Seeds

smooth, glabrous. On rocky slopes and hills, and in woodlands, draws and arroyos on the Edwards Plateau and in the Rio Grande Plains and Trans-Pecos. Mar–Nov.

Alcea Linnaeus

Herbs, annual, biennial or perennial. Stems erect, stellate-hairy to pilose or hirsute or glabrous. Leaves: stipules persistent or caducous, ovate or 2–4-fid, sparsely to densely stellate-pilose; blade orbicular, weakly lobed or deeply palmately parted, base cordate, cuneate, or truncate, margins crenate-serrate, apex acute to obtuse. Inflorescences terminal and/or axillary, usually unbranched racemes, or solitary or fascicled flowers, involucre persistent, attached to apex of pedicel. Flowers: calyx usually accrescent, not inflated, lobes slightly or conspicuously striate, lanceolate, densely stellate-pilose-hairy; corolla rotate, white, pink, red, purple, or yellow, darker or paler basally; staminal column exserted; style [15–]20–40-branched; stigmas filiform. Fruits schizocarps, erect, not inflated; mericarps [15–]20–40, 2-celled, one cell 1-seeded, the other sterile, laterally compressed with prominent ventral notch, pubescent. Seeds 1 per mericarp, glabrous or minutely hairy.

Alcea rosea, the hollyhock, is often found in cultivation and has been known to occasionally escape cultivation in the state. The flowers of hollyhocks are used to synthesize medicines for chest pains and improved blood circulation. The roots are used in Tibetan medicine to treat inflammation of kidneys and wombs. Fibers from the stems are used for papermaking.

Alcea rosea Linnaeus—HOLLYHOCK—Biennial, to 2.5 m high; stems stellate-pubescent to hirsute. Leaves with long petioles, large and rough to touch, rugose, orbicular in outline, cordate at base, 5- to 7-lobed or -angled, crenate. Flowers essentially

sessile, 8 cm or more in diameter, variously colored, mostly deep rose-color to pink or lavender, arranged at apex of stem in a long wand-like raceme or spike; bracts 6 to 9 below the calyx, connate at base. A native of Asia that is widely cultivated and is occasionally found along roadsides and about abandoned homesteads. Summer–fall.

Allowissadula D. M. Bates

Subshrubs or perennial herbs. Stems erect or spreading, stellate-pubescent and often viscid with glandular hairs. Leaves: stipules caducous, filiform; blade ovate to suborbicular, unlobed or 3-lobed, base cordate in ours, margins toothed. Inflorescences axillary and solitary flowers or cymes or terminal and racemes or panicles; involucre absent. Flowers: calyx not or only slightly accrescent, not inflated, lobes unribbed to strongly ribbed, ovate to narrowly or broadly triangular; corolla orange-yellow or yellow; staminal column \pm included; styles 5-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, papery to indurate, pubescent; mericarps 5, 2-celled, lower cell 1-seeded, upper cell 2-seeded, cells sometimes separated by an endoglossum. Seeds 3 per mericarp, glabrous.

The genus *Allowissadula* was established by Bates (1978) to accommodate taxa formerly included in *Wissadula* and *Pseudabutilon*. Two species are recognized for Texas.

Key to the Texas species of *Allowissadula*

1. Leaf blade cordate, margins dentate, surfaces pubescent; stems pubescent;
inflorescence panicles or cymes; corolla yellow-orange*A. holosericea*
1. Leaf ovate, margins crenate, surfaces pubescence absent; stem pubescence absent,
inflorescence cymes; corolla yellow*A. lozanoi*

Allowissadula holosericea (Scheele) D. M. Bates—VELVETLEAF—Robust branching plant to about 1.8 m high, densely velvety stellate-tomentose throughout, the stems and floral branches with conspicuous simple glandular hairs. Leaves broadly ovate to triangular-ovate, cordate at base, acute to acuminate at apex, to 20 cm long and often about as broad, irregularly crenate to dentate or rarely subentire, occasionally obscurely trilobed above, conspicuously veined beneath. Flowers short-peduncled, at first solitary in the lower axils, the later ones corymbose-paniculate at the summit; calyx campanulate, about 15 mm long, the lobes ovate and acute to acuminate; petals orange-yellow, 1.2–2 cm long; carpels tomentose, beaked, not exceeding the calyx. Seeds glabrous. In rocky soils, especially along the margins of woodlands in the Edwards Plateau and Trans-Pecos. May–Nov.

Allowissadula lozanoii (Rose) D. M. Bates—LOZANO'S FALSE INDIAN MALLOW—Subshrubs, to about 1.5 m high; branches covered with stellate or dendritic hairs. Leaves with stout petioles, blades suborbicular-ovate to triangular-ovate, sometimes obscurely 3-lobed above, 5–17 cm long and often about as wide, obtuse to acute at apex, cordate at base, densely stellate-tomentose, margins crenate. Flowers axillary and in panicles; pedicels stout, to 3 cm long, usually much shorter; fruiting calyx campanulate, 1–1.2 cm long, the lobes ovate and acute; petals yellow, obovate-cuneate, about 2 cm long; carpels 5, about 8 mm long, short-beaked, falsely 2-celled, the 2 cavities separated by a membranous tongue-like projection (endoglossum) from the dorsal wall. Seeds 3. In clay soils in thickets and open grassy areas in the South Texas Brush Country and southern Gulf Prairies and Marshes. Flowering throughout year.

Anoda Cavanilles

Herbs, annual, or subshrubs. Stems erect to decumbent, hispid or stellate-hairy to glabrescent. Leaves: stipules deciduous, inconspicuous, usually linear; blade usually linear, lanceolate, oblong, or ovate to triangular, sometimes lobed, base truncate, cordate, or cuneate, margins dentate to entire. Inflorescences axillary solitary flowers or terminal racemes or panicles; involucre absent. Flowers: calyx accrescent or not, not inflated, ribbed or not, base rounded, lobes ovate to triangular; corolla yellow, lavender, or purplish, rarely white; staminal column included; style 5–19-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, hairy; mericarps 5–19, 1-celled, with or without spur at dorsal angle, lateral walls usually disintegrating at maturity, irregularly dehiscent. Seeds 1 per mericarp, sometimes enclosed in persistent reticulate endocarp.

This treatment recognizes four species of *Anoda* in Texas, distinguished on the basis of growth form, pubescence, petiole length, leaf morphology, inflorescence type, and flower color. *Anoda pygmaea*, included in Correll and Johnston (1970), was transferred to the newly-erected genus *Fryxellia* by Bates (1974).

Key to the Texas species of *Anoda*

1. Stems decumbent, partially hairy; petiole equal to the blade in length; leaf cordate at base, surface partially hairy; petals purple-lavender..... *A. cristata*
1. Stems erect, densely hairy; petiole shorter than the blade in length; leaf truncate at base, surface densely hairy; petals yellow (2)
 2. Petiole shorter than blade; inflorescence solitary; pedicels 4–6 cm; petals pale yellow *A. lanceolata*
 2. Petiole subequal to blade length; inflorescence racemes; pedicels 2–7 cm; petals

bright yellow (3)

3. Leaf base truncate, margins crenate to dentate, surface minutely hairy; flower densely tomentose; schizocarps 7–9 mm, densely hairy; mericarps 5–8..... *A. crenatiflora*

3. Leaf base hastate, margins entire, surface tomentose; flower minutely hairy; schizocarps 4–5 mm, minutely hairy; mericarps 10–13 *A. pentachista*

Anoda crenatiflora Ortega—THICKET ANODA—Plant erect, to about 1 m high, stellate-pubescent. Leaves petiolate, ovate to hastate, narrowly so above, truncate at base, acute at apex, the margins crenate-dentate, 3–9 cm long. Flowers in racemes or panicles; calyx lobes 3–7 mm long, densely tomentose; petals pale yellow, 6–8 mm long; carpels 10 to 13, conspicuously beaked, densely pubescent. Moist canyons, banks of streams and irrigation ditches in the Trans-Pecos. Aug–Oct.

Anoda cristata (Linnaeus) Schlechtendal—VIOLETA—Plant branched from near base, erect, to about 0.8 m high, sparsely hirsute with mostly simple hairs. Leaves petiolate, deltoid to triangular-ovate or -lanceolate, truncate to broadly cuneate at base, acute to acuminate at apex, occasionally hastate at the base, the margins irregularly dentate or entire. Flowers solitary on long peduncles in the axils; calyx with triangular-lanceolate acuminate spreading lobes to 15 mm long, often purplish-red; petals purple, commonly cuneiform, 1–2.5 cm long; carpels 15 to 20, conspicuously beaked, hispid, the sides or partitions obliterated in the breaking up of the fruit. Seeds puberulent. On gravelly banks and in open woods along streams in the Trans-Pecos. Jul–Nov.

Anoda lanceolata Hooker & Arnott—LANCE-LEAF ANODA—Plant erect, to 1.5 m tall, viscid-puberulent and above more or less villous-hirsute. Leaves: lower deltoid-ovate, upper hastate-lanceolate. Peduncles about equaling or exceeding the subtending leaves, or

the upper ones in a naked raceme and subtended by linear or filiform deciduous bracts. Flowers: calyx canescent-pubescent; petals dull-yellow, 1–1.3 cm long, brown-purple at base; carpels 10 to 12, beaked. Seed minutely or sparsely pubescent. Rare in woodlands in the Trans-Pecos; not collected in Texas since 1942. Jul–Sep.

Anoda pentaschista A. Gray—FIELD ANODA—Plant very slender, to about 0.6 m high, puberulent and more or less cinereous throughout. Leaves to 7 cm long, usually much smaller, pale beneath, the slender-petioled lower ones ovate to subcordate and somewhat 3-lobed, the upper short-petioled ones hastate to lanceolate or linear. Flowers with slender pedicels to 25 mm long that are noticeably articulated above the middle, arranged in panicles; calyx about 4 mm long, rounded and apiculate, a little shorter than the bright-yellow corolla; carpels usually 5, sometimes 6 to 9, membranous with an inflexed thickish apex. Seed puberulent. Open woods and thickets in the Rio Grande Plains and Valley, and in the Trans-Pecos, Aug–Dec.

Bastardia Kunth

Subshrubs or shrubs. Stems erect, with simple, stellate, or glandular hairs, viscid. Leaves: stipules persistent, subulate; blade ovate, unlobed or weakly lobulate, base cordate, margins serrate to subentire, surfaces stellate- and glandular-pubescent. Inflorescences axillary, solitary flowers or terminal panicles; involucre absent. Flowers: calyx not accrescent, not inflated, divided nearly to base, not completely enclosing mature fruits, lobes unribbed, lanceolate; corolla yellow; staminal column included; style 6–8-branched; stigmas capitate. Fruits schizocarps but dehiscence imperfect, thus functionally capsular, erect, not inflated, papery, stellate-pubescent; mericarps 6–8, 1-

celled, without dorsal spur or endoglossum, apex rounded to apiculate. Seeds 1 per mericarp, usually minutely pubescent.

The small genus *Bastardia* is represented in Texas by only a single species, *B. viscosa*, restricted to the lower Rio Grande Valley.

Bastardia viscosa (Linnaeus) Kunth—VISCID MALLOW—Perennial herbs or subshrubs, erect, to about 1 m high, velvety-pubescent and viscid, sometimes also pilose. Leaves with slender petioles about as long as blades or shorter; blade ovate, cordate at base, acute to abruptly long-acuminate at apex, to 8 cm long, the margins irregularly sinuate-denticulate, paler and stellate-tomentulose beneath. Pedicels nearly filiform, usually longer than the petioles and often longer than the leaves. Flowers small, solitary or few in the axils; involucre none; calyx about 4 mm long, the 5 ovate-lanceolate acuminate lobes about as long as the tube; petals 5, yellow, 4–6 mm long; stamen column divided into several or many filaments at the apex; ovary 5-celled; style branches 5, the stigmas capitate. Capsule depressed-globose, 5-grooved, about twice as long as the calyx, the carpels beakless. Seeds puberulent. In clay soils in palm groves and brush thickets in the Rio Grande Valley. Flowering throughout the year.

Batesimalva Fryxell

Shrubs or herbs. Stems usually erect, pubescent with simple and stellate hairs, not viscid. Leaves: stipules persistent, filiform, sometimes absent; blade ovate to ovate-lanceolate, not dissected or parted, base cordate, margins coarsely crenate. Inflorescences axillary, solitary flowers or 2–4-flowered clusters; involucre absent. Flowers: calyx not accrescent, not inflated, divided about one-half its length, shorter than mature fruit, lobes unribbed, lanceolate to ovate; corolla blue-violet; staminal column included; style 8–10[–

16]-branched; stigmas capitate. Fruits schizocarps, erect or semipendent, inflated, prominently lobed, papery, minutely tomentose; mericarps 8–10[–16], 2-celled, without dorsal spur, apex rounded, one cell 1-seeded, seed covered by endoglossum), the other cell empty. Seeds 1 per mericarp, subglabrous to sparsely hairy.

The genus *Batesimalva*, named in honor of the Malvaceae specialist David M. Bates, was erected by Fryxell (1975) to accommodate one species formerly included in the genus *Gaya*, as well as one previously unrecognized species; since that time the genus has been expanded by Fryxell and others to include five species native to Texas, Mexico, and northern South America. *Batesimalva* is distinguished by its mericarp morphology, particularly the presence of an endoglossum or partition dividing the two chambers of the mericarp (Fryxell, 1975). *Batesimalva violacea* is the only species occurring in Texas and is only known from Brewster County in Big Bend National Park.

Batesimalva violacea (Rose) Fryxell—PURPLE GAYMALLOW—Shrub, slender, erect, to about 2 m high, branches with short soft pubescence together with long spreading hairs. Leaves with petioles 4–6 cm long, ovate to lanceolate, acuminate, 6–9 cm long, coarsely crenate, cordate at base with the sinus either narrow or closed, becoming glabrate above, pale and finely stellate-pubescent beneath. Flowers axillary, solitary or in clusters of 2 to 4; peduncles slender; calyx lobes ovate, acute; petals about 8 mm long, blue or violet; carpels 9, each 1-seeded, membranaceous, with a longitudinal endoglossum that usually more or less divides the cavity of the carpel. Among boulders and rubble above and below the “Window” in the Chisos Mountains. Oct–Nov.

Billieturnera Fryxell

Suffrutescent herbs or subshrubs. Stems ascending or procumbent, stellate-pubescent, not viscid. Leaves: stipules persistent, broadly oblanceolate; blade broadly oblanceolate, unlobed, not dissected or parted, base cuneate, margins dentate to subentire. Inflorescences axillary, of solitary flowers; involucre absent. Flowers perfect: calyx not accrescent, not inflated, not completely enclosing fruits, lobes unribbed, narrowly triangular; corolla pale yellow; staminal column included; style 5-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, papery, stellate-pubescent, apically dehiscent; mericarps 5, 1-celled, with abaxial keel and apical spine 1–1.5 mm. Seeds 1 per mericarp, minutely pubescent.

Billieturnera helleri was formerly recognized as a species of *Sida* (*S. helleri*), but was segregated as a monotypic genus by Fryxell (1982), who noted that *B. helleri* has more in common with *Abutilon* than with *Sida*. Fryxell pointed out that features distinguishing *B. helleri* from *Sida* include the morphology of the mericarps (basically elliptical in cross section with a \pm well-developed dorsal keel in *B. helleri* versus trigonal in cross section in *Sida* spp.), as well as the base chromosome number ($x = 8$) and the occurrence of pollen grains having only three apertures. *Billieturnera* is distributed in South Texas and the Mexican states of Tamaulipas and Nuevo Leon and prefers to grow in heavy, saline soils. The genus name honors the late Texas botanist, Billie Lee Turner.

In Fryxell's (1997) treatment of the American genera of Malvaceae, the distinguishing characteristics given for *B. helleri* are its distinctive leaf shape, prominent stipules, fruit morphology and its reduced growth habitat. Bates (2015) also recognized these characteristics to be prominent for *B. helleri*.

