

# GUIDE TO THE GENERA OF LIANAS AND CLIMBING PLANTS IN THE NEOTROPICS

## FABACEAE

By Pedro Acevedo-Rodríguez (5 Oct 2020)



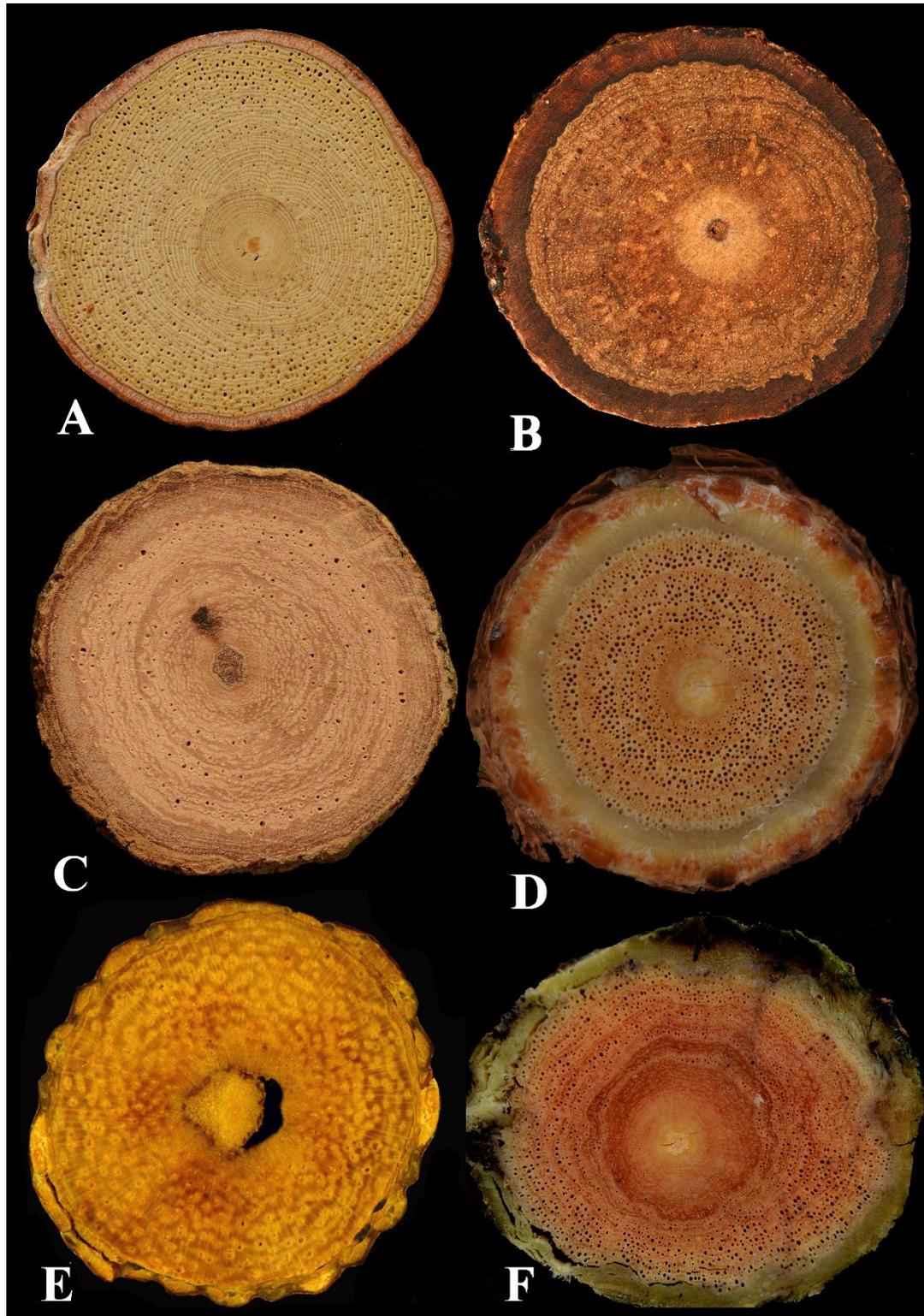
*Sigmoidotropis speciosa* (Kunth) A. Delgado,  
photo by P. Acevedo

One of the largest plant families of the world with ca. 19,500 species exhibiting diverse habits including trees, erect or climbing shrubs, vines, lianas and terrestrial or aquatic herbs, with cosmopolitan distribution. Herbaceous vines often are twiners or scramblers or less often have tendrils (e.g., *Vicia*). Lianas for the most part have prehensile branches, twining stems, cirri (e.g., *Machaerium*, *Senegalia*), and less often are scramblers with armed stems or leaves. There are about 254 genera and 5360 species of Fabaceae in the Neotropics\*. Of these, 57 genera contain lianas or climbing plants for a total of 840 species, occurring in a wide range of habitats, but more predominant in lowland moist forests, savannas, gallery forests, and in open disturbed biomes. Neotropical climbing Fabaceae are most diverse below 1500 m of elevation. (\* total numbers are from G. Lewis, pers. comm., 2018).

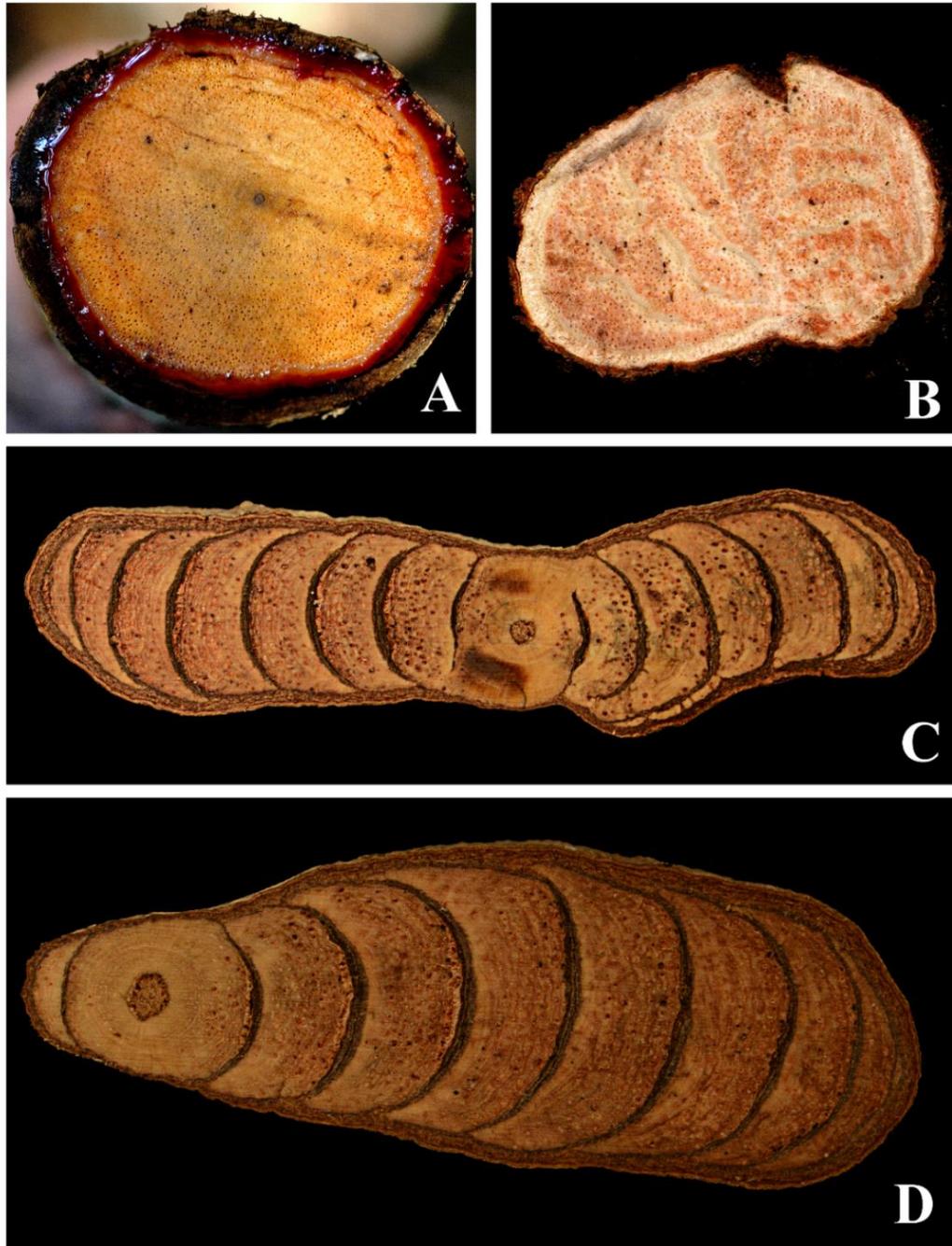
**Diagnosics:** Being a morphologically diverse family it is sometimes difficult to distinguish its members from vines in other families. As a general rule, leaves in the Fabaceae are alternate, compound and stipulate. Many herbaceous vines are twiners and have trifoliolate leaves; scrambling shrubs are often armed with recurved prickles and have bipinnate leaves; some lianas have flattened stems, usually with successive cambia, and bright red exudates.

## General Characters

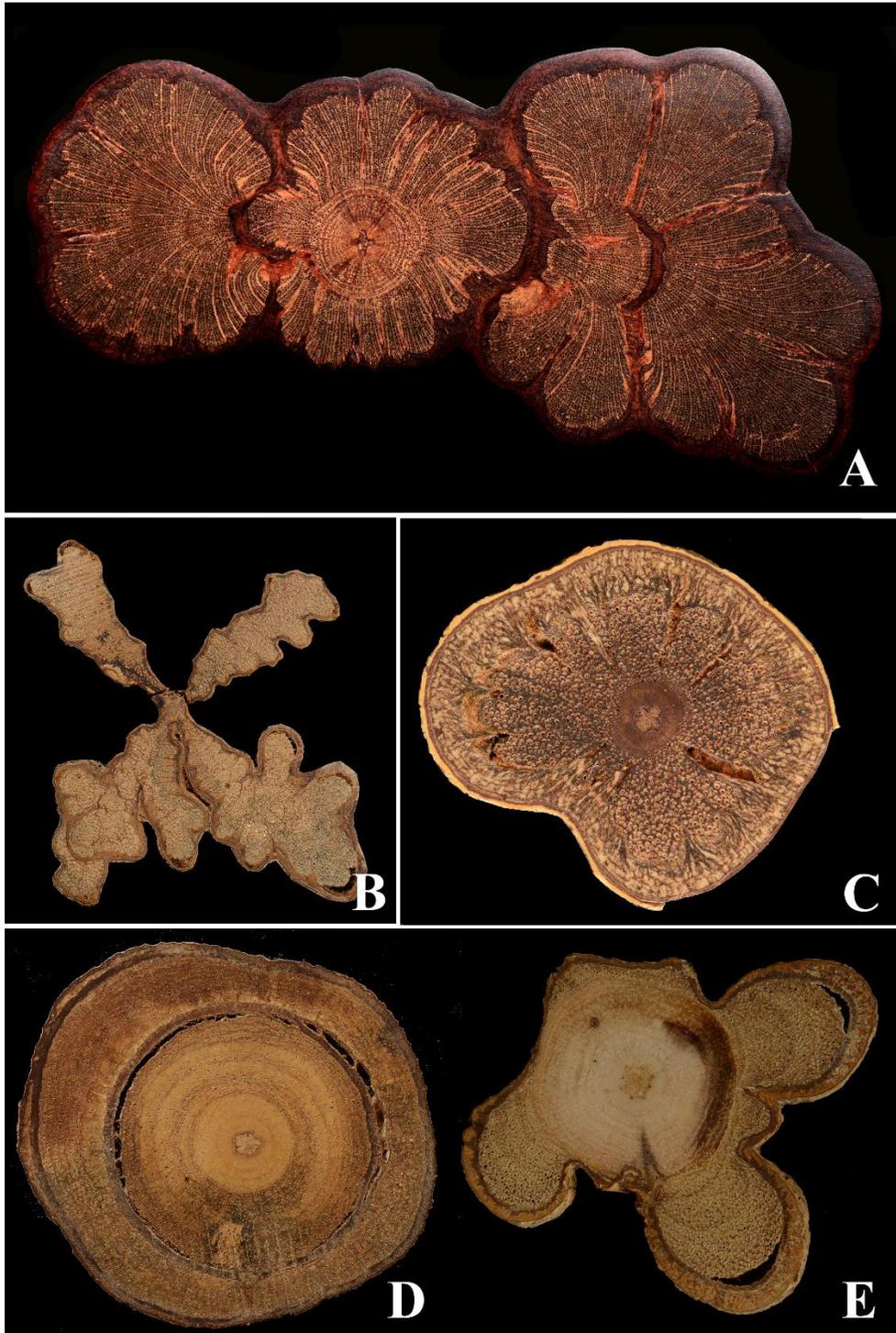
1. **STEMS.** Stems are woody or less often herbaceous. Woody, mature stems are usually 1 to 5 cm in diameter, although in several genera (e.g., *Dalbergia*, *Machaerium* and *Schnella*) they may reach 30 cm or more in diameter, and more than 30 m in length. Stems are cylindrical (e.g., *Dalbergia*, *Deguelia*, *Machaerium*; fig. 1a-f; 2a; 3d; 4c), flattened (e.g., *Machaerium*, *Rhynchosia*, *Schnella*; fig. 2c & d; 3a; 5b), lobed (fig. 3b & e; 4a), pentagonal (e.g., *Senna*; fig. 4b), quadrangular (e.g., *Schnella*) or winged (e.g., *Centrosema*; fig. 5d) in cross section. Generally, Fabaceae have regular wood anatomy with abundant paratracheal parenchyma in the secondary xylem, which is also observed in many species of lianas. This is often arranged in broad bands that are visible to the naked eye (fig. 1a-f). In addition, rays are narrow and more or less conspicuous (fig. 1a, b, d-f). Numerous species have stems with: 1) **Successive cambia** forming concentric rings of vascular tissue (e.g. *Machaerium*; fig. 4e), concentric discontinuous bands of vascular tissue (e.g., *Machaerium*, *Rhynchosia*; fig. 2c), or asymmetrical bands of vascular tissue (e.g., *Entada*, *Machaerium*, *Schnella*; fig. 2b, d & 3a); 2) **Neoformed vascular cylinders**, i.e., the formation of novel vascular cylinders outside the original vascular cylinder after prolonged secondary growth (e.g., *Dalbergia*; fig. 4d); and 3) **Phloem wedges** (e.g., *Dalbergia*, *Schnella*; fig. 1b; 3a & c; 4c).
2. **EXUDATES.** Exudates in herbaceous vines are usually watery and colorless (fig. 4c), but in lianas is quite variable depending on the genus, sometimes it is clear, bright red (e.g., *Deguelia*, *Machaerium*; *Rhynchosia*; fig. 2a, 4e), orangish (e.g., *Deguelia*), or watery red (e.g., *Mucuna urens* (L.) Medik.). In some species, the exudate oxidizes upon contact with air turning blackish (e.g., *Dalbergia* sp.).
3. **CLIMBING MECHANISMS.** Climbing mechanisms are quite diverse. **Twiners** are common throughout the family, but mostly found in herbaceous genera such as *Phaseolus*, *Teramnus*, and *Vigna*, or in moderately woody genera like *Dioclea*, *Mucuna*, *Neorudolphia* and *Rhynchosia*. The **scrambling** habit is predominant in woody individuals, which are either unarmed (e.g., *Macrosamanea*, *Senna*) or armed with curved prickles (e.g., *Guilandina* (fig. 6c), *Mimosa*, *Piptadenia*, *Senegalia*), or in herbaceous genera such as *Desmodium*. **Tendrils**, although not common in the family, are found in woody lianas such as *Entada* (fig. 6d),



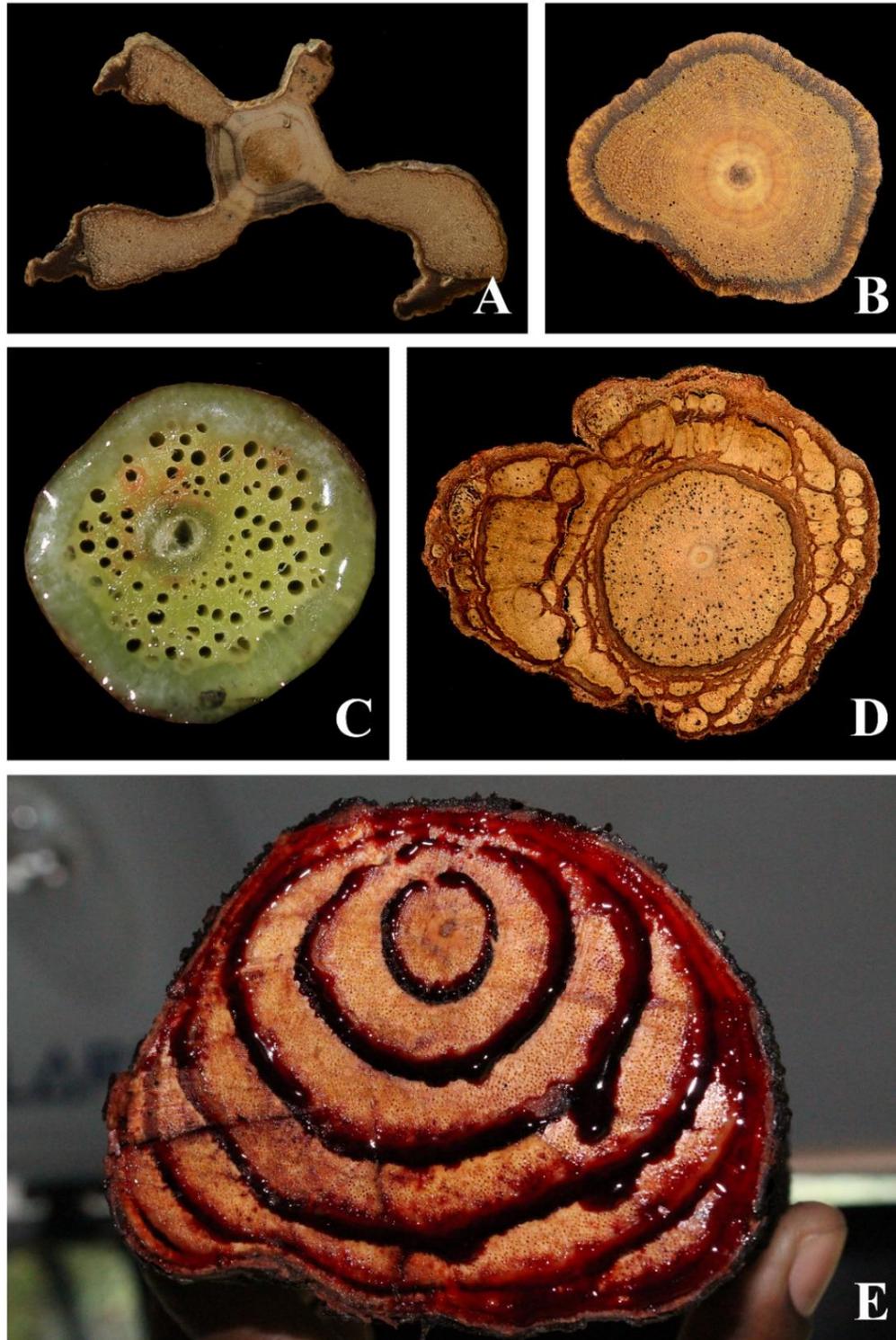
**Figure 1.** Cross sections of stems with regular anatomy. **A.** *Deguelia amazonica*. **B.** *Dalbergia monetaria*. **C.** *Machaerium kegelii*, young stems. **D.** *Senegalia* sp. **E.** *Piptadenia minutiflora*. **F.** *Mimosa hondurana*. Photos by P. Acevedo.



**Figure 2.** Cross sections of stems. **A.** *Machaerium amazonense* with regular anatomy. **B.** *Entada gigas* with successive cambia producing asymmetrical bands of vascular tissue. **C-D.** *Machaerium madeirense*, successive production of cambial tissue responsible for the formation of interxylary rings or bands of phloem tissue. Photos: A, C-D by P. Acevedo; B by J. Amith.



**Figure 3.** Cross sections of stems. **A.** *Schnella* sp. with a cross-shape medulla and successive cambia. **B.** *Schnella guianensis* with asymmetrical, lobed stems. **C.** *Schnella kunthiana* with a cross-shape medulla and deep phloem wedges. **D.** *Machaerium kegelii* with concentric successive cambium. **E.** *Senegalia multipinnata* with asymmetrical, 4-lobed or quadrangular stems. Photos by P. Acevedo.



