

ACANTHACEAE

P. Acevedo-Rodríguez and Dieter C. Wasshausen

A predominantly pantropical family, extending to temperate regions, mostly of herbs or shrubs, sometimes twining vines or lianas, and less often scrambling herbs or shrubs, or small trees. Twining vines and lianas in the Neotropics are restricted to the genera *Mendoncia* and *Thunbergia* and is weakly manifested in some *Ruellia*. *Mendoncia*, and *Ruellia* are native to the Neotropics, while *Thunbergia* although naturalized in the Neotropics, is native to the Old World. Species with scrambling habit occur in *Aphelandra*, *Asystasia*, *Dasytropis*, *Justicia*, *Neriacanthus*, *Odontonema*, *Oplonia*, *Ruellia*, and *Thyrsacanthus*. However, some of these species sometimes have erect habit. The family is represented in the Neotropics by ~2,000 species, with 12 genera (2 introduced) and ~111 (4 introduced) species of lianas or climbers, most of which belong to the genus *Mendoncia*.

Diagnosics: Leaves opposite, simple, entire, and exstipulate, usually with linear epidermal cystoliths; *Mendoncia* has fissured stems.

General Characters

1. **STEMS.** In herbaceous species, stems are cylindrical or quadrangular, weak, and ≤ 5 mm in diameter, reaching 2–5 m in length, with regular anatomy; in lianas stems are cylindrical, 1–4 cm in diameter, reaching up to 30 m in length in some species. Some *Mendoncia* are known to have fissured stems (Figure 33A, B) and some species of *Thunbergia* have interxylary phloem strands of different sizes, in *T. grandiflora* (Rottl.) Roxb. these are contiguous to the rays and difficult to see (Figure 33C). The presence of phloem wedges with continuous cambium has been detected in *Ruellia* (Figure 33D).
2. **EXUDATES.** Odorless and colorless, inconspicuous in all genera.

3. CLIMBING MECHANISM. Within climbing Acanthaceae in the Neotropics *Mendoncia* and *Thunbergia* are robust twiners, a few species of *Ruellia* are known as scrambling with distal stems weakly twining; the remaining genera are scrambling shrubs (Figure 32).
4. LEAVES. Opposite and simple, petiolate, and exstipulate. Epidermal cystoliths occur in most genera but they are lacking in *Mendoncia* and *Thunbergia*.
5. INFLORESCENCES. Flowers are solitary or in hanging or ascending, axillary or distal, cymes, racemes or panicles. Inflorescences are never cauliflorous.
6. PEDICELS. Long and robust in *Mendoncia* and *Thunbergia* but short and mostly slender in other genera.
7. FLOWERS. Bisexual, zygomorphic; calyx of 4–5, equal or unequal sepals, conspicuous or inconspicuous; corolla funnel-shaped, tubular, or salverform, 5-lobed or bilabiate; stamens 4 (all equal or 2 shorter) or 2, adnate to the corolla tube, anthers lanceolate or ellipsoid, opening by longitudinal slits; ovary superior, 2-locular, syncarpous, bicarpellate, usually subtended by a more or less cupular nectary disk, style long, filiform, stigma simple or branched; ovules numerous, with axile placentation.



Figure 32. *Ruellia inflata*. A scrambler with weak, cylindrical stems. Photo by P. Acevedo.