Billieturnera helleri (Rose ex A. Heller) Fryxell—COPPER SIDA—Stems prostrate to ascending, tomentose-canescens, to 45 cm long. Leaves: stipules elliptic to obovate or linear-oblongate, persistent; petiole 2–6 mm long; blade broadly oblongate to suborbicular, unlobed, not dissected or parted, 0.5–1.5 cm long, ± as wide as long, base cuneate to rounded or truncate, margin dentate to subentire, stellate-pubescent on both surfaces. Flowers subsessile or with pedicels to 4 mm long; calyx not surpassing the fruit; petals obovate, yellow, becoming orange-yellow with age, 5–6 mm long; carpels 5, about 5.5 mm high, 2-beaked at maturity. In sandy or clayey, usually saline soils of the Rio Grande Plains and south coastal Texas. Feb–May. Endemic.

Callirhoë Nuttall

Herbs, annual, perennial, or sometimes biennial. Stems erect, ascending, or decumbent, with simple and/or stellate pubescence or glabrous. Leaves: stipules persistent, caducous, or late deciduous, ovate, linear-lanceolate to subulate, auriculate, or rhombic-ovate; blade often pedate, suborbiculate, cordate, ovate, triangular, or hastate, palmately cleft or entire and crenate, base truncate, cordate, or sagittate to hastate, margins entire or dissected. Inflorescence racemose or paniculate; involucre present or absent. Flowers perfect or functionally pistillate; calyx not accrescent, not inflated, lobes with prominent midrib, deltate, ovate-lanceolate, or lanceolate; corolla reddish-purple, mauve, red, pink, or white; staminal column exerted; 1 per carpel; styles 10–28-branched; stigmas filiform. Fruits schizocarps, erect, not inflated, indurate, reticulate and rugose, strigose or glabrous, indehiscent or dehiscent; mericarps 10–28, 2-celled, prominently obtusely beaked or not, one locule sterile, the other 1-seeded. Seeds 1 per locule, glabrous.

The five Texas species of *Callirhoë* are distinguished primarily on the basis of vegetative characteristics, such as stem pubescence and leaf morphology, as well as by features of the fruit.

Key to the Texas species of *Callirhoë*

1. Stems glabrous (2)
 1. Stems densely hairy (3)
 2. Leaf blade suborbiculate, surface stellate hairy, lobes oblong; stipules lanceolate to linear..... *C. scabriuscula*
 2. Leaf blade hastate, simple hairs, lobes lanceolate; stipules oblong/ovate..... *C. papaver*
 3. Leaf blade suborbiculate to cordate, margins 3–5-lobed; schizocarp 5.5 mm in diameter; mericarps 10–14, dehiscent, glabrous *C. leiocarpa*
 3. Leaf blade triangular to ovate, margins 5-7 lobed; schizocarp 7-10 mm in diameter; mericarps 7–10, indehiscent, pubescent (4)
 4. Stems hairy; leaf blade triangular, margins 7 lobed; petals white or pink; schizocarps densely hairy..... *C. alcaeoides*
 4. Stems glabrous, leaf blade suborbiculate to ovate, margins 5 lobed; petals purple; schizocarps mostly glabrous..... *C. pedata*

Callirhoë alcaeoides (Michaux) A. Gray—PLAINS POPPY MALLOW—Perennial herbs from an oblong or napiform root; stems several, erect or ascending, to about 45 cm high, appressed-pubescent or sometimes glabrate. Leaf blades 5–9 cm long, 4–10 cm wide, mostly cordate or triangular-cordate; blades of basal leaves crenate or incised to palmately parted, the petioles equal to or twice as long as the blade, the segments mostly lacinate-cleft, the ultimate leaf divisions mostly oblong to linear; petioles of cauline

leaves mostly as long as blade, essentially lacking in uppermost leaves. Flowers in corymbose clusters; peduncles to 8 cm long; involucellar bracts absent; calyx lobes united below middle, lanceolate, ± 1 cm long, the pubescence of short strigose mostly appressed simple hairs; petals 15–22 mm long, pink or white; carpels 10, strigose-pubescent, 4–5 mm high. Grasslands in north-central Texas. Mar–May.

Callirhoë involucrata (Torrey & A. Gray) A. Gray—POPPY MALLOW, WINE CUP—

Perennial herbs, the stems mostly decumbent from an elongate to napiform root, to about 0.6 m long, hirsute or hispid. Leaves 2.5–5 cm long, 3–6 cm wide, usually 5- or 7-parted or -cleft to within 5–10 mm of petiole; leaf segments mostly cuneate at base and toothed or incised to lobed or parted above the central segment, 5–10 mm wide at base. Flowers racemose; peduncles surpassing the leaves; involucellar bracts 3, 4.5–17.5 mm long, linear to narrowly ovate; calyx 1–2.3 cm long, divided to near base into mostly lanceolate lobes; petals 14–35 mm long, reddish-purple with white basal spot, white, or mauve with white margins, apex slightly fimbriate; carpels 16 to 25, strigose. In sandy or gravelly soils in woodlands, on rocky slopes, along roadsides and in scrubland and thickets, throughout Texas but not common in the Trans-Pecos or northeastern part of the state. Feb–Jun. Two weakly separated varieties have been reported from Texas; both occur widely across the state:

1. Sinuses between lobes of cauline leaves extending to within 5–15 mm of petiole; petals reddish purple with white basal spot, rarely entirely white; mericarps pubescent..... *C. involucrata* var. *involucrata*

1. Sinuses between lobes of cauline leaves extending to within 2–5 mm of petiole; petals reddish purple with white basal spot, entirely white, or mauve with white margins; mericarps glabrous or pubescent..... *C. involucrata* var. *lineariloba*

Callirhoë involucrata (Torrey & A. Gray) A. Gray var. ***involucrata***—LOW POPPY MALLOW, BUFFALO ROSE—Stems decumbent, 7–75 cm long. Leaves: stipules 5–15(–23) mm long, (3.5–)5.5–10(–15) mm wide; blades (1–)2–8.5 cm long, 1.5–9.5 cm wide, the sinuses between lobes of the cauline leaves extending to within 5–15 mm of the petiole. Bracts of involucrel 6–17.5 mm long, 1.5–3.5 mm wide. Petals usually reddish purple with white basal spot, rarely white, (1.5–)1.9–3.2 cm long. Mericarps pubescent.

Callirhoë involucrata (Torrey & A. Gray) A. Gray var. ***lineariloba*** (Torrey & A. Gray) A. Gray—COWBOY ROSE—Stems decumbent to weakly erect, 5–80 cm long. Leaves: stipules 2.5–11.5 mm long, 1.5–7(–9) mm wide; blades 1–8 cm long, 1–9(–12) cm wide, the sinuses between lobes of the cauline leaves extending to within 2–5 mm of the petiole. Bracts of involucrel 4.5–10(–13.5) mm long, 0.5–2 mm wide. Petals reddish purple with white basal spot, white, or mauve with white margins, 1.4–3.5 cm long. Mericarps glabrous or pubescent.

Callirhoë leiocarpa R.F. Martin—TALL POPPY MALLOW—Annual. Growth form: Herbs. Stems: Erect, sparsely hairy. Leaves: Petiole 0.7–8 cm, blade suborbiculate to ovate, 3–7-lobed, surface sparsely hairy. Inflorescence: Racemose, involucellar bractlets absent. Flowers: Bisexual flowers, petals purplish red. Fruits: Schizocarps 5.5 mm in diameter, mericarps 10–14, glabrous, dehiscent. Clay soil. Annual and perennial herb. Petals rose purple. Flowering Late winter-spring-mid summer.

Callirhoë papaver (Cav.) A.Gray—WOODLAND POPPY MALLOW—Perennial. Growth form: Herb. Stems: Erect, stellate hairy. Leaves: Leaf blade hastate to cordate, 3 or 5 lobed, lobes lanceolate, simple hairs. Inflorescence: Racemose, involucellar bractlets 3. Flowers: Bisexual flowers, petals purplish red, sparsely hairy. Fruits: Schizocarps 7 mm in diameter, glabrous, indehiscent. Pine woods. Petals vinaceous; anthers white. Sandy soil along roadside. Flowering Spring–summer.

Callirhoë pedata (Nutt. ex Hook.) Gray—PALM LEAF POPPY MALLOW—Perennial. Growth form: Herbs. Stems: Erect, glabrous. Leaves: Petiole 3.5 mm, blade cordate to ovate to suborbiculate, surfaces sparsely hairy. Inflorescence: Racemose, involucellar bractlets absent. Flowers: Bisexual, petals purplish red. Fruits: Schizocarps 6–7 mm in diameter, mericarps 10–16, glabrous, indehiscent. Local, along roadside ditch in rocky soil. Tall plants, some over five feet tall, growing partially shaded in sandy soil. Purple corolla. Flowering Spring–summer.

Callirhoë scabriuscula B. L. Robinson—TEXAS POPPY MALLOW—Annual. Growth form: Herbs. Stems: Erect, densely hairy. Leaves: Petiole 1.5 cm, blades suborbiculate, stellate hairy. Inflorescence: Racemose, involucellar bractlets 3. Flowers: Bisexual, petals purplish red. Fruits: Schizocarps 7.8 mm in diameter, mericarps 12–20, indehiscent, hairy. Sandy soil. Flowering spring.

Cienfuegosia Cavanilles

Subshrubs or perennial herbs. Stems decumbent or ascending to erect, glabrous or pubescent, not viscid. Leaves: stipules persistent, subulate or lanceolate; blade narrowly oblong-lanceolate or ovate to elliptic, unlobed, margins entire or serrate. Inflorescences axillary, solitary flowers; involucler present. Flowers: calyx persistent, not accrescent, not

inflated, gland-dotted, lobes ribbed or unribbed, lanceolate; corolla or yellow, with or without dark center; staminal column included; stigmas connate, 3–5-lobed, clavate. Fruits capsules, erect, not inflated, papery, glabrous or pubescent. Seeds 2–5 per locule, pubescent.

Our representative of the genus, *C. drummondii*, has an unusual distribution, occurring in the Texas coastal plain and in South America (Argentina, Brazil and Paraguay).

Cienfuegosia drummondii (A.Gray) Lewton—YELLOW FUGOSIA, SULPHUR MALLOW—Perennial from a woody rootstock, essentially glabrous throughout. Stems rather stout, rigidly ascending, to about 0.5 m high. Leaves with petioles to 3 cm long, oval, 5–10 cm long, the margins coarsely repand-dentate; stipules caducous. Peduncles stout, dilated upward, equaling or exceeding the subtending leaves. Flowers perfect, solitary on long peduncles in axils; involucre of 7 to 9 linear or spatulate-oblong bractlets slightly shorter than the deeply 5-cleft calyx; petals 5, short-clawed, rounded or orbiculate, greenish-yellow or sulphur-yellow, about 1.5–3.5 mm long; stamen tube shorter than the petals; stigmas 4 or 5; capsule globular, glabrous, 3- or 4-valved; seeds 2 in each cell, tomentulose. Heavy clay, often saline, soils in fields and open thickets along the coast and in south Texas. Feb–Jun.

Fryxellia D. M. Bates

Herbs, perennial, stellate-hairy. Stems cespitose. Leaves: stipules persistent, filiform to subulate; petiole subequal to or somewhat shorter than blade; blade ovate to oblong-lanceolate, unlobed, base subcordate to obtuse, margins toothed, apex acute or obtuse, without foliar nectaries. Inflorescences axillary, solitary flowers, ± equaling leaves; apex;

filaments terminal and subterminal; ovary 12-carpellate; ovules 1 in each lower carpel cell, pendulous; styles 12-branched, (branches equal in number to carpels); stigmas capitate. Fruits schizocarps, not inflated, discoid, moderately indurate, stellate-hairy; mericarps 12, 1-celled, divided internally by endoglossum; distal cell reduced, barren, smooth-walled, hairy, each valve armed with suberect dorsal spur; proximal cell enclosing pendulous seed, reticulate-fenestrate, indehiscent, joined to columella by single median basal-dorsal vein. Seeds 1 per mericarp, puberulent about raphe.

Fryxellia pygmaea is a rare taxon that was originally described as *Anoda* in Fryxell (1997), but was later recognized by Bates (1974) as a monotypic genus and isolated from the other genera in the tribe Malveae. Fryxell (1997) used characteristics of the buds, flowers, styles, stigmas, and mericarps to distinguish *F. pygmaea*, but emphasized that there was skepticism when observing the material, as the stigma morphology suggested some affiliation with *Anoda*, while the endoglossum structure suggested some resemblance to *Batesimalva*.

Bates (2015) considers *F. pygmaea* to be a species of “conservation concern” as it is presently known only from the type collection (made by Pope in 1854 along his survey route through western Texas) and a specimen collected by Fryxell in Coahuila, Mexico, in 1990.

***Fryxellia pygmaea* (Correll) D. M. Bates**—SMALL FRYXELL-WORT—Plant about 5 cm high, essentially acaulescent, consisting of a rosette of leaves and one or more pedunculate flowers, densely covered with stellate hairs. Leaves with stout petioles to 3 cm long; blades thick, ovate to ovate-elliptic, usually slightly longer than petioles, to about 2 cm wide, rounded to slightly cordate at base, obtuse at apex, coarsely crenate-

serrate. Peduncle slender in flower, becoming stout in fruit, to about 2 cm long. Flowers: sepals 5, united for about half their length to form a concave disk 2.5–3 cm wide, the spreading lobes broadly triangular and acute, with simple hairs on the inner surface; petals yellow to orange, obovate-oblongate, about 15 mm long and 8 mm wide above middle. Fruit a flattened disk of 12 radiating carpels; carpels about 5 mm long, conspicuously beaked and dorsally spurred, the outer surface stellate-pubescent, the sides or partitions coarsely reticulate-honeycombed. Seeds reddish-brown, glabrous except for several cilia about the hilum. Known from a single collection in west Texas; definite locality unknown.

Gossypium Linnaeus

Shrubs. Stems erect, pubescent or glabrate, not viscid. Leaves: stipules persistent, subulate or linear to falcate; blade ovate, unlobed, shallowly lobed, or deeply parted, base subcordate or cordate, margins entire, surfaces glabrous or stellate-pubescent, often with abaxial foliar nectaries. Inflorescences axillary, solitary flowers or flowers sympodially arranged; involucre deciduous or persistent. Flowers: calyx not accrescent, not inflated, lobes sometimes unribbed, ovate or triangular; corolla cream or yellow, sometimes fading rose, with or without dark spot at center; staminal column included; style unbranched; stigmas clavate. Fruits capsules, erect, not inflated, leathery, usually glabrous. Seeds [2–]24, densely tomentose to glabrate or glabrous.

Gossypium hirsutum is found in cultivation worldwide and can often escape cultivation. The species is of great economic importance for its ability to produce fibers and has been domesticated and used for commercial purposes for many years.

Gossypium hirsutum Linnaeus—UPLAND COTTON, ALGODÓN—Shrubs, stellate-pubescent. Stems widely branching, usually 1–2 m high. Leaves 4–10 cm long, shallowly 3- to 5-lobed, the lobes broadly ovate, cordate at base, the apex acute to acuminate; petioles $\frac{1}{2}$ to as long as blade. Flowers axillary, solitary or in clusters; pedicels 2–4 cm long; calyx (excluding teeth) 5–6 mm long, the apex blunt or with 5 elongate teeth; petals cream, with or without a conspicuous red spot, 2–5 cm long. Capsules 3- to 5-loculed, ovoid to subglobose, 2–4 cm long, glabrous. Seeds 8–10 mm long, comose, the hairs white. Widely cultivated across the state and occasionally collected as a waif along roadsides. Mar–Jun.

