

## Flora of Usina São José, Igarassu, Pernambuco (Brazil): Lythraceae J. St.-Hil. and Onagraceae Juss.

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### Abstract

Lythraceae comprises about 30 genera and 600 species widely distributed in tropical and subtropical regions, while Onagraceae comprises 22 genera and about 660 species distributed in temperate and subtropical areas, predominantly in Americas. The aim of this work was to realize the taxonomic study of Lythraceae and Onagraceae species from Usina São José, Igarassu, Pernambuco (Brazil), an Atlantic forest remnant. Fieldworks and visits to herbaria HST, HUEFS, IPA, JPB, PEUFR and UFP were conducted between 2018 and 2019. Three Lythraceae species were recognized: *Cuphea carthagenensis* (Jacq.) J.F. Macbr., *C. flava* Spreg. and *Rotala ramosior* (L.) Koehne, and three Onagraceae species: *Ludwigia erecta* (L.) H. Hara, *L. hyssopifolia* (G. Don) Exell and *L. octovalvis* (Jacq.) P.H. Raven. *Rotala ramosior* is a new record for Brazil. Morphological descriptions, an identification key, phenological period, geographic distribution, taxonomic notes, photographs and illustrations of diagnostic characters are presented herein. The relevant morphological characters for species identification are phyllotaxy, indumentum of stems, shape and indumentum of leaves, petals color and apex, capsule shape, seeds arrangement and raphe size.

**Keywords:** Atlantic Forest, diversity, flora do brasil, myrtales, taxonomy.

## Flora da Usina São José, Igarassu, Pernambuco (Brasil): Lythraceae J. St.-Hil. e Onagraceae Juss.

### Resumo

Lythraceae apresenta cerca de 30 gêneros e 600 espécies amplamente distribuídas nas regiões tropicais e subtropicais, enquanto Onagraceae compreende 22 gêneros e cerca de 660 espécies distribuídas nas regiões temperadas e subtropicais, predominantemente nas Américas. Este trabalho teve como objetivo realizar o estudo taxonômico das espécies de Lythraceae e Onagraceae ocorrentes na Usina São José, Igarassu, Pernambuco (Brasil), um remanescente de Mata Atlântica. Para isso, foram realizadas expedições de campo e visitas aos herbários HST, HUEFS, IPA, JPB, PEUFR e UFP entre 2018 e 2019. Foram reconhecidas três espécies de Lythraceae: *Cuphea carthagenensis* (Jacq.) J.F. Macbr., *C. flava* Spreg. e *Rotala ramosior* (L.) Koehne, e três espécies de Onagraceae: *Ludwigia erecta* (L.) H. Hara, *L. hyssopifolia* (G. Don) Exell e *L. octovalvis* (Jacq.) P.H. Raven. *Rotala ramosior* é um novo registro para a flora do Brasil. Descrições morfológicas, uma chave de identificação, período fenológico, distribuição geográfica, notas taxonômicas, pranchas de fotografias e ilustrações dos caracteres diagnósticos são apresentadas. Os caracteres morfológicos relevantes para a identificação das espécies são filotaxia, indumento dos ramos, forma e indumento das folhas e cor e ápice das pétalas, forma da cápsula, arranjo das sementes e tamanho da rafe.

**Palavras-chave:** Mata atlântica, diversidade, flora do brasil, myrtales, taxonomia.

### Introduction

Myrtales is comprised in Malvidae clade with nine families, including Lythraceae J. St.-Hil. and Onagraceae Juss. that constitute one of the largest clades within the order (Stevens, 2001 onwards; Graham, 2007). Both families present leaves simple, margin entire and frequently opposite, flowers generally hermaphrodite and actinomorphic (Judd, Campbell, Kellogg, Stevens & Donoghue, 2009).

Lythraceae is widely distributed in tropical and subtropical

regions, with few records of herbaceous species occurring in temperate regions (Cavalcanti, 2007). The family comprises about 30 genera and 600 species (Graham & Graham, 2014). In Brazil, 11 genera and 216 species are recognized, predominantly distributed in Cerrado and Atlantic Forest areas, where 160 species are endemic. *Cuphea* P. Browne is the most representative genus with 108 species, where 70 are endemic. According to Flora do Brasil (2020, under construction), seven genera and 57 species can be found in

the Northeast region.