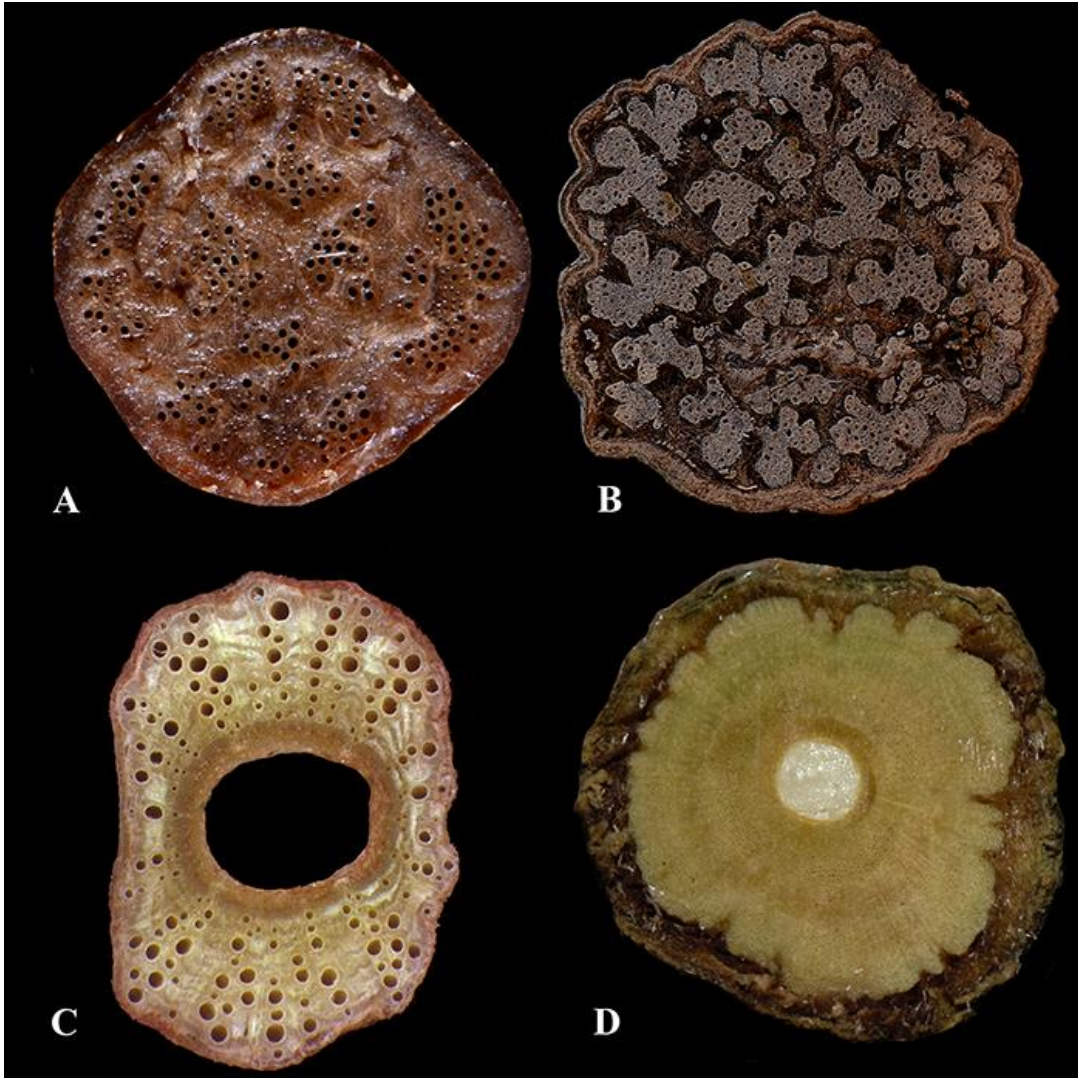


Figure 33. Cross section of stems of Acanthaceae. **A.** *Mendoncia tonduzii*, young, quadrangular stem with fissured stems. **B.** *Mendoncia hoffmannseggiana*, mature stems with fissured stem. **C.** *Thunbergia grandiflora*, young stem with large medulla and wide vessel; interxylary phloem adjacent to ray cells. **D.** *Ruellia inflata*, mature stem with phloem wedges, continuous cambium, narrow rays and large medulla. Photos: A, B, D by P. Acevedo; C by M.R. Pace.

8. FRUITS. Capsular, opening by longitudinal valves, placental tissue usually hook-like and persistent after capsule dehisces (Figure 34C), or a fleshy drupe in *Mendoncia* (Figure 34D).



Figure 34. **A.** *Thunbergia fragrans*, flower with large bracteoles at base. **B.** *T. fragrans*, un-dehiscent capsule. **C.** Capsule valves showing typical hook-like placental tissue (*Justicia sp.*). **D.** *Mendoncia hoffmannseggiana*, drupaceous fruit with a persistent bracteole at base. Photos: A, B, D by P. Acevedo; C from STRI webpage.