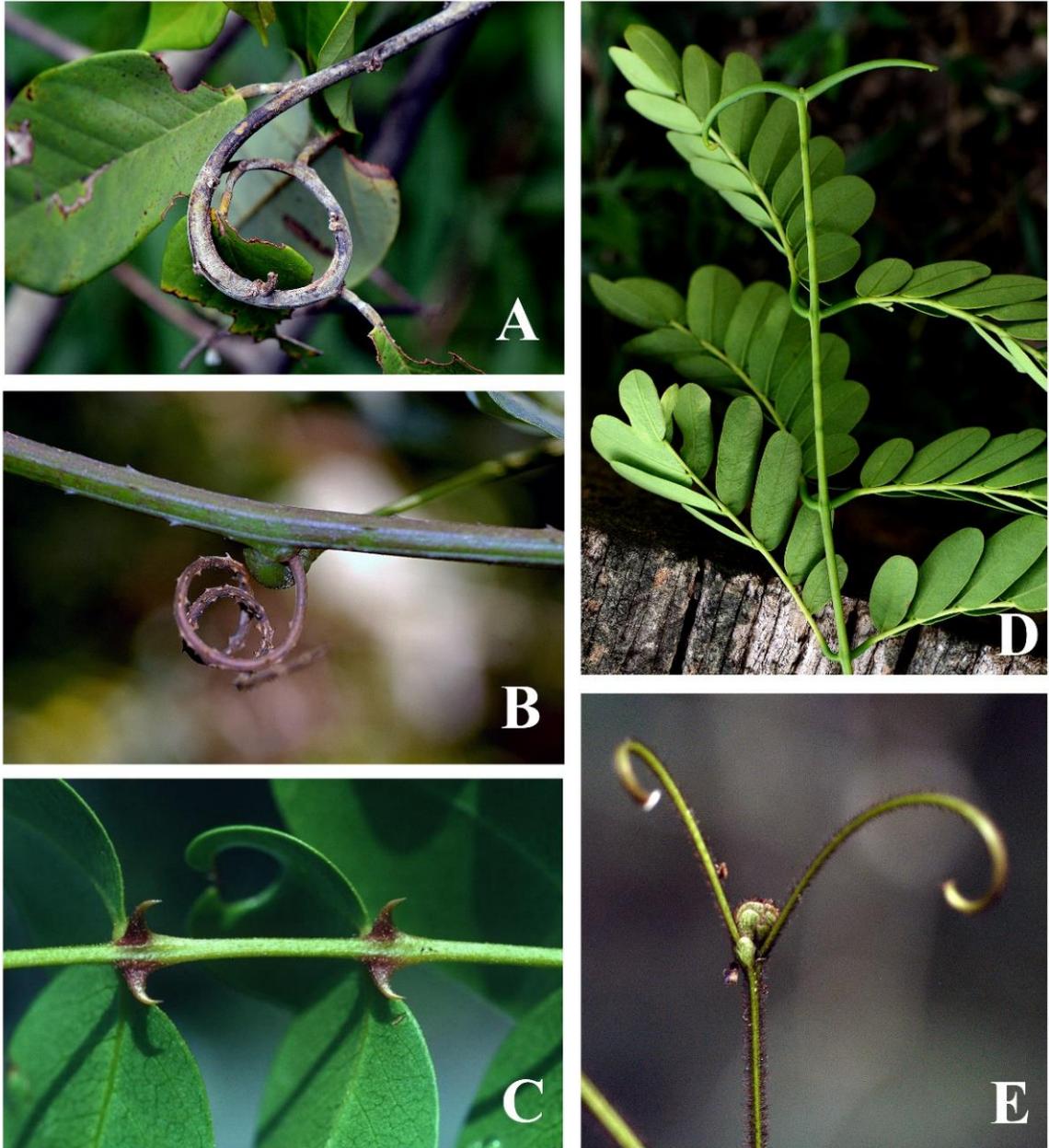
**Figure 4.** Cross sections of stems. **A.** *Senegalia hayesii* with 4-lobed-winged stems. **B.** *Senna quinqueangulata* with pentagonal stems. **C.** *Mucuna sp.* with cylindrical stems and clear exudate. **D.** *Dalbergia amazonica* with neoformations. **E.** *Machaerium sp.* with successive cambia and bright red exudate. Photos: A-B, D by P. Acevedo; C, E by H. Medeiros.

*Schnella* (fig. 6e) and *Senegalia* (fig. 16a), and in herbaceous genera such as *Lathyrus* and *Vicia*. Short **prehensile branches** are common in *Dalbergia* (fig. 6a), *Deguelia*, *Machaerium*, and some species of *Canavalia*, and *Piptadenia*. **Cirri**, i.e., short, leafless flagelum-like, prehensile branches, are known in several species of *Machaerium* (Fig. 5c) and *Senegalia* (fig. 6b).

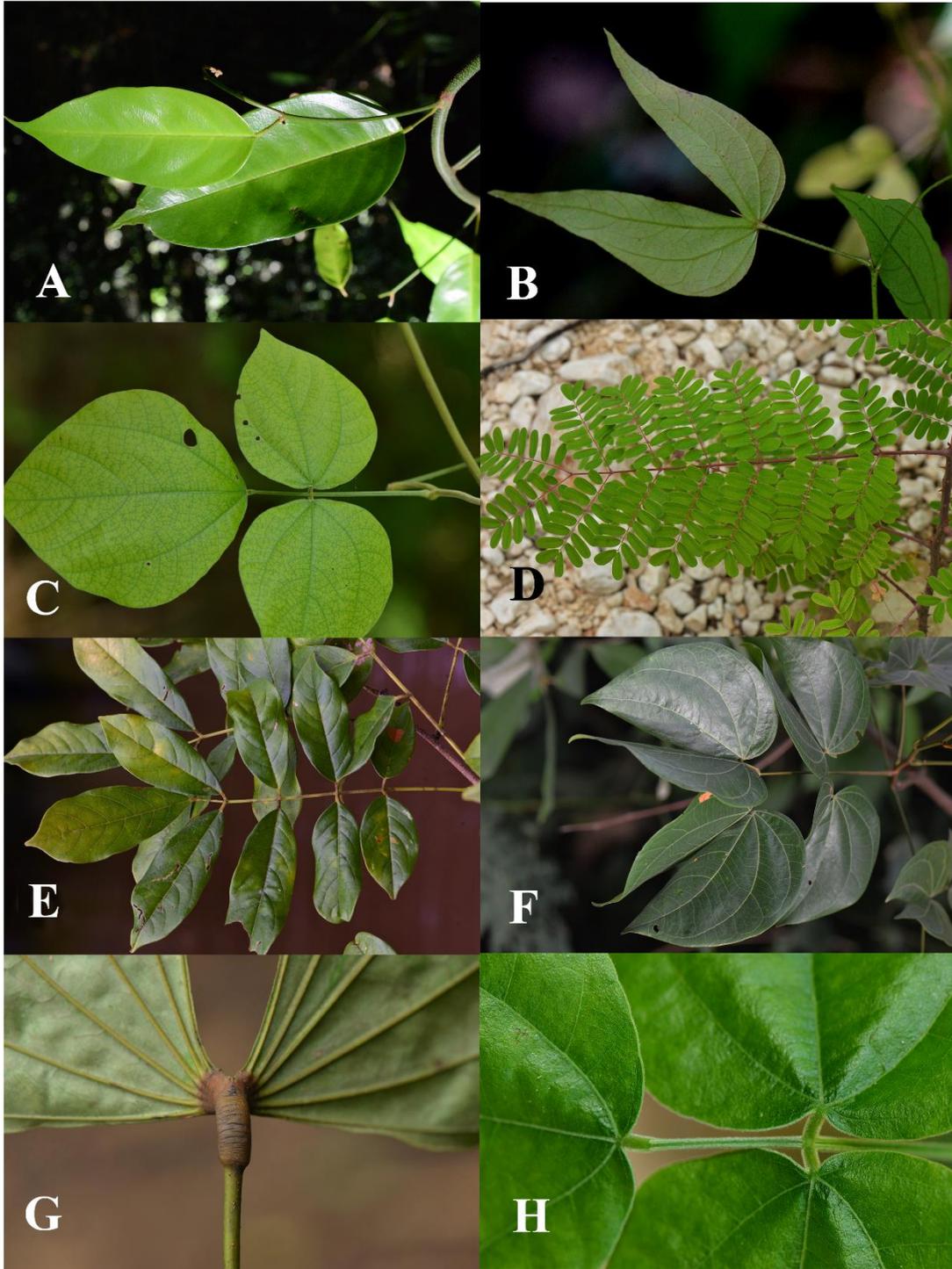
4. **LEAVES.** Leaves in Fabaceae are alternate or very rarely opposite. However, all climbers have alternate leaves which are commonly compound, but simple or unifoliolate (fig. 7a) leaves are found in a few species of climbers. The most common type of leaf is trifoliolate (fig. 7c) followed by pinnate (fig. 7e), bipinnate (fig. 7 d & f), and unifoliolate, bilobed leaves (fig. 7b) are comon in *Schnella*. Petioles and rachises are nearly cylindrical (fig. 6a, c-d), slightly flattened adaxially, winged or armed with recurved prickles (fig. 6c). Petioles and petiolules are usually pulvinate (fig. 7g & h). Stipitate or sessile glands are present in many genera (Mimosoid and Caesalpinoid clades), commonly near the base of petioles or along the rachis between the insertion of leaflets or pinnae (e.g. *Adenopodia*, *Havardia*, *Piptadenia*, *Senegalia* and *Senna*).
5. **STIPULES AND STIPELS.** Stipules are persistent or caducous, and of various sizes and shapes, sometimes spinescent (e.g. *Machaerium*). Stipels are present in many genera.
6. **INFLORESCENCES.** Inflorescences are quite variable, usually racemose (fig. 8a, b, d, e, h, i) but also spicate or capitulate (fig. 8f & g). They are ascending or hanging, axillary, distal, or cauliflorous. Distal inflorescences form a paniculate synflorescence at the end of branches and are common to all genera. Cauliflorous inflorescences are often fasciculate and found in only a few species.
7. **FLOWERS.** Flowers are commonly bisexual and quite variable in size, shape and number of parts, with zygomorphic or actinomorphic symmetry (figure 8), commonly sepals and petals are 5, stamens 10, but can be as little as 1 or numerous, and carpels always one.
8. **FRUITS.** Fruits are derived from a single carpel; most often flat, elongate and dehiscent, ranging in size from a few milimeters to nearly a meter long.
9. **SEEDS.** Seeds are quite variable in shape, size, texture, and color, some diagnostic at the generic level.



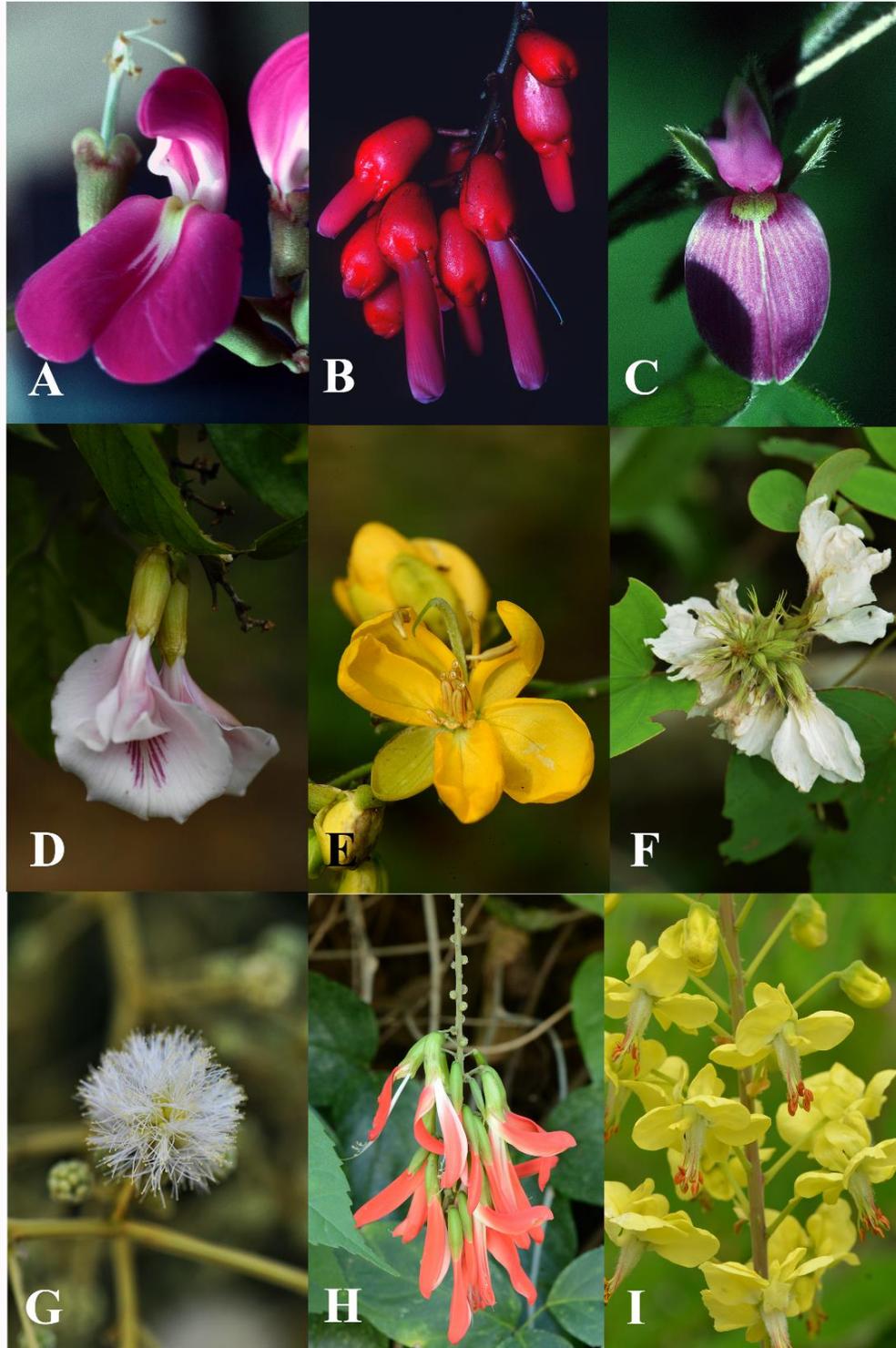
**Figure 5.** Stems of lianas in the Fabaceae. **A.** *Schnella guianensis*, sinuous stem, typical of the genus. **B.** *Rhynchosia erythrinoides*, flattened, ribbon-like stem. **C.** *Machaerium kegelii*, cylindrical stem, with short axillary cirri. **D.** *Centrosema plumieri*, twining, winged stem. Photos by P. Acevedo.



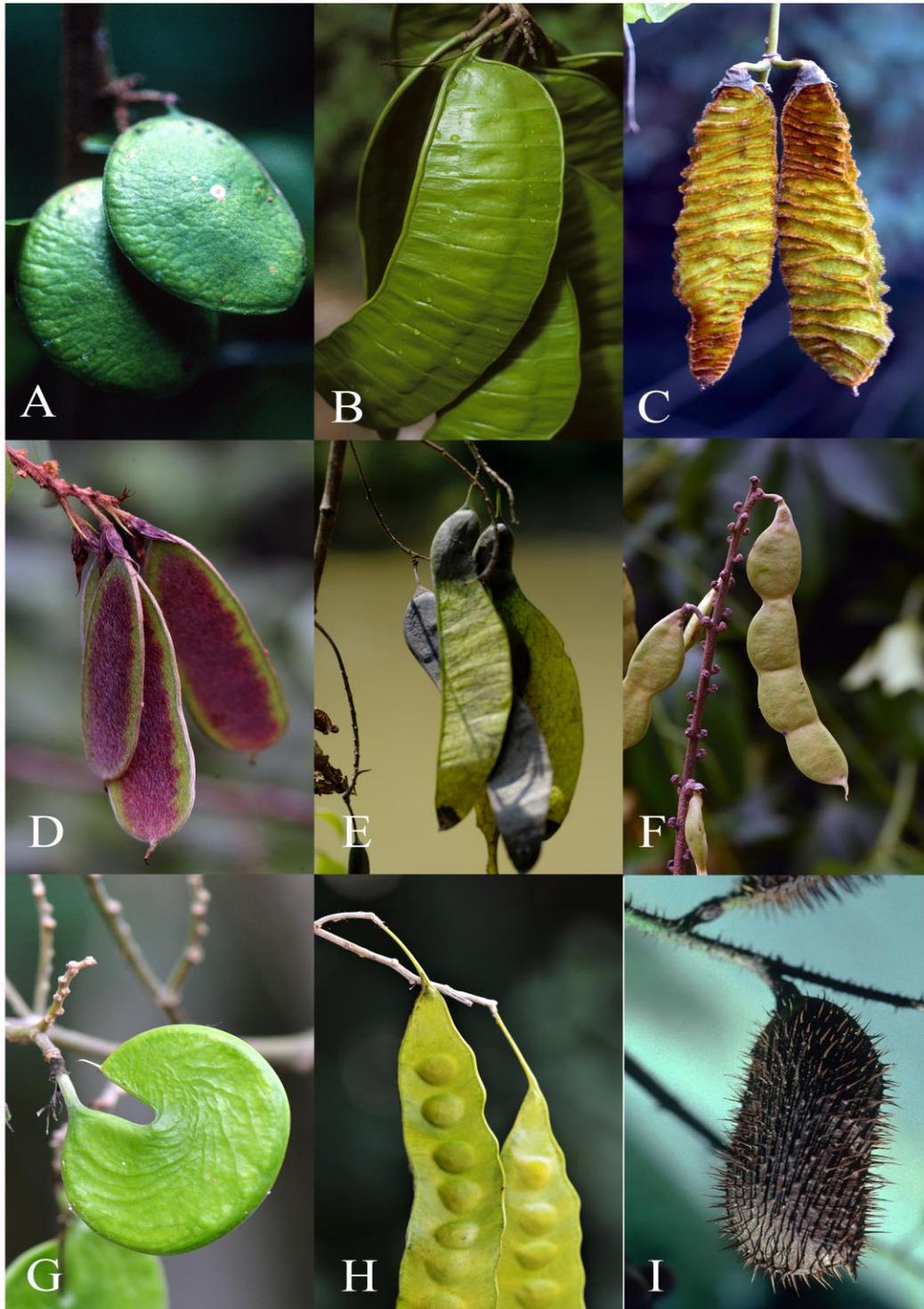
**Figure 6.** Climbing mechanisms. **A.** *Dalbergia monetaria*, with short prehensile branch. **B.** *Senegalia altiscandens*, with an axillary cirrus. **C.** *Guilandina ciliata*, armed leaf rachis. **D.** *Entada polyphylla*, tendrils derived from the two distal pinnae. **E.** *Schnella* sp. circinate tendrils at base of inflorescence. Photos by P. Acevedo.



**Figure 7.** Leaves in Fabaceae. **A.** *Dalbergia amazonica*, unifoliolate leaves. **B.** *Schnella* sp., unifoliolate, bilobed leaf. **C.** *Rhynchosia phaseoloides*, trifoliolate leaf. **D.** *Biancaea decapetala*, pari-bipinnate leaf. **E.** *Deguelia* sp., imparipinnate leaf. **F.** *Senegalia* sp., pari-bipinnate leaves. **G.** *Schnella* sp., base of deeply bilobed foliole and petiole with distal pulvinus. **H.** *Rhynchosia phaseoloides*, a trifoliolate leaf with pulvinate petiolules. Photos by P. Acevedo.



**Figure 8.** Flowers in Fabaceae. A-D, H. Papilionaceous flowers. E, F, I. Caesalpinieaceous flowers. G. Mimosoid flowers. **A.** *Canavalia rosea*, keel as long as the standard. **B.** *Neorudolphia volubilis*, folded elongate standard. **C.** *Galactia striata*, reflexed standard. **D.** *Clitoria pozuzoensis*, standard larger than remaining petals. **E.** *Senna bicapsularis*, poricidal anthers of different sizes. **F.** *Schnella* sp., petals of similar size. **G.** *Parasenegalia vogeliana*, minute flowers in a capitulum. **H.** *Camptosema spectabile*, elongate folded standard. **I.** *Biancaea decapetala*, inflorescence with nodding flowers. Photos by P. Acevedo.



**Figure 9.** Fruits in Fabaceae. **A.** *Dalbergia monetaria*, flat, nearly circular. **B.** *Entada polyphylla*, a craspedium. **C.** *Mucuna urens*, exocarp with irritant hairs. **D.** *Schnella* sp., oblong, flat, pubescent. **E.** *Machaerium huanucoense*, a samara. **F.** *Deguelia* sp., semi-lomentaceous margins. **G.** *Machaerium lunatum*, lunate, water dispersed. **H.** *Parasenegalia vogeliana*, thin, flat, with marked seed locules. **I.** *Guilandina bonduc*, turgid with spiny exocarp. Photos by P. Acevedo.

