



## Flora of Espírito Santo, Brazil

# Flora of Espírito Santo: Papaveraceae

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### Abstract

Papaveraceae comprises 40 genera and approximately 770 species. In Brazil, it is represented by four genera and eight species, all cultivated or naturalized. In the state of Espírito Santo, the family is represented by *Argemone mexicana*, for which we present the morphological description, geographical distribution, photographs, and comments.

**Key words:** *Argemone mexicana*, Atlantic forest, flora of Brazil, naturalized, taxonomy.

### Resumo

Papaveraceae compreende 40 gêneros e aproximadamente 800 espécies. No Brasil está representada por quatro gêneros e oito espécies, todas elas exóticas, cultivadas ou naturalizadas. No Espírito Santo, a família está representada por *Argemone mexicana*, para a qual apresentamos a descrição morfológica, distribuição geográfica no estado, fotografias e comentários.

**Palavras-chave:** *Argemone mexicana*, Mata Atlântica, flora do Brasil, espécies exóticas, taxonomia.

### Introduction

Papaveraceae (Ranunculales) comprises 40 genera and 800 species (Kadereit 1993; Mingli *et al.* 2008). The family is prevalent in north temperate regions and has East Asia and West North America as the main centers of dispersion (Kadereit 1993). The family is nowadays recognized to encompass the families Fumariaceae and Pteridophyllaceae (APG IV 2016).

In Brazil, Papaveraceae is represented by four genera and eight species: *Argemone mexicana* Linnaeus (1753: 508), *Chelidonium majus* Linnaeus (1753: 505), *Eschscholzia californica* Chamisso (1820: 74), *Papaver bracteatum* Lindley (1821: 23), *P. nudicaule* Linnaeus (1753: 507), *P. orientale* Linnaeus (1753: 508), *P. rhoeas* Linnaeus (1753: 507) and *P. somniferum* Linnaeus (1753: 508) (BFG 2015; Hassemer 2020). All the species

are exotic and cultivated except for *A. mexicana*, which is naturalized. In recent decades, among the investigations conducted with Papaveraceae in Brazil, a taxonomic approach was only adopted in the description of the family in the regional flora of the state of São Paulo (Souza *et al.* 2002). *Argemone mexicana* is the only species reported in the state of Espírito Santo (Dutra *et al.* 2015; Hassemer 2020). The species is known as cardosanto (in portuguese and spanish) and the infusion of its stems and leaves is used in folk medicine to treat asthma, conjunctivitis, eczema, and boils (Messias *et al.* 2015). Furthermore, studies have shown antimicrobial, anti-inflammatory, antistress, antiallergic, anthelmintic, nematicidal, larvicidal, antioxidant, antidiabetic, wound healing, antifertility, anticancer and anti-HIV activities (Caetano *et al.* 2002; Singh *et al.* 2009).

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*Argemone* comprises 29 species and occurs mainly in North America and West Indies. In South America, the genus is reported with four native species: *A. rosea* Hooker (1831: 207) and *A. crassifolia* Ownbey (1961: 97), native to Chile; *A. hunnemannii* Otto & Dietrich (1833: 298) native to Chile and naturalized in Argentina, and *A. subfusiformis* Ownbey (1961: 97) native to Argentina, Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay (Ownbey 1961; Petenatti & Del Vitto 2001; Zhang *et al.* 2008; Zuloaga *et al.* 2019). Native from Central and North America, *A. mexicana* is naturalized in Africa, Asia, Europe and Oceania, being reported in all South American countries (Ownbey 1958, 1961; Peña 2002; Funk *et al.* 2007; Edwards 2014). *Argemone mexicana* is reported throughout the Brazilian territory, except in the states of Acre, Amapá, Amazonas, Maranhão, Pará, Rio Grande do Sul, Rondônia, Roraima and Tocantins (BFG 2015; Hassemer 2020).

This work aims to present the treatment of *A. mexicana* in the state of Espírito Santo, Brazil, along with the morphological description, geographical distribution, photographs, and comments on the species.