Key to the genera of climbing Acanthaceae

1. Twining vines, herbaceous to woody; bracteoles spathe-like, covering the calyx and much of the corolla tube; calyx cupuliform or with minute teeth..... 2
1. Scrambling herbs or shrubs (seldom twining); bracteoles small, not covering the corolla; calyx with elongated, well-developed sepals 3
2. Corolla trumpet-shaped, straight or arcuate; fruit drupaceous, ellipsoid (C. and S. America) *Mendoncia*
2. Corolla funnel-shaped, arcuate; fruit a dry capsule, globose at base and abruptly beaked towards apex (4 species naturalized in the Neotropics)..... *Thunbergia*
3. Plants with paired, axillary straight thorns (West Indies)..... *Oplonia*
3. Plants without axillary thorns 4
4. Corollas funnel-or trumpet-shaped 5
4. Corollas tubular, bilabiate..... 7
5. Stamens exserted; stigma bifid (Mexico, C. and S. America) *Ruellia*
5. Stamens not exserted; stigma punctiform 6
6. Corolla pale violet, pink, white, or pale yellow, limb ~2.5 cm wide (invasive in the Neotropics) *Asystasia*
6. Corolla red, limb ~1 cm wide (Colombia)..... *Odontonema*
7. Stems hexagonal *Dasytropis*
7. Stems terete or quadrangular 8
8. Stamens 4; inflorescence flattened, with overlapping, usually colored bracts 9
8. Stamens 2; inflorescences otherwise 10
9. Stamens exserted; anthers 2-thealous (S. America)..... *Aphelandra*

9. Stamens not exerted; anthers 1-theous (S. America).....*Neriacanthus*
 10. Calyx 5-lobed (S. America) *Thyrsacanthus*
 10. Calyx 4-lobed (Mexico, C. and S. America) *Justicia*

APHELANDRA R. Brown, Prodr. 475. 1810.

Erect herbs, shrubs or small trees, exceptionally scrambling shrubs. Leaves opposite; blades simple, entire to dentate, with linear cystoliths on the upper surface, secondary veins conspicuous; stipules absent. Inflorescences of distal or axillary spikes, with showy bracts. Calyx of 5, lanceolate sepals of unequal size; corolla nearly actinomorphic to bilabiate, red, crimson, or straw-colored, lower lip reflexed; stamens 4, of equal length, exerted but not exceeding the upper lip of the corolla; ovary superior, bicarpellate, bilocular, stigma simple, subcapitate. Capsules claviform to subglobose; seeds 4, rounded.

Distinctive features: Scrambling shrubs with showy, flat inflorescences with overlapping, large bracts.

Distribution: A genus of ~175 species from Mexico to Bolivia. *Aphelandra tomentosa* Lind, a Venezuelan endemic, is the only species in the genus known to be a climbing shrub or liana, with stems that reach up to 10 m in length.

ASYSTASIA Blume, Bijdr. 796. 1826.

Erect, decumbent, or scrambling herbs. Leaves opposite; blades simple, with numerous linear cystoliths on the upper surface, the secondary veins conspicuous; stipules absent. Flowers bisexual, zygomorphic, arranged in spikes or one-sided, terminal racemes, accompanied at the base by 2 small bracts and 2 bracteoles. Calyx of 5 linear or lanceolate sepals of equal size;



Asystasia gangetica, photo by P. Acevedo.

corolla zygomorphic, pale violet, pink, white, or pale yellow, funnel-shaped, with 5 rounded lobes; stamens 4, didynamous; ovary superior, bicarpellate, bilocular, the stigmas bilobed or capitate. Capsules ellipsoid or claviform; seeds 2–4, lenticular.

Distinctive features: Scrambling herb with weak stems swollen at nodes and cordate leaves.

Distribution: A genus of ~40 species of Paleotropical origin. *Asystasia gangetica* (L.) T.

Anders., a scrambling herb, is the only species in this genus that is widely cultivated, naturalized and invasive in Central America, the West Indies, and parts of South America (Bolivia, Brazil (Rio de Janeiro), Colombia, Guyana, Peru, and Venezuela).