Herissantia Medikus

Herbs, perennial, or shrubs. Stems prostrate to erect, soft-tomentose, not viscid. Leaves petiolate or sessile; stipules persistent, inconspicuous, linear to subulate; blade ovate to triangular, unlobed, base cordate, margins crenate to dentate. Inflorescences axillary, solitary flowers; involucler absent. Flowers: calyx not accrescent, not inflated, lobes not ribbed, ovate to ovate-lanceolate; corolla yellow, orange, or white; staminal column included; styles 10–14-branched; stigmas capitate. Fruits schizocarps, reflexed, inflated, spheric to papery, setose; mericarps 10–12[–14], 1-celled, without dorsal spur, apex rounded. Seeds 2–6 per mericarp, spheric, glabrous or setose.

Herissantia crispa (Linnaeus) Brizicky—BLADDERMALLOW—Diffuse perennial with slender vinelike stems and branches to 1 m+ long, velvety-tomentulose or canescent. Leaves thin, with petioles equaling the blades or shorter, ovate, deeply cordate at base, mostly abruptly acuminate at apex, often prominently reticulate-veined, with crenulate margins, 2–7 cm long, the uppermost leaves nearly sessile. Involucler absent. Peduncles in

fruit commonly refracted. Flowers: calyx lobes 5, velvety and often villous, ovate to ovate-lanceolate, acute, 4–6 mm long; petals 5, about twice as long as calyx, pale-yellow to whitish or sometimes yellowish-orange. Fruit globose, 1–2 cm wide; carpels about 12, rounded and muticous, becoming greatly inflated, the walls thin and papery, normally hirsute with long hairs; ovules 2 to 6 in each carpel. Seeds glabrous. In chaparral, brushland, boulder-strewn areas, flats and rocky slopes in central, south and west Texas. Flowering throughout the year.

Hibiscus Linnaeus

Herbs, annual or perennial, subshrubs, shrubs, or trees. Stems erect, ascending or arching, unarmed or prickly, glabrous or pubescent. Leaves: stipules persistent or caducous, filiform to lanceolate or narrowly triangular; blade lanceolate to ovate or elliptic, unlobed or lobed, base cordate, rounded, truncate or cuneate, margins entire or variously serrate, dentate or crenate. Inflorescences axillary, sometimes adnate to subtending petiole, flowers solitary or clustered; involucrel present. Flowers: calyx persistent, sometimes accrescent, inflated or not, lobes \pm triangular, sometimes strongly 3-ribbed, sometimes with nectary on midrib; corolla white, cream, yellow, orange, pink, red, lavender, purple, or blue, usually red, purple, or brown basally; staminal column included or exserted; styles 5-branched; stigmas capitate to discoid. Fruits capsules, 5-valved, ovoid or spheroid, apex usually apiculate, acute, or acuminate, sometimes rounded or depressed or impressed, glabrous or hairy. Seeds to 60 per locule, reniform-ovoid, reniform-globose, or subglobose, papillose or not, glabrous or pubescent.

The classification of *Hibiscus* is currently in a state of flux. Recent molecular work (Pfeil and Crisp, 2005) has indicated that members of certain other genera should be

nested within *Hibiscus*, or that *Hibiscus* as traditionally circumscribed should be broken into smaller genera.

Weckesser (2011) reported the occurrence of a naturally-occurring hybrid between *H. coulteri* and *H. denudatus* in the Big Bend region of Texas. The hybrid (*H. ×sabei* Weckesser) can be distinguished from the parental species by pubescence characters, the morphology of leaves, floral bracts, sepals, fruits, and seeds, as well as by pollen stainability.

Key to the Texas species of *Hibiscus*

1. Herbage stellate hairy; leaf blade margins ciliate; petals white to pale yellow; capsules ellipsoid, minutely pubescent (2)
 1. Herbage almost entirely glabrous; leaf blade margins serrate; petals pink; capsules ovoid, glabrous.....*H. laevis*
 2. Leaves subulate; flowers erect; corolla bright red; stigmas red; styles red; capsules brown, glabrous (3)
 2. Leaves linear; flowers horizontal; corolla pale yellow; stigmas dark red; styles pale yellow; capsules black, hairy *H. trionum*
 3. Leaf blade orbiculate to elliptic, palmately 5-lobed; calyces not hairy; involucellular bractlets 9; petals red to pink; capsules minutely hairy (4)
 3. Leaf blade triangular to ovate, hastately 3-lobed; calyces hairy; involucellular bractlets 8; petals white; capsules very hairy..... *H. dasycalyx*
 4. Leaves lobed; pedicels 4 cm; flowers horizontal to ascending (5)
 4. Leaves unlobed; pedicels 1.5 cm; flowers nodding.....*H. martianus*

- 5. Petiole $\frac{1}{2}$ length of leaf blade; leaf base truncate, margins denticulate; petals red to orange (6)
- 5. Petioles $\frac{2}{3}$ the length of leaf blade; leaf base cordate, margins unevenly crenate; petals pale yellow.....*H. aculeatus*
- 6. Stems stellate pubescent; flowers erect or ascending; capsules pubescent; seeds with silky hairs (7)
- 6. Stems simple-pubescent; flowers horizontal; capsules glabrous; seeds glabrous.....*H. clypeatus*
- 7. Leaves unlobed; involucellar bractlets 8–14; capsule hairs yellow to white (8)
- 7. Leaves pinnately lobed; involucellar bractlets 10–15; capsules glabrous*H. coulteri*
- 8. Herbage glabrous with prickles; pedicels jointed near the center (9)
- 8. Herbage stellate tomentose; pedicels not jointed..... *H. striatus*
- 9. Stems stellate tomentose; capsules usually glabrous.....*H. denudatus*
- 9. Stems densely hairy with simple yellow hairs capsules hairy*H. radiatus*

Hibiscus aculeatus Walter—PINELAND HIBISCUS—Perennial herbs or subshrubs to 1 m high, the stems scabrous throughout. Leaf blades broadly to transversely ovate, 3- to 5-fid, sometimes lobed, the lobes obovate to oblanceolate, 3.5–9.5 cm long, 4.5–13.5 cm wide, the base cordate to cuneate, the margins coarsely crenate-serrate, the apex acute to acuminate, the surfaces scabrous. flowers axillary, solitary, or appearing racemose by reduction of the subtending leaves; pedicels inconspicuously jointed, to 1.5 cm long; bracteoles 8–11, linear-subulate; calyx campanulate, 1.6–2.8 cm long, the lobes triangular, with 3 prominent, often reddish ribs; corolla funnelform; petals pale yellow to

white, dark red basally, 5–8 cm long. Capsules brown to stramineous, ovoid, 1.2–2 cm long, antrorsely hispid. Seeds reddish brown to dark brown, reniform-ovoid, 3.3–4.5 mm long. Pine savannahs and woodlands in east Texas. Jul–Oct.

Hibiscus clypeatus Linnaeus—CONGO MAHOE—Shrubs or trees to 5 m tall, the young stems with a mixture of simple and stellate hairs. Leaf blades ovate to orbiculate, angular-lobed or sometimes unlobed, 10–22 cm long, 9–23 cm wide, deeply and narrowly cordate to truncate at base, the margins remotely and shallowly denticulate or undulate, the apex acute to acuminate, the surfaces stellate-tomentose. Flowers axillary, solitary, or occasionally subcorymbose; pedicels 3–10 cm long; bracteoles 7–10, linear-subulate to narrowly triangular, often falcate, 1–3 cm long; calyx campanulate, 3–4.5 cm long, lobes triangular; corolla funnelform to narrowly campanulate; petals dull red or dull orange, the 3 lower recurved, 4–5.5 cm long. Capsules dull orange, ovoid to obovoid, 2.5–5 cm long. pubescent. Seeds brown, mottled, 3.5–4 mm long. Known only from the lower Rio Grande Valley (Hidalgo County). Oct–Nov.

Hibiscus coulteri Harvey ex A. Gray—DESERT ROSE-MALLOW—Subshrubs or shrubs to 1 m high, hirsute with few-rayed hairs. Leaves dimorphic; lower blades broadly ovate to ovate-oval and dentate, upper blades mostly divided into 3 narrow coarsely dentate lobes. Flowers few, long-peduncled; pedicels usually disarticulating at maturity of the fruit; bracteoles 10 to 14, linear-setaceous, rigid, 2 cm or less long, about the length of the lobes of the calyx; petals broadly obovate, 2–4 cm long, whitish to lemon- or sulphur-yellow and commonly reddish- or purple-tinged. Capsule glabrous, shorter than the calyx. Seeds covered with long hairs. In desert areas, hills and slopes in the Trans-Pecos. Apr–Aug.

Hibiscus dasycalyx S. F. Blake & Schiller—NECHES RIVER ROSE-MALLOW—

Herbaceous perennial to 1.5 m high, the stems greenish, terete, glabrous. Leaves with slender petioles 3–5 cm long, blades 3-lobed and hastate at base, 5–9 cm long, 3–10 cm wide at base across the lobes, glabrous, the lobes linear-attenuate, 3–6 mm wide, usually irregularly incised or serrate. Flowers 6 or 7, solitary in uppermost axils; peduncles about 15 mm long, articulate near middle, bracteoles about 12, narrowly linear-attenuate, the inner surface and margins densely hirsute, hirsute to subglabrous on outside, about 15 mm long, 1–1.5 mm wide; calyx \pm 25 mm long, campanulate, densely spreading-white-hirsute on outside, densely yellowish-pilose with subappressed hairs on inner surface, the lobes deltoid-apiculate and \pm 7 mm long; corolla white with a purple spot, when dry \pm 6 cm long; ovary densely yellowish-pilose. Capsule brown, ovoid, 1.6–2.8 cm long. Known only from Cherokee, Harrison, Houston and Trinity counties in east Texas. May–Jul.

Hibiscus denudatus Benth—PALEFACE ROSE-MALLOW—Subshrubs, 0.3–0.6 m high, stellately canescent-tomentose, with several erect or ascending stems. Leaves sessile or with petioles to 1 cm long, ovate to suborbicular or ovate-oblong, rounded to obtuse at apex, broadly cuneate to truncate or slightly cordate at base, to 35 mm long, coarsely crenate-serrate, finely stellate-pubescent. Flowers short-peduncled in the axils and commonly along the naked summit of the branches; involucre of 4 to 7 short setaceous bracteoles, sometimes obsolete or as much as half the length of the 5 lanceolate acuminate canescent-tomentose calyx lobes; petals lavender-purple, 2–3 cm long. Capsule glabrous or pubescent at apex. Seeds few, densely long silky-pubescent. In desert areas, hills and slopes in the Trans-Pecos. Mar–Oct.

Hibiscus laevis Allioni—HALBERD-LEAVED ROSE-MALLOW, SMOOTH ROSE-MALLOW—Herbaceous perennial, the stems often tinged with red, to 2.5 m high, essentially glabrous. Leaves with slender petioles to 10 cm long or more, blades triangular-hastate in general outline, glabrous, the basal lobes (if developed) widely divergent, the middle lobe long-acuminate and 2 to 6 times as long as the body of the leaf. Flowers axillary, solitary; bracteoles linear-setaceous, tapering to a filiform point, to 3 cm long; calyx glabrous or very nearly so; petals obovate, pink or whitish with a purplish base, 6–8 cm long. Capsule brown, ovoid, 1.8–3 cm long, glabrous or nearly so. Seeds pubescent with short reddish-brown hairs. In marshes and shallow water mostly in the eastern third of Texas. May–Nov.

Hibiscus martianus Zuccarini—HEARTLEAF ROSE-MALLOW—Herbaceous perennials from a woody base, stellately canescent-tomentose throughout, the stems 30.3–0.6 m tall. Leaves with petioles to 7 cm long, broadly ovate, cordate at base, obtuse at apex, more or less sinuate-dentate to crenate, 3–7 cm long, slightly less wide, pale beneath and densely stellate-tomentose beneath/ Flowers on peduncles surpassing the leaves; involucre of about 10 spatulate-lanceolate 3-nerved tomentose bracteoles, shorter than the elliptic-lanceolate calyx lobes; petals crimson to deep rose-red, 2.5–3 cm long. Capsule glabrous, ± 15 mm long. Seeds ew, puberulent. In canyons, on gravelly slopes, and in chaparral in the Rio Grande Plains. Flowering throughout the year.

Hibiscus moscheutos Linnaeus—Perennial herbs, to about 2.5 m high, the stems minutely stellate-pubescent to glabrescent. Leaves with slender petioles to about 5 cm long, blades narrowly to broadly lanceolate to triangular-ovate or orbiculate, 3-lobed or unlobed, 8–20 cm long, 3–13 cm wide, the base cordate to cuneate, the margins crenate

to dentate or serrate, the apex acute to acuminate, the surfaces variously pubescent or the upper surface sometimes glabrous. Flowers solitary in the axils of upper leaves, the pedicels often fused to the subtending petiole; bracteoles and calyx canescent but not hairy; petals 5–10 cm long, light creamy-yellow or white with a crimson-purple base. Capsule dark brown, ovoid to subglobose, 1.4–3.5 cm long, glabrous or pubescent. Two subspecies are known, both of which occur in Texas:

1. Capsules glabrous; bracteoles of involucrel usually not ciliate; leaf blades usually glabrous above *H. moscheutos* subsp. *moscheutos*
1. Capsules pubescent; bracteoles of involucrel usually ciliate; leaf blades usually pubescent above *H. moscheutos* var. *lasiocarpos*

Hibiscus moscheutos Linnaeus subsp. ***lasiocarpos*** (Cavanilles) O. J. Blanchard—
 WOOLLY ROSE-MALLOW—Leaf blades lanceolate to broadly triangular-ovate, seldom lobed, usually pubescent above. Bracteoles 1.4–4.5(–5) cm long, usually ciliate. Petals usually white, sometimes pink, with a red basal spot. Capsules pubescent. Freshwater marshes, pond margins, roadside ditches, across much of the eastern half of the state. Jun–Aug.

Hibiscus moscheutos Linnaeus subsp. ***moscheutos***—Leaf blades narrowly lanceolate to orbiculate, sometimes shallowly 3-lobed, usually glabrous above. Bracteoles 0.5–3.5(–4) cm long, usually not ciliate. Petals white or pink, with or without a red basal spot. Capsules glabrous. Brackish and freshwater marshes, pond margins, roadside ditches across much of the eastern half of the state, but primarily in southeast Texas. Jun–Aug.

Hibiscus radiatus Cavanilles—MONARCH ROSE-MALLOW—Herbs or subshrubs, the stems erect or decumbent to 1.5 m high or long, the stems usually glabrous or sometimes

with prickles or simple hairs. Leaf blades broadly to transversely triangular-ovate, mostly 5-7-lobed, 4.5–15 cm long, 6–17 cm wide, broadly and shallowly to truncate at base, the margins serrate, the apex acuminate, the surfaces glabrous but the veins occasionally with prickles on the lower surface. Flowers axillary, solitary; pedicels jointed, to 1.5 cm; bracteoles 8–10, often reflexed in fruit, 1–1.8 cm long; calyx cylindrical-campanulate, 1.5–2.5 cm long, accrescent, the lobes narrowly triangular; corolla rotate; petals dark to rose-purple, rarely yellow, 3.5–7 cm long. Capsules pinkish brown, ovoid, 1.8–2.5 cm long, antrorsely hispid with deciduous hairs. Seeds brown, mottled, 3.5–4 mm long. Known in Texas from only two widely-separated collections (Cameron and Milam counties). Oct–Nov.

Hibiscus striatus Cavanilles—STRIPED ROSE-MALLOW—Herbaceous perennials to 3 m high, densely gray-velutinous with short stellate hairs; stem (and sometimes the petioles and peduncles) sparsely or densely aculeate with straight corky-based prickles 3 mm long or less, these sometimes lacking. Leaves with petioles 2–6 cm long, blades triangular-lanceolate to oblong-lanceolate or ovate-oblong, 8–11 cm long, 3.5–5 cm wide, acute to acuminate, sub truncate to shallowly cordate at base, the margin crenate-serrate throughout. Flowers solitary in the upper axils; peduncles to 35 mm long, jointed almost to the base; bracteoles about 12, narrowly linear or somewhat involute-margined and linear-filiform, 12–15 mm long, to 1.5 mm wide, densely velutinous, in age reflexed; calyx 28–32 mm long, sometimes more or less hispid outside, the broadly triangular acuminate teeth about equaling the tube; corolla 8–9 cm long, purplish-pink with dark-reddish basal spot, the petals with spreading tips. Capsule subglobose, densely spreading-

hispid outside with ochroleucus hairs. Seeds densely and shortly rufescent-velvety, 2.5 mm long. Sporadic in marshes and along canals along the coast. May–Oct.