## USES

Numerous products are derived from this incredibly diverse family. In general, Fabaceae lianas are the source of flexible, rope-like building materials. Stems and branches are commonly used in the tropics as fish stupefactants, these includes species of *Abrus*, *Camptosema*, *Deguelia*, *Desmodium*, *Entada*, *Lonchocarpus*, *Machaerium*, *Nissolia*, *Pachyrhizus*, *Phaseolus*, *Rhynchosia*, *Schnella*, and *Senna* (Acevedo, 1990). Some species of *Phaseolus*, *Lablab* and *Canavalia* bear seeds that are suitable for human consumption as they contain nutritious proteins or amino acids. The seeds of several genera are used as beads in the production of craft artifacts, as they are hard, showy, and often large; these include species in *Abrus*, *Canavalia*, *Dioclea*, *Guilandina*, *Mucuna*, and *Rhynchosia*. There are several genera of climbing Neotropical Fabaceae that are commonly used as ornamentals to add variety to local gardens. These include species of *Calopogonium*, *Camptosema*, *Canavalia*, *Centrosema*, *Clitoria*, *Dalbergia*, *Guilandina*, and *Vigna* (Menninger, 1970). In addition, there are numerous genera in the Neotropics that have ornamental potential.

## KEY TO THE GENERA OF CLIMBING FABACEAE

1. Plants armed with curved prickles ..... 2
1. Plants unarmed or if armed then with straight spines ..... 10
2. Leaves once pinnate, imparipinnate (exudate often red); predominantly neotropical ..... *Machaerium*
2. Leaves bipinnate (exudate never red) ..... 3
3. Petioles lacking nectaries; flowers bright yellow or pink ..... 4
3. Petioles with nectaries; flowers white, pale yellow or pale green ..... 6
4. Flowers mimosoid, corollas and stamens pink or pale yellow; neotropical..... *Mimosa*
4. Flowers caesalpinoid, corolla yellow ..... 5
5. Fruits unarmed; seeds oblong, brown; in disturbed habitats; exotic, naturalized in the Neotropics, especially in the West Indies ..... *Biancaea*
5. Fruits armed; seed ovoid, gray, yellow-orange, or black; mostly of coastal habitats; Pantropical ..... *Guilandina*
6. Stamens numerous; fruits dehiscent along the sutures, not leaving a marginal replum after dehiscing . 7
6. Stamens 5-10; fruits leaving a marginal replum after dehiscing or dehiscing along sutures ..... 8

7. Leaves and branches armed; stamens with filaments free or connate at the base; Neotropics .....	
.....	<b>Senegalia</b>
7. Stems armed only with stipular prickles; leaves unarmed; stamens with filaments connate at least ½ their length from base; Mexico to Nicaragua .....	<b>Havardia</b>
8. Leaves with a gland above the petiole base .....	9
8. Leaves with glands at petiole and between pinnae .....	<b>Piptadenia</b>
9. Anthers without an apical gland; Neotropics .....	<b>Mimosa</b>
9. Anthers with an apical gland; Mexico to Nicaragua .....	<b>Adenopodia</b>
10. Leaves pinnate .....	11
10. Leaves unifoliolate or trifoliolate .....	27
11. Leaves once pinnate .....	12
11. Leaves bipinnate .....	24
12. Leaves paripinnate .....	13
12. Leaves imparipinnate .....	17
13. Leaves with distal leaflets modified into tendrils .....	14
13. Leaves with normal distal leaflets .....	15
14. Style hairy along one side, from top to near the base; Mexico .....	<b>Lathyrus</b>
14. Style hairy on distal portion, just below the stigma .....	<b>Vicia</b>
15. Petioles and rachis lacking stipitate glands; leaflets and flowers with translucent glandular dots; anthers opening through longitudinal slits; Neotropics .....	<b>Poiretia</b>
15. Petioles and rachis bearing stipitate glands; leaflets and flowers not bearing translucent glandular dots; anthers poricidal .....	16
16. Plants herbaceous reaching few m in length; flowers < 2 cm wide; Brazil .....	<b>Chamaecrista</b>
16. Plants woody, reaching > 5 m long; flowers > 3 cm wide; predominantly neotropical .....	<b>Senna</b>
17. Corolla yellow .....	<b>Nissolia</b>
17. Corolla of other colors .....	18
18. Corolla bright red, standard oblong, suberect; Neotropics .....	<b>Barbieria</b>
18. Corolla of other colors, standard not oblong, reflexed .....	19
19. Twiners .....	20
19. Scramblers often with prehensile branches .....	22
20. Plants subwoody, reaching ≤ 5 m long; leaves membranaceous, small; fruits dehiscent, seeds black and red in some species .....	<b>Abrus</b>
20. Plants woody reaching ≥ 5 m long; leaves coriaceous; fruits dehiscent or indehiscent; seeds never as above .....	21

21. Flowers < 2 cm long; standard petal reflexed, as long as the other petals; fruit commonly indehiscent; Neotropics ..... *Deguelia*
21. Flowers > 2.5 cm long; standard petal suberect, much larger than the other petals; fruit dehiscent; predominantly neotropical ..... *Clitoria*
22. Fruits falcate, with a distal wing or lunate; stipules usually spinescent and recurved; stem often with thick, red exudate and successive cambia; predominantly neotropical ..... *Machaerium*
22. Fruits oblong, not falcate or lunate; stipules minute, caducous; stem with clear exudate, or if reddish then watery, lacking successive cambia..... 23
23. Leaflets opposite or subopposite; exudate clear; standard petal with basal callosities; wings as long as the keel; fruits papery to thin woody; predominantly neotropical ..... *Lonchocarpus*
23. Leaflets alternate; exudate clear or watery and red; standard petal without basal callosities, wings longer than the keel; fruits elongate to coin-shaped; pantropical ..... *Dalbergia*
24. Distal pinna modified into tendrils; Neotropics ..... *Entada*
24. Distal pinnae with normal leaflets ..... 25
25. Petioles and/or leaf rachis with nectariferous glands ..... 26
25. Petioles and leaf rachis lacking nectariferous glands; pantropical..... *Guilandina*
26. Flowers large (3-5 cm long); stamen filaments connate for about half of their length; South America ..... *Macrosamanea*
26. Flowers small (usually < 1 cm long); stamens free or connate only at base; pantropical..... *Parasenegalia*
27. Leaves unifoliolate, blade simple or bilobed (sometimes seemingly bifoliolate, with the two lobes separate to their bases) ..... 28
27. Leaves trifoliolate ..... 31
28. Stipels wanting..... 29
28. Stipels paired at the junction with the blade ..... 30
29. Leaves entire to deeply bilobed; plant bearing circinate tendrils in pairs; stems often sinuate, with a cross-shaped medulla; Neotropics ..... *Schnella*
29. Leaves unlobed; plant with axillary cirri; pantropical ..... *Machaerium*
30. Calyx fleshy, bell-shaped; Puerto Rico..... *Neorudolphia*
30. Calyx membranaceous, funnel shaped; Hispaniola ..... *Rhodopis*
31. Standard oblong, folded longitudinally..... 32
31. Standard orbicular to reniform in outline, revolute to slightly folded longitudinally ..... 33
32. Calyx campanulate, 5-lobed, with 2 upper and 3 lower lobes; standard shorter than the other petals; fruits usually with rigid, irritating hairs; pantropical ..... *Mucuna*

32. Calyx tubular, 4-lobed (due to the fusion of 2 lobes); standard longer or slightly longer than the other petals; fruits lacking stiff, stinging hairs; South America.....	<i>Camptosema</i>
33. Keel petal twisted or sigmoid.....	34
33. Keel petal straight .....	43
34. Keel sigmoid or hooked.....	35
34. Keel spirally twisted .....	38
35. Pseudoraceme nodes not noticeably swollen; pedicels longer than the calyx tube; Mexico to Costa Rica.....	<i>Ramirezella</i>
35. Pseudoraceme nodes swollen; pedicels shorter than the calyx tube .....	36
36. Beak of keel narrowly hooked; NE & SE Brazil .....	<i>Mysanthus</i>
36. Beak of keel widely curved.....	37
37. Beak of keel gradually curved upward into a hook with distal portion folded back on itself; Neotropics.....	<i>Ancistrotropis</i>
37. Beak of keel sigmoid curved, with distal portion not folded back; Neotropics .....	<i>Sigmoidotropis</i>
38. Plant with uncinata hairs; keel petal laterally and tightly coiled; United States to W South America.....	<i>Phaseolus</i>
38. Plant with straight hairs .....	39
39. Calyx lobes similar, shorter than the calyx tube .....	40
39. Calyx lobes dissimilar, as long as or longer than the calyx tube .....	41
40. Standard petal coiled; keel beak with numerous coils; style not swollen; Mexico to Argentina .....	<i>Cochlianthus</i>
40. Standard petal not coiled; keel beak slightly twisted to the left; style swollen near the base; Mexico to Argentina .....	<i>Condylostylis</i>
41. Corolla cardinal red or purple; fruits cylindrical; Neotropics.....	<i>Macroptilium</i>
41. Corolla violet purple or lavender blue; fruits flattened.....	42
42. Distal portion of keel loosely coiled in a forward direction; lateral calyx teeth narrowly triangular, longer than the calyx tube; fruit straight; Mexico to Argentina.....	<i>Helicotropis</i>
42. Distal portion of keel tightly coiled, projecting downward; lateral calyx teeth falcate, shorter than the calyx tube; fruit falcate; Neotropics.....	<i>Leptospron</i>
43. Fruit a lomentum, with at least one margin (sometimes both) sinuate between the seeds, separating into segments that adhere to clothing; Cosmopolitan.....	<i>Desmodium</i>
43. Fruit not a lomentum.....	44
44. Leaves lacking stipels at the base of leaflets; pantropical.....	<i>Canavalia</i>
44. Leaves with stipels at the base of leaflets .....	45

45. Leaflets and calyx with yellowish or orangish glandular dots; Neotropics .....	<i>Rhynchosia</i>
45. Leaflets and calyx without glandular dots .....	46
46. Calyx 4-lobed (the 2 upper lobes fused into a larger one) .....	47
46. Calyx 5-lobed .....	48
47. Wing petals at least twice as long as the calyx; pantropical .....	<i>Dioclea</i>
47. Wing petals minute, scarcely longer than the calyx; Brazil .....	<i>Cleobulia</i>
48. Standard with 2 elongate callosities near the base; legume tuberculate along upper margin; introduced throughout the Neotropics .....	<i>Lablab</i>
48. Standard and fruits smooth, not bearing callosities .....	49
49. Standard orbicular, much larger than the other petals.....	50
49. Standard variously shaped nearly equal to the other petal or only slightly larger .....	52
50. Wing petals spreading at right angles; South America, Hispaniola.....	<i>Periandra</i>
50. Wing petals not spreading at right angles, adhering to the keel.....	51
51. Calyx as long as the bracteoles; standard gibbous right above the claw; Neotropics .....	<i>Centrosema</i>
51. Calyx much longer than the subtending bracteoles; standard not gibbous; Neotropics.....	<i>Clitoria</i>
52. Stipules medifixed; corolla yellow or lilac; pantropical .....	<i>Vigna</i>
52. Stipules basifixed; corolla of other colors, rarely yellow .....	53
53. Calyx gibbous at the base; SW United States to Argentina .....	<i>Cologania</i>
53. Calyx symmetrical at base, not gibbous.....	54
54. Ovary stipitate; South America.....	<i>Cratylia</i>
54. Ovary sessile or subsessile.....	55
55. Wing petals with an appendage at the base.....	56
55. Wing petals without appendages.....	57
56. Fruits linear; distal Leaflets with trilobed margins; introduced throughout the Neotropics .....	<i>Neustanthus</i>
56. Fruits oblong; distal leaflets with sharp-toothed margins; Mexico to Venezuela.....	<i>Pachyrhizus</i>
57. Corolla white, pale lavender or yellowish green.....	58
57. Corolla blue, violet, pink or red .....	59
58. Fruits linear, flat; pantropical.....	<i>Teramnus</i>
58. Fruits oblong, turgid.....	60
59. Corolla white, the standard with purplish markings near the center; wings and keel shorter than the standard; fruit not thickened at margins, 4-5-seeded; introduced in Bolivia and Brazil .....	<i>Neonotonia</i>
59. Corolla yellowish green; wings and keel purplish, almost as long as the standard; fruit with thickened margins, 2-3-seeded; Mexico, C. & S. America .....	<i>Oxyrhynchus</i>

60. Flowers in short pseudoracemes or fascicles; standard suberect; introduced in Jamaica ..... *Shuteria*
60. Flowers in elongate pseudoracemes; standard reflexed ..... 61
61. Calyx with 4 similar lobes (the 2 upper lobes fused); predominantly neotropical ..... *Galactia*
61. Calyx bilabiate, upper lobes fused, lower lobes lanceolate; Neotropics ..... *Calopogonium*

## IDENTIFICATION OF GENERA BASED ON VEGETATIVE CHARACTERS

Cauliflory: *Clitoria* (some species), *Dioclea* (some species), *Neorudolphia*, *Sigmoidotropis*.

Cross-shaped medulla: *Schnella* (all species), *Senegalia* (some species).

Nectary glands on petioles and leaf rachis: *Adenopodia*, *Chamaecrista*, *Havardia*, *Macrosamanea*,  
*Mimosa* (some species), *Piptadenia*, *Senegalia*, *Senna*.

Red exudate: *Deguelia* (some species), *Machaerium*, *Rhynchosia* (some species).

Stipular spines: *Havardia*, *Machaerium* (some species), *Mimosa*, *Senegalia* (some species).

Successive cambia: *Canavalia* (some species, discontinuous), *Entada* (*E. gigas*, discontinuous),  
*Machaerium* (some species, concentric rings), *Rhynchosia* (some species, concentric rings),  
*Schnella* (some species, discontinuous).

## GENERIC DESCRIPTIONS

**ABRUS** Adanson, Fam. Pl. 2: 327, 511. 1763.

Twining vines or less often subshrubs, reaching few m in length. Stems cylindrical to moderately flattened; xylem with wide rays and shallow phloem wedges, reaching 1 cm in diam. Leaves paripinnate; rachis mucronate; leaflets opposite, membranaceous; stipels minute, appressed to the rachis; stipules minute, persistent. Inflorescences of axillary, lateral, or terminal pseudoracemes; bracts and bracteoles



*A. precatorius* L., photos by P. Acevedo

minute, caducous; pedicels short. Flowers papilionaceous; calyx campanulate, funnel-shaped, with 5 minute lobes at the apex; corolla pink, purplish to yellowish, much longer than the calyx; standard ovate or obovate, retuse at the apex, shortly clawed at base; wings recurved, shorter than or as long as the keel; stamens 9, the filaments united into a long tube; ovary almost sessile, with numerous ovules, the style smooth, curved, the stigma penicillate. Legume oblong,

flattened, small, dehiscent; seeds few, ellipsoid to almost globose, bright red with a black spot surrounding the hilum or completely brown.

**Distinctive features:** Paripinnate compound leaves, with minute stipels; stamens 9 connate; fruits short; seeds usually scarlet red with a black area around the hilum in *A. precatorius* L.

**Distribution:** A genus of 4 species, native to the Paleotropics. Two species naturalized and becoming weedy in the Neotropics.

Note: Seeds of *A. precatorius* are highly toxic, a single seed is potent enough to kill an adult human.

**ADENOPODIA** C. Presl, Epim. Bot. 206. 1851.

Climbing (scrambling) shrubs or sometimes erect, shrubs or small trees. Stems cylindrical to



slightly angled, armed with recurved prickles; simple with regular wood anatomy. Leaves bipinnate, paripinnate; pinna opposite; leaflets opposite, obovate; rachis and petiole with recurved thorns; petiole with a conspicuous gland above the base; rachis with a gland at the junction of upper pinnae; rachis mucronate; stipels

*A. patens* (Hook. & Arn.) Brenan, from Matuda 6184 (US)

absent; stipules minute.

Inflorescences of axillary, solitary or clustered spikes; bracts minute. Flowers minute, actinomorphic, sessile; calyx cupular, with 5 minute lobes; corolla white or yellowish, campanulate, 5-lobed, glabrous; stamens 10, free, projecting well beyond the corolla, anther with apical gland; ovary sessile, tomentose, with numerous ovules, the style smooth, the stigma punctiform. Fruit a craspedium with sinuate margins, transversely splitting into 1-seeded segments, leaving a persistent marginal replum.

**Distinctive features:** Presence of prickles on branches and leaves; petioles with a conspicuous gland above the base; flowers minute, in spikes; fruits splitting into transverse 1-seeded segments and leaving a replum along the margins. Often confused with *Entada* but distinguished by the prickled stems and leaves and the absence of tendrils. Vegetatively similar to *Senegalia* and *Piptadenia* which are also armed but distinguished from them by the fruits that split into segments leaving a replum, while in *Senegalia* and *Piptadenia* the fruits dehisce longitudinally along the sutures.

**Distribution:** Seven species, 4 in Africa and 3 in Mexico, all of which are climbers, one species extending to Nicaragua.

**ANCISTROTROPIS** A. Delgado, Amer. J. Bot. 98: 1704. 2011.

Herbaceous or subwoody, twining or creeping vines. Stems cylindrical to slightly angled, unarmed,



*A. peduncularis* (Fawc. & Rendle) A. Delgado, photo by Hervé Galliffet

glabrous or pubescent, simple with regular stem anatomy. Leaves trifoliolate; stipules minute, of various forms, persistent; stipels obovate, minute. Inflorescences of axillary pseudoracemes with 2-3 small to medium-size flowers (< 2.5 cm long) per node. Flowers papilionaceous; calyx campanulate, with pleated tube and 5 lobes;

corolla pale pink, violet or cream, the standard orbicular, involute along the margins forming a hood, the wings unguiculate longer than keel, the keel hook-shaped with distal portion open and folded back on itself, and with inner margins closed by conspicuous interlocking marginal hairs; stamens 10, diadelphous, the anthers of the same size; ovary sessile, with numerous ovules, the style thickened distally and extending as a small beak beyond the stigma, the stigma laterally extrorse due to torsion of the style (i.e., laterally positioned initially but ultimately turned to the outside face in an extrorse position). Fruit a linear to slightly curved, flattened fruit, erect on the infructescence, dehiscent along both sutures by twisting valves; seeds oblong, light brown.

**Distinctive features:** Flowers with standard petal forming a hood, wing petals much longer than the keel, and the keel with hooked beak splayed open distally. The fruit is linear and erect on the infructescence. Previously classified under the genus *Vigna* which differs by the incurved keel petal and the commonly yellow corolla.

**Distribution:** A genus of six species with Neotropical distribution, found in secondary or primary forests from 0 to 1200 m elevation.

**BARBIERIA** de Candolle, Prodr. 2: 239. 1825, (nom. cons.).

Twining woody vines reaching 4-10 m in length. Stems slender, cylindrical with regular



*B. pinnata* (Pers.) Bail., painting by F. Horne

anatomy. Leaves imparipinnate; leaflets 11-21, chartaceous, opposite, oblong, apex rounded and mucronate, base rounded or obtuse, margins ciliate; petiolules ferruginous-pubescent; petioles pilose; rachis with a pair of linear stipels at the base of each pair of leaflets; stipules lanceolate, 5-9 mm long, pubescent, persistent. Inflorescences hanging, of axillary racemes with few distal flowers, 4-16 cm long; bracts lanceolate, pubescent, forming an involucre at the base of the calyx. Flowers papilionaceous; calyx tubular, reddish, with five subulate sepals, shorter than the tube, ventral sepals slightly longer than the lateral ones; corolla red or red-orange, standard oblong-oblongate, unguiculate, 5-6 cm long, wings oblong, 9-13 mm long, keel elliptic-oblong, 17-23 mm long; stamens 10, staminal column white, anthers white; ovary linear, 8-11

mm long, white-pubescent. Legume subsessile, oblong, flattened, laterally compressed between the seeds, pubescent, with the margins sinuate and the calyx persistent at the base. Seeds 4-9 per fruit, dark brown or black, oblong, 4-6 mm long.

**Distinctive features:** Twining vine; leaves pinnately compound; leaflets discolored, with a pair of stipels at the base of each pair of leaflets; flowers red or red orange.

**Distribution:** A single species native to Cuba, Hispaniola, Puerto Rico, Mexico, Central America, and South America; in moist forests.

**BIANCAEA** Todaro, Nuov. Gen. Sp. 21. 1860.

Climbing, trailing or scrambling shrubs, or small trees. Stems cylindrical, armed with recurved



*B. decapetala*, photo by P. Acevedo

prickles, reaching 6 cm or more in diam. and > 15 m in length; wood with abundant paratracheal parenchyma, ray tissue inconspicuous. Leaves alternate, paribipinnate; petioles with scattered prickles; rachis armed with pairs of prickles at the base of each pinna; pinnae in opposite to alternate pairs; leaflets opposite to alternate; blade membranous, eglandular, oblong-elliptic, apex acute, obtuse, rounded to emarginate, base asymmetric; petiole and rachis lacking stipitate glands; stipules triangular, lanceolate to ovate, sometimes amplexicaule, caducous or persistent. Inflorescences ascending, of terminal or axillary racemes or panicles; rachis with scattered prickles; bracts ovate-lanceolate, caducous. Flowers zygomorphic, caesalpiniceous; calyx with a short hypanthium and 5 caducous sepals, leaving a hypanthium ring at the base of the fruit; petals 5, free, clawed, yellow to white, eglandular; median petal smaller; stamens 10, filaments free, densely pubescent on lower half; ovary sessile. Legume oblong,

coriaceous, unarmed, laterally compressed, or slightly swollen in *B. decapetala* (Roth) O. Deg., glabrous, oblong-elliptic to obovate, dehiscent, with a beaked apex. Seeds elliptic, ovoid to orbicular, black or brown, 8 per fruit.