DASYTROPIS Urban, Repert. Spec. Nov. Regni Veg. 20: 310. 1924.

Scrambling shrubs. Leaves opposite; blades entire, with numerous linear cystoliths on both surfaces; stipules absent. Flowers bisexual, arranged in distal panicles, accompanied at the base by 2 small bracteoles. Calyx of 5 linear-lanceolate sepals of equal size; corolla straight, bilabiate, pale green-white; stamens 2, exserted but not exceeding the upper lip of the corolla; staminodes wanting; ovary superior, bicarpellate, stigmas slightly bilobed. Capsules claviform; seeds 4, lenticular, glabrous.

Distinctive features: Small, chartaceous, ovate leaves.

Distribution: A single species (*D. fragilis* Urb.) endemic to Sierra de Nipe in Eastern Cuba.

JUSTICIA Linnaeus, Sp. Pl. 636. 1753.

Herbs or shrubs, erect or decumbent, rarely scrambling shrubs; stems terete to nearly



Justicia spicigera, photo by B. Hammel.

quadrangular.

Leaves opposite;

blades entire to

crenate, with

cystoliths; stipules

absent. Flowers

bisexual,

zygomorphic,

arranged in distal or

axillar spikes,

racemes, panicles,

or thyrses accompanied at the base by 2 small bracteoles. Calyx of 4–5 sepals of equal size; corolla straight or curved, bilabiate, pale greenish, white; pink, red or purple, lower lip usually with markings; stamens 2, exserted; staminodes wanting; ovary superior, bicarpellate, stigmas simple to bilobed. Capsules claviform; seeds 2–4, spherical to discoid, sometimes reniform.

Distinctive features: Scrambling shrubs; corolla elongated, strongly bilabiate.

Distribution: A cosmopolitan genus with ~600 species of shrubs or herbs, with ~490 species in the Neotropics. Fifteen species are consistently reported as scrambling shrubs that can reach 3 to 4 m in length, these are distributed from Mexico south to Bolivia, including Venezuela and the Guianas.

MENDONCIA Vandelli, Fl. Lusit. Brasil. 43. 1788.

Herbaceous or woody twining vines; stems articulated and usually quadrangular (Figures 33A; 35) when young, turning terete with age; cross section with fissured stems (Figure 33A, B).



Mendoncia cordata, photo by P. Acevedo.

Leaves opposite; blades simple, lacking cystoliths; stipules absent. Flowers bisexual, zygomorphic, axillary, usually solitary, with long pedicels and a pair of flat or keeled, foliaceous bracteoles,

partly connivent or connate, often covering most of the corolla tube. Calyx short, annular, cupuliform, truncate, irregularly dentate, or lobed; corolla large and showy, white, red, or greenish, often with purplish markings within, hypocrateriform, with a cylindrical to funnel-shaped tube, 5-lobed, sometimes 2-lipped; stamens didynamous, included, staminodes if present 1; nectary disc cupular, ovary superior, bicarpellate, bilocular or unilocular by reduction. Fruits a drupe, ovoid, ellipsoid or oblong, with fleshy mesocarp and bony endocarp; seeds 1 or 2 per fruit.

Distinctive features: Twiners, stems with dispersed xylem; flowers with a pair of foliaceous bracteoles covering most of the corolla; calyx minute; fruit a drupe with fleshy pericarp.

