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Original Paper

Flora of Ceará, Brazil: tribe Hibisceae (Malvaceae)

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Abstract

The present study is an integral part of the project Flora of Ceará: knowing to conserve. The goal of this work was to conduct a floristic-taxonomic survey and update the geographic distribution of the tribe Hibisceae (Malvaceae) in the state of Ceará, Brazil. The study is based on an analysis of specimens in national and international herbaria, collections made during fieldwork from January 2020 to May 2021, and literature. Eight genera and 20 species were recorded for Ceará, which mostly occur in areas of Stepic Savanna and Dense Ombrophylous Forest. *Pavonia varians* and *P. vinosa* are restricted to a single municipality. *Malachra fasciata* and *Peltaea lasiantha* are new records for the state of Ceará. Eleven species occur within 14 conservation units.
Key words: distribution, floristics, Malvales, Malvoideae, taxonomy.

Resumo

O presente estudo é parte integrante do projeto Flora do Ceará: conhecer para conservar. O objetivo deste trabalho foi realizar um levantamento florístico-taxonômico e atualizar a distribuição geográfica da tribo Hibisceae (Malvaceae) no estado do Ceará, Brasil. O estudo é baseado na análise de espécimes depositados em herbários nacionais e internacionais, coletas feitas durante trabalho de campo de janeiro de 2020 a maio de 2021 e literatura. Oito gêneros e 20 espécies foram registrados para o Ceará, distribuídas principalmente em áreas de Cerrado Estépico e Floresta Ombrófila Densa. *Pavonia varians* e *P. vinosa* estão restritas a um único município. *Malachra fasciata* e *Peltaea lasiantha* são novos registros para o estado do Ceará. Onze espécies ocorrem em 14 unidades de conservação.
Palavras-chave: distribuição, florística, Malvales, Malvoideae, taxonomia.

Introduction

The largest family in the order Malvales is Malvaceae it comprises approximately 243 genera and 4,225 species (Bayer *et al*. 1999; APG IV 2016; Gómez *et al*. 2019) that are in nine subfamilies and twenty tribes (Baum *et al*. 2004; Pfeil & Crisp 2005; Tate *et al*. 2005; APG IV 2016). The subfamily Malvoideae is the most representative and has about 110 genera and 1,800 species (Lima & Conceição 2016). This subfamily comprises the tribes Malveae, Gossypieae and Hibisceae that compose the Eumalvoideae clade, which is supported by morphological and molecular data (Baum *et al*. 2004; APG IV 2016).

The second largest tribe within Eumalvoideae is Hibisceae, which has 630 species distributed in 32 genera (Areces-Berazain & Ackerman 2017). Representatives of Hibisceae are primarily characterized by the presence of a style divided into five or 10 stigmas, capsular or schizocarpic fruits,

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and the absence of gossypol glands (structures that produce the phenolic pigment gossypol) (Bayer & Kubitzki 2003).

Hibiscus L. (300 spp.) and *Pavonia* Cav. (200 spp.) are the most representative genera within the tribe Hibisceae (Gómez *et al*. 2019). *Abelmoschus* and *Hibiscus* have species of nutritional, medicinal, pharmacological, and economic interest (Kumar *et al*. 2012; Mohite & Gurav 2019). *Abelmoschus esculentus* (L.) Moench (1794: 617) is widely cultivated for food and exhibits antidiabetic, antioxidant, anticancer, and antimicrobial properties (Elkhalifa *et al*. 2021). *Hibiscus rosa-sinensis* L. (1753: 694) is recognized for its ornamental potential and for exhibiting antioxidant and antimicrobial activities (Al-Snafi 2018).

In Brazil, there are nine genera and 214 species that belong to the tribe Hibisceae (Flora e Funga do Brasil 2020, continuously updated). The species of this tribe are cited in floristic and taxonomic studies that have been conducted in different states of the country (Krapovickas 2006, 2013; Esteves *et al*. 2014; Coelho & Amorim 2019; Rigueiral *et al*. 2019). For the Northeast Region, species are cited in floristic surveys (Alves *et al*. 2015; Costa *et al*. 2018; Tavares *et al*. 2021) and in a description of a new species in the state of Bahia (Gonçalez *et al*. 2017).

For Ceará, species of Hibisceae have only been cited in floristic studies (Costa & Araújo 2007; Loiola *et al*. 2015, 2020; Silveira *et al*. 2020a,b). However, the representatives of Hibisceae are important to the composition of the flora of Ceará and there is a lack of floristic-taxonomic studies of this group in the state. Therefore, a data survey of the species of this tribe will expand the knowledge of this group and provide a list of species that occur in Ceará.

Thus, the aim of this study was to conduct a floristic-taxonomic survey and update the geographic distribution of the tribe Hibisceae (Malvaceae) in the state of Ceará, Brazil, with the goals of determining the richness, area of occurrence, phenology, and major morphological characteristics of the members of this group.

Material and Methods

The study is based on specimens collected and observed during field expeditions made between January 2020 and May 2021 and a comparative analysis of collections in national (ALCB, CEN, EAC, ESA, HCDAL, HUEFS, IPA, MAC, MBM, R, and RB) and international (NY and US) herbaria (acronyms according to Thiers, continuously updated).

The species were identified by observing morphological characteristics under a stereomicroscope and consulting type specimens, protologues, and other literature (Fryxell 1997; Bayer 1999; Bovini *et al*. 2001; Bayer & Kubitzki 2003; Grings *et al*. 2011). The morphological characteristics (trichomes, stipules, leaves, and flowers) were described using the terminology in Harris & Harris (2001) and Gonçalves & Lorenzi (2011), as well as Spjut (1994) for the fruits. The species descriptions are based on samples collected in Ceará and material from other states when there was a lack of information.

The dichotomous key is based on vegetative and reproductive characteristics of specimens collected in Ceará. Freehand illustrations of the diagnostic characters were made and covered with India ink. They are based on an analysis of fresh and herbarium material. The common names were obtained from the records of the specimens.

The georeferenced data of the area of occurrence of the species were obtained from the labels of exsiccatae. The program QGIS was used to make the distribution maps, according to the model in Rebouças *et al*. (2019), where species were plotted in 0.5° longitude by 0.5° latitude squares. According to Valente & Porto (2006), the species were organized into three distribution categories: restricted, comprising one to four municipalities; moderate, five to ten municipalities; and wide, more than ten municipalities. To georeference the species with no or incorrect coordinates, the municipality coordinates were obtained with the "geoLoc" tool and used (CRIA 2020).

The types of vegetation were defined according to Figueiredo (1997) and the Manual Técnico da Vegetação Brasileira (IBGE 2012).

Results and Discussion

The tribe Hibisceae is represented in Ceará by 20 species belonging to eight genera: *Abelmoschus* (1 sp.), *Hibiscus* (3 spp.), *Malachra* L. (2 spp.), *Malvaviscus* Cav. (1 sp.), *Pavonia* (9 spp.), *Peltaea* (C.Presl) Standl. (2 spp.), *Taliparitti* Fryxell (1 sp.), and *Urena* L. (1 spp.). *Malachra fasciata* Jacq. (1788: 352) and *Peltaea lasiantha* Krapov. & Cristóbal (1965: 188) are new records for the state.

Malachra helodes Mart. (1839: 61), *Pavonia castaneifolia* A.St.-Hil. & Naudin (1842: 44), and *Peltaea obsita* (Mart. *ex* Colla) Krapov. & Cristóbal

(1996: 148) were cited on *species*Link for Ceará, but they were actually *M. fasciata*, *Peltaea trinervis* (C.Presl) Krapov. & Cristóbal (1965: 168) and *Pavonia peruviana* Gürke (1892: 487), respectively. Despite being cited on the Flora e Funga do Brasil 2020 (continuously updated) website for the state of Ceará, *Pavonia hexaphylla* (S.Moore) Krapov. (1983: 269) and *Pavonia intermedia* A.St.-Hil. (1825: 223) were not treated in this study because no records of collections were found in the national and international herbaria.

In Ceará, the species mostly occur in Stepic Savanna vegetation (9 spp.), Dense Ombrophylous Forest (8 spp.), and the Vegetation Complex of the Coastal Zone (*Floresta Estacional Semidecídua de Terras Baixas = Mata de Tabuleiro*) (6 spp.). *Malachra fasciata* exhibits wide ecological diversity and was recorded in different vegetation types (*Floresta Estacional Semidecídua de Terras Baixas = Mata de Tabuleiro*, Dense Ombrophylous Forest, Stepic Savanna, and Vegetation under Fluvial and/or Lacustrine Vegetation).

Regarding the range of occurrence, most species (13) have restricted distributions, of which *Pavonia varians* Moric. (1844: 122) and *Pavonia vinosa* G.L.Esteves (1998: 176) are restricted to a single municipality. Four species have moderate distributions (*M. fasciata*, *Malvaviscus penduliflorus* DC. [1824: 445], *Taliparitiliaceum* (L.) Fryxell [2001: 258], *Urena lobata* L. [1753: 692]). In turn, *Hibiscus rosa-sinensis* L. (1753: 694), *Pavonia cancellata* (L.) Cav. (1787: 135), and *Pavonia malacophylla* (Link & Otto) Garcke (1881: 221) have wide distributions in Ceará (Tab. 1).

Eleven species (55%) were recorded in conservation units in Ceará (Tab. 1): in the Área de Proteção Ambiental da Chapada do Araripe, 45% of the Hibisceae representatives were found (*Pavonia cancellata*, *P. malacophylla*, *Pavonia sidifolia* Kunth [1821: 283], *P. vinosa*, and *U. lobata*); in Parque Nacional de Ubajara, 36% were found (*P. cancellata*, *P. malacophylla*, *P. trinervis*, and *U. lobata*); and in the Estação Ecológica de Aiuaba, 27% were found (*Malachra radiata* L. [1767: 459], *P. cancellata*, and *Pavonia glazioviana* Gürke [1892: 524]).

The occurrence of 11 species of Hibisceae in conservation units in Ceará indicates that the representatives of this tribe are less susceptible to threats because they are within protected areas. Nevertheless, this fact does not nullify collection efforts in other areas of Ceará, as well as the development of studies related to the conservation of this group, considering that 13 species have restricted distributions. Additionally, the distribution of cultivated species, *A. esculentus*, *H. rosa-sinensis*, *Hibiscus sabdariffa* L. (1753: 695), *Hibiscus schizopetalus* (Mast.) Hook.f. (1880: 6524), *M. penduliflorus* and *T. tiliaceum*, may be underestimated for the state of Ceará.

Hibisceae Rchb. Sp. pl. 2: 770, 774. 1832.

Subshrub to shrub, rarely herbs, erect or prostrate, or trees. Branches glabrous, pubescent, or velutinous, less frequently hispid, or tomentose, rarely pilose; simple and stellate trichomes, rarely glandular; greenish or brown branches, rarely grayish-green or vinaceous. Stipules axillary, persistent, filiform, greenish, rarely caducous, ovate-lanceolate, falciform or vinaceous. Petiole glabrous, pubescent, velutinous, less frequently hispid, or tomentose, rarely pilose. Leaf blades entire or with 3–5 lobes, ovate, elliptic, rarely palmatifid, pinnatifid, orbicular or lanceolate; ovate or cordate base, rarely obtuse; acute apex, rarely obtuse; serrate, rarely crenate, or entire margin; membranaceous, rarely cartaceous; abaxial and adaxial surface glabrous, pubescent, or velutinous, less frequently hispid, or tomentose, rarely pilose, simple and stellate trichomes, rarely glandular; extrafloral nectary absent, rarely present. Foliaceous bracts absent, rarely present; ovate-lanceolate, with or without filamentous projections, greenish. Flowers axillary, solitary, rarely in pairs, aggregated into inflorescences glomerular, panicles, or pauciflorous; erect, rarely pendulous. Epicalyx with 5–22 bracteoles, rarely absent or connate in the basal portion; lanceolate, filiform, rarely peltate, smaller or greater than calyx in length; greenish, rarely vinaceous or red. Calyx cupuliform or rarely tubular, with five acute lobes, or free sepals, rarely connate in the base or deltoid; greenish, rarely vinaceous. Corolla, ovate petals, entire margin, rarely slightly or deeply lacerated, yellow, pink, red, less frequently white, rarely lilac, vinaceous basal spot present or absent. Staminal tube cylindrical, rarely conic; style divided into 10 stigmas, less frequently five. Fruit five mericarps or capsules; mericarps obovoid, mucronate or rostrate at the apex, 3-spined, rarely winged or glochidiate, glabrous, dark brown or light brown, rarely black, rarely covered by mucilage; capsules ellipsoid, obovoid, oval-oblong or cylindrical; greenish or rarely vinaceous. Seeds reniform or obovoid, rarely deltoid, dark brown, rarely blackish, or vinaceous, or covered by mucilage.

Table 1 – Species of the tribe Hibisceae registered in the state of Ceará. * = cultivated; ** = new record; UC = occurrence in Conservation Units; VE = type of vegetation; AC = range of occurrence.