**Distinctive features:** Scrambling, armed shrubs; leaves bipinnate, petiole and rachis lacking stipitate glands; corolla light yellow; anthers orangish; fruit unarmed, beaked. Superficially similar to *Guilandina* but leaves have many more leaflets, and the fruits are unarmed.

**Distribution:** A genus of six species native to southern Asia to the Malay Archipelago. *Biancaea decapetala* a large, scrambling shrub or liana has been introduced in the Neotropics, sometimes becoming a weed locally.

**CALOPOGONIUM** Desvaux, Ann. Sci. Nat. (Paris) 9: 423. 1826.

Herbaceous to moderately woody, twining vines or trailing herbs. Stems cylindrical to slightly



flattened, simple, with regular anatomy. Leaves trifoliolate; stipels and stipules minute. Inflorescences of axillary pseudoracemes or fascicles; the flowers clustered on the nodal swellings of the rachis; bracts and bracteoles minute; pedicels short. Flowers papilionaceous; calyx campanulate-tubular, with the two upper lobes united to form a lip, the 3 lower lobes lanceolate, shorter than the tube; corolla blue or violet, the standard obovate, auriculate at the base, erect, revolute at margins, the wings narrow (ob lanceolate), as long as the standard, the keel shorter than the wings; stamens 9-10, one of them free, the rest with the filaments united into a long tube; ovary sessile, hirsute, with numerous ovules, the style curved, glabrous, the stigma capitate. Legume dehiscent, flattened, linear-oblong, with crenate margins, septate between the seeds; seeds semi-circular, flattened.

*C. caeruleum* (Benth.) C. Wright, photo by P. Acevedo

**Distinctive features:** Twiner with trifoliolate leaves with stipels; corolla bluish or purplish, small (< 1 cm long); fruits flat, with slightly crenate margins.

**Distribution:** A genus of 8 to 9 species, native to the Neotropics from Mexico to northern Argentina including the West Indies, naturalized in the Paleotropics; mostly found in open disturbed habitats.

**CAMPTOSEMA** Hooker & Arnott, Bot. Misc. 3: 200. 1833.



*C. spectabile* (Tul.) Burkart, photo by P. Acevedo

pubescent, with 7-12 ovules, the style slightly distinctive, the stigma commonly truncate. Legume flattened, stipitate, linear, spirally dehiscent, constricted between seeds; seeds, flattened, lenticular, oblong or ovate.

**Distinctive features:** Red corollas, with elongate petals, the standard longitudinally plicate in most species, and ovary stipitate.

**Distribution:** A genus of about 13 species, 9 of which are Neotropical herbaceous to woody climbers, with a disjunct distribution in NE-SE Brazil and Rio La Plata region in South America; woody species are found in seasonal dense forest while the herbaceous ones occur in open thickets and grasslands.

Herbaceous to semi-woody twining vines or erect shrubs. Stems cylindrical when young, in some species becoming flattened, asymmetrical and with deep phloem wedges, with age. Leaves trifoliolate (simple in shrubby species); stipels and stipules minute. Inflorescences of axillary pseudoracemes; the flowers clustered on the nodal swellings of the rachis; bracts and bracteoles minute. Flowers papilionaceous, sometimes hanging; calyx tubular, 4-lobed (two fused upper lobes), the 3 lower lobes shorter but with the central, longer than the lateral ones; corolla red or red-orange, the standard elongate, lanceolate, oblong or oblanceolate, auriculate at the base, longitudinally plicate, the wings and keel narrow and elongate; stamens 10, one of them free, the rest with the filaments united into a long tube; ovary stipitate, slightly curved,



*Camptosema* sp., stem cross section, photo by P. Acevedo

**CANAVALIA** Adanson, Fam. Pl. 2: 325, 531. 1763.

Herbaceous to woody vines, twining or creeping. Stems cylindrical, simple or less often with



*Canavalia rosea* (Sw.) DC., photo by P. Acevedo

successive discontinuous concentric arcs of vascular tissue (e.g., *C. villosa* Benth.). Leaves trifoliolate; stipels absent; stipules minute, caducous. Inflorescences of axillary or terminal pseudoracemes; the flowers clustered on the nodal swellings of the rachis; bracts minute, in pairs; pedicels short. Flowers papilionaceous, resupinate; calyx campanulate, 5-lobed, two lobes much larger than the remaining 3 and longer than the tube, the remaining 3 shorter than the tube; corolla pink, violet, or purple, the

standard obovate, strongly reflexed, unguiculate, auriculate and thickened at the base, the wings and the keel of similar size; stamens 10, the filaments united into a long tube; ovary sessile or stipitate, pubescent, with numerous ovules, the style filiform, the stigma capitate. Legume elongate, flattened or slightly turgid, dehiscent or indehiscent, not septate between the seeds, with a longitudinal ridge parallel to the upper suture; seeds 3 or more, usually oblong, brown, white, black or red.

**Distinctive features:** Corolla pink, violet or purple, the standard unguiculate, auriculate and thickened at the base, keel and wings of similar length but shorter than the standard. Fruits longitudinally ridged along upper suture. Vegetatively similar to *Dioclea* but distinguished by the lack of stipels and the 5-lobed calyx, *Dioclea* on the other hand has stipels and a 4-lobed calyx.

**Distribution:** A genus of twining lianas and vines of about 60 species, 33 of which are native to the Neotropics in diverse vegetation formations, including flooded forest, gallery forest, open thickets and woodlands.

**CENTROSEMA** (de Candolle) Benth., *Commentat. Legum. Gen.* 53. 1837.



*C. pubescens* Benth., photo by P. Acevedo

Herbaceous to moderately woody twining vines, or rarely prostrate herbs. Stems cylindrical, wiry, sometimes slightly flattened, keeled or winged with age, simple, with regular anatomy, ray tissue conspicuous. Leaves trifoliolate or less often unifoliolate; stipels and stipules minute, persistent. Flowers resupinate, axillary, solitary or grouped on a bracteate peduncle; bracts appressed to the calyx; pedicels more or less elongate. Flowers papilionaceous; calyx campanulate, 5-lobed, lobes unequal to almost equal; corolla pink, lavender or white, the standard ovate or rounded, unguiculate, sub reflexed, the wings and the keel of similar size, but shorter than the standard; stamens 10, diadelphous or monadelphous; ovary almost sessile, with numerous ovules, the style curved, pubescent, the stigma capitate or truncate. Legume linear, flattened, the margins sometimes ribbed or winged, often with narrow discolored band, dehiscent by valves that twist on drying, not septate between the seeds; seeds numerous, small, oblong.

**Distinctive features:** Characterized by wiry stems and flowers with wide orbicular standards and shorter keel and wing petals. Similar to *Clitoria* but distinguished by the bracteoles that are as long as the calyx and by the standard that is gibbous right above the claw, while in *Clitoria* bracteoles are shorter than the calyx and the standard is not gibbous. Similar to *Periandra* which differs by the large spreading wing petals.

**Distribution:** A genus of about 36 species native to the New World, three of which have been widely introduced throughout the Old World.

**CHAMAECRISTA** (Linnaeus) Moench, Meth. 272. 1794.



*C. acosmifolia*, from Hatschbach 46556 (US)

Annual or perennial, erect herbs or shrubs, with a few scandent species. Leaves paripinnate; leaflets opposite; petioles usually grooved along upper surface, pulvinate at base and bearing one or two discoid or stipitate glands; rachis grooved, ending in a filiform segment, often with additional glands at the bases of the leaflets; stipels wanting; stipules minute to foliaceous. Flowers caesalpiniaceous, bisexual, solitary or in a few species in supra-axillary racemes; pedicels bracteolate near or above middle; calyx of 5 unequal sepals; corolla yellow, of 5, free, slightly heteromorphic petals; stamens 5-10, usually heteromorphic, the filaments shorter than the anthers; ovary 1-locular, sessile or shortly stipitate, with many ovules. Legume dehiscent along both sutures, the valves coiling; seeds many, flattened.

**Distinctive features:** Leaves paripinnate with the rachis ending in a scale-like projection; petioles bearing one or two discoid or stipitate glands; corolla yellow of free heteromorphic petals; stamens heteromorphic, with filaments shorter than the anthers.

**Distribution:** A tropical genus with about 330 species, 277 of which are found in the Neotropics, of these, only *C. acosmifolia* (H. S. Irwin & Barneby) H. S. Irwin & Barneby and *C. barbata* (Nees & Mart.) H. S. Irwin & Barneby are sometimes reported as climbing, scrambling shrubs in Brazil.

**CLEOBULIA** Martius ex Bentham, Commentat. Legum. Gener. 67. 1837.

Twining lianas or vines, rarely erect shrubs. Stems terete or flattened in *C. leiantha* Benth. when old.



*C. multiflora* Benth., photo by L.P. Queiroz

Leaves trifoliolate; rachis and petiole canaliculate; stipels setaceous, ca. 1 mm long; stipules triangular, persistent. Inflorescence axillary or sometimes terminal, solitary, erect; bracts triangular, ca. 2 mm long; pedicels short. Flowers papilionaceous, 10-15 mm long; calyx campanulate, 4-lobed (upper 2 lobes fused),

tinged reddish, glabrous to ferruginous pubescent, the lobes unequal; corolla reddish, less often lilac or purple, the standard obovate to orbicular, spreading or reflexed, unguiculate, plicate, the keel slightly shorter than the standard, the wings  $\frac{2}{3}$  as long as the keel; stamens 10, diadelphous; ovary sessile, with few ovules, the style erect, glabrous, the stigma capitate. Legume oblong, dehiscent along both sutures, slightly swollen, with the margins ribbed; seeds few, ca. 6 mm long, reniform, with hilum encircling nearly half of the seed.

**Distinctive features:** Leaflets coriaceous, strongly nerved and pubescent abaxially, sometimes treated as a synonym of *Dioclea* but differentiated by the smaller flowers with minute wing petals that scarcely surpass the calyx in length. Fruits and seeds as in some *Dioclea* species.

**Distribution:** A genus of four species with disjunct distribution. A species of shrub from the Oak and Pine forests in Guerrero, Mexico has been assigned to this genus; the remaining three species are vines that occur in Brazil; in wet to semi deciduous forests.

**CLITORIA** Linnaeus, Sp. Pl. 753. 1753.



*C. pozuzoensis* J.F. Macbr., photo by P. Acevedo

Twining herbaceous or woody vines, trees, or shrubs; stems cylindrical, simple, with regular anatomy. Leaves trifoliolate or 5-7-pinnate with opposite leaflets in *C. ternatea* L.; stipels present; stipules minute, persistent. Flowers papilionaceous, solitary or grouped in axillary or cauliflorous racemes; bracteoles appressed to the calyx, persistent. Calyx campanulate, with 5 equal or almost equal lobes, nearly as long as the tube; corolla blue-violet, white, yellow, or red, the standard suberect, rounded, rugose, longer than the wings and keel, the wings longer than the keel; stamens 10, diadelphous or monadelphous; ovary stipitate, the style curved, pubescent, the stigma truncate. Legume linear or oblong, flattened, dehiscent along both sutures, not septate between the seeds; seeds few, orbicular to oblong, compressed, dark brown.

**Distinctive features:** Showy, obovate standard petal, much longer than the wing and keel petals. Like *Centrosema* but distinguished by the wing

petals which are longer than the keel, while in *Centrosema* they are of about equal length.

**Distribution.** A pantropical genus of about 66 species, 48 of which are distributed in the Neotropics, of these, 25 are herbaceous to subwoody vines, in seasonally dry to wet forest, sometimes open and grassy habitats.

**COCHLIASANTHUS** Trew, Pl. Rar. 1: 41. 1764.



*C. caracalla*, photo by Phil Bendle

Twining subwoody vines reaching few meters in length. Stems cylindrical, ca. 3 mm diam. Leaves trifoliolate; stipels elliptic, ca. 2 mm long; stipules minute, deltoid, persistent. Inflorescences of axillary diffuse pseudo-racemes, with conspicuous swollen, nectariferous nodes; bracteoles minute, persistent. Flowers papilionaceous, spirally

twisted; calyx widely campanulate, ca. 1 cm long, with 5 equal or almost equal lobes; corolla lilac purplish or rosy, the standard oblong, twisted, longer than the keel and wings, the keel twisted with up to five loose right-handed coils, the wings large, appressed to the keel; stamens 10, diadelphous; ovary sessile, the style curved, the stigma punctiform. Legume oblong, flattened, with thickened margins and elongate beak, dehiscent along both sutures by twisting valves, slightly septate between the seeds; seeds few, oblong, dark brown, hilum straight as long as the seed.

**Distinctive features:** Subwoody vines, few meters long; flowers characteristically large and showy, with twisted standard and wing petals in a right-handed fashion, and spirally coiled keel; pedicels as long as or longer than the calyx, resulting in diffuse pseudoracemes.

**Distribution.** A single species, *Cochliasanthus caracalla* (L.) Trew, native to the Neotropics from southern Mexico to northern Argentina and Uruguay; in secondary and primary wet forests, mostly without a dry season. Cultivated worldwide, including parts of the West Indies for its spectacular flowers.

**COLOGANIA** Kunth, *Mimoses* 205. 1824.



*Cologania angustifolia* (Kunth) Taub., image from  
americansouthwest.net

Twining herbaceous vines or prostrate to erect herbs with a deep, woody taproot; stems cylindrical, very slender. Leaves trifoliolate, rarely 5-foliolate or unifoliolate; stipels present; stipules persistent. Flowers papilionaceous, solitary or in axillary fascicles, or less often pseudoracemes; bracts and bracteoles persistent. Calyx tubular, gibbous on the vexillary side, with 4-5 nearly equal lobes; corolla purple or rarely red; the standard obovate, reflexed, commonly emarginate and tapering at base, the wings and the keel unguiculate, the wings longer and slightly adherent to the incurved keel; stamens 10, diadelphous; ovary stipitate, the style incurved, glabrous, the stigma terminal, capitate. Legume linear or falcate, flattened to nearly cylindrical at maturity, dehiscent, shallowly septate between the seeds; seeds 6-12, flat, circular to nearly

square, the hilum oblong

**Distinctive features:** Herbaceous twining vines, with magenta flowers; calyx tubular, gibbous at the base; fruits subcylindrical.

**Distribution.** About 13 species distributed in SW United States, Mexico, Central America, Colombia, Venezuela, Ecuador, Peru, Bolivia and northern Argentina, mostly in montane habitats.

**CONDYLOSTYLIS** Piper, Contr. U.S. Natl. Herb. 22: 667. 1926.

Herbaceous twining vines. Stems cylindrical, slender. Leaves trifoliolate; leaflets 3-nerved from base;



*C. candida* (Vell.) A. Delgado, from *J. Wurdack 621* (US)

stipels and stipules minute, striate-nerved. Flowers papilionaceous, in axillary racemes; bracts and bracteoles striate-nerved. Calyx campanulate, with 5 wide, obtuse lobes; corolla blue-violet, white, yellow, or red, the standard orbicular, auricled, longer than the wings and the keel, the wings oblong, clawed, constricted below the middle; keel long-clawed, constricted and slightly twisted above the middle, with a bottle-shaped beak; stamens 10, diadelphous, the single free stamen thickened at base and geniculate at a right angle; ovary sessile, the style slightly curved, with a globose thickening at base, pubescent on distal portion, constricted at the tip and bearing a spatulate appendage, the stigma rounded, lateral. Legume linear, flattened, shortly beaked, dehiscent along both sutures; seeds few, cylindrical, with a linear hilum  $> \frac{1}{2}$  as long as the seed.

**Distinctive features:** Small, chartaceous leaflets with cuneate bases; corolla parts with left-handed symmetry; style with a globose thickening near its base; seeds with an ephemeral waxy layer.

Vegetatively similar to *Rhynchosia* but lacking the yellow punctations that characterize that genus.

**Distribution.** Four species distributed from southern Mexico south to Argentina and Uruguay in wet to semi deciduous forests, from 0 to 1500 m elevation.

**CRATYLIA** Martius ex Bentham, Commentat. Legum. Gener. 67. 1837.



*C. mollis* Benth., photo by Domingos Cardoso

Woody twiners or erect to scrambling shrubs; stems cylindrical, with regular anatomy. Leaves trifoliolate; leaflets coriaceous, often discoloured, some species abaxially golden pubescent; stipels minute, acicular; stipules small, caducous. Inflorescences of axillary pseudoracemes, fasciculate, the flowers grouped on the nodose swellings along the rachis; bracts and bracteoles

minute, caducous. Flowers papilionaceous; calyx campanulate, commonly sericeous, with 4 lobes, the upper lobe emarginate; corolla white, rose to lilac, the standard orbiculate to ovate, reflexed, slightly emarginate, the wings obovate, free, the keel incurved, slightly shorter than the wings; stamens 10, diadelphous; ovary stipitate, with numerous ovules, the style incurved, the stigma capitate, terminal. Legume linear to oblong, compressed, dehiscent, slightly thickened at margins; seeds compressed, with a short, oblong, hilum.

**Distinctive features:** Calyx and commonly the underside of leaflets sericeous; seeds, hard, large; hilum often  $\frac{1}{2}$  -  $\frac{3}{4}$  the length of seed circumference.

**Distribution:** A South American genus of 7 species, 5 of which are lianas or climbing shrubs; distributed in Peru, Brazil, and northern Argentina.

**DALBERGIA** Linnaeus f., Suppl. 52, 316. 1782, (nom. cons.).

Trees, erect or clambering shrubs, or lianas with short, prehensile branches (fig. 6a). Stems cylindrical, unarmed, up to 10 cm in diam. and more than 25 m in length; with regular anatomy, xylem



*D. monetaria* L. f., photo by P. Acevedo

sometimes with shallow phloem wedges (fig. 1b), and sometimes producing neoformations within the cortex (fig. 4d); exudate watery, sometimes quickly oxidizing. Leaves imparipinnate or unifoliolate; leaflets alternate; stipels absent; stipules minute to conspicuous, caducous, never spinescent. Inflorescences of axillary or terminal racemes or panicles; bracts and bracteoles minute, caducous or persistent. Flowers papilionaceous; calyx campanulate, with 5 short, equal or unequal lobes; corolla white, yellow, pink or purple, the standard rounded or ovate, retuse, narrow at the base, the wings usually longer than the keel; stamens 9-10, diadelphous or monadelphous; ovary stipitate, pubescent, the style usually curved, the stigma minute. Fruits are oblong to circular (coin-shaped), indehiscent and usually with membranaceous margins; seeds small, lenticular, one to few.

**Distinctive features:** Usually with short, axillary prehensile branches; leaves either unifoliolate or imparipinnate with alternate or rarely subopposite leaflets. Vegetatively like *Machaerium* but distinguished by the exudate that only turns red or pink after oxidizing and lack of stipular prickles, while in *Machaerium* the sap is commonly dark red, and many species have a pair of stipular prickles. Fruits in *Dalbergia* are oblong to coin-shaped (pseudo-samaras), never lunate or a samara like in *Machaerium*.

**Distribution:** A pantropical genus of about 250 species, 60 of which are found in the Neotropics, but only 28 of which are climbers; most commonly found in moist to wet forests especially along river margins.



**Figure 10.** *Dalbergia glabra*. **A.** Axillary inflorescence. **B.** Cross section with regular anatomy, the xylem with shallow phloem wedges at the periphery. Photo by P. Acevedo.

**DEGUELIA** Aublet, Hist. Pl. Guiane 750, t. 300. 1775.



*D. chrysophylla* (Kleinhoonte) R. Camargo & A.M.G. Azevedo, photo by P. Acevedo

oblong to obovate, usually emarginate at the apex, sometimes subauriculate; wings adnate with the keel above the claw; stamens unequal, pseudo-monadelphous, with vexillary stamen free at the base but connate higher up; ovary sessile or shortly stipitate, with (1–)2–15 ovules; style filiform, curved; stigma capitate. Legume indehiscent or rarely dehiscent, generally compressed, suborbicular, oblong to linear-oblong, membranaceous to coriaceous, rarely woody, with straight or sinuate margins (fig. 9f), the vexillary margin sometimes forming a narrow longitudinal wing. Seeds 1–12, oblong-reniform with short hilum.

**Distinctive features:** Leaves imparipinnate, usually > 5-pinnate with opposite leaflets; stems sometimes with pinkish or reddish exudate.

**Distribution:** A neotropical genus of about 20 species in the lowlands of northern South America, with two species extending through Central America north to Guatemala.