Hibiscus trionum Linnaeus—FLOWER-OF-AN-HOUR—Annual herbs to 0.6 m high, some branches becoming prostrate, the stems hispid to glabrate. Leaves 3-lobed or 3- to 5-parted, the segments mostly cuneate-oblong to spatulate, with the middle segment the largest, all coarsely toothed or incised. Flowers solitary; pedicel elongating in fruit; bracteoles linear; calyx setose, papery, dark-striped, becoming inflated; corolla sulphur-yellow or whitish, with a brown-purple center, 5–7.5 cm across. Capsule dark brown-black, ellipsoid to ovoid, 1.2–1.5 cm long. Seeds muriccate-papillose. Occasional as a weed on disturbed sites in central and north Texas. May–Sep.

Kosteletzkya C. Presl

Subshrubs or perennial herbs. Stems erect or ascending, variously scabrous, not viscid. Leaves: stipules persistent, linear-subulate or filiform; blade narrowly ovate to transversely ovate, unlobed to palmately, hastately or sagittately 3–5-lobed, base cordate to rounded or truncate, margins crenate, serrate, or nearly entire. Inflorescences axillary, solitary flowers or open panicles; involucre present. Flowers: calyx persistent, somewhat accrescent, not inflated, lobes veined, not strongly ribbed, triangular-ovate; corolla pink or white; staminal column included or exerted; styles 5-branched; stigmas capitate. Fruits capsules, erect, not inflated, 5-angled or -winged, 5-valved, 5-locular, pubescent or minutely so, often transversely rugose or striate. Seeds 1 per locule, reniform-ovoid, glabrous or scabridulous, often with curved, concentric lines.

Kosteletzkya is a genus of 17 species, two of which are known from Texas. The species can be distinguished on the basis of flower size and color and seed size and pubescence. *Kosteletzkya depressa* was first collected from Texas in 1991 and was not included in the treatment of Correll and Johnston (1970).

Key to the Texas species of *Kosteletzkya*

1. Calyx 3.2–6 mm long; petals white, sometimes roseate, 3–4.5 cm long; seeds 2.5–2.8 mm long, minutely pubescent.....*K. depressa*
1. Calyx 7–11 mm long; petals usually pink, rarely white, 15–45 mm long; seeds 3–4 mm long, glabrous*K. pentacarpos*

Kosteletzkya depressa (Linnaeus) O. J. Blanchard, P. A. Fryxell & D. M. Bates—STINGING MALLOW—Perennial herbs from a fibrous-thickened root crown, to about 2 m high, hispid or scabrid with stellate or simple hairs. Leaves sparsely to moderately pubescent, the blade ovate or narrowly ovate, sometimes palmately, hastately or sagittately 3(–5)-lobed, 3–8 cm long, 1.5–6.5 cm wide, the margins irregularly serrate to crenate, the apex broadly acute to acuminate. Flowers: calyx campanulate to rotate, 5-lobed, 3.2–6 mm long; corolla rotate, petals usually white, often with a yellow base, sometimes roseate, 3–4.5 cm long, 2–3 cm wide; staminal column 4–10 mm long. Fruit 5-angled, short-pubescent. Seeds brown, 2.5–2.8 mm long. Freshwater or brackish marshes near the coast; at present known only from Cameron County. Aug–Oct.

Kosteletzkya pentacarpos (Linnaeus) Ledebour—SALTMARSH MALLOW—Branched perennial herbs to about 1.5 m high, stellate-hirsute or -tomentose throughout, greenish or somewhat cinereous. Leaves gray-green, densely pubescent, the lower cordate-suborbicular to -ovate and angulate or coarsely toothed, the upper and bracteal mostly

lanceolate and without or with hastately divergent basal lobes, 5.5–17.5 cm long, 3.5–16 cm wide, the margins coarsely to finely serrate or irregularly dentate or \pm entire, the apex acute to acuminate. Flowers: calyx campanulate to rotate, 5-lobed, 7–11 mm long; corolla rotate, petals usually pink, rarely white, yellow at base, 15–45 mm long, 10–40 mm wide; staminal column 15–35 mm long. Fruit prominently 5-angled, copiously villous-hirsute. Seeds brown with paler concentric lines, 3–4 mm long. In brackish or nearly fresh marshes and along shores and in swamps, along coastal Texas. Jun–Oct.

Krapovickasia Fryxell

Herbs, perennial. Stems procumbent, with fine stellate pubescence and long simple hairs, not viscid. Leaves alternate and distichous; stipules persistent, inconspicuous, subulate; blade ovate-oblong, unlobed, base cordate, margins crenate-dentate, surfaces tomentose. Inflorescences axillary, solitary flowers; involucre absent. Flowers: calyx accrescent, inflated in fruit, completely enclosing fruit, lobes unribbed, ovate, stellate-pubescent; corolla white or rose; staminal column included; style 5[–9]-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, glabrous; mericarps 5, 1-celled, without dorsal spurs, indehiscent. Seeds 1 per mericarp, glabrous.

The genus *Krapovickasia*, named for the Argentinian botanist and student of Malvaceae, Antonio Krapovickas, was erected by Fryxell (1978) to accommodate four species formerly included in *Sida*. The genus differs from *Sida* primarily by its simple, unornamented mericarps (similar to those of *Malvella* and *Sidastrum*) and accrescent calyx that becomes reticulately membranous at maturity by disintegration of all but the finely reticulate vascular tissue (Fryxell, 1978). Only one of the species, *K. physaloides*,

is known from Texas, having been collected twice from sandy soils in a post oak woodland in Karnes County (Brown and Muschalek, 1996).

Krapovickasia physaloides (C. Presl) Fryxell—ANTONIO'S MALLOW—Perennial herbs with simple and stellate pubescence. Leaves: blade ovate-oblong, unlobed, the base cordate, the margins crenate dentate, 2.5–4.5 cm long, the surfaces tomentose. Flowers axillary, solitary; calyx accrescent, inflated in fruit, 7–8(–12) mm long; petals subequal to calyx, white or rose; carpels 5, black, lacking dorsal projections, 2.5–3 mm long. Disturbed sites in central and south-central Texas; introduced. Apr–Jun.

Lavatera Linnaeus

Shrubs, subshrubs, or herbs, perennial or annual. Stems erect, stellate-hairy or glabrate. Leaves: stipules early-deciduous, narrowly triangular, lanceolate, oblanceolate, or linear; blade lanceolate or ovate to orbiculate, base rounded to wide-cuneate, unlobed or palmately 3–7-lobed, margins crenate or dentate or nearly entire. Inflorescences axillary solitary flowers or terminal racemes; involucre present. Flowers: calyx not accrescent, not inflated, lobes triangular to ovate, not ribbed; corolla rose-pink, white, or purple, usually with darker purplish veins; staminal column included; style [9–]12–22[–40]-branched; stigmas filiform. Fruits schizocarps, erect, not inflated, somewhat indurate; mericarps [9–]12–22[–40], 1-celled, without dorsal spur, not beaked, sometimes slightly ridged or keeled, glabrous or hairy, indehiscent. Seeds 1 per mericarp, glabrous.

This taxon is often used as a garden ornamental and occasionally escapes from cultivation.

Lavatera trimestris Linnaeus—ROSE MALLOW—Branching herbaceous annual 0.9–1.8 m high. Leaves long-petiolate, irregularly crenate-dentate, finely pubescent or nearly

glabrous, the lower suborbicular-cordate, the upper ones angled; stipules caducous. Flowers solitary, axillary, 3–10 cm in diameter; pedicels jointed below the flowers, mostly shorter than the subtending leaves; the 3- to 6-lobed involucre shorter than the 5-lobed calyx; petals 5, rose-pink or red, obtuse to truncate or emarginate, short-clawed; carpels 5 to 12. Fruit not beaked, 1-seeded, indehiscent; axis of the fruit expanded at apex into a disk to enclose the ovary. Occasionally escaping from cultivation in south Texas. Flowering throughout the year.

Malachra Linnaeus

Herbs or subshrubs, annual or perennial. Stems erect, puberulent, hispid or stellate-pubescent, not viscid. Leaves: stipules persistent, filiform; blade broadly ovate, lyrate, or palmately 3–5-lobed, base rounded or truncate, margins crenate or serrate, surfaces usually stellate-pubescent. Inflorescences axillary or terminal, of head-like racemes subtended by prominently veined, boat-shaped bracts; involucre. Flowers: calyx not accrescent, not inflated, lobes unribbed or somewhat ribbed, lanceolate-ovate, hispid; corolla yellow; staminal column included; styles 10-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, glabrous or puberulent; mericarps 5, 1-celled, smooth, indehiscent. Seeds 1 per mericarp, glabrous.

In this treatment the characteristics that describe *M. capitata* emphasize the floral features, such as the bisexual flowers, the shape of the floral bracts, and the number of branched styles.

Malachra capitata Linnaeus—MALVA DE CABALLO—Erect perennial herb, usually branched, velvety stellate-pubescent and often with some long whitish hairs, to 1.5 m high. Leaves long-petiolate, broadly ovate to suborbicular, dentate or 3- or 5-lobed, the

lower leaves to 10 cm long, the upper leaves smaller; stipules subulate, to 15 mm long. Inflorescences several-flowered heads, mostly on axillary peduncles; outer bracts broadly ovate, cordate at base, acute at apex, strongly nerved with whitish markings, velvety, 2–2.5 cm long, the smaller inner bracts ovate. Flowers perfect; calyx 6–8 mm long, lobes ovate-lanceolate and obtuse; petals 5, yellow or orange-color, about 7–10 mm long; stamen tube shorter than the petals, bearing 15 to 30 filaments at about the middle; carpels 5, obtuse, convex, reticulated, nearly glabrous, 2.5–3 mm long. Fields, thickets, palm groves, roadsides, and waste places and in south Texas. Flowering throughout the year.

Malva Linnaeus

Herbs, annual, biennial, or perennial, subshrubs, or shrubs. Stems erect, ascending, or trailing, glabrous or hairy, hairs stellate or simple. Leaves: stipules persistent or deciduous, linear, lanceolate, triangular, or ovate to \pm falcate; blade orbiculate or reniform, unlobed or palmately 3–7(–9)-lobed or divided, base cordate to truncate, margins crenate to dentate. Inflorescences usually axillary, flowers usually in fascicles, sometimes solitary, sometimes in terminal racemes; involucre present. Flowers: calyx accrescent or not, not inflated, lobes reticulate-veined or not, not prominently ribbed, ovate or triangular; corolla white, pink, or lavender; staminal column included; style 6–15(–20)-branched; stigmas filiform. Fruits schizocarps, erect, not inflated, \pm indurate, glabrous or pubescent; mericarps 6–15(–20), 1-celled, wedge-shaped, beak or cusp absent, indehiscent. Seeds 1 per mericarp, glabrous.

The three Texas species of *Malva* are all weedy. *Malva parviflora* is widespread along roadsides and disturbed sites throughout the state, while the other species are more

sporadic in occurrence. Features used in this treatment to differentiate among them include characters of the leaves, flowers, and fruits.

Key to the Texas species of *Malva*

1. Leaf blade 5-lobed; petiole $\frac{1}{2}$ times as long as the blade; flower pink to purple
..... *M. sylvestris*
1. Leaf blade 6–7-lobed; petiole 2–5 times as long as the blade; flower white to pale lilac, red, or purple (2)
2. Flowers white to pale lilac; mericarps 10, narrowly winged or toothed; schizocarp mostly glabrous, sometimes hairy..... *M. parviflora*
2. Flowers pale lilac, pink, or lilac; mericarps 12, margins not winged or toothed; schizocarps pubescent..... *M. neglecta*

Malva neglecta Wallroth—COMMON MALLOW—Annual, biennial, or perennial herbs.

Stems prostrate, procumbent or ascending, to about 1 m long. Leaves long-petioled, orbicular to reniform, 3–6 cm wide, shallowly 5- to 9-lobed, crenate, cordate to subcordate at base. Flowers fascicled in the axils, with pedicels to 3 cm long; petals obcordate, 6–12 mm long, white or slightly tinged with pink or purple; carpels usually 12 to 15, rounded on the back, not rugose or reticulate, usually finely pubescent. Collected from widely-scattered localities across the state. Apr–Jul.

Malva parviflora Linnaeus—SMALL-FLOWERED MALLOW—Annual herbs, glabrous or sparsely pubescent. Stems erect or ascending, to \pm 2 m high or long. Leaves with long slender petioles, suborbicular to reniform and often somewhat angulate-lobed, to about 6 cm long and usually wider than long. Flowers clustered in the axils; pedicels 3–25 mm long; calyx lobes broadly ovate, in fruit often much-enlarged and spreading; petals

whitish or bluish-white; carpels puberulent or glabrous, sharply and transversely reticulate-rugose on the back. Along roadsides and on disturbed sites throughout much of Texas. Mar–Jul.

Malva sylvestris Linnaeus—HIGH MALLOW, GARDEN MALLOW—Perennial herbs, sparsely hirtellous to glabrate. Stems erect, ± 1 m high. Leaves orbicular to reniform in shape, shallowly 3- to 7-lobed, the lobes broadly rounded, serrate, the basal ones 5–10 cm long and wide; petioles pubescent only or chiefly in a single line on the upper side. Flowers fascicled in the upper axils, on peduncles to 5 cm long; petals red-purple, 2–2.5 cm long; carpels about 10, rugose-reticulate on the back, glabrous to sparsely short-pubescent. Known from a few widely-scattered localities in central and north-central Texas. May–Aug.

Malvastrum A. Gray

Herbs, annual or perennial, or subshrubs, hairy. Stems erect or ascending to decumbent, pubescence closely appressed or tufted, stellate, or simple. Leaves: stipules persistent, lanceolate to linear, usually subfalcate or falcate; blade wide-ovate to lanceolate, unlobed or sometimes obscurely 3-lobed, base rounded, slightly cordate, nearly truncate, to cuneate, margins crenate-dentate to dentate-serrate or denticulate. Inflorescences axillary solitary flowers, terminal racemes or spikes; involucrel present. Flowers: calyx not inflated, somewhat accrescent, lobes 3–5-ribbed, deltate to narrowly triangular; corolla yellow to yellow-orange; staminal column included; style 5–18-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, somewhat indurate at maturity; mericarps (5–)8–18, without apical spurs or with 1–3 apical spurs, sparsely to densely pubescent, rarely glabrous, indehiscent. Seeds 1 per mericarp, glabrous.

Correll and Johnston (1970) recognized the same species, but relied primarily on length and width measurements to distinguish among them, as opposed to the more descriptive features emphasized in this treatment.

Key to the Texas species of *Malvastrum*

1. Leaf blade shallowly 3-lobed or unlobed; pedicels exceeding length of calyx
*M. americanum*
1. Leaf blade unlobed; pedicels not exceeding length of calyx (2)
2. Stems ascending; stem pubescence dense, 6-10 rayed; leaf blade ovate, with crenate margins and acute apex..... *M. aurantiacum*
2. Stems erect; stem pubescence scattered, 2-4 rayed; leaf blade lanceolate, with dentate margins and acuminate apex.....*M. coromandelianum*

Malvastrum americanum (Linnaeus) Torrey—AMERICAN FALSE MALLOW—

Perennial herbs, erect, usually densely stellate-pubescent, to about 2 m high. Leaves broadly ovate, serrate, stellate-pubescent, subtruncate to obtuse at base, acute to acuminate at apex, the lower leaves long-petioled and to 7 cm long, the upper leaves smaller. Flowers in dense terminal cylindrical spikes 5–12 cm long and 15–25 mm thick, with sometimes a few in the upper axils; involucre bracts 5–7 mm long; calyx hirsute or hispid, ± 5 mm long, the lobes acuminate; petals yellow to orange-yellow, ± 7 mm long; carpels nearly 2 mm long, depressed-reniform, beaked, not aristate. Palm groves, woodlands, old lake beds and open woods in the Rio Grande Plains and Valley, primarily near the coast. Flowering throughout the year.