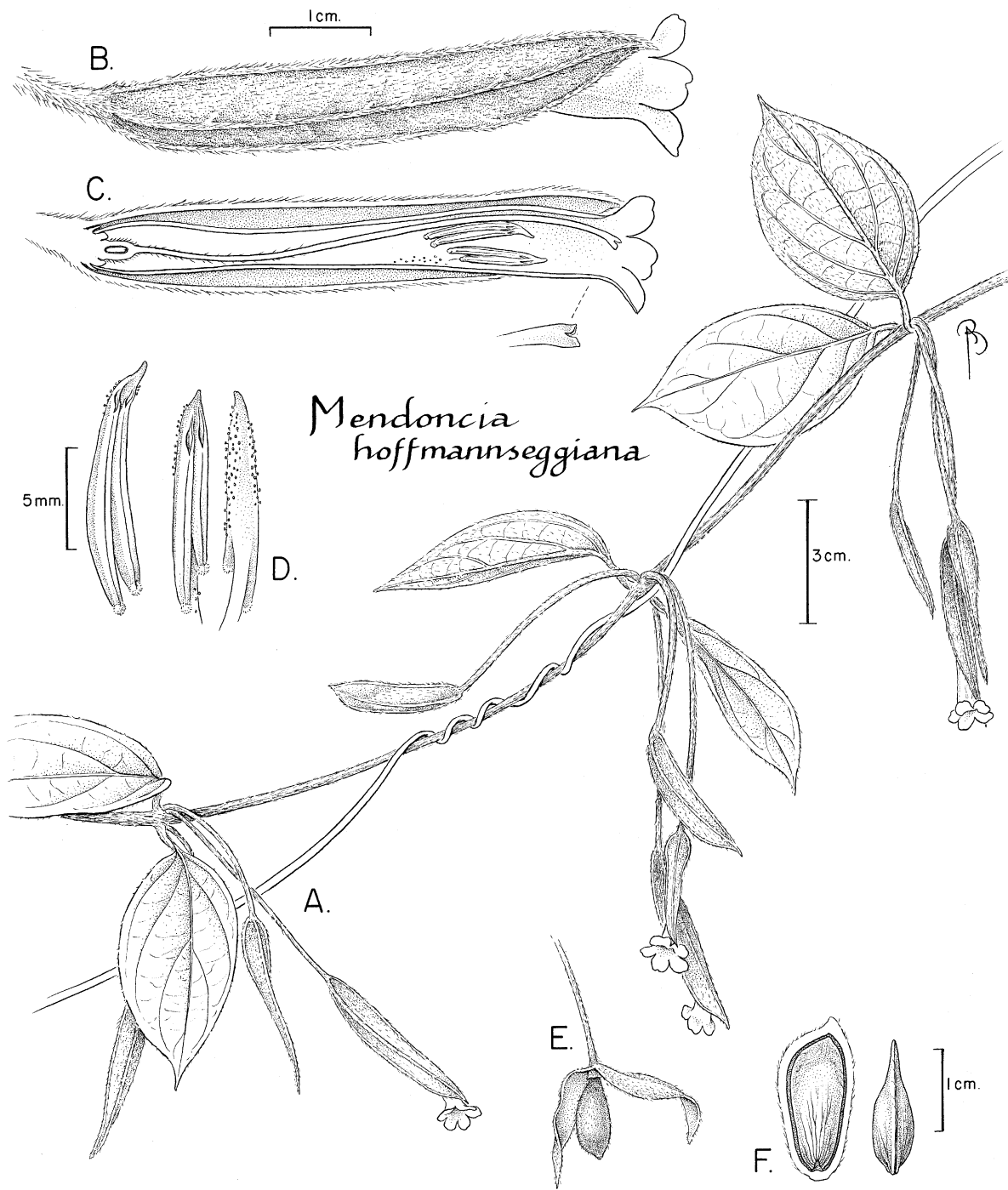


Figure 35. *Mendoncia hoffmannseggiana*. **A.** Flowering, twining branch. **B.** Flower with large foliaceous bracteoles, lateral view. **C.** Flower, longitudinal section. **D.** Anthers. **E.** Drupaceous fruit subtended by persistent bracteoles. **F.** Seed, longitudinal section and dorsal view. Drawing courtesy of Bobbi Angell.

Distribution: Approximately 90 species in tropical America and Africa, 72 of which occur from Mexico to Bolivia. The richest region appears to be Colombia where between 35 and 40 species have been described.

NERIACANTHUS Benth in Benth and J. D. Hooker, Gen. 2: 1096. 1876.