Species	UC	VE	AC
* *Abelmoschus esculentus* (L.) Moench		Stepic Savanna	Restricted
* *Hibiscus rosa-sinensis* L.		Stepic Savanna, Dense Ombrophylous Forest	Wide
* *Hibiscus sabdariffa* L.		Stepic Savanna and *Floresta Estacional Semidecídua de Terras Baixas* (*Mata de Tabuleiro*)	Restricted
* *Hibiscus schizopetalus* (Dyer) Hook.f.		Stepic Savanna/ Dense Ombrophylous Forest	Restricted
** *Malachra fasciata* Jacq.	Parque Estadual Botânico do Ceará, APA da Serra de Aratanha	*Floresta Estacional Semidecídua de Terras Baixas* (*Mata de Tabuleiro*), Dense Ombrophylous Forest, Stepic Savanna Estépica, Vegetation under Fluvial and/or Lacustrine Influence	Moderate
Malachra radiata (L.) L.	Estação Ecológica de Aiuaba	Stepic Savanna and *Estacional Semidecídua de Terras Baixas* (*Mata de Tabuleiro*)	Restricted
* *Malvaviscus penduliflorus* DC.		Stepic Savanna; Dense Ombrophylous Forest	Moderate
Pavonia cancellata (L.) Cav.	Estação Ecológica de Aiuaba, RPPN Serra das Almas, APA Chapada do Araripe, APA do Rio Pacoti, APA da Serra de Baturité, Floresta Nacional do Araripe-Apodi, APA da Lagoa da Jijoca, APA da Lagoa de Uruaú, Estação Ecológica do Pecém, APA de Praia de Ponta Grossa, RPPN Elias Andrade, APA Serra da Ibiapaba, RPPN Ambientalista Francy Nunes, Parque Nacional de Ubajara	Arboreous Stepic Savanna, *Floresta Estacional Semidecídua de Terras Baixas* (*Mata de Tabuleiro*)	Wide
Pavonia geminiflora Moric.	APA da Serra da Aratanha	Dense Ombrophylous Forest	Restricted
Pavonia glazioviana Gürke	Estação Ecológica de Aiuaba	Stepic Savanna, Arboreous Stepic Savanna, Florested Savanna	Restricted
Pavonia malacophylla (Link & Otto) Garcke	Floresta Nacional do Araripe-Apodi, Parque Nacional de Ubajara, APA Chapada do Araripe, APA da Serra de Baturité	Dense Ombrophylous Forest, Savanna, Florested Savanna	Wide
Pavonia paniculata Cav.			Restricted
Pavonia peruviana Gürke	APA Serra da Aratanha	Dense Ombrophylous Forest	Restricted
Pavonia sidifolia Kunth	APA Chapada do Araripe, Floresta Nacional do Araripe-Apodi	Savanna, Florested Savanna	Restricted
Pavonia varians Moric.		*Floresta Estacional Decídua de Terras Baixas* (*Mata de Tabuleiro*)	Restricted
Pavonia vinosa G.L.Esteves	APA Chapada do Araripe	Dense Ombrophylous Forest	Restricted

Species	UC	VE	AC
** *Peltaea lasiantha* Krapov. & Cristóbal			Restricted
Peltaea trinervis (C.Presl) Krapov. & Cristóbal	Parque Estadual Botânico do Ceará, Parque Nacional de Ubajara	*Floresta Estacional Decídua de Terras Baixas* (*Mata de Tabuleiro*)	Restricted
* *Taliparitti tiliaceum* (L.) Fryxell		*Floresta Estacional Decídua de Terras Baixas* (*Mata de Tabuleiro*)	Moderate
Urena lobata L.	APA Chapada do Araripe, Parque Nacional de Ubajara	Dense Ombrophylous Forest, Vegetation under Fluvial and/or Lacustrine Influence, Vegetation Complexo f the Coastal Zone	Moderate

Key to species of the tribe Hibisceae (Malvaceae) from Ceará

1. Prostrate herbs..... 8. *Pavonia cancellata*
1'. Subshrub or shrub, rarely erect herbs, or trees.
    2. Hispid branches; epicalyx absent.....5. *Malachra fasciata*
    2'. Glabrous, pubescent, or velutinous branches, less frequently hispid or tomentose, rarely pilose; epicalyx present.
        3. Mericarps with mucilage..... 11. *Pavonia malacophylla*
        3'. Mericarps or capsules without mucilage.
            4. Falciform stipules.....12. *Pavonia paniculata*
            4'. Filiform stipules; rarely ovate-lanceolate.
                5. Ellipsoid capsules..... 1. *Abelmoschus esculentus*
                5'. Obovoid mericarps and capsules.
                    6. Leaf blades with crenate margin .....15. *Pavonia varians*
                    6'. Leaf blades with serrate or entire margin.
                        7. Caducous stipules.....19. *Taliparitti tiliaceum* (Cultivated)
                        7'. Persistent stipules.
                            8. Leaf blades vinaceous ..... 16. *Pavonia vinosa*
                            8'. Leaf blades greenish.
                                9. Flowers aggregated into terminal inflorescence (glomerular). .....6. *Malachra radiata*
                                9'. Solitary flowers, aggregated into pairs, panicles, or pauciflorous.
                                    10. Petals deeply lacerated at the margin .... 4. *Hibiscus schizopetalus* (Cultivated)
                                    10'. Petals entire at the margin.
                                        11. Pendulous flowers..... .....7. *Malvaviscus penduliflorus* (Cultivated)
                                        11'. Erect flowers.
                                            12. Epicalyx and calyx vinaceous; vinaceous capsules.... 3. *Hibiscus sabdariffa* (Cultivated)
                                            12'. Epicalyx and calyx greenish; brown capsules or mericarps.
                                                13. Epicalyx with eight lanceolate bracteoles .....2. *Hibiscus rosa-sinensis* (Cultivated)
                                                13'. Epicalyx with (5, 7, 9, 11)12–17 filiform or lanceolate bracteoles.

14. Epicalyx with nine bracteoles approximately twice the size (0.8–1.3 cm long) of the calyx length (0.4–0.6 cm long) ..... 9. *Pavonia geminiflora*

14'. Epicalyx with (7, 9, 8, 11)12–17 bracteoles with a length greater or less than the calyx, rarely five bracteoles with a size equivalent to twice the calyx length.

15. Epicalyx with seven bracteoles .....14. *Pavonia sidifolia*

15'. Epicalyx with (5, 9, 11)12–17 bracteoles.

16. Greenish bracteoles at the base and red near at the apex ..... 10. *Pavonia glazioviana*

16'. Greenish bracteoles.

17. Peltate bracteoles.....18

17'. Lanceolate bracteoles.....19

18. Pink corolla with vinaceous basal spot .....17. *Peltaea lasiantha*

18'. Yellow corolla without basal spot ..... 18. *Peltaea trinervis*

19. Mericarps 3-costate at the dorsal surface .....13. *Pavonia peruviana*

19'. Glochidiate mericarps .....20. *Urena lobata*

Taxonomic treatment

1. ***Abelmoschus esculentus*** (L.) Moench, Methodus (Moench) 2: 617 (1794). Figs. 1; 2a

Subshrub to shrub 1.4–2.9 m tall; pilose and greenish branch, simple and stellate trichomes. Stipules 1.2–1.5 cm long, persistent, filiform, and greenish. Petiole 1.5–6.5 cm long, pilose. Leaf blades with 5 lobes, palmatifid, central lobe 3.2–12.5 × 1.2–4 cm, lateral lobes 3–9.3 × 2.7–4 cm, ovate to cordate base, acute to obtuse apex, serrate margin, membranaceous; abaxial and adaxial surface pilose, simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, erect. Epicalyx with 12 lanceolate bracteoles ca. 1.4 × 0.5 cm long, smaller than calyx in length, greenish. Calyx tubular 2.5–4 cm long with five acute lobes, greenish. Corolla with ovate petals 2.5–4.8 × 1–1.8 cm, entire margin, yellow with vinaceous basal spot. Staminal tube 1.2–2 cm long, conic; style divided into five stigmas. Fruit 2.7–10.5 × 0.7–2 cm, capsule, ellipsoid, pubescent, greenish, mucilage present. Seeds ca. 0.5 × 0.4 cm, obovoid, blackened, with mucilage.

Examined material: Farias Brito, 06º50'24"S, 39º36'00"W, 26.V.2014, fl. and fr., *J.M.D. Silveira* 254 (EAC). Granjeiro, entrada do município, 06°53'12"S, 39°13'18"W, 18.V.2021, fr., *A.B. Tavares & F.G.L.S Souza 30* (HCDAL). Mucambo, 7.VII.1997, fl. and fr., *F.S. Cavalcanti* (EAC 25155). Redenção, Fazenda Piroás, 04º09'16"S, 38º47'41"W, 24.III.2018, fl. and fr., *J.C.M.S.M. Sobczak* 771 (EAC).

The most relevant characteristic is the palmatifid leaf blades, ellipsoid capsules, and seeds with mucilage.

The species is originated in Africa and widely cultivated in all Regions of the world (GBIF 2020). In Brazil occurs in all regions in the phytogeographic domains of Amazônia, Caatinga, Cerrado and Mata Atlântica (Flora e Funga do Brasil 2020, continuously updated). In Northeast it has been recorded in states of Bahia, Ceará, Maranhão, Paraíba, Pernambuco and Piauí (Flora e Funga do Brasil 2020, continuously updated). In Ceará it was registered in four municipalities in areas of the Arboreous Stepic Savanna and Semideciduous Seasonal Forest. However, *A. esculentus* is cultivated for food and this distribution may cover other areas.

The species is used as food and in medicine (Kew 2020).

The species was collected with flowers and fruits in March, May, July and September. The popular name is quiabo.

2. ***Hibiscus rosa-sinensis*** L., Sp. Pl. 2: 694 (1753). Figs. 1; 2b

Shrub 2.5–3 m tall; glabrous and brown to grayish branch. Stipules 0.4–1 cm long, persistent, filiform and greenish. Petiole 0.5–5.2 cm long, glabrous. Leaf blades entire, ovate, 2–9.6 × 1–5.3 cm, ovate base, acute to obtuse apex, serrate margin, membranaceous; abaxial and adaxial surface glabrous; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with eight lanceolate bracteoles 0.1–1.8 cm long, smaller than calyx in length, greenish. Calyx tubular 1–2.5 cm long with five acute lobes, greenish. Corolla, ovate petals 4–8.5 × 3.5–4.5 cm, entire to slightly lacerated margin, white, yellow, pink to red with vinaceous basal spot. Staminal tube 4.5–10 cm long, cylindrical; style divided into five stigmas. Fruit 1.2–2 cm long, capsule, oval-oblong, light brown, mucilage absent. Seeds 0.5 cm long, reniform, blackish, mucilage absent.

Selected material: Abaiara, vila São José, 07º21'2"S, 39º2'7"W, 8.II.2020, fl., *A.B. Tavares 2* (HCDAL). Barbalha, balneário Caldas, 07º22'32"S, 39º20'46"W, fl., *A.B. Tavares & F.G.L.S. Souza 9* (HCDAL). Crato, Baixa do Maracujá, 07°12'49"S, 39°31'32"W, 13.II.2020, fl., *A.B. Tavares & F.G.L.S. Souza 7* (HCDAL). Fortaleza, campus do Itaperi, 03º47'09"S, 38º33'09"W, 11.VII.2015, fl., *C.J.E. Vasconcelos 14* (EAC). Juazeiro do Norte, Sítio Touro, 19.II.1999, fl., *Z. Oliveira* (HCDAL 2427). Missão Velha, Jamacaru, 07°25'18"S, 39°7'42"W, 20.V.2021, fl. and fr., *A.B. Tavares & F.G.L.S Souza 30* (HCDAL). Pacoti, Sítio Munguba de Baixo, 29.IV.2017, fl., *J.C.M.S.M. Sobczak 568* (EAC). Ubajara, escritório do ICMbio, 03º50'31"S, 40º56'35"W, 25.IV.2012, fl., *M.I.B. Loiola 1513* (EAC). Várzea Alegre, 16.XII.2002, fl., *M.A.S. Lima* (HCDAL 2599).

Additional material: BRASIL. BAHIA: Ilhéus, 28.IX.1998, fr., *J.G. Jardim & F.S. Juchum 1847* (MBM). MINAS GERAIS: Uberlândia, distrito de Tapuirama, 19.XI.2007, fr., *J.F.Q. Pereira* (HUFU 49433).

Share with *H. schizopetalus* the habit (shrub) and the morphology of leaf blades (ovate). However, *H. rosa-sinensis* has erect flowers and petals with entire margins to slightly lacerated (*vs.* pendulous flowers and deeply lacerated petals).

The species is originated in China and exhibit a cosmopolitan distribution (Esteves *et al*. 2014; GBIF 2020). In Ceará is registered in 22 municipalities in areas of the Stepic Savanna and Dense Ombrophylous Forest and mainly in urban areas.

The species has ornamental and medicinal uses (Esteves *et al*. 2014).

This species was collected with flowers in all months but has not been found with fruits. The popular names are brinco-de-princesa, papola, and papoula.