They occur in several different environments and phytogeographical domains, including swamps, dunes, humid tropical forests but more frequently in Cerrado, arid and rocky fields. Are represented by trees, shrubs, or rarely herbs, with simple leaves, commonly decussate, margins entire; inflorescence a raceme or a cyme; flowers bisexual, diclamide, rarely monoclamiide, actinomorphic, rare zygomorphic, floral tube persistent, petals 4–16, dialipetals, curly; fruit capsule (Cavalcanti & Graham, 2002). A family representative popularly known as pomegranate, *Punica granatum* L., is used as food and medicinal.

Onagraceae comprises about 660 species and 22 genera distributed in temperate and subtropical areas, predominantly in Americas (Wagner, Hoch & Raven, 2007). In Brazil, the family is recorded with 62 species and four genera, occurring mainly in Atlantic Forest areas, where 18 species are endemic. *Ludwigia* L. is the most representative genus with 45 species known, being 10 endemic. According to Flora do Brasil (2020, under construction), two genera and 18 species can be found in the Northeast region.

Onagraceae representatives can be found mostly in swamp areas, but also associated to high altitudes and coastal regions (Micheli, 1872). They can be herbs or trees, easily recognized by the petals 4 (occasionally 5-7 or 2), often with floral tube, ovary inferior, stamens usually the double of the petals number and positioned in two series, epipetals shorter than episepals and pollen connected by viscin (Munz, 1947; Raven, 1963). The family is widely used as ornamental, because of the beautiful flowers, especially the species of *Clarkia* L., *Fuchsia* L. and *Oenothera* L. (Judd et al., 2009).

In Brazil, the taxonomic treatments focusing Lythraceae are most significant in the Midwest and Southeast regions (Cavalcanti, 1990; Cavalcanti & Graham, 2002; Cavalcanti, 2004), while Onagraceae ones were made from South and Southeast regions (Duarte & Esteves, 2001; Grillo & Giulietti, 2004; Pesamosca, 2015).

In the Atlantic Forest of Pernambuco, the families were recorded in floristic inventories with one species (Zickel et al., 2007; Almeida Jr., Pimentel & Zickel, 2008; Almeida Jr., Olivo, Araújo & Zickel, 2009; Melo, Amorim, Pessoa, Maciel & Alves, 2016). In addition to the work by Melo et al. (2011) that recognized four Lythraceae and none Onagraceae species in the Usina São José.

The Usina São José is located in Atlantic Forest domain and presents forestry fragments that suffer anthropic actions due to the cane plantations that surround them, resulting in implications for conservation (Trindade, Lins-e-Silva, Silva, Figueira & Schessl, 2008). This study aim to provide the taxonomic treatment of Lythraceae and Onagraceae from Usina São José (USJ), increasing the knowledge about the families in Atlantic Forest in the north of São Francisco River.

## Material and methods

### Study area

The Usina São José is situated in Zona da Mata Norte region, situated in the municipalities of Igarassu, Goiânia,

Itaquitinga, Itapissuma, Abreu e Lima and Araçoiaba, with it greater territorial extension located in Igarassu, among the coordinates 7°40'21,25''–7°55'50,92''S, 34°54'14,25''–35°05'21,08''W, about 30 km from Recife, Pernambuco. USJ occupies a total area of 280 km<sup>2</sup> of Atlantic Forest domain and presents about 110 forestry fragments which vary from 20 to 400 ha, surrounded by sugar cane plantations (Trindade et al. 2008), which five are represented in this study, Chave fragment, Mata dos Macacos, Mata de Piedade, Mata de Santa Helena and Mata da Zambana, the largest ones.

### Material collect

Fieldworks were conducted in the study area between July 2018 and July 2019, however, we did not find any Lythraceae and Onagraceae individuals. The selected areas for the fieldworks included the areas considered priority according to their extension. Six herbaria were visited: HST, HUEFS, IPA, JPB, PEUFR and UFP (herbarium acronyms follow Thiers, continuously updated), totalizing 24 analyzed specimens of Lythraceae and eight of Onagraceae.

### Morphological analysis

We identified the species based on comparisons to species previously identified by specialist, to *typus* materials and specialized bibliography (Lythraceae: Graham, 1975; Cavalcanti & Graham, 2002; Graham, 2017; Flora do Brasil 2020, under construction; Onagraceae: Micheli, 1872; Munz, 1947; Raven, 1963; Zardini & Raven, 1997; Goldblatt & Raven, 1997; Grillo & Giulietti, 1998, 2004; Wagner et al., 2007). We also consulted the *online* collections from Virtual Herbarium REFLORE (Brazil), Missouri Botanical Garden (MO) and The New York Botanical Garden (NY). Morphological terminology for vegetative and reproductive structures followed mostly Gonçalves & Lorenzi (2011), but seeds shape follows Harris & Harris (2001) for Lythraceae, and for Onagraceae followed mostly Harris & Harris (2001), but stigma shape follows Radford, Dickison, Massey & Bell (1974) and leaves shape follows Rizzini (1977). An identification key, phenological state information, geographic distribution, taxonomic notes, photographs and illustrations are provided.