Erect herbs, erect or scrambling shrubs; stems in woody species terete, < 1 cm in diam. Leaves opposite; blades entire to undulate, with no cystoliths; stipules absent. Flowers bisexual, nearly actinomorphic, arranged in distal or axillar spikes bearing imbricate, entire, whitish or pinkish bracts; bracteoles minute, shorter than the calyx. Calyx of 5 lanceolate, free sepals; corolla straight, bilabiate; stamens 4, not exserted; staminodes filiform, anthers slender 1-thecous; ovary superior, bicarpellate, stigmas bilobed. Capsules clavate; seeds 4, subrounded.

Distinctive features: Scrambling shrubs with decussate greenish to lavender overlapping bracts; and anthers with a single theca.

Distribution: A South American genus with ~five species. *Neriacanthus nitidus* Leonard, a Venezuelan endemic, is the only species reported as a scrambling shrub.

ODONTONEMA Nees, Linnaea 16: 300. 1842 (nom. cons.).

Erect herbs or shrubs, exceptionally scrambling herbs. Leaves opposite; blades simple, entire to crenate, with linear cystoliths; stipules absent. Inflorescences of distal spikes, racemes or thyrses with flowers in alternate, opposite or whorled dichasia, with inconspicuous bracts. Calyx of 5, subulate to lanceolate, sepals of equal size; corolla nearly actinomorphic to bilabiate, red; stamens 2, not exserted, staminodes 2; ovary superior, bicarpellate, bilocular, stigma simple, subcapitate. Capsules stipitate, obovoid, usually constricted at the middle; seeds 4, lenticular, glabrous.

Distinctive features: Showy, red corollas on long spicate inflorescences with minute bracts.

Distribution: A genus of ~29 species from Mexico to Bolivia. The only species reported as a climber, *O. ampelocaula* Leonard, is endemic to Colombia and can reach 3–4 m in length.

OPLONIA Rafinesque, Fl. Tell. 4: 64. 1838.

Erect or scrambling shrubs, usually with opposite, axillary acicular thorns; stems slender



Oplonia microphylla, photo by P. Acevedo.

commonly ~5 mm in diam, 2–4 in length. Leaves opposite, small, with linear cystoliths on upper surface, short-petioled or sessile, secondary veins inconspicuous; stipules absent. Flowers bisexual, zygomorphic, heterostylous, axillary, solitary or in short, condensed racemes; calyx of 5

acicular sepals; corolla funnel-shaped, zygomorphic, with 5 lobes, one of them wider than the others; stamens 2, inserted or exserted; ovary superior, bicarpellate, bilocular, style filiform, stigma bilobed. Fruit capsular, claviform; seeds 2 or 4, lenticular.

Distinctive features: Leaves small or minute, with numerous cystoliths; plant with axillary opposite thorns.

Distribution: A genus of ~18 species, 12 native to the West Indies, one to northern Peru, and 5 to Madagascar; often found in dry or coastal forest or scrubs on limestone or sandy substrate.

The following five species are consistently reported as scrambling shrubs that can reach 2–4 m in

length: *Oplonia armata* (Sw.) Stearn (Jamaica), *O. jamaicensis* (Lindau) Stearn (Jamaica), *O. microphylla* (Lam.) Stearn (West Indies), *O. spinosa* (Jacq.) Raf. (West Indies), and *O. tetrasticha* (Griseb.) Stearn (Cuba).

RUELLIA Linnaeus, Sp. Pl. 634. 1753.

Herbs, subshrubs or shrubs, sometimes scrambling or twining vines. Leaves with numerous, transversely oriented cystoliths, entire to repand-crenulate at margins. Flowers



Ruellia inflata, photo by P. Acevedo.

solitary or in axillary or terminal spikes, racemes or panicles; calyx with 5 linear sepals, deeply cleft to the base; corolla red, yellow, white, or mauve, funnel-shaped or salverform, sometimes saccate; stamens

4, didynamous; stigma with

2 unequal lobes. Capsule oblong or club-shaped; seeds 8–32 (or more numerous) per capsule, lenticular.

Distinctive features: Scrambling or less often twining vines (e.g., *R. affinis*); flowers > 2.5 cm long, red or white, saccate or funnel-shaped.