Twining lianas, scrambling shrubs, and rarely trees; stems cylindrical reaching 5 cm or more in diam., and > 25 m long, with regular anatomy, parenchyma abundant, in numerous concentric bands alternated with darker bands of fibers (fig. 1a); exudate clear, pinkish to red. Leaves imparipinnate, 3–17-foliolate; leaflets opposite, or less often subopposite, usually smaller toward the basal portion of the rachis; petiolules pulvinate; stipels present or absent; stipules often caducous. Inflorescence axillary or terminal, clustered or solitary elongate pseudoracemes, with more than 5 flowers per node; bracts and bracteoles usually caducous. Flowers papilionaceous; calyx campanulate, subtruncate to dentate, usually with 3 distinct carinal lobes and 2 broader vexillary lobes partially connate; corolla white, yellow or purple to magenta, all petals unguiculate, of similar length; standard orbicular,

**DESMODIUM** Linnaeus f., Suppl. 52, 316. 1782, (nom. cons.).



*D. procumbens* (Mill.) Hitchc., photo by P. Acevedo

Erect, prostrate, or clambering herbs, some species reaching > 2 m in length. Stems slender, with regular configuration. Leaves usually trifoliate; stipels minute; stipules minute, caducous or persistent. Inflorescences of axillary or terminal pseudoracemes or panicles; bracts and bracteoles minute, caducous or persistent. Flowers papilionaceous; calyx campanulate, with 5 short to long, almost equal lobes; corolla pink, bluish or rarely white, the standard oblong to rounded, retuse, narrow at the base, the wings and the keel of the same length; stamens 10, diadelphous or monadelphous; ovary stipitate or sessile, pubescent, with few ovules, the style inflexed, the stigma minute. Fruit linear, flattened or spiral, with the ventral margin or both margins deeply sinuate between the seeds, indehiscent, but separating in segments containing a single seed which adhere to clothing or the fur of animals by uncinata hairs; seeds small, oblong.

**Distinctive features:** Corollas pink, lavender or violet; fruit a lomentum, commonly with uncinata pubescence that separates into single seeded segments which adheres to clothing.

**Distribution:** A pantropical genus with about 187 species, most of which are found in the New World, 161 species are found in the Neotropics, 17 of which are reported as clambering herbs or subshrubs.

**DIOCLEA** Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 6: 342. 1824 [fol. ed.].

*Cymbosema* Benth.



*D. scabra* (Rich.) Maxwell, photo by P. Acevedo



Seeds of *D. reflexa* Hook. f., photo by P. Acevedo

Twining woody vines to 25 m long, occasionally erect subshrubs; stems cylindrical, with regular anatomy and watery exudate. Leaves trifoliolate; stipels minute; stipules conspicuous, persistent, or caducous. Inflorescences of axillary pseudoracemes or fascicles, sometimes cauliflorous, the flowers grouped on the fleshy nodes along the rachis; bracts and bracteoles minute, caducous. Flowers papilionaceous; calyx campanulate, with 4 lobes (2 upper lobes fused) that are shorter than the tube, the upper lobe slightly larger, entire or emarginate; corolla purple or rarely white or red, the standard reflexed, emarginate at apex, auriculate and usually with 2 callosities at the base, the wings free, sometimes spurred, the keel distally fused, rostrate; stamens 10, pseudo-monadelphous; ovary villous, stipitate or sessile, with 1 or more ovules, the style flattened or cylindrical, the stigma capitate, terminal or subterminal. Fruit linear, oblong, or obovate, compressed or turgid, coriaceous or woody, dehiscent or indehiscent; seeds large, compressed to globose, many species with a linear, elongate hilum.

**Distinctive features:** Trifoliolate leaves with stipels; leaflets for the most part coriaceous, widely elliptic or ovate to round. Seeds large, hard; hilum often  $\frac{1}{2}$  -  $\frac{3}{4}$  the length of seed circumference.

**Distribution:** A genus of about 60 species distributed throughout the tropics, 52 of which occur in the

Neotropics; common in moist to wet forests. Seeds [drift seeds or sea beans] often found along tropical beaches worldwide.

**ENTADA** Adanson, Fam. Pl. 2: 318, 554. 1763, (nom. cons.).



*E. polyphylla* Benth., photo by P. Acevedo

Trees, shrubs or lianas; stems unarmed, cylindrical, reaching 8-15 cm in diam., with regular configuration or with successive cambia (Pace, pers. comm.) forming asymmetrical bands of vascular tissue in *E. gigas* (L.) Fawc. & Rendle (fig. 2b). Leaves bipinnate, neotropical species commonly with two distal pinnae modified into tendrils (fig. 6d); pinnae opposite; leaflets numerous, opposite; petioles with or without nectariferous glands; stipules small, setaceous; stipels minute, on secondary leaf axes. Flowers actinomorphic, bisexual, produced on spikes, usually arranged in paniculate inflorescences; bracts minute. Calyx campanulate or crateriform, of 5 small sepals; corolla of free petals; stamens 10, exserted, the filaments free at the base, the anthers with a caducous apical gland; ovary subsessile, with numerous ovules, the style filiform. Fruit highly variable in size (20-100 cm long; fig. 11), shape, and dehiscence, an oblong craspedium, straight or recurved, flattened, articulate between the seeds in some species (fig. 9b), the margins thickened, separating from the valves when ripe as a persistent replum; seeds flattened, circular or reniform, in some species ca. 1 cm long, in *E. gigas* up to 5 cm wide and ca. 1 cm thick, often found along beaches (sea beans, sea hearts).



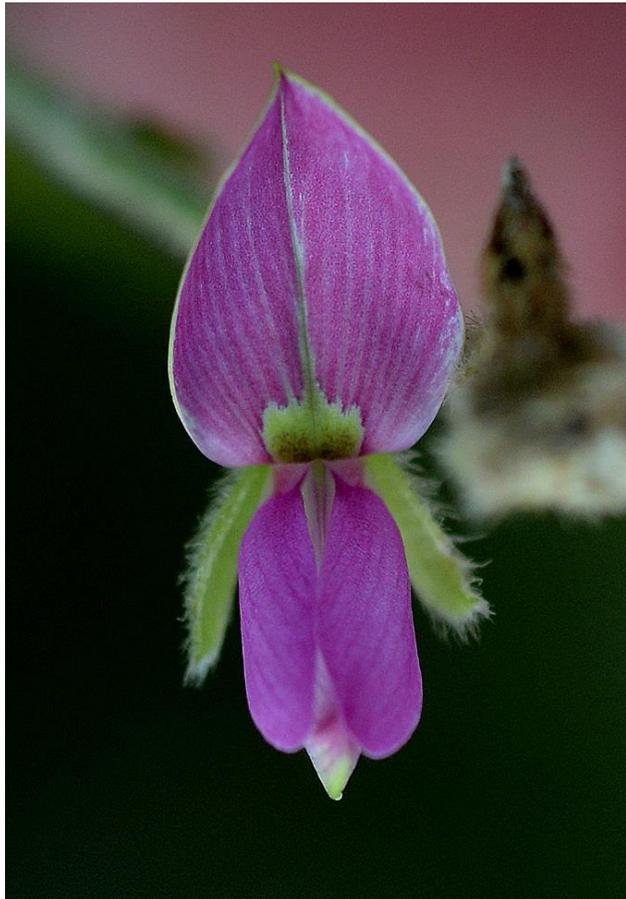
Seed of *E. gigas*, photo by J. Amith

**Distinctive features:** Large lianas (in the Neotropics), reaching the canopy; the neotropical species have bipinnate leaves with pinnae derived tendrils; spicate or paniculate inflorescences.

**Distribution:** A genus of about 30 species, of pantropical distribution; only 3 species in the Neotropics, all of which are

lianas. The genus according to G. Lewis is not monophyletic and needs further phylogenetic studies.

**GALACTIA** P. Browne, Civ. Nat. Hist. Jamaica 298. 1756.



*G. striata* (Jacq.) Urb., photo by P. Acevedo

Herbaceous or slightly woody twining vines, sometimes erect herbs or subshrubs. Leaves 1-7-foliolate but commonly trifoliolate; stipels and stipules minute, often caducous. Inflorescences of axillary or terminal pseudoracemes, the flowers grouped on the fleshy nodes along the rachis; bracts and bracteoles minute, caducous or persistent. Flowers papilionaceous; calyx campanulate, with 4 elongate (2 upper lobes fused), unequal lobes; corolla pink, lavender, white, or less frequently red, the standard elliptical or rounded, reflexed, narrowed at the base, the wings appressed to the keel; stamens 10, monadelphous or diadelphous, of unequal length; ovary sessile, pubescent, with numerous ovules, the style curved, glabrous, the stigma capitate. Fruit a flattened, linear legume, slightly curved, with a beak at the apex, dehiscent by twisting valves; seeds small, few, ovoid, brown.

**Distinctive features:** Delicate vines, sometimes with wiry stems; flowers for the most part < 1 cm long.

**Distribution:** A genus of about 118 species, 87 of which are found in the Neotropics with about 70 species of vines.

**GUILANDINA** Linnaeus, Sp. Pl. 381. 1753.

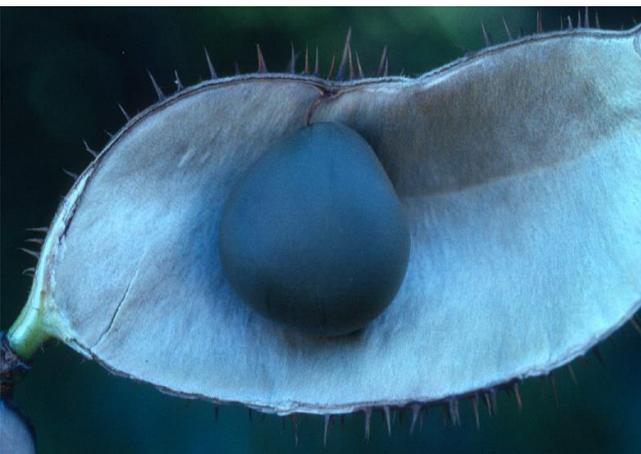
Scrambling shrubs or lianas commonly armed with recurved prickles. Stems cylindrical, striate,



*G. culebrae* Britton & P. Wilson, photo by P. Acevedo

reaching few to several meters in length. Leaves bipinnate; axes commonly armed with recurved prickles; pinnae opposite, leaflets opposite or alternate; petioles and rachis lacking glands; stipels wanting; stipules minute to foliaceous. Flowers caesalpiniate, unisexual or cryptically bisexual, in axillary or terminal racemes; pedicels articulate in the distal portion. Calyx campanulate, 5-lobed, sepals as long as the tube, reflexed; petals 5, free, yellow, unguiculate; stamens 10, filaments of equal length, flattened, free but interlocked by hairs; ovary sessile or short-stipitate, with numerous ovules. Legumes widely oblong, dehiscent along one or both sutures, often spiny (fig. 9i); seeds solitary or few, large, hard, ellipsoid or ovoid, white, gray, brownish yellow, brown or black.

**Distinctive features:** Vegetative parts often armed with recurved prickles; fruits dehiscent along one or both sutures, usually with spiny exocarp; seeds large, hard, gray, black, dark yellow, or brown, with small hilum.



*G. bonduc* L., photo by P. Acevedo

**Distribution:** A tropical genus of 13 species, two of which are pantropically distributed, one endemic to Madagascar, 9 are endemic to the West Indies, and one species endemic to Costa Rica; in coastal scrubs and seasonal forests, from sea level to 1300 m elevation.

**HAVARDIA** Small, Bull. New York Bot. Gard. 2: 91. 1901, (nom. cons.).

Trees, shrubs or lianas that reach the forest canopy. Stems cylindrical, with regular anatomy, armed with recurved stipular spines. Leaves bipinnate; pinnae opposite, leaflets opposite; petioles glandular;



*H. platyloba* (DC.) Britton & Rose, photo from *F. Sanchez L. 1047* (US)

stipels wanting. Flowers ca. 2 cm long, actinomorphic, bisexual, in long-pedicellate terminal fascicles of capitula. Calyx tubular-campanulate, 5-lobed; corolla tubular-campanulate, 5-lobed; stamens 60-70, white, exserted, monadelphous, connate at least  $\frac{1}{2}$  way; ovary short-stipitate, with few ovules. Legume flattened, oblong, chartaceous, dehiscent; seeds 8-9, elliptical, with

slightly winged margin.

**Distinctive features:** Vegetative parts armed with spines and recurved stipular spines; fruits early dehiscent; flowers in large heads with showy, white stamens. Similar to *Senegalia* but only armed with stipular recurved spines (not randomly scattered prickles as in most species of *Senegalia*), and the flowers are much larger.

**Distribution:** A genus of 7 species, distributed from Mexico to Colombia and Venezuela. Only *H. platyloba* is known to grow as a liana in Mexico and Nicaragua in deciduous forests.

**HELICOTROPIS** A. Delgado, Amer. J. Bot. 98: 1709. 2011.



*H. linearis* (Kunth) A. Delgado, photo by Rubens Teixeira de Queiroz

Twining herbaceous vines or prostrate herbs rooting at nodes, with a thick taproot at base. Stems slender, striate, hollow, mostly < 1 m long, sometimes reaching up to 2 m. Leaves trifoliolate; stipels minute, persistent; stipules triangular to lanceolate, parallel-nerved, persistent. Inflorescences axillary, few-flowered pseudoracemes; peduncles thick, much longer than the subtending leaf; bracts foliaceous, persistent; pedicel shorter than the calyx tube;

Flowers papilionaceous; calyx campanulate, asymmetrical, 5-lobed, vexillary lobe wider and shorter than the median and carinal lobes which are lanceolate, and as long as or longer than the tube; standard violet-purple, or lavender-blue with blotches of purple along the upper margin, obovate to widely ovate, revolute at margins, retuse at apex, with flap-like auricles at either side of distal portion of claw; wings overlapping and darker than the other petals; keel white to pale lavender, 2-3 times spirally coiled, beak with distal portion extended into an obtuse, short and flat opening; stamens 10, diadelphous; ovary with thick margins, the style thickened at base, the stigma apical to slightly lateral, introrse or extrorse, with a ring of hairs. Legume linear, flattened, with thickened margins and elongate beak, dehiscent by twisting valves. Seeds 18–25, reniform to square, flattened, hilum short, slightly darker than testa.

**Distinctive features:** Herbaceous twiners with trifoliolate leaves; corolla purplish to lavender, with a keel several times spirally coiled.

**Distribution:** A genus of 3 species, distributed from Mexico to northern Argentina; in open disturbed habitats, scrublands, savannas, and gallery forests.

**LABLAB** Adanson, Fam. Pl. 2: 325. 1763.



*L. purpureus* (L.) Sweet, photo by P. Acevedo

light brown, with a white hilum.

**Distinctive features:** Robust twining vine with trifoliolate leaves; leaflets 3-veined from base; corolla white (but purple in ornamental cultivars); fruits tuberculate along the upper margin.

**Distribution:** A single species native to sub-Saharan Africa and Madagascar, widely introduced throughout the tropics for food, fodder and ornamental purposes. Known from several countries in the Neotropics, naturalized and invasive in Puerto Rico and Dominican Republic.

Subwoody vine, twining, reaching 3-7 m in length. Stems slightly angular, simple. Leaves trifoliolate; leaflets broadly ovate or rhombic, chartaceous, with apex acute or acuminate and base cuneate or truncate on the central leaflet, unequal on the lateral ones, margins entire, ciliate; stipels subulate; petioles canaliculate, laterally flattened, thickened at the base; stipules lanceolate, persistent. Inflorescences of axillary pseudoracemes, erect, longer than the subtending leaf, flowers 2-3, grouped on the fleshy nodes along the rachis. Flowers papilionaceous; calyx campanulate, green, pubescent, sepals short, 4 or 5, unequal, lanceolate; corolla white or pale violet, the standard reflexed, rounded, wings oblanceolate, keel as long as the wings; stamens 10, diadelphous; ovary flattened, the style curved, the stigma terminal. Legume oblong, broader distally, the upper margin tuberculate, tardily dehiscent; seeds 3-5, up to 1 cm long, ovate or elliptical, flattened,

**LATHYRUS** Linnaeus, Sp. Pl. 729. 1753.

Trailing or climbing herbs with the aid of foliar tendrils, commonly less than 1 m long. Stems cylindrical. Leaves paripinnate, 2-24-foliolate; leaflets opposite or alternate, distal leaflets replaced by filamentous tendrils; stipels wanting; stipules conspicuous, usually foliaceous. Inflorescences of axillary racemes usually much longer than the subtending leaf. Flowers papilionaceous; calyx 5-lobed, variously



*L. japonicus* Willd., photo by T.F. Niehaus

colored but usually green; corolla pink, magenta, bluish,, cardinal, white or yellow, the standard oblong to nearly circular, unguiculate, slightly reflexed, much larger than the keel and wings, keel and wing petals unguiculate; stamens 10, diadelphous, ovary oblong, sessile, the style pubescent on the carinate side. Legume elongate, turgid, few-seeded; seeds lenticular,

prismatic-lenticular to subglobose, variously colored, with short hilum.

**Distinctive features:** One of the few genera of Fabaceae that bear tendrils of foliar origin, these representing a modified leaf or modified distal leaflets of a paripinnate leaf. *Lathyrus* is like *Vicia* as they both are herbaceous and have papilionaceous flowers but differ by the styles that are hairy all along the carinal side. *Vicia* species on the other hand, have styles that are hairy only on the distal portion. The only other Neotropical genus with foliar tendrils is *Entada* but it is a woody liana with mimosoid flowers.

**Distribution:** A genus of about 182 species most of which have a temperate to warm temperate distribution. Although there are 16 species of vines in this genus reported for the Neotropics, they are at the most a meter long, except for *L. splendens* Kellogg from Baja California, Mexico, which is recorded as reaching 2 m in length, and therefore the only species included in this treatment.

**LEPTOSPRON** (Bentham & Hooker f.) A. Delgado, Amer. J. Bot. 98: 1709. 2011.



*L. adenanthum*, photo by P. Acevedo

2 flowers per node; bracts small, caducous. Flowers papilionaceous; calyx green, campanulate, 4-lobed (2 upper lobes fused), the 3 lower lobes lanceolate, longer than the tube and the upper lobe; corolla lavender, the standard reniform, emarginate at apex, unguiculate, with yellow vexillary calluses, the wings obovate, unguiculate, twisted, nearly as long as the standard, the keel unguiculate, as long as the wings, spirally twisted  $\frac{1}{2}$  to  $1\frac{1}{2}$  times at apex; stamens 10, diadelphous; ovary sessile, with numerous ovules, the style spirally coiled, pubescent on the distal portion. Legume oblong, falcate, flattened with thickened margins and the seed locule slightly prominent, dehiscent by valves that twist on opening; seeds flattened, quadrangular or almost reniform.



stem x-section in *L. adenanthum*,  
photo by P. Acevedo

Herbaceous to subwoody twining vines, reaching 3-5 m in length. Stems cylindrical, glabrous to pilose; cross section regular, xylem with wide rays and deep phloem wedges in old stems. Leaves trifoliolate; leaflets 3-veined from base; stipules triangular, conspicuously veined, truncate at the base; stipels oblong. Inflorescences of axillary pseudoracemes, with

**Distinctive features:** Herbaceous to subwoody twining vines with lavender to pale violet corolla; the keel petals spirally twisted, projected downward.

**Distribution:** A genus of 2 species, one of which [*L. adenanthum* (G. Mey.) A. Delgado] is naturalized in Africa, Madagascar, Asia, and Australia. In the Neotropics the genus is found in Mexico, Central America, South America south to Argentina and Uruguay and the West Indies at 0 -2000 m elevations.

**LONCHOCARPUS** Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 6: 383. 1824,  
[quarto ed.], (nom. cons.).



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*L. punctatus* Kunth, photo by C. Delnatte

Trees or shrubs, rarely scandent shrubs or vines; stems cylindrical with regular anatomy. Leaves imparipinnate; leaflets (1-)5-15 (-23), subopposite; stipels absent; stipules deltoid, small; petiolules pulvinate. Flowers papilionaceous, in axillary pseudoracemes or terminal panicles, with (1-)2 (-3) flowers per node; bracts shorter than the corresponding flower buds; bracteoles present. Flowers papilionaceous; calyx usually truncate with 4 or 5 minute teeth; standard broadly ovate to obovate, with basal callosities, reflexed at base; wings obtuse, about the same length as the distinctly falcate keel; stamens 10, monadelphous; ovary hairy, with 2-9(-12) ovules. Fruit oblong, indehiscent or rarely tardily dehiscent, papery to thinly woody, sometimes thickened at the margins; seeds 1-7 per fruit, lenticular or reniform.

**Distinctive features:** Scrambling shrub with imparipinnate leaves that lack stipels; corolla pink.

**Distribution:** About 160 species distributed in the Neotropics, tropical Africa and Madagascar, 150 of which are found in the Neotropics, but they are all trees or shrubs with the exception of *L. patens* Urb. (found in Jamaica), which sometimes grows as a scrambling shrub or a liana with short prehensile branches. Circumscription of *Lonchocarpus* in the past included several species of Neotropical lianas and climbing shrubs but these now belong to the genera *Deguelia* (Neotropics) or *Derris* (Paleotropics).