## Results and Discussion

In Usina São José we identified two genera, *Cuphea* and *Rotala*, and three species of Lythraceae and one genus, *Ludwigia*, and three species of Onagraceae. *Rotala ramosior* (L.) Koehne is a new record for Brazil (Flora do Brasil 2020, under construction). Besides that, *Cuphea carthagenensis* (Jacq.) J.F. Macbr. and *C. flava* Spreng. were identified in the study area. According with Melo et al. (2011), four species of Lythraceae and none of Onagraceae are listed to USJ. Specimens identified as *C. calophylla* Cham. & Schltldl., *C. campestris* Koehne and *C. micrantha* Kunth in this list, were misidentified and herein updated to *C. carthagenensis* (Jacq.) J.F. Macbr.

## Taxonomic treatment

Identification key for Lythraceae and Onagraceae species from Usina São José, Igarassu, Pernambuco:

1. Leaves decussate. Petals white, yellow or rose to purple ..... Lythraceae
  2. Stems glabrous. Leaves sessile, glabrous on both faces ..... 3. *Rotala ramosior*
  - 2'. Stems pubescent. Leaves sessile or petiolate, glabrous or pilose.
    3. Leaves ovate, base subcordate. Floral tube green and petals yellow ..... 2. *Cuphea flava*
- 3'. Leaves elliptic, base cuneate. Floral tube purple and petals rose to purple ..... 1. *C. carthagenensis*
- 1'. Leaves alternate. Petals yellow ..... Onagraceae
  4. Capsule with seeds plurisseriate in the superior and unisseriate in the inferior region ..... 5. *Ludwigia hyssopifolia*
  - 4'. Capsule with seeds plurisseriate in all regions.
    5. Petals apex rounded. Capsule linear-oblong, 4-angulate. Seeds with raphe narrower than the body of the seed ..... 4. *L. erecta*
    - 5'. Petals apex emargined. Capsule cylindrical, 8-ribbed. Seeds with raphe inflated equal in size to the body of the seed ..... 6. *L. octovalvis*

Relevant morphological characters for species identification are phyllotaxy, indumentum of stems, shape and indumentum of leaves, petals color and apex, capsule shape, seeds arrangement and raphe size.

**Lythraceae** J. St.-Hil.

Herbs or shrubs, stems glabrous or pubescent. Leaves decussate, sessile or petiolate, elliptic, narrow-elliptic or ovate, base cuneate, decurrent or subcordate, apex cuneate or obtuse, glabrous, glabrescent, pubescent or pilose. Flowers solitary or raceme, bracteoles linear, narrow-triangular or ovate, glabrous, pubescent or pilose. Floral tube persistent, tubular or urceolate, plicate, glabrous or pubescent, spur absent or present, descending. Petals white, yellow or rose to purple. Stamens 4 or 11, included or exserted, vesicles absent or 5. Style included or exserted. Capsule cylindrical or globose. Seeds concavo-convex or globose.

In Brazil are recognized 11 genera and in Usina São José occurs two, *Cuphea* and *Rotala*.

**Cuphea** P. Browne, Civ. Nat. Hist. Jamaica 216–217. 1756.

Herbs or shrubs, stems pubescent. Leaves sessile or petiolate, blade elliptic or ovate, base cuneate or subcordate, apex cuneate, glabrous, glabrescent, pubescent or pilose. Flowers solitary or raceme, pedicel pubescent, trichomes simple, hyaline, bracteoles ca. 1 mm long, narrow-triangular or ovate, pubescent or pilose on the margin, trichomes simple, hyaline. Floral tube green or purple, tubular, appendages of size nearly half of the calyx lobes, trichome simple, hyaline, spur present, descending. Petals 6, yellow or rose to purple, elliptic or obovate, base cuneate, apex cuneate or rounded. Stamens 11, included or exserted, vesicles absent or 5. Style included or exserted. Capsule cylindrical. Seeds ca. 2 x 2 mm, globose.