Malvastrum aurantiacum (Scheele) Walpers—TEXAS FALSE MALLOW—Plant with rigid stems ascending from a lignescent base, to about 0.6 m high, sparingly branched.

Leaves slender-petioled, subcordate-oval to oblong, broadly cuneate to truncate at base, obtuse at apex, rather coarsely crenate-serrate. Flowers: bracts of the involucl ovate or subcordate, adnate to base of calyx and more or less surpassed by the ovate-acuminate calyx lobes; petals golden-yellow, \pm 13 mm long; carpels 15 to 20, firm-coriaceous, much-compressed, brownish-red at maturity, smooth, hirsute at top, dorsally 2-gibbous, ventrally subulate-aristate. East-central parts of the state and the coastal bend. Apr–Sep.

Malvastrum coromandelianum (Linnaeus) Garcke—COMMON FALSE MALLOW—
Perennial herbs, freely branched, strigose-pubescent, to about 1 m high. Leaves slender-petioled, ovate to ovate-oblong or lanceolate, 2–8 cm long, irregularly and sharply serrate, the hairs of the upper surfaces mostly simple. Flowers mostly solitary in the axils, on peduncles shorter than the petioles; involucl of 3 small narrow bracts; calyx lobes triangular, acute, longer than the tube; petals pale-yellow to orange-color, \pm longer than the calyx, obliquely truncate; carpels 8 to 12, hirsute on top, with an awn near the inflexed apex and 2 beaks on the back. Disturbed sites on the Edwards Plateau, Rio Grande Plains and coastal regions, primarily in the southern half of the state. Flowering throughout the year.

Malvaviscus Fabricius

Shrubs, sometimes forming dense clones propagated by root proliferation. Stems erect, hairy or glabrous, not viscid. Leaves: stipules deciduous, linear or subulate; blade elliptic to broadly ovate, unlobed or 3–5-lobed, base rounded to cordate, margins serrate or crenate to subentire. Inflorescences axillary solitary flowers or rarely terminal 2–5-flowered cymes; involucl present. Flowers: calyx not accrescent, not inflated, lobes unribbed, lanceolate or deltate; corolla red; staminal column exerted; styles 10-

branched; stigmas capitate. Fruits schizocarpic berries, erect, fleshy, glabrous; mericarps 5, 1-celled, without dorsal spur, indehiscent. Seeds 1 per mericarp, glabrous.

Malvaviscus penduliflorus de Candolle, with large, pendulous flowers to 7 cm long, is widely cultivated in the lower Rio Grande Valley and may occasionally escape from cultivation.

Malvaviscus arboreus Cavanilles—WAXMALLOW—Shrubs to 3 m high, usually tomentulose. Leaf blades elliptic to broadly ovate, 4–25 cm long, 3–12 cm wide, the surfaces sparsely to densely pubescent with simple and stellate hairs. Flowers axillary, usually solitary but occasionally in apical 2- to 5-flowered cymes, ascending or erect; bracts of involucre linear-spatulate; calyx lobes connate for ½ to 2/3 length, 8–15 mm long; petals imbricate, asymmetrical, auriculate towards base, 1.5–5 cm long. Fruits berrylike, red or orange-red, 8–13 mm long, 10–17 mm wide, fleshy. Seeds reniform. Two varieties have been reported as native or naturalized in Texas:

1. Leaf blades usually unlobed, longer than wide, base rounded to subcordate; stems stellate-pubescent to glabrate or glabrous..... *M. arboreus* var. *arboreus*
1. Leaf blades deeply 3-lobed, ± as broad as long, base usually strongly cordate; stems glabrous towards base, densely minutely tomentose distally
..... *M. arboreus* var. *drummondii*

Malvaviscus arboreus Cavanilles var. ***arboreus***—Plants not clone-forming, 1–3 m tall, subglabrous to densely pubescent. Stems stellate-pubescent to glabrate or glabrous. Leaf blades usually unlobed or shallowly 3- to 5-lobed, elliptic to ovate, 4–25 cm long, 3–12 cm wide, often longer than wide, base rounded to subcordate, apex acute, margins

serrate to subentire; petals 1.5–4 cm long. Known in Texas from a single collection (*A. W. Lievens 2917*, NY) from Cameron County; perhaps an escape from cultivation.

Malvaviscus arboreus Cavanilles var. *drummondii* (Torrey & A. Gray) Schery— TEXAS MALLOW, TURK’S CAP, DRUMMOND WAXMALLOW)— Plants clone-forming by root proliferation, 0.5–1.5(–3) m tall. Stems glabrous towards base, densely and minutely tomentose distally. Leaf blades deeply 3-lobed, broadly ovate, 4–9 cm long, 4–12 cm wide, often wider than long, base usually strongly cordate, apex obtuse or rarely acute, margins crenate-dentate; petals 1.5–3.5 cm long. Shaded woodlands and slopes, stream margins, from eastern Edwards Plateau eastward and south to the Rio Grande Valley. May–Oct.

Malvella Jaubert & Spach

Herbs, perennial. Stems prostrate, with stellate and lepidote pubescence, not viscid. Leaves alternate and distichous; stipules persistent, subulate, 3–5 mm; blade asymmetric basally, reniform, or ovate to triangular, not dissected or parted, base asymmetric, margins dentate, serrate, or entire, surfaces stellate or lepidote. Inflorescences axillary solitary flowers; involucl present or absent. Flowers: calyx not accrescent, not inflated, lobes unribbed, ovate or cordate, stellate or lepidote; corolla whitish or pale yellow, sometimes with pink flush or fading pale rose; staminal column included; style 7–10-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, minutely pubescent; mericarps 7–10, 1-celled, dorsally rounded, indehiscent. Seeds 1 per mericarp, glabrous.

The species of *Malvella* recognized here were all treated as taxa in *Sida* by Correll and Johnston (1970). The Texas species can be separated largely on the basis of leaf characteristics.

Key to the Texas species of *Malvella*

- 1. Leaf blade reniform, base truncate, margins serrated, apex obtuse; sepals ovate
 *M. leprosa*
- 1. Leaf blade triangular to narrowly triangular, base truncate/cuneate, margins
 entire or dentate, apex acute; sepals cordate (2)
- 2. Leaf blade triangular, margins dentate; involucl sometimes present *M. lepidiota*
- 2. Leaf blade narrowly triangular, margins entire; involucl absent *M. sagittifolia*

Malvella lepidota (A. Gray) Fryxell—SCURFY MALLOW—Low-growing herbs. Stems commonly prostrate and trailing to ± 0.4 m long, densely hairy with a mixture of stellate and silvery-lepidote hairs. Leaf blades ± triangular to somewhat ovate, mostly 1–2 cm long, usually 1–2-times as long as wide, the base truncate or cuneate, the margins irregularly dentate, the apex acute, the surfaces silvery-lepidote above and predominantly stellate below. Flowers axillary, solitary; pedicels ± equal to the subtending leaves; bracteoles absent or occasionally 3, filiform; calyx 6–8 mm long, silvery-lepidote, the lobes cordate-ovate; petals whitish or pale yellow, sometimes fading rose, 10–15 mm long. Fruits 5–6 mm in diameter. Heavy saline soils on mud flats and lake and pond margins, primarily in the Panhandle and Trans-Pecos and occasionally in the Rio Grande Plains. May–Sep.

Malvella leprosa (Ortega) Krapovickas—DOLLAR-WEED, SCURFY SIDA—Perennial herbs, the stems commonly prostrate, with a mixture of stellate and appressed sublepidote

hairs. Leaf blades \pm reniform, mostly 1–3.5 cm long, wider than long, the base obliquely truncate, the margins serrate, the apex obtuse or subacute, the surfaces with dense appressed, sublepidote and stellate pubescence. Flowers axillary, solitary; pedicels \pm equal to the subtending petiole; bracteoles 3 or occasionally absent, filiform; calyx 8–10 mm long, silvery-lepidote, the lobes ovate; petals pale yellow, sometimes fading rose, 12–15 mm long. Fruits \pm 7 mm in diameter. Clayey saline soils, primarily in the Panhandle and Trans-Pecos. Flowering throughout the year.

Malvella sagittifolia (A. Gray) Fryxell—ARROW-LEAF MALLOW— Perennial herbs, the stems commonly prostrate, trailing, with silvery-white lepidote hairs. Leaf blades narrowly triangular, mostly 1.5–3.5 cm long, usually 3–5-times as long as wide, the base truncate, the margins entire with 2–4 hastate teeth at base, the apex acute, the surfaces sparsely silvery-lepidote. Flowers axillary, solitary; pedicels usually shorter than the subtending leaves; bracteoles absent; calyx 7–9 mm long, silvery-lepidote, the lobes cordate-ovate; petals whitish or pale yellow, sometimes fading rose, \pm 15 mm long. Fruits 5–6 mm in diameter. Heavy saline soils of mud flats and shorelines, primarily in the Trans-Pecos, but with scattered localities in the Panhandle and Rio Grande Plains. Flowering throughout the year.

Meximalva Fryxell

Subshrubs. Stems erect, stellate-tomentose. Leaves distichous and alternate; stipules persistent, linear; blade narrowly ovate or oblong-lanceolate, unlobed, base cordate, margins serrate, surfaces stellate-hairy. Inflorescences axillary, solitary flowers; involucrel absent. Flowers: calyx not accrescent, not inflated, lobes unribbed, wide-ovate; purple; staminal column included; style 7- or 8-branched; stigmas capitate. Fruits schizocarps,

erect, not inflated, indurate, puberulent; mericarps 7 or 8, 1-celled, without dorsal spur. Seeds 1 per mericarp, glabrous or with a few stellate hairs.

On the basis of mericarp morphology (mericarps only partially dehiscent, lacking apical spines, and possessing lateral walls that are reticulate, Fryxell (1975) erected the genus *Meximalva* to accommodate two species formerly included in *Sida*. The only Texas species of the genus is *M. filipes*, which is found on the Edwards Plateau and in South Texas; it is easily distinguished from species of *Sida* by its dark purple corollas. Also, it is worth noting that *M. filipes* is considered reminiscent of the widespread *Sidastrum paniculatum*, from which it differs in its solitary, axillary flowers being subtended by a reduced leaf (Fryxell and Hill, 2015).

Meximalva filipes (A. Gray) Fryxell—TEXASFAN—Subshrub or herbaceous from a perennial rootstock, to about 1 m high, rather slender, fulvous-canescens with close stellate pubescence. Leaves very short-petioled, blades lanceolate or the lower ones oblong, coarsely dentate-serrate, obtuse to acute at apex, cordate to truncate at base, 2–7 cm long, pubescent and dark-green above, stellate-tomentose and pale beneath. Pedicels filiform, as long as or longer than the leaves, articulate 3–6 mm below calyx. Flowers nodding in and after anthesis; calyx lobes \pm 2 mm long, ovate, obtuse; petals obovate, deep violet-purple, 4–5 mm long; carpels 7 or 8, obtusely apiculate at the eventually dehiscent apex, puberulent to glabrate, the sides rugose. In rocky ravines and on dry limestone hills and flats in the Edwards Plateau and Rio Grande Plains. Mar.–Aug.

Modiola Moench

Herbs, perennial. Stems procumbent, not viscid, sometimes with few simple hairs on herbage. Leaves: stipules persistent, ovate; blade orbiculate, usually palmately 5–7-parted

or -lobed, base shallowly to deeply cordate, margins dentate. Inflorescences axially, solitary flowers; involucler present. Flowers: calyx slightly accrescent, not inflated, lobes not ribbed, narrowly triangular; corolla salmon-orange, often with darker center, drying brick red; staminal column included; styles 16–22-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, setose; mericarps 16–22, 2-celled, dorsally setose, with 2 apical spurs/spines, chamber divided by endoglossum or partial septum. Seeds 1 per cell, with proximal notch, sparsely and minutely hairy.

Modiola is a monotypic genus introduced throughout much of the United States. Hill (2015) suggested that the species may only be native to a small area of South America.

Modiola caroliniana (Linnaeus) G. Don—CAROLINA BRISTLEMALLOW—Low creeping perennial herb, hirsute with simple or geminate hairs or glabrate, to 0.6 m long or more. Leaves with petioles to 3 cm long, rounded, palmately 3- or 5-lobed and incised, to 6 cm long and 4 cm wide. Peduncles commonly filiform and equaling or surpassing the petiole. Flowers small, solitary on axillary peduncles, subtended by a persistent involucler of 3 foliaceous bractlets; petals small, salmon-color to purplish-red, obovate, 4–6 mm long, slightly the calyx; stamens 10 to 20; stigmas capitate. Fruit depressed, composed of 15 to 30 thin-coriaceous carpels; carpels reniform, much-compressed, more or less hirsute, with a dorsal bipartite cusp and hispid at summit, eventually falling free from the axis and becoming somewhat glabrate. Roadsides, disturbed sites, lawns, and edges of salt marshes, lawns and similar places, mostly in the eastern half of the state. Mar–May.

Pavonia Cavanilles

Subshrubs or shrubs. Stems usually erect, often stellate-hairy, sometimes glabrate, not viscid. Leaves: stipules usually persistent, subulate to filiform; blade usually symmetric,

ovate-triangular to hastate-oblong or ovate, not dissected or parted, base truncate to cordate, margins dentate or crenate to subentire. Inflorescences terminal racemes, or axillary solitary flowers; involucler present. Flowers: calyx not or scarcely accrescent, not inflated, lobes ribbed or unribbed, usually lanceolate-ovate; corolla lavender to pink; staminal column usually included; styles 10-branched; stigmas capitate. Fruits schizocarps, usually erect, not inflated, indurate, minutely pubescent or glabrous; mericarps 5, 1-celled, usually indehiscent. Seeds 1 per mericarp, glabrous or pubescent.

Two species of *Pavonia* are known from Texas, *P. lasiopetala*, which is widespread in central and southern parts of the state, and *P. hastata*, which has been collected from two widely disparate localities. The species are distinguished by features of pubescence, leaf morphology, and fruit size.

Key to the Texas species of *Pavonia*

1. Stems hairy; leaf margins crenate, surface glabrous; schizocarps dark brown, 6 mm in diameter, pubescent; seeds minutely pubescent..... *P. hastata*
2. Stems sparsely stellate hairy; leaf margins dentate, surface hairy; schizocarps pale, 8–9 mm in diameter, glabrous; seeds densely pubescent *P. lasiopetala*

Pavonia hastata Cavanilles—PALE PAVONIA, PINK PAVONIA—Subshrubs to about 0.5 m high, ± stellate-pubescent throughout. Leaves: stipules subulate, 2 mm long; petioles less than ½ length of blade; blade ovate-triangular to hastate-oblong, to 7 cm long, the base cordate, the margins coarsely crenate, the apex acute or subobtuse. Flowers perfect, solitary on slender peduncles in the axils; bracteoles of involucler 5, ovate, shorter than the 3-nerved calyx lobes; petals 5, pale pink with dark maroon base, usually with reddish veins, 15–22 mm long; carpels 5, 1-celled, dorsally keeled but lacking spines. A

cultivated species, known from two collections in north-central and southeast Texas (Harris and Wise counties). Apr.