3. *Hibiscus sabdariffa* L., Sp. Pl. 2: 695 (1753). Figs. 1; 2c

Subshrub 1–2 m tall; vinaceous and glabrous branch. Stipules 0.5–0.7 cm long, persistent, filiform, greenish. Petiole 0.6–7.4 cm long, glabrous. Leaf blades entire to 3–4 lobes, lanceolate 4.8–6.6 × 0.6–3.5 cm, palmately, central lobe 8–10.5 × 1.6–2.3 cm, lateral lobes 2.6–3.6 × 0.6–0.8 cm, ovate base, acute to obtuse apex, serrate margin, membranaceous; abaxial and adaxial surface glabrous; extrafloral nectary located

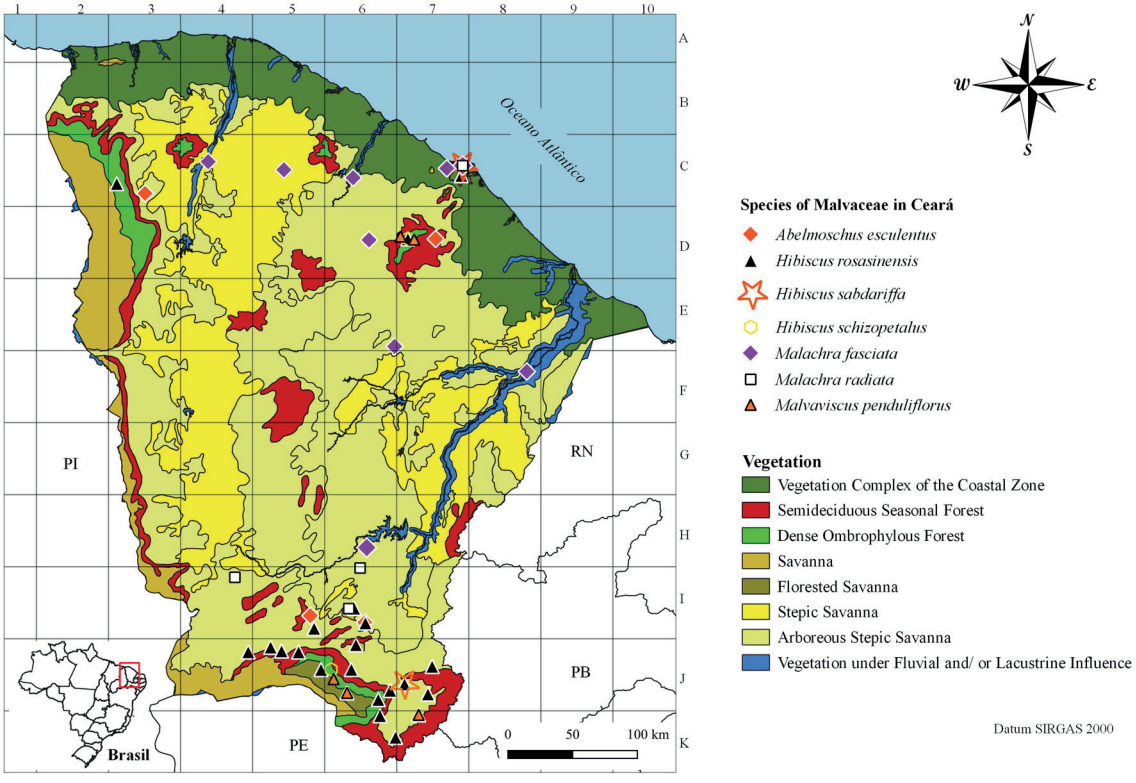

Figure 1 – a-l. Distribution of *Abelmoschus esculentus*, *Hibiscus rosa-sinensis*, *Hibiscus sabdariffa*, *Hibiscus schizopetalus*, *Malachra fasciata*, *Malachra radiata* and *Malvaviscus penduliflorus* in Ceará.

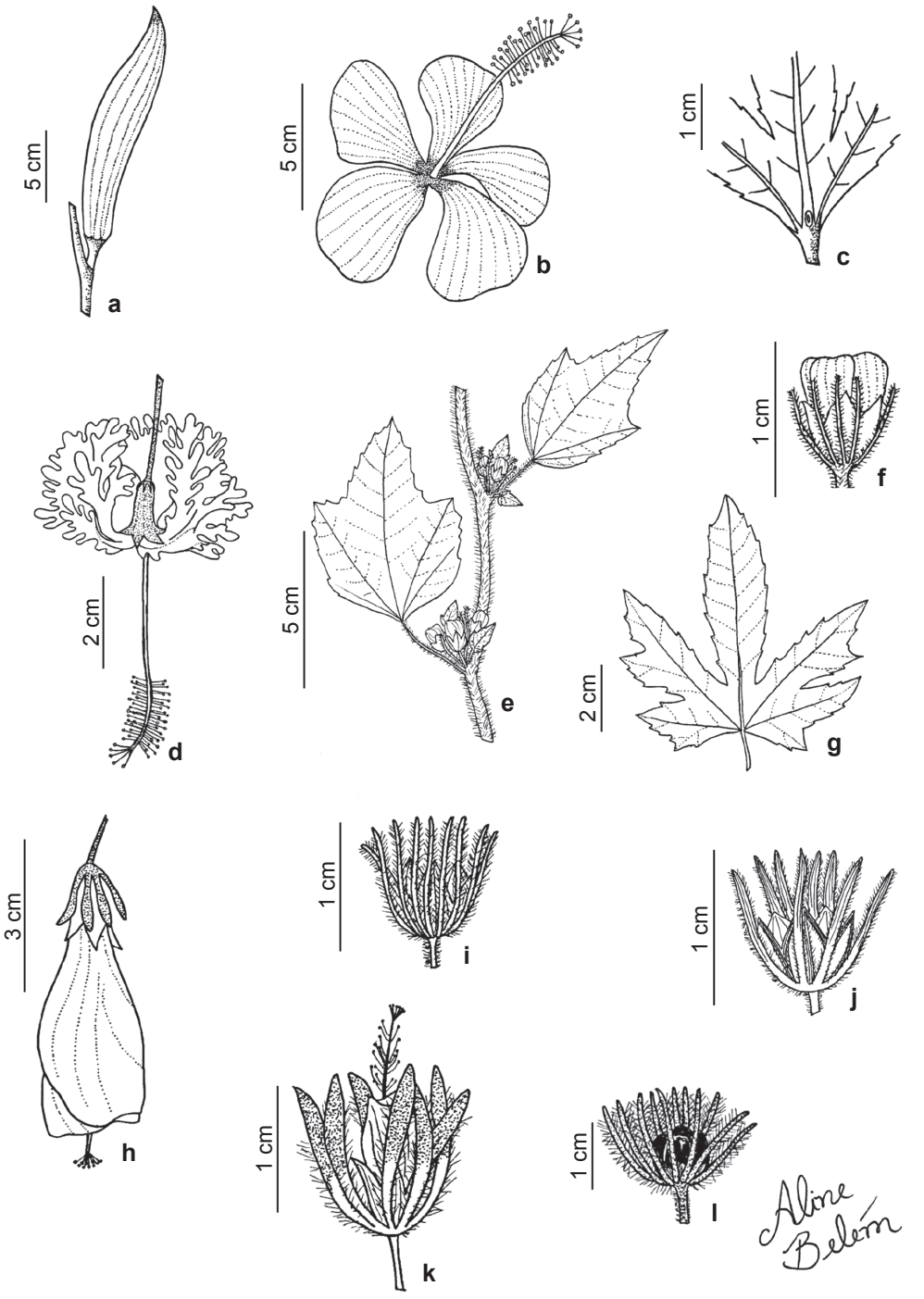

Figure 2 – a-l. Hibisceae (Malvaceae) in the state of Ceará, Northeast, Brazil – a. capsule of *A. esculentus*; b. flower of *Hibiscus rosa-sinensis*; c. abaxial surface of the leaf blades of *H. sabdariffa*, highlighting the extrafloral nectary located in the central vein; d. flower of *H. schizopetalus*; e. branch with inflorescences of *M. fasciata*; f-g. *M. radiata* – f. epicalyx, calyx and corolla; g. leaf blade; h. flower of *M. penduliflorus*; i. epicalyx and calyx of *P. cancellata*; j. epicalyx and calyx of *P. geminiflora*; k. epicalyx, calyx, corolla and staminal tube of *P. glazioviana*; l. epicalyx, calyx and mericarps of *P. malacophylla*. (a. *Cavalcanti* (EAC 25155); b. *Tavares 4*; c. *Drouet 2325*; d. *Tavares 6*; e. *Souza* (EAC 26542); f-g. *Matias et al.* (EAC 47738); h. *Tavares 10*; i. *Tavares 11*; j. *Krapovickas* (EAC 10490); k. *Fernandes* (EAC 17502); l. *Lima-Verde 2094*).

at the base of the vein of the abaxial surface of the leaf blade. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with 11 lanceolate bracteoles 1–1.4 cm long, smaller than the calyx in length, vinaceous. Calyx lanceolate 1.5–3 × 0.6–1 cm, sepals connate in the base, vinaceous. Corolla, ovate petals ca. 4.5 × 2.5 cm, entire to slightly lacerated margin, white with vinaceous basal spot. Staminal tube ca. 0.8 cm long, cylindrical; style divided into five stigmas. Fruit 2.2 × 2.4 cm, capsule, obovoid, glabrous, vinaceous, mucilage absent. Seeds ca. 0.3 × 0.3 cm, reniform, dark brown, mucilage absent.

Examined material: Crato, 25.III.1936, *P. Luetzelburg 25837* (EAC, IPA). Fortaleza, Floresta, 22.VIII.1935, fr., *F.E. Drouet 2325* (US). Milagres, Sítio Limoeiro, 27.VII.1997, fr., *A.S.F. Castro 441* (EAC).

Additional material: BRAZIL. AMAZONAS: Borba, Rio Madeira, 04°22'59"S, 59°34'48"W, 23.VI.1983, fl., *S.R. Hill 12811* (NY). BAHIA: Feira de Santana, campus da Universidade Estadual de Feira de Santana, 12°11'46"S, 38°58'05"W, 10.X.2017, fl., *G.B. Silva 6* (HUEFS).

Differs from other species for presenting branches, epicalyx, sepals, and capsules vinaceous and extrafloral nectary (at the base of the central vein of the abaxial surface of the leaf blade).

The species is originated in Sudan and occurs in all continents, except for Antarctica (Coelho & Amorim 2019). In Brazil it was recorded in all Regions in the phytogeographic domains of Amazônia, Caatinga, Cerrado and Mata Atlântica (Coelho & Amorim 2019; GBIF 2020). In Ceará is registered in two municipalities in areas of the Stepic Savanna and Vegetation Complex of the Coastal Zone.

The species has uses as food, ornamental and medicinal (Coelho & Amorim 2019).

This species was collected with fruit in the months of July and August. The popular name is vinagreira.

4. *Hibiscus schizopetalus* (Dyer) Hook.f., Bot. Mag. 106: t. 6524 (1880). Figs. 1; 2d

Shrub 2.5–3 m tall; glabrous and brown branch. Stipules 0.2–0.4 cm long, persistent, filiform, greenish. Petiole 0.5–3 cm long, glabrous. Leaf blades entire, ovate, 1.8–11 × 0.6–5.4 cm, base ovate, apex acute, serrate margin, membranaceous; abaxial and adaxial surface glabrous; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with seven filiform bracteoles ca. 0.2 cm long, smaller than calyx in length, greenish. Calyx tubular 1.2–1.5 cm long with five acute lobes, greenish. Corolla, ovate petals 4.3–6.5 × 1.4–2 cm, deeply lacerated, red without vinaceous basal spot. Staminal tube 7.2–9 cm long, cylindrical; style divided into five stigmas. Fruit ca. 3 cm long, capsule, cylindrical, brown, mucilage absent. Seeds ca. 0.3 cm long, deltoid, dark brown, mucilage absent.

Examined material: Crato, Chapada do Araripe, 07°12'49"S, 39°27'18"W, 13.II.2020, fl., *A.B. Tavares 6* (HCDAL). Pacoti, sítio Loca, 20.VIII.2016, fl., *J.C.M.S.M. Sobczak 275* (EAC).

Additional material: ÁFRICA. IX.1973, fl. and fr., *unknown* (K 000240491, Lectotype).

The differential characteristic of *H. schizopetalus* is the pendulous flowers with petals deeply lacerated at the margin.

This is a native species of East Tropical Africa and exhibits a cosmopolitan distribution. In Brazil occurs in the Regions of South, Southeast and Northeast in the phytogeographic domains of Caatinga, Cerrado and Mata Atlântica (GBIF 2020). In Ceará is registered in two municipalities in transition areas of the Stepic Savanna/Dense Ombrophylous Forest.

The species has ornamental uses (Esteves *et al*. 2014).

This species was collected with flowers in February and August.

