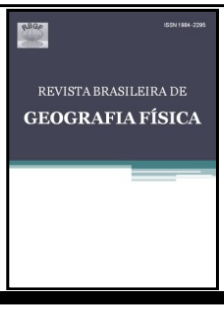
ISSN:1984-2295

Revista Brasileira de Geografia Física

Homepage: www.ufpe.br/rbgfe



Flora of the Spix and Martius expedition in Piauí: a 200 year later parallel

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Artigo recebido em 01/03/2023 e aceito em 01/10/2023

A B S T R A C T

The floristic composition of a place can be changed by human actions, such as agricultural activities, farming, and construction and by natural factors, such as soil type, phenology, and fires. This study recorded the current flora of the region traveled by J. B. von Spix and C. F. P. von Martius in Piauí state, Brazil, comparing the data with species from the same region described in the Flora Brasiliensis. Data were collected in May 2019. A total of 157 species belonging to 113 genera and 36 families were catalogued. The presence of endemic species from the Caatinga and Cerrado biomes and the first occurrence of *Chorchorus hirtus* L. in the state were recorded. In the Flora Brasiliensis, 166 species, 107 genera, and 38 families were listed for Piauí. When comparing the species recorded in Flora Brasiliensis with the survey carried out in this study, 200 years later, at a family level, Fabaceae, Poaceae, and Malvaceae had the largest number of species, but the listed species did not show high correlation. It is believed that mainly environmental changes, such as reduction of areas with aquatic vegetation, growth of cities, and anthropogenic actions, such as deforestation in the area covered by the European researchers are reasons for the discrepancy in the listed flora.

Keywords: Biodiversity, Caatinga, Cerrado, Endemism, Floristics, Naturalists.

Flora da expedição Spix e Martius no Piauí: um paralelo 200 anos depois

R E S U M O

A composição florística de um local pode ser alterada devido a ações humanas como atividades agrícolas, conversão de habitats e construções. Também, por fatores naturais como fenologia, queimadas, entre outros. Este estudo registrou a flora atual da região percorrida por Johann Baptist von Spix and Carl Friedrich P. von Martius no Piauí, comparando os dados obtidos com as espécies descritas para a mesma região na Flora Brasiliensis. A coleta de dados aconteceu em maio de 2019, mesmo período da viagem dos naturalistas. Foram catalogadas 157 espécies pertencentes a 113 gêneros e 36 famílias. Foi registrada a presença de espécies endêmicas da Caatinga e do Cerrado e a primeira ocorrência de *Corchorus hirtus* para o Piauí. Na Flora Brasiliensis, 166 espécies, 107 gêneros e 38 famílias foram listadas para o estado. Ao comparar as espécies registradas na Flora Brasiliensis com o levantamento realizado neste estudo, 200 anos depois, em nível de família, Fabaceae, Poaceae e Malvaceae apresentaram o maior número de espécies. No entanto, as espécies listadas não apresentam semelhança. Acredita-se que principalmente mudanças ambientais como a redução de áreas com vegetação aquática, o crescimento das cidades e as ações antrópicas tais como o desmatamento e similares na área de abrangência dos pesquisadores europeus sejam a razão da discrepância na flora listada.

Palavras-chave: Biodiversidade, Caatinga, Cerrado, Endemismo, Florística, Naturalistas.

Introduction

The vegetation of Piauí is characterized by mosaics; distribution of species has been driven by climate and geological conditions and influence of other domains, such as: Amazonia, the Northeast, and the Brazilian highlands (Farias & Castro 2004). Three main types of vegetation formations are distinguishable: the Caatinga, with approximately 49.6 % (12,478,363 ha); the Cerrado, with approximately 47 %, 33 % of which corresponding to the core domain area (8,349,759 ha) and 14 % (3,507,107 ha) to transition areas; and the

remaining area, with less than 3 % (738,156 ha) corresponds to transitional forests with high biodiversity and significant heterogeneity, where species from different floristic domains (Amazon, Cerrado, Caatinga, and Atlantic Forest) are found (Castro 2020, Santos 2021).

Flora diversity is an important component of ecosystems (Hua *et al*. 2022). Studies on floristic composition are important for knowing and understanding vegetation structure and dynamics and gather qualitative and quantitative information about the studied areas, especially regarding geographic distribution of species and their abundance in different locations (Souza *et al.* 2017, Vasconcelos *et al.* 2017). The floristic composition of a place can be changed by human activities, including livestock, agriculture, and construction, and by natural factors, such as fires and the vegetation phenology over dry and rainy seasons (Silva *et al.* 2010). Fire disturbance, for example, alters soil-vegetation associations, regulating the structural nature of these communities (Lira-Martins *et al.* 2022).

The year of 2019 marked the bicentenary of a visit to the state of Piauí, Brazil, by the scientific expedition of the naturalists Johann Baptist *von* Spix (zoologist) and Carl Friedrich Philipp *von* Martius (botanist). These researchers traveled about 500 km through the territory of Piauí, from southeast to northwest, during April and May 1819 (Spix & Martius 1981). Martius collected many species that were later recorded in the Flora Brasiliensis, which is the most important basis for studies of the Brazilian flora. The species recorded in the work are a testament to the biological richness of Brazil and the state of Piauí.

Despite the floristic abundance evidenced in the different botanical excursions undertaken since the 19th century by foreign botanists such as Martius (Spix & Martius 1981) and George Gardner (Gardner 1975) and, more recently, in many studies carried out within the scope of postgraduate and undergraduate programs at Brazilian universities, no floristic study of similar scope, covering so many areas of Piauí, has been carried out. Consequently, there are still many gaps in the information about the native flora of the state. Thus, due to the importance and floristic richness of the major vegetational domains of Piauí (Caatinga and Cerrado-Caatinga transitional vegetation).

In this context, the study has as its central question: Does the current record of species maintain similarity with what was collected for the region according to Flora Brasiliensis records? The hypothesis defended is that natural factors, environmental alterations provoked by the growing development, environmental degradation and intensified deforestation in Brazil from the 20th century onwards, led to a change in the current flora of the region covered by Spix and Martius. Thus, the present study aimed to record the current flora of the area in Piauí through which Spix and Martius traveled, and compare the new data with the species of the same region described in the Flora Brasiliensis.

Material and Methods

Study area

The study area was in the Semiarid macro-region, which presents Caatinga vegetation (predominant) and Cerrado-Caatinga transitional vegetation. The municipalities in which the study was carry out were selected considering the current political-geographical division of Piauí, following the route described by Spix & Martius (1981) (Fig. 1), and confirmed by Lima (2005) and Silva (2017). The area currently corresponds to the municipalities of Conceição do Canindé, Simplício Mendes, Campinas do Piauí, Santo Inácio do Piauí, Colônia do Piauí, Oeiras, Santa Rosa do Piauí, Cajazeiras do Piauí, Arraial, Francisco Ayres, and Regeneração, all located in the Canindé River basin (Fig. 2).