**MACHAERIUM** Persoon, Syn. Pl. 2: 276. 1807, (nom. cons.).



*Machaerium* sp., photo by P. Acevedo



*Stipular spines* in *M. isadelphum*, photo by P. Acevedo

Trees, shrubs, or scrambling lianas, armed with recurved prickles or lignified, recurved stipular spines, usually with short prehensile branches (fig. 12b) or flagellum-like branches (fig. 5c); stems usually with red or orangish exudate, cylindrical, with regular anatomy (fig. 1c & 2a) or successive cambia (fig. 4e), or sometimes flattened with successive rings or bands of vascular tissue (fig. 2c & d). Leaves imparipinnate or less often unifoliolate; leaflets alternate or subopposite; stipels absent; stipules spinescent and persistent or membranous and caducous. Inflorescences of axillary or terminal racemes or panicles; bracts minute; bracteoles broadly ovate, paired at the base of the calyx. Flowers papilionaceous; calyx asymmetrically campanulate, 5-lobed or subtruncate, the lobes unequal, shorter than the tube; corolla violet-pink, or white, the standard rounded or reniform, narrowed at the base, the wings and the keel subequal; stamens 10, diadelphous or monadelphous; ovary short-stipitate, with 1-2 ovules, the style curved, the stigma punctiform or capitate. Fruit a samara, with a terminal wing (fig. 12a), or rarely indehiscent, flattened, straight, curved, or in the form of a half-moon (fig. 9g & 12c), circular in outline, without a wing, or the wing reduced; seeds solitary, reniform, ovate or orbicular.

**Distinctive features:** Stems cylindrical to flattened, usually armed and producing a reddish sap; leaves imparipinnate with alternate leaflets, usually with a pair of spinescent, recurved stipules; fruit usually a samara with a distal wing.

**Distribution:** Essentially a neotropical genus of about 130 species (with only *M. lunatum* extending to Africa), 88 species are climbers; In moist, wet, gallery and flooded lowland forests.



**Figure 11.** A. *Machaerium huanucoense*, with samaras. B. *Machaerium quinatum*, showing lateral, short prehensile branches. C. *Machaerium lunatum*, with lunate, water-dispersed fruits. Photos by P. Acevedo.

**MACROPTILIUM** (Bentham) Urban, Symb. Antill. 9: 457. 1928.

Erect, creeping, or clambering herbs or herbaceous twining vines. Leaves trifoliolate; stipules and stipels minute. Inflorescences of axillary pseudoracemes, the flowers grouped in pairs on the fleshy nodes



*M. lathyroides* (L.) Urb., photo by P. Acevedo

along the rachis; bracts minute. Flowers papilionaceous; calyx asymmetrically campanulate or tubular, of 5 short, equal or unequal lobes; corolla usually cardinal red or purple, the standard rounded, reflexed, unguiculate, the wings unguiculate, much longer than the other petals, the keel unguiculate, twisted in the distal portion, fused to the staminal tube; stamens 10, diadelphous; ovary subsessile, flattened, pubescent, with many ovules, the style thickened at the base, distally curved and barbate, the stigma capitate. Legume linear, cylindrical, dehiscent by valves that twist on drying; seeds numerous, small, oblong-cylindrical.

**Distinctive features:** Scrambling herbs or twining vines; wing petals much larger than the standard, the keel twisted at the distal portion.

**Distribution:** A neotropical genus of 20 species extending into the warm temperate areas of the Americas; distributed from southern United States to Argentina, including the West Indies. Introduced in parts of tropical Africa, tropical Asia, and Australia.

**MACROSAMANEA** Britton & Killip, Ann. New York Acad. Sci. 35: 131. 1936.

Trees, erect or scandent shrubs, or lianas; stems unarmed, nearly cylindrical, with regular anatomy.



*M. spruceana*, photo by André Cardoso

Leaves bipinnate, pinnae opposite or subopposite; leaflets numerous, opposite; petiole with a conspicuous gland above the base; rachis commonly with a gland at the junction of pinnae; stipules small, setaceous or subulate. Flowers (up to 5 cm long) actinomorphic, bisexual large, arranged in pedunculate capitula. Calyx light green, narrowly campanulate, elongate, 5-dentate; corolla pale green, funnel-shaped,

elongate, with 5 lanceolate lobes; stamens white, numerous, filaments connate for about half of their length, more than twice as long as the corolla, the minute ovary subsessile, with few ovules, the style filiform. Legume, oblong, flattened, woody, longitudinally dehiscent along both sutures, the margins thickened; seeds flattened, elliptic or reniform, brown.

**Distinctive features:** Unarmed lianas, with bipinnate leaves bearing glands on petiole and leaf rachis; leaflets falcate; stamens white, much longer than the pale green corolla. Similar to *Entada* but distinguished by the lack of foliar tendrils and the larger flowers in capitula, not spikes or racemes.

**Distribution:** A South American genus with about 11 species of trees, two of which [*M. pubiramea* (Steud.) Barneby & Grimes and *M. spruceana* (Benth.) Record] sometimes grow as scrambling shrubs or lianas.

**MIMOSA** Linnaeus, Sp. Pl. 516. 1753.

Erect or climbing, scrambling herbs or shrubs; stems usually armed with randomly scattered prickles.



*Mimosa* sp., photo by P. Acevedo

Leaves bipinnate; pinnae opposite; leaflets small, numerous, opposite; petioles sometimes with a nectariferous gland at the base; rachis without nectariferous glands; stipules minute, caducous or persistent; stipels minute or absent. Flowers actinomorphic, bisexual or staminate, produced in heads, solitary or grouped in axillary or terminal

racemes; bracts small, usually shorter than the corolla. Calyx minute, cup-shaped, crowned by 5 minute lobes; corolla yellow or pink, funnel-shaped, with 3-5(6) lobes; stamens as numerous as or double the number of petals (3-10 stamens), long-exserted, the filaments free, the anthers glandless; ovary stipitate, with several ovules, the style filiform, the stigma punctiform. Fruits mostly a craspedium, oblong, chartaceous, flattened, usually with spiny margins, breaking away from the thickened margin (replum) into one seeded articles or the whole central unit detaching from the replum; seeds flattened, lenticular or ovate.

**Distinctive features:** Armed, scrambling shrubs; leaves bipinnate with opposite pinnae, and numerous, opposite leaflets, sometimes with stipels; petioles and rachis usually without nectariferous glands (15-20 species in the Amazon have nectariferous glands); stamens free, pink or white; fruits usually with spiny margins.

**Distribution:** A genus of about 600 species, of pantropical distribution, the majority of the species native to the Neotropics, but only twenty-six species are reported as climbing herbs or shrubs in this region.

**MUCUNA** Adanson, Fam. Pl. 2: 325, 579. 1763, (nom. cons.).

Twining lianas or vines, reaching 20 or more m in length. Stems cylindrical; cross section with



*M. urens* (L.) Medik., photo by P. Acevedo

regular anatomy. Leaves trifoliolate; stipels absent or present; stipules caducous. Inflorescences of pendulous axillary pseudoracemes, usually with a long peduncle; bracts foliaceous, caducous. Flowers papilionaceous; calyx campanulate, bilabiate, with 4 short lobes, one of which is smaller; corolla violet, violet-pink, bluish, orange, or yellow, the



Seeds of *M. urens*, photo by P. Acevedo

standard oblong, folded longitudinally, elongate, narrowed at the base, auriculate, shorter than the subequal wings and keel; stamens 10, diadelphous; ovary sessile, villous, with few ovules, the style filiform, the stigma punctiform. Legume oblong, coriaceous, usually covered with irritant hairs (fig. 9c), dehiscent; seeds plump, oblong, circular, rounded, often with a hilum that circles  $\frac{2}{3}$ - $\frac{3}{4}$  of the seed circumference.

**Distinctive features:** Inflorescences with a very long peduncle, hanging down; fruits usually covered with irritant hairs. Seeds in some species are hard, large, and have a very long hilum.

**Distribution:** A pantropical genus of 112 species, 22 of which are native to the Neotropics, in addition, the noxious African weed *M. pruriens* (L.) DC., is widely naturalized throughout the Neotropics.

**MYSANTHUS** P.G. Lewis & A. Delgado, Kew Bull. 49: 343. 1994.



*M. uleanus*, photo by Domingos Cardoso

Herbaceous twining vines to 3 m long; stems nearly cylindrical, striate, strigose. Leaves trifoliolate; leaflets 3-5-veined from base, distal leaflets obtuse to subcordiform at base; stipules small, persistent, ovate-deltoid, striate; stipels small, oblong. Inflorescences of axillary, elongate (up to 90 cm long), slender pseudoracemes, with 2-3 flowers per node; bracts

minute. Flowers papilionaceous, small; calyx campanulate, bilabiate, with 5 lobes, two of which are almost completely united; corolla lilac-purple fading to yellowish, the standard widely obovate to suborbicular, emarginate at apex, eccentric covering the beak of the keel, wing petals at right angles to each other, the keel hooked and twisted to the right, stamens 10, diadelphous, with vexillary stamen free; ovary sessile, with 5-8 ovules, the style curved, expanded toward the middle portion, pubescent on the distal portion, the stigma capitate. Legume falcate, slightly flattened, dehiscent by valves that twist on opening, with seeds parallel to the suture; seeds reniform, plump, light brown, mottled, 6-7 mm long, the hilum ca. 1.5 mm long.

**Distinctive features:** Small twining vines with broadly falcate fruits and small flowers with large wing petals.

**Distribution:** A single species *M. uleanus* (Harms) G.P. Lewis & A. Delgado, with two infraspecific taxa, endemic to NE and SE Brazil.

**NEONOTONIA** J.A. Lackey, *Phytologia* 37: 210. 1977.

Herbaceous twining or trailing vines up to 4.5 m long, with woody taproot. Leaves trifoliolate; stipules lanceolate, striate; stipels subulate, persistent. Inflorescences of axillary, elongate pseudoracemes



*N. wightii*, photo by Sheldon Navie

with 2-3 flowers per node; bracts small. Flowers papilionaceous; calyx campanulate, with 5 lobes, two of which are joined along much of their length; corolla white, the standard subreflexed, obovate to rounded, emarginate at apex, with purplish marking near the center, the wings and keel shorter than the standard; stamens 10, diadelphous,

the anthers of the same size; ovary sessile, with many ovules, the style curved, the stigma minutely capitate. Fruits oblong, turgid, nearly cylindrical but slightly constricted between the seeds, dehiscent by valves that twist on opening; seeds flattened, rectangular to nearly reniform, with minute hilum and a persistent small funicular remnant.

**Distinctive features:** Profuse twining vines, often covering an area of several square meters; plant hirsute all over; flowers with light purplish markings.

**Distribution:** A genus of two species native to sub-Saharan Africa, with *N. wightii* (Arn.) J.A. Lackey introduced as fodder in Argentina, Bolivia and Brazil, where it has become naturalized.

**NEORUDOLPHIA** Britton in N.L. Britton & P. Wilson, Sci. Surv. Porto Rico & Virgin Islands 5: 426. 1924.



*N. volubilis*, photo by P. Acevedo

Twining woody vine, up to 10 m long. Stems wiry, cylindrical, slightly flattened, with regular anatomy. Leaves unifoliolate; leaflets coriaceous, ovate or broadly ovate, the base cordiform or less frequently truncate; petiolule thickened, with a pair of stipels at the base; petioles 2.5-5 cm long, sulcate, puberulent, pulvinate at base. Inflorescences cauliflorous or axillary pseudoracemes, erect or pendulous, 12-24 cm long, the flowers 2-3 per node; bracts minute, lanceolate. Flowers papilionaceous; calyx 2.5-3 cm long, pink, fleshy, almost campanulate, 5-lobed, two of which are broad and rounded, the remaining three lanceolate; corolla brilliant red, the standard oblong, folded in half longitudinally, enclosing the stamens, the remaining 4 petals (the wings and two petals homologous to the keel, which are not fused) ca. 1.5 cm long, linear and slightly curved; stamens 10, diadelphous, slightly exposed; ovary

short-stipitate, with numerous ovules, the style slender, elongate, sericeous, the stigma punctiform.

Legume oblong, flattened, pubescent, dehiscent by valves that open in a spiral. Seeds oblong or ovoid, 6-8 mm long, light brown.

**Distinctive features:** Leaves unifoliolate, cordiform, with a pair of stipels at the junction with the petiole. Showy, bright red-flowered racemes, axillary and erect or cauliflorous and hanging.

**Distribution:** A single species, *Neorudolphia volubilis* (Willd.) Britton is endemic to central Puerto Rico.

**NEUSTANTHUS** Benth in Miquel, Pl. Jungh. 234.1852.

Herbaceous or woody vines, twining; stems cylindrical to flattened, with regular vascular anatomy. Leaves trifoliolate; stipules ovate to linear, persistent; stipels minute. Inflorescences of axillary or



*N. phaseoloides*, photo by P. Acevedo

terminal pseudoracemes; bracts minute. Flowers papilionaceous; calyx campanulate, with 5 unequal lobes; corolla blue or violet, the standard obovate, retuse at the apex, unguiculate and auriculate at the base, the wings unguiculate, with a curved appendage at the base of the inner margin, the keel slightly longer than the wings; stamens 10, monadelphous or diadelphous; ovary sessile, with several ovules, the style glabrous, curved, the stigma capitate. Fruit a linear legume, subflattened, dehiscent by valves that twist on opening; seeds oblong, numerous.

**Distinctive features:** Rapid growing, twining, hirsute, herbaceous vine with trifoliolate leaves; distal leaflet trilobed; corolla lilac.

**Distribution:** Currently recognized as a segregate of *Pueraria* (Egan & Pan, 2015) with a single species and three infraspecific taxa native to southeastern Asia to the Malay Archipelago and Australia.

*Neustanthus phaseoloides* (Roxb.) Benth. var. *phaseoloides* has been introduced in the New World as forage and later becoming a weed throughout the region.

**NISSOLIA** Jacquin, Enum. Syst. Pl. 7, 27. 1760, (nom. cons.).

*Chaetocalyx* DC.

Herbaceous to semi-woody twining vines. Stems cylindrical, striate, slender, 1-4 mm in diam.,



*N. fruticosa* Jacq., photo by P. Acevedo

sometimes hollow with regular anatomy. Leaves imparipinnate, 5-17-foliolate; leaflets with entire margins; petiolules pulvinate; stipels lacking; stipules persistent, deltoid to lanceolate, entire to laciniate, sometimes setose. Inflorescences axillary or terminal racemes, panicles, or fascicles, but sometimes flowers solitary; bracts like the stipules but

smaller; bracteoles wanting; pedicels and peduncles variable in length, pedicel articulated just below the calyx. Flowers papilionaceous, 4-15 mm long; calyx campanulate 5-toothed, or truncate with remote linear or subulate teeth, sometimes with glandular setae; corolla yellow, the standard reflexed, spatulate to obovate-orbicular, shortly unguiculate and slightly longer than the wings and keel, the keel incurved; stamens 10, monadelphous; ovary sessile or stipitate, with 1-16 ovules, the style straight or recurved, glabrous, the stigma capitate. Fruit a lomentum, with few-16, flat or biconvex articles, with wavy margins, the distal article sterile and expanded into a straight or oblique obovate wing in some species; seeds small, flattened, reddish brown.

**Distinctive features:** Twining vines with imparipinnate leaves, yellow flowers, and samaroid or lomentaceous fruits.

**Distribution:** A Neotropical genus of about 29 species distributed from SW United States through Mexico, Central America to Paraguay and the West Indies (Jamaica, Hispaniola, Lesser Antilles), in humid, open habitats.

**OXYRHYNCHUS** Brandege, Univ. Calif. Publ. Bot. 4: 270. 1912.

Herbaceous twining vines. Stems cylindrical. Leaves trifoliolate; stipels small, falcate; stipules



deltoid, striate, persistent.

Inflorescences of axillary pseudoracemes with few flowers per node; bracts and bracteoles minute, striate. Flowers papilionaceous, 10 mm long; calyx campanulate, 5-lobed, the lobes obtuse and subequal; corolla

yellowish green, the standard orbiculate,

short-unguiculate at base, emarginate at apex, slightly revolute, the wings falcate-obovate, adherent to the keel, the keel strongly beaked, incurved, as long as the wings; stamens 10, diadelphous; ovary sessile, with 2-3 ovules, the style curved, pubescent on the distal portion, the stigma capitate, penicillate. Legume oblong, turgid, coriaceous, with thickened margins; seeds 2-3 per fruit, subglobose, black, with white hilum about as long as the seed.

**Distinctive features:** Small twining vines; flowers with oblate, yellowish green standard petals, and recurved, beaked keel; fruits oblong, short, turgid, few seeded.

**Distribution:** A genus of 4 species with disjunct distribution, one species in New Guinea, and the remaining three from Mexico to Colombia, including the Bahamas and Cuba.

**PACHYRHIZUS** L.C. Richard ex de Candolle, Prodr. 2: 402. 1825, (nom. cons.).



*P. erosus* (L.) Urb., photo by P. Acevedo

**Distinctive features:** Twining vines with a large edible, obpyramidal tuber; leaves trifoliate; leaflets with sharp marginal teeth; distal leaflet with cuneate base.

**Distribution:** A genus of 5 species native to Mexico south to Colombia and Venezuela, introduced to other parts of South America, the West Indies, part of tropical Africa, and tropical Asia.

Twining, herbaceous or subwoody vines, with tuberous roots. Leaves trifoliate; stipels filiform; stipules lanceolate, persistent. Inflorescences of axillary or terminal pseudoracemes, long-pedunculate; bracts minute. Flowers papilionaceous; calyx campanulate, bilabiate, with 5 short, nearly equal lobes; corolla blue or violet, the standard reflexed, broadly obovate, auriculate, oblong, the wings oblong-falcate, with a curved appendage at the base of the inner margin, adhering to the keel along the basal portion of the inner margin, the keel as long as the wings, recurved; stamens 10, diadelphous; ovary sessile, with many ovules, the style curved, the stigma globose. Legume oblong, coriaceous, turgid, torulose (compressed between seeds), dehiscent by twisting valves, the valves septate internally between the seeds; seeds flattened, with a small hilum.



Edible tuber of *P. erosus*, photo by P. Acevedo

**PARASENEGALIA** Seigler & Ebinger, Novon 25(2): 181. 2017.



*P. vogeliana*, photo by P. Acevedo

Trees, shrubs, or lianas climbing through the aid of short prehensile branches, or scrambling shrubs; stems unarmed, cylindrical up to 25 m long and ca. 5 cm in diam. Leaves bipinnate; pinnae opposite; leaflets usually small, numerous (but see *S. mikanii* (fig. 16A), and opposite; petioles and rachis with nectariferous glands; stipules minute, caducous. Flowers actinomorphic, bisexual, produced in heads or spikes grouped in axillary or terminal racemes or panicles; bracts small. Calyx campanulate, 5-lobed at apex; corolla white or cream, campanulate, 5-lobed; stamens numerous, exserted, the filaments free, white, the anthers minute; ovary stipitate, with several ovules, the style filiform. Fruit an oblong, flattened, straight legume, dehiscent along the valves; seeds lenticular.

**Distinctive features:** Woody unarmed lianas, with cylindrical stems, that climb through the aide of short, prehensile, lateral

branches. Flowers actinomorphic, white or cream, with numerous exserted stamens, arranged in heads. Similar to other Mimosoideae lianas but distinguished by the lack of thorns and the presence of prehensile lateral branches.

**Distribution:** A neotropical genus of 7 species, two of which are reported as sometimes growing as climbers. *Parasenegalia vogeliana* (Steud.) Seigler & Ebinger, can grow as a liana with prehensile branches and is found in dry forest below 500 m elev. in the West Indies (Hispaniola, Puerto Rico, and Lesser Antilles).

While *P. rurrenabaqueana* (Rusby) Seigler & Ebinger can grow as a scrambling shrub and is found in Peru and Bolivia in dry forest, thickets and savannas below 700 m.



x-section of *P. vogeliana* stem, photo by P. Acevedo

**PERIANDRA** Martius ex Bentham, Ann. Wiener Mus. Naturgesch. 2: 120. 1938.



*P. coccinea* (Schrad.) Benth., photo by Alex Popovkin

Erect shrubs or herbs, or twining vines. Stems cylindrical, wiry. Leaves trifoliolate or unifoliolate; stipels present; stipules striate. Flowers axillary, solitary or grouped on a bracteate peduncle, or in distal racemes; bracts paired, striate; bracteoles striate, shorter and appressed

to the calyx; pedicels shorter than the calyx. Flowers papilionaceous, resupinate; calyx campanulate, the lobes short, the 2 upper ones connate, the remaining ones longer; corolla lilac, purple, red or yellowish, the standard reflexed, widely obovate or orbiculate, unguiculate at base, retuse at apex, the wings and the keel much shorter than the standard, the wings obovate, spreading, the keel incurved, shorter than the wings; stamens 10, diadelphous or monadelphous; ovary subsessile, with numerous ovules, the style incurved. Legume subsessile, linear, flattened, long-beaked at apex, with thickened margins, dehiscent by valves that twist on drying, not septate between the seeds; seeds few, compressed, small, lenticular.