5. *Malachra fasciata* Jacq., Collectanea [Jacquin] 2: 352; Ic. Pl. Rar. iii. 11., t. 548 (1788). Figs. 1; 2e

Herb, subshrub to shrub 40–80 cm tall; hispid and greenish branch, simple and stellate trichomes. Stipules 0.8–2.5 cm long, persistent, filiform, greenish. Petiole 0.6–6 cm long, hispid. Leaf blades entire, ovate, or orbicular 2.2–9.2 × 1–5 cm, with 3–4 lobes, pinnatifid, central lobe 2.3–7.4 × 0.9–2.2 cm, lateral lobes 1.5–4.7 × 0.3–1 cm, base ovate, apex acute, serrate margin, membranaceous; abaxial and adaxial surface hispid, simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts 1.2–3 × 0.5–1 cm, ovate-lanceolate, greenish, with filamentous projections. Flowers aggregated into axillary inflorescences (pauciflorous). Epicalyx absent. Calyx cupuliform ca. 0.3 × 0.2 cm, sepals connate in the base, greenish. Corolla, ovate petals 0.7–0.8 × 0.3 cm, entire margin, white without vinaceous basal spot. Staminal tube ca. 1.5 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.3 × 0.2 cm long, 5-mericarps, obovoid, glabrous, light brown, mucilage absent. Seeds ca. 0.2 × 0.1 cm, reniform, dark brown, mucilage absent.

Selected material: Caridade, Fazenda Desterro, 5.VII.1996, fl. and fr., *A. Fernandes & E. Nunes* (EAC 24205). Caucaia, Parque Botânico do Ceará, 27.V.1998, fl., *E.B. Souza* (EAC 26542). Fortaleza, Lagoa do Tauápe, 03º43'02"S, 38º32'35"W, 13.VIII.1935, fl., *F.E. Drouet 2253* (NY). Iguatu, G27-Cajás, 06º22'03"S, 39º12'31"W, 18.V.2010, fl., *L.R.O. Normando et al. 558* (EAC). Irauçuba, Mimosa, 8.V.2004, fl., *E. Trigueiro* (EAC 33895). Limoeiro do Norte, Área de Pivô Central, 19.VII.2005, fl., *A.V. Vieira* (EAC 37727). Pentecoste, fazenda experimental Vale do Curu, 03º48'04"S, 39º18' 11"W, 19.V.2016, fl., *F.Y.E.C. Dias* (EAC 60146). Quixadá, 1.VI.1941, fl., *P. Bezerra 246* (EAC). Sobral, Estrada das Marrecas, 03°41'22"S, 40°18' 31"W, 27.VI.2017, fl., *E.B. Souza 4661* (HUEFS).

Is characterized for the hispid indument, axillary inflorescences and epicalyx absent. *Malachra fasciata* share with *M. radiata* the hispid indument. However, this last species has terminal inflorescences and epicalyx.

This is a native species from Mexico and Tropical America (GBIF 2020). In Brazil occurs in the Regions of Northeast (Bahia, Maranhão, and Pernambuco) and Southeast. In the phytogeographic domains of the Amazônia, Cerrado, and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in nine municipalities in areas of the Vegetation Complex of the Coastal Zone, Dense Ombrophylous Forest, Stepic Savanna and Vegetation under Fluvial and/or Lacustrine Influence. This species was recorded in the conservation unit Parque Estadual Botânico do Ceará.

This species was collected with flowers in April, May, June, July, August, and November and with fruits in June and July.

6. *Malachra radiata* L., Syst. Nat., ed. 12. 2: 458 (1767). Figs. 1; 2f-g

Subshrub to shrub 2 m tall; hispid and greenish branch with simple and stellate trichomes. Stipules 0.3–1 cm long, persistent, filiform, greenish. Petiole 0.3–3.7 cm long, hispid. Leaf blades with 3–5 lobes, palmatipartite, central lobe 1.5–5.2 × 0.5–1.6 cm, lateral lobes 0.9–3.7 × 0.2–1.2 cm, ovate base, acute to obtuse apex, serrate margin, membranaceous, abaxial and adaxial surface hispid with simple and stellate trichomes; extrafloral nectary absent. Foliaceus bracts 1.4–1.8 × 0.8–1.3 cm, ovate-lanceolate, with filamentous projections, greenish. Flowers aggregated into glomerular inflorescences, terminal, erect. Epicalyx with 10 filiform bracteoles 0.5–1 cm de long, length equal to calyx, greenish. Calyx cupuliform ca. 0.6 × 0.4 cm, sepals free, greenish. Corolla, ovate petals ca. 0.7 × 0.4 cm, entire margin, lilac without vinaceus basal spot. Staminal tube 0.6 cm, cylindrical; style divided into 10 stigmas. Fruit ca. 0.4 × 0.2 cm, mericarps, obovoid, light brown, mucilage absent. Seeds ca. 0.1 × 0.1 cm, obovoid, dark brown, mucilage absent.

Selected material: Aiuaba, Lagoa do Rosio, 31.V.1984, fl., *E. Nunes.* (EAC 12644). Fortaleza, Campo do EAC, 17.V.1958, *L.Z. Almeida* (EAC 1807). Iguatu, Lagoa do Baú, 06°23'44"S, 39°24'24"W, 11.V.2015, fl., *L. Ibiapina-Santo et al. 34* (EAC). Várzea Alegre, Lagoa Azul, 06º47'27"S, 39º19'59"W, 10.VI.2015, fl., *A.C. Albuquerque et al. 12* (EAC).

Is characterized for the branches hispid, dense terminal inflorescences and an epicalyx with 10 filiform bracteoles.

This is a native species from Tropical and Subtropical America, Tropical Africa, and Southern Sudan (GBIF 2020). In Brazil occurs in the Regions of Northeast (Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Rio Grande do Norte and Sergipe) and Southeast (Flora e Funga do Brasil 2020, continuously updated). In the phytogeographic domains of Caatinga and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in four municipalities in areas of the Stepic Savanna and the Vegetation Complex of the Coastal Zone. This species is recorded in the Estação Ecológica de Aiuaba.

This species was collected with flower in May and June.

7. *Malvaviscus penduliflorus* DC., Prodr. [A. P. De Candolle] 1: 445 (1824). Figs. 1; 2h

Subshrub to shrub 1.5 m tall; glabrous and brown branch. Stipules ca. 0.4 cm long, persistent, lanceolate, greenish. Petiole 1–1.5 cm long, glabrous. Leaf blades entire, ovate, 5.2–11 × 2.3–4.6 cm, ovate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface glabrous; extrafloral nectary absent. Foliaceus bracts absent. Flowers axillary, solitary, pendulous. Epicalyx with seven lanceolate bracteoles 0.4–1.5 cm, smaller than calyx in length, greenish. Calyx tubular ca. 2 × 1 cm with five acute lobes, greenish. Corolla, ovate petals ca. 6.5 × 2.2 cm, entire margin, red, without vinaceous basal spot. Staminal tube ca. 7.5 cm long, cylindrical; style divided into 10 stigmas. Fruit (mericarps) not observed. Seeds not observed.

Examined material: Barbalha, Caldas, 07°22'31"S, 39°20'41"W, 11.III.2020, fl., *A.B. Tavares & F.G.L.S. Souza 10* (HCDAL). Brejo Santo, passagem de pedra, 07°31'41"S, 38°50'53"W, 20.V.2021, fl., *A.B. Tavares & F.G.L.S. Souza* (HCDAL). Crato, Parque Grangeiro, 07°16'46"S, 39°26'18"W, 10.II.2020, fl., *A.B. Tavares & F.G.L.S. Souza 3* (HCDAL). Guaramiranga, Pico Alto, 04°12'30"S, 38°58'28"W, 30.IV.2017, fl., *J.C.M.S.M. Sobczak 602* (EAC). Pacoti, conglomerado 100-B, 04°13'48"S, 38°52'48"W, 13.VIII.2014, fl., *M. Mayer 365* (EAC).

Malvaviscus penduliflorus share with *H. schizopetalus* the pendulous flowers. However, are differentiated by the morphology of the corolla. In the first species the petals are entire at the margin vs. deeply lacerated in *H. schizopetalus*.

This species is registered in Texas, Venezuela, Peru and Brazil (GBIF 2020). In Brazilian territory occurs in all the Regions in phytogeographic domains of Amazônia, Caatinga, Cerrado and Mata Atlântica (GBIF 2020; Flora e Funga do Brasil 2020, continuously updated). In Ceará is recorded in five municipalities in areas of the Stepic Savanna and Dense Ombrophylous Forest.

The specie has ornamental uses (GBIF 2020).

This species was collected with flowers in February, March, April, May, and August.

8. *Pavonia cancellata* (L.) Cav., Diss. 3, Tertia Diss. Bot. 135 (1787). Figs. 3; 2i

Herb prostrates 10–30 cm tall; velutinous and greenish branch with simple and stellate trichomes. Stipules 0.1–0.7 cm long, persistent, filiform, greenish. Petiole 0.4–4 cm long, velutinous. Leaf blades entire, ovate to deltoid, 0.4–6.8 × 0.5–7.5 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface velutinous with simple and stellate trichomes; extrafloral nectary absent. Foliaceus bracts absent. Flowers axillary, solitary, erect. Epicalyx with 13–16 filiform bracteoles 0.2–1.5 cm long, greater than the calyx in length, greenish. Calyx cupuliform 0.8–1.4 × 0.2–0.3 cm, acute lobes, greenish. Corolla, ovate petals 1.2–3.5 × 1.2–1.5 cm, entire margin, yellow, with vinaceous basal spot. Staminal tube ca. 0.8 cm, cylindrical; style divided into 10 stigmas. Fruit ca. 0.4 × 0.3 cm, mericarps, obovoid, mucronate in the apex, dark brown, mucilage absent. Seeds ca. 0.1 × 0.2 cm, reniform, dark brown, mucilage absent.

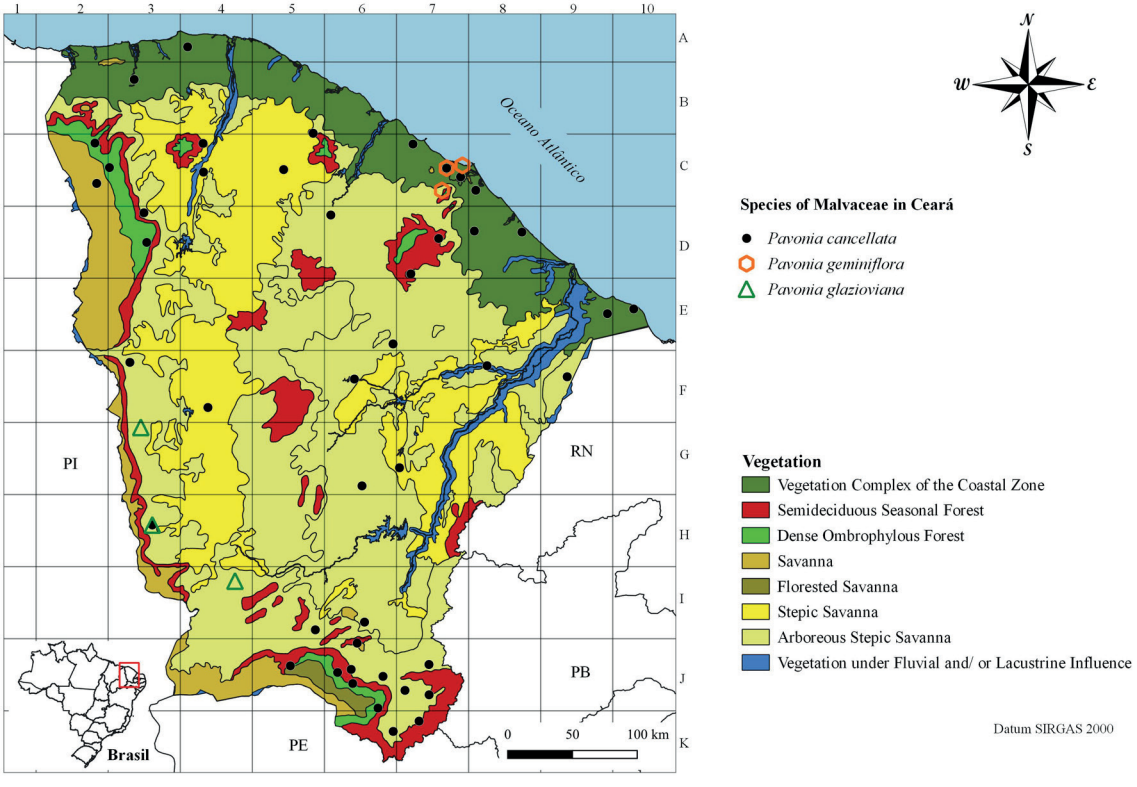

Figure 3 – Distribution of *Pavonia cancellata*, *Pavonia geminiflora* and *Pavonia glazioviana* in Ceará.