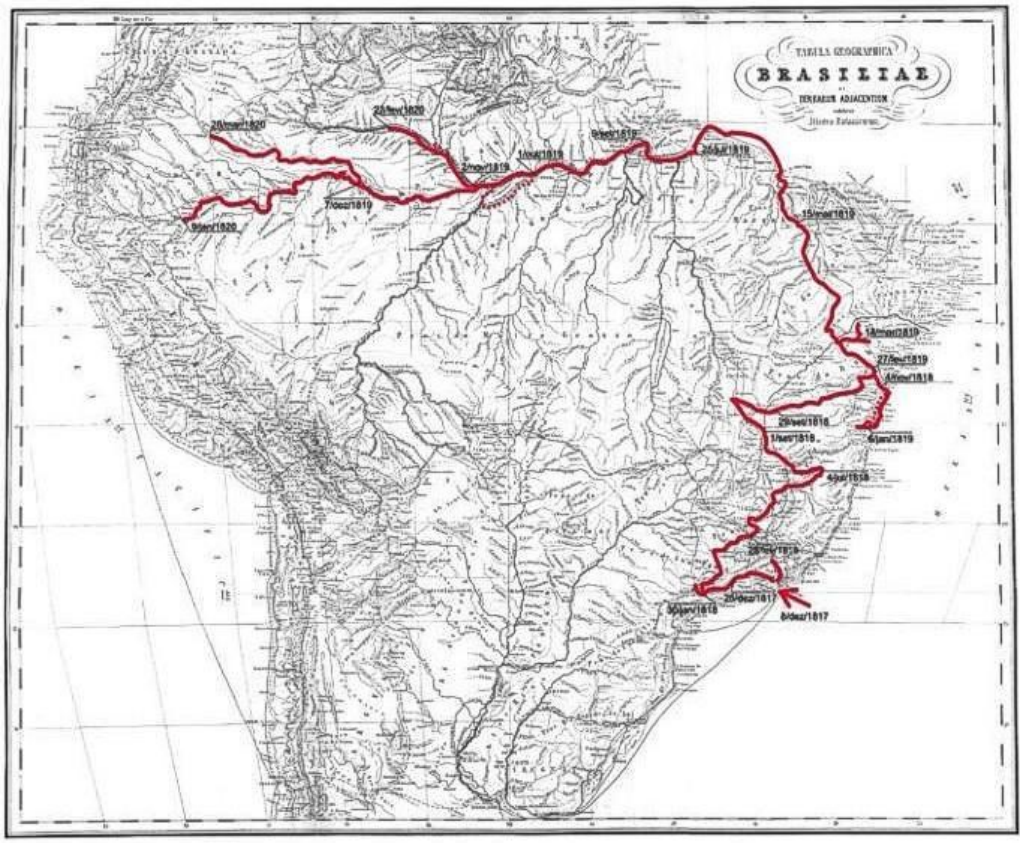

Figure 1. Representative image of the original route of the Spix and Martius expedition in Brazil from 1817 to 1820 and in Piauí in 1819. Source: Brasilianische Reise 1817 – 1820: Carl Philipp von Martius. Geburtstag photograph by Jorg Helbig (1994).

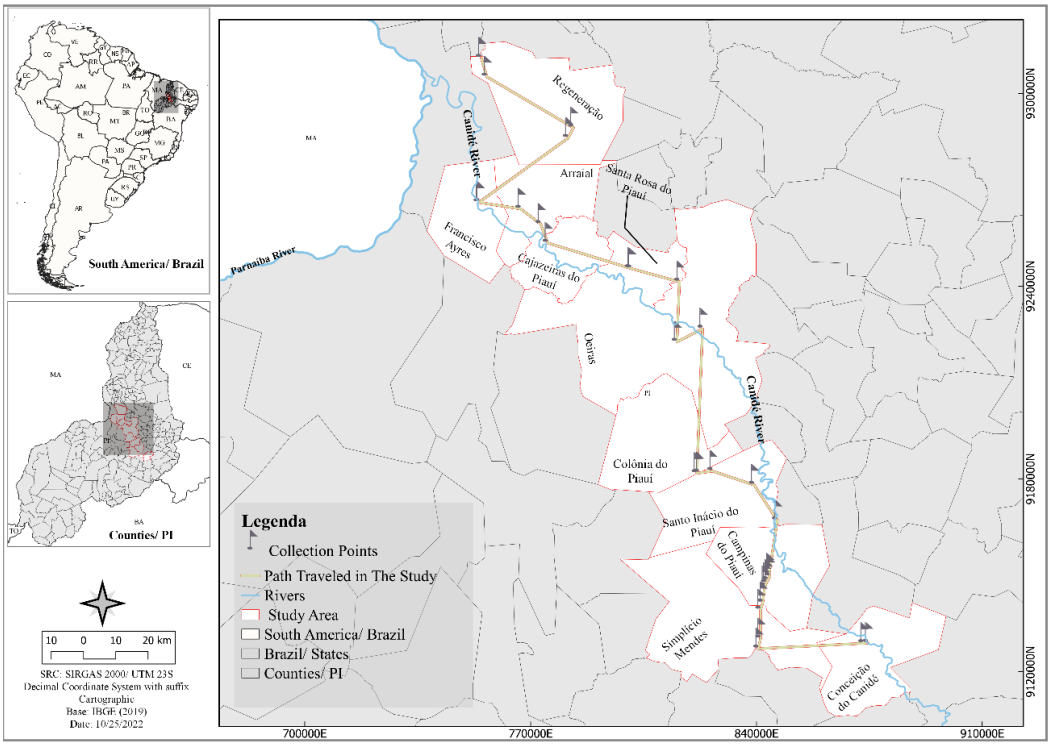

Figure 2**.** Representative map of the botanical collection points in the bicentenary excursion following the route of the Spix and Martius expedition through the state of Piauí, Brazil.

Collection of botanical material

The revisiting of the Spix and Martius expedition route was carried out by a field excursion in May 2019, the same period as the 1819 expedition. The collections of botanical

material were carried out at random stops on the route through Caatinga and Cerrado-Caatinga transitional vegetation, including streams and river banks, mainly on the banks of the Canindé River, as it was the place focused by the Martius collection, according to reports of the work.

The botanical material from the current expedition was processed using usual botanical techniques (Mori *et al.* 1989) and identified using identification keys, original descriptions, specialized bibliography, comparison with the TEPB collection (acronyms according to Thiers, continuously updated), and digital collections available in the databases Reflora – Virtual Herbarium (Flora do Brasil 2020), Species Link (CRIA 2021), POWO (2021 and Tropicos.org (2021); duplicates of samples from taxa that present greater difficulty in identification were sent to specialists. Dried specimens were incorporated into the HDELTA collection (acronyms according to Thiers, continuously updated).

The listing of taxa was based on the Angiosperm Phylogeny Group (APG IV 2016), and the spelling of taxon names and life forms of the species followed the Flora e Funga do Brasil (2021) website. All collections of the collected specimens were georeferenced.

Floristic Survey of the Flora Brasiliensis

A survey of the plants from Piauí collected by Martius in 1819 and recorded in the Flora Brasiliensis was carried out, using the resources of the websites CRIA (2021) and BHL (2020), where the work is available online. The 15 volumes of the work were analyzed page by page and relevant families and botanical species were arranged in electronic spreadsheets and tables. After surveying the flora, the botanical nomenclature of all species was updated, according to the online databases POWO (2021) and Flora e Funga do Brasil (2021). The list of species was organized in electronic spreadsheets and tables for counting and comparison with the flora inventoried in the present work.

Results and Discussion

The current sample of the floristic composition presented 157 species, distributed into 113 genera and 36 families. Considering the life forms of the species, herbs were the most representative (Tab. 1).

Table 1 - Composition and habit of the flora sampled in the Spix and Martius expedition route in the state of Piauí, Brazil.