*Cuphea* is the most representative genus of Lythraceae with about 250 species, and is endemic from Americas, occurring primarily in the tropics and subtropics (Graham, 2017). In Usina São José occurs two species, *C. carthagenensis* (Jacq.) J.F. Macbr. and *C. flava* Spreng.

**1. Cuphea carthagenensis** (Jacq.) J.F. Macbr., Publ. Field

Mus. Nat. Hist., Bot. Ser. 8(2): 124. 1930. (Figure 1a-d)

Basionym: *Lythrum carthagenense* Jacq., Enum. Syst. Pl. 22. 1760.

Herbs or shrubs, 10–50 cm tall, stems pubescent, trichomes simple, hyaline. Leaves petiolate, petioles 0.5–2 mm long, blade 0.8–3.7 × 0.3–1.5 cm, elliptic, base cuneate, pubescent on both faces, trichomes simple, hyaline. Raceme, pedicel 1–3 mm long, bracteoles narrow-triangular, pubescent on the margins, inserted at the superior third of the pedicel. Floral tube 5–6 mm long, purple, calyx lobes ca. 0.5 mm long, apex cuneate, outer surface pubescent, trichomes simple or glandular, hyaline to yellowish, inner surface pubescent above and glabrescent below stamen insertion, trichomes simple or glandular, hyaline to whitish. Petals rose to purple, 2 petals ca. 3 × 2 mm, 4 petals ca. 3 × 1 mm, elliptic, apex cuneate. Stamens 2 shorter, 9 longer, included, vesicles 5. Style ca. 1.5 mm long, included.

At the study area, *C. carthagenensis* was collected with flowers and fruits between February and November. According to Graham (2017), this is the most widely distributed species of the genus, occurring from United States to Argentina. In USJ, it was found in the edge of Mata dos Macacos and Mata de Piedade. It can be distinguished from *C. flava* by the indumentum only on one side of the stems and pedicel (vs. on whole surface), leaves elliptical, base cuneate (vs. leaves ovate, base subcordate) and petals rose to purple (vs. yellow).

Examined material: Brazil. Pernambuco: Igarassu, Usina São José, 23 Aug 1997, fl. fr., A. S. Luz s.n. (HST!, IPA!, ALCB); Mata do Engenho Piedade, 16 Oct 2002, fl. fr., G. J. Bezerra & M. J. Silva 37 (PEUFR!); Mata do Engenho Piedade, 16 Oct 2002, fl. fr., G. J. Bezerra & M. J. Silva 59 (PEUFR!); Mata do Engenho Piedade, 24 Apr 2003, fl. fr., A. Melquíades & G. J. Bezerra 180 (PEUFR!, UFP!); Mata de Piedade, 29 Jul 2007, fl. fr., D. Araújo et al. 378 (UFP!, IPA!); Mata dos Macacos, 15 Aug 2007, fl. fr., D. Araújo et al. 417 (IPA!, UFP!); Mata de Piedade, 05 Nov 2007, fl. fr., N. A. Albuquerque et al. 477 (IPA!); Mata de Piedade, 06 May 2008, fl. fr., J. Irapuan 25 (UFP!, IPA!); Mata de Piedade, 07 Feb 2009, fl. fr., E. Pessoa 66 (UFP!, MAC!); Mata de Piedade, 27 Jul 2010, fl. fr., J. L. Viana & S. O. Santos 16 (JPB!); Mata de Piedade, 08 Oct 2013, fl. fr., R. Barbosa et al. 2 (UFP!).

**2. *Cuphea flava*** Spreng., *Novi Provent.* 14. 1818. (Figure 1e-h)

Herbs or shrubs, ca. 40 cm tall, stems pubescent, trichomes simple, hyaline, yellowish to purplish. Leaves sessile or short petiolate, petioles 0–0.5 mm long, blade 0.5–1.2 × 0.2–0.5 cm, ovate, base subcordate, pilose on the margin, glabrous or glabrescent on the veins and glabrous on both faces, trichomes simple, hyaline to yellowish. Flowers solitary, pedicel 3–4 mm long, bracteoles ovate, pilose on the margin, inserted at the middle third of the pedicel. Floral tube ca. 8 mm long, green, calyx lobes ca. 1 mm long, apex acute, outer surface pubescent, trichomes simple, hyaline to yellowish, inner surface pilose above stamen insertion and pubescent at the base of the ovary, trichomes simple, hyaline to whitish. Petals yellow, 2 petals ca. 4 × 2 mm, 4 petals ca. 3 × 1 mm, obovate, apex rounded. Stamens 2 shorter, included, 9 longer, included or exerted, vesicles absent. Style ca. 5 mm long, exerted.