Selected material: Aiuaba, Estação Ecológica de Aiuaba, 06°34'25"S, 40°07'25"W, 24.III.2006, fr., *P.G.A. Mendes 33* (HCDAL). Aracati, Fazenda Belém, 04°44'44"S, 37°32'16"W, 2.VI.2014, fl., *M.I.B. Loiola 2287* (EAC). Brejo Santo, passagem dos porcos, 07°34'19"S, 38°50'38"W, 20.V.2021, fl. and fr., *A.B. Tavares & F.G.L.S. Souza 39* (HCDAL). Capistrano, Fazenda Araçanga, 30.V.1994, fl., *J.B.L.P. Medeiros 72* (EAC). Crateús, Serra das Almas, 7.VI.2001, *M.S. Sobrinho & M.M.A. Bruno 168* (EAC). Milagres, Sítio Boa Vista, 07°21'30"S, 38°56'30"W, 5.IX.2020, fl. and fr., *A.B. Tavares 12* (HCDAL). Missão Velha, Sítio Olho D'água Comprido, 07°15'41"S, 39°5'39"W, 1.IX.2020, fl. and fr., *A.B. Tavares 11* (HCDAL). São Gonçalo do Amarante, Estação Ecológica do Pecém, 03°34'00"S, 38°49'00"W, 22.XI.2000, fl., *H. Magalhães 225* (EAC).

The differential characteristic is the prostrate habit. Occasionally confused with *P. sidifolia* for the similarity of the corolla (yellow with vinaceous basal spot). However, this second species is an erect herb and has lanceolate bracteoles (*vs.* filiform bracteoles in *P. cancellata*).

This is a native species from Mexico to Tropical South America (GBIF 2020). In Brazil occurs in the Regions of North, Northeast (Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Sergipe), Midwest and Southeast (Flora e Funga do Brasil 2020, continuously updated). In the phytogeographic domains of Amazônia, Caatinga, Cerrado and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in 45 municipalities in areas of the Semideciduous Seasonal Forest, Vegetation Complex of the Coastal Zone, and Arboreous Stepic Savanna. This species is recorded in two conservation units: Estação Ecológica de Aiuaba and Estação Ecológica do Pecém.

This species was collected with flowers in all months and with fruits in March, May, and September.

9. *Pavonia geminiflora* Moric., Pl. Nouv. Amer. 120 (t. 73) (1844). Figs. 3; 2j

Subshrub 1.2 cm tall; pubescent and vinaceous branch with glandular and simple trichomes. Stipules 0.2–0.5 cm long, persistent, filiform, greenish. Petiole 0.2–7.1 cm long, pubescent. Leaf blades entire, ovate, 1.5–11.4 × 0.7–6.2 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface pubescent with glandular and simple trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, two per axil, erect. Calyx cupuliform 0.4–0.6 × 0.4–0.8 cm, sepals connate in the base, greenish. Epicalyx with nine filiform bracteoles 0.8–1.3 cm long, doubles the length of the calyx, greenish. Corolla, ovate petals 1.2 × 0.6 cm, entire margin, yellow with vinaceous basal spot. Staminal tube ca. 1 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.2 × 0.1 cm, mericarps, obovoid, mucronate in the apex, winged, mucilage absent. Seeds ca. 0.1 cm, obovoid, vinaceous, mucilage absent.

Selected material: Caucaia, Soledade, 11.VI.1974, fl., *A. Fernandes* (EAC 2428). Fortaleza, caminho da Barra do Ceará, 24.VI.1955, *A. Fernandes & G.A. Black* (EAC 1280). Maranguape, Serra de Maranguape, 26.VI.1981, fl., *E. Nunes 10490* (EAC, HUEFS).

Is characterized for two flowers per leaf axil and for the epicalyx with nine bracteoles. The epicalyx with approximately double (0.8–1.3 cm) the length of the calyx (0.4–0.6 cm).

This is a native species from Brazil, Guyana, and Venezuela (GBIF 2020). In Brazil occurs in the Regions of North, Northeast (Bahia, Ceará, Paraíba) and Southeast (Flora e Funga do Brasil 2020). In the phytogeographic domains of the Amazônia, Caatinga, Cerrado and Floresta Atlântica (BFG 2018; Flora e Funga do Brasil 2020). In Ceará is registered in three municipalities in areas of the Dense Ombrophylous Forest and Vegetation Complexo of the Coastal Zone.

This species was collected with flowers in June.

10. *Pavonia glazioviana* Gürke, *Fl. bras.* (Martius) 12(3): 524 (1892). Figs. 3; 2k

Subshrub to shrub 1,6 m tall; tomentose and greyish-green branch with stellate trichomes. Stipules 0.2–0.5 cm long, persistent, filiform, greenish. Petiole 0.4–3.5 cm long, tomentose. Leaf blades entire, ovate, 0.7–8.8 × 0.6–7 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface tomentose with stellate trichomes; extrafloral nectary absent. Foliaceus bracts absent. Flowers axillary, solitary, erect. Epicalyx with 12–17 lanceolate bracteoles 0.5–2.9 × 0.1–0.2 cm, greater than calyx in length, greenish at the base and red in the apex. Calyx tubular 1.2–1.5 × 0.6 cm, with five acute lobes, greenish. Corolla, ovate petals 1.6–2.4 × 0.5–0.6 cm, entire margin, red without vinaceous basal spot. Staminal tube ca. 2 cm long, cylindrical; style divided into 10 stigmas. Fruits ca. 0.5 × 0.2 cm, mericarps, obovoid, rostrate in the apex, light brown, mucilage absent. Seeds ca. 0.4 cm, reniform, dark brown, mucilage absent.

Selected material: Aiuaba, Serra do Zabelê, 06°38'44"S, 40°30'45"W, 2.I.1998, fl., *L.W. Lima-Verde et al. 833* (EAC). Novo Oriente, baixa fria, 28.III.1990, fl., *F.S. Araújo 46* (EAC). Parambu, Serra da Esperança, 12.VI.2000, fl., *A.S.F. Castro 864* (EAC).

This species is characterized for tomentose branches and 12–17 lanceolate bracteoles. The bracteoles are green in the basal portion and red in the apex.

This is an endemic species from Northeast of Brazil. Occurs in the states of Bahia, Ceará, Pernambuco and Piauí in the phytogeographic domain of Caatinga (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in three municipalities in areas of Stepic Savanna and Arboreous Stepic Savanna.

This species was collected with flowers in January, February, March, April, May, June, July, and September.

11. *Pavonia malacophylla* (Link & Otto) Garcke, Jahrb. Königl. Bot. Gart. Berlin 1: 221 (1881). Figs. 4a; 2l; 5

Subshrub to shrub 1.7–3 m tall; velutinous and greenish branch with simple and stellate trichomes. Stipules 0.3–1.2 cm long, persistent, filiform, greenish. Petiole 0.4–15.6 cm long, velutinous. Leaf blades entire, ovate, 0.5–16.5 × 0.3–16 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface velutinous with simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers aggregated into pauciflorus inflorescences. Epicalyx with 16–22 filiform bracteoles 0.5–1.8 × 0.1 cm, greater than the calyx in length, greenish. Calyx cupuliform ca. 0.4 × 0.2 cm, sepals connate in the base, greenish. Corolla, ovate petals 1.6–3.4 × 1 cm, margin entire, pink without vinaceous basal spot. Staminal tube 2.7–3.8 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.5 × 0.2 cm, mericarps, obovoid, blackened, mucilage present. Seeds ca. 0.4 × 0.2 cm, reniform, blackened, mucilage absent.

Selected material: Araripe, Floresta Nacional do Araripe, 17.VII.1994, fl., *F.S. Pinto 256* (EAC). Barbalha, Chapada do Araripe, 07º22'13"S, 39°20'07"W, 23.V.2011, fl., *E.M. Marreira 171* (EAC). Crato, Casa Sede - IBAMA, 07º14'55"S, 39º29'49"W, fl., *A.L. Jorge* (HCDAL 3116). Granja, 13.XI.1988, fl., *M. Andrade Neto* (EAC 15842). Guaraciaba do Norte, Serra da Ibiapaba, 25.VIII.1980, fl., *A. Fernandes et al.* (EAC 6553). Ipueiras, Serra da Ibiapaba, 23.VII.2009, fl., *A.S.F. Castro 2206* (EAC). Pacoti, Sítio São Luís, 04°13'29"S, 38º53'27"W, 17.VII.2016, fl., *J.C.M.S.M. Sobczak 244* (EAC). São Benedito, 8.I.1942, *P. Bezerra 408* (EAC). Ubajara, Parque Nacional de Ubajara, 03°50'27"S, 40º54'28"W, fl. *M.I.B. Loiola 1929* (EAC). Viçosa do Ceará, 2.X.1991, fl., *M. Andrade Neto* (EAC 17842).

Is differentiated for the mericarps with mucilage, branches and leaf blades velutinous and epicalyx with 16–22 bracteoles.

This species is registered in southern Mexico extending to Central America, Cuba, Peru, Bolivia, and Brazil (Esteves 2001). In Brazil occurs in the Regions of North, Northeast (Alagoas, Bahia, Ceará, Maranhão, Pernambuco and Sergipe), Midwest and Southeast (Flora e Funga do Brasil 2020, continuously updated). In the phytogeographic domains of Amazônia, Caatinga, Cerrado and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in 11 municipalities in areas of the Dense Ombrophylous Forest, Savanna and Florested Savanna. *Pavonia malacophylla* is recorded in the Floresta Nacional do Araripe and Parque Nacional de Ubajara.

This species was collected with flowers in March, April, May, June, July, August, September, October, November, and December and with fruits in January, June, July, August, October and September. The species popular names are malva-do-agreste, malva-branca, papola, malva-da-mata, malva-branca-da-mata, and malva-da-flor-rosa.

12. *Pavonia paniculata* Cav., Diss. 3, Tertia Diss. Bot. 135, t. 46, fig. 2 (1787). Figs. 4b; 5

Subshrub 1.5 m de tall; pubescent and brown branch with stellate trichomes. Stipules ca. 0.4 cm long, persistent, falciform, greenish. Petiole 0.6–3.6 cm long, pubescent. Leaf blades entire, ovate, 6.8 × 5.8 cm, cordate base, acute apex, serrate margin, membranaceous, abaxial and adaxial surface pubescent with stellate trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, aggregated into panicles, erect. Epicalyx with eight filiform bracteoles 0.4–0.8 cm, greater than calyx in length, greenish. Calyx cupuliform 0.4–0.8 cm, sepals connate in the base, greenish. Corolla, ovate petals ca. 2 × 1.2 cm, entire margin, yellow without vinaceous basal spot. Staminal tube 0.8 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.5 × 0.2 cm, mericarps, obovoid, light brown, mucilage absent. Seeds ca. 0.2 cm, reniform, dark brown, mucilage absent.

Selected material: Baturité, 12.VI.1976, fl., *A. Fernandes* (EAC 2788).