Families/Species	Habit	Voucher
ACANTHACEAE		
Justicia triloba (Lindau) E.C.O.Chagas & Costa-Lima	Shrub	HDELTA 6804
Ruellia paniculata L.	Shrub	HDELTA 6802
Ruellia sp.	Herb	HDELTA 6803
AMARANTHACEAE		
Alternanthera sessilis (L.) R.Br.	Herb	HDELTA 6806
Amaranthus spinosus L	Herb	HDELTA 6805
ARALIACEAE		
Hydrocotyle bonariensis Lam	Herb	HDELTA 6807
APOCYNACEAE		
Aspidosperma pyrifolium Mart. & Zucc.	Arboreal	HDELTA 6810
Cryptostegia madagascariensis Bojer	Shrub	HDELTA 6809
Indeterminada	Shrub	HDELTA 6812
Prestonia lindleyana Woodson	Climber	HDELTA 6811
Tabernaemontana cf. *hystrix* Steud.	Arboreal	HDELTA 6808
Asteraceae		
Dissothrix imbricata (Gardner) B.L.Rob.	Herb	HDELTA 6813
Indeterminada	Herb	HDELTA 6815
Pectis oligocephala (Gardner) Sch.Bip.	Herb	HDELTA 6816
Tilesia baccata (L.) Pruski	Herb	HDELTA 6814
BIGNONEACEAE		
Adenocalymma peregrinum (Miers) L.G.Lohmann	Climber	HDELTA 6822
Adenocalymma sp.	Climber	HDELTA 6819

Amphilophium crucigerum (L.) LGLohmann	Climber	HDELTA 6818
Anemopaegma laeve DC.	Climber	HDELTA 6820
Cuspidaria sceptrum (Cham.) L. G. Lohmann	Subshrub	HDELTA 6817, 6823
Pyrostegia sp.	Climber	HDELTA 6824
Tanaecium dichotomum (Jacq.) Kaehler & L.G.Lohmann	Shrub	HDELTA 6821
BORAGINACEAE		
Cordia rufescens A. DC.	Shrub	HDELTA 6827
Cordia superba Cham.	Arboreal	HDELTA 6825
Heliotropium indicum L.	Herb	HDELTA 6826
CACTACEAE		
Tacinga inamoena (K.Schum.) N.P.Taylor & Stuppy	Subshrub	HDELTA 6828
CLEOMACEAE		
Tarenaya spinosa (Jacq.) Raf.	Herb	HDELTA 6829
COMBRETACEAE		
Combretum leprosum Mart.	Arboreal	HDELTA 6831
Terminalia argentea Mart. & Zucc.	Arboreal	HDELTA 6830
COMMELINACEAE		
Commelina erecta L.	Herb	HDELTA 6834
Commelina sp. 1	Herb	HDELTA 6832
Commelina sp. 2	Herb	HDELTA 6833
CONVOLVULACEAE		
Distimake aegyptius (L.) A.R. Simões & Staples	Climber	HDELTA 6839
Evolvulus cardiophyllus Schltdl	Herb	HDELTA 6837
Ipomoea asarifolia (Desr.) Roem. & Schult	Climber	HDELTA 6836
Ipomoea carnea Jacq.	Climber	HDELTA 6840
Ipomoea hederifolia L.	Climber	HDELTA 6835
Ipomoea triloba L.	Climber	HDELTA 6841
Jacquemontia gracillima (Choisy) Hallier f.	Climber	HDELTA 6838
CUCURBITACEAE		
Cayaponia diversifolia (Cogn.) Cogn.	Climber	HDELTA 6843
Momordica charantia L.	Climber	HDELTA 6842
CYPERACEAE		
Cyperus aggregatus (Willd.) Endl.	Herb	HDELTA 6844
Cyperus ligularis L.	Herb	HDELTA 6847
Cyperus luzulae (L.) Retz.	Herb	HDELTA 6845
Cyperus eragrostis Lam.	Herb	HDELTA 6846
Cyperus virens Michx.	Herb	HDELTA 6848
Eleocharis sp.	Herb	HDELTA 6849
EUPHORBIACEAE		
Cnidoscolus urens (L.) Arthur	Shrub	HDELTA 6854, 6858
Croton pedicellatus Kunth	Subshrub	HDELTA 6852
Dalechampia scandens L.	Climber	HDELTA 6851
Dalechampia tiliifolia Lam.	Climber	HDELTA 6850
Euphorbia hirta L.	Erva	HDELTA 6855
Jatropha curcas L.	Shrub	HDELTA 6856
Jatropha ribifolia (Pohl) Baill.	Shrub	HDELTA 6857
Ricinus communis L.	Shrub	HDELTA 6853
Tragia volubilis L.	Shrub	HDELTA 6859
FABACEAE		
Aeschynomene evenia C.Wright & Sauvalle	Shrub	HDELTA 6880, 6902
Amburana cearensis (Allemão) A.C.Sm.	Arboreal	HDELTA 6895
Anadenanthera colubrina (Vell.) Brenan	Arboreal	HDELTA 6899
Bauhinia cheilantha (Bong.) Steud.	Subshrub	HDELTA 6873

Cenostigma bracteosum (Tul.) Gagnon & G.P.Lewis	Arboreal	HDELTA 6890
Centrosema brasilianum (L.) Benth.	Herb	HDELTA 6888
Chamaecrista carobinha (H.S.Irwin & Barneby) H.S.Irwin & Barneby	Subshrub	HDELTA 6868
Chamaecrista eitenorum (H.S. Irwin & Barneby) H.S.Irwin & Barneby	Arboreal	HDELTA 6889
Chamaecrista serpens (L.) Greene	Subshrub	HDELTA 6882
Cratylia argentea (Desv.) Kuntze	Shrub	HDELTA 6870
Cratylia mollis Mart. Ex Benth.	Climber	HDELTA 6898
Crotalaria longirostrata Hooker et Arn.	Herb	HDELTA 6900
Dahlstedtia araripensis (Benth.) M.J. Silva & A.M.G. Azevedo	Arboreal	HDELTA 6874
Macropsychanthus comosus (G.Mey.) L.P.Queiroz & Snak	Climber	HDELTA 6203
Enterolobium contortisiliquum (Vell.) Morong	Arboreal	HDELTA 6886
Galactia jussiaeana Kunth	Arboreal	HDELTA 6862
Galactia striata (Jacq.) Urb	Climber	HDELTA6865, 6871
Indigofera hirsuta L.	Herb	HDELTA 6864
Lachesiodendron viridiflorum (Kunth) P.G. Ribeiro, L.P. Queiroz & Luckow		HDELTA 6891
Leucaena leucocephala (Lam.) de Wit	Arboreal	HDELTA 6881
Libidibia ferrea (Mart. ex Tul.) L.P.Queiroz	Arboreal	HDELTA 6883
Lonchocarpus sericeus (Poir.) Kunth ex DC.	Arboreal	HDELTA 6894
Macropsychanthus bicolor (Benth.) L.P.Queiroz & Snak	Arboreal	HDELTA 6860
Macroptilium atropurpureum (Sessé & Moc. ex DC.) Urb.	Herb	HDELTA 6875, 6878
Macroptilium martii (Benth.) Maréchal e Baudet	Herb	HDELTA 6896
Mimosa caesalpiniifolia Benth	Arboreal	HDELTA 6869, 6872, 6884
Mimosa ophthalmocentra Mart exBenth.	Arboreal	HDELTA 6867
Mimosa tenuiflora (Willd.) Poir.	Herb	HDELTA 6877
Mimosa verrucosa Benth.	Arboreal	HDELTA 6887
Pityrocarpa moniliformis (Benth.) Luckow & R.W. Jobson	Arboreal	HDELTA 6876
Pterodon emarginatus Vogel		HDELTA 6897
Rhynchosia minima (L.) DC.	Climber	HDELTA 6885
Senegalia piauhiensis (Benth.) Seigler	Arboreal	HDELTA 6863
Senna macranthera (DC. Ex Collad.) H.S. Irwin & Barneby	Shrub	HDELTA 6866, 6892
Senna obtusifolia (L.) H. S. Irwin & Barneby	hábito	HDELTA 6861
Senna occidentalis (L.) Link	hábito	HDELTA 6893
Senna reticulata (Willd.) H.S.Irwin & Barneby	Shrub	HDELTA 6879
Tephrosia cinerea (L.) Pers.	Shrub	HDELTA 6901
IRIDACEAE		
Trimezia sp.	Erva	HDELTA 6904
LAMIACEAE		
Amasonia campestris (Aubl.) Moldenke	Shrub	HDELTA 6909
Hypenia salzmannii (Benth.) Harley	Climber	HDELTA 6905, 6807
Mesosphaerum suaveolens (L.) Kuntze	Herb	HDELTA 6906
Rhaphiodon echinus (Nees & Mart.) Schauer	Herb	HDELTA 6908
LYTHRACEAE		
Cuphea lutescens Pohl ex Koehne	Herb	HDELTA 6910
MALPIGHIACEAE		
Banisteriopsis stellaris (Griseb.) B. Gates	Shrub	HDELTA 6915