### Material and Methods

The study was based on the analysis of collections deposited in the following herbaria, through visits, virtual herbaria and loan requests: MBM, MBML, P, RB, SPF, VIES (Thiers, continuously updated). The terminology followed Barroso *et al.* (1999) and Harris & Harris (2003) for general morphology, and Ownbey (1958, 1961) and Khadereit (1993) for specific characters of the family. Geographic distribution maps were based on the examined material.

### Results and Discussion

One species of Papaveraceae, *A. mexicana*, is registered in Espírito Santo, no information on cultivation of other species is available. The species occurs in plantations, open fields, forest edges, and with greater occurrence in anthropized areas. It was recorded in the municipalities of Vitória and Vila Velha.

#### Papaveraceae Juss.

Annual or biennial herbs or shrubs, laticifers present. Leaves alternate or in a basal rosette, rarely opposite or whorled, usually without stipules,

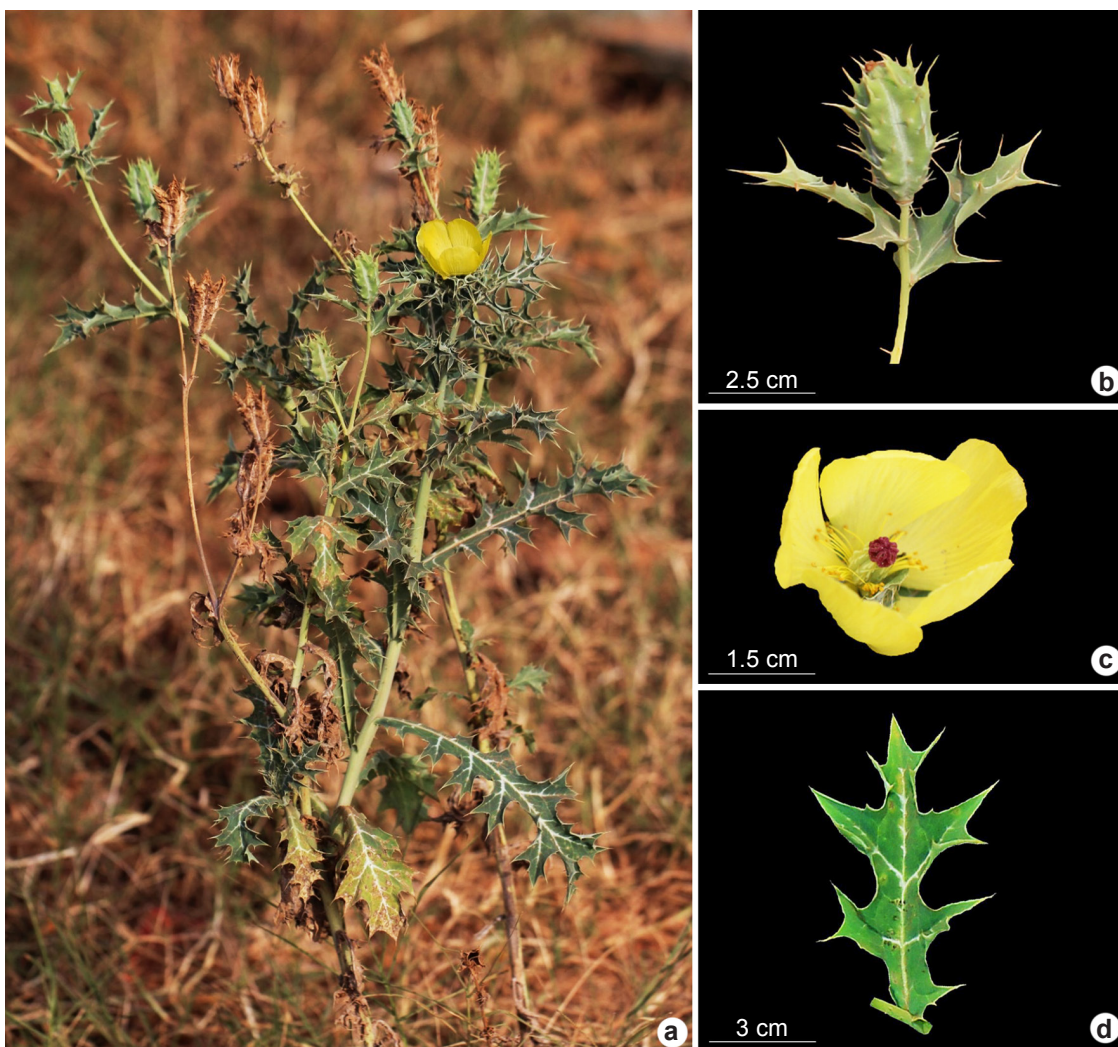
leaf blade entire to compound. Inflorescences racemes, panicles, dichasia, or solitary flowers. Flowers actinomorphic or zygomorphic, always bisexual, usually 2-merous, rarely 3–4-merous, calyx caducous, green, corolla rarely absent, stamens free, usually numerous, anthers opening by slits, ovary superior, syncarpous with 2 to many carpels, placentation parietal. Fruit capsule, dry.