**Distinctive features:** Twining vines with showy flowers that have a wide orbicular standard with shorter keel and wings, easily confused with *Centrosema* or *Clitoria* but distinguished by the spreading wing petals.

**Distribution:** Predominantly a South American genus of 7 species with one species endemic to Dominican Republic. Four species reported as twining vines.

**PHASEOLUS** Linnaeus, Sp. Pl. 723. 1753.

Twining herbaceous vines, with a pubescence of uncinata hairs. Leaves trifoliolate, with the rachis more or less elongate; stipules striate, truncate at the base, persistent; stipels minute. Inflorescences



of axillary racemes, with the nodes not swollen and lacking extra-floral nectaries; bracts minute, persistent. Flowers papilionaceous; calyx asymmetrically campanulate, bilabiate, with 5 minute lobes;

*P. coccineus* L., photo by P. Acevedo  
corolla white, pink, red, or purple, the standard symmetrical, rounded, unguiculate, reflexed, the keel tightly coiled and with a laterally projected keel beak, the wing as long as the keel; stamens 10, diadelphous; ovary almost sessile, linear, with one or more ovules, the style spirally twisted 1.5-2 times, barbate, the stigma terminal. Legume linear, oblong or falcate, straight, turgid, slightly compressed between seeds, dehiscent; seeds few, oblong, reniform, ellipsoid, variously colored, hilum very small.

**Distinctive features:** Twining vines with uncinata hairs; flowers with tightly coiled and laterally projected keel beak.

**Distribution:** A genus of about 87 species, native to the southern United States, and from Mexico to western South America, now with nearly cosmopolitan distribution through cultivation as the source of several kinds of beans.

**PIPTADENIA** Bentham, J. Bot. (Hooker) 2: 135. 1840.



*P. adiantoides* (Spreng.) J.F.Macbr., photo by Geovane S. Siqueira

with 3 to numerous ovules, the style smooth, the stigma punctiform. Legume oblong, stipitate or sessile, flattened, membranaceous, dehiscent along one or both sutures; seeds compressed, small.

**Distinctive features:** Vegetatively similar to *Senegalia* and *Adenopodia*. Distinguished from the former by the flowers with 10 stamens, anthers with an apical gland (vs. numerous stamens, and anthers without glands), and from *Adenopodia* by the fruits that dehisce along the sutures (vs. craspedia).

**Distribution:** A Neotropical genus of 33 species distributed from southern Mexico to Bolivia, 16 of which are reported as climbers, some as large, woody lianas.

Trees, erect or climbing shrubs or lianas to 30 m or sometimes longer; stems armed with recurved prickles; cross section slightly angled or cylindrical, up to 10 cm in diam., simple with regular wood anatomy. Leaves pari-bipinnate; pinnae opposite; leaflets opposite; rachis and petiole with recurved prickles; petiole with a conspicuous gland above the base; rachides distally provided with a gland; stipels wanting; stipules minute, sometimes spinescent. Inflorescences of axillary, solitary or clustered spikes; bracts minute. Flowers actinomorphic; calyx campanulate, shortly dentate; corolla white or greenish, campanulate, 5-lobed, the tube as long as the lobes; stamens 10, free, projecting well beyond the corolla, anther with an apical gland; ovary subsessile,



Stem x-section of *Piptadenia* sp., photo by P. Acevedo

**POIRETIA** Ventenat, Mém. Cl. Sci. Math. Inst. Natl. France 1: 4. 1807.

Shrubs or small trees, with one species of herbaceous twining vines reaching 3 m in length. Stems cylindrical, slender, striate, 1-4 mm in diam., with regular anatomy. Leaves paripinnate, 4-foliolate; leaflets spatulate, with translucent glandular dots and crenate margins, stipels subulate, persistent;



*P. punctata*, photo by P. Acevedo

petiolules  
pulvinate; stipules  
subulate, entire,  
glabrous, and  
persistent. Flowers  
papilionaceous, in  
short axillary  
racemes; bracts  
like the stipules  
but smaller;  
pedicels longer  
than the calyx.  
Flowers ca. 1 cm  
long; calyx green,  
campanulate with 5

short, nearly equal lobes, the tube glabrous, gland-dotted; corolla yellow, the standard orbicular, reflexed, with involute margins, gland-dotted, unguiculate and slightly longer than the wings and keel, the wing obovate, slightly longer than the incurved keel; stamens 10, monadelphous; ovary sessile, with few ovules, the style incurved, glabrous, the stigma terminal, capitate. Fruit a linear-oblong loment, with 1-3 articles, indehiscent, flattened, verrucose in the middle.

**Distinctive features:** Similar to *Nissolia* in appearance, but easily distinguished by the 4-foliolate paripinnate leaves with glandular punctations, and by the lomentaceous fruits with 1-3 articles.

**Distribution:** A Neotropical genus of about 12 species with only *P. punctata* (Willd.) Desv. recorded as a vine and widely distributed in Mexico, Honduras, Costa Rica, northern and middle South America, Cuba and Hispaniola; in moist forest at middle elevations.

**RAMIREZELLA** Rose, Contr. U.S. Natl. Herb. 8: 44. 1903.



*R. penduliflora* A. Delgado & Ochot.-Booth, photo by N. Ramírez Marcial

Twining woody vines. Stems cylindrical, hollow in some species. Leaves trifoliolate; leaflets strongly trinerved from base; stipules conspicuous, oblong-lanceolate, striate, caducous; stipels lanceolate. Inflorescences of axillary pseudoracemes, longer than the

subtending leaf, nodes not swollen but glandular; bracts large, ovate, imbricate; pedicels often longer than the calyx. Flowers papilionaceous; calyx campanulate, with 5 lobes of similar length; corolla pink to magenta, the standard wide-orbicular, slightly cucullate, the wings asymmetrical, the keel beak, recurved to the right, and often sigmoid, longer than the wings; stamens 10, diadelphous; ovary sessile, with numerous ovules, the style curved, pubescent on the distal portion, the stigma lateral. Legume oblong, turgid to nearly cylindrical, dehiscent by valves that twist on opening; seeds flattened, lenticular or oblong, 5-8 mm long.

**Distinctive features:** Twining woody vines with pink to magenta corollas, the keel sigmoid; fruits turgid to nearly cylindrical.

**Distribution:** A genus of 7 species native from Mexico to Costa Rica; in seasonal dry forest and open plant biomes.

**RHODOPIS** Urban, Symb. Antill. 2: 304. 1900, (nom. cons.).



*R. planisiliqua*, photo by P. Acevedo

Twining woody vine, reaching 5-15 m in length. Stems slightly angled to cylindrical, dark brown, with numerous lenticels when mature; cross section with regular anatomy. Leaves unifoliolate; leaflets coriaceous, ovate to lanceolate, the apex obtusely acuminate, the base obtuse, rounded to subtruncate, the margins entire or sinuate; petiolule thickened, 1-2 mm long, with a pair of stipels at the base; petioles 1-2 cm long, sulcate; stipules lanceolate, striate. Inflorescences axillary, erect pseudoracemes to 25 cm long, the flowers in groups of 2-3 per node; pedicels 10-12 mm long, pink; bracts minute, lanceolate. Flowers papilionaceous; calyx 1.3-1.5 cm long, magenta-pink, fleshy, funnel-shaped, 4-lobed, the lobes almost as long as the tube, the vexillary lobe ovate, much wider than the others, the 2 lateral ones very short, the carinal one lanceolate, as long as the vexillary one; corolla

magenta-pink to brilliant red, the standard 2.8-3.5 cm long, oblong, folded in half longitudinally, auriculate, the wings oblong-linear, auriculate, keel much longer than the wings; stamens 10, diadelphous, slightly exposed; ovary sessile, with numerous ovules. Legume oblong, ca. 10 cm long, flattened, dehiscent, strigose or glabrous; seeds ellipsoid to ovoid, slightly compressed, 6-8 mm long, light brown.

**Distinctive features:** Leaves unifoliolate, ovate to lanceolate, with a pair of stipels at the junction with the petiole; showy, bright red flowers with long folded standards in pyramidal pseudo-racemes.

**Distribution:** A single species, *R. planisiliqua* (L.) Urb. (with 2 infraspecific taxa) is endemic to the mountains of Hispaniola.

**RHYNCHOSIA** Loureiro, Fl. Cochinch. 425, 460. 1790.



*R. erythrinoides* Schlecht. & Cham., photo by P. Acevedo

stipitate, with few or numerous ovules, the style glabrous, curved, the stigma capitate. Fruit an oblong or falcate-lunate legume, flattened, apiculate at the apex, usually dehiscent by valves that twist on opening; seeds few, flattened, rounded or elliptical, sometimes red and black.

**Distinctive features:** Trifoliate leaves; leaflets usually with yellow or orange resinous dots on lower surface; many species with flattened, ribbon-like stems; corollas yellowish; many species with small, red and black seeds.

Prostrate to erect herbs, or herbaceous to woody twining vines, some species reaching 15 or more m in length. Stems slender and cylindrical, some species developing a wide (up to 7 cm), flattened ribbon-like (fig. 5b) stem with successive cambia that produce alternate concentric arcs of xylem and phloem; many species producing a reddish exudate. Leaves trifoliate, the lower surface with numerous yellow resinous dots; stipules caducous; stipels minute. Inflorescences axillary racemes, with the flowers sparse or clustered; bracts minute, persistent or caducous. Flowers papilionaceous; calyx campanulate, with 4-5 elongate nearly equal lobes; corolla yellow, the standard obovate or rounded, slightly retuse at the apex, unguiculate and auriculate at the base, the wings unguiculate, with a curved appendage at the base of the inner margin, the keel scarcely longer than the wings; stamens 10, monadelphous or diadelphous; ovary short-



x-section of *R. phaseoloides* stem, photo by P. Acevedo

**Distribution:** A genus of about 250 species, of pantropical distribution, extending into warm temperate zones, with 58 species in the New World, 38 of which are tropical climbers.

**SCHNELLA** Raddi, Quar. Piant. Nuov. Bras. 32. 1820.

Tendrilled lianas, reaching 30 m in length; mature stems of various shapes, these straight or sinuate



*S. glabra*, photo by P. Acevedo

(fig. 5a), sometimes reaching up to 30 cm in width (fig. 13); cross sections cylindrical, square (fig. 14a), flattened (ribon-like) (fig. 3a & 14c), asymmetrically lobed (fig. 14b & d), or deeply lobed (fig. 3b), all species with a cross-shaped medulla (fig. 3a & c), sometimes with deep phloem wedges (fig. 3a & c), and some species with successive cambia giving rise to continuous concentric arcs of xylem and phloem (fig. 3a); exudate a clear sap. Tendrils derived from short, axillary branches with determinate growth, these distally circinate (fig. 6e; 15d), often becoming woody after securing a support. Leaves unifoliolate,



Sinuous stem in *S. guianensis* (Aubl.) Wunderlin, photo P. Acevedo

entire, retuse at apex to deeply bilobed (sometimes the lamina divided in two, resembling two separate leaflets); petioles pulvinate at both ends (fig. 7g); stipules minute to foliaceous, persistent or caducous; stipels wanting, but some species with a minute stipel-like projection where the two lobes of the leaf meet (fig. 7b). Inflorescences of axillary racemes, with the flowers sparse to clustered into a nearly head-like inflorescence; bracts minute to large, persistent or caducous. Flowers caesalpinaceae; calyx campanulate, 5- to 15-ribbed, 5-lobed, the lobes wide to narrow, unequal or equal, or the calyx apically truncate; corolla zygomorphic

with 5 unguiculate petals one of which is smaller, white or pink (fig. 15a & b); stamens 10, all fertile; ovary short-stipitate, with 1-6 ovules, the style glabrous, curved, the stigma capitate. Fruit a oblong, flattened, legume, apiculate at apex, dehiscent or sometimes indehiscent; seeds few, flattened, rounded or elliptical.

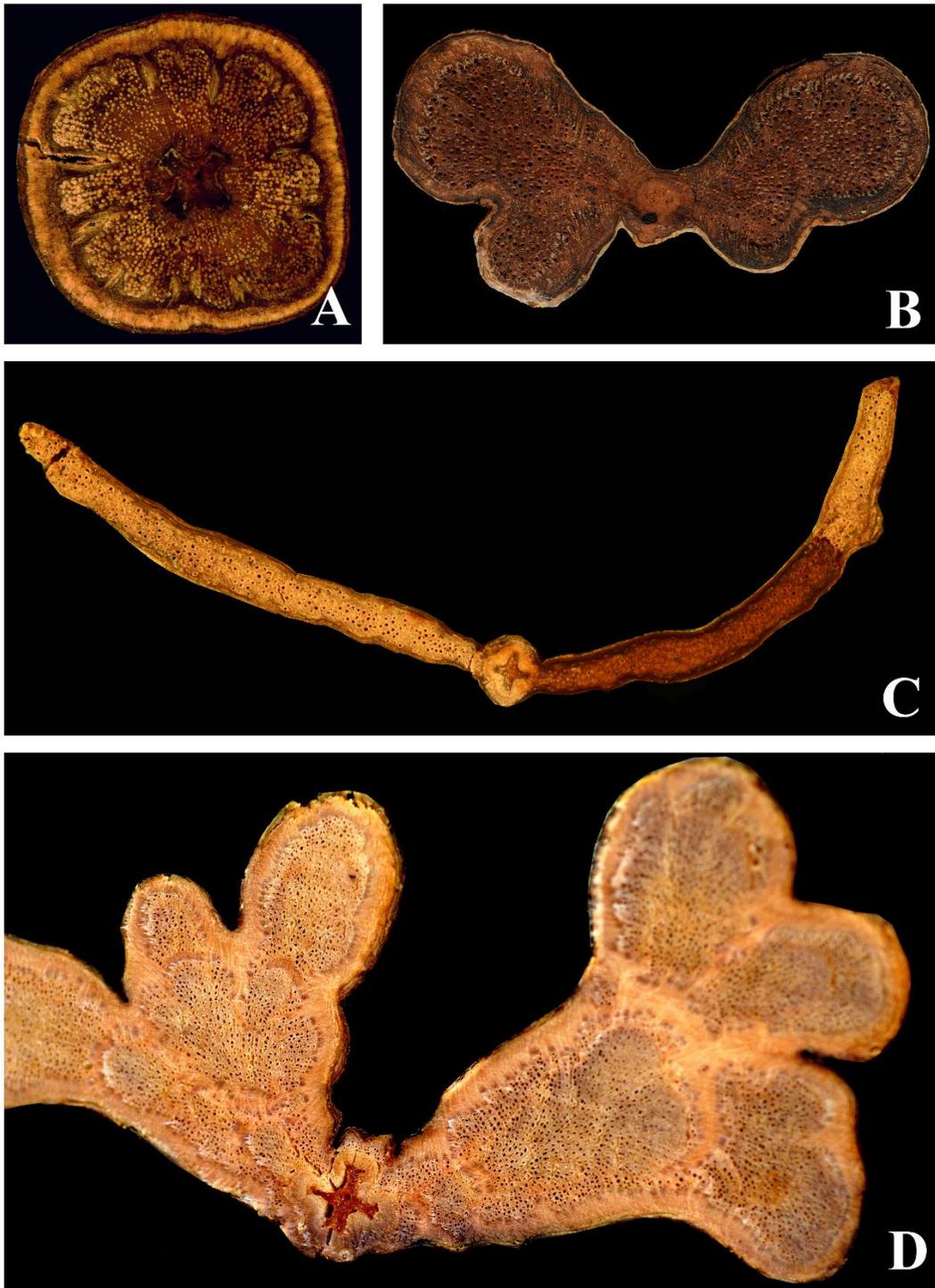
**Distinctive features:** Easily distinguished by the bilobed or partly bilobed unifoliolate leaves and the showy flowers. Some species have sinuate stems and are locally called monkey ladders. All species have stem medulla that is cross shaped, this feature is however, also found in the closely related Old World genus *Phanera* and in climbing species of *Senegalia*.

**Distribution.** A Neotropical genus of 45-47 species, distributed from southern Mexico to northern Argentina, with one species [*S. glabra* (Jacq.) Dugand] reaching Cuba; lowland moist or wet forest, some species in shrubby savannas or scrub forest.

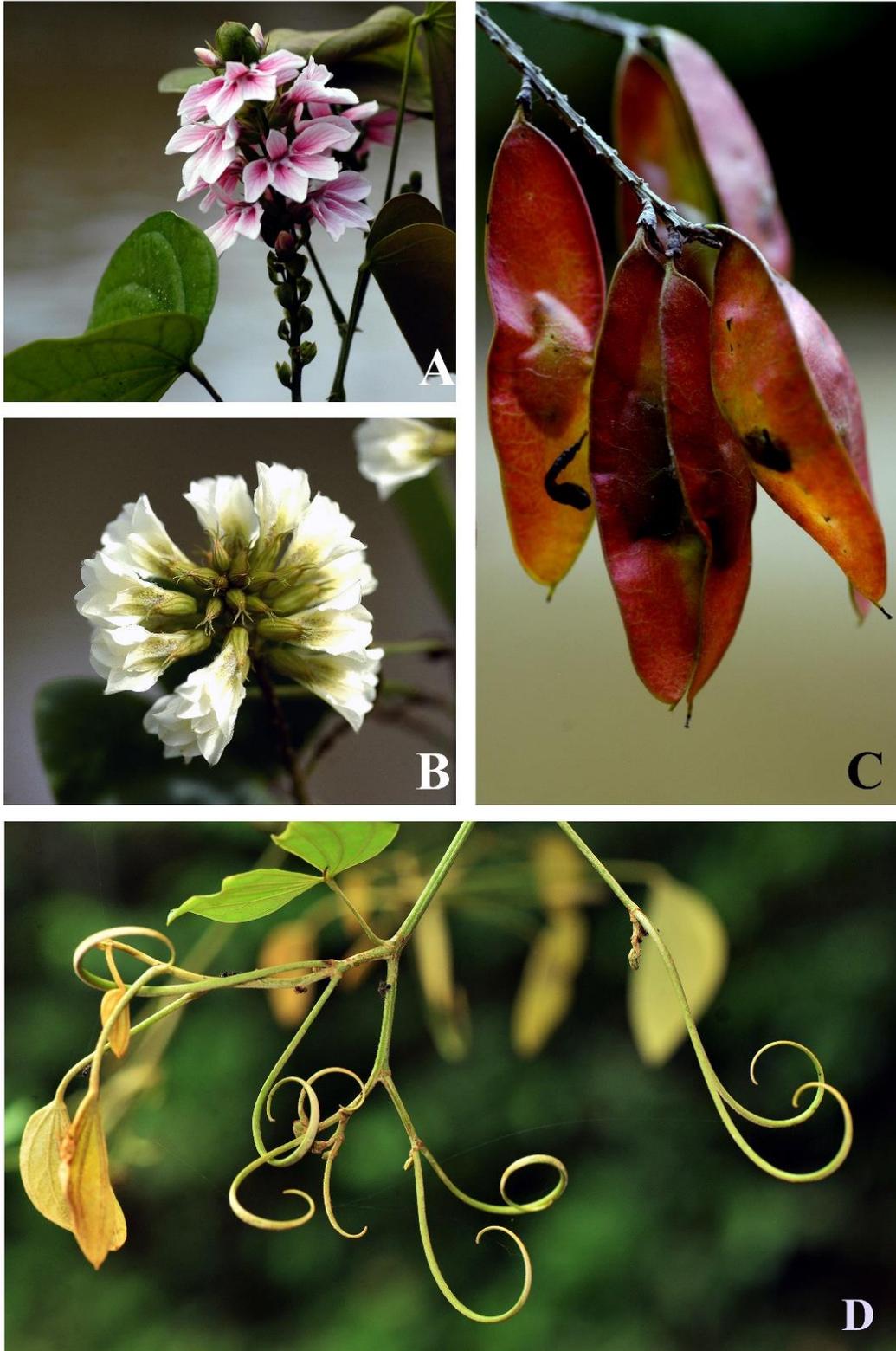
**Note:** The species nowadays recognized in *Schnella* have gone through much nomenclatural change in the last decade, most were previously classified under *Bauhinia* or *Phanera*, but now, neotropical *Bauhinia* contains only trees or shrubs, and *Phanera* are lianas restricted to the Asian tropics.



**Figure 12.** Trunk of a *Schnella* sp. in Barro Colorado, Panama, leaning against a tree. Trunk fenestrate and sinuate, approximately 30 cm wide. Photo by P. Acevedo



**Figure 13.** Cross sections of *Schnella* stems. **A.** *Schnella trichosepala* with square stems. **B.** *Schnella guianensis* with butterfly-shaped stems. **C.** *Schnella* sp. with ribbon-like stems. **D.** *Schnella microstachya* with deeply lobed stems.