Byrsonima ligustrifolia A. Juss.	Arboreal	HDELTA 6912
Byrsonima gardneriana A. Juss.	Arboreal	HDELTA 6913
Diplopterys valvata (W. R. Anderson & B. Gates) W.R. Anderson & C.C. Davis	Shrub	HDELTA 6911
Stigmaphyllon blanchetii C.E. Anderson	Shrub	HDELTA 6914
MALVACEAE		
Corchorus aestuans L.	Herb	HDELTA 6922
Corchorus hirtus L.	Herb	HDELTA 6603
Helicteres baruensis Jacq	Shrub	HDELTA 6919
Herissantia tiubae (K. Schum.) Brizicky	Herb	HDELTA 6927
Malachra fasciata Jacq.	hábito	HDELTA 6916
Melochia tomentosa L.	Subshrub	HDELTA 6929
Pavonia cancellata (L.) Cav.	Shrub	HDELTA 6923
Sida spinosa L.	Shrub	HDELTA 6924
Sida galheirensis Ulbr.	Shrub	HDELTA 6930
Sida planicaulis Cav.	Shrub	HDELTA 6818
Sida cordifolia L.	Shrub	HDELTA 6928
Sida sp.	Erva	HDELTA 6917
Sidastrum micranthum (A.St.-Hil.) Fryxell	Shrub	HDELTA 6921
Waltheria brachypetala Turcz	Shrub	HDELTA 6926
Waltheria indica L.	Herb	HDELTA 6925
Waltheria operculata Rose	Herb	HDELTA 6920
MENIANTHACEAE		
Nymphoides indica (L.) Kuntze	Herb	HDELTA 6931
MOLLUGINACEAE		
Mollugo verticillata L.	Herb	HDELTA 6932
NYCTAGINACEAE		
Boerhavia coccinea Mill.	Herb	HDELTA 6933
ONAGRACEAE		
Ludwigia hyssopifolia (G. Don) Exell	Herb	HDELTA 6934
Ludwigia leptocarpa (Nutt.) H. Hara	Herb	HDELTA 6935
PIPERACEAE		
Piper peltatum L.	Shrub	HDELTA 6936
PLUMBAGINACEAE		
Plumbago zeylanica L.	Subshrub	HDELTA 6937
POACEAE		
Cenchrus ciliaris L.	Herb	HDELTA 6944
Digitaria cf. *ciliaris* (Retz.) Koeler	Herb	HDELTA 6941, 6943,
Digitaria horizontalis Willd.	Herb	6952
Digitaria sanguinalis (L.) Scop.	Herb	HDELTA 6948, 6950
Echinochloa colonum (L.) Link	Herb	HDELTA 6947
Eragrostis pilosa (L.) P. Beauv.	Herb	HDELTA 6942
Eriochloa punctata (L.) Desv. ex Ham.	Herb	HDELTA 6951
Megathyrsus maximus (Jacq.) B.K. Simon & S.W.L. Jacobs	Herb	HDELTA 6945
Melinis repens (Willd.) Zizka	Herb	HDELTA 6954
Panicum trichoides Sw.	Herb	HDELTA 6940, 6953
Paspalum conjugatum P.J. Bergius	Herb	HDELTA 6949
Paspalum sp.	Herb	HDELTA 6938
Setaria parviflora (Poir.) Kerguélen	Herb	HDELTA 6936
Setaria vulpiseta (Lam.) Roem. & Schult.	Herb	HDELTA 6946
PONTEDERIACEAE		
Eichhornia crassipes (Mart.) Solms	Herb	HDELTA 6955
RHAMNACEAE		
Sarcomphalus joazeiro (Mart.) Hauenschild	hábito	HDELTA 6956
RUBIACEAE		
Borreria capitata (Ruiz & Pav.) DC.		HDELTA 6960

Mitracarpus sp.	Shrub	HDELTA 6958
Randia cf. *armata* (Sw.) DC.	Herb	HDELTA 6959
Richardia grandiflora (Cham. & Schltdl.) Steud.	Herb	HDELTA 6957
SAPINDACEAE		
Magonia pubescens A.St.-Hil.	Arboreal	HDELTA 6962
SOLANACEAE		
Physalis angulata L.	Herb	HDELTA 6963
Solanum absconditum Agra	Subshrub	HDELTA 6964
Solanum crinitum Lam.	Shrub	HDELTA 6965
Solanum palinacanthum Dunal	Shrub	HDELTA 6966
TALINACEAE		
Talinum paniculatum (Jacq.) Gaertn.	hábito	HDELTA 6967
PASSIFLORACEAE		
Turnera subulata Sm.	Shrub	HDELTA 6969
Turnera ulmifolia L.	Shrub	HDELTA 6970
Turnera coerulea DC.	Shrub	HDELTA 6968
VOCHYSIACEAE		
Qualea grandiflora Mart.	Arboreal	HDELTA 6971

Considering the 36 families found in the survey, those with the most species were Fabaceae (38 species), Malvaceae (16 species), Poaceae (14 species) and Euphorbiaceae (9 species). The genera with most species were *Cyperus* autor and *Sida* autor, with five species each and *Ipomoea* L.*, Mimosa* autor*,* and *Senna* autor, with four species each.

The current flora collected included the genera *Croton* autor*, Mimosa, Chamaecrista* autor*, Ipomoea, Senna, Jacquemontia* autor*, Turnera* autor, and *Evolvulus* autor; according to Fernandes *et al.* (2020), they are the main genera of the Caatinga biome. The following species endemic to the Caatinga biome were recorded (Giulietti *et al.* 2004): *Aspidosperma pyrifolium* Mart. & Zucc., *Anemopaegma laeve* DC., *Jatropha ribifolia* (Pohl) Baill., *Cratylia mollis* Mart. ex Benth., *Crotalaria holosericea* Nees & C. Mart., *Mimosa caesalpiniifolia* Benth, *M. ophthalmocentra* Mart ex Benth., *Sida galheirensis* Ulbr., and *Sarcomphalus joazeiro* (Mart.) Hauenschild.