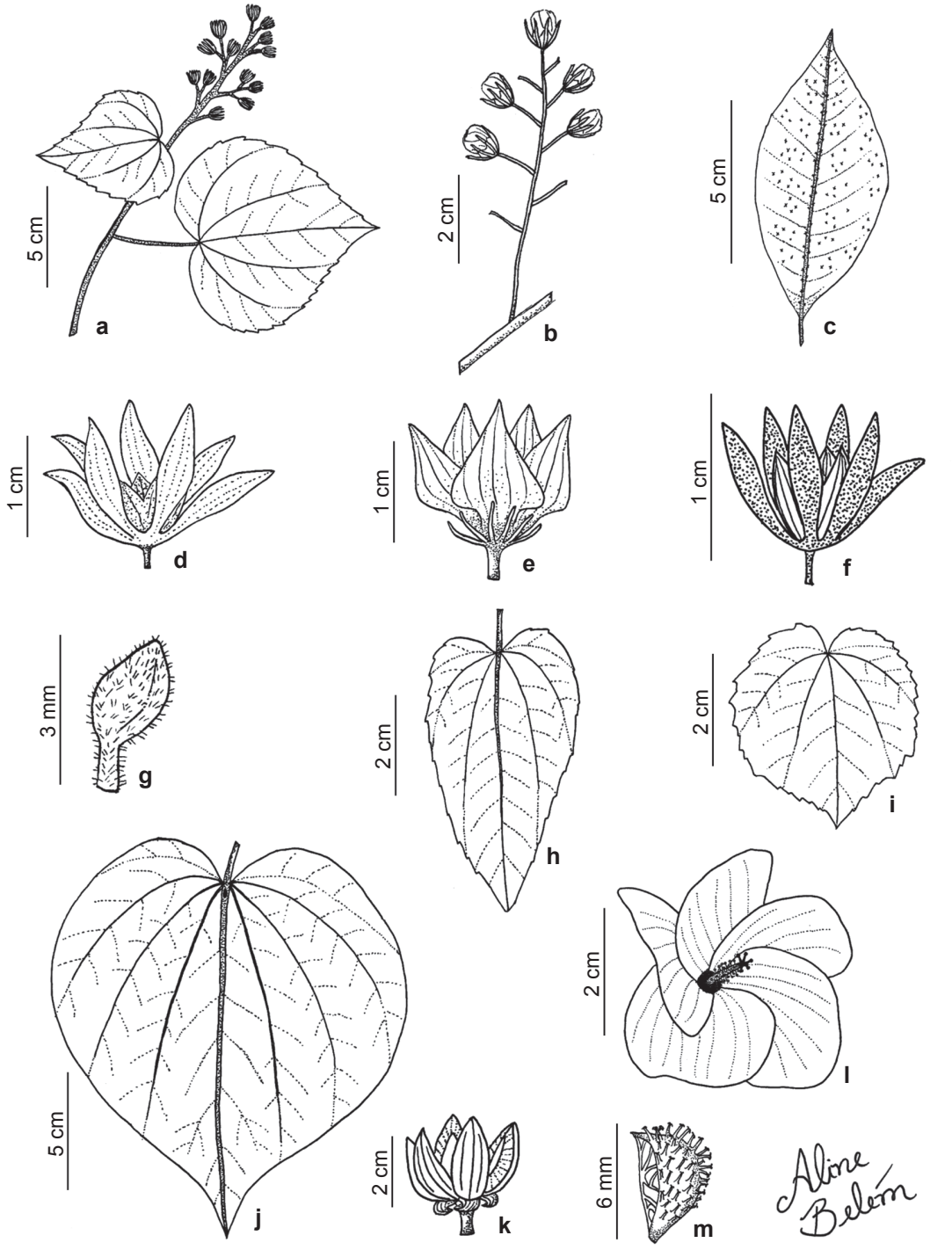

Figure 4 – a-m. Hibisceae (Malvaceae) in the state of Ceará, Northeast, Brazil – a. branch of *P. malacophylla*; b. panicles inflorescences of *P. paniculata*; c. adaxial surface of the leaf blade of *P. peruviana*; d. epicalyx and calyx of *P. sidifolia*; e. epicalyx and calyx of *P. varians*; f. epicalyx and calyx of *P. vinosa*; g-h. *P. lasiantha* – g. bracteole; h. leaf blade; i. leaf blade of *P. trinervis*; j-l. *T. tiliaceum* – j. adaxial surface of leaf blade; k. capsule; l. flower; m. glochidiate mericarp of *Urena lobata*. (a. *Lima-Verde 2094*; b. *Krapovickas* (EAC 2788); c. *Loiola et al. 2473*; d. *Tavares 13*; e. *Fernandes & Matos* (EAC 12008); f. *Krapovickas* (EAC 8070); g-h. *Allemão & Cysneiros 104*; i. *Mata* (EAC 15608); j-l. *Tavares 8*; m. *Sampaio & Mendes 543*).

Additional material: BRAZIL. BAHIA. Santo Amaro, próximo à Usina Aliança, 10.XI.1983, fl. and fr., *H.P. Bautista 1312* (INPA).

The outstanding features are the flowers aggregated into panicles and the falciform stipules.

This is a native species from Mexico and Tropical America (GBIF 2020). In Brazil occurs in the Regions of North, Northeast (Alagoas, Ceará, Paraíba, Pernambuco), Midwest and Southeast. In the phytogeographic domain of Cerrado (Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in the municipality of Baturité (Maciço de Baturité) in areas of the Semideciduous Seasonal Forest.

This species was collected with flowers in June.

13. *Pavonia peruviana* Gürke, *Fl. bras.* (Martius) 12(3): 487, t. 88, fig. 1 (1892). Figs. 4c; 5

Subshrub 0.3–0.5 m tall; pubescent and brown branch with stellate trichomes. Stipules ca. 0.6 cm long, persistent, filiform, greenish. Petiole 0.5–1.6 cm long, pubescent. Leaf blades entire, lanceolate, 4.8–10.5 × 1.5–4.4 cm, acute base, acute apex, crenated or serrate margin, membranaceous; abaxial and adaxial surface pubescent with stellate trichomes; extrafloral nectary absent. Bracts foliaceous absent. Flowers aggregated into pauciflorus inflorescence. Epicalyx with 11–13 lanceolate or filiform bracteoles 0.6 cm long, connate in the base, greater than calyx in length, greenish. Calyx cupuliform ca. 0.4 cm long, sepals connate in the base, lanceolate, greenish. Corolla, ovate petals ca. 0.6 × 0.3 cm, entire margin, yellow without vinaceous basal spot. Staminal tube 0.5 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.5 × 0.2 cm, mericarps, obovoid, 3-spined, dark brown, mucilage absent. Seeds ca. 0.4 × 0.1 cm, reniform, dark brown, mucilage absent.

Selected material: Maranguape, trilha da Pirapora, 27.IX.2014, fl., *M.I.B. Loiola, R.S. Fonseca, V.S. Sampaio & J. Kilder 2473* (EAC). Maranguape, trilha da Pedra Rajada, 13.VII.1997, *A.S.F. Castro 422* (EAC). Pacatuba, Serra da Aratanha, 26.XII.1999, *A.S.F. Castro 773* (EAC).

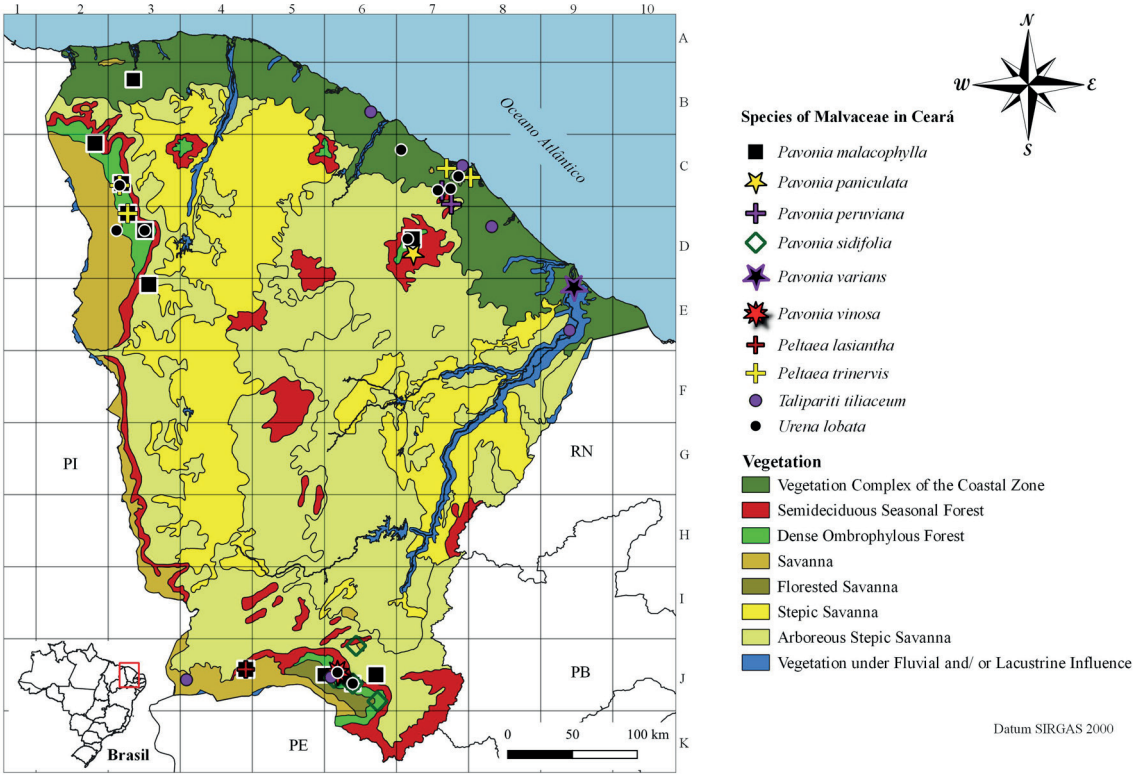

Figure 5 – Distribution of *P. malacophylla*, *P. paniculata*, *P. peruviana*, *P. sidifolia*, *P. varians*, *P. vinosa*, *P. lasiantha*, *P. trinervis*, *T. tiliaceum* and *U. lobata* in Ceará.

Additional material: BRAZIL. GOIAS: Colinas do Sul, próxima à linha de transmissão Niquelândia, Serra da Mesa, 13°51'00"S, 48°18'00"W, 21.IX.1991, fr., *B.M.T. Walter 814* (CEN).

Is characterized for the pubescent leaf blades with stellate trichomes and mericarps 3-spined at the dorsal face.

This is a native species from South America (GBIF 2020). In Brazil occurs in the Regions of North, Northeast (Ceará), Midwest and Southeast in areas of Cerrado and Mata Atlântica (Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in two municipalities in areas of the Dense Ombrophylous Forest.

This species was collected with flowers in July.

14. *Pavonia sidifolia* Kunth, Nov. Gen. Sp. [H.B.K.] 5: 283 (1822). Figs. 4d; 5

Herb erects to subshrub 45–50 cm tall; pubescent and greenish branch with simple, glandular, and stellate trichomes. Stipules 0.2–0.6 cm long, persistent, filiform, greenish. Petiole 0.2–2.5 cm long, pubescent. Leaf blades entire, ovate, 0.9–8 cm × 0.6–3.8 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface pubescent with simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with seven lanceolate bracteoles 0.7–1.3 × 0.2–0.3 cm, greater than calyx in length, greenish. Calyx cupuliform 0.5–0.8 × 0.2–0.4 cm, lanceolate, greenish. Corolla, ovate petals 1.7–2.5 × 1–1.8 cm, entire margin, yellow with vinaceous basal spot. Staminal tube ca. 1 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.3 × 0.2 cm long, mericarps, obovoid, mucronate in the apex, dark brown, mucilage absent. Seeds ca. 0.2 × 0.1 cm, obovoid, light brown, mucilage absent.

Selected material: Barbalha, Ladeira do S, *A.C.B. Santos* (HCDAL). Caririaçu, 07°2'57"S, 39°16'51"W, 18.V.2021, fl. and fr., *A.B. Tavares & F.G.L.S. Souza 27* (HCDAL). Crato, Granjeiro, 07°14'04"S, 39°24'33"W, 10.II.2020, fl. and fr., *A.B. Tavares & F.G.L.S. Souza 5* (HCDAL). Granjeiro, 26.V.1936, fl., *P. Luetzelburg 26002* (EAC). Missão Velha, Jamacaru, 07°26'5"S, 39°7'59"W, 20.V.2021, fl. and fr., *A.B. Tavares & F.G.L.S. Souza 34* (HCDAL).

This species share with *P. cancellata* the yellow corolla with a vinaceous basal spot. However, are differentiated by their number and morphology of the bracteoles. *Pavonia sidifolia* has seven lanceolate bracteoles *vs.* 13–16 filiform bracteoles in *P. cancellata*.

This is a neotropical species from Mexico to South America (Esteves 2001). In Brazil occurs in the regions of Northeast (Bahia, Ceará, Pernambuco, Piauí and Sergipe), Midwest and Southeast (Flora e Funga do Brasil 2020, continuously updated). In the phytogeographic domains of Caatinga, Cerrado and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in five municipalities in areas of the Savanna and Florested Savanna. This species is recorded in the Chapada do Araripe.

This species was collected with flowers in January, February, March, May, June, November and December and fruits in February and June. The popular names are relógio and malva-amarela.

15. *Pavonia varians* Moric., Pl. Nouv. Amer. 122, t. 74 (1844). Figs. 4e; 5

Subshrub 1.2–2 m tall; velutinous and greyish-green branch with simple and stellate trichomes. Stipules 0.4–0.5 cm long, persistent, filiform, greenish. Petiole 0.8–2.3 cm long, velutinous. Leaf blades with 5–6 lobes, palmatipartite, central lobe ca. 3.7 cm × 1.6 cm, lateral lobes ca. 2.3 cm × 1.5 cm, cordate base, acute apex, crenate margin, abaxial and adaxial surface pubescent with simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with 6–10 filiform bracteoles 0.3–0.7 × 0.1 cm, smaller than the calyx in length, greenish. Calyx cupuliform, 0.5–1.3 × 0.2–0.6 cm, deltoid sepals connate in the base, greenish. Corolla, ovate petals ca. 1.8 × 1.2 cm ovate, entire margin, yellow with vinaceous basal spot. Staminal tube ca. 1.6 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.5 × 0.2 cm, mericarps, obovoid, 3–rostrate, light brown, mucilage absent. Seeds ca. 0.4 × 0.1 cm, obovoid, dark brown, mucilage absent.

Selected material: Aracati, 17.VI.1976, fl., *A. Fernandes* (EAC 2799); Icapuí, 14.V.1983, fl. and fr., *A. Fernandes & Matos* (EAC 12008).

Additional material: BRAZIL. BAHIA: Juazeiro, Baixo Médio São Francisco, 13.VI.2009, fr., *M.L. Guedes* (ALCB 92385). BRASIL. PERNAMBUCO: Petrolina, Beira da estrada, 09°39'17"S, 40°49'59"W, 4.IV.1983, fl., *G. Fotius 3394* (MAC).

The relevant characteristics are the velutinous branches, leaf blades with 5–6 lobes, crenate margins, and the epicalyx smaller than the calyx in length.

This is an endemic species from Northeast Region of Brazil (Bahia, Ceará, Pernambuco and Piauí) in the phytogeographic domain of Caatinga

(BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in Aracati and Icapuí municipalities in areas of the Vegetation Complex of the Coastal Zone with occurrence in the Vegetation Complex of the Coastal Zone. It is important to emphasize that this species is represented by only five collections.

This species was collected with flowers in May, June and September.