Pavonia lasiopetala Scheele—ROSE PAVONIA, ROCK ROSE—Plants shrubby, to about 1.5 m high, tomentulose and cinereous. Leaves: stipules subulate, 2–5 mm long; petioles ½ or more as long as blade; blade ovate, 2–5 cm long, slightly longer than wide, the base ovate-cordate, the margins coarsely dentate, the apex acute. Flowers perfect, solitary on slender peduncles in the axils; bracteoles of involucrel 5 to 8, linear, longer than the 5 ovate, acuminate 3- to 5-nerved calyx lobes; petals 5, rose-color, ciliate on the claw, 12–20 mm long; carpels 5, 1-celled, smooth or obscurely reticulate, when mature separating from axis. In shaded, rocky woodlands on the Edwards Plateau and Rio Grande Plains. Flowering throughout the year.

Pseudabutilon R. E. Fries

Subshrubs or shrubs. Stems erect or rarely decumbent, bristly- or stellate-pubescent, not viscid. Leaves: stipules persistent, linear to lanceolate; blade ovate to broadly ovate, unlobed or sometimes shallowly 3-lobed, base cordate, margins crenate to serrate. Inflorescences axillary or terminal umbels or solitary flowers; involucrel absent. Flowers: calyx accrescent, not inflated, lobes unribbed, triangular to ovate; corolla yellow; staminal column included; styles 5–8[–10]-branched; stigmas capitate. Fruits schizocarps, erect to weakly ascending, not inflated, slightly indurate, pubescent; mericarps 5–8[–10], 1-celled or sometimes with a partial endoglossum and appearing 2-celled, with divergent apical distal spines, lateral walls usually disintegrating at maturity, dehiscent. Seeds (2 or)3 per mericarp, papillate, glabrous.

The sole Texas representative of *Pseudabutilon*, *P. umbellatum*, was treated as a species of *Abutilon* by Correll and Johnston (1970).

Pseudabutilon umbellatum (Linnaeus) Fryxell—FALSE VELVETLEAF—Shrubs with erect stems, densely stellate pubescent, sometimes with a few simple hairs. Leaves: blades broadly ovate, sometimes shallowly 3-lobed apically, the base cordate, the margins crenate to serrate, to 12 cm long and 6 cm wide, gradually reduced distally. Flowers in 2- to 5-flowered umbels; calyx accrescent, 6–8 mm long, the lobes triangular; petals 6–8 mm long, yellow, glabrous; carpels 6 to 8, with a dorsal spur 2–4 mm long. Seeds 2–3 mm long. Shrublands, roadsides, and fencerows in the lower Rio Grande Valley. Flowering throughout the year.

Rhynchosida Fryxell

Herbs, perennial. Stems trailing to ascending, stellate-hairy, not viscid. Leaves: stipules persistent, linear; blade oblong-ovate to oblong-lanceolate, unlobed, base shallowly cordate, margins crenate or serrate. Inflorescences axillary solitary flowers; involucre absent. Flowers: calyx accrescent, inflated in fruit, lobes overlapping, unribbed, cordate, stellate-pubescent; corollas yellow; staminal column included; style 8–10[–14]-branched; stigmas capitate. Fruits schizocarps, pendulous, somewhat inflated, indurate, glabrous; mericarps 8–10[–14], 1-celled, each with long, horizontal, obtuse rostrum, indehiscent. Seeds 1 per mericarp, puberulent.

The species of *Rhynchosida* were originally included in *Sida*, but were segregated as a new genus by Fryxell (1978) on the basis of the enlarged, accrescent calyx, mericarp characteristics and the base chromosome number.

Rhynchosida physocalyx Gray—BUFFPETAL—Plant loosely and coarsely stellate-hirsute, partly glabrate. Stems spreading or decumbent from a perennial rootstock, to about 0.4 m long. Leaves with petioles to 3 cm long, rather succulent, suborbicular to oblong, obtuse to broadly rounded at apex, cordate at base, to 6 cm long and 5 cm wide, crenate or serrate. Flowers: pedicels solitary in the axils, soon recurved; calyx lobes cordate, with a small apical ligule, 8–12 mm long, membranaceous and veiny, connivent and forming a globular and angled loose covering over the fruit; petals yellowish or buff-color, scarcely exceeding the calyx; carpels 10 to 14, blackish when mature, ovate with a short beaklike apex, thin-membranaceous and reticulate-veiny. Sandy, gravelly or rocky soils on prairies, in washes and waste ground, mostly in the western two-thirds of Texas. May–Oct.

Sida Linnaeus

Herbs, annual or perennial, subshrubs, or shrubs. Stems erect, ascending, or reclining to procumbent, glabrous or pubescent, sometimes viscid. Leaves petiolate or sessile; stipules persistent, usually linear to lanceolate or falcate; blade usually unlobed, base cuneate, cordate, subcordate, truncate, or rounded, margins crenate, dentate, serrate, or entire. Inflorescences axillary, solitary (sometimes paired or clustered) flowers or terminal panicles; involucre absent. Flowers: calyx not accrescent, not inflated, not completely enclosing fruit, often 10-ribbed at base or angulate, lobes acute or acuminate to triangular or ovate; corolla white, cream, yellow, yellow-orange, salmon-pink, red-orange, or reddish, sometimes with dark-red center; staminal column included; style 5–14-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, indurate, glabrous or pubescent; mericarps 5–14, 1-celled, without endoglossum, without dorsal spurs,

usually with 2 apical spines, glabrous or hairy, indehiscent below, indehiscent or partially dehiscent apically. Seeds 1 per mericarp, glabrous.

Sida is a large (circa 150 species) worldwide genus that is particularly common in warm temperate and tropical regions. The ten Texas species of the genus can be distinguished on the basis of stem and leaf pubescence, leaf morphology, and features of the inflorescence and calyx.

Key to the Texas species of *Sida*

1. Stems with stellate hairs; leaves evenly distributed along stems; stipules separate from petiole; leaf blade ovate to oblong*S. abutilifolia*
1. Stems with appressed hairs; leaves crowded at the stems; stipules joined by petiole; leaf blade elliptic (2)
2. Inflorescence terminal; pedicels 0.1–0.4 cm, shorter than calyx *S. ciliaris*
2. Inflorescence axillary; pedicels 8–12 cm, longer than calyx (3)
3. Calyx 8 mm, stellate hairy; petals orange; style 8–9-branched*S. longipes*
3. Calyx 6–7 mm, minutely hairy; petals yellow to red; style 10–12-branched (4)
4. Petals yellow; schizocarps oblate, 6–7 mm, minutely hairy *S. neomexicana*
4. Petals orange; schizocarps subconic, 4–5 mm, glabrous (5)
5. Stems stellate pubescent; petiole 7 mm, glabrous; leaf blade rhombic*S. rhombifolia*
5. Stems minutely pubescent; petiole 5–15 mm, hairy; leaf blade ovate (6)
6. Leaf blade minutely stellate hairy; calyx glabrous; schizocarps subconic, 4 mm
..... *S. spinosa*
6. Leaf blade not hairy; calyx stellate hairy; schizocarps oblate, 5–6 mm (7)
7. Calyx stellate hairy; mericarps 2-spined apically, 1 mm long *S. tragiifolia*

- 7. Calyx densely stellate tomentose; mericarps 1-spined apically, 2 mm long (8)
- 8. Pedicels 0.2–0.4 cm, shorter than calyx; petals yellow; style 8–14-branched.....
.....*S. cordifolia*
- 8. Pedicels 2–4 cm, longer than calyx; petals orange; style 10-branched.....
.....*S. lindheimeri*

Sida abutilifolia Miller—PROSTRATE SIDA—Stems branched at base, prostrate-spreading, from a slender woody rootstock, to 0.5 m long or more, stellate-puberulent and with or without long spreading hairs. Leaves with slender petioles about as long as the blade, broadly ovate to lanceolate, subtruncate to cordate at base, rounded to bluntly obtuse at apex, stellate-puberulent and sometimes with scattered long hairs, crenate-dentate, to 35 mm long, usually much smaller. Flowers solitary in axils of leaves, with slender pedicels much-exceeding the petioles; calyx somewhat angular, about 5 mm long; petals orange-yellow or yellow, much-surpassing the calyx; carpels 5, varying from barely apiculate to biaristate. On rocky open hills, in open woodlands, and on disturbed sites throughout much of the western two-thirds of Texas. Mar–Sep.

Sida ciliaris Linnaeus—BRACTED SIDA—Many-stemmed herb or subshrub to about 0.3 m high, mostly spreading-prostrate, stellately strigose-pubescent. Leaves long-petioled, linear to suborbicular, obtuse to truncate-retuse, rounded to cordate at base, serrate above the middle, to 25 mm long, glabrous above, stellately appressed-pubescent beneath; stipules filiform- or spatulate-linear; petioles hirsute-ciliate or barbate. Flowers: calyx 5–7 mm long, the lobes ovate-triangular; petals white to yellow or variously salmon-color to rose-purple, to 15 mm long; carpels 5 to 8, turgid, very strongly rugose-reticulate, the apex 1- or 2-aristate. In sandy soils of pastures, scrub oaks, mesquite

thickets and along roadsides and on clay flats, mostly in the Rio Grande Plains with a few localities in central and east Texas. Flowering throughout the year.

Sida cordifolia Linnaeus—GREAT-LEAVED SIDA—Perennial or somewhat woody annual, densely stellate-velvety tomentose throughout, to 1.5 m high. Stems erect and rather stout. Leaves ovate to ovate-orbicular or ovate-oblong, cordate at base, acute to obtuse at apex, irregularly crenate-dentate, to 10 cm long and 5 cm wide, the lower long-petioled. Flowers terminal and axillary, corymbose or subglomerate, with pedicels to 15 mm long; calyx canescent-tomentose, 5-angled, 6–8 mm long, the triangular lobes acute; petals yellow or salmon-pink, nearly twice as long as the calyx; carpels 7 to 12, biaristate or bimucronate. Uncommon in sandy soils on plains and along roadsides, mostly in the Rio Grande Plains with one historic (1950) collection from the Trans-Pecos. Jul–Nov.

Sida elliotii Torrey & A. Gray var. *parviflora* Chapman—ELLIOTT'S FANPETALS—Perennial herbs, puberulent to glabrate, to about 0.5 m high. Leaves with petioles 2–9 mm long, much shorter than the blade; blade narrowly linear to narrowly elliptic, to about 2–8 cm long, truncate at base, acute at apex, dentate; stipules subulate. Flowers axillary, solitary; pedicels 0.5–4 cm long; calyx 6–9 mm long, the lobes ovate, basally stellate-pubescent; petals yellow-orange, 12–15 mm long; carpels 8 to 11, apically spinose. Uncommon on sandy soils of the coastal bend region of Texas (Jackson to San Patricio counties) with two historic collections (1935, 1940) from the Trans-Pecos. May–Oct.

Sida lindheimeri Engelm. & A. Gray—LINDHEIMER'S SIDA—Subshrubs or perennial herbs, stellately cinereous-puberulent, to about 1 m high. Stems erect or sprawling, herbaceous from a woody base. Leaves with petioles 1 cm long or less, linear to linear-lanceolate, 1.5–4 cm long, obtuse to acute at apex, truncate to rounded at base, serrate on

the often purplish margins, minutely and densely stellate-pubescent beneath. Flowers: pedicels slender, borne mostly in the upper axils, to 5 cm long, about equaling or often exceeding the subtending leaves; calyx 8–10 mm long, the lobes broadly ovate and acute, the margins often purplish; petals yellow to salmon-color, 12–15 mm long; carpels about 10, dorsally puberulent or glabrate, cuspidately bidentate. Sandy soils in open woodlands and thickets, and in beach areas in south and coastal Texas. Apr–Oct.

Sida longipes A. Gray—LONG-STALKED SIDA—Stems herbaceous from a woody rootstock, erect, branched from the base, somewhat scabrous-puberulent, to about 0.5 m high. Leaves with petioles to \pm 25 mm long, linear-elongate to linear-lanceolate, narrowly obtuse at apex, truncate to broadly cuneate at base, serrulate or crenulate on the often purplish margins, to about 6 cm long. Flowers: pedicels erect, elongate, to 15 cm long; calyx \pm 7 mm long, the lobes triangular-ovate and acute; petals orange-color, \pm 15 mm long; carpels 8 to 10, puberulent to glabrous, muticous or only slightly obtuse. On limestone hills and slopes in the Edwards Plateau and Trans-Pecos, rare in the Rio Grande Plains. Apr–Sep.

Sida neomexicana A. Gray—NEW MEXICO SIDA—Stems usually herbaceous, from a woody rootstock, to about 0.4 m high, minutely stellate-pubescent. Leaves with petioles 1 cm long or less, linear-elongate to linear-oblong, to 6 cm long, obtuse to acute at apex, rounded to truncate at base, serrate on the often purplish margins, finely stellate-pubescent. Flowers sessile or with pedicels to about 1 cm long, somewhat clustered at the ends of the branches; calyx about 8 mm long, the lobes broadly ovate and subacuminate; petals orange, turning purplish or reddish with age, \pm 1 cm long; carpels

10, mucicous or scarcely bimucronulate. In rocky soils in mountains and grasslands of the Trans-Pecos. Jul–Nov.

Sida rhombifolia Linnaeus—ARROWLEAF SIDA, CUBAN JUTE—Plant herbaceous or shrubby, to about 2 m high, the stems minutely stellate-pubescent. Leaves short-petiolate, rhombic-oblong to ovate-cuneate or oblanceolate, obtuse to rounded or subacute at apex, cuneate to rounded and usually minutely cordate at the very base, to 8 cm long and 4 cm wide, pale and cinereous-puberulent beneath, green and subglabrous above, serrate or serrulate; stipules setaceous, caducous. Flowers: pedicels more or less elongated; calyx 5–7 mm long, minutely cinereous-puberulent, the base at maturity with 5 to 10 callous-thickened nerves, the lobes broadly ovate and acuminate; petals pale-yellow to orange-yellow, ± 6 mm long, sometimes red at base; carpels 10, subulately 2-awned or merely acute. In sandy-clayey soils in brushlands, meadows, low open woods and alluvial soils in the eastern third of Texas. Flowering throughout the year.

Sida spinosa Linnaeus—PRICKLY SIDA—Annual, finely pubescent, to about 0.7 m high. Leaves with petioles to 3 cm long, those of the larger leaves with a small spinelike tubercle at the base dorsally, ovate to ovate-lanceolate or narrowly lanceolate, to about 5.5 cm long and 3 cm wide, broadly rounded to truncate or subcordate at base, obtuse to subacute at apex, crenate-dentate; stipules linear. Flowers axillary, with pedicels shorter than the petioles; calyx 5–7 mm long, the lobes triangular and acute; petals pale-yellow, slightly exceeding the calyx; carpels 5, dehiscent at the apex into 2 prominent beaks. Mostly on disturbed sites in the eastern third of Texas. Flowering throughout the year.

Sida tragiifolia A. Gray—NOSEBURN-LEAF SIDA—Herbaceous perennial to about 0.6 m high, stellular-pubescent or puberulent and with scattered long hairs throughout.

Leaves with petioles to 15 mm long, ovate-oblong to linear-oblong, cordate to truncate at base, mostly obtuse at apex, to about 5 cm long, coarsely dentate, stellate-pilose beneath, glabrate above. Flowers mostly solitary in the axils, with slender pedicels; calyx 7–8 mm long, with a somewhat 10-angled base, densely stellate-tomentose and with long silvery hairs, the lobes triangular and acuminate; petals orange-yellow, to 14 mm long; carpels 9 to 12, rugose-reticulate below, smooth towards the bimucronate apex. Uncommon on limestone hills in the southern Rio Grande Plains and Big Bend region of the Trans-Pecos. May–Nov.

Sidalcea A. Gray

Herbs, annual or perennial, or subshrubs. Stems erect or ascending, reclining to decumbent at base, usually pubescent with simple and/or stellate hairs. Leaves evenly spaced on stem or crowded near base; stipules usually persistent, linear or lanceolate to ovate; blade ovate to orbiculate or reniform, unlobed or palmately lobed or parted, usually variable, base cordate, rounded, or truncate to wide-cuneate, margins crenate or dentate; basal leaves often long-petioled and scarcely lobed or crenate; mid-cauline leaves palmately 3–7(–9)-lobed; upper cauline leaves short-petiolate to sessile and palmately divided nearly to base often with narrow, entire or dentate lobes.