Typical Cerrado species were collected, such as *Magonia pubescens* A.St.-Hil. and *Qualea grandiflora* Mart., which are among the most frequent woody species in the Cerrado biome (Castro 2007).

The family with the largest number of endemic species was Fabaceae (n = 4), is considered the best represented family of the Caatinga and has the most significant number of endemic species (Córdula *et al*. 2014, Fernandes *et al.* 2020, Barreto, Fernandes & Queiroz 2020).

This survey recorded the first occurrence of the species *Corchorus hirtus* L. (Malvaceae) in the state of Piauí (Sá *et al.* 2021), contributing to expanding information about the geographic distribution of this species and the floristic richness of the state.

The diversity of families and species recorded in this study is similar those of other floristic surveys, including those reported by Castro *et al.* (1998), Lemos & Rodal (2002), Lemos (2004), Barros & Castro (2006), Chaves & Barros (2008), Mendes & Castro (2009), Amaral *et al.* (2012), Silva *et al.* (2015), Cerqueira *et al.* (2016), Souza *et al*. (2017), Silva *et al.* (2017), and Rocha *et al.* (2017), Ribeiro, Santos & Silva (2021) Silva & Sousa (2022), Machado *et al* (2022), Silva *et al.* (2022), Oliveira & Lucena (2023).

Expanding the floristic list of Piauí is an important potential objective for future studies. The results of the present study reinforce the need for further studies for the state flora, since no floristic and taxonomic studies in the studied semiarid region were found in the literature.

The floristic survey of species in Piauí conducted by Martius and published in the Flora Brasiliensis recorded 164 species, distributed into 115 genera and 39 families. After the nomenclatural update of these data, the 164 species were distributed into 107 genera and 38 families (Tab. 2). The most representative families were Fabaceae (43 species), Poaceae (29 species), Malvaceae (nine species), and Asteraceae (eight species). The first three were the most representative families recorded by Martius and remained the same in the present collection in 2019.

Table 2 – List of species collected by Martius in 1819 in Piauí. Name status and habit of the species, with names shown according to the spelling used in Flora Brasiliensis and the current spelling based on the POWO (2021) and Flora e Funga do Brasil (2021). Synonym, Accepted = accepted name.

Flora Brasiliensis Families/Species	Name status	Flora e Funga do Brasil (2021) POWO 2021 Families/Species	Habit
BRYOPHYTA DIVISION			
HYMENOPHYLLEAE		HYMENOPHYLLACEAE	
Trichomanes pyxidiferum L.	Synonym	*Polyphlebium hymenophylloides* (Bosch) Ebihara & Dubuisson	Herb
PTEROPHYTA DIVISION			
POLYPODIACEAE		THELYPTERIDACEAE	
Nephrodium conterminum Desv	Synonym	*Thelypteris opposita* (Vahl) Ching	Herb
POLYPODIACEAE		NEPHROLEPIDACEAE	
Nephrolepis exaltata Schott	Accepted	*Nephrolepis exaltata* (L.) Schott	Herb
POLYPODIACEAE		POLYPODIACEAE	
Polypodium chnoophorum Kunze	Synonym	*Pecluma chnoophora* (Kunze) Salino & Costa Assis	Herb
POLYPODIACEAE		PTERIDACEAE	
Gymnogramma calomelanos Kaulf	Accepted	*Pityrogramma calomelanos* (L.) Link	Herb
Gymnogramma elongala Hook	Synonym	*Jamesonia elongata* (Grev. & Hook.) J.Sm.	Herb
LYCOPODINEAE		SELAGINELLACEAE	
Lycopodium erytropus Mart.	Synonym	*Selaginella erythropus* (Mart.) Spring	Herb
LYCOPODIACEAE		LYCOPODIACEAE	
Lycopodium complanatum Linn.	Synonym	*Diphasiastrum thyoides* (Willd.) Holub	Herb
MAGNOLIOPHYTA DIVISION			
AMARANTHACEAE		AMARANTHACEAE	
Telanthera dentata Moq.	Synonym	*Alternanthera brasiliana* (L.) Kuntze	Subshrub
Gomphrena gnaphalioides Vahl	Synonym	*Pfaffia gnaphaloides* (L.f.) Mart.	Herb
Gomphrena debilis Mart.	Accepted	*Gomphrena debilis* Mart.	Subshrub
APOCYNACEAE		APOCYNACEAE	
Aspidosperma bicolor Mart.	Synonym	*Aspidosperma cuspa* (Kunth) S.F.Blake	Shrub
Condylocarpon rauwolfiae Mull.	Synonym	*Condylocarpon isthmicum* (Vell.) A.DC.	Climber
ASCLEPIADACEAE		APOCYNACEAE	
Schubertia grandiflora Mart.	Accepted	*Schubertia grandiflora* Mart.	Climber
BOMBACEAE		MALVACEAE	
Cavanillesia tuberculata (Mart. & Zucc.) Kostel.	Synonym	*Cavanillesia arborea* K. Schum.	Arboreal
BROMELIACEAE		BROMELIACEAE	
Encholirion spectabile Mart.	Accepted	*Encholirion spectabile* Mart. ex Schult. & Schult. f.	Shrub
BUTOMACEAE		ALISMATACEAE	
Limnocharis plumieri Rich	Synonym	*Limnocharis flava* (L.) Buchenau	Herb
COMBRETACEAE		COMBRETACEAE	
Combretum anfractuosum Mart.	Synonym	*Combretum duarteanum*	Shrub