It was collected at USJ with flowers and fruits in February and July. This species is endemic from Brazil, occurring from Rio Grande do Norte to Rio de Janeiro (Flora do Brasil, 2020 under construction). At the study area was found in the inland of Mata dos Macacos and in the edge of Mata da Zambana. The differences between *C. flava* and *C. carthagenensis* were discussed under the comments of that species.

Examined material: Brazil. Pernambuco: Igarassu, Usina São José, Mata dos Macacos, 06 Jul 2007, fl., *J. S. Marques & N. A. Albuquerque 186* (IPA!); Mata da Zambana, 14 Feb 2008, fl. fr., *A. Alves-Araújo & J. S. Marques 860* (UFP!).

***Rotala*** L., *Mant. Pl.* 2: 143–144, 175. 1771.

*Rotala* is represented by about 45 species predominantly from Africa and Asia, besides few species from Americas (Cook, 1979). In Usina São José occurs only one species.

**3. *Rotala ramosior*** (L.) Koehne, *Fl. Bras.* 13(2): 194. 1877. (Figure 1i-l)

Basionym: *Ammannia ramosior* L., *Sp. Pl.* 1: 120. 1753.

Herbs, ca. 20 cm tall, stems glabrous. Leaves sessile, blade 0.4–1.6 × 0.1–0.4 cm, narrow-elliptic, base decurrent, apex obtuse, glabrous on both faces. Flowers solitary, sessile or short pedicellate, pedicel 0–0.5 mm long, glabrous, bracteoles 2–3 mm long, linear, glabrous, inserted at the base of the floral tube. Floral tube 2–3 mm long, colour not seen, urceolate, calyx lobes ca. 0.5 mm long, apex cuneate, appendages of size nearly equal to the calyx lobes, glabrous, spur absent, outer and inner surfaces glabrous. Petals white not seen. Stamens 4, each pair is positioned at a different level, included, vesicles absent. Style ca. 0.5 mm long, included. Capsule globose. Seeds ca. 0.5 × 0.5 mm, concavo-convex.

*Rotala ramosior* was collected with flowers and fruits in September at USJ. This species is distributed in Americas (GBIF, 2019), but according to Flora do Brasil (2020, under construction), it does not occur in Brazil. The genus was considered naturalized, since two species were recorded in São Paulo (Cavalcanti & Graham, 2002). Therefore, we considered this species also naturalized in Brazil, since it was found growing spontaneously in Mata da Zambana, on the edge of sugar cane plantation. *Rotala ramosior* is distinguished easily

from *Cuphea* species by being completely glabrous, with petals white.

Examined material: Brazil. Pernambuco: Igarassu, Usina São José, Mata da Zambana, 04 Sep 2007, fl. fr., *A. Alves-Araújo et al. 543* (UFP!).

**Onagraceae** Juss.

Herbs, stems glabrous, glabrescent, pubescent or strigose. Leaves alternate, sessile or short petiolate, elliptic, linear-lanceolate or lanceolate, base acute or decurrent, apex acute or attenuate, glabrous, glabrescent, pubescent or strigose. Flowers solitary, sessile. Hypanthium persistent. Sepals green, lanceolate or ovate, apex acute, glabrous, pubescent, hirsute or strigose. Petals 4, yellow. Capsule cylindrical, linear or linear-oblong, 4-locular, glabrous, glabrescent, pubescent or strigose. Seeds smaller than 1 mm long.

In Brazil are recorded four genera and in Usina São José occurs one, *Ludwigia*.

***Ludwigia*** L., *Sp. Pl.* 1: 118. 1753.

The vegetative structures of *Ludwigia* are inconsistent for identification, since the species present phenotypic plasticity according to the environment where they are inserted (Zardini, Peng & Hoch, 1991). The genus is pantropical and the most representative of Onagraceae with about 83 species (Raven, 1963; Wagner et al., 2007). In Brazil Northeast are recorded 17 species in the different vegetation types (Flora do Brasil 2020, under construction). In Usina São José occurs three species, *L. erecta* (L.) H. Hara, *L. hyssopifolia* (G. Don) Exell and *L. octovalvis* (Jacq.) P.H. Raven.