Distribution: Approximately 250 species with pantropical distribution, 230 of which occur in the Neotropics. The following 5 species are consistently reported as scrambling shrubs or vines that can reach 3–5 m in length: *Ruellia affinis* (Nees) Lindau (Brazil), *R. beckii* Washh. & J.R.I.

Wood (Bolivia), *R. inflata* Rich. (Bolivia, Brazil, Guianas, Peru), *R. jiboia* E.C.O. Chagas & Costa-Lima (Bahia, Brazil), *R. sprucei* Lindau (Brazil (AM) and Colombia), and *R. steyermarkii* Wassh. (Venezuela).

SAPPHOA Urban, Repert. Spec. Nov. Regni Veg. 18: 24. 1922.

Scrambling shrubs. Leaves opposite; blades simple, with numerous cystoliths; stipules absent. Flowers bisexual, actinomorphic, long-pedicellate, produced in axillary clusters; calyx with 5 linear sepals, deeply cleft to the base; corolla blue, funnel-shaped, limb of 5 equal, rounded lobes; stamens 2, not exerted, borne on upper half of tube; staminodes 2; ovary superior, bicarpellate, style elongated; stigma 2-lobed. Fruits capsular, sessile, oblong, 4-seeded.

Distinctive features: Leaves small; corolla blue, 1.5–2.3 cm long, actinomorphic, with 2 stamens and 2 staminodes.

Distribution: Endemic to eastern Cuba, with 1 or 2 species.

THUNBERGIA Retzius, Physiogr. Sölsk. Handl. 1(3): 163. 1780 ['1776'] (nom. cons.).

Herbaceous or woody twining vines or less frequently erect shrubs; stem cross section (at least in *T. grandiflora*) with multiseriate wide rays and interxylary phloem strands that are



Thunbergia fragrans, photo by P. Acevedo.

contiguous to the rays. Leaves opposite; blades simple, undulate to shallowly lobed, lacking cystoliths; stipules absent. Flowers bisexual, zygomorphic, axillary, usually solitary or in short racemes, long-pedicellate, with and a pair of foliaceous bracteoles covering the lower portion of the corolla. Calyx short, cupuliform, truncate or dentate; corolla funnel-shaped or hypocrateriform, large and showy, regular or irregular; stamens didynamous; ovary superior, bicarpellate, bilocular. Fruits capsular, globose at the base, with the apex in the form of a beak; seeds subglobose.

Distinctive features: Relatively large flowers, subtended by two large foliaceous bracteoles; fruit capsular.

Distribution: Approximately 200 species from the Paleotropics. The herbaceous vines, *T. alata* Sims and *T. fragrans* Roxb. and the liana *T. grandiflora* Roxb.) are naturalized through most of the Neotropics.

THYRSACANTHUS Moricand, Pl. Nouv. Amer. 9: 165. 1847.

Erect, densely branched shrubs, scrambling shrubs or less often vines; stems terete, < 1



Thysacanthus ramosissimus, photo by P. Acevedo.

cm diam, with regular anatomy. Leaves opposite, blades with numerous, minute cystoliths, short-petioled or sessile. Flowers bisexual, zygomorphic, in secund spikes or thyrses; calyx of 5 deeply lobed, lanceolate sepals; corolla red, funnel-shaped, zygomorphic, bilabiate, upper

lip entire or 2-lobed, lower lip 3-lobed; stamens 2, exserted; staminodes wanting; ovary superior, bicarpellate, bilocular, the style filiform, stigma bilobed. Fruit capsular, ovoid, stipitate; seeds 2 or 4, lenticular, sparsely tuberculate, rugulose, or smooth.

Distinctive features: Scrambling herbs with red, slightly curved, funnel-shaped corollas; leaves with numerous cystoliths.

Distribution: A genus of 5 to 7 species, native to South America. The following three species are consistently reported as scrambling or climbing shrubs which can reach ≥ 2 m in length:

Thysacanthus boliviensis (Nees) A.L.A. Côrtes & Rapini (Brazil, Bolivia, and Paraguay), *T. ramosissimus* Moric. (NE Brazil), and *T. secundus* (Leonard) A.L.A. Côrtes & Rapini, (Brazil, Suriname, Guyana, French Guiana, Venezuela).