**Figure 14.** **A.** *Schnella cf. hirsutissima* with pink corollas. **B.** *Schnella* sp. with white corollas. **C.** *Schnella sprucei*, showing membranaceous legumes. **D.** *Schnella* sp. showing tendrils. Photos by P. Acevedo.

**SENEGALIA** Rafinesque, Sylva Tell. 119. 1838.

Trees, shrubs, or lianas climbing through the aid of short prehensile branches, coiled cirri (fig. 16b),



*S. riparia* (Kunth) Britton & Killip, photo by P. Acevedo

circinate tendrils (fig. 16a) (resulting from short, shoots with determinate growth) or scrambling; stems armed with randomly scattered prickles, deeply 4-lobed (fig. 3e & 4a) or less often cylindrical (fig. 1d). Leaves bipinnate; pinnae opposite; leaflets usually small, numerous (but see *S. mikanii* (fig. 16A), and opposite; petioles and rachis usually with nectariferous glands, in variable

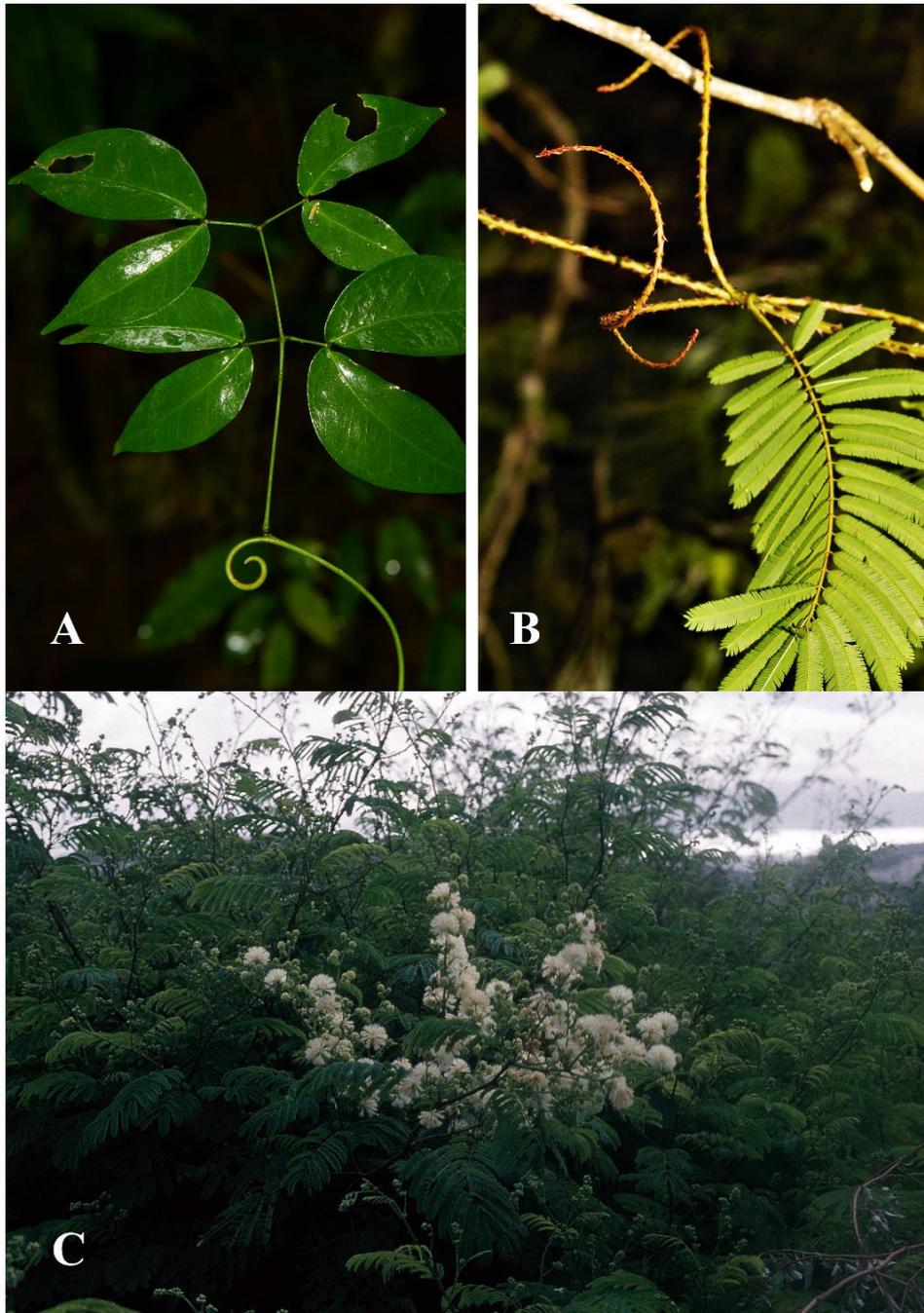
positions depending on the species; stipels sometimes at the base of pinnae; stipules usually spiny, persistent. Flowers actinomorphic, bisexual, produced in heads or spikes grouped in axillary or terminal racemes or panicles; bracts small. Calyx campanulate, 5-lobed at apex; corolla yellow or white, tubular, with 4-5 lobes; stamens numerous, exserted, the filaments free or united just at the base, the anthers sometimes with an apical gland; ovary sessile or stipitate, with several ovules, the style filiform, curved, pubescent on the distal portion. Fruit an oblong or linear legume, straight or curved, flattened, dehiscent or indehiscent; seeds of diverse forms, usually flattened.



x-section of *S. riparia* stem, photo by P. Acevedo

**Distinctive features:** Woody lianas, many species with deeply 4-lobed stems, which sometimes split longitudinally into strands that correspond to the number of lobes. Flowers actinomorphic, white or light yellow, with numerous exserted stamens, arranged in heads or spikes. Many species have cross-shaped medullas similar to *Schnella*. Similar to *Adenopodia* and *Piptadenia* (see under those genera for differentiating characters).

**Distribution:** A pantropical genus of about 210 species, half of which are native in the Neotropics, with 48 species reported as lianas or climbing shrubs; distributed from southern Mexico to northern Argentina, including the West Indies, with majority of species in Brazil.



**Figure 15.** Climbing mechanisms in *Senegalia*. **A.** *Senegalia mikanii*, unarmed species with circinate tendrils. **B.** *Senegalia* sp. with axillary cirri. **C.** *Senegalia riparia*, a species with scrambling habit. Photos by P. Acevedo.

**SENNA** P. Miller, Gard. Dict. Abr. ed. 4. 1754.

Trees, erect or scrambling shrubs, or less frequently herbs. Stems unarmed, with regular anatomy, often pentagonal (fig. 4b), in some species the stems turn yellowish when collected. Leaves pinnate; leaflets opposite; petioles and rachis sulcate, usually with a stipitate gland; stipules persistent. Flowers



*S. undulata* (Benth.) H.S. Irwin & Barneby, photo by P. Acevedo

nearly actinomorphic, bisexual, in axillary or terminal racemes or panicles or solitary; bracts minute to foliaceous; pedicels elongate or short. Flowers caesalpinaceae; calyx of 5 more or less elongate, free sepals; corolla yellow, of 5 free, slightly unequal, unguiculate petals; stamens 10, dimorphic, three of which are usually smaller and sterile, the filaments flattened, free, the anthers basifixed, dehiscent by terminal pores; ovary short-stipitate, with numerous ovules. Fruit of various forms, dehiscent or indehiscent; seeds numerous, of various forms, but commonly lenticular.

**Distinctive features:** Climbing, scrambling shrubs, easily told apart by the large, caesalpinaceae yellow flowers; leaves paripinnate; petiole and rachis usually with a stipitate gland. Stem cross sections nearly pentagonal and with a yellowish hue in many species.

**Distribution:** A genus of about 280 species, 210 of which are present in the New World, with 27 reported as climbing, scrambling shrubs in the Neotropics.

**SHUTERIA** Wight & Arnott, Prodr. Fl. Ind. Orient. 1: 207. 1834, (nom. cons.).



*S. involucrata* (Wall.) Wight & Arn., photo from efloraofindia

Herbaceous twining vine reaching few meters in length; stems slender, cylindrical. Leaves trifoliolate; stipules striate; stipels persistent. Inflorescences of axillary, short pseudoracemes or fascicles; bracts striate, persistent; bracteoles subulate, persistent, appressed to the calyx. Flowers papilionaceous, small; calyx campanulate, bilabiate with upper wider lobes connate, the remaining lobes acuminate; corolla pale pink or purplish, the standard obovate, suberect, unguiculate at base, emarginate at apex, longer than the other petals, the wings narrowly oblique, adherent to the keel, the keel obtuse, appressed to the standard, shorter than the wings; stamens 10, diadelphous, the anthers of the same size; ovary sessile, with many ovules, the style incurved, the stigma terminal, capitate. Fruits oblong, flattened, obscurely septate, dehiscent by valves that separate;

seeds flattened, subrounded to ellipsoid, with minute hilum.

**Distinctive features:** Hirsute herbaceous vine, the flowers small, with suberect standards.

**Distribution:** A genus of four species native to tropical Asia, Malesia and New Guinea, with *S. vestita* Wight & Arn. introduced to parts of tropical Africa and naturalized in Jamaica, where it is locally common.

**SIGMOIDOTROPIS** (Piper) A. Delgado, Amer. J. Bot. 98: 1710. 2011.



*S. speciosa* (Kunth) A. Delgado, photo by Matt Lavin

Herbaceous, twining vines reaching 3-5 m in length. Stems cylindrical, slender. Leaves trifoliolate; leaflets chartaceous, 3-veined from base; stipules conspicuous, asymmetrical at base; stipels subulate. Flowers pseudo-papilionaceous, in axillary pseudoracemes that are longer than the subtending leaf. Calyx green, campanulate, 5-

lobed, the lobes of similar length, shorter than the tube; corolla pale violet to violet-pink, with lighter or greenish portions, the standard obovate, unguiculate, rounded at the apex, wings and keel unguiculate, of similar length, the keel sigmoid and appressed to the face of the standard, with distalmost portion flat and extended, and inner margins closed by short interlocking marginal hairs, the wings spreading; stamens 10; ovary shortly stipitate, flat, pubescent, the style curved and pubescent distally, the stigma penicillate. Fruits linear, flattened, in a spreading position in the infructescence, dehiscent by twisting valves; seeds 15-20 per fruit, oblong, reniform flattened, 2-3 mm long, brown or blackish, with small hilum.

**Distinctive features:** Herbaceous twining vines with pale violet flowers, having a distinctly sigmoid-curved keel that lacks the distal fold. Until recently, the species of *Sigmoidotropis* were treated under the genus *Vigna* with which it shares many vegetative characters. Refer to the generic key on how to differentiate *Sigmoidotropis* from closely related taxa.

**Distribution:** A genus of 7 species; inhabits secondary and primary forests, with or without a dry season, as well as coastal thickets and riparian forests throughout much of the Neotropics; from 0 to 2250 m elev.

**TERAMNUS** P. Browne, Civ. Nat. Hist. Jamaica 290. 1756

Herbaceous or woody twining vines, rarely erect subshrubs. Stems nearly cylindrical, wiry. Leaves



trifoliolate, the lower surface strigose; stipules subulate, persistent; stipels minute. Inflorescences of axillary pseudoracemes, with 2-3 flowers grouped at the nodes; bracts small, persistent. Flowers papilionaceous, small; calyx campanulate, with 4-5 elongate, equal or unequal lobes; corolla white, lavender or yellow (lavender in the Neotropics), the standard obovate, slightly retuse at the apex, unguiculate, the wings unguiculate, the keel shorter than the wings; stamens 10, monadelphous with two unequal anthers; ovary sessile, with numerous ovules, the style short, pubescent, the stigma capitate. Legume linear, flattened, curved at the apex, dehiscent by valves that twist on opening; seeds few to numerous, reniform, with a small hilum.

*T. uncinatus* (L.) Sw., photo by P. Acevedo

**Distinctive features:** Small vines usually less than 5 m long; stems wiry, slender, and variously pubescent; flowers small, lavender; fruits with a curved or hooked beak. Sometimes confused with *Galactia* but in that genus the fruits are oblong, not linear.

**Distribution:** A genus of 8 species of pantropical distribution, with 3 species native to the Neotropics; found from Mexico, to SE Brazil, and the West Indies; in open and disturbed habitats.

**VICIA** Linnaeus, Sp. Pl. 734. 1753.



*V. sativa* L., by Christiaan Sepp, in Fl. Batava II (1807)

long hilum.

**Distinctive features:** One of the few genera with tendrils of foliar origin, these representing a modified leaf or distal leaflets of a paripinnate leaf. *Vicia* is like *Lathyrus* as they are herbaceous and have papilionaceous flowers but differ by the styles that are hairy on the distal portion or along the vexillary side. *Lathyrus*, on the other hand, have styles that are hairy along the carinal side. The only other Neotropical genus with foliar tendrils is *Entada* but it is a woody liana with mimosoid flowers.

**Distribution:** A genus of about 236 species most of which have a temperate to warm temperate distribution. Although there are 19 species of vines in this genus reported for the Neotropics, they are

Trailing or climbing herbs, commonly less than 1 m long. Stems cylindrical or angled. Leaves paripinnate, 2-24-foliolate; leaflets opposite or alternate, distal leaflets replaced by filamentous tendrils (highly reduced in *V. faba*); stipels wanting; stipules conspicuous, usually foliaceous. Inflorescences of axillary racemes longer or shorter than the subtending leaf. Flowers papilionaceous; calyx 5-lobed, variously colored but usually green; corolla pink, magenta, bluish, white or yellow, the standard widely elliptical, unguiculate, slightly reflexed, much larger than the keel and wings, keel and wing petals unguiculate; stamens 10, monadelphous, ovary oblong, sessile, style with a tuft of hairs near the apex or pubescent along the vexillary side. Legume elongate, relatively flat, few-seeded; seeds variously colored, lenticular to subglobose, with medium to

very short, not reaching a meter in length, except for *L. sativa* L. collected in Haiti, and *V. stenophylla* Vogel from Minas Gerais (Brazil) both of which are recorded as reaching 2 m in length.

**VIGNA** Savi, Nuov. Giorn. Lett. 8: 113. 1824, (nom. cons.).



*V. vexillata* (L.) A. Rich., photo by P. Acevedo

Herbaceous twining vines, climbing or trailing or erect herbs or subshrubs. Leaves trifoliolate; stipules of various forms, persistent; stipels subulate. Inflorescences of axillary or terminal pseudoracemes; bracts small. Flowers papilionaceous; calyx campanulate, with 5 nearly equal lobes that are

as long as the tube, two of which are almost completely united; corolla yellow, greenish yellow abaxially, sometimes pinkish, the standard oblate, emarginate, slightly revolute at the apex, the wings unguiculate, with a narrow projection or spur at the base, the keel beaked, recurved, as long as the wings; stamens 10, diadelphous, the anthers of the same size; ovary sessile, with numerous ovules, the style curved, pubescent on the distal portion, the stigma lateral. Legume falcate, oblong or linear, flattened to cylindrical, dehiscent by valves that twist on opening; seeds flattened, quadrangular or almost reniform.

**Distinctive features:** Small twining vines; flowers with oblate, yellow or lavender standard petals, and recurved keels.

**Distribution:** A genus of about 100 species with pantropical distribution, the majority in tropical Africa and Asia; 18 species in the Neotropics, including 6 species which were introduced from the Old World tropics.

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#### PICTURE VOUCHERS

Figure 1.

A. *Deguelia amazonica* Killip (Acevedo 14348)

B. *Dalbergia monetaria* L.f. (Acevedo 10452)

C. *Machaerium kegelii* Meisn. (Acevedo 15113)

D. *Senegalia* sp. (Acevedo 16976)

E. *Piptadenia minutiflora* Ducke (Prance 23963)

F. *Mimosa hondurana* Britton (Acevedo 16336).

Figure 2.

A. *Machaerium amazonense* Hoehne (Acevedo 14370)

B. *Entada gigas* (L.) Fawc. & Rendle (Amith s.n.)

C-D. *Machaerium madeirense* Pittier (Acevedo 3419)

Figure 3.

- A. *Schnella* sp. (Acevedo 3486)
- B. *Schnella guianensis* (Aubl.) Wunderlin (Acevedo 3331)
- C. *Schnella kunthiana* (Vogel) Wunderlin (Acevedo 10376)
- D. *Machaerium kegelii* Meisn. (Acevedo 7643)
- E. *Senegalia multipinnata* (Ducke) Seigler & Ebinger (Acevedo 14276)

Figure 4.

- A. *Senegalia hayesii* (Benth.) Britton & Rose (Acevedo 14307)
- B. *Senna quinqueangulata* (Rich.) H. S. Irwin & Barneby (Acevedo 16081)
- C. *Mucuna* sp. (Medeiros 2148)
- D. *Dalbergia amazonica* (Radlk. ex Kopff) Ducke (Acevedo 16068)
- E. *Machaerium* sp. (Medeiros s.n.).

Figure 5.

- A. *Schnella guianensis* (Aubl.) Wunderlin (no voucher)
- B. *Rhynchosia erythrinoides* Schlecht. & Cham. (Acevedo 15957)
- C. *Machaerium kegelii* Meisn. (Acevedo 16158)
- D. *Centrosema plumieri* (Pers.) Benth. (Acevedo 16211)

Figure 6.

- A. *Dalbergia monetaria* L.f. (no voucher)
- B. *Senegalia altiscandens* (Ducke) Seigler & Ebinger (Acevedo 14275)
- C. *Guilandina ciliata* Wikstr. (Acevedo 4227)
- D. *Entada polyphylla* Benth. (no voucher)
- E. *Schnella* sp. (no voucher)

Figure 7.

- A. *Dalbergia amazonica* (Radlk. ex Kopff) Ducke (Acevedo 16068)
- B. *Schnella* sp. (no voucher)
- C, H. *Rhynchosia phaseoloides* (Sw.) DC. (Acevedo 17245)
- D. *Biancaea decapetala* (Roth) O. Deg. (Acevedo 17331)
- E. *Deguelia* sp. (Acevedo 17119)
- F. *Senegalia* sp. (no voucher)
- G. *Schnella* sp. (Acevedo 16987)

Figure 8.

- A. *Canavalia rosea* (Sw.) DC. (Acevedo 2911)
- B. *Neorudolphia volubilis* (Willd.) Britton (Acevedo 2984)
- C. *Galactia striata* (Jacq.) Urb. (Acevedo 3816)
- D. *Clitoria pozuzoensis* Macbr. (no voucher)
- E. *Senna bicapsularis* (L.) Roxb. (Acevedo 16212)
- F. *Schnella* sp. (Acevedo 17014)
- G. *Parasenegalia vogeliana* (Steud.) Seigler & Ebinger (Acevedo 17260)

- H. *Camptosema spectabile* (Tul.) Burkart (no voucher)  
I. *Biancaea decapetala* (Roth) O. Deg. (Acevedo 17331)

Figure 9.

- A. *Dalbergia monetaria* L.f. (Acevedo 4715)  
B. *Entada polyphylla* Benth. (Acevedo 12314)  
C. *Mucuna urens* (L.) Medik. (no voucher)  
D. *Schnella* sp. (Acevedo 17083)  
E. *Machaerium huanucoense* Rudd (Acevedo 14414)  
F. *Deguelia* sp. (Acevedo 17119)  
G. *Machaerium lunatum* (L. f.) Ducke (no voucher)  
H. *Parasenegalia vogeliana* (Steud.) Seigler & Ebinger (Acevedo 17259)  
I. *Guilandina bonduc* L. (Acevedo 4021)

Figure 10.

- A, B. *Dalbergia glabra* (Mill.) Standl. (Acevedo 16203)

Figure 11.

- A. *Machaerium huanucoense* Rudd (Acevedo 14414)  
B. *Machaerium quinatum* (Aubl.) Sandw. (Acevedo 16110)  
C. *Machaerium lunatum* (L. f.) Ducke (no voucher).

Figure 12.

- A. *Schnella* sp. (no voucher).

Figure 13.

- A. *Schnella trichosepala* (L.P.Queiroz) Wunderlin (Roque 2687)  
B. *Schnella guianensis* (Aubl.) Wunderlin (Acevedo 6141)  
C. *Schnella* sp. (Acevedo 14721)  
D. *Schnella microstachya* Raddi (Acevedo 14392).

Figure 14.

- A. *Schnella cf. hirsutissima* (Wunderlin) Trethowan & R. Clark (Acevedo 14413)  
B. *Schnella* sp. (Acevedo 15046)  
C. *Schnella sprucei* (Benth.) Wunderlin (Acevedo 14399)  
D. *Schnella* sp. (Acevedo 16987).

Figure 15.

- A. *Senegalia mikanii* (Benth.) Seigler & Ebinger (Acevedo 16492)  
B. *Senegalia* sp. (Acevedo 16870)  
C. *Senegalia riparia* (Kunth) Britton & Killip (Acevedo 11216).