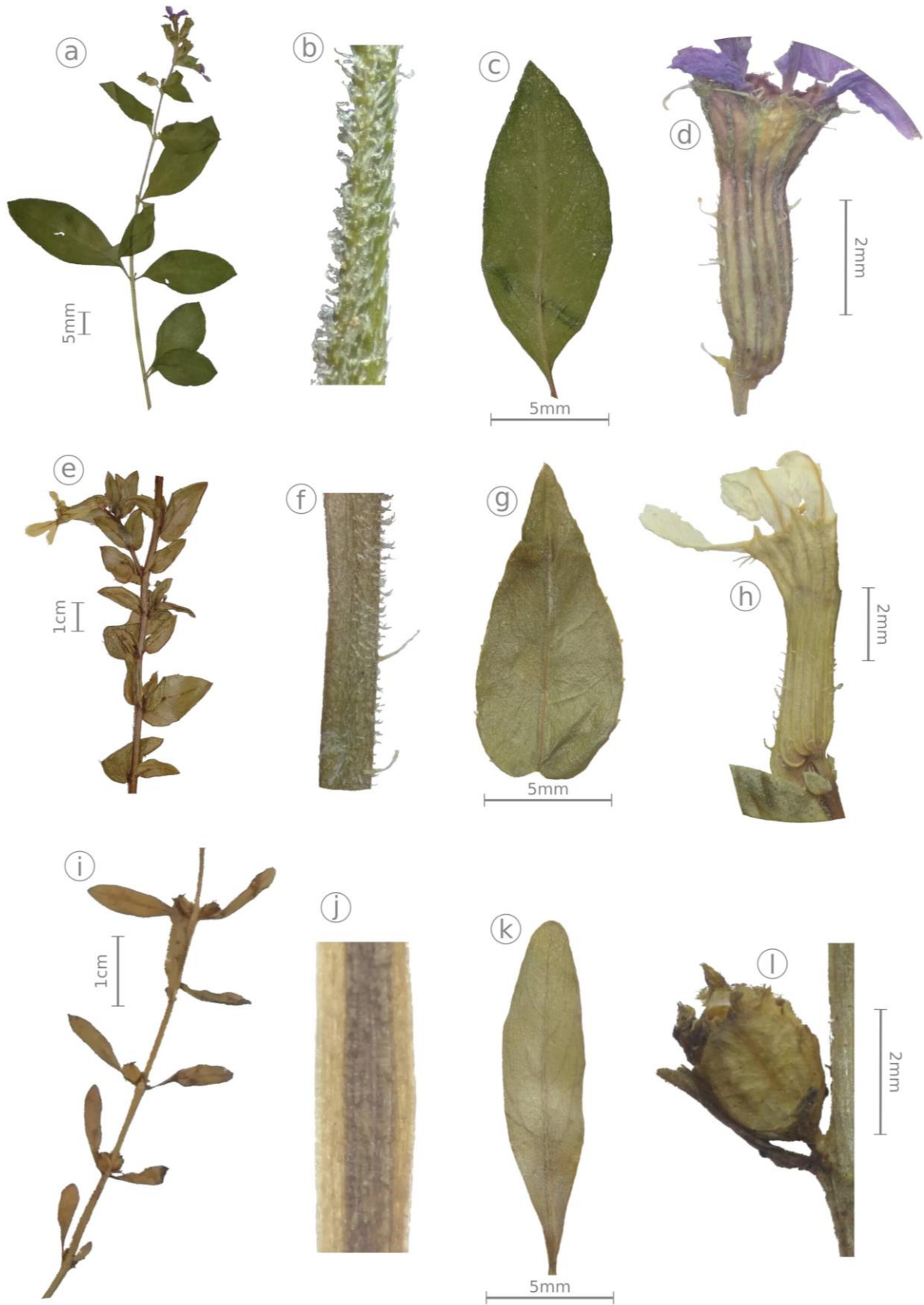
**4. *Ludwigia erecta*** (L.) H. Hara, *J. Jap. Bot.* 28(10): 292. 1953. (Figure 2a-d)

Basionym: *Jussiaea erecta* L., *Sp. Pl.* 1: 388. 1753.

Herbs, stems strigose. Leaves sessile, blade 3.5–5.0 × 0.8–0.11 cm, elliptic or lanceolate, base decurrent, apex acute, margin and nerves of abaxial face strigose. Hypanthium ca. 8 mm long. Sepals 4 × 2 mm, lanceolate, outer face strigose. Petals 2 × 1 mm, obovate, apex rounded. Style ca. 1 mm long, stigma capitate. Stamens 8. Nectariferous disk flat. Capsule ca. 15 mm long, linear-oblong, 4-angulate, strigose. Seeds plurisseriesiate in all regions and not embedded in endocarp, raphe narrower than the body of the seed.