16. ***Pavonia vinosa*** G.L.Esteves, Bol. Inst. Bot. (São Paulo) 11: 176, fig. 3J-L (1998). Fig. 5

Subshrub to shrub 1–2.5 m tall; pubescent and vinaceous branch with simple and glandular trichomes. Stipules ca. 0.2 cm long, persistent, filiform, vinaceous. Petiole 2.2–3 cm long, pubescent. Leaf blades entire, ovate 0.9–4.6 × 0.5–3.0 cm, cordate base, acute apex, serrate margin, membranaceous; abaxial and adaxial surface simple with stellate and glandular trichomes; extrafloral nectary absent. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with seven lanceolate bracteoles ca. 0.8 × 0.2 cm, greater than calyx in length, vinaceous. Calyx cupuliform ca. 0.7 × 0.3 cm, sepals lanceolate, vinaceous. Corolla, ovate petals ca. 1.6 × 0.6 cm, ovate, entire margin, pinkish to white without vinaceous basal spot. Staminal tube 1.2 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.3 × 0.3 cm, mericarps, obovoid, mucronate in the apex, winged, dark brown, mucilage absent. Seeds ca. 0.2 × 0.1 cm, obovoid, vinaceous, mucilage absent.

Selected material: Crato, Mata dos Cavalos, 3.IV.1942, fl., *P. Bezerra 446* (EAC); Chapada do Araripe, 27.II.1980, fl., *P. Martins* (EAC 8070). Crato, Chapada do Araripe, 07°16'00"S, 39°39'00"W, 15.II.1985, *H. Alwyn, E. Gentry, M. Zardini & A.F. Gentry 50162* (MO).

The outstanding characteristics are the branches, leaf blades, petiole, and epicalyx vinaceous with glandular trichomes.

This is an endemic species from Northeast Brazil. In Brazilian territory occurs in the states of Ceará and Maranhão (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in the municipality of Crato in areas of Dense Ombrophylous Forest. This species is recorded in the Chapada do Araripe. *Pavonia vinosa* is represented by only three collections.

This species was collected with flowers in February and April. The popular name is malva roxa.

17. ***Peltaea lasiantha*** Krapov. & Cristobal, Kurtziana ii. 188 (1965). Figs. 4g-h; 5

Subshrub to shrub; pubescent and greenish branch with simple and stellate trichomes. Stipules 0.4–0.5 cm long, persistent, filiform, greenish. Petiole 1–1.6 cm long, pubescent. Leaf blades entire, ovate 3.4–5.5 × 2.5–4.2 cm, cordate base, acute to obtuse apex, serrate margin, abaxial and adaxial surface pubescent with simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts ovate-lanceolate. Flowers axillary, solitary, erect. Epicalyx with 10 peltate bracteoles (differentiated in stem and blade), stem ca. 0.2 cm long, blade ca. 0.3 cm long, smaller than calyx in length, greenish. Calyx cupuliform ca. 0.8 × 0.6 cm, sepals connate in the base, greenish. Corolla, ovate petals ca. 2.3 × 1.2 cm, entire margin, pinkish with vinaceous basal spot. Staminal tube ca. 1 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.3 × 0.2 cm, mericarps, obovoid, light brown, mucilage absent. Seeds ca. 0.2 × 0.1 cm, reniform, dark brown, mucilage absent.

Examined material: Araripe, fl., *F. Allemão & M. Cysneiros 104* (R 85874).

Additional material: BRAZIL. GOIÁS: Goiânia, Rodovia Goiânia, 10.II.1988, fl. and fr., *J.R. Pirani 2091* (NY).

Peltaea lasiantha share with *P. trinervis* the peltate bracteoles. However, are differentiated by the morphology of the petals. In the first species the petals are pink with a vinaceous basal spot and yellow without a basal spot in the second.

This is a native species from Brazil and Paraguay (Kew 2020). In Brazil occurs in the Regions of Midwest (Mato Grosso do Sul, Mato Grosso) and Southeast (Minas Gerais, São Paulo) (Flora e Funga do Brasil 2020, continuously updated). In the phytogeographic domain of Cerrado and Mata Atlântica (Flora e Funga do Brasil 2020, continuously updated). *Peltaea lasiantha* is a new record for the Northeast of Brazil and the state of Ceará. This species is registered in the municipality of Araripe in areas of Savanna.

This species was collected with flowers in February.

18. ***Peltaea trinervis*** (C.Presl) Krapov. & Cristóbal, Kurtziana 2: 168 (1965). Figs. 4i; 5

Herb, subshrub to shrub 0.5–1 m tall; tomentose and greenish branch with simple and stellate trichomes. Stipules 0.3–0.5 cm long, persistent, filiform, greenish. Petiole 0.3–2.6 cm long, tomentose. Leaf blades entire, ovate,

0.9–4.4 × 0.8–4 cm, base cordate, apex acute, margin serrate, membranaceous; abaxial and adaxial surface tomentose with simple and stellate trichomes; extrafloral nectary absent. Foliaceous bracts ovate-lanceolate. Flowers axillary, solitary or pauciflorous, erect. Epicalyx with nine peltate bracteoles (differentiated in stem and blade), stem 0.1–0.2 cm long, blade 0.2–0.3 cm long, smaller than the calyx in length, greenish. Calyx cupuliform ca. 0.6 × 0.2 cm, sepals connate in the base, lanceolate, greenish. Corolla, ovate petals 1.6–1.4 × 0.6–1.2 cm, entire margin, yellow without vinaceous basal spot. Staminal tube ca. 1 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.2 × 0.2 cm, mericarps, obovoid, light brown, mucilage absent. Seeds ca. 0.2 × 0.1 cm, reniform, dark brown, mucilage absent.

Selected material: Caucaia, Lagoa do Barro, 5.XI.2006, fr., *A.S.F. Castro 1860* (EAC). Fortaleza, 03°47'55"S, 38°29'10"W, 17.IV.2008, fl., *M.F. Moro 531* (EAC); Campus do Pici, 10.IV.2001, *A.V. Vieira* (EAC30613). São Benedito, 6.I.1942, *P. Bezerra 381* (EAC). Ubajara, 2.VII.1978, fl., *A. Fernandes & A. Matos* (EAC 4194).

The differential characteristics are the nine peltate bracteoles and yellow petals without vinaceous basal spot.

This is a native species from Mexico to South America (GBIF 2020). In Brazil occurs in the Regions of North and Northeast (Bahia, Ceará and Pernambuco). In the phytogeographic domains of Amazonia, Caatinga, Cerrado and Mata Atlântica (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is registered in four municipalities in areas of the Vegetation Complex of the Coastal Zone and Dense Ombrophylous Forest.

This species was collected with flowers in April, May, July, October, November and with fruits in April, May, October, and November.

19. *Taliparitiliaceum* (L.) Fryxell, Contr. Univ. Michigan Herb. 23: 258 (2001). Figs. 4j-l; 5

Tree 6 m tall; glabrous and grayish branch. Stipules 1.5–2.7 × 0.5–0.9 cm, caducous, ovate-lanceolate, greenish. Petiole 1,5–8 cm long, velutinous. Leaf blades entire, ovate, 4.5–14 × 4.8–13.5 cm, cordate base, acute to obtuse apex, entire margin, cartaceous, abaxial and adaxial surface velutinous with simple trichomes; extrafloral nectary located at the base of the vein of the abaxial surface of the leaf blade. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with nine lanceolate bracteoles ca. 0.6 × 0.5 cm, connate in the base, smaller than calyx in length, greenish. Calyx tubular ca. 2 × 1.5 cm with five acute lobes, greenish. Corolla, ovate petals ca. 7.5 × 5 cm, entire margin, yellow with vinaceous basal spot. Staminal tube ca. 4.5 cm long, cylindrical; style divided into five stigmas. Fruit ca. 1.8 × 2.5 cm, capsule, obovoid, greenish, mucilage absent. Seeds ca. 0.3 × 0.3 cm long, reniform, dark brown, mucilage absent.

Selected material: Cascavel, 04º08'24"S, 38º20'24"W, 20.XI.2013, *I. Lucena 42* (EAC). Crato, estrada para o Barreiro Grande, 07°16'01"S, 39°27'20"W, fl. and fr., *A.B. Tavares, F.G.L.S. Souza 8* (HCDAL). Fortaleza, Campus do Pici, 03°43'02"S, 38°32'35"W, 16.IX.1990, *R. Tavares* (EAC 16705). Jaguaruana, 04°51'36"S, 37°47'59"W, 22.XI.2013, fr., *A.E.S. Ferreira 77* (EAC). Paraipaba, estrada para a Lagoa das Almécegas, 03°20'38"S, 39°10'45"W, 9.I.2019, fr., *M.C. Camelo et al. 64* (ALCB). Salitre, Praça Mãe Rainha, 22.VI.2017, fr., *C.L.S. Alencar* (HCDAL 13219).

The distinctive characteristics is the habit (tree), cordate and cartaceous leaf blades and the calyx with five acute lobes.

This species is registered in tropical and subtropical Regions (GBIF 2020). In Brazil occurs in all Regions in the phytogeographic domains of Amazônia e Mata Atlântica (GBIF 2020; Flora e Funga do Brasil 2020, continuously updated). In Ceará is recorded in six municipalities in areas of Dense Ombrophylous Forest and Vegetation Complex of the Coastal Zone.

This species was collected with flowers and fruits in January, March, April, September, and November. The popular name is algodão-da-praia.

20. *Urena lobata* L., Sp. Pl. 2: 692 (1753). Figs. 4m; 5

Herb to shrub 1.5 m tall; velutinous and greenish branch with simple and stellate trichomes. Stipules ca. 0.3 cm long, persistent, filiform, greenish. Petiole 0.6–3.8 cm long, velutinous. Leaf blades with 3–7 lobes, pinnatifid, central lobe 1.4–8 × 0.6–2.5 cm, lateral lobes 1–6.5 × 0.2–3 cm, ovate base, acute to obtuse, margin serrate apex, membranaceous; abaxial and adaxial surface velutinous with simple and stellate trichomes; extrafloral nectary located at the base of the vein of the abaxial surface of the leaf blade. Foliaceous bracts absent. Flowers axillary, solitary, erect. Epicalyx with five lanceolate bracteoles 0.6–0.8 × 0.1–0.2 cm, connate at the base, greater than calyx in length, greenish. Calyx cupuliform 0.4–0.5 × 0.1 cm, sepals connate in the base, greenish. Corolla, ovate petals 1–1.5 × 0.4–0.6 cm, entire margin,

pinkish with vinaceous basal spot. Staminal tube ca. 0.9 cm long, cylindrical; style divided into 10 stigmas. Fruit ca. 0.6 × 0.3 cm, mericarps, obovoid, glochidiate, dark brown, mucilage absent. Seeds ca. 0.3 × 0.2 cm, obovoid, dark brown, mucilage absent. **Selected material**: Barbalha, Arajara, 23.V.1996, *M.A.P. Silva* (EAC 24092). Carnaubal, Parque das Águas, 19.VI.1992, fr., *M.A. Figueiredo* (EAC 19752). Crato, Garibés, 19.XI.1996, fr., *F.A.S. Clemente* (EAC 25099). Fortaleza, Lagoa da Maraponga, 03º47'28"S, 38º34'15"W, 11.VII.2018, fl. and fr., *V.S. Sampaio & G.F. Mendes 543* (EAC). Guaraciaba do Norte, 04º07'55"S, 40º50'46"W, 2.V.2013, fr., *F.C.L. Pinto & E.R. Silveira 46* (EAC). Maracanaú, 1.I.1935, *B.E. Dahlgren* (P0660721 1). Maranguape, trilha da Pirapora, 03º53'18"S, 38º42'49"W, 27.IX.2014, fl. and fr., *M.I.B. Loiola et al. 2445* (EAC). Pacoti, Sítio Pirajá, 20.XII.1940, fr., *B. Landim* (EAC 195). São Gonçalo do Amarante, Pecém, 28.VII.2010, *A.S.F. Castro & M.F. Moro 2332* (EAC). Ubajara, Parque Nacional de Ubajara, 22.I.1999, fl. and fr., *A. Fernandes et al.* (EAC 27821).

Is distinguished for the leaf blades with 3–7 lobes, extraforal nectary at the central vein in the leaf blades (abaxial surface) and glochidiate mericarps.

This is a native species from tropical and subtropical Regions (GBIF 2020). In Brazil occurs in all Regions in the phytogeographic domains of the Amazônia, Caatinga, Cerrado, Mata Atlântica, Pampa and Pantanal (Flora e Funga do Brasil 2020, continuously updated). In Northeast is registered in the states of Alagoas, Bahia, Ceará, Maranhão, Paraíba and Sergipe (BFG 2018; Flora e Funga do Brasil 2020, continuously updated). In Ceará is recorded in 10 municipalities in areas of the Vegetation Complex of the Coastal Zone, Dense Ombrophylous Forest and Vegetation under Fluvial and/or Lacustrine Vegetation.

This species was collected with flowers and fruits in January, April, May, June, August, September, and December.

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Data availability statement

In accordance with Open Science communication practices, the authors inform that all data are available within the manuscript.

References

Al-Snafi AE (2018) Chemical constituents, pharmacological effects and therapeutic importance of *Hibiscus rosa-sinensis* - a review. Journal of Pharmacy 8: 101-119.