		Cambess.	
Combretum leprosum Mart.	Accepted	*Combretum leprosum* Mart.	Arboreal
Combretum monetaria Mart.	Accepted	*Combretum monetaria* Mart.	Shrub
Terminalia biscutella Eichl.	Synonym	*Terminalia argentea* Mart. & Zucc.	Shrub
Thiloa glaucocarpa Eichl.	Synonym	*Combretum glaucocarpum* Mart.	Arboreal
COMMELINACEAE		COMMELINACEAE	
Aneilema pooides Seub.	Synonym	*Callisia filiformis* (M.Martens & Galeotti) D.R.Hunt	Herb
COMPOSITAE		ASTERACEAE	
Dissothrix gardneri A. Gray	Synonym	*Dissothrix imbricata* (Gardner) B.L.Rob.	Subshrub
Elephantopus hirtiflorus DC	Accepted	*Elephantopus hirtiflorus* DC.	Herb
Elephantopus riparius Gardn.	Accepted	*Elephantopus riparius* Gardner	Herb
Eremanthus martii Baker.	Synonym	*Chresta martii* (DC.) H.Rob.	Subshrub
Eupatorium blanchetii Schultz.	Synonym	*Lasiolaena blanchetii* (Sch.Bip. ex Baker) R.M.King & H.Rob.	Shrub
Eupatorium urticaefolium L.f.	Synonym	*Conocliniopsis prasiifolia* (DC.) R.M.King & H.Rob	Subshrub
Pithecoseris pacourinoides Mart.	Synonym	*Chresta pacourinoides* (Mart. ex DC.) Siniscalchi & Loeuille	Herb
Telmatophila scolymastrum Mart.	Accepted	*Telmatophila scolymastrum* Mart. ex Baker	Subshrub
CONVOLVULACEAE		CONVOLVULACEAE	
Aniseia gracillima Choisy	Synonym	*Jacquemontia gracillima* (Choisy) Hallier f.	Herb
Evolvulus frankenioides Moric.	Accepted	*Evolvulus frankenioides* Moric.	Herb
Evolvulus lagopus Mart.	Accepted	*Evolvulus lagopus* Mart.	Herb
Ipomoea brasiliana Meisn.	Accepted	*Ipomoea brasiliana* (Choisy) Meisn.	Climber
Jacquemontia racemosa Meisn.	Synonym	*Jacquemontia breviacuminata* (Mart. ex Choisy) Buril	Climber
CUCURBITACEAE		CUCURBITACEAE	
Trianosperma piauhiensis Cogn.	Synonym	*Cayaponia tayuya* (Vell.) Cogn.	Climber
CUSCUTACEAE		CONVOLVULACEAE	
Cuscuta umbellata H. B. K	Accepted	*Cuscuta umbellata* Kunth	Herb
DILLENIACEAE		DILLENIACEAE	
Doliocarpus dentosus Mart.	Synonym	*Doliocarpus major* J.F.Gmel.	Shrub
ERIOCAULACEAE		ERIOCAULACEAE	
Eriocaulon griseum Kcke.	Accepted	*Eriocaulon griseum* Körn.	Herb
EUPHORBIACEAE		EUPHORBIACEAE	
Manihot palmata Müll.Arg.	Accepted	*Manihot palmata* Müll.Arg.	Shrub
GNONTACEAE		BIGNONIACEAE	
Adenocalymma scabriusculum Mart.	Accepted	*Adenocalymma scabriusculum* Mart. ex DC.	Shrub
Arrabidaea pliciflora Bureau & K.Schum.	Accepted	*Fridericia pliciflora* (Mart. ex DC.) L.G.Lohmann	Shrub
Memora flavida Bur. et K. Sen	Synonym	*Adenocalymma validum* L.G.Lohmann	Climber
Neojobertia candolleana Bur. et K. Sen	Accepted	*Adenocalymma candolleanum* (Mart. ex DC.) L.H. Fonseca & L.G. Lohmann	Climber
Petastoma cuneifolium Bureau	Synonym	*Fridericia cuneifolia* (DC.)	Climber

& K. Schum.		L.G.Lohmann	
Tecoma impetiginosa Mart.	Synonym	*Handroanthus heptaphyllus* (Vell.) Mattos	Arborea l
GRAMINEAE		POACEAE	
Andropogon apricus Trin.	Synonym	*Andropogon pseudapricus* Stapf	Herb
Andropogon fastigiatus Sw.	Synonym	*Andropogon fastigiatus* Sw.	Herb
Aristida capillacea Lamarck	Accepted	*Aristida capillacea* Lam.	Herb
Aristida elliptica Kunth	Accepted	*Aristida elliptica* (Nees) Kunth	Herb
Aristida gibbosa Kunth	Accepted	*Aristida gibbosa* (Nees) Kunth	Herb
Aristida setifolia H.B.K.	Accepted	*Aristida setifolia* Kunth	Herb
Aristida tincta Trinius in Act.	Synonym	*Aristida torta* (Nees) Kunth	Herb
Briza barbata Trinius	Accepted	*Neesiochloa barbata* (Nees) Pilg.	Herb
Chloris polydactyla Swartz.	Synonym	*Chloris virgata* Sw.	Herb
Cynodon dactylon Persoon	Accepted	*Cynodon dactylon* (L.) Pers.	Herb
Dactyloctenium mucronatum Willdenow	Synonym	*Dactyloctenium aegyptium* (L.) Willd.	Herb
Eragrostis pilosa Palisot de Beauvois.	Accepted	*Eragrostis pilosa* (L.) P. Beauv.	Herb
Eragrostis rufescens Schultes	Accepted	*Eragrostis rufescens* Schrad. ex Schult.	Herb
Gymnopogon mollis Nees ab Esenb.	Synonym	*Leptochloa anisopoda* (B.L. Rob.) P.M. Peterson	Herb
Heteropogon acuminatus Trin.	Synonym	*Heteropogon melanocarpus* (Elliot) Benth..	Herb
Luziola peruviana Persoon	Accepted	*Luziola peruviana* Juss. ex J.F.Gmel.	Herb
Panicum capillaceum Lamarck	Synonym	*Panicum trichoides* Sw.	Herb
Panicum caudatum Lamarck	Synonym	*Hymenachne amplexicaulis* (Rudge) Nees	Herb
Panicum hians Elliott	Synonym	*Steinchisma hians* (Elliott) Nash	Herb
Panicum molinioides Trinius Diss.	Synonym	*Apochloa molinioides* (Trin.) Zuloaga & Morrone	Herb
Panicum rottboellioides H.B. K	Accepted	*Mesosetum rottboellioides* (Kunth) Hitchc.	Herb
Panicum vilvoides Trinius	Synonym	*Sacciolepis vilvoides* (Trin.) Chase	Herb
Pappophorum mucronulatum Nees	Accepted	*Pappophorum mucronulatum* Nees	Herb
Paspalum platicaulon Poir.	Synonym	*Axonopus compressus* (Sw.) P. Beauv.	Herb
Paspalum scutatum Nees	Accepted	*Paspalum scutatum* Nees ex Trin.	Herb
Sorghum nutans A. Gray	Synonym	*Sorghastrum nutans* (L.) Nash	Herb
Trachypogon polymorphus Hack.	Synonym	*Trachypogon spicatus* (L.f.) Kuntze	Herb
Vilfa aenea Trinius	Synonym	*Sporobolus aeneus* (Trin.) Kunth	Herb
Vilfa arguta Nees ab Esenbeck.	Synonym	*Sporobolus pyramidatus* (Lam.) Hitchc.	Herb
IRIDEAE		IRIDACEAE	
Cipura paludosa Aubl.	Accepted	*Cipura paludosa* Aubl.	Herb
Roterbe campestris Klatt	Synonym	*Calydorea campestris* (Klatt) Baker	Herb
LEGUMINOSAE		FABACEAE	
Acacia paniculata Willd	Synonym	*Senegalia tenuifolia* (L.) Britton & Rose	Shrub
Arachis prostrata Benth	Accepted	*Arachis prostrata* Benth.	Herb
Calliandra brevipes Rentit	Accepted	*Calliandra brevipes* Benth.	Shrub
Canavalia obtusifolia DC.	Synonym	*Canavalia rosea* (Sw.) DC.	Climber