*Argemone mexicana* L., Sp. Pl. 1: 508. 1753. Type: without data, location and collector (lectotype: LINN 607.1). Lectotypified by Fawcett & Rendle (1914). Figs. 1-2

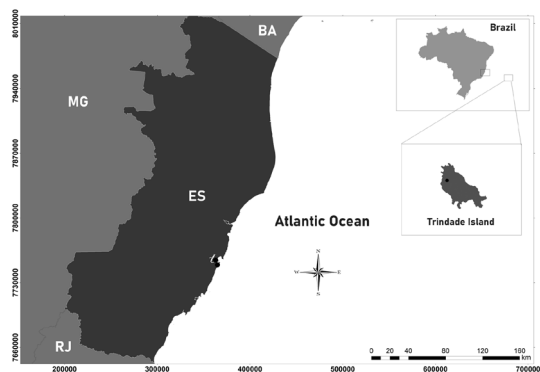
Herbs, annual or occasionally short-lived perennial, 30–45 cm tall, spiny, yellow lactiferous, stems mostly erect. Leaves alternate, lobate, lobes dentate; blade broadly oblanceolate, obovate or elliptic, 4–15 × 3.6–9.2 cm, glabrous, glaucous, paler abaxially, spiny on veins, base cuneate, margin pinnatifid, apex acute; lobes spiny, petiole ca. 6 mm. Flowers solitary, sometimes in few-flowered cymes, trimerous, receptacles narrowly conical. Sepals 1–3, cymbiform, apex with horned appendices. Petals 6, free, yellow, broadly obovate, 1.5–2.3 cm, base broadly cuneate, apex rounded. Stamens many, free, filaments ca. 2.5 mm, free, yellow, anthers narrowly oblong, 0.5–1 mm, yellow. Carpels 4–6, ovary ellipsoid or oblongoid, with explanate fulvous spines; styles ca. 2.5 mm; stigmas free, 4–6-lobed, ovules many. Capsule oblongoid to broadly ellipsoid, 1.5–3.5 × 0.8–1.6 cm, sparsely fulvous spiny, 4–6-valved dehiscent from apex. Seeds many, spheroidal.

**Material examined:** Vila Velha, 16.VI.1983, fl. and fr., *B. Weinberg* 897 (SPF). Vitória, Maruípe, 17.X.1986, fl. and fr., *A.C.T. Dias* (VIES1074); Ilha de Trindade, 23.I.1992, *J.M.L. Gomes* 1761 (VIES); VI.1997, *R.J.V. Alves* 5862 (R); terraço acima da Enseada dos Portugueses, 25.XII.1965, fl. and fr., *J. Becker* (P02308331, R010010672).

The species can be easily recognized by the herbaceous habit, presence of spines in stem and leaves, deeply lobed glaucous leaves with glaucous venation, a yellow corolla with petals that are easily detached on handling, oblong capsule fruits with spines. In Espírito Santo, the species was found in coastal areas, crops, open fields, forest edges, and other anthropized areas, and few specimens were collected with flowers in January, June, October, November, and December.



**Figure 1** – a-d. *Argemone mexicana* in Americana, SP, Brazil – a. habit; b. fruit; c. flower; d. leaf. Photos: D. A. Zavatin.



**Figure 2** – Distribution map of *Argemone mexicana* in the state of Espírito Santo represented by black dots. State acronyms: RJ = Rio de Janeiro; ES = Espírito Santo; MG = Minas Gerais; BA = Bahia.

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