Inflorescences terminal, spiciform, capitate, or racemose, or sometimes axillary solitary flowers; involucre absent or 1–3. Flowers perfect or imperfect; calyx often somewhat accrescent, not inflated, lobes ribbed or unribbed, ovate or triangular; corolla pale to dark pink, rose-pink, magenta, or purplish to lavender, sometimes white; staminal column included, divided into concentric inner and outer series of connate filaments; styles (4–)5–10-branched; stigmas linear. Fruits schizocarps, erect, not inflated, indurate, glabrous

or pubescent; mericarps (4 or)5–10, 1-celled, indehiscent, sometimes beaked, cuspidate, or mucronate. Seeds 1 per mericarp, glabrous.

The genus *Sidalcea* includes only one species known from Texas, *S. neomexicana*. This species was not included in Correll and Johnston's (1970) treatment, presumably because the only known Texas material was an 1849 collection from Jeff Davis County (C. Wright 39 (GH)). The species is included in the present treatment in the unlikely event that *S. neomexicana* should be recollected in Texas.

Sidalcea neomexicana A. Gray—NEW MEXICO CHECKERBLOOM—Perennial herbs with a thick, fleshy, tuberous or fibrous root, 0.2–0.8 m tall. Stems erect or ascending from a slightly decumbent base, moderately to densely hirsute to stellate-pubescent or sometimes glabrous basally, minutely puberulent or glabrous distally. Leaves: blades fleshy, the margins often short-ciliate, the surfaces sparsely pubescent with simple or stellate hairs; basal leaves orbiculate, unlobed, the margins crenate or shallowly 5- to 7-lobed, 2–6 cm long and wide; cauline leaves deeply palmately (3–)5–7(–9)-lobed, the ultimate divisions linear. Inflorescences 20+-flowered. Flowers bisexual or occasionally unisexual and pistillate; calyx 5–8(–10) mm long, often accrescent; petals pale pink or pale lavender-purple, rarely white, 10–20 mm long; carpels 8 or 9, 2–3 mm long, with a short awn 0.5–0.8 mm long. Seeds 1.5 mm long. Possibly occurring in the Trans-Pecos. Apr–Aug.

Sidastrum Baker f.

Shrubs. Stems erect, ± stellate-hairy, not viscid. Leaves spirally arranged, petiolate or subsessile; stipules persistent, subulate; blade ovate or lanceolate, not dissected or parted, base truncate or subcordate, margins dentate, surfaces stellate-pubescent. Inflorescences

terminal panicles; involucre absent. Flowers: calyx not accrescent, not inflated, not completely enclosing fruit, lobes cupuliform, unribbed; corolla purple; staminal column \pm included; style 5-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate, often stellate-pubescent; mericarps 5, 1-celled, without dorsal spurs or endoglossum, smooth or weakly reticulate, essentially indehiscent. Seeds 1 per mericarp, glabrous.

The monotypic species *Sidastrum paniculatum* was formerly incorporated into the genus *Sida* (Correll and Johnston, 1970) but has long been established into its own species and segregated into its own genus, being separated largely on the basis of calyx and mericarp morphology.

Sidastrum paniculatum (Linnaeus) Fryxell—PANICLED SANDMALLOW—Slender erect herb or subshrub, the branches from a woody base, densely stellate-pubescent with coarse appressed hairs. Leaves mostly short-petiolate, rarely with petioles to 6 cm long, ovate to ovate-lanceolate, mostly densely stellate-pubescent, rounded to cordate at base, obtuse to acuminate at apex, crenate, to about 11 cm long, usually much smaller. Flowers in loose panicles; pedicels filiform, 2.5–4 cm long, articulate below calyx; calyx 2–3 mm long, the minute lobes triangular; petals reddish-purple to orange-red, acuminate-apiculate, reflexed at maturity, 3–4 mm long; carpels 5, not beaked. In sandy soils of thickets, open woods and groves in the Rio Grande Plains and Valley. Flowering throughout the year.

Sphaeralcea A. St.-Hilaire

Herbs, annual or perennial. Stems erect or decumbent to ascending, stellate-canescens to stellate-silvery-lepidote, rarely glabrous. Leaves petiolate or sessile; stipules persistent or deciduous, linear; blade linear, lanceolate, orbiculate, or ovate to triangular, or cordate,

unlobed or pedately dissected, base tapered, cuneate, or truncate to cordate, margins entire or crenate to serrate. Inflorescences terminal, racemes or panicles, or flowers sometimes fascicled or in axillary cymose racemes; involucler absent or present. Flowers: calyx not accrescent, not inflated, lobes connate for one-half length, not ribbed, linear to lanceolate; corolla usually orange, red-orange, or red, sometimes lavender, purple, pink, or white; staminal column included; styles 7–30-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, indurate, pubescent; mericarps [7–]9–30, 1- or 2-celled, without dorsal spur, proximally usually rugose-reticulate and indehiscent, distally ± dehiscent, often remaining attached to fruit axis after maturity by threadlike extension of dorsal vein. Seeds 1 or 2(or 3) per mericarp, glabrous or slightly pubescent.

The species of *Sphaeralcea* are often difficult to identify, the species boundaries often being obscured by hybridization, polyploidy, and morphological variation in response to environmental conditions (La Duke, 2015). The species recognized for Texas are distinguished primarily on the basis of pubescence, leaf, and inflorescence characteristics.

Key to the Texas species of *Sphaeralcea*

1. Stems light green; leaf blades grayish green, oblong to ovate, lobed, base cuneate, margins crenate to dentate (2)
1. Stems silvery; leaf blade silvery, triangular to linear, mostly unlobed, base truncate margins entire.....*S. leptophylla*
2. Leaf blade lobes pedately parted; inflorescence paniculate, involucellar bractlets green; anthers yellow (3)
2. Leaf blades 3–5-parted; inflorescence racemose, involucellar bractlets red to purple; anthers purple.....*S. laxa*

- 3. Stems white to yellow; schizocarps urceolate; mericarps, 4–5 mm long (4)
- 3. Stems light green; schizocarps hemispheric; mericarps 15–20 mm long
.....*S. pedatifida*
- 4. Leaf blades mostly unlobed or parted; sepals 4–11 mm long; seeds brown,
glabrous (5)
- 4. Leaf blade 3-lobed; sepals 6–7 mm long; seeds gray, pubescent*S. polychroma*
- 5. Inflorescence racemose; mericarps 9–13 (6)
- 5. Inflorescence paniculate; mericarps 10–30..... *S. hastulata*
- 6. Stems whitish; leaf blades deltate to ovate (7)
- 6. Stems green; leaf blades widely triangular*S. digitata*
- 7. Sepals 8–15 mm long; petals red; mericarps 18*S. lindheimeri*
- 7. Sepals 6–7 mm long; petals lavender; mericarps 12–15..... *S. wrightii*

Sphaeralcea angustifolia (Cavanilles) G. Don—NARROW-LEAVED GLOBEMALLOW—

Perennial herbs with erect stems from a thick woody crown, ± stellately canescent throughout, to about 1.8 m high. Leaves with petioles rarely more than one fourth as long as the blade, blades lanceolate to oblong-lanceolate or linear-lanceolate, cuneate at base, obtuse to acuminate at apex, 3-veined from base, to about 15 cm long, usually much smaller, not lobed but often angulate near the base or subhastately toothed with ascending teeth, the margins usually finely and regularly crenate or crenate-dentate. Inflorescence a long narrow interrupted many-flowered thyrses. Flowers: pedicels usually stout and much shorter than the calyx; calyx 5–9 mm long, the lobes lanceolate to oblong-lanceolate and acuminate; petals usually mauve or lavender but sometimes white or grenadine, 1–2 cm long; carpels 10 to 15, usually strongly connate at maturity, 3.5–6.5 mm long, the erect

dehiscent portion mucicous to mucronulate or sometimes short-cuspidate or spinulose at apex, the indehiscent portion very finely reticulate. In sandy or rocky soils, waste places and along roadsides, primarily in the Trans-Pecos and western Edwards Plateau, less common in the Panhandle and Rio Grande Plains. Flowering \pm throughout the year. The variants in our region have been segregated as follows:

1. Leaf blades linear-lanceolate to lanceolate, with or without hastate to angulate lobes *S. angustifolia* var. *angustifolia*
1. Leaf blades broadly linear to broadly trowel-shaped, with broad lobes
..... *S. angustifolia* var. *oblongifolia*

Sphaeralcea angustifolia (Cavanilles) G. Don var. ***angustifolia***—Leaf blades linear-lanceolate to lanceolate, with or without hastate or angulate lobes.

Sphaeralcea angustifolia (Cavanilles) G. Don var. ***oblongifolia*** (A. Gray)

Shinners—Leaf blades broadly linear to broadly trowel-shaped, with broad lobes.

Sphaeralcea coccinea (Nuttall) Rydberg—COMMON GLOBEMALLOW—Perennial herbs with usually decumbent or ascending stems from a slender or stout taproot, usually densely grayish or whitish stellate-pubescent throughout, the stems to 0.5 m long. Leaves with petioles of lowermost ones as long as or longer than the blades, usually more pubescent on the lower than on the upper surface, broadly deltoid in outline, pedately parted or divided, the midlobe and often the primary lateral divisions pinnately few-cleft or even parted, the primary lateral divisions not less than two thirds as long as the midlobe with the latter and often the primary lateral divisions long-cuneate at base, all the divisions rounded-truncate to acutish at apex, the larger blades 1–6 cm long and wider than long. Inflorescence racemiform or occasionally subthyrsoid at base, with usually

very short internodes, few- to many-flowered. Flowers: pedicels usually rather stout and shorter than the calyx, the lower ones sometimes more slender and elongate; calyx conspicuously villous, 5–10 mm long, with lanceolate to deltoid-ovate or usually ovate-lanceolate acuminate lobes; petals grenadine, 1–2 cm long; carpels 10 to 14, very thick, with coriaceous walls, 3–3.5 mm long and wide, the dehiscent portion muticous, the indehiscent portion much wider than the dehiscent portion and very coarsely and prominently reticulate, rugose-tuberculate dorsally. On caliche outcrops and gypsum, and in gravelly soils in the Panhandle and Trans-Pecos, Apr–Aug. Two weakly-distinguished varieties of the species are recognized, both of which occur in Texas:

1. Midlobe of leaf blade \pm equaling the secondary lobes*S. coccinea* var. *coccinea*

1. Midlobe of leaf blade longer than the secondary lobes *S. coccinea* var. *elata*

Sphaeralcea coccinea (Nuttall) Rydberg var. ***coccinea***—Midlobe of leaf blades \pm equaling the secondary lobes. Dehiscent portion of mericarps accounting for 10–35% of height.

Sphaeralcea coccinea (Nuttall) Rydberg var. ***elata*** (Baker f.) Kearney—Midlobe of leaf blades longer than the secondary lobes. Dehiscent portion of mericarps accounting for 10–20% of height.

Sphaeralcea digitata (Greene) Rydberg—JUNIPER GLOBEMALLOW—Perennial herbs with slender decumbent to ascending or nearly erect stems from woody crown, \pm canescent throughout, the stems to about 0.5 m long, usually much shorter. Leaves with slender petioles shorter than the blades, rather thin, pedately divided or nearly so, with the primary lateral divisions so deeply parted as to give the appearance of a 5-parted leaf, all the divisions oblanceolate to narrowly obovate, cuneate at base, obtuse to acute and

often mucronulate at apex, the midlobe not more than 5 mm wide and not much longer than the primary lateral divisions, all the divisions entire or coarsely and irregularly few-toothed or -cleft, the larger blades 1.5–4 cm long and about as wide. Inflorescence usually 10- to 20-flowered, narrowly subthyrsoid with often only the lowest nodes bearing more than 1 flower. Flowers: pedicels mostly stout and usually but not always much shorter than the calyx; calyx 3.5–7 mm long, with ovate-lanceolate acuminate lobes; petals greenish, 8–14 mm long; carpels 9 to 13, thickish, with chartaceous walls, 3–4 mm long, the acute dehiscent portion mucicous to short-cuspidate, the indehiscent portion finely and usually not prominently reticulate. In rock crevices and on rocky hills in limestone and gypsum soils in the Trans-Pecos. Mar–Nov.

Sphaeralcea hastulata A. Gray—SPEAR GLOBEMALLOW—Perennial herbs with few or several ascending or decumbent stems from a small crown, the stems to 30 cm long but usually shorter, canescent. Leaves with slender petioles one half as long as the blade or less, usually bright-green and rather sparsely pubescent above, paler and densely sericeous-pubescent beneath, oblong-ovate to ovate-lanceolate, cuneate to cordate at base, acute to short-acuminate at apex, usually merely subhastately toothed or shallowly lobed with rounded teeth or lobules less than one fifth as long as the midlobe (sometimes deeply cleft with much longer lateral lobes), the margins nearly entire to coarsely and irregularly crenate-dentate or the midlobe even pinnately cleft, the larger blades 2–6 cm long. Inflorescence paniculate or racemose, the flowers solitary or clustered. Flowers: calyx 4–11 mm long; petals red-orange, pink, or purple, 1–2 cm long; carpels thickish, with chartaceous walls, 3–7 mm long, the obtuse to acute dehiscent portion usually mucicous but sometimes mucronate or cuspidate and sometimes sparsely spinulose

dorsally toward apex, the indehiscent portion coarsely and prominently reticulate. In sandy or rocky soils, caliche or on salt flats mainly in the Trans-Pecos but also in north-central Texas and the Rio Grande Plains. Feb–Aug.

Sphaeralcea laxa Wooton & Standley—CALICHE GLOBEMALLOW—Perennial herbs with several erect or ascending stems from a thick woody crown and a stout taproot, usually densely whitish canescent or tomentose with short hairs, to about 0.9 m high. Leaves with slender petioles equaling or longer than the blade of the lower leaves; mostly thinnish, broadly ovate to deltoid in outline, subcordate to deeply cordate at base, very obtuse to acutish at apex, shallowly 3-lobed to almost 3-parted, with the lateral lobes sometimes deeply cleft, the lobes usually rounded, the midlobe seldom more than twice as long as the lateral ones, the margins irregularly crenulate to crenate or coarsely dentate, the larger blades 1.5–5 cm long and about as wide. Inflorescence an open lax relatively few-flowered panicle. Flowers: pedicels slender, usually much shorter than the calyx; bracteoles of the involucre often dark-red and conspicuous; calyx 7–11 mm long, with lanceolate to oblong-lanceolate acuminate lobes; petals grenadine-pink to grenadine-red, 12–18 mm long; anthers dark-purple; carpels 12 to 14, thin-walled, 4–6 mm long, the dehiscent portion acute to obtuse and cuspidate to mucronulate at apex, the indehiscent portion rather prominently but finely reticulate. In shallow limestone soil in west Texas. May–Nov.