Cassia pilifera Vog.	Synonym	*Senna pilifera* (Vogel) H.S.Irwin & Barneby	Shrub
Cassia stenocarpa Vog.	Synonym	*Chamaecrista nictitans subsp. disadena* (Steud.) H.S.Irwin & Barneby	Shrub
Cassia subtriflora Mart. Mss.	Synonym	*Chamaecrista repens var. multijuga* (Benth.) H.S.Irwin & Barneby	Shrub
Centrosema pascuorum Mart.	Accepted	*Centrosema pascuorum* Mart. Ex Benth.	Climber
Copaifera confertiflora Benth	Synonym	*Peltogyne pauciflora* Benth.	Arboreal
Cratylia mollis Mart.	Accepted	*Cratylia mollis* Mart. ex Benth.	Shrub
Crotalaria holosericea Nees e Mart.	Accepted	*Crotalaria holosericea* Nees & Mart.	Subshrub
Crotalaria laeta Mart	Accepted	*Crotalaria laeta* Mart. ex Benth.	Subshrub
Crotalaria vitellina Keb.	Accepted	*Crotalaria vitellina* Ker Gawl.	Shrub
Derris negrensis Benth.	Synonym	*Deguelia negrensis* (Benth.) Taub.	Climber
Desmodium spirale DC.	Synonym	*Desmodium procumbens* (Mill.) Hitchc.	Subshrub
Dioclea glabra Benth.	Synonym	*Macropsychanthus glaber* L.P.Queiroz & Snak	Climber
Discolobium hirtum Benth.	Accepted	*Discolobium hirtum* Benth.	Subshrub
Galactia jussiaeana H. B. K.	Accepted	*Galactia jussiaeana* Kunth	Subshrub
Hymenaea martiana Hayne,	Accepted	*Hymenaea martiana* Hayne	Arboreal
Hymenaea stigonocarpa Mart.	Accepted	*Hymenaea stigonocarpa* Mart. ex Hayne	Arboreal
Machaerium acutifolium Vog.	Accepted	*Machaerium acutifolium* Vogel	Arboreal
Mimosa acutistipula Benth.	Accepted	*Mimosa acutistipula* (Mart.) Benth.	Arboreal
Mimosa brevipinna Benth.	Accepted	*Mimosa brevipinna* Benth.	Subshrub
Mimosa caesalpiniaefolia Benth.	Accepted	*Mimosa caesalpiniifolia* Benth.	Arboreal
Mimosa ophthalmocentra Mart.	Accepted	*Mimosa ophthalmocentra* Mart. ex Benth.	Arboreal
Mimosa polycarpa Kunth.	Accepted	*Mimosa polycarpa* Kunth	Subshrub
Mucuna altissima DC.	Synonym	*Mucuna urens* (L.) Medik	Climber
Muellera moniliformis Linn.	Synonym	*Muellera monilis* (L.) M.J. Silva & A.M.G. Azevedo	Herb
Neptunia plena Benth.	Accepted	*Neptunia plena* (L.) Benth.	Herb
Phaseolus bracteolatus Nees et Mart.	Synonym	*Macroptilium bracteatum* (Nees & Mart.) Maréchal & Baudet	Herb
Phaseolus firmulus Mart.	Synonym	*Ancistrotropis firmula* (Mart. ex Benth.) A. Delgado	Subshrub
Phaseolus martii Benth	Synonym	*Macroptilium martii* (Benth.) Maréchal & Baudet	Herb
Phaseolus peduncularis H. B. K.	Synonym	*Ancistrotropis peduncularis* (Kunth) A. Delgado	Herb
Plathymenia foliolosa Benth	Synonym	*Plathymenia reticulata* Benth.	Arboreal

Schrankia leptocarpa DC.	Synonym	*Mimosa candollei* R.Grether	Herb
Soemmeringia semperflorens Mart.	Accepted	*Soemmeringia semperflorens* Mart.	Herb
Stenolobium brachycarpum Benth.	Synonym	*Calopogonium mucunoides* Desv.	Herb
Stryphnodendron rotundifolium Mart.	Accepted	*Stryphnodendron rotundifolium* Mart.	Arboreal
Stylosanthes capitata Vog.	Accepted	*Stylosanthes capitata* Vogel	Subshrub
Stylosanthes humilis H. B. K	Accepted	*Stylosanthes humilis* Kunth	Subshrub
Swartzia multijuga Vogel	Accepted	*Swartzia multijuga* Vogel	Arboreal
Vigna luteola Benth	Accepted	*Vigna luteola* (Jacq.) Benth.	Climber
Zornia diphylla Pers.	Accepted	*Zornia diphylla* (L.) Pers.	Subshrub
LORANTHACEAE		SANTALACEAE	
Phoradendron emarginatum Mart.	Synonym	*Phoradendron mucronatum* (DC.) Krug & Urb.	Herb
Phoradendron rubrum (Linn.) Griseb.	Accepted	*Phoradendron rubrum* (L.) Griseb.	Herb
LORANTHACEAE		LORANTHACEAE	
Struthanthus cuspidatus Mart.	Synonym	*Struthanthus polyrrhizus* (Mart.) Mart.	Herb
LYTHRACEAE		LYTHRACEAE	
Ammannia latifolia LiNN.	Accepted	*Ammannia latifolia* L.	Herb
Cuphea campestris Mart. Msc.	Accepted	*Cuphea campestris* Mart. ex Koehne	Subshrub
Cuphea pascuorum Mart. Msc.	Accepted	*Cuphea pascuorum* Mart. ex Koehne	Herb
Cuphea patula St-Hil.	Synonym	*Cuphea antisyphilitica* Kunth	Subshrub
Cuphea punctulata Koehne	Accepted	*Cuphea punctulata* Koehne	Subshrub
Pleurophora anomala (St-HIL.) Koehe	Accepted	*Pleurophora anomala* (A.St.-Hil.) Koehne	Subshrub
MALVACEAE	Accepted	MALVACEAE	
Wissadula hernandioides Grcke.	Accepted	*Wissadula hernandioides* (L.Hér.) Garcke	Shrub
Wissadula periplocifolia Prsl.	Accepted	*Wissadula periplocifolia* (L.) C.Presl. ex Thwaites	Shrub
Wissadula spicata Prsl.	Synonym	*Allobriquetia spicata* (Kunth) Bovini	Shrub
MARANTACEAE		MARANTACEAE	
Thalia geniculata L.	Accepted	*Thalia geniculata* L.	Herb
MELASTOMACEAE		MELASTOMATACEAE	
Aciotis annua Triana	Accepted	*Aciotis annua* (Mart. Ex DC.) Triana	Herb
Acisanthera inundata Triana	Synonym	*Noterophila limnobios* (DC.) Mart.	Herb
Miconia latecrenata Naud	Accepted	*Miconia latecrenata* (DC.) Naudin	Shrub
Pterolepis trichotoma Cogn.	Accepted	*Pterolepis trichotoma* (Rottb.) Cogn.	Herb
Rhynchanthera serrulata Naud.	Accepted	*Rhynchanthera serrulata* (L.C.Rich.) DC	Subshrub
MYRSINEAE		PRIMULACEAE	