Alves M, Oliveira RB, Teixeira SR, Guedes MLS & Roque N (2015) Levantamento florístico de um remanescente de Mata Atlântica no litoral norte do estado da Bahia, Brasil. Hoehnea 42: 581-595.

APG IV - Angiosperm Phylogeny Group (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society 181: 1-20. DOI: 10.1111/boj.12385

Areces-Berazain F & Ackerman JD (2017) Diversification and fruit evolution in eumalvoids (Malvaceae). Botanical Journal of the Linnean Society 184: 401-417.

Baum DA, Smith SW, Yen A, Alverson WS, Nyffeler R, Whitlock, BA & Oldham RL (2004) Phylogenetic relationships of Malvatheca (Bombacoideae and Malvoideae; Malvaceae *sensu lato*) as inferred from plastid DNA sequences. American Journal of Botany 91: 1863-1871.

Bayer C, Fay MF, Bruijn AY, Savolainen V, Morton CM, Kubitzki K, Alverson WS & Chase MW (1999) Support for an expanded family concept of Malvaceae within a recircumscribed order Malvales: a combined analysis of plastid atp B and rbc L DNA sequences. Botanical Journal of the Linnean Society 129: 267-303.

Bayer C & Kubitzki K (2003) Malvaceae. *In*: Kubitzki K & Bayer C (eds.) The families and genera of vascular plants. Flowering plants, dicotyledons: expanded Caryophyllales, Capparales and Malvales. Vol. 5. Springer, Berlin. Pp. 225-311.

Bovini MG, Carvalho-Okano RMD & Vieira MF (2001) Malvaceae A. Juss. no Parque Estadual do Rio Doce, Minas Gerais, Brasil. Rodriguésia 52: 17-47.

Cavanilles AJ (1787) Monadelphiae Classis Dissertationes Decem. Vol. 3. Ex Tipografia Regia, Matriti. 340p.

Coelho CA & Amorim BS (2019) Expandindo a distribuição geográfica de *Hibiscus sabdariffa* L. (Malvaceae): uma espécie naturalizada e negligenciada para a flora brasileira. Hoehnea 46: 1-7.

Costa IR & Araújo FS (2007) Organização comunitária de um encrave de cerrado *sensu stricto* no bioma Caatinga, Chapada do Araripe, Barbalha, Ceará. Acta Botanica Brasilica 21: 281-291.

Costa GM, Pereira JS, Martins MLL & Aona LYS (2018) Florística em fitofisionomias de restinga na Bahia, Nordeste do Brasil. Journal of Neotropical Biology 15: 78-95.

CRIA - Centro de Referência em Informação Ambiental (2020) Geoloc. Available at <http://splink.cria.org.br/>. Access on 25 October 2020.

De Candolle AP (1824) Prodromus Systematis Naturalis Regni Vegetabilis. Vol. 1. Sumptibus Sociorum Treuttel et Würtz, Parisii. 745p.

Elkhalifa AEO, Alshammari E, Adnan M, Alcantara JC, Awadelkareem AM, Eltoum NE, Mehmood K, Panda BP & Ashraf SA (2021) Okra (*Abelmoschus esculentus*) as a potential dietary medicine with nutraceutical importance for sustainable health applications. Molecules 26: 1-21.

Esteves GL (1998) O gênero *Pavonia* Cav. (Malvaceae) na Região Nordeste do Brasil. Boletim do Instituto de Botânica 11: 161-235.

Esteves GL (2001). O gênero *Pavonia* Cav.(Malvaceae) na Região Sudeste do Brasil. Boletim do Instituto de Botânica, 15: 125-194.

Esteves GL, Duarte MC & Takeuchi C (2014) Sinopse de *Hibiscus* L. (Malvoideae, Malvaceae) do estado de São Paulo, Brasil: espécies nativas e cultivadas ornamentais. Hoehnea 41: 529-539.

Figueiredo MA (1997) A cobertura vegetacional do Ceará: unidades fitoecológicas. *In*: Ceará. Atlas do Ceará. IPLANCE, Fortaleza. Pp. 28-29.

Flora e Funga do Brasil 2020 (continuously updated) Hebário Virtual. Available at <http://reflora.jbrj.gov.br/reflora/herbarioVirtual/ConsultaPublicoHVUC/ConsultaPublicoHVUC.do>. Access on 12 May 2020.

Fryxell PA (1997) The American genera of Malvaceae-II. Brittonia 49: 204-269.

Fryxell PA (2001) Contributions from the University of Michigan Herbarium. Vol. 23. Ann Arbor, Michigan. 417p.

Garcke CAF (1881) Jahrbuch des Königlichen Botanischen Gartens und des Botanischen Museums zu Berlin. Vol. 1. Borntraeger, Berlin. 351p.

GBIF - The Global Biodiversity Information Facility (2020) Available at <https://www.gbif.org/what-is-gbif>. Access on 10 August 2020.

Gómez JJM, Pozo DG & Cervantes E (2019) Seed shape quantification in the Malvaceae reveals cardioid-shaped seeds predominantly in herbs. Botanica 25: 21-31.

Gonçalez VM, Pfeil BE, Antonelli A & Duarte MC (2017) Two new species of *Pavonia* (Malvoideae, Malvaceae) from Southern Bahia, Brazil. Phytotaxa 305: 97-103.

Gonçalves EG & Lorenzi H (2011) Morfologia vegetal organografia e dicionário ilustrado de morfologia das plantas vasculares. Ed. Instituto Plantarum, Nova Odessa. 544p.

Grings M, Krapovickas A & Boldrini II (2011) A new species of *Pavonia* (Malvaceae) from Southern Brazil. Systematic Botany 36: 419-423.

Gürke RLAM (1892) Malvaceae. *In*: Martius CFP (ed.) *Flora brasiliensis*. R. Oldenbourg, Monachii et Lipsiae. Vol. 3. 624p.

Harris JG & Harris MV (2001) Plant identification terminology: an illustrated glossary. 2ª ed. Spring Lake Publishing, Utah. 216p.

Hooker JD (1880) Botanical Magazine. Vol. 106. London, Academic Press. 882p.

IBGE (2012) Manual técnico da vegetação brasileira. 2ª ed. Available at <ftp://geoftp.ibge.gov.br/documentos/recursos_naturais/manuais_tecnicos/manual_tecnico_vegetacao_brasileira.pdf>. Access on 18 September 2019.

Jacquin NJ von (1788) Collectanea ad botanicam chemiam, et historiam naturalem, spectantia, cum figuris. Vol. 2. Ex Officina Wappleriana, Vindobonae. 392p.

Krapovickas A & Cristóbal CL (1965) Revisión del género *Peltaea* (Malvaceae). Kurtziana 2: 135-216.

Krapovickas A (1983) Notas sobre malváceas, IV. Bonplandia 5: 257-273.

Krapovickas A & Cristóbal CL (1996) *Peltaea obsita* (Mart. *ex* Colla) Krapov. & Cristóbal nov. comb. (Malvaceae). Bonplandia 9: 148.

Krapovickas A (2006) Dos especies nuevas de *Hibiscus* secc. *Furcaria* (Malvaceae) de Minas Gerais (Brasil). Bonplandia 15: 47-51.

Krapovickas A (2013) *Hibiscus paulae* (secc. furcaria), especiesnueva de malvaceae de Minas Gerais (Brasil). Bonplandia 22: 137-139.

Kumar P, Singh KV, Singh B, Kumar S & Singh O (2012) Correlation and path analysis studies in okra [*Abelmoschus esculentus* (L.) Moench]. Progressive Agriculture 12: 354-359.

Kunth KS (1821) Nova genera et species plantarum. Vol. 5. Lutetiae, Parisiorum. Pp. 283-284.

Kunth KS (1822) Nova genera et species plantarum. Vol. 5. Ex officina Christophori Plantini, Antverpiae, 338p.

Lima JB & Conceição ADS (2016) Malvoideae Burnett (Malvaceae) in the environmental protection area Serra Branca, Raso da Catarina, Jeremoabo, Bahia, Brazil. Biota Neotropica 16: 1-14.

Linnaeus C (1753) Species Plantarum. Vol. 1. Salvius, Stockholm. Pp. 1-560.

Linnaeus C (1753) Species Plantarum. Vol. 2. Holmiae, Impensis Laurentii Salvii, 1200p.

Linnaeus C (1767) Systema Naturae. Vol. 2. Holmiae, Impensis direct, Laurentii Salvii. 736p.

Loiola MIB, Araújo FS, Lima-Verde LW, Souza SSG, Matias LQ, Menezes MOT, Soares Neto RL, Silva MAP, Souza MMA, Mendonça AM, Macêdo MS, Oliveira SF, Sousa RS, Balcázar AL, Crepaldi CG, Campos LZO, Nascimento LGS, Cavalcanti MCBT, Oliveira RD, Silva TC & Albuquerque UP (2015) Flora da Chapada do Araripe. *In*: Albuquerque UP & Meiado MV (eds.) Sociobiodiversidade na Chapada do Araripe. Vol. 1. NUPEEA, Recife. Pp. 103-148.

Loiola MIB, Ribeiro RTM, Sampaio VS & Souza EB (2020) Diversidade de angiospermas do Ceará. Edições HUVA, Sobral. 257p. Available at <https://www.researchgate.net/publication/346787616_Diversidade_de_Angiospermas_do_Ceara>. Access on 7 December 2021.

Martius CFP von (1839) Flora oder Botanische Zeitung. Vol. 22. Die Gesellschaft, Regensburg. Pp. 61-62.

Moench C (1794) Methodus Plantas Horti Botanici et Agri Marburgensis, a staminum situ describendi. Vol 2. Marburgi Cattorum, in officina nova libraria academiae. 780p.

Mohite AV & Gurav RV (2019) Nutraceutical and antioxidant evaluation of *Abelmoschus* taxa. International Journal of Vegetable Science 25: 610-618.

Moricand ME (1844) Plantes nouvelles d'Amérique. Vol. 1. Imprimerie de Jules-Gme Fich, Genève. 176p.

Pfeil BE & Crisp MD (2005) What to do with *Hibiscus*? A proposed nomenclatural resolution for a large and well known genus of Malvaceae and comments on paraphyly. Australian Systematic Botany 18: 49-60.

Rebouças NC, Carneiro JAA, Ribeiro RTM, Queiroz RT & Loiola MIB (2019) *Zornia* (Leguminosae) no estado do Ceará, nordeste do Brasil. Rodriguésia 70: 1-15.

Reichenbach HGL (1832) Flora Germanica Excursoria. Vol. 2. Lipsiae, Carolum Cnobloch, 478p.

Rigueiral LHG, Gonçalez VM & Duarte MC (2019) Espécies nativas de *Hibiscus* (Malvoideae, Malvaceae) da Região Sudeste do Brasil. Rodriguésia 70: 1-19.

Saint-Hilaire AFCP (1825) Flora Brasiliae Meridionalis. Vol. 1. *Apud* A. Belin, Parisiis. 223p.

Saint-Hilaire AFCP & Naudin CV (1842) Annales des sciences naturelles. Vol. 18. Fortin, Paris. 44p.

Silveira AP, Menezes BS, Loiola MIB, Lima-Verde LW, Zanina DN, Carvalho ECD, Souza BC, Costa RC, Mantovani W, Menezes MOT, Flores LMA, Nogueira FCB, Matias LQ, Barbosa LS, Gomes FM, Cordeiro LS, Sampaio VS, Batista MEP, Soares Neto RL, Silva MAP, Campos NB, Oliveira AA & Araújo FS (2020a) Flora and annual distribution of flowers and fruits in the Ubajara National Park, Ceará, Brazil. Floresta e Ambiente 27: 1-19.

Silveira AP, Loiola MIB, Gomes VS, Lima-Verde LW, Oliveira TS, Silva EF, Otutumi AT, Ribeiro K, Xavier FAS, Bruno MMA, Souza, SSG & Araújo FS (2020b) Flora of Baturité, Ceará: a west island in the Brazilian semiarid. Flora e Ambiente 27: 1-22.

Spjut RW (1994) A systematic treatment of fruit types. Vol. 70. The New York Botanical Garden Press, New York. 182p.

Tate JA, Aguilar JF, Wagstaff SJ, Duke JC, Slotta TAB & Simpson BB (2005) Phylogenetic relationships within the tribe Malveae (Malvaceae, subfamily Malvoideae) as inferred from ITS sequence data. American Journal of Botany 92: 584-602.

Tavares AB, Bezerra JWA, Souza FGLS, Silva MAP & LinharesKV (2021) Síndromes de dispersão de espécies vegetais do cerrado *sensu lato* da Chapada do Araripe, nordeste, Brasil. Pesquisas, Botânica 75: 155-195.

Thiers B (continuously updated) Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available at <http://sweetgum.nybg.org/science/ih/>. Access on 20 April 2021.

Valente EB & Porto KC (2006) Hepáticas (Marchantiophyta) de um fragmento de mata atlântica na Serra da Jibóia, município de Santa Teresinha, BA, Brasil. Acta Botanica Brasilica 20: 433-441.

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