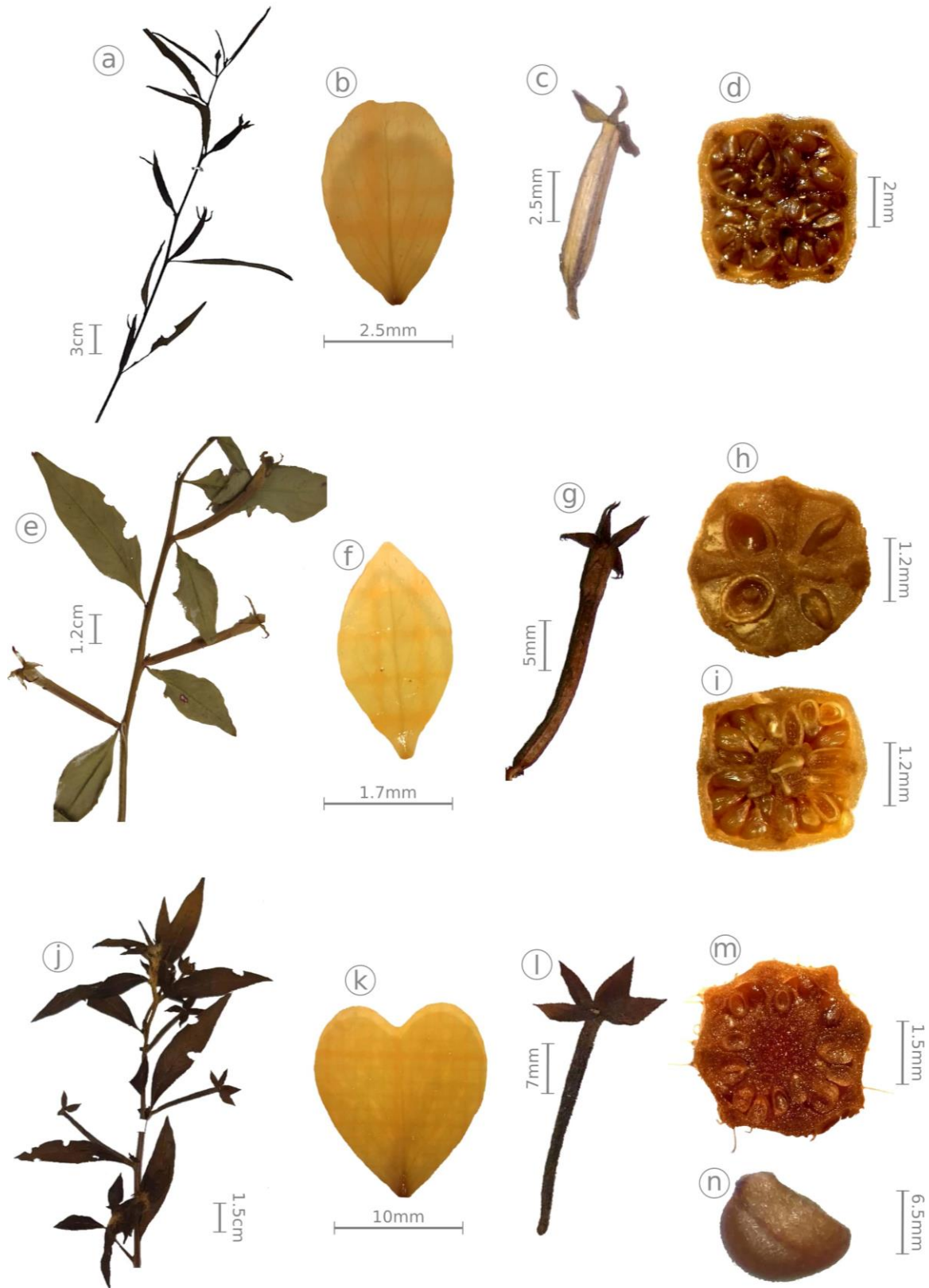
It was collected at USJ with flowers and fruits in January. This species is widely distributed in the Neotropics, occurring from Florida to Brazil (Goldblatt & Raven 1997). At the study area was found on the edge of Mata de Santa Helena. It can be identified by the petals with apex rounded, capsule linear-oblong, 4-angulate and seeds plurisseriesiate in all regions not embedded in endocarp.