Ardisia semicrenata Mart.	Synonym	*Ardisia guianensis* (Aubl.) Mez	Shrub
ONAGRACEAE		ONAGRACEAE	
Jussiaea larouotteana Camb.	Synonym	*Ludwigia laruotteana (Cambess.)* H. Hara	Shrub
PALMAE		ARECACEAE	
Astrocaryum vulgare Mart.	Accepted	*Astrocaryum vulgare* Mart.	Palm tree
Attalea compta Mart.	Accepted	*Attalea compta* Mart.	Palm tree
Copernicia cerifera Mart.	Synonym	*Copernicia prunifera* (Mill.) H.E.Moore	Palm tree
Euterpe oleracea Mart.	Accepted	*Euterpe oleracea* Mart.	Palm tree
Geonoma baculifera (Poit.) Kunth	Accepted	*Geonoma baculifera* (Poit.) Kunth	Palm tree
Geonoma pauciflora Mart.	Accepted	*Geonoma pauciflora* Mart.	Palm tree
Geonoma schottiana Mart.	Accepted	*Geonoma schottiana* Mart	Palm tree
POLYGALEAE		POLYGALACEAE	
Bredemeyera brevifolia Klotzsch.	Accepted	*Bredemeyera brevifolia* (Benth.) Klotzsch ex A.W.Benn.	Shrub
POLYGALEAE		KRAMERIACEAE	
Krameria argentea Mart.	Accepted	*Krameria argentea* Mart. ex Spreng.	Shrub
PONTEDERIACEAE		PONTEDERIACEAE	
E*ichhornia pauciflora* Seub.	Synonym	*Eichhornia diversifolia* (Vahl) Urb.	Herb
ROSACEAE		CHRYSOBALANACEAE	
Couepia martiana Hook.	Synonym	*Couepia uiti* (Mart. & Zucc.) Benth. ex Hook.f.	Shrub
SAPINDACEAE		SAPINDACEAE	
Magonia glabrata St. Hil	Synonym	*Magonia pubescens* A.St.-Hil.	Arborea l
SOLANACEAE		SOLANACEAE	
Solanum apiculatum Sendt.	Accepted	*Solanum apiculatum* Sendtn.	Shrub
Solanum platanifolium Hook	Synonym	*Solanum mammosum* L.	Shrub
Solanum polytrichum Mobic.	Accepted	*Solanum polytrichum* Moric.	Shrub
Solanum rupincola Sendt	Accepted	*Solanum rupincola* Sendtn.	Climber
STERCULIACEAE		MALVACEAE	
Helicteres muscosa Mart.	Accepted	*Helicteres muscosa* Mart.	Shrub
*Helicteres vua*rame Mart.	Accepted	*Helicteres vuarame* Mart.	Shrub
Waltheria ferruginea St-Hil.	Accepted	*Waltheria ferruginea* A.St.-Hil.	Shrub
Waltheria macropoda Turcz.	Synonym	*Waltheria bracteosa* A.St.-Hil. & Naudin.	Shrub
Waltheria viscosissima St-Hil.	Accepted	*Waltheria viscosissima* A.St.-Hil.	Shrub
URTICINEAE		MORACEAE	
Dorstenia bryoniaefolia Mart.	Synonym	*Dorstenia vitifolia* Gardner	Herb
VERBENACEAE		VERBENACEAE	
Stachytarpha lythrophylla Schauer	Accepted	*Stachytarpheta lythrophylla* Schauer	Herb
VOCHYSIACEAE		VOCHYSIACEAE	
Callisthene microphylla Warm.	Accepted	*Callisthene microphylla* Warm.	Shrub

Based on observations regarding changes in nomenclature, most (53 %, n = 88) of the species surveyed (n = 166) have the same accepted name and 47 % (n = 78) are synonyms; many species are now included in different botanical families; for

example, species from the Polypodiaceae are included in Pteridaceae, Nephrolepidaceae, and Thelypteridaceae. In addition, 74 of the species with the same accepted name remained within the same family.

Comparing the current survey and the taxa published in the Flora Brasiliensis related to Piauí, 7.3 % (n = 12) of species, 27.1 % (n = 29) of genera, and 47.4 % (n = 18) of families were the same. The species were *Cratylia mollis* Mart. ex Benth., *Combretum leprosum* Mart., *Dissothrix imbricata* (Gardner) B.L.Rob., *Eragrostis pilosa* (L.) P. Beauv., *Galactia jussiaeana* Kunth, *Jacquemontia gracillima* (Choisy) Hallier f., *Macroptilium martii* (Benth.) Maréchal and Baudet, *Magonia pubescens* A.St.-Hil., *Mimosa caesalpiniifolia* Benth., *M. ophthalmocentra* Mart. ex Benth., *Panicum trichoides* Sw., and *Terminalia argentea* Mart. & Zucc. These species included *Cratylia mollis*, *Combretum leprosum*, *Mimosa caesalpiniifolia*, and *M. ophthalmocentra*, which are endemic to the Caatinga biome (Giulietti *el al*. 2004) and *Magonia pubescens*, which is endemic to the Cerrado biome (Castro 2007).

The flora collected by Martius includes plants from aquatic and swamp environments belonging to the Bryophyta, Pterophyta, and Magnoliophyta divisions, in addition to plants recognized as aquatic macrophytes. It is noteworthy that the wetlands of the region such as the Canindé River and the streams, the main collection sites for Martius (Spix & Martius, 1981), were largely converted into areas for agricultural development, urban areas, civil construction, among others. others. In addition, the high rainfall variability has been affecting the availability of water resources, being reduced in quantity and quality in the regions of the Brazilian Northeast, mainly in the semi-arid region (Silva *et al*. 2023), factors that contributed to the little similarity between the inventoried flora in 1819 with the flora of 2019.

Regarding the structure and life forms/habit of the species, it appears that Martius collected more herbs, shrubs, and subshrubs. His list presented few tree species in relation to the current flora collected. He also collected palm species, which were his preferred ones, according to his reports (Fig. 3). In this study, specimens of palm trees were not collected because they were not in a reproductive state. The habit classification of the species was carried out according to the Flora e Funga do Brasil (2020).

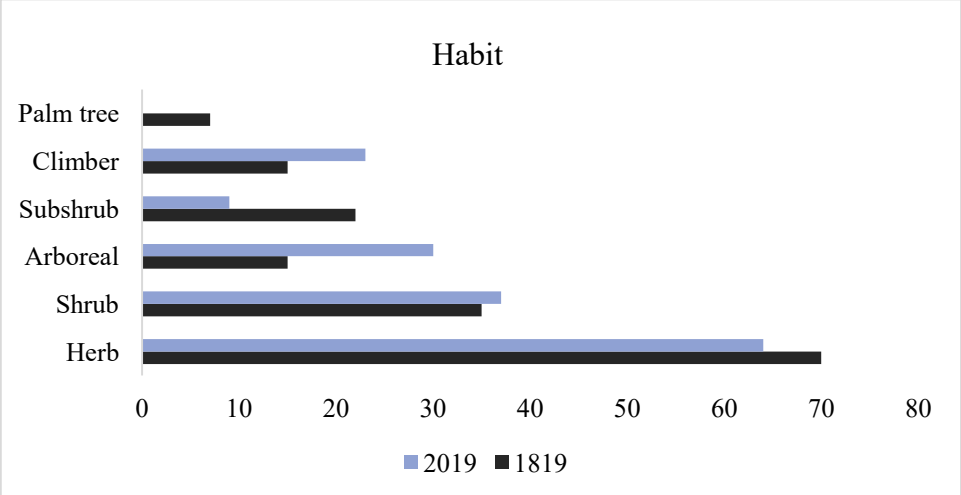

Figure 3. Habit of species collected by Martius in 1819 and by the 2019 expedition, in Piauí, according to the Flora e Funga do Brasil (2020).

Conclusions

The vegetation along the Spix and Martius 1819 expedition route includes representative species of the Caatinga and Cerrado biomes. Comparing the results of 2019 to the flora collected by Martius, there was little similarity, except at family level. Martius collected many macrophyte species. Considering that the present study is a comparison between two flora surveys in the same area carried out 200 years apart, environmental factors, especially anthropogenic changes, may have altered the flora composition of the region, contributing to the difference between the two inventories.

The list of families and species recorded in the present study indicates that the studied area, in the Semiarid region of Brazil, might have a higher floristic diversity than previously thought, since new species have been recorded during the study, such as *Corchorus hirtus*, and endemic species.

Therefore, more floristic studies are needed in the region for expanding the information and support the conservation of the regional flora diversity.

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