Sphaeralcea leptophylla (A. Gray) Rydberg—SCALY GLOBEMALLOW—Perennial with several or numerous decumbent to ascending or erect stems from a long stout taproot and a stout woody crown, silvery-lepidote with short many-rayed appressed hairs that form fringed scales, the stems to 5 dm long; leaves sometimes fascicled in the lower

axils, with slender petioles usually less than one third as long as the blade, rather thick, with midvein prominent beneath, usually conduplicate or with the margins revolute, the upper leaves entire, linear to narrowly oblanceolate, obtuse to acute and usually cartilaginous-apiculate at the apex, the lower leaves 3-divided or very nearly so with the midlobe 1.5-3 mm wide and 1 to 2 times as long as the lateral divisions, one or more of the divisions sometimes 1- or 2-cleft, the larger blades 15-35 mm long; inflorescence racemiform, with long internodes, with 12 or fewer flowers, appearing naked throughout or leafy at the base only; pedicels usually slender, much shorter than to twice as long as the calyx; involucre of 3 thick bractlets, often persisting until fruit maturity; calyx 4.5-7 mm long, with deltoid-ovate to ovate-lanceolate and acute to short-acuminate lobes; petals greenish, 9-15 mm long; carpels 7 to 9, very thick, with coriaceous walls, 3-3.5 mm long, the dehiscent portion obtuse to acute and mucicous or mucronulate at apex, the indehiscent portion much wider than the dehiscent portion, very prominently and usually coarsely reticulate, moderately rugose to slightly tuberculate dorsally. In limestone soil on hills and along roadsides in the Trans-Pecos, Mar.-Aug.; from Tex. and Colo., w. to Ut., Ariz. and n. Mex.

Sphaeralcea lindheimeri Gray—LINDHEIMER'S GLOBEMALLOW—Perennial herbs with a few decumbent stems from a small crown, densely whitish-pubescent with relatively very long soft felted hairs, the stem to 0.7 m long. Leaves with slender or stout petioles about as long as the blade, thin, deltoid-ovate to suborbicular, truncate to cordate at base, rounded to acutish at apex, usually very shallowly but sometimes deeply lobed, the margins shallowly crenate to coarsely and irregularly dentate, the larger blades 25-45 mm long and wide or wider. Inflorescence usually racemiform, at most subthyrsoid, few-

flowered. Flowers: pedicels slender or stout, much shorter than to twice as long as the calyx; calyx 8–15 mm long, with lanceolate to ovate-lanceolate attenuate-acuminate lobes; petals grenadine-pink, 13–25 mm long; carpels about 18, with chartaceous walls, ± 4 mm long, the dehiscent portion rounded and muticous at apex, the indehiscent portion prominently and rather coarsely reticulate. In sandy soils in oak woodlands, and along roadsides in south Texas. Feb–Jun. Endemic.

Sphaeralcea pedatifida (A. Gray) A. Gray—PALMLEAF GLOBEMALLOW—Biennial or short-lived perennial herbs with a few slender decumbent or ascending stems from a slender taproot and small crown, sparsely to somewhat copiously stellate-pubescent, the stems to 0.7 m long but usually much shorter. Leaves with slender petioles somewhat shorter to considerably longer than the blade, thin, sparsely stellate-pubescent, pedately parted or divided, all the divisions pinnately cleft or coarsely toothed with acute often setose-tipped teeth, the midlobe to 2 times the length of the lateral lobes, the larger blades 1.5–3 cm long and at least equally as wide. Inflorescence few-flowered, racemiform or sometimes subthyrsoid below. Flowers: pedicels slender, shorter than to more than twice as long as the calyx; bracteoles of the involucre often denticulate; calyx 6–9 mm long, stellate-pubescent, with ovate-lanceolate to deltoid more or less acuminate lobes; petals orange-chrome or grenadine-pink, 8–14 mm long; carpels 15 to 20, with thin chartaceous walls, 3–3.5 mm long, the dehiscent portion muticous, the indehiscent portion wider than the dehiscent portion, coarsely and prominently reticulate. In sandy soil in thorn scrubland, on rocky or gravelly slopes and in fields in the Rio Grande Plains. Feb–Aug.

Sphaeralcea polychroma La Duke—HOT SPRINGS GLOBEMALLOW—Perennial herbs with erect, white or yellow stems 1–2 m tall, densely soft stellate-pubescent. Leaf blades

white or yellow, deltate to lanceolate, substate to 3-lobed, 4–7 cm long, the secondary lobes to 2.2 cm long, cuneate at the base, the margins crenate to dentate, the surfaces densely canescent. Inflorescence paniculate, many-flowered. Flowers: bracteoles of the involucre green to tan; calyx 6–7 mm long; petals white, pink, lavender, purple, red-orange, or red, 10–13 mm long; carpels 12–14, chartaceous, 4–5.5 mm long, the dehiscent portion with reflexed cusps to 2 mm long, the indehiscent portion not wider than the dehiscent portion. Rocky or gravelly soils in desert lowlands in the Trans-Pecos. Jun–Aug.

Sphaeralcea wrightii A. Gray—WRIGHT'S GLOBEMALLOW—Perennial herbs with few erect or nearly erect stems from a small woody crown, grayish-canescenscent or subtomentose with soft hairs, to 0.75 m high. Leaves with slender petioles that are usually as long as to much longer than the blade of the lower leaves, with veins rather prominent beneath, much more densely pubescent below than above, broadly ovate to semiorbicular in outline, truncate to deeply cordate at base, usually obtuse and often mucronulate at apex, all but the lowest leaves pedately deeply cleft or parted, the coarse wedge-shaped divisions irregularly and pinnately few-toothed or -cleft with broad usually obtuse teeth, the midlobe about twice as long as the lateral lobes, the larger blades 2–4 cm long and wide. Inflorescence a narrow few- to many-flowered interrupted thyrses. Flowers: pedicels stout, shorter to considerably longer than the calyx; calyx 6–7 mm long, with deltoid-ovate to ovate-lanceolate short-acuminate lobes; petals grenadine or pink, often drying lavender or violet-color, 1–1.8 cm long; carpels 12 to 15, with chartaceous walls, sometimes slightly connate at maturity, 4–5 mm long, the dehiscent portion very obtuse to acute and cuspidate at apex, the indehiscent portion prominently

and rather coarsely or finely reticulate. Uncommon on mountain slopes at a few localities in the Trans-Pecos. Mar–May.

Wissadula Medikus

Subshrubs or perennial herbs. Stems usually erect, pubescent with simple and/or stellate hairs, not viscid. Leaves: stipules usually persistent, filiform, subulate, or minute; blade broadly ovate to ovate-triangular, unlobed, base cordate, margins entire, surfaces usually stellate-pubescent. Inflorescences terminal panicles or racemes; involucre absent. Flowers: calyx not accrescent, not inflated, lobes not ribbed, triangular; corolla usually yellowish, sometimes white; staminal column exerted; style 3–6-branched; stigmas capitate. Fruits schizocarps, erect, not inflated, not indurate; mericarps 3–6, 2-celled, proximal cell indehiscent, distal cell dehiscent. Seeds (1–)3 per mericarp, lower cell 1-seeded, upper cell usually 2-seeded, pubescent.

Wissadula is a genus of 25 species, three of which occur in the United States, occurring only in Texas. The species can be easily distinguished on the basis of their leaf characteristics.

Key to the Texas species of *Wissadula*

1. Leaf blade 4–11 cm long, apex acuminate; stipules 4–12 mm long; petals pale yellow to white with red spot at base (2)
1. Leaf blade 2.5–3 cm long, apex acute; stipules short; petals yellow to pale orange
..... *W. parvifolia*
2. Leaf blade ovate to triangular, base cordate, margins entire; petals pale yellow to white with red spot along the base; stipules 5 mm long *W. periplocifolia*

2. Leaf blade broadly ovate, base deeply cordate, margins curvy; petals yellow, stipules 7 mm long *W. hernandioides*

Wissadula hernandioides (L'Héritier) Garcke—YELLOW VELVETLEAF—Subshrubs with erect branches, to about 2 m high, more or less puberulent throughout and with scattered longer simple or stellate hairs. Leaves broadly ovate, thin, very pale beneath, entire, sometimes with short acute lateral lobes above middle, cordate at base, acute to acuminate at apex, the lower leaves slender-petioled and 5–15 cm long, the upper smaller leaves nearly sessile. Flowers forming axillary and terminal panicles; pedicels slender, elongate or short, to 3 cm long; calyx 3–4 mm long; petals yellow, 4–6 mm long; carpels 4 or 5, 7–8 mm long, short-beaked, puberulent, brown. In palm groves in the Rio Grande Valley. Sep–Dec.

Wissadula parvifolia Fryxell—LITTLELEAF WISSADULA— Subshrubs, branched, to about 1 m high, minutely and obscurely stellate-pubescent. Leaves ovate, ± entire, cordate at base, gradually acute to subobtusate at apex, light-tawny beneath, the lower leaves slender-petioled and 2.5–3.5 cm long, the upper smaller leaves short-petioled. Flowers in open racemes or panicles; pedicels 2–3 cm long; calyx 3–4.5 mm long; petals yellow, fading to orange; carpels brown, apiculate, 7–9 mm long. Roadsides and shrublands in Hidalgo and Willacy counties. Flowering spring and fall.

Wissadula periplocifolia (Linnaeus) C. Presl ex Thwaites—WHITE VELVETLEAF— Subshrubs, branched, densely brownish stellate-pubescent throughout, to about 1 m high. Leaves ovate-lanceolate to lanceolate, entire, truncate to rounded or rarely subcordate at base, gradually long-acuminate at apex, light-tawny beneath, the lower leaves slender-petioled and 5–15 cm long, the upper smaller leaves short-petioled. Flowers solitary in

the axils and in a terminal panicle to 20 cm long; pedicels filiform, to 5 cm long, usually much shorter; calyx 3–4 mm long; petals white, obovate, about twice as long as the calyx; carpels dark-brown to blackish, apiculate, 6–8 mm long. In shrublands in extreme south Texas, with one historic collection from Calhoun County. Flowering throughout the year.

LITERATURE CITED

- Alverson, W. S., K. G. Karol, D. A. Baum, M. W. Chase, S. M. Swenson, R. McCourt and K. J. Sytsma. 1998. Circumscription of the Malvales and relationships to other Rosidae: evidence from *rbcL* sequence data. *Amer. J. Bot.* 85(6):876–877.
- Alverson, W. S., B. A. Whitlock, R. Nyffeler, C. Bayer and D. A. Baum. 1999. Phylogeny of the core Malvales: evidence from *ndhF* sequence data. *Amer. J. Bot.* 86(10):1474–1486.
- Bates, D. M. 1974. *Fryxellia*, a new genus of North American Malvaceae. *Brittonia* 26:95–100.
- Bates, D. M. 1978. *Allowissadula*, a new genus of North American Malvaceae. *Gentes Herb.* 11:329–354.
- Bates, D. M. 2015. *Fryxellia*. Pp. 248–249 in *Flora of North America Editorial Committee (eds.), Flora of North America north of Mexico*, vol. 6. Oxford University Press, New York.
- Bayer, C., M. F. Fay, A. Y. De Bruijn, V. Savolainen, C. M. Morton, K. Kubitzki, W. S. Alverson and M. W. Chase. 1999. Support for an expanded family concept of Malvaceae within a recircumscribed order Malvales: a combined analysis of plastid *atpB* and *rbcL* DNA sequences. *Bot. J. Linn. Soc.* 129:267–303.
- Brown, L. E., and D. A. Muschalek. 1996. *Krapovickasia physaloides* (Malvaceae) and *Lactuca intybacea* (Asteraceae) new to Texas and the United States. *Sida* 17:291–294.
- Correll, D. S. and M. C. Johnston. 1970. *Manual of the vascular plants of Texas*. Texas Research Foundation, Renner, Texas.

- Flora of North America Editorial Committee. 2015. Malvaceae. Pp. 187–375 in Flora of North America North of Mexico, vol. 6. Oxford University Press, New York.
- Fryxell, P. A. 1975. *Batesimalva* y *Meximalva*, dos géneros nuevos de Malváceas mexicanas. Bol. Soc. Bot. Mex. 35:23–36.
- Fryxell, P. A. 1978. Neotropical segregates from *Sida* L. (Malvaceae). Brittonia 30(4):447–462
- Fryxell, P. A. 1982. 1982. *Billieturnera* (Malvaceae), a new genus from Texas and Mexico. Sida 9:195–200.
- Fryxell, P. A. 1997. The American genera of Malvaceae–II. Brittonia 49(2):204–269.
- Fryxell, P. A. and S. R. Hill. 2015. *Meximalva*. Pp. 302–303 in Flora of North America Editorial Committee (eds.), Flora of North America north of Mexico, vol. 6. Oxford University Press, New York.
- Hatch S. L., K. N. Gandhi and L. E. Brown 1990. Checklist of the vascular plants of Texas. Texas Agricultural Experiment Station Publ. MP-1655. Texas A&M University, College Station, TX.
- Hassan, M., M. H. Sheikh, R. Akhtar, F. Sana, A. Aniq, Z. Muhammad and H. M. Marlia. 2021. Ethnobotanical properties and traditional uses of medicinal plant *Abutilon theophrasti* Medik. In: Aftab, T., Hakeem, K.R. (eds) Medicinal and aromatic plants. Springer, New York.
- Hill. S. R. 2015. *Modiola*. Pp. 303–304 in Flora of North America Editorial Committee (eds.), Flora of North America north of Mexico, vol. 6. Oxford University Press, New York.

- Ikitoo, E. C. 2011. *Gossypium hirsutum* L. In: M. Brink and G. Belay (eds.), Plant Resources of Tropical Africa/Ressources végétales de l'Afrique tropicale, Wageningen, Netherlands.
- Jones S. D., J. K. Wipff and P. M. Montgomery. 1997. Vascular plants of Texas. University of Texas Press, Austin, Texas.
- Judd, W. S. and S. R. Manchester. 1997. Circumscription of Malvaceae (Malvales) as determined by a preliminary cladistic analysis of morphological, anatomical, palynological, and chemical characters. *Brittonia* 49(3):384–405.
- La Duke, J. 2015. *Sphaeralcea*. Pp. 357–369 in Flora of North America Editorial Committee (eds.), Flora of North America north of Mexico, vol. 6. Oxford University Press, New York.
- Pfeil, B. E. and 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. *Austral. Syst. Bot.* 18:49–60.
- Rendón, B., R. Bye and J. Núñez-Farfán. 2001. Ethnobotany of *Anoda cristata* (L.) Schl. (Malvaceae) in central Mexico: Uses, management and population differentiation in the community of Santiago Mamalhuazuca, Ozumba, State of Mexico. *Econ. Bot.* 55(4):545–554.
- Saleem, U., S. Khalid, S. Zaib, F. Anwar, B. Ahmad, I. Ullah, A. Zeb and M. Ayaz. 2020. Phytochemical analysis and wound healing studies on ethnomedicinally important plant *Malva neglecta* Wallr. *J. Ethnopharmacol.* 249:112401.

- Saxena, S., D. S. Rawat and P. B. Rao. 2020. *Malvastrum coromandelianum* (L.) Garcke: An invasive weed with multiple ethnopharmacological properties. *Int. J. Pharmacog. Phytochem. Res.* 12:16–22.
- Shale, T. L., W. A. Stirk and J. van Staden. 2005. Variation in antibacterial and anti-inflammatory activity of different growth forms of *Malva parviflora* and evidence for synergism of the anti-inflammatory compounds. *J. Ethnopharmacol.* 96:325–330.
- Simpson, B. B. and M. C. Ogorzaly. 2014. *Plants in our world: Economic botany*, 4th ed. McGraw-Hill, New York.
- Weckesser, W. 2011. A new hybrid of *Hibiscus* (Malvaceae) from Texas. *J. Bot. Res. Inst. Texas.* 5(1):41–44.
- Wendel J. F., C. Brubaker, I. Alvarez, R. Cronn and J. M. Stewart. 2009. Evolution and natural history of the cotton genus. In: Paterson, A. H., ed., *Genetics and genomics of cotton. Plant genetics and genomics: Crops and models*, vol. 3. Springer, New York, NY.
- Wendel J. F. and C. E. Grover. 2015. Taxonomy and evolution of the cotton genus, *Gossypium*. In: D.D. Fang and R.G. Percy (eds.), *Cotton. Agron. Monogr.* 57, 2nd ed. American Society of Agronomy.
- Zheng, H., Y. Wu, J. Ding, D. Binion, W. Fu and R. Reardon. 2004. Invasive plants of Asian origin established in the United States and their natural enemies, vol. 1. USDA Forest Service Publ. FHTET 2004–05, Washington, D.C.