Examined material: BRAZIL. Pernambuco: Igarassu, Usina São José, Mata de Santa Helena, 28 Jan 2009, fl. fr., *E. Pessoa & T. Arruda 39* (UFP!).



**Figure 1.** *Cuphea carthagenensis* a. Flowering stems. b. Indumentum of the stems. c. Leaf. d. Flower. *C. flava* e. Flowering stems. f. Indumentum of the stems. g. Leaf. h. Flower. *Rotala ramosior* i. Flowering stems. j. Stems glabrous. k. Leaf. l. Flower.





**Figure 2.** *Ludwigia erecta* a. Flowering stems. b. Petal. c. Hypanthium 4-angular. d. Transversal cut of the hypanthium. *L. hyssopifolia* e. Flowering stems. f. Petal. g. Fruit. h. Transversal cut of the inferior region of the fruit. i. Transversal cut of the superior region of the fruit. *L. octovalvis* j. Flowering stems. k. Petal. l. Hypanthium. m. Transversal cut of the hypanthium. n. Seeds with inflated raphe.

**5. *Ludwigia hyssopifolia*** (G. Don) Exell, Garcia de Orta 5: 471. 1957. (Figure 2e-i)

Basionym: *Jussiaea hyssopifolia* G. Don, Gen. Hist. 2: 693. 1832.

Herbs, stems glabrous. Leaves sessile, blade 1.3–2.8 × 0.35–0.5 cm, lanceolate, base decurrent, apex attenuate, glabrous on both faces. Hypanthium not seen. Sepals 4.5 × 1 mm, lanceolate, glabrous on both faces.

Petals not seen. Style and stigma not seen. Stamens not seen. Nectariferous disk not seen. Capsule 17–20 mm long, linear, slightly enlarged in the superior region, glabrous. Seeds plurisseriate and free in the superior region, unisseriate and embedded in cortical endocarp in the inferior region, raphe narrower than the body of the seed.

It was collected at USJ with flowers and fruits in November. This species is pantropical (Zardini & Raven, 1997). At the study area was found in *Chave* fragment. It can be distinguished from the other species by the position of the seeds in the capsule, free and plurisseriate in the superior region and embedded in cortical endocarp and unisseriate in the inferior region.

Examined material: Brazil. Pernambuco: Igarassu, Usina São José, Fragmento Chave, 24 Nov 2009, fl. fr., *E. M. Pessoa & J. A. N. Souza 123* (JPB!, UFP!).

**6. *Ludwigia octovalvis*** (Jacq.) P.H. Raven, Kew Bull. 15(3): 476. 1962. (Figure 2j-n)

Basionym: *Oenothera octovalvis* Jacq., Enum. Syst. Pl. 19. 1760.

Herbs, ca. 60 cm tall, stems glabrescent or pubescent. Leaves short petiolate, petioles ca. 0.5 mm long, blade 5.5–7.1 × 1.6 cm, linear-lanceolate or lanceolate, base acute, apex acute, glabrescent or pubescent. Hypanthium 20–35 mm long. Sepals 10–12 × 4.5–5 mm, ovate, outer face hirsute or pubescent. Petals 12 × 8 mm, obovate, apex emarginate. Style ca. 2 mm long, stigma capitate. Stamens 8. Nectariferous disk convex. Capsule ca. 42 mm long, cylindrical, 8-ribbed, glabrescent or pubescent. Seeds plurisseriate in all regions and not embedded in endocarp, raphe inflated equal in size to the body of the seed.

It was collected at USJ with flowers and fruits in April, August and November. This species is pantropical, occurring predominantly in Americas (Raven, 1963; Grillo & Giuletti, 2004). At the study area was found in Fragmento Chave and in the edge of Mata de Piedade. It can be identified from the other species by the petals with apex emarginate, capsule 8-ribbed, seeds with raphe inflated equal or superior in size to the body of the seed, plurisseriate in all regions and not embedded in endocarp.

Examined material: Brazil. Pernambuco: Igarassu, Usina São José, 06 Apr 1983, *R. Barreto & A. Chiappeta 482* (PEUFR!, IPA); Fragmento Chave, 24, Nov 2009, fr., *E. Pessoa & J. A. N. Souza 185* (UFP!); Mata de Piedade, 21 Aug 2010, fl. fr., *J. L. Viana et al. 79* (UFP!, JPB!, NYBG!).

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